3

A DESCRIPTION OF NEW Philosophical Furnaces,

OR

A new ART of Distilling, divided into five parts.

Whereunto is added a Description of the Tincture of *GOLD*,

Or the true

AURUM POTABILE;

ALSO,

The First part of the *MINERAL WORK*.

Set forth and published for the sakes of them that are studious of the *TRUTH*.

By JOHN RUDOLPH GLAUBER.

Set forth in English, By *J. F.* D. M.

LONDON, Printed by *Richard Coats*, for *Tho: Williams*, at the Signe of the Bible in *Little-Britain*. 1651.

To his Honored Friend,
JOHN JENISON in the
BISHOPRICK of *DURHAM*
ESQVIRE.

SIR,

PErceiving in you a singular ingenuity in penetrating into the *Arcana's* of nature, and a cheerful forwardness in a charitable improvement of the utmost of your experience in doing good to mankind, especially to the despised poor,

who cannot come with price in their hands, I eſteemed it as a ſervice well pleaſing to God, and moſt acceptable to man, to be inſtrumental in adding ſomewhat to that experience of yours, and of thoſe of like publick ſpirit with your ſelf, thereby enabling you to be yet more ſerviceable to this your generation: I therefore here preſent you with a rich Cabinet of natures unvaluable Jewels; But know, that it hath many doors, the one whereof as being ſhut to many, but not to all, I have opened with an Engliſh key; the other muſt be entred by a penetrating judgement quickened with Celeſtial lightening. Now where there are publick ſpirits, profound Meditations and a conſtant induſtry, Divine illumination is at the door. The large

large and boundleſs ſecrets of Nature will not attend private intereſts, nor the deep myſteries of Nature be fathomed by ſhallow apprehenſions, no nor her fair daughters be courted by inconſtant ſervants. But you are otherwiſe qualified then to deſpaire of ſeeing her ſelf in her own colours: She unvailes her ſelf to thoſe only that will admire her beauty, and not to thoſe that will caſt dirt in her face, being altogether unable to judge of her features.

This *Philoſophical* Treatiſe being frequently & profoundly read may be underſtood, and being underſtood by you wil qualifie you with ſuch capacities, that you may be able to make not only all the poor in your country rich, but al the ſick healthy, and thereby bring to your

self as much honor as mortality need care for. Accept of these my endeavors as proceeding from a sensibleness of your unfeigned love, and respects to him who is

Sir,

Yours affectionatly to love and serve you

J. F.

To

English Reader,

Finding the second being the greatest part of this treatise in private hands already translated into English by a learned German, *I was willing, it being in such a forwardness, to set a aside for thy good, some few hours to teach the other parts thereof speak the same language. It is pitty that such useful and so learned writings should be obscured from the English Nation. Many indeed would not have any that understand no other language but that of* England *to read any thing of learning but what is originally writ in English: and what is the reason? Is it because they would have* England *kept in ignorance, or because they think they are not able to understand any thing besides what is writ in their mother tongue. This is my judgement that they that be intelligent may understand intelligible things although they do not understand Latin or German words, as well as great linguist themselves: for I do not believe that tongues do enlarge the capacity any otherwise then they enable any one for the reading of learned Anthors. I am so far from having men confined to the knowing of things writ only in their own language, that I wish that all things truely worth knowing were writ in every language of the world, that intelligent men of all Nations may the better understand intelligible thiugs. I abhor to think that any should make a Monopolie of learning which consists more in the undrestanding of things*

things, then of tongues. Why ſhould any be unwilling that learning and Philoſophy both theoretical and practical ſhould be propagated? Are not Philoſophers the beſt moralized men, of the pureſt lives, and moſt ſerviceable in their generation? It ſhall be my practiſe as long as I live to be inſtrumental in promoting true knowledge, wheather by way of Tranſlation, or any other way of making what is occult manifeſt. Now as for this treatiſe in ſtead of a commendatory Epiſtle, it is ſufficient to ſay that Glauber *is the Author of it. He is carryed upon the wings of Fame throughout the whole world. His Fame all know is great, and flyes high, but his worth ſurmounts his Fame. He is a Philoſopher and Chymiſt indeed, as appears by this enſuing Treatiſe, in which are diſcovered ſuch ſecrets that by the help thereof being underſtood (as poſſible they may) the pooreſt man may in a ſhort time become very rich, the moſt ſickly very healthy, and the baſeſt truely honorable. In this tranſlation look not ſo much at words as things, as I my ſelf did: and as for Errata's which perhaps may prove many beſides what I have obſerved in my curſory reading, be thou ſo courteous as to impute them neither to the Printer nor my ſelf, but my abſence from the town all the time the book was in the Preſs. This together with thine acceptance ſhall oblige*

Thy Friend

J. F.

A Preface

A Preface to the Courteous Reader.

I Have hitherto reſerved to my ſelf as ſecrets, ſome peculiar furnaces and compendious wayes of diſtilling, which with diligent ſtudy and ſpeculation I found out ſome few yeers ſince, by which many excellent works, impoſſible to be done by the vulgar art, may be performed; but now at laſt I have, conſidering with my ſelf how advantagious it may be to the world, determined to conceale this art no longer, but for the good of my neighbour to publiſh it, by giving to Chymiſts a perfect and fundamental information of this new invented art, that they may no longer for the future ſpend their time, and expend their coſts in long tedious operations, but may after a more eaſie way by the help of my furnaces be able to effect many excellent things. Now this book ſhall be divided into five parts, the firſt whereof ſhall teach how to build a furnace, in which incombuſtible things are diſtilled and ſublimed, and indeed ſuch things which

cannot be done by retort or any other veſſels, and how the Spirits, Flowers, and Oyles of Minerals, and Metals may by the help thereof be prepared, as alſo what their uſe, and vertues are.

In the ſecond part ſhall be ſhewed another furnace, in which combuſtible things, as Vegetables, Animals, and Minerals are diſtilled and moſt perfectly ſubtilized: by help whereof many moſt excellent medicaments for the cure of moſt grievous and otherwiſe incurable diſeaſes and effects may be prepated.

In the third ſhall be taught a certain new invention hitherto unknown, of diſtilling burning ſpirits, as of Wine, Corne, Fruits, Flowers, Hearbs and Roots; as alſo the waters of Vegetables and Animals, and that in a great quantity, in a ſhort time, and without much coſts; as alſo of boyling Beer, Hydromel, Wine, and other things, which otherwiſe are made in Copper or Iron veſſels; and all this by the help of wooden veſſels, and benefit of a certain ſmal Copper, or Iron inſtrument of two or three pound weight, and that after a certain eaſie maner without furnaces. This newly invented Art doth alſo teach divers Chymical operations, as putrefactions, digeſtions, circulations, extractions, abſtractions, cohobations, fixations, &c. And this invention is very neceſſary and profitable for young beginners in this Art, for they need not in the making of burning ſpirits, waters of Vegetables, Extracts, and other Medicaments ſo many Furnaces, and ſo many Copper, Iron, Tin, Earthen and Glaſs veſſels, for it is here taught how all the aforeſaid operations may be done only by the help of a certain ſmal Copper or Iron veſſel in wooden veſſels as well as by Alembicks and other great Copper veſſels, by

by which meanes a great deal of coſts is ſaved,

In the fourth part ſhall be taught another certaine, and hitherto unknown furnace, in which all Chymical operations may moſt eaſily be done: being moſt profitable for the trying of the natures of Minerals and Metals; as alſo for the proving, examining, melting, cupelling, and ſeparating of Metals, that nothing may be loſt of them, and that after a compendious and eaſie way, and that alſo to great advantage.

In the fifth ſhall be taught how to make and prepare Iron, Earthen, Glaſs, and other kind of Inſtruments neceſſary for the aforeſaid four furnaces, as alſo other neceſſary, and moſt profitable Manuals.

And indeed in the firſt part, the Fabrick of the firſt furnace being delineated, I ſhall alſo ſhew how by the help thereof may be made Spirits, Oyles, Flowers, and other moſt profitable Medicaments, alſo their vertues and uſe, and that as faithfully as I may, and without fraud. And truly I do not doubt but thoſe of underſtanding will approve of this work, but ignorant *Zoiles* will contemne it: For it is ſaid according to the Proverb, *He that builds by the high way will hear many things from them that finde fault*, and eſpecially from the vulgar, &c. But it would be well if thoſe *Thraſoees* would put forth ſomething more excellent, before they finde fault with and carp at other mens paines and labours.

Wherefore let no one raſhly judge of this work, untill he be throughly informed concerning the ſame, and then I do not doubt but the Authour ſhall be by him commended.

And if haply all things ſhall not preſently ſucceed well, to his minde, with him that ſhall build this furnace, and

 operate

operate therewith, let him think with himself that perhaps he hath erred in some part (for it is a new and unknown work, in which any one may easily erre) and not presently therefore murmur against the Author, blameing him, because he hath not wrote cleer enough, but let him ascribe it to his own ignorance, and let him study to understand the Authours meaning, and still be practising upon it, and then I do not doubt, but he will have better success, which I pray every one may have, AMEN.

THE

THE FIRST PART OF PHILOSOPHICAL FURNACES: CONTAINING A NEW ART OF Making Spirits, Oyles, Flowers, and other Medicaments by the help of the first of those Furnaces, after a most easie, and peculiar manner out of Vegetables, Animals, and that with great profit:

ALSO

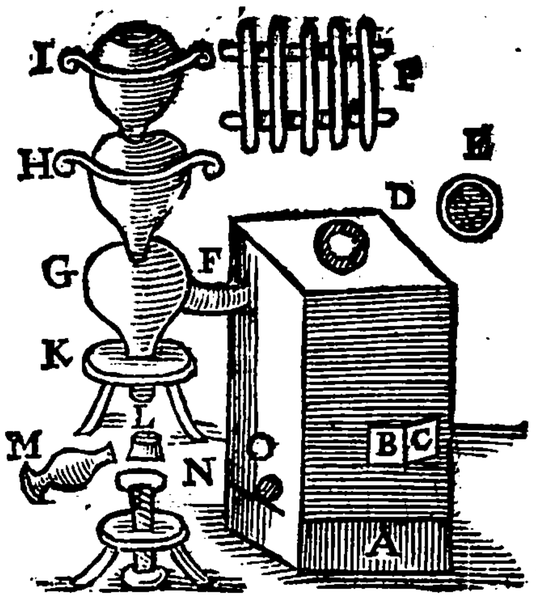
The *CHYMICAL* and *MEDICINAL* use thereof.

By JOHN RUDOLPH GLAUBER.

LONDON,
Printed by *Richard Cotes*, for *Tho: Williams* at the signe of the Bible in *Little-Britain*. 1652.

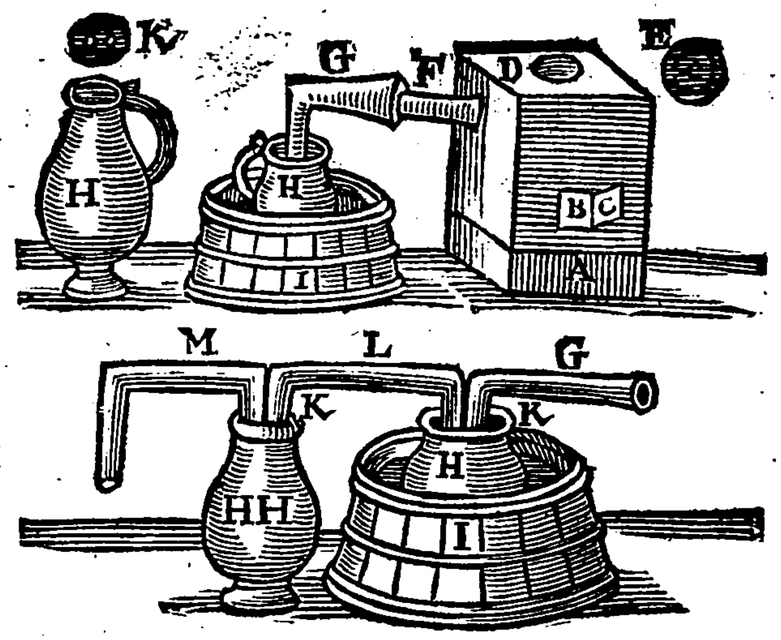
E. The first subliming pot, which is set into the upper hole of the furnace. D. The upper hole of the furnace. F. The second pot. G. The third, H. The fourth.

A. The



A. The ash hole with the wideneſs of the furnace. B. the middle hole by which the coals and matter to be diſtilled are caſt in. C. A ſtopple of ſtone which is to ſtop the ſaid hole after injection. D. The upper hole with a certain falſe bottome which is to be filled with ſand. E. The cover of the upper hole, which is laid on after the injection of the coales and materials. F. A pipe going out of the receiver, and joyned to the firſt pot. C. The firſt receiver, H. The ſecond. I. The third. K. A ſtoole on which the firſt receiver ſtands, having a hole in the middle, through which the neck of the firſt pot to which a diſh is annexed, paſſeth. L. The diſh, through the pipe whereof the refrigerated ſpirits diſtill. M. A receiver into which the ſpirits collected in the diſh do flow. N. A ſcrew to be raiſed higher at pleaſure for the better joyning the receiver to the pipe, and it goeth through a ſtoole. O. The place of the pipe for the diſtilling of ſpirit of Vitriol and Allome. P. A grate conſiſting of two ſtrong croſs iron bars, faſtened in the furnace, and foure or five more leſs that are moveable, for the better cleanſing of the furnace.

G. The



G. The first crooked pipe fitted to the pipe of the furnace. *F.* The pipe of the furnace. *H.* A receiver fitted to that pipe, and set in a tub of water for the accelerating the operations which recipient hath a cover with two holes through the first whereof goeth a single crooked pipe, and through the other two crooked pipes, whereof one goeth into the receiver as did the single, and the other out of the receiver *H.* into *H. H. I.* The tub of water. *M.* A third pipe.

By this way flowers are sublimed, and spirits distilled speedily and in great quantity.

OF

THE FIRST PART OF PHILOSOPHICAL FURNACES.

Of the structure of the first Furnace.

AS for the first Furnace it may be built greater or lesser as you please, a regard being had of the quantity of the water to be distilled, and also either round or square; either of Bricks or by a Potter with Potters clay. Now when the Diameter is of one span, *viz.* within side, the height must be of four, *viz.* one from the bottom to the grate, another from the grate to the hole made for putting in of Coales, and two from thence to the top of the Pipe, which must at least go forth out of the Furnace one span, lest the receivers should by the worms of the Furnace be heated. The Pipe also must have on the fore part a Diameter, answering the third part of the intrinsecal Diameter of the Furnace; also a little larger on the hinder part then the fore-part. Let the grate be such a one, as may be taken out at your

 pleasure

pleasure and made clean, being stopt by the water that is cast in and distilled: for it is easily stopt in distilling of Salts melted with the coales, whereby the aire is kept from coming to the fire, and the distillation by consequence hindred; Or let there be put into the vessel cross-wise two strong Iron bars, upon which lay four or five lesser, distant the one from the other the breadth of a finger, going a little out of the Furnace, in which when they are stopt, you may take them with a paire of Tongs, stir them, and cleanse them from the burnt water, and then again put them into their own places: wherefore also the Furnace must on the fore part be open under the grate, that you may the better order the grate.

Also the grate must have above, a covering of Iron or Stone, with a hole in the midle thereof with a certain distinction, which is to be filled with sand; that the cover may the better and more fitly shut the hole, and prevent the exhaling of the spirits which by this means will being forced, go forth thorow the Pipe into the receivers, after you have cast in the water which is to be distilled.

Of the Receivers.

Let the receivers be made of glass, or of strong earth, which may retain the spirits, and such is Waldburgick, Hassiack, Frechheimensian, Siburgic earth, &c. They are better that are made of glass, if they are to be had, and those especially which are made of strong and firme glass, which may be smoothed about the joynts with a Smiris stone, and so fitted that they may the better be joyned together, and then they need not laving (but how they shall be smoothed with the Smiris stone, and be fitted, shall be taught in the fifth part, which treates of Manuals) because by this means they are joyned so close, that no spirits can go through the joynts: otherwise you must close the joynts with the best lute, such as will not let the spirits exhale, which shall be taught in the book treating of Manuals. The form of the recipient you may see in the delineation thereof. As for the quantity thereof, know that by how much the greater they are, so

so much the better they are, for then you need the fewer, but the more, by how much the lesser they are. Let the superior orifice be larger then the inferior, so that alwayes another receiver may with its inferior orifice be joyned to it, and let the inferior orifice have a Diameter of three fingers breadth or thereabouts, I mean in case the Diameter of the Furnace be of one span. For a greater Furnace requires greater holes, as also orifices of the receivers, by which means a sufficient, and due proportion of aire may be given to the fire: or if the Diameter of the furnace be more then a span, it must also have two or three pipes (which being considered together should have a wideness answering the wideness of the third part of the Furnace, for so great a wideness, and so much aire is required, if the fire burn freely and do its office) to which vessels of the aforesaid proportion must be applyed, that the fire be not choaked.

Now the figure that is annexed will teach the conjunction of the receivers, as also their application to the furnace. And in the first place the receiver stands in a threefoot stoole bored thorow in the middle, that the neck of the first receiver may pass thorow, to which is applyed a dish with a pipe receiving the dropping spirits: To the first there is joyned a second, and to that a third, and so consequently (*viz.* neer unto a wall or ladder) so many as you please. Let the upper receiver, and indeed, all the rest be left open; To the lower, as hath been said is joyned a dish with a pipe, by which the distilled spirits run down into another certain glass vessel added thereunto, which being filled is taken away, and another is set in the place of it, because that is set under it without luting, and therefore may easily be changed. And if you please to distil any thing else, you must take away that dish with a pipe, and make it clean, and then joyn it close again (that no spirit may breath forth) to the work of the lower receiver. And if that dish cannot be so closely joyned, that nothing exhale, pour in a spoonful of water, for that doth astringe, neither doth it hurt the spirits, because in the rectifying it is separated.

Of Subliming vessels.

These you need not make of glass, or of such earth as may retain the spirits, as hath been above mentioned; it is sufficient if so be they be made of good common potters earth and be well glazed within, *viz.* of such a form, and figure, as appears by the annexed delineation.

Yet you must choose good earth that will endure the fire, for the lower pots are so heated by the fire, that they would be broken if they should not be made of good earth.

Now I will shew you in general the manner it self of distiling; as also the manual necessaries in every distillation.

The manner of distiling.

In the first place let there be some burning coales put in, which afterwards must be covered with more until the Furnace be full almost to the pipe, which being done let not the uppermost cover be laid over its hole (that the heat and smoke, may pass that way, and not thorow the pipe, and receivers which will thereby be red hot; and this will be a hindrance to the distillation) untill the fire be sufficiently kindled and the furnace be throughly hot; then cast in with an Iron ladle of the water prepared for distillation as much as will cover the coales, which being done, stop the furnace very close, by pressing down strongly the upper cover upon its hole, or sand, which is put in the lower part of the hole being a place made for that purpose. Now let him that casts in any thing thorow the middle hole, presently stop it with a stopple of stone, and that very close, for by this means all those things which were cast in, will be forced after the manner of a thick cloud to break forth through the pipe into the receivers, and there to condense themselves into an acid spirit, or oyle, and thence to distil into the dish set under, through the pipe whereof they do yet distil down further into an other glass receiver. The Coales being burnt out, and all the spirits being come forth, you must cast in more Coales, and more materials, until

until you have got a sufficient quantity of Spirits. In this way of distilling, you may at your pleasure cease, and begin again without any danger.

When you will make clean the Furnace, you need do nothing else, then draw out the Iron bars that ly on the cross bar, that the *Caput Mortuum* may fall down, which afterwards may be taken away with a fire shovel, which being done you must put in the bars again and lay them on the cross bars as before, upon which you must cast burning coals, and upon them others until there be enough, then on them all being well kindled cast your materials.

When you go to make clean the receivers, and to begin to distil an other thing, you need not remove them, but only pour pure water into them, *viz.* by their upper receiver, by the descending whereof the other are purified.

And by this way not only out of vegetables, volatiles, and minerals (incombustible) but also out of metals fixed, and stones, spirits, oyles and flowers are drawn forth wonderfully, easily, and in good quantity, which otherwise could never have been done by the vulgar art of distilling.

Now in this furnace are distilled only such materials, which being distilled yeeld an incombustible quantity, as common salt, vitrial, allom, and other minerals, & vessels, each of which doth yet require their peculiar manuals, if operated upon.

Now because this furnace doth not serve for every water, because the materials to be distilled are cast upon burning coals, which are things combustible, I have determined in the second part to give another, *viz.* a lesser unlike to this, yet convenient to distil all combustible things that are endued with volatile spirits, as Tartar, Hartshorn, Amber, Salt armoniac, of urine, *&c* There are by the help hereof made most subtile, volatil, sulphureous spirits of salts, and minerals, as of common salt, vitrial, allom, nitre, antimony, and of all other minerals, and metals, which otherwise without this furnace could not have been made, with which spirits wonderful things are performed in Medicine, and Alchymie, as in the second part shall be demonstrated more largely.

Now I will shew you a way to make other receivers belonging to the first furnace, and indeed such as are more fit for some operations, as the former were more fit then others : wherefore let him that will operate choose these, or the other, as he pleaseth.

As therefore the former being erected upwards by a wall, or ladder, by which means the spirit might ascend from one into an other so long, untill being refrigerated, and condensed might again drop downward into the dish that is annexed thereto : so these are a contrary way set and placed collaterall in a vessel filled with cold water to condense the spirits, by which means you need not so many receivers ; Also they must not be fashioned like the former, as to be open above, and below, but only above like pots that serve for boyling : but this you must observe that by how much the deeper and larger they are, by so much the better they are.

Also you must joyn them together by the help of earthen pipes, being so distinct, that the spirits may be kept back, being yet hot (and not refrigerated) from passing out of one into the other, but being forced through the middle of the separation of the pipes may go to the bottom of every receiver, and thence arise by another pipe into another receiver that hath a double cover like the former, where again descending to the cold bottom, remain refrigerated, and condensed. Now three or four of these are enough (whereas of other thirteen or fifteen are required) a regard being had of their greatness.

You may see the figure of these receivers, as also their joyning together by the annexed delineation. Now for the most part one is sufficient for him that distils a few things, especially if the water be not pretious, and then let one crooked earthen pipe at least be joyned, one arme with the pipe that goeth forth of the furnace, the other with the receiver, but so that it go into the receiver downwards, even to the middle thereof, and then you need not shut the orifice of the receivers, for it is no great matter if somewhat evaporate, *viz.* if the water to be distilled be not pretious. And by this way may new

new spirits, and new flowers be made every houre, with the help of one furnace, and one recipient but with this caution, that for every new distillation, the recipient be washed with water before it be put to the pipe ; which being put to, you may then cast your species into the furnace, and this do till you have a sufficient quantity of spirits.

And this way of distillation serves especially for the trying of the natures and properties of many and divers minerals, such as yeild in the fire spirits, and flowers. For it would be too tedious in every new distillation to apply a new and distinct receiver : as also many studious of the Chymical art would quit their study, being able to make by retort but one tryal in a day. And no wonder if expences, and loss of time should deter many.

Now here there is no need of many Retorts, nor of laving them, without receivers, and such like superfluous things ; neither is there here required the constant presence of the operator, the observation of the regiment of fire, the neglect whreof would otherwise endanger the loss of the retorts and receivers, and by consequence the loss of labor. These and such like tedious things are not here to be cared for, because it is sufficient only to cast the water upon the coals, and cover the furnace, and then presently go forth the spirits, and flowers of the same kinde with their mineral : of which when thou hast got a sufficient quantity, thou must draw out the Iron bars, upon which the coals lye, that they may fall down, and be taken away ; and whilst the furnace is yet hot, to put in the Iron bars again, and upon them to lay fresh coals, which then will of their own accord be kindled with the heat of the furnace. In the mean time you must take away the receiver, and make it clean and set it to again, or if you had rather put another clean one, *viz.* for the new distillation of another water.

And by this way divers things may be in the space of 1. hour distilled, and sublimed, *viz.* in a small quantity. But he that will distil, or sublime in a greater quantity, let him take three or four pots that the spirits may pass from one into another,

that

that nothing thereof be loſt. Here need not (as I ſaid before) the continual preſence of the operator, for he may be gone, ceaſe, or repeal as he pleaſe, becauſe the work is without danger of breaking the retorts, and receivers.

He that knows the uſe of this furnace may do many things in a ſhort time without ſpending much time or coſt. For any one may do more by the help thereof in one hour, then in the common way in 24. by which way alſo there is a great ſaving of coals, becauſe ten pound of coals will do more this way then a hundred the other. As for example, he that will try ſhall make a pound of ſpirit of ſalt in one hour with 3. 4. or five pounds of coals; whereas after the other way are required fifty or ſixty pounds, and at leaſt twenty or thirty hours time, *viz.* in the common way by the help of retorts: which is indeed very tedious.

Alſo by this way may be made the flowers of minerals, and metals, in a great quantity, very eaſily, and in a ſhort time without great coſt, ſo as that in one hours ſpace with three or four pound of coals may a pound of the flowers of Antimony be made. And this is no ſmall help to the Phyſitian, and Chymiſt.

Moreover this furnace being once built endures for many yeers, and being broken is eaſily repaired.

And by this way you ſhall need only materials to be diſtilled, no retorts, and receivers are not in danger, by which means much coſt is ſaved.

Beſides the aforeſaid wayes I have yet another, and that more compendious, *viz.* of diſtilling, and ſubliming, and more eaſie, by which means in a very little time, an incredible quantity of ſpirits of ſalts, and flowers of Minerals, and metals may be made: which I ſhall refer till another time becauſe for the preſent I have ſaid enough.

Now I do not doubt but diligent Chymiſts will follow my ſteps, and finde out thoſe things which were unknown to me. *For it is eaſier to adde to things founde out, then to finde out things unknown.*

The conſtruction therefore of the furnaces being in mine opinion

opinion cleerly ſhewed, there now follows the manner of diſtilling, and ſubliming with it.

Although haply, and contrary to my hope any obſcurity ſhould be met withall, yet one proceſs will explain another: and the diligent operator, and ſearcher of nature ſhall without doubt by his practiſe attain the effect after the ſame manner as I have preſcribed. And this is that, which together with the bleſſing of God may overtake all pious Chymiſts, Amen.

How the Spirit of Salt is to be diſtilled.

THE reaſon why I enter upon the ſpirit of ſalt, before I ſay any thing of the ſpirits of vegetables, is this, *viz.* becauſe it is even the chiefeſt, which can be made in this furnace: for few exceed this in ſtrength and vertues; wherefore I alſo have given it the preeminency. Neither is there any of the acid ſpirits, about which the Chymiſts hitherto have been more buſied, then this, wherefore alſo it was of all, of greateſt price, &c. For ſome have mixed ſalt with potters clay; and have made this mixture into little bals, which they have for to get the ſpirit, forced by retort into a very ſtrong fire: ſome have mixed ſalt with bole, ſome with the powder of tyles, others with burnt Allume, &c.

Others uſing a more compendious way have made ſalt to flow in a retort, which hath a pipe both in the upper, and hinder part; by the upper pipe of which they have dropped in cold water, to elevate the ponderous ſpirits of the ſalt, but by the hinder they have blown with bellows, to force the ſpirits into the retort: and this way is not altogether to be ſlighted, yet it hath this inconveniency, that in proceſs of time the retorts are broken, that they can no longer retain the ſalt, and ſo the diſtillation is intercepted. Some have attempted it with Iron retorts, but by this means the ſpirits have been deaded, becauſe they eaſily ſet upon the Iron, whence in ſtead of ſpirit they have had flegme. And ſuch, and other

tedious wayes of distilling they have invented; and by the best of them indeed they could scarce distill one pound in 24. or 30. houres space with 50. 60. or 100 pound of coals; this being the reason, because the salt is very little wrought upon, and therefore it is that few ever had the spirit right, and good, whence also the vertues thereof have been unknown.

And this therefore I was willing to make known, that it might appeare, what price this spirit hath hitherto been of, and how easie, and abundantly, and with what little cost, it may after my new invented way be made.

It is said above, that the materials may in this way of distilling be immediately cast into the fire; yet this must be wisely understood. For although some of the species may without any preparation be immediately cast into the fire, yet it doth not follow that all and every one of them must: for in some of them we must use our discretion, as in the distilling of salt. For if the salt be immediately cast into the fire, it will not only yeeld no spirits, but will leap so long upon the coals, untill it finde a descent to the lowest part of the furnace: Now this may be prevented divers wayes; and first indeed after this manner: Dissolve salt in common water, then quench burning coales in this water, that they may be impregnated with the salt, which afterwards set on fire in the furnace: but you must first cast in other burning coals, upon which you must cast those that are impregnated with salt untill the furnace be full, as is above said: and whiles the coales burn the the salt is resolved by the force of the fire into spirit.

Now you must observe that he that distils spirit of salt after this manner must make choice of glass receivers, because the spirit whilest it is hot, penetrates by reason of its wonderful subtilty, those that are earthen. And this spirit is of a most grateful tast. But in defect of glass receivers, I shall shew you another way, wherein you may use those that be of earth.

Mix salt, and vitrial or allome together, grinding them very wel in a morter (for by how much the better they are ground the more spirit they yeeld.) Then cast this mixture into the fire with an Iron ladle, *viz.* so much of it as will be sufficient,

ent to cover the coals, and then with a great fire the spirits come forth into the receivers, where being coagulated, they distill down into a dish, and thence into another receiver. And if thou knowest how to work aright, the spirits will like water continually run out through the pipe the thickness of a straw; and thou mayest easily every hour make a pound of the spirit. Now the reason why thou shalt by this way have more spirits then by the other, is this, *viz.* because the vitriol, and allome which is mixed with the salt, makes it flow quickly, by which means it is prevented from falling down through the coals to the lower part of the furnace, but sticking to the coals is almost all of it turned into spirits. The *Caput Mortuum*, which is reddish, easily fals with the ashes through the grate, and can no more be distilled, but yeelds by excoction a white fixed salt, which serves for the flowing of metals; and being dissolved in warm water serves also for a glyster against the worms, which it kils, and purgeth also the bowels.

Thou wilt object, that the spirit made after this maner is not the true spirit of salt by reason of the mixture of vitriall and allome, but mixed, and compounded. I answer; There can by this way distill no spirit of vitrioll, and allome, being that which I often tryed, casting vitriol, or allome into the furnace, where I received no spirit at all; the reason of this is, because these spirits are far more heavy then the spirit of salt, neither can they ascend so great a height, *viz.* of three spans, but are burnt, whence unless the flegme, nothing distils. Wherefore the spirit of salt that is made after this manner is not mixed, but pure and meer spirit of salt, of the same tast, and vertue as that is of, that is made by it self; because in this furnace the spirit of allome, and vitriol cannot be made unless a pipe go out of the fnrnace neer the grate, as you may see by the delineation of the furnace, for otherwise it cannot be made; besides, these spirits are better, and more truly taught in the second part. And if it be granted that somewhat together with the spirit of salt come forth (which is yet impossible) what hurt I pray you comes from thence

either in the solution of metals, or medicine? wherefore the spirit made after this way is not to be suspected. Yet I will satisfie the incredulous, and will shew him another way without the addition of allom, or vitrial, for the distilling of that spirit, but that will be in the second part of this book, where I will teach you the furnace by which is made spirit of nitre, Aqua foris, and amongst combustibles; the oyles of vegetables, and fats of animals and other things which cannot be made by this: and by this way I will satisfie those, who are not pleased with the former.

Now for want of glass receivers we are forced to use earthen, but these cannot retain the spirit of salt made after the aforesaid wayes: in which case I could indeed discover a certain little manual, by vertue of which the aforesaid spirit may be received even in a great quantity in earthen recipients: but for certain causes I shall here be silent, and shal refer it till the edition of the second part. Let it suffice therefore that I mentioned such a thing, wherefore omitting that, I shall proceed to shew you the vertues, and use of this spirit, as well in Alchymie, as in medicine, & other Mechanicall arts.

Of the use of the spirit of Salt.

IT is worth while to speak of the power, and vertues of this excellent spirit; what other authors have cleerly described, I shall here pass over, and refer the reader to the writings of those Authors; touching only on some few of which they said nothing.

The Spirit of salt is by most accounted a most excellent medicine, and safely to be used as well inwardly, as outwardly: It extinguisheth a preternatural thirst in hot diseases, abstergeth, and consumeth flegmatique humors in the stomack, exciteth the appetite, is good for them that are hydropical, have the stone, and gout, *&c.* It is a menstruum dissolving metals, excelling all other therein: For it dissolveth all metals and minerals (excepting silver) and almost all stones (being rightly prepared) and reduceth them into excellent medicaments.

It

It doth also many excellent things in mechanicall arts.

Neither is it to slighted in the kitchen, for with the help thereof are prepared divers pleasant meats for the sick as well as for those that are in health, yea and better then with vinegar, and other acid things: and it doth more in a small quantity, then vinegar in a great. But especially it serves for those countreys that have no vinegar. It is used also instead of verjuice and the juce of Lymons. For being prepared after this way, it is bought at a cheaper rate then vinegar or juice of Lymons. Neither is it corruptible as expressed juices are, but is bettered by age. Being mixed with Sugar it is an excellent sauce for rost meat. It preserves also divers kinds of fruits for many yeers. It makes also raisins, and dryed grapes to swell, so as to acquire their former magnitude again, which are good to refresh a weak stomach in many diseases, and serves for the preparing of divers kinds of meats of flesh and fish; but you must mix some water with the spirit, or else the raisins will contract too much acidity. This spirit doth especially serve for making meats delightfully acid; for whatsoever things are prepared with it, as Chickens, Pigeons, Veale, *&c.* are of a more pleasant tast then those which are prepared wirh vinegar. Beefe being macerated with it becomes in a few dayes so tender, as if it had been a long time macerated with vinegar. Such, and many more things can the spirit of salt do.

A distillation of vegetable oyles, whereby a greater quantity is acquired, then by that common way, by a gourd still.

AS many distillers as hitherto have been, have bin ignorant of a better way to distill oyles of spices, woods, and seeds, then by a gourd still, or alembick, with a great quantity of water. And although they may also be made by retort, yet there is a great deal of care required, or else they contract an *Empyreuma*; wherefore that way by a still is alwayes accounted the better, which way indeed is not to be slighted if you distill vegetables of a low price, and such as be oleaginous;

but not so in the distillation of spices, and of other things that are of a greater value, as are Cinnamon, Mace, Saffron, &c. which cannot be distilled in a gourd still without loss, because then there is required a great quantity of water, and by consequence great, and large vessels, to which something adheres, wherefore we lose almost half, which is not to be so much valued in vegetables that are oleaginous, as in anniseed, fennel, and caryoway seed, *&c.* But the loss made in the distilling of dryer and dearer vegetables, as of Cinnamon, *Lignum Rhodii*, *Cassia*, is evident enough, and by consequence not to be slighted. Neither can it be, that all things can be distilled that way, for a good quantity by coction acquireth a gummy tenaciousness, which cannot ascend with the water. But that this way for the future be prevented, I will shew another way to distill the oyles of spices, and other pretious things, which is done with spirit of salt, whereby all the oyle is drawn forth without any loss, the process whereof is this, *viz.* Fill a gourd with cinnamon or any other wood, or seed, upon which pour so much of the spirit of salt, as will be sufficient to cover the wood, then place it with its Alembick in sand, and give it fire by degrees that the spirit of salt may boyle, and all the oyle will destill off with a little flegme, for the spirit of salt doth with its acrimony penetrate the wood, and freeth the oyle that it may distil off the better and easier. And by this way the oyle is not lost by the addition of that great quantity of water in those great, and large vessels, but is drawn in lesser glass vessels with the addition of a little moysture. Distillation being finished the spirit is poured off by inclination from the wood, being again useful for the same work. And if it hath contracted any impurity from the wood, it may be rectified: but the residue of the spirit which remains in the wood ye may recover, if that wood be cast into the aforesaid furnace upon burning coals, by which means it may come forth again pure, and clear: and by this means we lose none of the spirit of salt. And after this way by help of the spirit of salt are drawn forth oyles of dearer vegetables together with their fruit which cannot be done by a still.

There

There are made also by means thereof oyles of gummes and rosins, cleer, and prospicuous.

The cleer oyle of Mastick, and frankincense.

TAke of frankincense, or mastick powdered small as much as will serve to fill the third part of a cornute (which must be coated) upon which pour a sufficient quantity of the spirit of salt, taking heed that the retort be not filled too full, or else the spirit when it boyles, flows over it, then place it in sand, and give fire by degrees, and there will first come out some phlegme, after which a clear transparent oyle together with the spirit of salt, which must be kept by it self, after this a certain yellow oyle which must be received by it self: and last of all there follows a red oyle, which although it is not to be cast away, yet it is very unlike to the first, serving for outward uses, and to be mixed with oyntments and Emplasters, for it doth wonderfully consolidate, and therefore good in new and old wounds. The first being well rectified is in its subtilty, and penetrating faculty not unlike to spirit of wine, and may profitably be used inwardly, and outwardly, *viz.* in cold affects, but especially in the stiffness of the Nerves caused by cold humors, upon which follows a contraction; but then you must first rub the member contracted with a linnen cloth, that it may be well warmed, into which then the oyle must be chafed with a warm hand. For it doth do wonders in such like affects of the Nerves.

After the same maner may oyles be made out of all gums. The red, tenacious, and stinking oyles of Tartar, Hartshorn, Amber, *&c.* distilled after the common way by retort are also rectified with spirit of salt so as to become transparent and to lose the *Empyreuma* contracted by distillation.

Now the cause of the blackness, and fetidness of these kind of oyles is a certain volatile salt which is to be found as well in vegetables, as certain Animals, which is easily mixed with

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the oyle,and then makes it of a brown colour.For every volatile salt whether it be of Urine, Tartar, Amber, Hartshorn, and of other vegetables, and Animals, is of this condition, and nature as to exalt, and alter the colours of sulphureous things,and that either for the worse,or for the better: but for the most part it makes oyles thick, black and stinking, as you may see in Amber,Hartshorn, and Tartar. The cause therefore of the blackness,and fetidness of these oyles being known we may the more easily take heed thereof in distilling,and being contracted, correct them again by the help of spirit of salt. For all volatile salt hath contrariety to any acid spirit, and on the other side,every acid spirit hath a contrariety with all volatile salts, that have the nature of salt of Tartar. For metals that are dissolved with acid spirits are as well precipitated with spirit of urine or any volatile salt as with the liquor of salt of Tartar; which shall be more at large declared in the second part.

The volatile salt therefore is by the mortifying acid spirits, as of salt,vitrial, allom, vinegar,*&c.* deprived of its volatility, and is fixed, by which means being debilitated it forsakes its associate which was infected with blackness by it: it is necessary that we should proceed after the same maner with these fetid oyles, *viz.* as follows.

Take any fetid oyle of Tartar, Amber,*&c.* with which fill the fourth part only of a glass cornute, and upon it poure by drops the spirit of salt; and it will begin to be hot, as it is used to be, when Aqua fortis is poured on salt of Tartar; wherefore the spirit is to be poured on it by little and little, and by drops for fear of breaking the glasse: Now the signe of the mortification of the volatile salt is when it ceaseth to make a noise, and then no more is to be poured on, but set your retort in sand, and give fire to it by degrees, as is used to be done in the rectifying of things of easie elevation: and first of all will go forth a certain stinking water, after which comes a transparent clear, and odoriferous oyle,and after that a certain yellow, clear, and also well smelling oyle, but not so as the first, wherefore each must be taken a part by changing

ging the receivers. Now these oyles become more grateful then those fetid of the shops. For these oyles retaine their cleerness, and fairness, the cause of their fetidness, and redness being taken away by the spirit of salt. In the bottom of the retort remains the black volatile salt with the spirit of salt, from whence it may be sublimed into an odoriferous salt, resembling salt armoniack in tast. The spirit of salt is also deprived of its acidity, and coagulated by the volatile salt, and is like *tartarum vitriolatum*, appointed also for its uses, as shall be spoken in the second part of the spirit of urine.

After the same manner also are rectified other oyles, which by length of time have contracted a clammines, as are oyle of Cinnamon, Mace, cloves,*&c.* with the spirit of salt,if they be rectified by retort, for then they acquire again both the same clearness, and goodness,as they had when they were newly distilled.

Here I must make mention of a certain error of Physitians, not only of ignorant Galenists, but Spagyricks, committed in the preparations of some Chymical medicaments. For many have perswaded themselves that oyle of Tartar, Hartshorn,*&c.* having lost its stink, is a medicine radically taking away all obstructions; but this must be taken with a graine of salt. For some have rectified these kinds of oyles by calcined vitriol, and by that means have somewhat made them lose their *Empyreuma*, but withall their vertues: which others observing have conceived that the fetidness thereof is not to be taken away, because the vertue of them is thereby lost, as if the vertue consisted in the fetidness thereof; but that is a very great error,because fetidness is an enemy to the heart and brain, and in it is no good. But this is granted, that they that take away the fetidness of those oyles mortifie the vertues of them. But thou saist, How then must we proceed in taking away their fetidness without the loss of the vertues? Must they be rectified by the spirit of salt? as even now thou taughtest. R. No, for although I said that oyles might be clarified with spirit of salt, yet it doth not follow that my

meaning was that that clarification was the mending of them: this is only a way of clarification, whereby they become more grateſull; and it is not to be ſlighted, a better being unknown. But how they are to be rectified from their fetidneſs, and blackneſs without the loſs of their vertues, and to be made more noble, doth not belong to this place, becauſe it cannot be done by this furnace: I ſhall refer the reader therefore to the ſecond part, where it ſhall be ſhewed, how ſuch ſpirits are to be rectified without the loſs of their vertues, which being ſo prepared may well be accounted for the fourth pillar of Phyſick. And theſe things I was willing at leaſt for information ſake to ſhew you, not to offend you, and that becauſe I was moved with pity, and compaſſion towards my neighbor.

The Quinteſſence of all vegetables.

POur upon ſpices, ſeeds, woods, roots, fruits, flowers, &c. the ſpirit of wine well rectified, place them in digeſtion to be extracted, untill all the eſſence be extracted, with the ſpirit of wine; then upon this ſpirit of wine being impregnated pour the beſt ſpirit of ſalt, and being thus mixed together place them in Balneo to digeſt, untill the oyle be ſeparated and ſwim above from the ſpirit of wine, then ſeparate it with a ſeparating glaſs: or diſtill off the ſpirit of wine in Balneo, and a cleer oyle will aſcend: for if the ſpirit of wine be not abſtracted, then that oyle will be as red as blood; and it is the true quinteſſence of that vegetable, from whence by the ſpirit of wine it was extracted.

The Quinteſſence of all Metals, and Minerals.

DIſſolve any metal (excepting ſilver, which muſt be diſſolved in Aqua fortis) in the ſtrongeſt ſpirit of ſalt, and draw off the flegme in Balneo: to that which remaines pour the beſt rectified ſpirit of wine, put it to digeſting, untill the oyle be elevated to the top as red as blood, which is the tincture

ture, and quinteſſence of that metal, being a moſt pretious treaſure in medicine.

A ſweet, and red oyle of metals and minerals.

DIſſolve a metal, or Mineral in ſpirit of ſalt, diſſolve alſo an equall weight of ſalt of wine eſſentificated; mix theſe diſſolutions, and diſtill them by retort in a gradual heat, and there will come out an oyle ſweet, and as red as blood together with the ſpirit of ſalt: and ſometimes the neck of the retort, and receiver will be coloured like a Peacocks taile with divers colours, and ſometimes with a golden colour.

And becauſe I would without any difference comprehend all metals and minerals under one certain general proceſs; let him that would make the eſſence of ſilver take the ſpirit of nitre, and proceed in all things as was ſpoken of the other metals. Concerning the uſe of theſe eſſences, I need not ſpeak much thereof; for to him that knows the preparation ſhall be diſcovered the uſe thereof. Concerning the corroſive oyles of metals and minerals, ſeeing they cannot be deſcribed by any one proceſs, it will be worth while to ſet down what is peculiar to each of them, as followeth.

The oyle, or liquor of Gold.

DIſſolve the calx of gold in the ſpirit of wine (which muſt be very ſtrong, or elſe it cannot diſſolve it) but in defect of the ſtrongeſt ſpirit thereof mix a little of the pureſt ſalt-peter; but that oyle is the beſt which is made with the ſpirit of ſalt alone. From the gold diſſolved abſtract half the ſolution, and there will remaine a corroſive oyle, upon which pour the expreſſed juice of limons, and the diſſolution will become green, and a few feces fall to the bottom, which may be reduceed in melting. This being done put this green liquor in Balneo and draw off the flegme: that which remains take out, and put upon a marble in a cold moiſt place, and it will be reſolved into a red oyle, which may ſafely, and without

danger be taken inwardly, curing those that are hurt with Mercury. But especially it is commended in old ulcers of the mouth, tongue, and throat, arising from the French pox, leprousie, scorbute, &c. where the oyle of other things cannot be so safely used. There is not a better medicine in the exulceration, and humors of the glandules, in the ulcers of tongue and jaws, which doth sooner mundifie, and consolidate. Neither yet must we neglect necessary purgings, and sudorifickes for fear of a relapse, the cause not being taken away.

Neither will there any danger follow, whether it be given inwardly, or used outwardly, as in the accustomed use of other medicaments, and gargarismes; for it may dayly, and truly without all danger be used at least three times with a wonderful admiration of a quicke operation.

Oyle of Mars.

Dissolve thin plates of Iron in rectified spirit of salt, take the solution, which is green, of a sweet tast, and smelling like fetid sulphur; & filter it from that filthy and feculent residence: then in a glass gourd in sand abstract all the humidity (*viz.* with a gentle fire) which will be as insipid as rain-water, because the iron by reason of its dryness hath attracted all the acidity to it self: but in the bottom will remain a masse as red as blood, burning the tongue like fire: It takes away all proud flesh of wounds, and that without all danger. It is to be kept in a glasse close stopt from the aire, lest it be resolved into an oyle, which will be of a yellow colour. But he that desires to have the oyle may set it on a marble in a moist Cellar, and within a day it will be resolved into an oyle which will be in colour betwixt yellow and red: It is a most excellent secret in all corroding ulcers, fustula's, cancer, &c. being an incomparable consolidator, and mundifier. And it is not without profit mixed also with common water to wash the moist, fetid ulcers of the leggs; which cause humors, by being

being applyed warm like a bath, for it dryes, and heales suddenly, if withal Purges be administred. It cures also any scab. That red masse (being yet unresolved) being put on the oyle of sand, or flints (of which in the second part) makes a tree to grow in the space of one or two hours, having root, trunk, and boughs: which being taken out, and dryed in the test yeelds good gold, which that tree extracts from the earth, *i.e.* from the flints, or sand. Thou maist if thou pleasest, more accurately examine this matter.

Oyle of Venus.

Spirit of Salt doth not easily work upon Copper, unless it be first reduced into a calx, and that after this manner. Take plates of Copper made red hot in an open crucible, quench them in cold water, & they will cleave into red scales: then the remainders of the plates make red hot, & quench as before: do this so often till thou hast got a sufficient quantity of the calx; which being dryed, and poudered extract with the rectified spirit of salt, in sand, untill the spirit of salt be sufficiently coloured with a green tincture, which you must decant, and filter, and then abstract from it the superfluous moisture, that there may remain a green thick oyle, which is an excellent remedy for ulcers, especially such are venereal, being applyed outwardly.

Oyle of Jupiter *and* Saturne.

Neither are these two metals easily dissolved in the spirit of salt, yet being filed are dissolved in the best rectified spirit of salt. But the operation is performed better with the flowers of these metals (the preparation whereof shall be hereafter taught) Take therefore the flowers, upon which in a gourd glass pour the spirit of salt, and presently the spirit will work upon them, especially being set in a warm place; filter the yellow solution, and abstract the humidity

untill there remain a yellow heavy oyle, which is proper against pitrid ulcers.

Oyle of Mercury.

NEither is this easily dissolved with the spirit of salt: but being sublimed with vitriol, and salt is easily dissolved. Being dissolved it yeelds an oyle very corrosive which must be used with discretion, wherefore it is not to be administred unless it be where none of the other are to be had. For I saw a woman suddenly killed with this oyle, being applyed by a certain Chirurgeon. But this oyle is not to be slighted in eating ulcers, tetter, *&c.* which are mortified by it.

Oyle of Antimony.

CRude Antimony that hath never undergone the fire, is hardly dissolved in spirit of salt: as also the *Regulus* thereof; but the *Regulus* being subtilly poudered is more easily wrought upon in case the spirit be sufficiently rectified.

The *Vitrum* is more easily, but most easily of all the flowers are dissolved, being such as are made after our prescription a little after set down. Neither is *Butyrum Antimonii* (being made out of sublimed Mercury, and Antimony) any thing else but the *Regulus* of Antimony dissolved with spirit of salt: for sublimed Mercury being mixed with Antimony, feeling the heat of the fire, is forsaken by the corrosive spirits associating themselves with antimony, whence comes the thick oyle: whilest which is done the sulphur of Antimony is joyned to the quick-silver, and yeelds a Cinnabar, sticking to the neck of the retort; but the residue of the Mercury remains in the bottom with the *Caput Mortuum*, because a little part thereof doth distill off: And if thou hast skill thou maist recover the whole weight of the Mercury again.

And these things I was willing the rather to shew thee because

cause many think this is the oyle of Mercury; and therefore that white pouder made thence by the pouring on of abundance of water they call *Mercurius vitæ*, with which there is no mixture at all of Mercury, for it is meer Regulus of Antimony dissolved with spirit of salt, which is again separated, when the water is poured on the antimoniall butter; as is seen by experience: For that white pouder being dryed, and melted in a crucible yeelds partly a yellow glass, and partly also a Regulus, but no Mercury at all.

Whence it doth necessarily follow that that thick oyle is nothing else but Antimony dissolved in spirit of salt. For the flowers of Antimony being mixed with spirit of salt make an oyle in all respects like to that butter which is made of Antimony, and sublimated Mercury; which also is after the same manner by the affusion of a good quantity of water precipitated into a white pouder, which is commonly called *Mercurius vitæ*: It is also by the same way turned into *Bezoardicum minerall*, viz. by abstracting the spirit of nitre, and it is nothing else but Diaphoretick Antimony.

For it is all one whether that Diaphoretick be made with spirit of nitre, or with nitre it self, *viz.* corporeal, for these have the same vertues, although some are of opinion that that is to be preferred before the other: but the truth is, there is no difference. But let every one be free in his own judgement, for those things which I have wrote, I have not writ out of ambition, but to finde out the truth.

Now again to our purpose, which is to shew an oyle of antimony made with the spirit of salt.

Take a pound of the flowers of Antimony (of which a little after) upon which pour two pound of the best rectified spirit, mix them well together in a glass, and set them in sand a day, and night to dissolve, then pour out that solution together with the flowers into a retort that is coated, which set in sand, and first give a gentle fire, untill the flegme be come off, then follows a weak spirit with a little stronger fire, for the stronger spirits remaine in the bottom with the Antimony: then give a stronger fire, and there will come forth an oyle like

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to the butter of Antimony made with ſublimed Mercury, and is appropriated to the ſame uſes, as follows.

The flowers of Antimony white and vomitive.

TAke of this butter as much as you pleaſe, upon which in a glaſs gourd, or any other large glaſs pour a great quantity of water until the white flowers will precipitate no more; then decant off the water from the flowers, which edulcorate with warm water, and dry with a gentle heat, and thou ſhalt have a white pouder.

The Doſe is, that 1. 2. 3. 8. 10. grains be macerated for the ſpace of a night in wine, which is to be drank in the morning, and it worketh upward, and downward. But it is not to be given to children, thoſe that be old, and weak, but to thoſe that be ſtrong, and accuſtomed to vomiting. When at any time this infuſion is taken and doth not work, as ſometimes it fals out, but makes the patient very ſick, he muſt provoke vomiting with his finger, or elſe it will not work but make thoſe that have taken it to be ſick, and debilitated even to death. We muſt alſo in the over much working of theſe flowers drink a draught of warm beer or rather of warm water, decocted with chervil, or parſly, and they will work more mildly. But let not him that is able to bear the operation thereof any way hinder it, for there is the greater hope of recovering his health thereby, for they do excellently purge choler, and evacuate flegme in the ſtomack, being humors that will not yeeld to other Catharticks; they open obſtructions, reſiſt the putrefaction of the blood, the cauſes of many diſeaſes, ſuch as are feavers, headaches, *&c.* they are good for them that are leprous, ſcorbutical, Melancholical, hypochondriacal, infected with the French pox, and in the beginning of the plague. In brief, they do work gallantly, and do many things.

After the taking of them the patient muſt ſtay in his bed or at leaſt not go forth of his houſe for to avoid the aire, or otherwiſe they may be miſtruſted.

And

And becauſe of their violence they are feared, and hated, I ſhall in the fourth part of this book for the ſake of the ſick ſet down ſuch as are milder, and ſafer, ſuch as ſhall work rather downward then upward, cauſing eaſie vomits, which alſo thou mayeſt give to children, and thoſe that are old without danger, yet ſome reſpect being had of the diſeaſe, and age.

The flowers of Antimony, diaphoretical.

THE foreſaid flowers if they be caſt into melted nitre, and be left a while in melting, are made fixt, ſo as to become Diaphoretical, and loſe their Cathartical vertue. The acid water being ſeparated from the flowers, if it be evaporated, leaves behinde the beſt ſpirit of ſalt, ſerving for the ſame, or ſuch like uſes again.

Of the external uſe of the Corroſive oyle of Antimony.

THis oyle hath been long uſed by Chirurgions, for they have with a feather applyed it to wounds almoſt uncurable, to ſeparate impurities, for the acceleration of the cure that after other medicaments being applyed may the better operate. But it is better if it be mixed with ſpirit of ſalt, for they are eaſily mixed, and it is made more mild thereby, and the too great corroſive faculty thereof is mitigated. Neither is there any other beſide the ſpirit of ſalt, with which this oyle can be mixed, unleſs it be the ſtrongeſt ſpirit of nitre, for the weak ſpirit of Antimony precipitates the butter of Antimony, as you may ſee in the preparation of *Bezoardicum Minerale*. But the ſtrongeſt ſpirit of nitre diſſolving this butter, makes a red ſolution of wonderful vertue in Chymiſtry, of which we are not to treat in this place; and if this be drawn off again by diſtillation, it leaves behinde the firſt time a fixed Antimony, and Diaphoreticall, which otherwiſe muſt be drawn off twice, or thrice, *viz.* if it be weak, and not able to diſſolve the butter without precipitation.

Now this *Bezoardicum*, is the best, and safest Diaphoretick in all diseases that require sweat, as in the plague, french pox, feavers, scorbute, leprosie, *&c.* if it be given from 6. 8. 10. to twenty grains in proper vehicles; it penetrates the whole body, and evacuates all evil humors by sweat and urine.

The Oyle of Arsenic *and* Auripigmentum.

AS the spirit of salt doth not easily work upon Antimony by reason of the abundance of crude sulphur, unless it be reduced into flowers, in the preparation whereof some part of its sulphur is burnt; so also Arsenic and *Auripigmentum* are hardly dissolved with spirit of salt, unless they be reduced into flowers, and the spirit of salt be very strong, which may be able to work upon it. These may be distilled by retort like Antimony into a thick heavy oyle; which being used in cancrous eating ulcers exceeds that of Antimony in mortifying, mundifying and purging those evils. After the same manner may corrosive oyles be made out of all the realgars being ordained for outward uses.

Oyle of Lapis Calaminaris.

TAke of the best yellow or red *Lapis Calaminaris* very subtilly poudered, as much as you please, and pour upon it five or six times as much of rectified spirit of salt, mix and stir them well together, and do not leave them long unstirred, but ever and anon shake the glass with the materials; and this do oftentimes, or else the *Lapis calaminaris* will grow together into a very hard stone, which can be dissolved no more, which is prevented by the aforesaid often shaking: and when the spirit of salt will dissolve no more thereof in *frigido*, set the glass in warm sand so long untill the spirit be tinged with a most yellow colour, which then decant, and pour on fresh and again set it in digestion to extract, and do not forget to shake the glass often. The solution being finished filter it, and

and cast away the residue of the *terra mortua*. Afterwards set the solution in sand, and give fire, and almost three parts of the spirit of salt will go over insipid, which is nothing but the flegme, although the spirit was never so well rectified; the reason whereof is the most dry nature of *lapis calaminaris*, to which the spirit of salt is very friendly, and therefore very hard to be separated from it. For I never knew any mineral or metal (beside *Zinck*) which exceeds *lapis calaminaris* in dryness. At last when no more flegm will go over, let all things coole; which being done, take out the glass, and thou shalt finde a thick red oyle, as fat as oyle olive, and not very corrosive; for that spirit of salt being almost mortified with *lapis calaminaris* is deprived of its acidity. This oyle is to be kept from the aire; or else within a few dayes it attracts much aire which it converts into water, and thereby becomes weakened.

This oyle is of wonderful vertue, being used as well inwardly as outwardly. And I wonder that in so long a time there hath been no body, who hath operated in *lapis calaminaris* & described the nature thereof, seeing it hath in it a golden sulphur (of which thing in the fourth part) for if the terrestreity thereof were separated from it artificially, pure gold would be manifested therein; now the greatest part thereof is volatile, and immature, and cannot easily be reduced into a body in melting, wherefore hitherto that stone hath not been esteemed of by Chymists, but to the wise was always [illegible]ious, *&c.*

The use of the oyle of Lapis Calaminaris.

[illegible]e given from 1. 2. 3. drops to ten and fifteen with suitable vehicles, it purgeth the dropsie, leprosie, gout, and other noxious fixed humors not yeelding to vegetable Catharticks, of which more at large in the second part of the spirit of urine and salt of tartar. It serves outwardly for an excellent vulnerary balsome, the like to which can scarce be shewed, not only in reducing old corrupt wounds, but also

in those that are green, for it doth powerfully dry, mundifie, and consolidate.

It is also used in houshold affaires, for birdlime being dissolved in it yeelds a certain tenacious matter serving to catch birds, mice, &c. about the house or in the field. For it is as permanent in the heat of the Sun, as in the cold of winter, wherefore it may be used at any time of the yeere; all small animals stick to it if they do but touch the matter.

A ligature or string smeered therewith, and bound about any tree prevents the spiders from climbing up thereon, and other kindes of insects that are noxious to the fruit; a thing worth taking notice of.

This oyle is not by the pouring on of water corrupted, neither is it precipitated, as that of Antimony: wherefore it is useful for many things. Common yellow sulphur boyled in it, *viz.* in a strong fire, so as to be dissolved in it, swims upon it like fat, is thereby purified and made as transparent as yellow pellucid glass, and a better medicine then those common flowers of sulphur: it serves also for other uses, all which to relate here it would be too tedious.

This oyle being mixed with clean sand, and distilled by retort in a fire that is very strong (otherwise the spirit of salt will leave the *lapis calaminaris*) yeelds a most fiery spirit, the *lapis calaminaris* remaining in the bottome of the retort.

This spirit is so strong, that it can scarce be kept; it dissolves all metals, and all minerals (excepting silver & sulphur) wherefore by the help thereof many excellent medicaments are made, which cannot be made with the common spirit though never so well rectified, which although it be often rectified, yet is not without flegme, which cannot be separated from it by the power of rectification, so well as with *lapis calaminaris*.

This spirit doth perform many things in medicine, as in Alchymie, as also in other arts, as you may easily conjecture, but here is not opportunity to speak more of these things, yet for

for the sake of the sick I shall add one thing, to which few things are to be compared, the plaine and short process where-of I would not have thee be offended at. And it is this, *viz.* Mix this spirit with the best rectified spirit of wine, digest this mixture somewhile, and the spirit of salt will separate the spirit of wine, and will make the oyle of wine swim on the top, the volatile salt being mortified: and this oyle is a most incomparable cordial, especially if with the said spirit of wine spices have first been extracted, and with the said spirit of salt, gold hath been dissolved. For then in the digestion of this mixture, the oyle of wine being separated attracts the essence of the cordial species, and of other vegetables, being extracted before with the spirit of wine, as also the tincture of gold, and so by consequence a most efficacious incomparable and universal medicine for all diseases, fortifying the *Humidum radicale*, that it way be able to overcome its enemies; for which let praise and glory be given to the immortall God for ever who hath revealed to us so great secrets.

Of the extrinsecal use of the spirit of salt in the kitchen.

I Said before that in stead of vinegar, and verjuice it may be used, as also in stead of the juice of Limons, now it remains that I shew you how it is to be used, and that indeed as wil for the sake of the healthy as the sick.

Let him therefore that will dress a pullet, pigeons, veale, &c. in the first place put a sufficient quantity of spices, of water, and butter, and then as he pleaseth a greater, or lesser quantity of spirit of salt: and by this means fleshes are sooner made ready being boyled, then that common way; an old hen though the flesh thereof be old is made as tender as a chicken by the addition of this spirit: but he that will use it in stead of the juice of Limons with rost meat, must put into it the pill of limons for preservation sake, because it preserves it. It is used in stead of verjuice by it self alone, or mixed with a little sugar, if it be too acid.

He that will stew beef, and make it as tender as kid, must first dissolve it in tartar and a little salt before he wets the flesh therewith, and the flesh will not only be preserved but made tender thereby: but to keep flesh a long time you must mix some water therewith, and with weights press down the flesh, that it may be covered with the pickle: for by this means flesh may be preserved a great while.

After the same manner may all kinds of garden fruits be preserved, as cucumbers, purslaine, fennel, broom, German capers, *&c.* and indeed better then in vinegar. Also flowers, and hearbs may a long while be preserved by the help thereof, so that you may have a rose all the winter.

It preserves also wine, if a little be mixed therewith. A little thereof being mixed with milk precipitates the cheese, which if it be rightly made is never corrupted, being like to such cheese as they call *Parmesan.* The whey of that milke dissolves Iron, and cures any scab being washed therewith.

With the help of spirit of salt is made with honey, and sugar a most pleasant drink, not unlike to wine. There is made also of certain fruits with the spirit of salt a very good vinegar like to the Rhenish vinegar. Such and many more things, which I wil not now divulge, may be done with spirit of salt.

And thus have I in some measure taught the use of the spirit of salt, which I would not have you take as if I had revealed all things; for, for brevities sake, as also for some other reasons I have silently passed over many things. Neither do I know all things my self: but those things, which I do know, I have so far declared that others may from thence have hints of seeking further. He that would describe all, & every power & vertue thereof, had need to write a whole volume, that which is not my purpose at this time to do, but may prehaps be done another time. There shall also be shewed in the second part of this book, some secrets which may be prepared by the help of this spirit: as how it may be dulcified to extract the tincture of gold, and of other metals, leaving a white body, which tincture is a medicine not to be slighted. Wherefore now seeing

seeing it is manifest how great things this spirit can do, every one will desire a good quantity for his houshold uses, especially seeing most excellent spirits may be made after an easie and short way.

How an acid spirit, or vinegar may be distilled out of all vegetables, as hearbs, woods, roots, seeds, &c.

FIrst put a few living coals into the furnace, then put upon them the wood that is to be distilled, that it may be burnt: out of which whilest it is burning goes forth the acid spirit thereof into the receiver, where being condensed it fals down into another receiver, resembling almost common vinegar in its smell, wherefore also it is called the *vinegar of woods.*

And after this manner you may draw forth an acid spirit out of any wood, or vegetable, and that in a great quantity without costs, because the wood to be distilled is put but upon a very few living coals, and upon that another, for one kindles the other; and this spirit requires no more charges then of the wood to be distilled; which is a great difference betwixt this, and the common way of distilling, where besides retorts, is required another fire; and out of a great retort scarce a pound of spirit is drawn in the space of five or six hours; whereas in ours in the space of one day, and that without any cost or labor may be extracted twenty or thirty pound, because the wood is immediately to be cast into the fire to be distilled, and that not in pieces, but whole. Now this spirit (being rectified) may commodiously be used in divers Chymical operations, for it doth easily dissolve animal stones, as the eyes of Crabs, the stones of Perches, and Carps, Corals also and Pearle, *&c.* as doth vinegar of wine. By means thereof also are dissolved the glasses of metals, as of tin, lead, Antimony, and are extracted, and reduced into sweet oyles.

This vinegar being taken inwardly of it self doth cause sweat wonderfully, wherefore it is good in many diseases, especially that which is made of Oake, Box, Guaiacum, Juniper,

per, and other heavy woods; for by how much the heavier the woods are, by so much the more acid spirit do they yeeld.

Being used outwardly it mundifies ulcers, wounds, consolidates, extinguisheth, and mitigates inflammations caused by fire, cures the scab, but especially the decoction being made of its own wood in the same. Being mixed with warm water for a bath for the lower part of the body, it cures occult diseases of women; as also malignant ulcers of the leggs.

This spirit therefore deserves some place in the shops, *i.e.* it is unjustly rejected in the shops, seeing it is easie to be made. In distilling of wormwood and other vegetables, there remaines in the bottome of the furnace ashes, which being extracted with warme water yeelds a salt by decoction, which being again dissolved in its own spirit or vinegar, and filtred, doth by the evaporating of flegme, being placed in a cold place pass into a Crystalline salt, which is of a pleasant tast, not like unto a *lixivium*, nor unto other salts that are dissolved in aire. This salt is also more efficacious (being reduced into Crystals by its proper Spirit) then that which is made by the help of sulphur, or Aqua fortis, and oyle of Vitrioll, and otherwayes which Chymists, and Apothecaries use.

The spirit of paper and linen cloth.

PEices of linen cloth gathered, and got from Sempsters being cast into the furnace upon living coales yeeld a most acid spirit, which tingeth the nailes, skin, and hair with a yellow colour, restores members destroyed with cold, is good in a gangrene, and erysipelas if linen clothes wet in the same be applyed thereto, *&c.* The same doth spirit made of paper, *viz.* of the peices thereof.

The

The spirit of Silk.

AFter the same manner is there a spirit made of pieces of silke, which is not so sharpe as that which is made of linnen and paper, neither doth it tinge the skin, but is most excellent in wounds as wel old as green, and it makes the skin beautiful.

The spirit of mans haire, and of other animals, as also of horns.

OUt of horns also, and hair is made a spirit, but most fetid, wherefore it is not so useful, although otherwise it may serve for divers arts: being rectified it becomes clear and to be of the odour of the spirit of urine. It dissolves common sulphur, and yeelds a water, that cures the scab in a very short time.

Now for this business shreds of woollen cloth undyed may serve, being cast in a good quantity into the furnace. Pieces of cloth dipt in this spirit and hanged in vinyards and fields, keep out Deer and Swine from coming in, because they are afraid of the smell of that spirit as of a huntsman that waits to catch them.

The spirit of vinegar, honey, and sugar.

HE that will distill liquid things, must cast red-hot coals into them, as for example into vinegar in the furnace, or if it be honey, or sugar, let them first be dissolved in water, by which means they will be drunk up by the coales, which being therewith impregnated, must afterwards at several times be cast into the furnace, and be burnt; and whilest the coals are burning that which is incombustible comes forth. And by this means you may distill liquid things in a great quantity.

Vinegar which is distilled this way, is of the same nature, as that which is distilled in close vessels.

But honey and sugar that are distilled after this manner are a little altered, and acquire other vertues: but how they shall be distilled without the loss of their volatile spirit shall be taught in the second part. Also after this manner may all liquid things being drunk up by living coales be distilled.

Of the use of distilled vinegar many things might be said, but because the books of all the Chymists treat abundantly thereof, I account it needless to repeat what they have writ. Yet this is worth taking notice of, that the sharpest vinegar hath a great affinity with some metals, which may be extracted by the help thereof; also dissolved, and reduced into medicaments; yea many things may be made with the help thereof, as the books of all the Chymists testifie.

But there is yet another vinegar, of which there is often mention made in the books of the Philosophers, by the help whereof many wonderful things are performed in the solutions of metals, the name whereof the ancients have been silent in; of which I do not here treat, because it cannot be made by this furnace; but I shall treat of it in another part; yet so that I incur not the curse of the Philosophers.

How spirits may be made out of the salt of tartar, vitriolated tartar, the spirit of salt tartarizated, and of other such like fixed salts.

AS many Chymists as there hath been, almost all have been of the opinion that a spirit cannot be drawn out of salt of tartar, and other fixed salts. For experience hath taught that by retort little or no spirit can be drawn from thence, as I had often experience of before the invention of this furnace: the reason of which thing was the admixtion of sand, earth, bole, pouder of tiles, &c. for to prevent the flowing of salt of tartar being by this means dispersed. But this is done through the ignorance of Authors, who have been ignorant of the properties

perties of salt of tartar. For a stony matter, as sand, flint, bole, &c. being mixed with salt of tartar, feeling the heat of the fire, and being made red with the same, is joyned to it most closely, so as no spirit can be drawn from thence, but become a most hard stone. For sand, and such things that are like to it, have so great an affinity with the salt of tartar that being once united can scarce ever be separated. Yet it may be made by Art by the addition of pure sand, or flint, because the whole substance of the salt of tartar may be turned into a spirit in the space of one or two hours, as shall be taught in the second part, and it excels all other medicaments in vertue, in curing the stone, and gout. And if by the regiment of art there be left any *Caput Mortuum* in that distillation, it hath being dissolved in the aire a power to putrefie metals being prepared, and mixed with it, in the space of few hours, so as to make them become black, and to grow up like trees with their roots, trunks, & boughs, which by how much the longer they are so left, become the better. Of calx of lead being subtilized, and of salt of tartar may be made a *spiritus gradatorius* of wonderful vertues as well in medicine as Alchymie. There is made of the *Caput Mortuum*, *per deliquium* a green liquor which doth wonderful things; whence it is proved, *That Saturne is not the lowest of the planets*; Enough to the wise.

And so is Lac Virginis, and the Philosophical Sanguis Draconis made.

SOmetimes there is found a certain earth, or bole, which hath no affinity with tartar, which being mixed with salt of tartar yeelds a spirit, but very little. But in this furnace may all fixed things be elevated, because the Species not being included in it, but dispersed, being cast upon the fire, are from the fire elevated through the aire, and are being refrigerated in the recipients again condensed, which cannot be so well done by a close retort.

He therefore that will make the spirit of the salt of tartar, need do nothing else then to cast the calcined tartar into

the fire, and it will wholly come over in a ſpirit : but then there are required glaſs recipients, becauſe thoſe that are earthen cannot retain it.

And this is the way whereby moſt fixed ſalts are diſtilled into a ſpirit by the firſt furnace. In the ſecond furnace(*viz.* in the furnace of the ſecond part) it may be done better, and eaſier, where together with the preparation ſhall be taught the uſe thereof.

The ſpirits, flowers, and ſalts of Minerals and ſtones.

BY this way ſpirits may be raiſed from any minerall or ſtone, and that without the addition of any other thing: yet ſo as that the minerals, and ſtones,as flints, Cryſtal, talke, *lapis calaminaris*, Marcaſite, Antimony, being ground be with an Iron ladle caſt upon the coales, and there will ariſe together with a certain acid ſpirit, ſome ſalt and flowers, which are to be waſhed off from the recipients, and filtred, and the flowers will remain in *Charta bibula*, for the water together with the ſpirit, and the ſalt paſſeth through the filter,all which may be ſeparated, rectified and be kept by themſelves for their proper uſes. Now this you muſt know, that you muſt chooſe ſuch minerals which have not been touched by the fire, if you deſire to have their ſpirit.

How minerals, and metals may be reduced into flowers, and of their vertues.

HItherto the flowers of metals, and minerals have not been in uſe, excepting the flowers of Antimony, and ſulphur, which are eaſily ſublimed : for Chymiſts have not dared to attempt the ſublimation of other metals, and fixed minerals, being content with the ſolution of them with Aqua fortis, and corroſive waters, precipitating them with the liquor of ſalt of tartar, and afterward edulcorating, and drying them ; and being ſo prepared they have called them their flowers : but by which flowers I underſtand the ſame water, which

which is by the help of fire without the addition of any other thing ſublimed, and turned into a moſt ſubtile pouder, not to be perceived by the teeth or eyes, which indeed is (in my judgement) to be accounted for the true flowers; when as the flowers which others make are more corporeal, and cannot be ſo well edulcorated, but retaine ſome ſaltneſs in them, as may be perceived by the increaſe of their weight,and therefore hurtful to the eyes, and other parts.

But our flowers being by the force of the fire ſublimed by themſelves, are not only without ſaltneſs, but are alſo ſo ſubtile that being taken inwardly preſently operate, and put forth their powers, *viz.* according to the pleaſure of the Phyſitian. Neither is their preparation ſo coſtly as the others.

Metals alſo, and minerals are maturated, and amended in their ſublimation, that they may be the more ſafely taken; but in other preparations they are rather deſtroyed, and corrupted,as experience witneſſeth : Now how theſe kind of flowers are to be made I ſhall now teach, and indeed of each metal by it ſelf, whereby the artiſt in the preparation cannot erre, and firſt thus.

Of Gold and Silver.

GOld and ſilver can hardly be brought into flowers, becauſe many are of opinion, that nothing comes from them in the fire, eſpecially from Gold, although it ſhould be left there for ever : which although it be true, *viz.* that nothing comes from gold in the fire, although it ſhould remaine there a long time,and from ſilver but a little,except it have copper or any other metal mixed, which yet vapours away but by little and little.

Which I ſay although it be ſo; yet they being broken and ſubtilized and ſcattered upon coales, and ſo diſperſed,may by the force of the fire and help of the aire be ſublimed, and reduced into flowers.

Now ſeeing the aforeſaid metals are dear, and of a great

price, and the furnace with its recipients large, I would not that any one should cast them in, especially gold, because he cannot recover them all; but I shall to those that desire to make these flowers shew another way in the second part, whereby they may make them without the loss of the metal; to which I referr the reader. For this furnace serves for the subliming of metals, and minerals, which are not so pretious, the loosing of part whereof is not so much regarded. And thus much is said to shew that gold, and silver, although fixed, may be sublimed. Now other metals may more easily be sublimed, yet one more easily then another, neither need they any other preparation but beating small, before they be cast into the fire.

Flowers of Iron and Copper.

TAke of the filings of Iron or Copper, as much as you please, cast them with an Iron laddle upon burning coals, *viz.* scatteringly, and there wil arise from Iron a red vapour, but from Copper a green, and will be sublimed into the sublimatorie vessels. As the fire abates it must be renewed with fresh coales, and the casting in of these filings be continued, uutill you have got a sufficient quantity of flowers, and then you may let all coole. This being done take off the sublimatorie vessels, take out the flowers, and keep them, for they are very good if they be mixed with unguents, and emplasters: and being used inwardly cause vomiting; therefore they are better in Chirurgery, where scarce any thing is to be compared to them. Copper being dissolved in spirit of salt, and precipitated with oyle of vitriol, edulcorated, dryed, and sublimed, yeelds flowers, which being in the aire resolved into a green balsom, is most useful in wounds and old putrid ulcers, and is a most pretious treasure.

Flowers

Flowers of Lead and Tin.

YOU need not reduce these metals into small crums, it is sufficient if they be cast in piece by piece, but then you must under the grate put an earthen platter glazed, and filled with water, to gather that which flows down melted, which is to be taken out, and cast again into the fire, and this so often until all the metall be turned into flowers, which afterwards are again, the vessels being cold, to be taken out, as hath been said of the flowers of *Mars* and *Venus*. And these flowers are most excellent being mixed with plaisters and oyntments in old and geeen wounds, for they have a greater power to dry, then metals calcined, as experience can testifie.

Of Mercury.

THis is easily reduced into flowers, because it is very volatile, but not for the aforesaid reason, because it leapes in the fire, and seeks to descend. And if you desire to have the flowers thereof, mix it first with sulphur that you may pulverize it, and cast it in mortified. And if you cast into a red hot crucible set in the furnace, a little quick Mercury, *viz.* by times with a laddle, presently it will fly out, and some part thereof will be resolved into an acid water, which is to be preferred before the flowers in my judgement; but the rest of the Mercury drops into a receiver. But here are required glass vessels, because the aforesaid water is lost in earthen. And this water without doubt doth something in Alchymie: It is also good being applyed outwardly, in the scab, and venereal ulcers.

The flowers of Zinck.

IT is a wonderful metal, and is found in the spagyrical anatomie to be meer sulphur, golden, and immature. Being put upon burning coales doth suddenly fly away wholly;

it.

it is inflamed also, and partly burns like common sulphur, with a flame of another colour, *viz.* golden purple: and yeelds most gallant white, and light flowers.

The use.

BEing given from 4. 5. 6. grains to 12. they provoke sweat wonderfully, and sometimes vomit, and stooles according to the offending matter. The vertues thereof being exteranlly used are also wonderful, for there are not found better flowers; for they do not only speedily consolidate fresh wounds, but also old, such as alwayes drop water, in which cases they excell all other medicaments. For they are of such dryness, which hath joyned with it a consolidating vertue, as that they do even things incredible. They may be used divers wayes, as to be strewed by themselves putting over them a stiptick plaister, or being brought into a unguent with honey to be put into wounds; which unguents in deep wounds may be boyled to a hardness for the making of small suppositories, which are to be put into the wounds, which must afterwards be covered with some plaister, and preserved from the aire. Being applyed after this manner they cure fundamentally, being mixed with plaisters also they do wonderfull things.

If they be mixed with rose, or raine water, so as to be united together, and afterwards some of this mixture be sometimes every day dropt into red eyes that water, yeelding not to other ophthalmicks, do restore, and heal them.

These flowers being taken up in lint and strewed upon those places of Children that are galled with their urine (those places being first washed with water) heale them quickly. They heale also quickly any excoriation which is contracted by lying long in any sickness, and is very paineful, if they be strewed thereon.

These flowers also are more easily dissolved in corrosive waters, then other metals, and minerals, neither doth the spirit leave them in the fire, but an insipid phlegme only distill

distils off leaving a fat, and thick oyl, as is above said concerning the *lapis calaminaris*, being ordained for the same uses, but more efficaciously then that. Which spirit if it be by the violence of fire driven forth, is of so great strength, that it can scarce be kept. And not only spirit of salt, but also Aqua fortis, and Regia may after this manner be exalted, so as to be able to do wonderful things in the separation of metals; but here is not place for these things they shall be spoken of in the fourth part.

But you need not make flowers for this work, because crude Zinck doth the same, although the flowers do it something better: whence it appears that a metal contracts a higher degree of dryness in sublimation.

Flowers of Antimony.

THere is no difficulty to make the flowers of Antimony, for Chymists have a long time made use of them, and because their preparation was tedious, they were not sold at a low rate.

Wherefore there was no body willing to attempt any thing else in them, because they were used only for vomiting; the dose whereof was from 1. 2. 3. 4. grains to 8. and 10. in affects of the stomack and of the head, as also in feavers, plague, morbus gallicus, *&c.* Neither is it a wonder if Chymists tryed no farther in them, for we see that there are found men in these dayes who perswade themselves that there is nothing which was not found out by the learned ancients, can be found out in these dayes, and if there were any thing to be yet found out it was found out already by them. But this opinion truly is very foolish, as if God gave all things to the ancients, and reserved nothing for them that should come after. Neither indeed do they understand nature in their operations, which works incessantly, and is not wearyed in her labours, *&c.* But however it is manifest that God hath revealed things in these times which were hid from them of

old, and he will not ceaſe to do the ſame even to the end of the world.

But to return to our purpoſe againe, which is to ſhew an eaſier way of making the flowers of Antimony, whereby a greater quantity may be had, as alſo that they may ſerve for other uſes.

Take of crude Antimony poudered as much as you pleaſe, & firſt make your furnace red hot, then caſt in at once a pound of Antimony, or thereabouts, *viz.* ſcatteringly upon the coals; and preſently it will flow, and mixed with the coals by the force of the fire will be ſublimed through the aire into receivers like a cloud, which will there be coagulated into white flowers. Note that when the firſt coales are burnt up, more muſt be put in to continue the ſublimation, and thoſe muſt be firſt kindled before they are put in, leſt the flowers be by the duſt of the coales ariſing together with the flowers diſcoloured, and contract thence a gray colour: but it matters not if you will not uſe them by themſelves to provoke vomiting, becauſe there is no danger thereby, for that colour comes only from the ſmoake of the coales, wherefore you need not be afraid of them. But let him that diſlikes this colour, firſt kindle the coales before he put them into the furnace, and then he ſhall have white flowers. Alſo you muſt not ſhut the middle hole through which the coales, and Antimony are caſt in, that thereby the fire may burn the more freely: for elſe the flowers of the ſuperior pots will be yellow and red, by reaſon of the ſulphur of the Antimony, which is ſublimed higher then the regulus. Now you may by this way make a pound of the flowers with 3.4.5. pound of coals. It is a little that goes away from the Antimony, *viz.* the combuſtible ſulphur, which is burnt, all the reſt going into flowers. You muſt have a care to provide a ſufficient quantity of ſubliming pots by reaſon that a large ſpace is required for the ſublimation of the flowers.

The flowers that are prepared after this way are ſold at a lower rate, ſo that one pound thereof is cheaper, then half an ounce of thoſe that are made after the other manner. Alſo they

they are ſafer, as being made with an open and free flame of the fire, for they do not provoke vomit ſo vehemently; morever the flowers of the lower pots are not vomiting, but diaphoretical, as if they had been prepared with nitre, for thus they are corrected by the fire; And by this way at one and the ſame operation divers flowers of divers operations may be made, for the flowers of the lower pots are diaphoretical, of the middle a little vomitive, but of the uppermoſt vehemently vomitive. For by how much the more they have endured the fire, by ſo much the better are they corrected; from whence the diverſity of their power proceeds. Wherefore each of them are to be kept by themſelves, and the uppermoſt for plaiſters or butter, or oyle, and thoſe to be made ſweet or corroſive thereby; The midle for purging, and vomiting, but the lowermoſt for ſweat, being more excellent then *Bezoardicum Minerale*, or *Antimonium Diaphoreticum* made with nitre. Truly I do not believe that there is an eaſier way of making vomiting, and diaphoretical flowers then ours. Now for the uſe of them, you muſt know that thoſe that are vomitive are to be adminiſtred to thoſe that are ſtrong, and accuſtomed to vomit: but to children, and old men with diſcretion, as hath been ſaid above of the butter of Antimony: but thoſe that are diaphoretical may be given without danger to old and young, to thoſe that are in health, and to the ſick; in any affection that requires ſweat, as in the plague, Morbus Gallicus, ſcorbute, leproſie, feavers, &c. The Doſe of them is from 3. 6. 9. 12. graines to 24. with proper vehicles to ſweat in the bed: for they do expel as well by ſweat, as by urine all evil humors. And becauſe they that are vomitive are in a greater quantity then thoſe, that are diaphoretical, and not ſo neceſſary as theſe, and there may be many more doſes out of them, it is neceſſary to ſhew you how thoſe that are vomitive may be turned into diaphoreticall: and that may be done three wayes, the two former whereof I have before ſhewed concerning the butter of Antimony made of flowers with ſpirit of ſalt, the third is this, *viz.* put flowers in a crucible covered (without luting) leſt any thing fall into it, ſo ſet them by

themselves in a gentle fire, that they melt not, but be made only darkly glow for the space of some hours, then let them coole, for they are become fixed, and diaphoreticall. Although they had before contracted some yellowness or ash colour, yet by this means they are made white and gallant, fixed, and diaphoretical. Also these flowers are used in stiptick plaisters by reason of their dry nature, with which they are endued.

Also they are melted into a yellow transparent glass, neither is there taught an easier way of reducing Antimony by it self into a yellow transparent glass, where crude Antimony is first sublimed, and being sublimed is melted into glass.

This sublimation serves in stead of calcination, by the help whereof 20. pound are more easily sublimed, then by the help of the other one pound is brought into calx.

Neither is there here any danger of the ascending fumes, because when the Antimony is cast into the fire you may be gone, which is a safe, and easie calcination, whereas the common way requires the continual presence of the artist stirring the matter, who also takes out the matter when it is once grown together, and grinds it again; by which means he hath much to do, before the matter come to a whiteness; but by our way, the matter is at the first time made sufficiently white, and more then by that common way of calcination and agitation. I suppose therefore that I have shewed to him that will make glass of Antimony, the best, and hitherto unknown way; which being taught I hope there is no man will hereafter like a fool go that tedious way of the ancients, but rather follow my steps. For by this way may any Physitian, most easily be able to prepare for himself vomitive and diaphoretical flowers, and also glass of Antimony *per se*.

Of those flowers may be made oyles both sweet and corrosive, and other medicaments, as hath been above said of the spirit of salt, and shal afterwards be spoken in the second part.

Let him that will make flowers of the regulus, fairer then those which are made of crude Antimony, cast it being powdered into the fire, and in all things proceed as hath been said, and he shall have them, &c. for they are easily sublimed. Now, how

how the regulus is to be made after a compendious manner you shall finde in the fourth part. The scory also are sublimed, so as nothing is lost. But he that will make flowers that shall be dissolved in the aire into a liquor must adde some calcined tartar, or some other fixt vegetable salt, and he shall have flowers that will be dissolved in any liquor: but he that will make red flowers as well those that are diaphoretical as those that are purging, must mix Iron, and he shall have flowers like to cinnabar: Let him that desires green, mix copper, if purple, *lapis calaminaris*.

And thus out of any mineral may be made flowers whether it be fixed, or volatile; for it is forced to fly on high being cast into the fire. And these may be used diversly in Chirurgery, in plaisters and unguents; for they dry, and astringe potently, especially those that are made of *lapis calaminaris*. Neither are they to be slighted that are made of the golden, and silver marcasite. Those that are made of Arsenic and auripigmentum are poysonous, but are useful for painters. Arsenic, & auripigmentum being calcined with nitre, and then sublimed, yeeld flowers that are safely to be taken inwardly, expelling all poysons by sweat and stoole. For they are corrected two wayes, *viz.* first by by the nitre, secondly by the fire in the subliming: they are not therefore to be feared, because that Antimony was poysonous before the preparation thereof. For by how much the greater poyson it was before preparation, so much the greater medicine afterwards.

The flowers of sulphur are taught in the second part, although they may also be made by this furnace, *viz.* the nature, and properties thereof being known by an expert artist or otherwise it is burnt.

So also stones being prepared are brought into flowers, and many other things, of which we need not say any thing, only let him that pleaseth make tryal thereof.

And now I suppose I have made plain, and shewed you cleerly how distillation is to be made in this our first furnace, wherefore I will now end. He therefore that nnderstands and knows the fabrick of the furnace (which he may understand

by the delineation thereof) and the use thereof, will not deny but that I have done a good work, and will not disapprove of my labor.

And this is the best way of distilling, and subliming incombustible things. In the second part you shall finde another furnace in which are distilled, combustible things, as also most subtile spirits, *&c.* The first furnace serves also for other uses, as the separation of metals; of the pure from the impure; for the making of the central salt, and of the *humidum radicale* of them all. But because it cannot be done after the aforesaid way, by which things are cast into the fire to get their flowers, and spirits, but after a certain secret Philosophical maner, by the power of a certain secret fire, hitherto concealed by the Philosophers (neither shall I prostrate that secret before all) It is sufficient that I have given a hint of it for further enquirie, and have shewed the way to other things.

FINIS.

THE SECOND PART OF THE PHILOSOPHICAL FURNACES:

WHEREIN

Is described the Nature of the

SECOND

FVRNACE;

By the help whereof all volatile, subtle and combustible things can be distilled.

Whether they be Vegetables, Animals, or Minerals, and that after an unknown and very compendious way; whereby nothing is lost, but even the most subtile spirits may be caught and preserved, which else without the means of this Furnace is impossible to be done by Retorts or other distilling Instruments.

By JOHN RUDOLPH Glauber.

LONDON,
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A. The furnace together with the iron distilling-vessel fastened into it, whereunto a receiver is applyed. B. The distiller with his left hand taking off the lid, and with his right casting in his prepared matter. C. The externall form of the distilling vessel. D. The internal form of the vessel. E. Another distilling vessel, which is not fastened to a furnace, but only standeth upon coals.

THE

THE SECOND PART OF PHILOSOPHICAL FURNACES.

The structure of the second Furnace.

THE Distilling vessel must be made of Iron, or good earth, such as can abide in the fire (whereof in the fist part of this Book it shall be taught) and you may make it as big or as little as you please, according as your occasion shall require. That of Iron is most fit to be used for such spirits, as are not very sharpe or corroding, else they would corrode the vessel: but that of earth may be used for such things, as shew their activity upon the Iron, and do make it to melt, as sulphur, Antimony and the like; and therefore you ought to have two such vessels, *viz.* one of iron, and one of earth, to the end that for both sorts of materials (corrosive or not corrosive) you may have proper vessels, and fit furnaces for their distilling, and that they may not be spoiled by things con-

contrary and hurtful to them. The shape of the vessel is shewed by the figure here annexed, *viz.* the lower part of it somewhat wider then the upper part, and twice as high as wide; at the top having a hollow space between the two edges or brims, whereinto the edge of the lid may close and enter into an inch deep. The lid must have a ring or handle, by which it may be taken off and put on again with a paire of tongs. The lid must have a deepe edge answering to the hollow space aforesaid. The lower part must have three knobbs or shoulders thereby to rest upon the wall of the furnace; the form whereof is no other, then that of a common distilling furnace with sand Capel, as the figure of it doth shew: but if you will not have the furnace, then it needeth no knobbs or shoulders, if so be the distilling vessel be flat at the bottom, or else have leggs, for to stand upon them: Beneath the edge of the vessel there comes forth a spout or pipe of a span in length, and one or two inches wide, and somewhat narrower before then behinde, through which the spirits are conveighed into the Receiver.

The way or the manner to perform the destillation.

WHen you intend to distill, then first make a fire in he furnace, that the distilling vessel come to be very hot. But if it be not fastned to the furnace, then set it upon a grate, and lay stones about it, and coales between, and so let it grow hot, and lay melted lead into the space between the two edges or brims, to the end, that the lid, when it is put on, may close exactly, so that no spirit can get through. This done take a little of the matter you intend to distil and cast it in and presently put on the lid, and there will be no other passage left but through the pipe, to which there must be applyed and luted a very big receiver. As soon as the species cast in come to be warm, they let go their spirit, which doth come forth into the receiver: and because there was but little of the matter cast in it hath no power to force through the lute

lute or to break the receiver, but must settle it self. This done, cast in a little more of your matter, cover it and let it go till the spirit be settled: continue this proceeding so long, untill you have spirits enough: but take heed, that you carry in no more at once, then the receiver is able to bear, else it will break. And when your vessel is full the distillation not being ended, then take off the lidd, and with an iron ladle take out the Caput Mortuum; and so begin again to cast in, and still but a little at a time, and continue this as long as you please.

Thus in one day you may distil more in a smal vessel, then otherwayes you could do in a great retort; and you need not fear the least loss of the subtile spirit, nor the breaking of the receiver by the abundance of the spirits: and you may cease or leave off your distilling and begin it again when you list: also the fire cannot be made too strong so that it might cause any hurt or damage; but by this way you can make the most subtle spirits, which is impossible to be done by any Retort. But if you will distil a subtle spirit through a Retort, as of Tartar, Hartshorn, Salarmoniac, or the like, you cannot do it without prejudice (though there were but half a pound of the matter in it) the subtlest spirits coming forth with force seek to penetrate through the lute if that be not good, but if that be good so that the spirits cannot pass through it, then they break the receiver, because it cannot possibly hold such a quantity of subtle spirits at once. For when they are coming, they come so plentifully and with such a force, that the receiver cannot containe them, and so of necessity must flye asunder, or must pass through the lutum; All which is not to be feared here, because there is but a little cast in at once, which cannot yeeld such a quantity of spirits, as to force the receiver to break: And when there come forth no more spirits, and the former is settled, then more of the matter is to be cast in, and this is to be continued so long untill you have spirits enough. Afterward take off the receiver, and put the spirit into such a glass (as in the fifth part of this book amongst the Manuals

ſhall be diſcovered) wherein it may be kept ſafely without waſting or evaporating.

In this manner all things, Vegetable, Animal, or Mineral, can be diſtilled in this furnace, and much better then by means of a Retort: eſpecially ſuch ſubtile ſpirits (as by the other way of diſtilling cannot be ſaved, but paſs through the lutum) are got by this our way; and they are much better, then thoſe heavy oyles, which commonly are taken for ſpirits, but are none, being only corroſive waters. For the nature and condition of a ſpirit is to be volatile, penetrating and ſubtle, and ſuch are not thoſe ſpirits of ſalt, Vitriol, Allome and Nitre, which are uſed in Apothecary ſhops, they being but heavy oyles, which even in a warm place do not evaporate or exhale.

But a true ſpirit fit for Medicinal uſe, muſt riſe or aſcend before the phlegme, and not after; for whatſoever is heavier then phlegme, is no volatile ſpirit, but a heavy ſpirit or (rather called) a ſowre heavy oyle. And it is ſeen by the experience that the Apothecaries ſpirit of vitriol will cure no falling ſickneſs, which vertue is aſcribed to that ſpirit, and indeed juſtly: for the true ſpirit of vitriol performeth that cure out of hand. Likewiſe their ſpirit of Tartar (as they call it) is no ſpirit, but only a ſtinking phlegme or Vinegar.

The way to make ſuch true ſpirits, I will now ſhew becauſe much good may be done by them in all manner of diſeaſes. And this way of diſtilling ſerveth only for thoſe which ſeek after good medicines: but others which care not whether their medicines be well prepared or no, need not take ſo much pains as to build ſuch a furnace, and to make their ſpirits themſelves, for at any they can buy for a ſmall matter a good quantity of dead and fruitleſs ſpirits at the common ſellers and Apothecaries.

Hence it is no marvel, that now a dayes ſo little good is done by Chymicall medicaments, which of right ſhould far outſtrip all the Galenical in goodneſs and vertue. But alas! it is come to that paſſe now, that a true Chymiſt and honeſt ſon of *Hermes*, is forced almoſt to bluſh, when he heareth

heareth men talk of Chymical medicines, becauſe they do no ſuch miracles, as are aſcribed unto them. Which infamy is occaſioned by none more then by careleſs Phyſitians, which though they make uſe of Chymicall medicines (becauſe they would faine be eſteemed to know more then others) yet they do take greater care for their kitchin, then for the welfare of their patients; and ſo buying ill prepared medicines of unskilful ſtillers, and withall uſing them undiſcreetly (whereby they many times do more hurt then good to the ſick) they do lay ſuch foule aſperſions upon the noble Art of Chymiſtry.

But an Induſtrious and accurate Phyſitian is not aſhamed to make his medicines himſelf, if it be poſſible, or at leaſt to have them made by good and well exerciſed Artiſts: whereupon he may better relye and get more credit, then one that knoweth not whereof, nor how his medicine which he doth adminiſter to his patients is prepared. But ſuch wicked and ignorant men will one day fal ſhort of their anſwer before the Judgement of the righteous Samaritane.

How to make the Acid oyle and the volatile ſpirit of Vitriol.

HItherto I have taught, how to diſtill in general, and to get the ſubtle ſpirits. There remaineth now to deſcribe what manuals or preparations are fitting for every matter in particular; and firſt,

Of Vitrioll.

TO diſtill Vitrioll, there needs no other preparation, but only that it be well viewed, and if there be any filth amongſt it, that the ſame be carefully pickt out, leſt being put together with the Vitriol into the diſtilling veſſel, the ſpirit be corrupted thereby. But he that will go yet more exactly to work, may diſſolve it in faire water, then filtrate it, and then

then evaporate the water from it till a skin appear at the top, and then set it in a cold place, and let it shoote again into Vitrioll; and then you are sure that no impurity is left in it.

Now your vessel being made red hot, with an Iron ladle cast in one or two ounces of your vitriol at once, put on the lid, and presently the spirits together with the phlegme will come over into the receiver, like unto a white cloud or mist; which being vanished, and the spirits partly settled, carry in more Vitriol, and continue this so long, until your vessel be full: Then uncover your vessel, and with a pair of tongs or an iron ladle take out the Caput Mortuum, and cast more in; and continue this proceeding as long as you please, still emptying the vessel when it is filled, and then casting in more matter, and so proceeding untill you conceive that you have got spirits enough. Then let the fire go out, and let the furnace coole; take off the receiver, and powre that which is come over into a retort, and lay the retort in sand, and by a gentle fire distill the volatile spirit from the heavy oil; having first joyned to the retort the receiver, which is to receive the volatile spirit, with a good lutum, such as is able to hold such subtle spirits, the making whereof shall be taught in the fifth part of this book amongst the Manuals.

All the volatile spirit being come over, which you may know by the falling of bigger dropps, then take off the receiver, and close it very well with wax, that the spirit may not make an escape; then apply another (without luting it) and so receive the phlegme by it self, and there will remaine in the retort a black and heavy corrosive oyle, which if you please, you may rectifie, forcing it over by a strong fire, and then it will be clear; if not, let all coole, then take out your Retort together with the black oyle, and pour upon it the Volatile spirit, which in the rectifying went over first, put the retort into the sand, and apply a receiver, and give it a very gentle fire, and the volatile spirit will come over alone leaving its phlegme behinde with the oyle, which by reason of its dryness doth easily keep it. Thus the spirit being freed

freed from all phlegme, is become as strong as a meer fire, and yet not corrosive. And if this spirit be not rectified from its own oyle, it will not remaine good, but there doth precipitate a red pouder after it hath stood for some space of time, and the spirit looseth all its vertue, in so much that it is not to be discerned from ordinary water, which doth not happen when it is rectified. The reason of this precipitation is no other then the weakness of the spirit, which is accompanied with too much water, and therefore not strong enough for to keep its sulphur, but must let it fall: but after it is rectified by its own oyle, it can keep its sulphur well enough, because then it is freed from its superfluous moisture. However the red powder is not to be thrown away, but ought to be kept carefully; because it is of no less vertue then the spirit it self. And it is nothing else but a Volatile sulphur of Vitrioll, It hath wonderfull vertues, some of which shall be related.

The use and Dose of the Narcotick sulphur of Vitrioll.

OF this sulphur 1. 2. 3. 4. or more grains (according to the condition of the patient) given at once mitigates all pains, causeth quiet sleep; not after the manner of Opium, Henbane, and other the like medicines, which by stupefying and benumming cause sleep, but it performeth its operation very gently and safely without any danger at all, and great diseases may be cured by the help thereof. *Paracelsus* held it in high esteeme, as you may see, where he doth write of *Sulphur embryonatum*,

Of the use and vertue of the Volatile spirit of Vitriol.

THis sulphureous volatile spirit of Vitriol, is of a very subtle and penetrating quality, and of a wonderful operation; for some drops thereof being taken and sweated upon it, doth penetrate the whole body, openeth all obstructions, consumeth those things that are amiss in the body, even as fire. It is an excellent medicine in the falling sickness, in that kinde of madness or rage which is called *Mania*, in the convulsion of the mother, called *Suffocatio matricis*, in the scurvy; in that other kinde of madness which is called Melancholia Hypochondriaca; and other diseases proceeding from obstructions and corruption of the blood: It is also good in the plague, and all other feavers: mingled with spirit of wine, and daily used, it doth wonders in all external accidents: Also in the Apoplexy, shrinking and other diseases of the Nerves, the distressed limbe rubbed therewith, it doth penetrate to the very marrow in the bones; it doth warm and refresh the cold sinews, grown stiffe: In the Colick, besides the internal use, a little thereof in a clyster applyed, is a present help: Externally used in the Goute, by anoynting the places therewith asswageth the pains, and taketh away all tumors and inflammations: it doth heale the scabs, tetters and ringworms, above all other medicines; it cureth new wounds and old sores, as Fistulaes, Caneers, Woolves, and what name so ever else they may have: It extinguisheth all inflammations, scaldings, the Gangrene, dissipateth and consumeth the knobs and excrescencies of the skin. In a word, this spirit, which the wise men of old called *Sulphur Philosophorum*, doth act universally in all diseases, and its vertue cannot sufficiently be praised and expressed: And it is much to be admired, that so excellent a Medicine is no where to be found.

If it be mingled with spring water, it doth make it pleasantly sowrish, and in taste and vertue like unto the natural sowre water of wels.

Also

Also by this spirit many diseases may be cured at home; so that you need not go to bathes afar off, for to be rid of them.

Here I could set down a way, how such a spirit may be got in great abundance for the use of bathing, without distillation, whereby miraculous things may be done; but by reason of the ungratefulness of men, it shall be reserved for another time.

Of the vertue and use of the corrosive oyle of Vitriol.

THis oyle is not much used in Physick, although it be found almost in every Apothecaries shop, which they use for to give a sowrish taste to their syrups and conserves. Mingled with spring water and given in hot diseases, it will extinguish the unnatural thirst, and coole the internal parts of the body. Externally it cleanseth all unclean sores, applyed with a feather; it separateth the bad from the good, and layeth a good foundation for the cure.

Also if it be rectified first, some metals may be dissolved with it and reduced into their Vitriols, especially Mars and Venus; but this is to be done by adding common water thereunto, else it will hardly lay hold on them. The way of doing it is thus:

How to make the Vitriol of Mars and Venus.

TAke of your heavy oyle, just as it came over, *viz.* together with its phlegme (but that the Volatile spirit be drawn off from it first) as much as you please, put it into a glass body together with plate of copper or iron, set it in warme sand, and let it boyle untill that the oyle will dissolve no more of the metal, then power off the liquor, filtre it through brown paper, and put it into a low gourd glass, and set it in sand, and let the phlegme evaporate untill there appear a skin at the top, then let the fire go out, and the glass grow coole; then set it in a cold place, and within some dayes there

will ſhoote faire green Cryſtals; if of iron, greeniſh; if of Copper, then ſomething blewiſh; take them out and dry them upon filtering paper, the remaining liquor, which did not ſhoote into Vitriol, evaporate again in ſand, and then let it ſhoote as before; continue this proceeding, untill all the ſolution (or filtred liquor) be turned to Vitriol. This Vitrioll is better and purer then the common; for it yeeldeth a better Volatile ſpirit, and for that reaſon I did ſet down the way how to make it. There can alſo be made a good Vitrioll of both theſe metals by the means of ordinary yellow brimſtone; but becauſe the making of it is more tedious, then of this here ſet down, I think it needleſs to deſcribe its preparation in this place.

The way to make a faire blew Vitrioll out of Luna (*that is, ſilver.*)

DIſſolve the ſhavings or filings of ſilver with rectified oyle of Vitrioll, adding water thereunto, but not ſo much as to Iron and Copper: Or elſe, which is better, diſſolve calcined ſilver, which hath been precipitated out of Aqua fortis either with Copper or ſalt water; the ſolution being ended powre it off and filtre it, and drop into it of ſpirit of urine or of Sal armoniac, as long as it doth hiſs, and almoſt all the ſilver will precipitate again out of the oyle, and ſo there will fall a white powder to the bottome; This precipitated ſilver together with the liquor poure into a phiall-glaſs, ſet it to boyle in ſand for twenty four hours, and the liquor will diſſolve again almoſt all the precipitated ſilver-calx and become blew thereby. Then poure off the ſolution (or liquor) and filtre it through brown paper, and abſtract the moiſture till a skin ariſe at the top; then in a cold place let it ſhoote to Vitriol. With the remaining liquor proceed further, as above in the preparation of the Vitriol of Iron and Copper hath been taught.

By this way you will get an excellent Vitrioll out of ſilver, which

which from 4. 5. 6. to 10. grains uſed onely of it ſelf, will be a good purge, eſpecially in diſeaſes of the braine.

If you have a good quantity of it, that you may diſtill a ſpirit thereof, you will get not only an acide (or ſowre) but alſo a volatile ſpirit, which in the infirmities of the braine is moſt excellent; that which in the diſtilling remains behinde, may be reduced againe into a body, ſo that you loſe nothing of the ſilver, ſave onely that which is turned into ſpirit.

Moreover, the acide (or ſowre) oyle of common Vitriol, doth precipitate all metals and ſtones of beaſts or fiſhes; alſo pearles and corals, they being firſt diſſolved in ſpirit of ſalt or of Nitre, and maketh faire light powders of them (which by the Apothecaries are called Magiſteries) much fairer then by precipitation with ſalt of Tartar is done, eſpecially of corals and pearles, ſuch a faire gliſtering and delicate powder is made; and likewiſe alſo of mother of pearle, and other ſhels of ſnailes, that it giveth as fair a gloſs to them, as the faireſt oriental pearles have; which way hath not been made common hitherto, but being known only to few, hath been kept very ſecret by them, as a ſingular Art. Such magiſteries commonly were precipitated out of vinegar onely by ſalt of Tartar, which for lightneſs, whiteneſs and fair gloſs are not comparable at all to ours: But if in ſtead of the oyle of Vitriol you take oyle of ſulphur, then theſe powders will be fairer then when they are done by the oyle of Vitriol, in ſo much, that they may be uſed for painting for a black skin.

Having made mention of Magiſteries, I cannot forbear to diſcover the great abuſe and error, which is committed in the preparing of them.

Paracelſus in his Archidoxes teacheth to make Magiſteries, which he calleth extracted Magiſteries: but ſome of his diſciples teach to make precipitated Magiſteries, which are quite different from the former. *Paracelſus* is clean of another opinion in the preparing of his Magiſteries, then others in the making of theirs: doubtleſs *Paracelſus* his Magiſteries were

good cordiall living medicines, whereas the other were but dead carkaſes, and although they be never ſo faire, white and gliſtering, yet in effect they prove but a groſs earthy ſubſtance, deſtitute of vertue.

I do not deny, but that good medicines may be extracted out of pearles and corals, for I my ſelf alſo do deſcribe the preparations of ſome of them; but not at all after ſuch a way as theirs is. For what good or exalting can be expected by ſuch a preparation, where a ſtony matter is diſſolved in corroſive waters, and then precipitated into ſtone again? Can its vertue be increaſed thereby? ſurely no, but rather it is diminiſhed, and made much the worſe thereby. For it is well known, that the corroſive ſpirits (no leſs then fire) do burn ſome certain things; for not all things are made better by fire or corroſives, but moſt of them are abſolutely ſpoyled by them. Some perchance will ſay, that ſuch preparations of Magiſteries are onely for to be reduced into a finer powder, that ſo much the ſooner they may perform their operation. To which I anſwer, that pearles, corals, and other of the like nature, if they be once diſſolved by corroſive waters, and then precipitated and edulcorated, never or hardly can be diſſolved againe by acid ſpirits. Whence it is evident that by ſuch preparations they are not opened or made better, but rather cloſed or made worſe. And we ſee alſo by daily experience that thoſe Magiſteries do not thoſe effects, which are aſcribed unto them. By which it appeareth cleerly, that to the Archeus of the ſtomach they are much leſs grateful then the crude unprepared corals and pearles; whoſe tender eſſence being not burnt up by corroſives, do oftentimes produce good effects. For our Anceſtors have aſcribed unto corals and pearles, that they purifie the impure and corrupt blood in the whole body, that they expel Melancholy and ſadneſs, comforting the heart of man, and making it merry, which alſo they effectually perform: whereas the Magiſteries do not. And this is the reaſon, why unprepared corals, pearles and ſtones of fiſhes have more effect, then the burnt Magiſteries. For it is manifeſt and well known, that the aboveſaid diſeaſes for

for the moſt part do proceed from obſtructions of the ſpleen, which obſtructions are nothing elſe, but a tartarous juice or a ſowre flegme which hath poſſeſſed and filled up the entrals, and coagulated it ſelf within them. By which obſtruction not only head-ach, giddineſs, panting of the heart, trembling of the limbs, a ſpontaneous laſſitude, vomits, unnatural hunger; alſo, loathing of victuals; then cold, then hot fluſhing fits, and many more ſtrange ſymptomes are cauſed; but alſo a moſt hurtful rottenneſs and corruption is introduced into the whole maſs of blood, from whence the leproſie, ſcurvy, and other loathſome or abominable ſcabs do ſpring.

Of which evil the onely cauſe (as hath been ſaid) is a crude acide Tartar, from which ſo many great diſeaſes do riſe.

This to be ſo may eaſily be proved; for it is notorious, that melancholik folks, hypocondriaques, and others do often caſt up a great quantity of acid humor, which is ſo ſharpe that no vinegar is comparable to it, and doth ſet their teeth on ſuch an edge, as if they had eaten unripe fruit.

What remedy now? take away the cauſe and the diſeaſe is taken away. If you could take away the peccant matter by purgings, it would be well, but it remaineth obſtinate and will not yeeld to them. By vomit it may be diminiſhed in ſome meaſure. But becauſe that not every one can abide vomiting, it is therefore no wiſdome to turn evil into worſe. Shall then this tartar be killed and deſtroyed by contraries, which indeed in ſome ſort may be effected; as when you uſe vegetables or animals, whoſe vertue conſiſteth in a volatile ſalt: ſuch are all ſpecies or ſorts of creſſes, Muſtard-ſeed, horſe-radiſh, ſcurvy graſs, alſo the ſpirit of Tartar, of Hartſhorn, and of urine and the like, which by reaſon of their penetrating faculty paſs through all the body, finding out the Tartar thereof, deſtroying the ſame, as being contrary unto it; and in this combat two contrary natures is kindled, a great burning heat, whereby the whole body is throughly heated and brought to ſweating; and whenſoever by theſe contraries a

ſweating

sweating is caused, there is alwayes mortified some of this hurtful Tartar. But because that of that acid humor but a little at a time can be mortified and edulcorated by contrary volatile spirits, and that therefore it would be required to use them often, for to kill and expell all the Tartar; and because also (as hath been mentioned before) a strong sweat alwayes is caused by every such operation, whereby the natural spirits are much weakened, so that the patient would not be able to hold out long thereby, but by taking away of one evil, another and greater one would be occasioned.

And therefore such things must be offered to that hungry acid humor, by which the corrosive nature thereof, may be mortified and grow sweet, with that proviso nevertheless, that those things be such as are not contrary or hurtful to the nature of man, but grateful and friendly, as are corals, pearles and crabs eyes, *&c.*

For amongst all stones none are more easily to be dissolved then Pearles, Corals, Crabbs-eyes, and other stones of fishes.

But the truth of this, *viz.* that every corrosive is killed by feeding upon pearles and corals, and thereby can be made sweet; and besides, how a sowre coagulated Tartar, by the help of corals or pearles may be reduced to a sweet liquor (a pleasant and acceptacle medicine to the nature of man) which never can be coagulated again by any means, shall be afterwards proved and taught when I shall come to treate of Tartar.

Now in tartareous coagulations and obstructions of the internals proceeding from the predominancy of an acid humor there is no better remedy, then to give the patient every morning fasting from ℈ss. to ʒ i. (more or less, according to the condition of the patient) of red corals and pearles made into powder, and to let him fast two or three hours upon it, and so to continue daily untill you see amendment: By this means the hurtful acid humor is mortified, and dulcified by the corals and pearles so that afterwards it may be overcome by nature, whereby the obstructions are removed, and the body freed from the disease. This

This my opinion of the abuse of Magisteries and the good use of Corals I could not conceale although I do know for certain, that it will take but with few, in regard that it will seem very strange to most. However, happily there may be some yet, that will not be unwilling to search into the truth and to consider further of it, and at last will finde this not to be so strange, as it seemed to them at the first: but he that cannot believe or comprehend it, may keep to his Magisteries.

And if it seem so strange unto any, that corals or pearles made into powder shall be concocted in the stomach, and so put forth their vertue, what will you say then, if I do prove, that even whole pearles, crabs-eyes, and corals being swallowed, are totally consumed by the Melancholy humor, so that nothing cometh forth again among the excrements? and which is more, even the like may be said of hard and corrupted metals, as Iron, and speaucer or Zinck: But this must be understood only of those that are of a Malancholick constitution but not so in others, *viz.* those that are of a sanguine, and those that are of a phlegmatick constitution, to whom such like things are seldome prescribed. For I have seen many times, that against obstructions to strong bodies there hath been given at once from ℈ß. to ʒ i. of the shavings or filings of iron, and they found much good by it, yea more help then by other costly medicines of the Apothecaries, whereof they had used many before, but to no purpose, by reason whereof their excrements came from them black, just as it useth to fall out with those that make use of medicinal sowre waters, which run through iron mines, and thereby borrow a spiritual mineral vertue.

Now if those filings of iron had not been consumed in the stomach, how come it that the excrements are turned black? so then it is sufficiently proved, that even a hard unprepared metal can be consumed in the stomach: and if so, why not as well soft pearles and corals?

Which is also to be seen by children, that are troubled with worms, if there be given unto them 4. 6 8. to 12. or 16. grains of the finest filings of steel or iron, that all the worms in the

body are killed thereby, their ſtomach and guts ſcowred very clean, and their ſtools alſo turned black. But this muſt be obſerved by children, when the worms are killed, and yet remaine in the guts (becauſe that the iron in a ſmall quantity is not ſtrong enough for to expell them, but only make the body ſoluble) that a purge muſt be uſed after, for to carry them out; for elſe if they do remaine there, others will grow out of their ſubſtance. But to thoſe that are more in yeers, you may give the Doſe ſo much the ſtronger, as from ℈i. to ʒi. that the worms alſo may be carryed out, they beeing better able to endure it then little children, and although ſometimes a vomit doth come, yet it doth no hurt, but they will be but ſo much the healthier afterward.

And thus Iron may be uſed, not only againſt worms, but alſo againſt all ſtomach-agues, head-ach, and obſtructions of the whole body, without any danger and very ſucceſſefully, as a grateful or very acceptable medicine to Nature; for after a powerful magnetical way it doth attract all the ill humors in the body, and carrieth them forth along with it. Of whoſe wonderful vertue and nature, there is ſpoken more at large in my treatiſe of the Sympathy and Antipathy of things. Which ſome Phyſitians perceiving and ſuppoſing by Art to make it better, they ſpoiled it, and made it voyd of all vertue: for they taking a peece of ſteel, made it red-hot, and held it againſt a peece of common Sulphur, whereby the ſteel grew ſubtle, ſo they did let it drop into a veſſel filled with water; then they took it out, and dryed it, and made it into powder, and uſed it againſt obſtructions, but to no effect almoſt; for the Iron was ſo altered by the ſulphur and reduced to an inſoluble ſubſtance (which ought not to have been ſo) that it could perform no conſiderable operation: But if they had made the ſteel more ſoluble (whereas they made it more inſoluble) then it was of it ſelf before, then they had done a good work: for he that knoweth ſulphur, doth know well enough, that by no *Aquafortis* or *Aqua Regis* it can be diſſolved; and how could it then be conſumed by an animal humor?

Hitherto

Hitherto it hath been proved ſufficiently, that in ſome men, eſpecially in thoſe that are of a Melancholick conſtitution there is an acid humor, which can ſufficiently diſſolve all eaſily ſoluble metals and ſtones: and that therefore it is needleſs to torture, and diſſolve pearles, corals and the like with corroſive waters before they be adminiſtred to patients: but that the Archeus of the ſtomach is ſtrong enough by the help of the ſaid humors to conſume thoſe eaſily ſoluble things, and to accept of that which ſerveth his turn, and to reject the reſt.

But it is not my intent here, that this ſhould be underſtood of all metals and ſtones; for I know well, that other metals and ſtones (ſome excepted) before they are duly prepared, are not fit for phyſick, but muſt be fitted firſt, before they be adminiſtred or given unto patients.

For this relation I made only for to ſhew, how ſometimes good things (though with intent to make them better) are made worſe and ſupplyed by thoſe that do not make an exact ſearch into nature and her power.

I hope this my admonition will not be taken ill, becauſe my aime was not vaine-glory, but only the good of my neighbor.

Now let us return again to Vitriol.

Of the ſweet oyle of Vitriol.

THE Ancients make mention of a ſweet and green oyle of Vitriol, which doth cure the falling ſickneſs, killeth worms, and hath other good qualities & vertues beſides: and that the Oyle is to be diſtilled *per deſcenſum*. To attain unto this oyle the later Phyſitians took great paines, but all in vaine: becauſe they did not underſtand at all the Ancients about the preparing of this oyle, but thought to get it by the force of fire, and ſo uſing violent diſtillation, they got no ſweet oyle, but ſuch as was very ſowre and corroſive, which in taſte, efficacy and vertue was not comparable at all to the former.

How-

However they ascribed unto it (though falsely) the same vertues, which the ancients (according to truth) did unto theirs. But daily experience sheweth, that the oyle of vitriol as it is found ordinarily, cureth no falling sickness, nor killeth worms, whereas this Philosophical doth it very quickly. Whence it appeareth, that the other is nothing like unto the true medicinal oyle of vitriol, neither is it to be compared to it.

I must confess indeed, that *per descensum* out of common vitriol, by the force of the fire, there may be got a greenish oyle, which yet is not better then the other because it proveth as sharpe in taste, and of as corroding a quality, as if it had been distilled through a Retort.

Those that found out this oyle, as *Paracelsus*, *Basilius*, and some few others, did alwayes highly esteem it, and counted it one of the foure maine pillars of Physick. And *Paracelsus* saith expressly in his writings, that its viridity or greenness must not be taken away or marred (which indeed a very little heat can do) by the fire; for (saith he) if it be deprived of its greenness, it is deprived also of its efficacy and pleasant essence. Whence it may be perceived sufficiently, that this sweet green oyle is not to be made by the force of the fire as hitherto by many hath been attempted, but in vaine.

And it is very probable, that the ancients, which did so highly praise the oyle of vitriol, happily knew nothing of this way of distilling, which is used by us now a dayes: for they only simply followed Nature, and had not so many subtle and curious inventions and wayes of distilling.

But however it is certain, that such a sweet and green-oyle cannot be made of vitrioll by the force of the fire, but rather must be done by purification, after a singular way; for the Ancients many times understood purification for distillation: as it is evident, when they say, Distill through a filtre, or through filtring paper: which by us is not accounted for distillation, but by them it was.

How-

However, this is true and very sure, that a great Treasure of health (or for the health of man) lyeth hidden in Vitriol: yet not in the common, as it is sold every where, and which hath endured the heat of the fire already; but in the Oare as it is found in the earth, or its mine. For as soon as it cometh to the day light, it may be deprived by the heat of the Sun of its subtle and penetrating spirit, and so made voyde of vertue; which spirit, if by Art it be got from thence, smelleth sweeter then musk and amber, which is much to be admired, that in such a despicable mineral and gross substance (as it is deemed to be by the ignorant), such a royal medicine is to be found.

Now this preparation doth not belong to this place, because we treat here only of spirits, which by the force of fire are driven over. Likewise also, there doth not belong hither the preparation of the green oyle, because it is made without the helpe of fire. But in regard, that mention hath been made of it here, I will (though I kept it alwayes very secret) publish it for the benefit of the poor patients, hoping that it will do much good to many a sick man.

For if it be well prepared, it doth not only cure perfectly every Epilepsie or Convulsion in young and old; and likewise readily and without faile killeth all worms within and without the body, as the Ancients with truth ascribed unto it; but also many Chronical diseases and such as are held incurable, may be happily overcome and expelled thereby, as the plague, pleurisie, all sorts of feavers and agues, what ever they be called, head-ach, colick, rising of the mother; also all obstructions in the body, especially of the spleen and liver, from whence *Melancholia Hypochondriaca*, the scurvy, and many other intolerable diseases do arise: Also the blood in the whole body is by the means thereof amended and renewed, so that the Pox, Leprosie and other like diseases proceeding from the infection of the blood are easily cured thereby: Also it healeth safely and admirably all open sores and stinking ulcers turned to fistula's in the whole body, and from what cause so ever they did proceed, if they be anoynted

therewith, and the same also be inwardly used besides.

Such and other diseases more (which it is needless here to relate) may be cured successfully with this sweet oyle; especially, if without the loss of its sweetness it be brought to a red colour; for then it will do more then a man dare write of it, and it may stand very well for a *Panacea* in all diseases.

The preparation of the sweet oyle of Vitriol.

COmmonly in all fat soyles or clayie grounds, especially in the white, there is found a kinde of stones, round or oval in form, and in bigness like unto a pigeons or hens-egg, and smaller also, *viz.* as the joynt of ones finger, on the outside black, and therefore not esteemed when it is found, but cast away as a contemptible stone. Which if it be cleansed from the earth, and beaten to peeces, lookes within of a fair yellow and in streaks, like a gold Marcasite, or a rich gold Oare; but there is no other taste to be perceived in it, then in another ordinary stone; and although it be made into powder, and boyled a long time in water, yet it doth not alter at all, nor is there in the water any other taste or colour, then that which is had first (when it was powred upon the stone) to be perceived. Now this stone is nothing else, but the best and purest Minera (or Oare) of Vitrioll, or a seed of Metals; for Nature hath framed it round, like unto a vegetable seed, and sowed it into the earth, out of which there can be made an excellent medicine, as followeth.

Take this Oare or Minera beaten into peeces, and for some space of time, lay or expose it to the coole aire, and within twenty or thirty dayes it will magnetically attract a certain saltish moysture out of the aire, and grow heavy by it, and at last it falleth asunder to a black powder, which must remaine further lying there still, untill it grow whitish, and that it do taste sweet upon the tongue like vitriol. Afterward put it in a glass-vessel, and poure on so much faire raine water,

as

as that it cover it one or two inches; stirr it about several times in a day, and after a few dayes the water will be coloured green, which you must powre off, and powre on more faire water, and proceed as before, stirring it often untill that also come to be green: this must be repeated so often, until no water more will be coloured by standing upon. Then let all the green waters which you poured off, run through filtring paper, for to purifie them; and then in a glass-body cut off short let them evaporate till a skin appear at the top: then set it in a cold place, and there will shoote little green stones, which are nothing else but a pure vitriol: the remaining green water evaporate again, and let it shoote as before: and this evaporating and Crystallising must be continued untill no vitriol more will shoote, but in warm aud cold places there remaine still a deep green pleasant sweet liquor or juyce: which is the true sweet and green oyle of Vitriol and hath all the vertues above related.

But now this green oyle further without fire may at last (after the preparing of many fair colours between) be reduced to a blood red, sweet and pleasant oyle, which goeth far beyond the green both in pleasantness and vertue, and is in comparison to it like a ripe grape to an unripe: Hereof happily shall be spoken at another time, because occasion and time will not permit me now to proceed further in it. And therefore the Philo-Chymical Reader is desired for the present to be contented with the green oyle, to prepare it carefully, and to use it with discretion; and doubtless he will get more credit by it, and do more wonderfull things then hitherto hath been done by the heavy corrosive oyle.

The use and Dose of the sweet oyle of Vitriol.

OF this green oyle, there may be taken from 1.2.4.8. to 10. or 12. drops at once, according to the condition of the patient and the disease, in fit Vehicles, in Wine or Beer, in the morning fasting, as other medicines are usually taken: Also the Dose may be increased or lessened, and as often reiterated as the disease shall require it.

This Oyle expelleth all ill humors, not only by stoole and vomits, but also by urine and sweating, according as it doth meet with superfluities; and this very safely, and without any danger at all; whereby many diseases radically or perfectly can be cured.

Let no man wonder that I ascribe such great vertues unto this oyle, it coming from such a despicable stone, and its preparation requiring no great Art or paynes, as those intricate deceitful processes do, that are every where extant in books quite filled up with them. And it is no marvel, that men are in love with such false and costly processes; for the most of them do not believe, that any good is to be found in things that are not in esteeme; but onely make great account of deer things, far fetcht, and requiring much time and paines for to be prepared.

Such men do not beleeve the word of God, testifying, *That God is no respecter of persons*, but that all men that fear and love him, are accepted of him. If this be true (which no good Christian will doubt) then we must beleeve also, that God created Physick or the matter of Physick as well for the poor as for the rich. Now if it be also for the poor, then certainly such will be the condition thereof, that it may be obtained by them, and easily prepared for use. So we see that Almighty God causeth not onely in great mens grounds to come forth good vegetables, Animals and Minerals, for the curing of the infirmities of mankinde, but that the same also are found every where else. Whereby we perceive, that it is also the will of God, that they shall be known by all men, and

and that he alone, as the Maker of all good, may be praised and magnified by all men for the same.

I doubt not but that there will be found self-conceited scoffers, that will despise this so little regarded subject, as if no good thing could be made of it, because they could finde nothing in it themselves. But be it known to them, that neither to me nor them all things have been discovered, but that yet many wonderful works of Nature are hidden to us: and besides that I am not the first that writ of Vitriol and its medicine. For the Ancients our dear Ancestors had alwayes Vitriol in very great esteem, as the following Verse doth prove:

Visitabis Interiora Terræ Rectificando
Invenies Occultum Lapidem Veram Medicinam.

Whereby they would give us to understand, that a true medicine is to be found in it. And the same also was known to the latter Philosophers: for *Basilius* and *Paracelsus* have alwayes highly commended it, as in their writings is to be found.

It is to be admired, that this Oare or Metallical seed, which may justly be called the gold of the Physitians (in regard that so good a medicine can be made of it) is not changed or altered in the earth, like other things that grow in it, but keepeth alwayes the same form and shape, untill it cometh to the aire, which is its earth or ground, wherein it putrefieth & groweth. For first it swelleth and groweth like as a vegetable seed doth in the earth: and so taketh its increase & grows out of the aire, just as a seed of an hearb in the earth; and the earth is not only its Matrix, wherein it groweth and doth increase like a vegetable, but it is also its Sun which maketh it ripe. For within four weeks at the furthest it putrefieth and groweth black: and about a fourtnight after it groweth white, and then green; and thus far it hath been described here: But if you proceed further Philosopher-like therewith, there will come forth to light at the last the fairest red, and most plea-

ſant Medicine, for which God be praiſed for ever and ever, Amen.

Of the ſulphureous volatile and Acide ſpirit of common Salt, and of Allome.

THE ſame way, which above hath been taught for the making of the volatile ſpirit of vitriol, muſt be likewiſe uſed in the making of the volatile ſpirits of common ſalt and allome.

The manner of preparing.

ALlome is to be caſt in as it is of it ſelf, without mixing of it, but the ſalt muſt be mixed with bolus or ſome other earth, to keep it from melting: with the ſpirit volatile, there goeth alſo along an acid ſpirit, whoſe vertue is deſcribed in the 1. part. The Oyle of allome hath almoſt the like operation with the oyle of vitriol. Alſo the ſpirit volatile of both theſe, is of the ſame nature and condition with that which is made of vitriol: and the common ſalt, and allome do not yeeld as much, as the vitriol; unleſs both, *viz.* ſalt and allome be mixed together, and ſo a ſpirit diſtilled of them.

Of the ſulphureous volatile ſpirit of Minerals and Metals, and of their preparation.

SUch a penetrative ſulphureous ſpirit can be made alſo of Minerals and Metals, which in vertue goeth beyond the ſpirit of vitriol, that of common ſalt, and that of allome, *viz.* after the following manner.

The preparation of the volatile ſpirits of Metals.

DIſſolve either Iron or Copper, or Lead or Tin with the acid ſpirit of vitriol or of common ſalt: abſtract or draw off the phlegme; then drive the acid ſpirit againe from the Metal, and he will carry along a volatile ſpirit, which by rectifying muſt be ſeparated from the corrofive ſpirit. And ſuch Metallical ſpirits are more effectual then thoſe that are made of the ſalts.

The preparation of the volatile ſpirit of Minerals.

TAke of Antimony made into fine powder, or of gold-Marcaſite, or of ſome other ſulphureous Mineral, which you pleaſe, two parts, Mixe therewith 1. part of good purified Salt nitre, and caſt in of that mixture one little quantity, and then an other, and ſo forth after the manner above deſcribed; and there will come over a ſpirit which is not inferior to the former in efficacy and vertue; but it muſt alſo be well rectified.

Another way.

CEment what laminated or granulated Metal you pleaſe (except gold) with half as much in weight of common Sulphur, cloſed up in a ſtrong melting pot or crucible, ſuch as doth not let the Sulphur go through, for the ſpace of half an houre, untill that the Sulphur hath penetrated and broken the plates of Metals: Then beat them into powder, mixe them with the like quantity in weight of common ſalt, and ſo diſtill it after the way above mentioned, and you will get a volatile ſpirit of great vertue: and every ſuch ſpirit is to be uſed for ſuch ſpecial part or member of the body, as the Metal is proper for it, out of which the ſpirit is made. So Silver for the braine; Tinne for the lungs, Lead for the ſpleen, and ſo forth.

The spirit of Zinck.

OF Zinck there is distilled both a volatile and also an acid spirit, good for the heart; whether it be made by the help of the spirit of Vitrioll, or of salt, or of Allome: or else by the means of Sulphur; for Zinck is of the nature of gold.

The volatile spirit of the Drosse of the Regulus Iron.

THe black scoria of the *Regulus Martis*, being first faln asunder in the aire, yeilds likewise a very strong sulphureous volatile spirit, not much unlike in vertue unto the former.

The like Sulphureous volatile spirits can be made also of other minerals, which for brevities sake we do omit, as also in regard, that they are almost the same in vertue.

How to make a white acid, and a red volatile spirit out of salt nitre.

TAke two parts of Allome, and one part of salt nitre, make them both into powder, mix them well together, and cast into the still a little and a little thereof, as above in the making of other spirits hath been taught, and there cometh over an acid spirit together with the volatile spirit; and so many pounds as there is of the materials, which are to be cast in, so many pounds of water must be put into the receiver, to the end that the volatile spirits may so much the better be caught and saved. And when the distillation is performed, the two spirits may be separated by the means of a gentle rectification made in *Balneo*; and you must take good heed, that you get the volatile spirit pure by changing the receiver in a good time, so that no flegme be mixed with the red spirit, whereby it will be weakened and turn white. The marke whereby you may perceive, whither the spirit or the flegme doth go forth is this: when the volatile spirit goeth, then the

the receiver looketh of a deep red: and afterward when the flegme doth come, the receiver looks white again: and lastly, when the heavy acide spirit goeth, then the receiver to be red again, but not so as it is was, when the first volatile spirit came over.

This spirit can also be made and distilled after another way, *viz.* mixing the salt nitre with twice as much bole or brick dust, and so framed into little bals to prevent melting: but no way is so good as the first; especially when you will have the red volatile spirit.

Of the use of the red volatile spirit.

THis volatile spirit, which (being quite freed from flegm) remaineth alwayes red, and doth looke like blood, in all occasions may be accounted like in vertue unto the former sulphureous spirits, especially in extinguishing of inflammations & gangrenes it is a great treasure, the clothes being dipt in it, & laid upon the grieved place; Also it goeth almost beyond all other medicines in the Erysipelas and colick: and if there be any congealed blood in the body (which came by a fall or blow) this spirit outwardly applyed with such waters as are proper for the grief, & also taken inwardly, doth dissolve and expell it: and being mingled with the volatile spirit of urine it doth yeild a wonderful kinde of salt, as hereafter shall be taught.

The use of the white acid spirit of salt nitre.

THe heavy and corrosive spirits of salt nitre is not much used in Physick, though it be found almost in all Apothecaries shops, and there is kept for such use, as above hath been mentioned of the spirit of vitriol, *viz.* to make their conserves and cooling-drinks tast sowrish. Also it is used by some in the colick, but it is too great a corrosive, and too gross to be used for that purpose; and although its corrosiveness may be mitigated in some measure, by adding of water thereto, yet in goodness and vertue it is not comparable at all to the volatile spirit, but is as far different from it, as black

from white, and therefore the other is fittest to be used in Physick; but this in dealing with metals and minerals, for to reduce them into vitriols, calxes, flores, and crocus.

Aqua Regis.

IF you dissolve common salt (which hath been decrepitated first) in this acid spirit of salt nitre, and rectifie it through a glass retort (lying in sand) by a good strong fire, it will be so strong, that it is able to dissolve gold, and all other metals and minetals, except silver and sulphur; and several metals may by the means thereof be separated much better then by that Aqua regia which hath been made by adding of Salt Armoniack. But if you rectifie it with *lapis calaminaris* or Zinck, it will be stronger yet, so as able to dissolve all metals and Minerals (silver and sulphur excepted) whereby in the handling of Metals, much more may be effected, then with common spirit of salt nitre or sulphur, as now hereafter shall be taught and first in the preparing of gold.

The preparation of Aurum fulminans or Aurum Tonitruans.

TAke of fine granulated or laminated gold (whither it be refined by Antimony or *Aqua fortis*) as much as you please: put it in a little glass body, and powre four or five times as much of *Aqua regis* upon it, set it stopt with a paper in a gourd in warme sand; and the *Aqua regis* within the space of one or two hours will dissolve the gold quite into a yellow water: but if it have not done so; it is a signe, that either the water was not strong enough, or that there was too little of it for to dissolve it. Then powre the solution from the gold, which is not dissolved yet into another glass; and poure more of fresh *Aqua Regia* upon the gold: set it again to dissolve in warme sand or ashes, and the remaining gold will likewise be dissolved by it, and then there will remaine no more, but a little white calx, which is nothing else but silver, which could not

not be dissolved by the *Aqua Regia* (for the *Aqua Regia* whither it be made after the common way with salt Armoniack, or else with common salt, doth not dissolve silver) so in like manner common *Aqua fortis*, or spirit of salt nitre dissolveth no gold; but all other metals are dissolved as well by strong *Aqua fortis* as by *Aqua Regia*. And therefore you must be careful to take such gold as is not mixed with Copper, else your work would be spoiled: for if there were any Copper mixed with it, then that likewise would be dissolved and precipitated together with the gold; and it would be a hindrance to the kindling or fulminating thereof: but if you can get no gold; that is without Copper, then take Ducats or Rose-nobles, which ought to have no addition of Copper, but onely of a little silver, which doth not hurt, because that it cannot be dissolved by the *Aqua Regia*, but remaineth in the bottome in a white powder. Make those Ducats or Rose nobles red hot, and afterward bend them, and make them up in roles, and throw them into the *Aqua Regia* for to dissolve. All the gold being turned into yellow water, and poured off, poure into it by drops a pure oyle made of the Salt of Tartar *per deliquium*, and the gold will be precipitated by the contrary liquor of the Salt of Tartar into a brown yellow powder, and the solution will be clear. But you must take heed, to pour no more oyle of Tartar into it then is needful for the precipitation of the gold; else part of the precipitated gold would be dissolved again, and so cause your loss. The gold being well precipitated, poure off the cleer water from the gold calx by inclination and poure upon it warm raine or other sweet water, stir it together with a clean stick of wood, and set it in a warm place, until the gold is settled, so that the water standeth cleer upon it again; then poure it off, and poure on other fresh water, and let it extract the saltness out of the gold calx: and this pouring off, and then pouring on of fresh water againe, must be reiterated so often, untill no sharpness or saltness more be perceived in the water that hath been poured off: Then set the edulcorated gold into the Sun or another warm

warm place for to dry. But you muſt take heed that it have no greater heat then the heat of the Sun is in *May* or *Iune*, elſe it would kindle or take fire, and (eſpecially if there be much of it) give ſuch a thunder clap, that the hearing of thoſe that ſtand by, would be much endangered thereby, and therefore I adviſe you to beware and cautious in the handling of it, leſt you run the hazard both of your gold and of your health by your overſight.

There is alſo another way for to edulcorate your precipitated gold, *viz.* thus, take it together with the ſalted liquor, and poure it into a funnel lined with brown paper laid double, and ſo let the water run through into a glaſs veſſel, whereupon the funnel doth reſt, and poure on other warm water, and let it run through likewiſe; do this again, & again untill that the water come from it as ſweet as it was poured on. Then take the paper with the edulcorated gold calx, out of the funnel, lay it together with the paper upon other brown paper lying ſeverally double together, and the dry paper will attract all the moyſtneſs out of the gold calx, ſo that the gold can be dryed the ſooner. Which being dry, take it out of the filtring paper, and put it into another that is clean, and ſo lay it aſide, and keep it for uſe. The ſalted water that came through by filtring, may be evaporated in a little glaſs body (ſtanding in ſand) until to the dryneſs of ſalt (*ad ſiccitatem ſalis*) which is to be kept from the aire: for it is likewiſe uſeful in phyſick; becauſe ſome vertue of the nature of gold is yet hidden in it: though one ſhould not think it, in regard that it is ſo faire, bright and cleer; which for all that may be obſerved by this, that when you melt it in a clean covered crucible or pot, and poure it afterward in a clean Copper morter or baſon (being firſt made warm) you get a purple coloured ſalt, whereof 6. 9. 12. to 24. grains given in, doth cleanſe and purge the ſtomach and bowels, and eſpecially it is uſeful in feavers and other diſeaſes of the ſtomach. But in the crucible, out of which the ſalt hath been poured, you will finde an earthy ſubſtance, which hath ſeparated it ſelf from the ſalt, and looketh yellowiſh; this being taken out and melted in a little crucible by

by a ſtrong fire, turneth to a yellow glaſs, which is impregnated with the Tincture of Gold, and doth yeeld a corn (or grain) of ſilver in every regard like unto common cupellated ſilver, wherein no gold is found, which is to be admired: becauſe that all Chymiſts are of opinion, that no *Aqua regia* can diſſolve ſilver, which is true. The queſtion therefore is from whence or how this ſilver came into the ſalt ſince no *Aqua Regia* doth diſſolve ſilver? whereupon ſome perchance may anſwer, that it muſt have been in the oyle of Tartar, in regard that many do believe, that the ſalts likewiſe may be turned into metals, which I do not gainſay, but only deny that it could have been done here; for if that ſilver had been exiſtent in the *Aqua Regia* or ſalt of Tartar (whereas *Aqua Regia* cannot bear any) it would have been precipitated together with the gold. But that it was no common ſilver, but gold which turned to ſilver after it was deprived of its Tincture, I ſhall briefly endeavor to prove. For that ſalt-waters (of *Aqua Regia* and ſalt of Tartar) out of which the gold hath been precipitated, is of that nature, before it be coagulated to ſalt, though it be quite clear and white, that if you put a feather in it, it will be dyed purple within few dayes, which purple colour comes from the gold, and not from ſilver; in regard that ſilver doth dye red or black: and hence it appeareth, that the ſalt water hath retained ſomething of gold.

Now ſome body peradventure may ask: if that the ſaid ſalt water hath retained ſome gold, how is it then, that in the melting no gold comes forth, but only ſilver? To which I anſwer that ſome ſalts are of that nature, that in the melting they take from the gold its colour and ſoule; whereof if the gold be truly deprived, it is then no more gold nor can be ſuch; neither is it ſilver, but remaineth onely a volatile black body, good for nothing, which alſo proveth much more unfixt then common lead, not able to endure any force of fire, much leſs the cupel: But like *Mercury* or *Arſenicum* vaniſheth (or flyeth away) by a ſmall heat. Hence it may be gathered, that the fixedneſs (or fixity) of gold doth conſiſt

in its soul or Tincture, and not in its body, and therefore it is credible, that gold may be anatomized, its best or purer part separated from the grosser (or courser) and so that a Tingent medicine (or Tincture) may be made of it. But whether this be the right way, whereby the universal medicine of the ancient Philosophers (by whose means all metals can be changed or transmuted into gold) is to be attained unto, I will not dispute; yet I believe that peradventure there may be another subject, endued with a far higher Tincture then gold is, which obtained no more from nature, then it doth need it self for its own fixedness. However, we may safely beleeve, that a true Anima or Tincture of gold, if it be well separated from its impure black body, may be exalted and improved in colour; so that afterwards of an imperfect body a greater quantity, then that was from which it was abstracted, may be improved and brought to the perfection of gold. But waving all this, it is true and certain, that if the gold be deprived of its Tincture, the remaining body can no more be gold; as is demonstrated more at large in my treatise (*de Auro potabili vero*) of the true potable Gold: And this I mentioned here onely therefore, that in case the lover of this Art, in his work should meet perchance with such a white corne, he may know, from whence it doth proceed.

I could have forborne to set down the preparation of the fulminating gold, and so save paper and time, in regard that it is described by others: but because I promised in the first part to teach how to make the flores of gold, and that those are to be made out of fulminating (or thundring) gold, I thought it not amiss to describe its preparation, that the lover of this Art need not first have his recourse to another book for to finde out the preparation, but by this my book may be furnished with a perfect instruction for the making of the flores of gold, and this is the common way for to make *Aurum fulminans*, known unto most Chymists; but in regard that easily an error may be committed in it, either by pouring on too much of the liquor of Tartar (especially when it is not pure enough, so that not all the gold doth precipitate, but

but part of it remaineth in the solution, whereby you would have loss; or else, the gold falling or precipitating into a heavy calx, which doth not fulminate well, and is unfit for to be sublimed into flores.

Therefore I will here set down another and much better way, whereby the gold can be precipitated quite and clean out of the *Aqua Regia* without the least loss, and so that it cometh to be very light and yellow, and doth fulminate twice as strong as the former, and there is no other difference between this and the former preparation, but only that in steed of the oyle of Tartar, you take the spirit of urine or of Salt Armoniack for to precipitate the dissolved gold thereby; and the gold (as before said) will be precipitated much purer, then it is done by the liquor of the salt of Tartar, and being precipitated, it is to be edulcorated and dryed, as above in the first preparation hath been taught.

The use of Aurum fulminans.

THere is little to write of the use of *Aurum fulminans* in phyfick; for because it is not unlockt, but is onely a gross calx and not acceptable to the nature of man, it can do no miracle. And although it be used to be given *per se* from 6. ℈ ß 2. grains to ℥ i. for to provoke sweating in the plague, and other malignant feavers, yet it would never succeed so well as was expected. Some have mixed it with the like weight of common sulphur, and made it red hot (or calcined it) whereby they deprived it of its fulminating vertue, supposing thus to get a better medicine, but all in vaine, for the gold calx would not be amended by such a gross preparation. But how to prepare a good medicine out of *Aurum fulminans*, so that it may be evidently seen, that the gold is no dead body nor unfit for physick, but that it may be made quick and fit for to put forth or shew forth those vertues which it pleased God to treasure up in it, I shall briefly discover it here.

First get such an instrument (as above hath been taught) made for you out of Copper, bnt not too big, nor with a lid at the top, but only with a pipe, unto which a receiver may be applyed, which must not be luted to it, but it sufficeth, that the pipe enter far into the belly of the receiver; and at the lower part it must have a flat bottome, that it may be able to stand: over the bottome there must be a little hole with a little door, that closeth very exactly: and there must be also two little plates or scales of silver or copper, as big as the naile of ones finger, whereupon the *Aurum fulminans* is to be set into the the Instrument; which is to stand upon a Trevet, under which you are to lay some burning coals for to warm or heat the bottom withal. The Instrument together with the glass receiver being so ordered, that it stands fast, and also the bottom thereof being warmed or heated, then with little pinsers one of the little scales, containing 2. 3. or 4. grains of *Aurum fulminans* must be conveighed into the Instrument & set upon the warm bottom, and then shut the little door, and when the gold doth feel the heat, it kindleth and giveth a clap, and there is caused a separation and especial unlocking of the gold; for as soon as the clap is done, the gold doth go through the pipe like a purple coloured smoak into the receiver, and sticks on every where like a purple coloured powder. When the smoak is vanished, which is soon done, then take the empty scale out of the Instrument or Oven, and set in the other with the gold which will likewise fulminate and yeild its flores, Then the first being cooled in the mean time, is to be filled again and put in, in stead of that which is empty, and so forth; putting in one scale after another by turns, continue it so long till you have got flores enough: After the sublimation is performed, let the Copper vessel grow coole, and then sweep or brush the gold-powder which is not sublimed with a haires foot or a goose feather out of the vessel, which powder serveth for nothing, but to be melted with a little borras, and it wil be good gold again, but onely somwhat paler then it was before it was made into fulminating gold. But the flores in the receiver cannot be brushed out thus, especially when they are cast in

in with an addition of salt Nitre, as by the flores of silver hereafter shall be taught, because they are something moist, and therefore poure in as much of dephlegmed Tartarised spirit of wine unto it, as you think it to be enough, for to wash off the flores with. This done, pour out the spirit of wine, together with the burnt Phœnix into a clean glass, with a long neck, set it (being well luted first) into a gentle Balneum, or into warm ashes for some dayes, and the spirit of wine in the mean time will be coloured with a faire red, which you must poure off and then poure on other fresh spirit & set it in a warm place for to be dissolved, this being likewise coloured, put both the extracts together in a little glass body, and abstract the spirit of wine (in Balneo) from the Tincture, which will be little in quantity, but of a high red colour and pleasant in taste. The remaining flores from which the Tincture is extracted, may be with water washed out of the glass, and then dryed if they are to be melted; and they will yeild a little pale gold, and the most part turneth into a brown glass, out of which perchance something else that is good may be made, but unknown to mee as yet.

N.B. If you mixe the *Aurum fulminans* with some salt nitre, before fulmination, then the flores will be the more soluble, so that they yeeld their Tincture sooner and more freely, then alone of themselves; and if you please, you may adde thereto thrice as much salt nitre, and so sublime them in flores, in the same manner, as shall be taught for the making of the flores of silver.

The use of the Tincture of Gold.

THe extracted Tincture is one of the chiefest of those medicines, which comfort and cheer up the heart of man, renew and restore to youthfulness, and cleanse the impure blood in the whole body, whereby many horrible diseases, as the leprosie, the pox, and the like may be rooted out.

But whether this Tincture by the help of fire may be further advanced into a fixed substance I do not know: for I have not proceeded further in it, then here is mentioned.

Of the flores of silver and of its medicine.

HAving promised in the first part of this book (when I was describing the preparation of flores out of Metals) to teach in the second part to make the flores of gold and silver, those of gold being dispatcht; there followeth now in order after the gold, to speak also of silver and of its preparation, which is to be thus performed.

Take of thin laminated or smal granulated fine silver as much as you please, put it into a little separating glass body, and poure upon it twice as much in weight of rectified spirit of salt nitre, and the spirit of salt nitre will presently begin to work upon the silver and to dissolve it. But when it will not dissolve any more in the cold, then you must put the glass body into warm sand or ashes, and the water wil presently begin to work again; let the glass stand in the warm ashes, untill all the silver be dissolved. Then put the solution out of the little glass body, into another such as is cut off at the top, and put on a little head or Limbeck, and in sand abstract the moity of the spirit of salt nitre from the dissolved silver; then let the glass body remaine in the sand till it be coole; after take it out, and let it rest for a day and a night, and the silver will turn into white foliated crystals, from which you must poure off the remaining solution which is not turned; and from thence abstract again the moity of the spirit, and let it shoote or turn in a cold place; and this abstracting and crystallising you are to reiterate, until almost all the silver is turned to Crystals; which you must take out and lay them upon filtring paper for to dry, and so keep it for such further use, as hereafter shall be taught. The remaining solution, which is not crystallised, you may in a copper vessel by adding of sweet water thereto, precipitate over the

the fire into a calx, and then edulcorate and dry it, and keep it for other use, or else melt it again into a body. Or else you may precipitate the same with salt water, and so edulcorate and dry it; and you will have a calx, which doth melt by a gentle fire, and is of a special nature, in the spirit of urine, of salt Armoniack, of Hartshorn, of Amber, of soot, and of haire it doth easily dissolve; and it may be prepared or turned into good medicines, as shortly in our treating of the spirit of urine shall be taught. Or else, you may choose not to precipitate the remaining solution of silver, but with the spirit of urine to extract an excellent Tincture, as hereafter shall be taught.

Of the use of the crystals of silver.

THese crystals may safely be used in Physick alone by themselves 3. 6. 9. 12. grains thereof being mixed with a little sugar, or else made up into pils; they do purge very gently and without danger; but by reason of their bitterness they are somewhat untoothsome to take; also, if they be not made up into pils, they colour the lips, tongue and mouth quite black (but the reason of that blackness belongeth not to this place to treat of, but shall by and by follow hereafter) Also if they touch metals, as Silver, Copper and Tin, they make them black and ugly, and therefore they are not much used. But if you put into the solution of silver (before it be reduced into Crystals) halfe as much quick-silver as there was of the silver, and so dissolve them together and afterwards let them shoote together, there will come forth very faire little square stones like unto Allome, which do not melt in the aire, as the former foliated ones use to do; neither are so bitter, and they purge also quicker and better, then those that are made onely of silver.

How to sublime the Crystals of silver into flores, and then to make a good Medicine of the flores.

TAke of the foliated Crystals of Silver as many as you please, and upon a grinding stone made warm first, grinde as much purified and wel dryed salt nitre amongst it, and lay it into your Iron distilling vessel (to the pipe whereof there is to be applyed and luted a great receiver) coles made into powder two inches high, and make a fire under it, that the vessel every where together with the coles that are in it, become red hot. Then take off the lid, and with a ladle throw in at once of your Crystals of silver ʒ i. yea more or less, according as you think that your receiver in regard of its bigness is able to bear. This done, presently put on the lid, and the salt nitre together with the crystals of silver will be kindled by the coles that lye on the bottome of the vessel, and there will come forth a white silver fume through the pipe into the receiver, and after a while when the cloud is vanished in the receiver, cast in more, and continue this so long, until all your prepared silver is cast in; then let it coole, amd take off the receiver, and poure into it good Alcolized spirit of wine, and wash the flores with it out of the receiver, and proceed further with them, as above you have been taught to proceed with the gold, and you will get a greenish liquor, which is very good for the braine.

Take the coles out of the distilling vessel, and make them into fine powder, and wash them out with water, to the end that the light cole-dust may be got from it, and you will finde much silver dust (or a great many little silver graines) which the salt nitre could not force over, which you may reduce, for it will be good silver.

There can also be made a very good medicine out of the crystals of silver, which will be little inferior to the former, whereby the diseases and infirmities of the braine may be very well remedied, which is done thus:

How to make a green oyle out of silver.

POure upon Crystals of silver twice or thrice as much (in weight) of the strongest spirit of salt Armoniack, put it in a glass with a long neck well closed, into a very gentle warmth for the space of 8. or 14. dayes in digestion, and the spirit of salt Armoniack will be tinged with a very faire blew colour from the silver, then pour it off, and filtre it through brown paper, and then put it in a little glass retort or glass body, and abstract in Balneo by a gentle fire, almost all the spirit of salt Armoniack (which is still good for use) and there will remaine in the bottom a grass green liquor, which is to be kept for a medicine.

But in case, that you should miss, and abstract too much of the spirit from the Tincture of silver, so that the Tincture be quite dry, and turned to a green salt, then you must poure upon it again as much of the spirit of salt Armoniack, as will dissolve the green salt again to a green liquor, but if you desire to have the Tincture purer yet, then abstract all moystness from it, to a stony dryness: upon which you must poure good spirit of wine, which will quickly dissolve the stone, and then filtre it, and there will remaine fæces, and the Tincture will be fairer: from which you must abstract most of the spirit of wine, and the Tincture will be so much the higher in vertue. But if you please, you may distill that green salt or stone (before it be extracted once again with spirit of wine) in a little glass-retort, and you will get a subtile spirit and a sharp oyle, and in the bottome of the retort there remaineth a very fusile silver which could not come over.

It is to be admired, that when you pour spirit of salt Armoniack or spirit of wine upon that stone for to dissolve it, that the glass comes to be so cold by it, that you hardly are able to endure it in your hand, which coldness in my opinion cometh from the silver (being so well unlockt) which naturally is cold.

The use of the green liquor in Alchymy, and for Mechanical operations.

THis green liquor serveth not only for a medicine, but also for other Chymical operations (for both Copper and glass may be easily and very fairly silvered over therewith) very useful for those that are curious and love to make a shew with fair houshold-stuff; for if you get dishes, trencher plates, salters, cups and other vessels made of glass, after the same fashion as those of silver use to be made, you may very easily and without any considerable charge silver them over therewith within and without, so that by the eye they cannot be discerned from true silver plate.

Besides the above related good medicines, there may be made an other and especial good one out of the crystals of silver, *viz.* dissolving and digesting them (for a space of time) with the universal water, which hath been distilled by nature it self; and is known to every body: and after its digesting for a short time, and change into several colours, there will be found a pleasant essence, which is not so bitter as the above described green liquor, which is not brought yet by heat to ripeness and maturation.

N. B. In this sweet universal Menstruum, there can also all other metals by a small heat and the digestion of a long time be ripened and fitted for medicines (having first been reduced into their vitriols and salts) and then they are no more dead bodies, but by this preparation have recovered a new life, and are no more the metals of the covetous, but may be called, the metals of the Philosophers and of the Physitians.

Be-

Besides Physick or physical use.

LAstly there may be many pretty things more effected (besides the medicinal use) by means of the Crystals of silver, *viz.* when you dissolve them in ordinary sweet raine water, you can dye beards, haire, skin, and nailes of men or beasts into carnation or pinck red, brown & black according as you have put more or less thereof in the water; or else, according as the haire was more or less times wetted therewith, whereby the aspect of man and beast (which sometimes in several occasions may not be contemned) is changed, so that they cannot be known.

This colouring or dye may be also performed with Lead or Mercury no less then with silver, but otherwise prepared, whereof in the fourth part.

Now I have taught how to make flores and tinctures of gold and silver by the help of the acid spirit of Nitre. There may be many other medicines taught to be made out of them, but in regard that they belong not to this place, they shall be reserved for other places of this second, and also for the other following parts.

As by the help of the spirit of Nitre good medicines can be made out of gold and silver; so the like may be done out of other inferiour metals. But in regard that their description is fitter for other places of this book, I do omit them here. Yet nevertheless I thought good, to describe one preparation of every metal, and after the silver there followeth now the copper.

A medicine out of copper externally to be used.

DIssolve burnt plates of copper in spirit of salt, and abstract the spirit again from thence to a dryness, but not too hard, and there will a green mass remaine behinde, which you may cast in by little and little, and so distil it, as of silver hath been taught. It doth yeild a strong and powerful

ſpirit and flores alſo for outward uſe in putrid wounds to lay a good ground thereby for the healing.

A medicine out of iron or ſteel.

IN the ſame manner you may proceed with iron and ſteel, and there will remaine behinde a good crocus of a great ſtipticity or aſtringency, eſpecially out of iron or ſteele, and may with good ſucceſs be mixed with oyntments and plaſters.

Of Tin and Lead.

IF Tin or Lead be diſſolved therein, after the abſtracting of part of the ſpirit, they will ſhoote into cleer and ſweet cryſtals. But Tin is not ſo eaſily diſſolved as lead; both may ſafely be uſed for medicines. Alſo there may be ſpirits and flores got out of them by diſtilling. The rehearſing of the preparation is needleſs, for what for the preparing of ſilver hath been taught, is to be underſtood alſo of other metals.

The uſe of the cryſtals of Lead and Tin.

THe cryſtals of lead are admirably good to be uſed in the plague for to provoke ſweating and expel the venome out of the body; they may alſo with credit be uſed in the bloody flux. Externally diſſolved in water, and clothes dipt therein and applyed they excellently coole and quench all inflamations, in what part of the body ſo ever they do befall. Likewiſe the ſpirit thereof uſed *per ſe* (and the flores mixed among oyntments) do their part ſufficiently.

But the cryſtals of Tin do not prove altogether ſo quick in operation, though they do act their part alſo, & they are more pleaſant then thoſe that are made of Lead; for in Tin there is found

found a pure ſulphur of gold; but in Lead a white ſulphur of ſilver, as is proved in my *Treatiſe of the Generation and nature of metals.*

Of Mercury.

WHen you diſſolve common Mercury in rectified ſpirit of Nitre, and abſtract the ſpirit from it again, then there will remaine behinde a faire red gliſtering precipitate; but when the ſpirit is not rectified, it will not be ſo faire, becauſe that the impurity of the ſpirit remains with the Mercury and pollutes it. This calcinated Mercury is called by ſome *Mercurius præcipitatus*, and by others *Turbith minerale*, wherewith the Surgeons and ſomtimes one or other unskilful Phyſitians do cure the pox; they do give at once 6. 8. 10. graines (more or leſs) according to its preparation and force in operation to the patient; for if the ſpirit be not too much abſtracted from it, it worketh much ſtronger, then when by a ſtrong fire it is quite ſeparated from it; for the ſpirits that remaine with the Mercury make it quick and active which elſe without the ſpirits would not be ſuch.

The other metals alſo, if they be not firſt made ſoluble by ſalts or ſpirits, can perform either none or but very ſmal operation, unleſs it be Zinck or Iron, which being eaſily ſoluble are able to work without any foregoing diſſolution, as hath been ſhewn above, when we treated of the oyle of vitriol. But that the ſharp ſpirits are the cauſe of that operation, may hence be perceived and made manifeſt; that although you take ℥ß. of quick-ſilver and pour it down into the ſtomach, yet it would run out again beneath, as above it was poured in. But if it be prepared with the ſpirits or ſalts, then but few graines of it will work ſtrongly, and the more it is made ſoluble, the ſtronger it worketh, as you may ſee when it is ſublimed from ſalt and vitriol, that it groweth ſo ſtrong thereby that one graine doth work more then eight or ten grains of Turbith Mineral, and three or four grains thereof would kill a man by reaſon of its mighty ſtrength. Alſo it

worketh extreamly and much more then the sublimate, when it is dissolved in spirit of Nitre and crystalliſed, so that you cannot well take it upon your tongue without danger. Which some perceiving, evaporate the *Aqua fortis* by a gentle heat from it, so that the *Mercurius* remained yellow, which in a smaler dose wrought more then the red, from which the spirits were quite evaporated. And they used it not only externally strewing it into impure sores, for to corrode or fret away the proud flesh, not without great paine to the patient: but also withont distinction of young or old gave it inwardly for to purge; which is one of the most hurtful purges that can be used. For this evil guest, however he be prepared, cannot leave his tricks, unless it be reduced into such a substance, as that it never can be brought back to a running Mercury, for then much good can be done therewith in physick without any hurt or prejudice to the health of man, whereof perchance something more shall be said in another place.

I cannot omit for the benefit of young innocent children, to discover a great abuse. For it is grown very common almost among all that deale in physick, that as soon as a little childe is not well before they know whether it will be troubled with wormes or with any thing else, they presently fall upon Mercury, supposing that in regard it hath no taste, it be so much the better for to get the children to take it for to kill the wormes.

But those men do not know the hurtful nature of it, which it doth shew against the sinews and nerves: For some are of opinion, that if they know to prepare Mercury so, that it can be given in a greater dose (as is to be seen in sublimed *Mercurius dulcis*) that then it is excellently prepared: but they are in a great error, and it were much better, it were not so well prepared, that the less hurt might be done to man, in regard that then they durst not give it in so great a dose. For if that which is prepared with *Aqua fortis* or spirit of salt nitre be used in the pox to men that are advanced in years, it cannot do so much hurt, because it is given in a small dose, and doth work with them, whereby nature gets help for to overcome

come and expel that hurtful venome, and its malignity is abated by the strong salivation, which the provident nature hath planted in it, so that not so much mischief can come by it, as by *Mercurius dulcis*, whereof is given to little weak children from ten to thirty graines at once, which commonly (unless they be of a strong nature, and do grow it out) doth cause a weakness and lameness in their limbs, so that (if they do not come to be quite lame at last) they have a long time to struggle withal, till they overcome it.

In like manner those also do err, which do shake Mercury in water or beer so long until the water come to be gray-coloured, and so give that water or beer to little children to drink for the wormes, pretending that they do not give the substance or body of Mercury, but onely its vertue. But this gross preparation is no better then if they had ministred the running Mercury it self. Neither have I ever seen, that the use of *Mercurius dulcis* or of the gray coloured water was seconded with good success in killing of the worms. But it is credible, that it may be done by yellow or red precipitate, in regard of its strong operation. But who would be such an enemy to his childe, as to plague and torture it with such a hurtfull and murthering medicine; especially there being other medicines to be had, which do no harme to the children, as is to be found by iron or steel, and the sweet oyle of vitriol.

And so much of the abuse of Mercury: I hope it will be a good warning unto many, so that they will not so easily billet such a tyrannical guest in any ones house, whereby the ruine thereof of necessity must follow. And that cure deserveth no praise at all, whereby one member is cured with the hurt of two or three other members. As we see by the pox, when one infected member is cured by Mercury, and that but half and not firme at all, that all the rest of the body is endangered thereby for the future. And therefore it would be much better that such crude horse-physick might be severed from good medicaments, & such used instead of them, as may firmely, safely, and without prejudice to other parts perform the

cure

cure of which kinde several are taught in this book. But in case that you have patients, which have been spoyled by such an ill-prepared Mercury, then there is no better remedy to restore them, then by medicines made of metals, wherewith Mercury hath great affinity, as of gold and silver: for when they are often used, they attract the Mercury out of all the members, and carry it along with them out of the body, and so do rid the body thereof. But externally the precipitated Mercury may more safely be used, then internally, in case there be nothing else to be had, *viz.* to corrode or eat away the proud flesh out of the wound. But if in stead of it there should be used the corrosive oyle of Antimony, Vitriol, Allom or common salt it would be better, and the cure much the speedier, and it would be better yet, that in the beginning good medicaments were used to fresh wounds, and not by carlesness to reduce them to that ill condition, that afterwards by paineful corrosives they must be taken away. But such a Mercury would serve best of all for souldiers, beggers and children that go to schoole, for if it be strewed upon the head of children, or into their clothes, no louse will abide there any longer. In which case Mercury must by his preparation not be made red, but onely yellow, and it must be used warily, and not be strewed on too thick, lest the flesh be corroded, which would be the occasion of great mischief.

Of Aqua fortis.

OUt of Salt nitre and vitriol, taking of each a like quantity, or (if the water is to be not altogether so strong) two parts of vitriol to one part of salt nitre, a water distilled is good to dissolve metals therewith, and to separate them from one another; as gold from silver and silver from gold, which in the fourth part punctually shall be taught.

The

The *Aqua fortis* serveth also for many other Chymical operations to dissolve and fit metals thereby, that they may be reduced the easier into medicaments: but because the spirit of salt nitre and the *Aqua fortis* are almost all one and have like operations: for if the *Aqua fortis* be dephlegmed and rectified, you may perform the same operations with it, which possibly may be performed with the spirit of salt nitre; and on the other side the spirit of salt nitre will do all that can be done with the *Aqua fortis*; whereof in the fourth part shall be spoken more at large.

Now I know well that ignorant laborators (which do all their work according to custome, without diving any further into the nature of things, will count me an Heretick (because I teach, that the *Aqua fortis* made of vitriol and salt nitre is of the same nature and condition with the spirit of salt nitre, which is made without vitriol) saying that the *Aqua fortis* doth partake likewise of the spirit of vitriol, because vitriol also is used in the preparation of it. To which I answer, that although vitriol be used in the preparation of it, yet for all that in the distilling, nothing or but very little of its spirit comes over with the spirit of salt nitre, and that by so small a heat it cannot rise so high, as the spirit of salt nitre doth: and the vitriol is added onely therefore unto the salt nitre, that he may hinder its melting together, and so the more facilitate its going into a spirit. And for the more to be convinced of this truth, the unbelieving may adde to such spirit of salt nitre, as is made by it self, a little of oyle of vitriol likewise made by it self, and try to dissolve silver gilded with it, and he will finde that his spirit of salt nitre by the spirit of vitriol is made unfit to make a separation; for it preyeth notably upon the gold, which is not done by *Aqua fortis*.

Of the sulphurized spirit of salt nitre.

THere can also be made a spirit of salt nitre with sulphur, which is still in use with many, *viz.* that they take a strong earthen retort, which hath a pipe at the top, and fasten it into a furnace, and having put salt nitre in it, they let it melt, and then through the pipe they throw peeces of sulphur of the bigness of a pea one after another, which being kindled, together with the nitre doth yield a spirit called by some spirit of salt nitre, and by others oyle of sulphur, but falsely; for it is neither of both, in regard that metals cannot be dissolved therewith as they are done with other spirit of salt nitre or sulphur; neither is there any great use for it in physick, and if it were good for any Chymical operations, by the help of my distilling instrument might easily be made and in great quantity.

N B. But if salt nitre be mixed with sulphur in due proportion, and in the first furnace be cast upon quick coles, then all will be burnt, and a strong spirit cometh over, whose vertue is needless here to describe; but more shall be mentioned of it in another place.

Of the Cissus.

AMong the Physitians of this latter age, there is mention made of another spirit, which they make of Antimony, Sulphur, and salt nitre, a like quantity taken of each, which they call *Cissus*, and which they have in high esteem, and not without cause, becaus it can do much good, if it be well prepared.

The inventor for the making thereof used a retort with a pipe, as was mentioned by the sulphurized spirit of salt nitre, through which pipe he threw in his mixture. And it is a good way if no better be known: but if the Author had known my

my invention and way of distilling, I doubt not but he would have set aside his, that hath a nose or pipe retort, and made use of mine.

The materials indeed are good, but not the weight or proportion; for to what purpose so great a quantity of sulphur, it being not able to burn away all with so smal a quantity of salt nitre. And if it doth not burn away, but only sublime and stop the neck of the retort, whereby the distillation is hindred, how can it then yeeld any vertue? Therefore you ought to take not so much sulphur, but only such a quantity as will serve to kindle the salt nitre, *viz.* to ℔ i. of salt nitre four drams of sulphur: but because Antimony also is one of the ingredients, which hath likewise much sulphur (for there is no Antimony so pure, but it containeth much combustible sulphur, as in the fourth part of this book shal be proved:) therefore it is needless to add so much sulphur unto Antimonie, to make it burn, because it hath enough of it self. And therefore I will set down my composition, which I found to be better then the first.

Take Antimony ℔ i. salt nitre ℔ ij. sulphur ʒ iij. the materials must be made into smal powder and well mixed, and at once cast in ʒ ij. thereof, and there will come over a sulphureous acid spirit of Antimony, which will mix it self with the water, which hath been put before in the receiver; which after the distillation is finished must be taken out and kept close for its use. It is a very good diaphoretick (or sweat-provoking) medicine especially in feavers, the plague, epilepsie, and all other diseases, whose cure must be performed by sweating. The *Caput Mortuum* may be sublimed into flores in that furnace, which is described in the first part.

Of the Tartarised spirit of nitre.

IN the very same manner there may also be distilled a good sweat-provoking spirit out of salt nitre and Tartar, a like quantity taken of each, which is very good to be used in the plague and malignant feavers.

The *Caput Mortuum* is a good melting powder for to reduce the calxes of metals therewith; or elſe you may let it diſſolve in a moyſt place to oyle of Tartar.

Of the Tartariſed ſpirit of Antimony.

A Much better ſpirit yet may be made of Tartar, ſalt nitre, and Antimony, a like quantity being taken of each and made into fine powder, and mixed well together, which though it be not ſo pleaſant to take, is therefore not to be deſpiſed. For not only in the plague and feavers, but alſo in all obſtructions and corruptions of blood it may be uſed with admiration of its ſpeedy help.

The *Caput Mortuum* may be taken out, and melted in a crucible, and it will yeeld a *Regulus*, the uſe whereof is deſcribed in the fourth part. Out of the ſcoria or droſs a red Tincture may be extracted with ſpirit of wine, which is very uſeful in many diſeaſes. But before you extract with ſpirit of wine, you may get a red lixivium out of it with ſweet water, which lixivium may be uſed externally for to mend the faults of the skin and to free it from ſcabbineſs.

Upon this lixivium if you poure Vinegar or any other acid ſpirit, there will precipitate a red pouder, which if it be edulcorated and dryed, can be uſed in phyſick. It is called by ſome Tartar *auratum diaphoreticum*: but it is no Diaphoretick, but maketh ſtrong vomits, and ſo in caſe of neceſſity, when you have no better medicine at hand, it may be uſed for a vomitory from 6. 7. 9. to 15. grains.

Alſo out of the ſcoria there can be extracted a faire Sulphur with the ſpirit of urine and diſtilled over the Limbeck, which is very good for all diſeaſes of the lungs.

Of Stone-coles.

IF you mixe ſtone-coles with a like quantity of ſalt nitre, and diſtill them, you will get an admirable ſpirit and good to be uſed for external ſores; for it cleanſeth and draweth the wounds together exceedingly, and there will alſo come over a metallical vertue in the form of a red powder, which muſt be ſeparated from the ſpirit, and kept for its uſe. But if you caſt in ſtone-coles alone by themſelves, and diſtill them, there will come over not only a ſharp ſpirit, but alſo a hot and blood red oyle, which doth powerfully dry and heal all running ulcers; eſpecially it will heal a ſcald-head better then any other medicine, and it doth conſume alſo all moyſt and ſpongious excreſcencies in the skin, where ever they be: but if you ſublime ſtone-coles in the furnace deſcribed in the firſt part, there comes over an acid metallical ſpirit, and a great deale of black light flores, which ſuddenly ſtanch bleeding, and uſed in plaſters, are as good as other metallical flores.

Of the Sulphreous ſpirit of ſalt nitre or Aqua fortis.

IF you take one part of ſulphur, two parts of ſalt nitre, and three parts of vitriol, and diſtill them, you will get a graduating *Aqua fortis*, which ſmelleth ſtrongly of ſulphur; for the ſulphur is made volatil by the ſalt nitre and vitriol. It is better for ſeparating of metals, then the common *Aqua fortis*.

If ſilver be put in, it groweth black, but not fixed; ſome of it poured into a ſolution of ſilver a great deal of black calx will precipitate, but doth not abide the tryal. You may alſo abſtract a ſtrong *ſulphureous* volatile ſpirit from it, which hath like vertue as well internally as externally for bathes, and may be uſed like unto a volatile ſpirit of Vitriol or Allome.

Of the Nitrous spirit of Arsenick.

IF you take white Arsenick and pure salt nitre of each a like quantity ground into fine powder, and distill them, you will get a blew spirit, which is very strong, but no water must be put into the receiver, else it would turn white, for Arsenick, from which the blew cometh, is precipitated by the water. This spirit dissolveth and graduateth the copper as white as silver, and maketh it malleable but not fix. The remaining *Caput Mortuum* maketh the copper white, if it be cemented therewith, but very brittle and unmalleable, but how to get good silver out of Arsenick and with profit, you shall finde in the fourth part. In physick the blew spirit serveth for all corroding cancrous sores, which if they be anoynted therewith, will be killed thereby, and made fit for healing.

To make a spirit of Sulphur, crude Tartar and Salt nitre.

IF you grinde together one part of Sulphur, two parts of Crude Tartar, and four parts of salt nitre, and distill it Philosopher-like, you will get a most admirable spirit, which can play his part both in Physick and Alchymie. I will not advise any body to distill it in a retort; for this mixture, if it groweth warm from beneath, it fulminateth like gunpowder; but if it be kindled from above, it doth not fulminate, but onely burneth away like a quick fire: metals may be melted and reduced thereby.

To make a spirit out of Salt of Tartar, Sulphur, and Salt-nitre.

IF you take one part of salt of Tartar, and one part and half of Sulphur, with three parts of salt nitre, and grinde them together, you will have a composition, which fulminateth

nateth like *Aurum fulminans*, and the same also (after the same manner as above hath been taught with the gold) can be distilled into flores and spirits, which are not without speciall vertue and operation. For the corruption of one thing is the generation of another.

How to make a spirit of saw dust, sulphur and salt nitre.

IF you make a mixture of one part of Saw-dust made of Tilia or Linden-wood, and two parts of good sulphur, and nine parts of purified and well dryed salt nitre, and cast it in by little and little, there will come over an acid spirit, which may be used outwardly, for to cleanse wounds that are unclean. But if you mix with this composition minerals or metals made into fine powder, and then cast it in and distill it, there will come not only a powerful metallical spirit, but also a good quantity of flores, according to the nature of the mineral, which are of no small vertue: for the minerals and metals are by this quick fire destroyed and reduced to a better condition, whereof many things could be written: but it is not good to reveal all things. Consider this sentence of the Philosophers. *It is impossible to destroy without a flame. The combustible Sulphur of the Calx, which the digged Mine doth doe.*

Also fusible minerals and metals may not only be melted, therewith, but also cupellated in a moment upon a Table in the hand or in a nut shel; whereby singular proofs of oares and metals may be made and much better, then upon a Cupel, whereof further in the fourth part of this book. Here is opened unto us a gate to high things; if entrance be granted unto us, we shall need no more books to look for the Art in them.

To make metallical spirits and flores by the help of salt-nitre and linnen cloth.

IF metals be dissolved in their appropriated Menstruums, and in the solution (wherein a due proportion of salt nitre must be dissolved) fine linnen rags be dipt and dryed, you have a prepared metal, which may be kindled, and (as it was mentioned above concerning the saw dust) through the burning away and consuming of their superfluous sulphur, the mercurial substance of the metal is manifested. And after the distillation is ended, you will finde a singular purified calx, which by rubbing coloureth other metals, as that of gold doth guild silver, that of silver over-silvereth copper, and copper calx maketh iron look like copper, &c. which colouring though it cannot bring any great profit, yet at least for to shew the possibility, I thought it not amiss to describe it: and perchance something more may be hid in it, which is not given to every one to know.

Of Gun-powder.

OF this mischievous composition and diabolical abuse of Gunpowder much could be written: but because this present world taketh onely delight in shedding innocent blood, and cannot endure that unrighteous things should be reproved, and good things praised, therefore it is best to be silent, and to let every one answer for himself, when the time cometh that we shall give an account of our stewardship, which perhaps is not far off; & then there will be made a separation of good and bad, by him that tryeth the heart, even as gold is refined in the fire from its dross. And then it will be seen what Christians we have been. We do all bear the name, but do not approve our selves to be such by our works: every one thinketh himself better then others, and for a words sake which one understandeth otherwise, or takes in another sense then the other (and though it be no point, wherein salvation doth

doth depend) one curseth and condemneth another and persecuteth one another unto death which Christ never taught us to do, but rather did earnestly command us that we should love one another, reward evil with good, and not good with evil, as now a dayes every where they use to do, every one standeth upon his reputation, but the honor of God and his command are in no repute, but are trampled under foot, and Lucifers pride, vaine ambition, and Pharisaicall hypocrisie or shew of holiness, hath so far got the upper-hand with the learned, that none will leave his contumacy or stubbornness, or recede a little from his opinion although the whole world should be turned upside down thereby. Are not these fine Christians? By their fruit you shall know them, and not by their words. Woolves are now clothed with sheeps skins, so that none of them almost are to be found, and yet the deeds and works of Woolves are every where extant.

All good manners are turned into bad, women turn men, and men women in their fashion and behaviour, contrary to the institution and ordinance of God and Nature. In brief, the world goeth on crutches. If *Heraclitus* and *Democritus* should now behold this present world, they would finde exceeding great cause for their lamenting and laughing at it. And therefore it is no marvel, that God sent such a terrible scourge as the gun-powder is upon us; and it is credible, that if this do not cause our amendment, that a worse will follow, *viz.* thunder and lightning falling down from heaven, whereby the world shalbe turned upside down for to make an end of all pride, self-love, ambition, deceit and vanity. For which the whole creature doth waite, fervently desiring to be delivered from the bondage thereof.

Now this preparation, which is the most hurtfull poyson, a terror unto all the living, is nothing else but a *fulmen terrestre* denouncing unto us the wrath and coming of the Lord. For Christ for to judge the world is to come with thundering and lightning: and this earthly thunder perchance is given us for to put us in minde and fear of that which is to come; but this

is not so much as thought on by men, who prepare it only for to plague and destroy mankinde therewith in a most cruel and abominable manner, as every one knoweth.

For none can deny but that there is no nimbler poyson, then this gunpowder. It is written of the Basiliske, that he killeth man only by his look, which a man may avoyd, and there are but few (if any at all) of them found: but this poyson is now prepared and found every where.

How often doth it fall out, that a place wherein this powder is kept is stricken with thunder as with its like, in so much that all things above it are in a moment destroyed, and carryed up into the aire? Also in sieges, when an Ordnance is discharged, or mines blown up, all whom it lays hold on, are suddenly killed, and most miserably destroyed. What nimbler poyson then could there be invented? I beleeve there is none, who will not acknowledge it to be such.

And seeing that the ancient Philosophers and Chymists were alwayes of opinion, that the greater the poyson is, the better medicine may be made of it, after it is freed from the poyson, which with us their posterity proved true by many experiences; as we see by Antimony, Arsenick, Mercury, and the like minerals, which without preparation are meer poyson, but by due prepartion may be turned into the best and most effectual medicaments, which though not every one can comprehend or believe, yet your Chymists know it to be true, and the doing of it is no new thing to them. And because I treat in this second part of medicinal spirits, and other good medicaments, and finding that this which can be made out of the gunpowder, is none of the least, I would not omit in some measure, and as far as lawfully may be done, to set down its preparation: which is thus performed.

How

How to make a spirit of Gunpowder.

YOur distilling vessel being made warm, and a great receiver with sweet water in it, being applyed to it without luting, put a dish with gunpowder, containing about 12. or 15. grains a peece, one after another into it; in the same manner as above was taught to do with gold. For if you should put in too much of it at once, it would cause too much winde and break the receiver.

As soon as you have conveighed it into the vessel, shut the doore, and the gunpowder will kindle, and give a blast that it maketh the receiver stir, and a white mist or steam will come over into the receiver. As soon as the powder is burnt, you may cast in more before the mist is settled, because else the distilling of it would cost too much time, and so you may continue to do untill you have spirit enough. Then let the fire go out, and the furnace grow coole, and then take off the receiver, poure the spirit with the water that was poured in before (the flores being first every where washed off with it) out of the receiver into a glass body, and rectifie it in a B. through a limbeck, and there will come over a muddy water, tasting and smelling of sulphur: which you must keep. In the glass body you will finde a white salt, which you are to keep likewise in the glass-body. Take out the *Caput Mortuum*, which remained in the distilling vessel, and looks like gray salt, calcine it in a covered crucible, that it turn white, but not that it melt; and upon this burnt or calcined salt, pour your stinking water, which came over through the limbeck, and dissolve the calcined white salt with it, and the feces which will not dissolve cast away. Filtre the solution, and poure it upon the white salt, which remained in the glass body, from which the sulphureous spirit was abstracted before, and put the glass body (with a limbeck luted upon it) into sand, and abstract the sulphureous water from it, which will be yellowish, and smell more of sulphur then it did before.

This water if it be abstracted from the salt several times, will turn white, almost like unto milk, and tast no more of sulphur, but be pleasant and sweet. It is is very good for the diseases of the lungs. Also it doth guild silver, being anoynted therewith, although not firmely, and by digestion it may be ripened and reduced into a better medicine.

The salt which remained in the glass body, urge with a strong fire, such as will make the sand, wherein the glass standeth red hot, and there will sublime a white salt into the limbeck, in taste almost like unto salt Armoniack, but in the the midst of the glass body, you will finde another, which is yellowish, of a mineral taste and very hot upon the tongue.

These sublimed salts, as well the white which did ascend into the limbeck, as the yellow, which remained in the glass body are good to be used in the plague, malignant feavers and other diseases, where sweating is required; for they doe mightily provoke sweating, they comfort and do cleanse the stomach, and cause sometimes gentle stools.

But what further may be done in Physick with it, I do not know yet.

In Alchymie it is also of use, which doth not belong to this place upon the remaining salt which did not sublime you may pour rain water, and dissolve it there in the glass body, (if it be whole still) else if it be broken, you may take out the salt dry, and dissolve and filtre and coagulate it againe, and there will be separated a great deal of fæces. This purified salt, which will look yellowish, melt in a covered crucible, and it will turn quite blood red, and as hot as fire upon the tongue, which with fresh water you must dissolve again, and then filtre and coagulate; by which operation it will be made pure and clear, and the solution is quite green before it be coagulated, and as fiery as the red salt was before its dissolution.

This grass green solution being coagulated again into a red fiery salt, it may be melted again in a clean and strong crucible, and it will be much more red and fiery.

N.B. And

N. B. And it is to be admired, that in the melting of it many fiery sparks do flye from it, which do not kindle or take fire, as other sparks of coales or wood use to do. This well purified red salt being laid in a cold and moist place, will dissolve into a blood red oyle, which in digestion dissolveth gold and leaveth the silver: this solution may be coagulated, and kept for use in Alchymie.

There may also a pretious Tincture be extracted out of it with alcolized spirit of wine, which Tincture guildeth silver, but not firmely.

And as for use in Physick, it ought to be kept as a great Treasure. But if the red fiery salt be extracted with spirit of wine before gold be dissolved therewith, it will yeild likewise a faire red Tincture, but not so effectual in Physick as that unto which gold is joyned. And this Tincture can also further be used in Alchymie, which belongeth not hither, because we onely speak of medicaments.

Of the use of the medicine or Tincture made of the Gunpowder.

THis Tincture whether with or without gold, made out of the red salt, is one of the chiefest that I know to make, if you go but rightly to work, and prepare it well: for it purifieth and cleanseth the blood mightily, and provoketh also powerfully sweat and urine; so that it may safely and with great benefit be used in the plague, feavers, epilepsie, scurvy, in *Melancholia Hypochondriaca*, in the gout, stone, and the several kinds of them; as also in all obstructions of the spleen and liver: and in all diseases of the lungs, and it is to be admired that of such a hurtful thing such a good medicine can be prepared. Therefore it would be much better to prepare good medicaments of it, to restore the poor diseased to health there with, then to destroy with it those that are whole and sound.

I know a Chymiſt, that ſpent much time and coſt to ſearch this poyſonous dragon, thinking to make the univerſal medicine or ſtone of the ancient Philoſophers out of it. Eſpecially becauſe he ſaw, that ſo many ſtrange changes of colours appeared, whereof mention is made by the Philoſophers when they deſcribe their medicine and the preparation thereof.

The dragons blood, Virgins milke, green and red lion, black blacker then black, white whiter then white, and the like more needleſs here to relate, which eaſily may perſwade a credulous man as it hapned alſo unto him. But afterward he found, that this ſubject in which he put ſo much confidence, was leprous and not pure enough, and that it be impoſſible to to make that tingent ſtone of it, for to exalt men and metals, and ſo was glad to be contented with a good particular medicine and to commit the reſt unto God.

And ſo much of that poyſonous dragon the gunpowder: but that there is another and more purer dragon, whereof the Philoſophers ſo often made mention, I do not deny: for nature is mighty rich, & could reveal us many Arcana by Gods permiſſion: But becauſe we look only for great honor and riches, and neglect the poor, there is good reaſon why ſuch things remaine hidden from the wicked and ungodly men.

To make ſpirits and flores of Nitre and Coales.

IF you diſtill Nitre (well purified from its ſuperfluous ſalt) mixed with good coals, the Egyptian Sun bird doth burn away, and out of it doth ſweat a ſingular water, uſeful for men and metals. Its burnt aſhes are like unto calcined Tartar, and for the purging of metals not to be deſpiſed.

To make flores and ſpirits of flints, cryſtals or ſand, by adding of coales and ſalt nitre to them.

TAke one part of flints or ſand, and three parts of Linden coales, with ſix parts of good ſalt nitre mixed well together, and caſt of it in, and the combuſtible ſulphur of the flints will be kindled by the piercing and vehement fire of the ſalt nitre, and maketh a ſeparation, carrying over with it part thereof, which it turneth into ſpirits and flores, which muſt be ſeparated by filtring. The ſpirit taſteth as if it had been made of ſalt Tarrar and flints, and is of the ſame nature and condition; and the remaining *Caput Mortuum* alſo yeildeth ſuch an oyle or liquor in all like unto that, and therefore its condition is not deſcribed here, but you may finde it where I ſhall treat of the ſpirit made of ſalt tartar by adding of flints.

To make a ſpirit and oyle out of Talck with ſalt nitre.

TAke one part of Talck made into fine powder, and three parts of Linden-coales, mixe them with five or ſix parts of good ſalt nitre, caſt in of that mixture one ſpoonful after another, and there will come over a ſpirit and a few flores, which muſt be ſeparated as hath been taught above concerning flints.

The ſpirit is not unlike unto the ſpirit of ſand: the *Caput Mortuum*, which looks grayiſh, muſt be made red hot or burnt well in a crucible, ſo that it melt, and then powre it out, and it will yeild a white tranſparent Maſſa, like as the flints and cryſtals do, which in a cold moiſt cellar will turn to thick liquor, fatter in the handling then the oyle of ſand. It is ſomething ſharpe like unto oyle of Tartar; it cleanſeth the skin, haire and nailes, and makes them white; the ſpirit may be uſed inwardly for to provoke ſweat and urine: externally uſed it cleanſeth wounds, and healeth all manner of ſcabs in

the body out of hand. What further may be done with it, I do not know yet: But how to bring Talck, pebles and the like ſtony things to that paſs, that they may be diſſolved with ſpirit of wine and reduced into good medicaments ſhall be taught in the fourth part.

To make a ſpirit, flores, and an oyle out of Tin.

IF you mixe two parts of the filings of Tin, with one part of good ſalt nitre, and caſt it in, as you were taught to do with other things, then the ſulphur of Tin will kindle the ſalt nitre, and make a flame, as if it were done with common ſulphur, whereby a ſeparation is made, ſo that one part of the Tin cometh over in flores and ſpirit, and the reſt ſtayeth behinde, which if it be taken out, ſome of it in a moyſt place will turn into a liquor or oyle, which externally may be uſed with good ſucceſs in all ulcers for to cleanſe them. It hath alſo the vertue, if it be pertinently applyed to graduate and exalt wonderfully all the colours of vegetables and animals, which would be uſeful for dyers. The ſpirit of it mightily provoketh ſweating: the flores being edulcorated and uſed in plaſters, do dry and heal very ſpeedily.

To make a ſpirit, flores and a liquor out of Zinck, or ſpeauter.

IN like manner as hath been taught with the Tin, you may alſo proceed with the Zinck, and it will yeild a good deal of flores, and alſo a ſpirit and oyle, almoſt of the ſame vertues with thoſe made of Tin: and theſe flores corrected with ſale nitre, are better then thoſe which were taught to be made by themſelves in the firſt part of the book.

To

To make a ſpirit, flores and oyle of Lapis Calaminaris.

MIxe two parts of ſalt nitre with one part of *lapis calaminaris* and caſt it in, and it will yield a ſharp ſpirit very uſeful for ſeparating of metals, and there will come over alſo a few yellow flores. The reſt remaining behinde is a dark green Maſs very fiery upon the tongue, like ſalt of Tartar, and if it be diſſolved with raine water, yeildeth a graſs green ſolution, which being not preſently coagulated into ſalt, the green ſeparateth it ſelf from the fixed ſalt nitre, and there falleth to the bottom a fine red powder, and if it be edulcorated and dryed, and given in from one grain to ten or twelve it cauſeth gentle ſtools and vomits, better then prepared Antimony; for *lapis calaminaris* and Zinck are of the nature of gold, as in the fourth part ſhall be proved: the white *lixivium* or lye, from which the green is precipitated, may be coagulated into white ſalt, like unto ſalt of Tartar; but if you coagulate the green ſolution, before the green be ſeparated from the ſalt nitre, then you will get a very faire green ſalt, high in colour and much more fiery then ſalt of Tartar, whereby ſpecial things can be done in Alchymy, which doth not belong hither. And if you deſire to make ſuch a green ſalt for to uſe it in Alchymie, you need not to take ſo much pains, as firſt to diſtil a ſpirit out of the mixture, but take three or four parts of good ſalt nitre, and mixe it with one part of *lapis calaminaris*, and let this mixture boyle together in a winde furnace, till the ſalt nitre be coloured green by the *lapis calaminaris*, then powre it out and ſeparate the green goldiſh ſalt from it, and make ſuch good uſe of it as you thinke fit.

But if you will extract a good Tincture and Medicine, make it into powder, and extract it with ſpirit of wine, and it will yeild a blood red Tincture, both in Phyſick und Alchymie of good uſe.

Further you are to take notice, that among all metals and minerals, which I know (except gold and ſilver) there is

n one found, out of which can be extracted a greenneſs which is of fire-proofe, but only out of *lapis calaminaris*, which deſerveth to be well conſidered and further thought upon.

To make a ſpirit of ſalt nitre, ſulphur and common ſalt.

TAke one part of ſalt, two parts of ſulphur, and four parts of ſalt nitre, grinde all together, and caſt in one ſpooneful after another to diſtill, and it will yeild a ſharp yellow ſpirit, which if it be put among common water, ſo that the water be not made too ſharp of it, it is a good bath, good for many diſeaſes; eſpecially it healeth all ſcabs very ſuddenly. The *Caput Mortuum* may alſo be diſſolved in water and uſed among baths, and it is good likewiſe, but the ſpirit is penetrating, and doth operate ſuddenly in ſhrinkings and other defects of the nerves, of ſuch kinde of bathes there ſhall be ſpoken more in the third part. Alſo the remaining fixed yellow ſalt is good to be uſed in Alchymie: for it graduateth ſomewhat the ſilver by cementing.

To make a ſpirit, flores and oyle out of ſalt nitre and Regulus Martis.

TAke one part of *Regulus Martis ſtellatus* (made of one part of Iron or ſteele, and three parts of Antimony whoſe preparation is deſcribed in the fourth part) and three parts of pure ſalt nitre, mix and grinde all together, and caſt it in by little and little to diſtill, and there will come over a ſpirit together with a white ſublimate, which muſt be ſeparated with water, as hath been taught above with other flores and both the ſpirit and and the flores are good to provoke ſweat. The remaining *Caput Mortuum* (as they uſually call it) is not dead, but full of life and vertue, whereby much good may be done both in Phyſick and Alchymie, as followeth. The remaining Maſs, which looks white, and is very ſharpe and fiery (if the *Regulus* have been pure, if not, then it will look yellowiſh) may be edulcorated

ted with freſh water, and it will yeild a *lixivium* or lye in all like unto calcined Tartar, but ſharper and purer, and may be uſed almoſt in all operations inſtead of ſalt of Tartar (but firſt the *Regulus Antimonii* muſt be precipitated from it by the help of water) and afterward it may be coagulated into ſalt and kept for its uſe; the edulcorated, as alſo that which was precipitated with water is a white and fine powder, uſeful in the plague, feavers, and other diſeaſes to provoke ſweating thereby, and may very ſafely be uſed, and although if it be given in a greater quantity then uſual, it do cauſe ſome vomits alſo, yet for all that it doth no hurt. It is eaſily taken becauſe it hath no taſte. It is given to children from 3. 4. to 12. grains: to elder folkes from ℈ ß. to ʒ ß. they worke ſucceſſefully in all diſeaſes, where ſweating is needfull. This *Antimonium diaphoreticum*, may alſo be melted into glaſs, and ſo extracted and diſſolved with ſpirit of ſalt, and it may be prepared into ſeveral good medicaments: and if all that which may be done with it, ſhould be deſcribed at large, it would require too much time. The *lixivium*, if it be coagulated, hath wonderfull vertues, ſo that if one ſhould deſcribe them, he would hardly be credited by any body, becauſe it is not made of coſtly things; and truly the life of man is too ſhort to finde out by experience all that lyes hid in it: and it would be but a laughing matter to a proud fool, if one ſhould reveale it: therefore it is better to keep counſel, then to ſow ſtrife. *Baſilius Valentinus* in his Triumph of Antimony, where he writeth of the ſigned ſtar, hinted it ſufficiently, but very few take notice of it. *Paracelſus* alſo, here and there in his books under an unknown name, makes frequent mention of it; but its true preparation and uſe, by reaſon of the unthankeful was never deſcribed by the Philoſophers, which for inſtruction of good honeſt men we do here mention.

Before you edulcorate the *Regulus* (made by fulmination) you may extract of it a good medicinal Tincture with ſpirit of wine, and if you diſſolve it with ſpirit of ſalt, there will ſhoote a white foliated Talck in all like unto the Mineral Talck: whereof a liquor may be made, which colloureth the

skin very white, but if this calx of Antimony, before it be extracted with ſpirit of wine or diſſolved with ſpirit of ſalt be made into fine powder, and expoſed to the moiſt aire, it will diſſolve into a fat liquor, which though it be ſomething ſharpe, yet doth no hurt to the skin, if it be uſed with diſcretion, but rather cleanſeth it more then any other thing, and ſo it doth likewiſe to the haire and nailes; but as ſoone as the liquor hath been applyed for that purpoſe, it muſt be waſhed off again with water, leſt it do not onely take away the groſs and unclean skin, but alſo work upon the tender white skin and do hurt, and therefore I give warning, that you uſe it diſcreetly: for according to the old proverbe, you may miſuſe even that which elſe is good in it ſelf. If you put ſome of it into warm water and bath your ſelf in it, the groſs skin will peele off all the body, ſo that you will almoſt ſeem to be another body. And this bath alſo is good for many diſeaſes: for it openeth the pores mightily, and cleanſeth all the blood in the body, by drawing many ill humors out of it, which maketh a man light and ſtrong, eſpecially if he be purged firſt, before he uſeth the bath. It is alſo good for Melancholy, ſcurvy and leproſie, eſpecially when the red Tincture drawn out of it with ſpirit of wine, be uſed beſides. It is alſo good to be uſed in a foot bath for thoſe that are troubled with corns and other excreſcencies upon their feet, or with nailes that cut the fleſh; for it ſofteneth them and makes them fit for cutting, and as tractable as wax. For there is nothing known under the Sun, which ſofteneth more a hard skin, haire, nailes and other excreſcencies, then this oyle. And this I did ſet down therefore, becauſe I know, that many are ſo tormented therewith, that they cannot well endure their ſhoes upon their feet. But if you coagulate this oyle into ſalt, and melt it in a crucible, and powre it out into a flat braſs baſon, that it flow at large and may be broken, then you have the beſt Cauſticum, to open the skin withal where is need. If you diſſolve crude Tartar with it and coagulate it again, you will get a ſalt which is uſeful in many Chymical operations; and there may be extracted out of it a blood

a blood red Tincture with ſpirit of wine, which proveth very effectual againſt all obſtructions.

Alſo every combuſtible ſulphur can be eaſily diſſolved with it, and uſed among bathes, it acteth his part admirably. If any oyle of ſpices be boyled therewith, then the oyle will diſſolve in it, and they turn together to a balſome, which doth mingle it ſelf with water, and is good to be taken inwardly for ſome infirmities: but women with childe muſt not meddle with it, becauſe it makes them miſcarry. But after their delivery, it is good to expel after burthen and other reliques. But if you boyle *Oleum ligni Rhodii* with this liquor and roſe water ſo long till the oyle do incorporate with the liquor and waters and then ſeparate the watery ſubſtance from it, you will get a ſope as white as ſnow, which may be uſed for to waſh the hands with it, and it doth ſmel very wel. You may alſo waſh the head with it; for it ſtrengthneth the braine and cleanſeth the head and haire. This ſope may be diſtilled, and it will yeild a penetrating oyle, very good for the ſinews and nerves.

Now as this liquor of *Regulus Antimonii* ſofteneth the skin, nailes, haire, feathers, horns, and the like, and diſſolveth them more then any thing in the world: In the like manner alſo it hath power to diſſolve not only metals, but alſo the hardeſt ſtones, but not in that manner which is done by boyling, and was mentioned by the ſulphur, but after another way, which is not proper for this place. It ſufficeth that I hinted it. The fiery fixed ſalt nitre can be diſſolved with ſpirit of ſalt or vinegar, and ſublimed into a *Terra foliata*. What further can be effected with it, doth not belong to this place, and perchance ſome where elſe more ſhall be ſpoken of it.

To distil Butyrum out of Antimony, Salt and vitriol, like unto that, which is made out of Antimony and Mercury sublimate.

TAke one part of crude Antimony, two parts of common salt, and four parts of vitriol calcined white, beat all to powder and mix them wel, and so cast it in as you were taught to do with other materials, and there will come over a thick oyle of Antimony like butter, which may be rectified like any other oyle, that is made after the common way with Mercury sublimate, and is also the same with it in use, which use you may see in the first part: the same also can be made better and in a greater quantity in the furnace described in the first part, and also with less coals and time by the help of the open fire, because it endureth greater heat then in the second furnace.

To distil Butyrum of Arsenick and Orpiment.

AFter the same manner as was taught with Antimony, there may also out of Arsenick and Auripigment together with salt and vitriol a thick oyle be distilled, which not only outwardly but also inwardly is safe to be used, and may be so corrected, that it shall be nothing at all inferior in vertue unto the *butyrum Antimonii*, but rather go beyond it: which perchance will seem impossible to many. But he that knows the nature and condition of minerals, will not be astonished at my words, but they will be to him as a light in a darke place.

To

To make a rare spirit of vitriol.

IF common vitriol be dissolved in water, and you boyle granulated Zinck in it, all the metal and sulphur contained in the vitriol will precipitate on the Zinck, and the solution will turn white, the precipitated matter is nothing else, but iron, copper, & sulphur, which the salt of vitriol did containe, and now is drawn from it by the Zinck. The reason why the metal precipitateth out of the salt upon the Zinck, belongeth to the fourth part, where you will finde it sufficiently explained; The white solution, from which the metallical matter is separated, must be coagulated to the dryness of salt, and so by it self a spirit distilled of it, which riseth easily, and is in taste and vertue not unlike unto common oyle of vitriol, but only that this is a little purer then the common.

Here perchance many may object: you take the green from the vitriol, which *Paracelsus* doth not teach, but bids us to keep it. To which I answer, that I do not teach here to make the sweet red oyle of vitriol, whereof *Paracelsus* hath written, but the white acid oyle; which is as good, or rather much better then the common, which is made of the common impure vitriol. To what purpose is it that you take green vitriol to distil, whereas the green doth not come over, and although that green should come over, why should that oyle be better then the white? for the green in the common vitriol is nothing else but copper and iron, which the salt water running through the passages of Metals did dissolve and take into it self, and as soon as such a green vitriol feeleth the fire, the green turneth into red, which is nothing else but a calcined iron or copper, which in the reducing by a strong fire and by melting is made manifest.

Paracelsus hath not taught us, that we should drive over the green by the force of the fire into a red and sweet oyle, but he hath shewed us an other way, which is found out by few men,

men, whereof in the beginning of the second part already hath been made mention.

This spirit or acid oyle distilled out of the purified vitriol is of a pleasant sowreness, and serveth for all those uses, which above by the vitriol were described. And this process is set down onely for that end, that we may see, that when the vitriol is purified, that then it is easier distilled, and yeildeth a more pleasant spirit, then if it be yet crude and impure.

And that such a purifying of the vitriol is nothing else but a precipitating of the metal, which the water (as before said) running through the veines thereof hath assumed, is thus to be proved; dissolve any metal in its appropriate Menstruum, whether it be done with distilled acid spirits or sharpe salts, adding common water to them, or else dry by the fire in a crucible, according as you please, and then put into that solution another metal, such as the dissolvent doth sooner seize on, then upon that which it hath assumed and then you will finde, that the dissolvent doth let fall the assumed metal or mineral, and fals upon the other, which it doth sooner seise on, and dissolveth it as being more friendly to it; Of which precipitation in the fourth part shall be spoken more at large.

This one thing more is worthy your observation, that among all metals there is none more soluble then Zinck, and therefore that all the other (as well in the dry as in the wet way) may be precipitated thereby and reduced into light calxes, in so much that the calx of gold or silver precipitated in this manner (if so be you proceed well) retaineth its splendor or gloss, and is like a fine powder wherewith you can write out of a pen.

To make a subtle spirit and pleasant oyle of Zinck.

BEcause I made mention here of Zinck, I thought good not to omit, that there may be made a penetrating spirit and wholesome oyle out of it by the help of vinegar, which is thus to be done. Take of the flores (which were taught to be

be made in the first part) one part, put them into a glass (fit for digestion) and poure upon them 8. or 10. parts of good sharp vinegar made of honey; or in want thereof take wine vinegar, and set the glass with the flores and vinegar in a warm place to dissolve, and the solution being performed, powre off the cleer, which will look yellow, and after you have filtred it abstract the phlegme, and there will remaine a red liquor or balsome, to which you must add pure sand, such as is well burnt, and distill it, and first there will come over an unsavory phlegme, afterward a subtle spirit, and at last a yellow and red oyl which are to be kept by themselves separated from the spirit as a treasure for to heale all wounds very speedily. The spirit is not inferior unto the oyle, not onely for inward use to provoke sweat thereby, but also externally for the quenching of all inflammations, and doubtless this spirit and oyle is good for more diseases, but because its further use is not known to me yet, I will not write of it, but leave the further triall to others.

To distil a spirit and oyle out of lead.

IN the same manner as was taught of the Zinck, there may be out of lead also distilled a subtle spirit and a sweet oyle, and it is done thus: Poure strong vinegar upon *Minium*, or any other calx of lead, which is made *per se*, and not with sulphur, let it digest and dissolve in sand or warm ashes, so long till the vinegar be coloured yellow by lead, and turned quite sweet. Then poure off the clear solution, and poure on other vinegar, and let this like wise dissolve, and this repeat so often, till the vinegar will dissolve no more, nor grow sweet, then take all these solutions, and evaporate all the moysture, and there will remaine a thick sweet yellow liquor, like unto honey, if the vinegar was not distilled, but if it was distilled and made clear, then no liquor remaineth, but onely a white sweet salt. This liquor or salt may be distilled after the same manner as was taught with the Zinck, and there will come over not only a penetrating subtle spirit, but also a yellow

oyle, which will not be much, but very effectual, in all the the ſame uſes, as of the ſpirit and oyle of the Zinck was taught.

N. B. This is to be obſerved, that for to make this ſpirit and oyle, you need no diſtilled ſpirit, but that it may be done as well with undiſtilled vinegar, and the undiſtilled yeilds more ſpirit then the diſtilled. But if you look for a white and cleer ſalt, then the vinegar muſt be diſtilled, elſe it doth not ſhoote into cryſtals, but remaineth a yellow liquor like unto honey, and it is alſo needleſs to make the ſolution in glaſſes, and by digeſtion continued for a long time, but it may as well be done in a glaſed pot, *viz.* powring the vinegar upon the Minium in the pot, and boyling it on a coale fire; for you need not fear that any thing of the vinegar will evaporate, in regard that the lead keeps all the ſpirits, and lets onely go an unſavory phlegme. You muſt alſo continually ſtir the lead about with a wooden ſpatula, elſe it would turn to a hard ſtone, and would not diſſolve: the ſame muſt be done alſo when the ſolution is done in glaſſes; and the ſolution after this way may be done in three or four houres: and when both kinde of ſolutions are done, there will be no difference betwixt them, and I think it providently done not to ſpend a whole day about that which may be done in an houre.

And if you will have this ſpirit and oyle better and more effectual, you may mix ℥ i. of crude Tartar made into powder with ℔ j. of diſſolved and purified lead, and ſo diſtill it after the ſame manner as you do diſtill it by it ſelf, and you will get a much ſubtler ſpirit aud a better oyle then if it were made alone by it ſelf.

To diſtill a ſubtile ſpirit and oyle out of crude Tartar.

MAny think it to be but a ſmal matter to make the ſpirit of Tartar, for they ſuppoſe, that if they do but onely put Tartar into a retort, and apply a receiver, and by a ſtrong fire force over a water, they have obtained their deſire: and they do not obſerve, that in ſteed of a pleaſant ſubtle ſpirit, they

they get but a ſtinking vinegar or phlegme; the pleaſant ſpirit being gone. Which ſome careful operators perceiving, they cauſed great receivers to be made, ſuppoſing by that means to get the ſpirit. Now when they after the diſtillation was done, weighed their ſpirits together with the remainder, they found, that they had ſuffered great loſs, wherefore they ſuppoſed it to be an impoſſible thing, to get all the ſpirits, and to loſe none, and indeed it is hardly poſſible to be done otherwiſe by a retort: for although you apply a great receiver to a ſmal retort, and that there be alſo but a little Tartar in it, and the joynts being wel luted, ſo that nothing can paſs through, and though you make alſo the fire never ſo gentle, hoping to get the ſpirit by that way, yet for all that you cannot avoyd danger and loſs. For at laſt the retort beginning to be red hot, and the black oyle going, then and but then the ſubtleſt ſpirits will come forth, which either ſteale through the joynts, or elſe do break the retort or receiver, becauſe they come in abundance and with great force, and do not ſettle eaſily: wherefore I will ſet down my way of making this moſt profitable, and excellent ſpirit.

The preparation and the uſe of the ſpirit of Tartar.

TAke good and pure crude Tartar, whether it be red or white, it matters not, make it into fine powder, and when the diſtilling veſſel is red hot, then caſt in with a ladle half an ounce and no more at once, and ſo ſoon as the ſpirits are gone forth and ſetled, caſt in another ℥ ß. and this continue, till you have ſpirit enough, then take out the remainder, which will look black, and calcine it wel in a crucible, and put it in a glaſs retort, and poure the ſpirit that came over together with the black oyle upon it, drive it in ſand at firſt gently, and the ſubtleſt ſpirits will come over, and after them the phlegme, at laſt a ſowre vinegar together with the oyle, whereof you muſt get each by it ſelf. But if you deſire to have the ſubtle ſpirit which came over firſt, more penetrating yet, then you muſt

take the *Caput Mortuum* that ſtayed in the retort, and make it red hot in a crucible, and abſtract the ſpirit once more from it, and the calcined Tartar will keep the remaining moyſtneſs or phlegme, and onely the ſubtleſt ſpirit will come over, which is of a moſt penetrating quality, whereof from half a dram to an ounce taken in wine or any other liquor provoketh a quick and ſtrong ſweat, and it is a powerful medicine in all obſtructions, and moſt approved and often tryed in the plague, malignant feavers, ſcurvy, *Melancholia Hypochondriaca*, colick, contracture, epilepſie and the like diſeaſes. And not onely theſe mentioned diſeaſes, but alſo many others more, which proceed from corrupt blood under God may ſucceſſefully be cured with it.

The phlegme is to be caſt away, as unprofitable: the vinegar cleanſeth wounds: the oyle allayeth ſwelling and pains, and doth cure ſcabs, and diſperſeth knobs that are riſen upon the skin, as alſo other excreſcencies of the ſame, if it be uſed timely, and the uſe thereof be continued.

N. B. If the black ſtinking oyle be rectified from the calcined *Caput Mortuum*, it will be clear and ſubtle, and it will not only aſſwage very ſpeedily all pains of the goute, but alſo diſſolve and expel the conglobated gravel in the reines, applyed as a plaſter or unguent. In like manner it will diſſolve and extract the coagulated Tartar in the hands, knees and feet, ſo that the place affected will be freed and made whole thereby: becauſe in ſuch a deſpicable oyle there lyes hid a volatile ſalt which is of great vertue. But if you deſire experimentally to know whether it be ſo, then poure upon this black ſtinking oyle an acid ſpirit, as the ſpirit of common ſalt, or of vitriol or ſalt nitre, or only diſtilled vinegar, and the oyle will grow warm and make a noyſe and riſe, as if *Aqua fortis* had been powred upon ſalt of Tartar, and the acid ſpirit will be mortified thereby, and turne to ſalt. And this well purified oyle doth diſſolve and extract the Tartar out of the joynts (unleſs it be grown to a hard ſtony ſubſtance) even as ſope ſcowres the uncleanneſs out of cloths, or to compare it better, even as like receiveth its like, and is eaſily mixed with it,

it, and doth love it; but on the contrary, nothing will mixe it ſelf with that wherewith it hath no affinity at all. As if you would take pitch out of cloth by waſhing it with water, which never will be done by reaſon of the contrary nature; for common water hath no affinity with pitch or other fat things, nor will it ever be taken out therewith without a mediator, partaking of both natures, *viz.* of the nature of pitch and that of the water, and ſuch are ſulphureous ſalts, and nitrous ſalts, whether they be fixed or volatile. As you may ſee at the ſoape-boylers, who incorporate common water by the help of ſulphureous ſalts with fat things, as tallow and oyle. But if you take warm oyle or any thin fat ſubſtance, and put it upon the pitch or rozin, then the oyle eaſily accepteth of and layes hold on its like, and ſo the pitch is diſſolved and got out of the cloth, and the remaining fatneſs of the oyle may be fetcht out of the cloth with lye or ſope and common water, and ſo the cloth recovereth its former beauty and pureneſs. And as it falleth out with the ſulphureous things, ſo it doth likewiſe with the Mercurial. For example, if you would take the ſalt out of powdred fleſh or pickled fiſh with lixivium it would not ſucceed, becauſe that the nitrous and acid ſalts are of contrary natures.

But if upon the powdred fleſh or pickled fiſh you poure on water wherein ſome of the ſame ſalt (wherewithall the fleſh was powdered) is diſſolved, that ſalt water will extract the ſalt out of the fleſh, as being its like, much more then common ſweet water, wherein there is no ſalt.

In this manner the hardeſt things alſo, as ſtones and metals, may be joyned or united with water, whereof more in my other books are extant; it is needleſs here therefore to relate. I gave a hint of it, onely for to ſhew, that alwayes like with like muſt be extracted. True it is that one Contrarium can mortifie another, and take the corroſiveneſs from it, whereby the paynes for a time are aſſwaged, but whether the cauſe of the diſeaſe it ſelf be eradicated thereby is a queſtion.

Here may be objected, that I made a difference between the ſulphureous and Mercurial ſalts, whereas neither Mercury

nor sulphur apparently is to be seen in either. It is true, he that doth not understand nor know the nature of salts, is not able to apprehend it. And I have not time now to demonstrate it, but the same is shewed at large in my book *de Natura salium*, that some of them are sulphureous, and some Mercurial: but he that looks for a further direction yet, let him read my book *de Sympathia & Antipathia rerum*, wherein he shall finde it demonstrated that from the Creation of the World to the time present, there were alwayes two contrary natures fighting one against the other, which fight will continue so long till the Mediator betwixt God and Man, the Lord Jesus Christ shall put an end unto this strife, when he shall come to separate the good from the bad, by whose lightning and fire flame the proud and hurtful superfluous sulphur shall be kindled and consumed; the pure Mercurial being left in the center.

How to make pretious spirits and oyles out of Tartar joyned with some minerals and metals.

TAke any metal or mineral, dissolve it in a fit menstruum, mix with it a due proportion of crude Tartar, so that the crude Tartar being made into powder together with the solution make up a pap as it were; then at once cast in one spoonful of it, and distil it into a spirit and oyle, which after the distillation must be separated by rectification, for to keep each by it self for its proper use.

The use of the metallized spirit and oyle of Tartar.

THis spirit of a Tartarized metal is of such a condition, that it readily performeth its operation according to the strength of the spirit, and the nature of the metal or mineral, whereof it is made. For the spirit and oyle of gold and Tartar is good for to corroborate the heart, and to keep out its enemies: the spirit of silver and Tartar doth serve for the braine; that of Mercury and Tartar, for the liver: of lead and

and tin for the spleen and lungs: of iron and copper for the reins and seminary vessels: that of Antimony and Tartar for all accidents and infirmities of the whole body; and these metallical spirits made with Tartar, provoke sweat exceedingly whereby many malignities are expelled out of the body Likewise also the oyle hath its operation, though this of several metals, as of Mercury and copper, is not well to be used inwardly, because it causeth salivations and strong vomits. But externally they are very good for to cleanse all putride ulcers, and to lay a good and firme ground for healing them.

The remainder, whereof the spirit and oyle is distilled, you may take out, and reduce it in a crucible into a metal, so that what is not come over, may not be lost, but made to serve againe.

And as you were taught to distill spirits and oyles out of dissolved metals and crude Tartar, so you may get them likewise out of common vitriol and Tartar, *viz.* thus, take one part of Tartar made into powder, two parts of good pure vitriol, mixe them well together, and distill a spirit of them, which though it be unpleasant to take, for all that in all whatsoever obstructions and corruption of blood it is not to be despised, but very successefully performeth its operation; especially when it is rectified from its *Caput Mortuum*, and so freed from its phlegme; and its best vertue, which consisteth in the volatility, be not lost in the distilling.

N. B. But if you will have this spirit more effectual, then you may joyn Tartar and vitriol by boyling them together in common water, and crystallizing; and then cast it in, and distill it, and there will come over a much purer and more penetrating spirit; because that in the solution and coagulation of both many fæces were separated: but if to one part of vitriol you take two parts of Tartar, and dissolve it together and so filtre and coagulate it, then the Tartar with the vitriol will shoote no more, but there remaineth a thick liquor like unto honey, out of which with spirit of wine there may be extracted a good tincture against obstructions. This liquor

taken

taken from ℈ i. to ʒi. doth purge very gently, and sometimes it causeth a vomit, especially if the vitriol was not pure and good: and it may also be distilled into a spirit not inferior unto the former in vertue. Besides the way above taught, there is yet (for to distill a metallized spirit of Tartar) another way, whereby several metals and minerals may be reduced into much pleasant spirits and oyles, and of more vertue, and it is done in this manner.

Take of the Tartar of white Rhenish wine made into powder, powre upon it sweet raine or running water, so that to ℔ j. of Tartar there come ℔ x. or ℔ xij. of water, or so much that the Tartar may be dissolved by it in the boyling, and then boyle the mixture with the water in a tinned kettle, or which is better, in a glased pot, until it be quite dissolved, and in the mean while take off the skum (with a woodden skimmer) still as it riseth in the boyling: and when no more skum riseth, and all the Tartar is dissolved, then powre the solution thus hot through a linen cloth, tyed straight on an earth glased vessel, that the remaining slymigness may be separated. The Tartar water being strained, let it stand for 24. or 30. houres without stirring, and there will stick a crystallised Tartar to the sides of the vessel, which after the water is powred off may be taken out, and washed with cold water, and then dryed. This purified Tartar keep, untill I shall teach you, what further is to be done with it; and this Tartar is pure enough for the above said purpose, *viz.* to reduce metals into oyle with it, as shall follow anone. It is also good taken of it self for an absterstive to make the body soluble. But if you desire to have it yet whiter and fairer and in great crystals, you must proceed thus.

You must know this that all salts, if they shall shoote into great crystals, there must be a great quantity of them, for of little there comes but little. And if you will make great and faire white crystals of Tartar, which will be not better then the former, but only pleasant to the eye, then you must proceed in this manner.

Take of white Tartar made into powder about ten or

or thirty ℔. powre so much water upon it, as is needful for to dissolve it, and boyle it by a strong fire in a tinned kettle untill all the Tartar be dissolved, which you may know by stirring in it with a woodden ladle, and skim off diligently all the filth riding on the water; and you must take heed, that you take neither too much nor too little water to it; for if you take too little, part of the Tartar will remaine undissolved, and so will be cast away and lost among the slime: but if you take too much of it, then the Tartar is too much dispersed in the water, and cannot shoote well, and so will likewise be lost, being cast away afterwards with the water. For I heard many a one complain, that they could get but little of a pound, and therefore supposed the Tartar to have been nought, whereas the fault was not in the Tartar but in the workman, that managed not wel his work, powring away one half which did not shoote with the water: but if you proceed well, then four pound of common Tartar will yeild ℔ iij. of pure white Crystals. The solution being well made, and one, and no skim more riding at the top, cover the kettle, and let it coole without removing from the warme place it stands in, which will be done within three or four dayes, if the kettle be bigg. But the fire must be taken away from under the kettle, and so let it stand for the time mentioned. In the mean while the Tartar will crystallise to the sides of the kettle, which crystals after the time is expired and the water powred off, are to be taken out and washed and boyled again with fresh water, and so skimmed and crystallised; and this proceeding must be still reiterated, untill (which is done the third or fourth time) the crystals are white enough: then take them out, dry and keep them for use; whereof from ʒ j. to ℈ j. made into powder, and taken in wine, beer, warme broth or other liquor, will give some gentle stooles, and serveth for those, which cannot endure strong physick. This Tartar may be sharpened with Diagridium or any other purging drug, that so you need not take it in so great a quantity at once, but a lesser dose may serve turn. But if you do not look for great crystals, but only for Tartar well purified, then you

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may use this following manual, and you will get exceeding faire and glistering little crystals, which need no beating into powder, but by the working come to be so pure and fine, as if they had been ground upon a stone, and looking not like a dead powder, but having a gloss, like unto small glistering snow that fell in very cold weather, and it is done thus: when the crystals are come to be pure enough by often dissolving and coagulating, then dissolve them once again in pure water, and pour the solution into a clean vessel of wood, copper or earth being glased; and let it not stand still (as above taught with the crystals) but as soon as it is powred in, with a clean wooden stick stirr about continually without ceasing, till all be cold, which will be done in half an houre. In this stirring the Tartar hath no time to shoote into crystals, but doth coagulate into the smallest glistering powder, pleasant to behold, and like unto frozen snow settleth to the bottom of the vessel; then poure off the water, and dry the powder, and keep it for use. The waters which you powred off, in regard that they containe yet some Tartar, ought not to be cast away (as others do) but evaporated, and the Tartar contained in them will be saved, and so nothing will be lost, and in this manner not onely white Tartar may be reduced into clear crystals, but also the red being several times dissolved and crystallised, loseth its redness, and turneth white and cleer. Besides the above said there is another way to reduce the Tartar into great white crystals at once by precipitation: but these being good enough for our purpose, *viz.* to make good medicines out of metals, I hold it needlesse to lose more time by the relation of it, and so I will acquiesce.

The other way to make a metallised spirit of Tartar.

TAke of purified Tartar dissolved and coagulated but once as much as you please, poure so much raine or other sweet water to it as will serve to dissolve it; in which solution you must boyle the plate of metals, until the Tartar have dissolved

dissolved enough of it, so that it will dissolve no more; the signe whereof is, when the solution is deep coloured of the metal, and during your boyling you must often supply the evaporated water with pouring on of other, lest the Tartar come to be too dry and burn; and this solution may be done best of all in a metallical vessel; as when you will make the solution of iron, you may do it in an iron pot; and for copper you may take a copper kettle, and so forth for other metals, a vessel made of the same is to be taken. But you must know that gold, silver and crude Mercury, unless they be first prepared cannot be dissolved like iron and copper, but when they are prepared first for the purpose, then they will also be dissolved. In like manner some minerals also must be first prepared, before they can be dissolved with Tartar and water. But if you can have good glasses or glased vessels of earth, you may use them for all metals and minerals for to dissolve them therein, and the solution you may not onely use of it self for a medicine, but also distill it, and make a very effectual spirit and oyle of it as followeth.

To distil the spirit and oyle of Lead and Tin.

TAke the filings of Lead and Tin, and boyle them with the water or solution of Tartar in a leaden or tin-vessel, untill the Tartar be sweetned by the water, so that it will dissolve no more, to which pass it will be brought within twenty four hours, for both these metals will be dissolved but slowly, but if you would perform this solution sooner, then you must reduce the metals first into a soluble calx, and then they may be dissolved in less time then an houre. The solution being done, you must filtre it, and in B. abstract all the moysture to the thickness or consistency of honey, and there will remaine a pleasant sweet liquor, which of it self without any further preparation may safely be used inwardly for all such diseases, for which other medicaments, made of these metals are useful. Especially the sweet liquor of lead and tin doeth much

much good in the plague, not only by driving the poyſon from the heart by ſweating, but alſo by breaking or allaying the intolerable heat, ſo that a happy cure doth follow upon it: but externally the liquor of lead may be uſed ſucceſſully in all inflammations, and it healeth very ſuddenly, not only freſh wounds, but alſo old ulcers turned to fiſtulaes; for the Tartar cleanſeth and lead conſolidates.

The liquor of tin is better for inward uſe then for outward whoſe operation is not ſo fully known yet, as that of lead. But if you will diſtill a ſpirit thereof, then caſt it in with a ladle by little and little, as above in other diſtillations oftentimes was mentioned, and there will come over a ſubtle ſpirit of Tartar, carrying along the vertue and beſt eſſence of the metals and therefore doth alſo prove much more effectual, then the common ſpirit of Tartar, which is made alone by it ſelfe, and this ſpirit as well that which is made of tin, as that of lead, if it be well dephlegmed firſt, may be uſed and held for a great treaſure in all obſtructions, eſpecially of the ſpleen; and few other medicins will go beyond them; but beſides there muſt not be neglected the uſe of good purging medicines, if need require them. With the ſpirit there cometh over alſo an oyle, which is of a quick operation, eſpecially in wounds and ſores of the eye, where other oyntments and plaſters may not ſo fitly be uſed, for it doth not only allay the heat and inflammation, a common ſymptome of the eye wounds, but alſo doth hinder and keep back all other ſymptomes, which few other medicaments are able to do; and for the reſidue, if it be driven further by the ſtrongeſt fire, then there will come over a ſublimate, which in the aire diſſolveth into oyle, which is alſo of a powerful operation, not only in phyſick, but alſo in Alchymie.

And the Lead runeth together in a fair white *Regulus*, which is much whiter, purer and fairer then other common lead: but the Tartar retaines the blackneſs, and raiſeth it ſelf to the top as a fuſible droſs, which is impregnated with the ſulphur of lead, wherewith you may colour haire, bones, feathers and the like, and make them to be and remaine brown and black.

I made

I made tryal once of ſuch a diſtillation in an iron veſſel, whereby the ſame in the inſide was ſo whitened by the purified lead, that it was like unto fine ſilver in brightneſs: which afterwards trying againe, it would not fall ſo faire as at firſt; whereat none ought to wonder, for I could write ſomething more (if it were fit) of Tartar, knowing well what may be effected with it, if I did not ſtand in fear of ſcoffers, which do vilifie all what they do not underſtand. I durſt preſume to call Tartar the ſope of the Philoſophers; for in the cleanſing of ſome metals by long experience I found it of admirable vertue; though I would not be underſtood thus, as if I did count it to be the true *Azoth univerſalis Philoſophorum*, whereby they waſh their Laton: but I cannot deny, but that it is of particular uſe for the waſhing and cleanſing of ſeveral metals: for it is endued with admirable vertues for the uſe of metals, whereof in other places more ſhall be ſaid hereafter.

How to make a Tartariſed ſpirit and oyle out of Iron or Steel and Copper.

IF you intend to make a good medicine out of iron or ſteel or copper joyned with Tartar, then for the iron or ſteel take an iron pot, and for copper a kettle of copper, make them very clean and put in it the filings of iron or ſteel or copper, which you pleaſe, and twice as much of pure Tartar made into powder, and ſo much water, that the Tartar may be diſſolved well by it in the boyling, and ſo boyle the metal with the Tartar-water ſo long, till it be deeply coloured by the metal, as red by the iron, and deep green by the copper; and when the water in the boyling doth waſte, you muſt ſtill ſupply it with other, that the Tartar may not burn; for there muſt be alwayes ſo much water, that no skin of the Tartar may riſe at the top, but that it remaine alwayes open, and there muſt not be too much water neither, leſt it be too ſweet, and not able to diſſolve the metal. The ſolution of iron or ſteel being come to be red and ſweet, and in taſte like

unto vitriol, but green and bitter of copper, powre it off warm by inclination into an other clean vessel, and let it stand so long againe in a very gentle heap of coals, till almost all the water be evaporated, and the dissolved metal with the Tartar, remaine in the consistency of honey.

Which metallical liquor may be used inwardly and outwardly (especially that of iron) which doth purge gently, and openeth the obstructions of the liver and spleen; cleanseth the stomach and killeth the wormes: externally used it is a good wound balsame, and goes far beyond all such as are made of vegetables. It is a singular treasure, not onely for to cure new wounds; but also for to cleanse and heal old corrupt exulcerated sores, turned to fistulaes: but the liquor of copper is not so safe for to be used inwardly, for it is not only very unpleasant in taste, but also causeth vehement vomits: and therefore I would not advise any one to be forward to use it, unless it be for strong folkes and for to kill wormes in them, for which purpose it is excellent good and surpasseth all other medicines whatsoever; but to little children it ought not to be given at all, in regard that it is of farre too strong an operation for them.

N. B. And if you will use it to strong bodies against the wormes or stomach-agues you must observe that the patient (in case he cannot get it up) thrust his finger into the throat to further the vomiting, that it may not stay behinde, but come forth againe out of the body, which done health followeth upon it; but if it remaine in the body, it causeth a loathsomness to use it any more. And therefore you must take heed to use it warily: and in regard that this liquor is very bitter, you may mixe it with some sugar, to facilitate the taking thereof: but that of iron needeth no such correction, it being sweet enough of it self, and therefore I commend and prefer it before the other. But if you will needs that of copper (because th it worketh so strongly) then the patient must keep in from the cold aire, and not presently after the operation load the stomach with strong drink and superfluity of meat,

meat, contenting himself with some warm broth and a little cup of wine or beer, and the next day his meat and drink will taste the better with him, and do him so much the more good.

But externally this liquor is of the same use with that of iron or steel, yea proveth more effectual and speedier in healing. It would be good that Surgeons knew how to prepare it, and would use it instead of their salves, wherewith many fresh wounds are spoyled and turned into horrid ulcers, especially it requiring so little cost and paines to make it. And if you would have these liquors purer yet, you must poure on spirit of wine, and extract them, and they will easily yeild their Tincture, and leave many fæces behinde which are good for nothing: but the Tincture will be so much the better, purer and more effectual, so that you need but one to four or five drops for purging, whereas of the gross liquor you must have from 4. 6. 8. to 12. or 16. drops: and this extracted Tincture worketh also much better externally and keepeth longer then the balsame or liquor, which in time is corrupted, but the extraction is never spoyled. But if you will distil the liquor or balsame, it is needless that it be extracted first, but may be distilled so as the boyling made it, after the same manner, as above was taught for Lead, and there will come over a yellow spirit and oyle from iron or steel, and from copper a greenish spirit and oyle.

The spirit and oyle of iron may safely be used in the plague, feavers, obstructions, and corruption of blood, from ʒ i. to ℈i. It is much better to provoke sweat, then that which is made of crude Tartar, without addition of a metal: the like doth that also which is made of copper and more effectually yet and sometimes causeth a vomit, if it be used in a greater quantity, then is fitting.

N. B. Although the Chymists do perfer copper before iron as a more firme and ripe metal, nevertheless it is found by experience, that iron or steel by reason of its sweetness is better to be used for an inward medicine then copper. But for external use copper (if it be well prepared) hath the preheminence, being

being an appropriate medicine for all ulcers and open sores, in all the parts of the body, if the same inwardly be kept clean besides by fitting purges. For not only the now described medicine, but also many more besides, are taught to be made out of copper in other places of my books.

A Country-physick and purge I will teach for those, which either live far from Apothecary-shops, or have no money to spare for physick, and it is to be made out of iron and copper, whereby they may cleanse their slymie stomachs, spoyled by a disorderly dyet, whence headaches, wormes, agues and other diseases are occasioned, warning withal those that are either too old or too young, or else decayed and weak, and so not strong enough for such powerful physick, that they will forbear to use it, lest besides the wormes they kill and expel life it self also; but those that are of a strong constitution, and a midle age, and of a sound heart, may safely use this purge, whereby stomach-agues, belly-worms, and many other occult diseases may be cured with good success. The preparation is done thus: Take ℥ ß. of pure Tartar made into powder, and ℥ß. or ℥j. of sugar or honey, and ℥v. or ℥vj. of spring or raine water, put all into a clean copper vessel which is not greasie and boyle it upon a coal fire as long or somewhat longer then you use to boyle an egg, or at the furthest half a quarter of an hour; take off the skum in boyling, let it stand till it be milk warm, so that it may be drunke. This potion tasting almost like warme wine sweetned with sugar, give unto the patient to drink, and let him fast upon it, and within half an hour it wil begin to work upwards and downwards: whereat you need not to be amazed, but only keep the body warm, and within an houre it will have done working. But if you will drive out wormes from little children by purging, then in stead of the copper-vessel, take a clean iron-vessel, and put in a less quantity of Tartar, sugar and water, and boyle it as abovesaid, and give it to them, and it will purge onely downward, but sometimes it will also give a gentle vomit, which will do them no hurt, but rather will cleanse the stomach the better. But if the drink be too weak, so

so that it doth not work, it may be used againe the next day (but you must take more of the ingredients, or else let them boyle longer) there is no danger in it at all, if you proceed aright and it is much pleasanter to take, then the bitter wormseed, wherewith they usually torment children.

The reason why this decoction works in this manner is that the Tartar and sugar being boyled in metallical vessels with water worke upon the metal, and extract vertue out of it, which causeth vomiting and purging (the Tartar also being helpful to it.)

How to make a Tartarised spirit of Mercury.

VUlgar Mercury cannot be dissolved like the former metals with Tartar and water, without any foregoing preparation; but must be sublimed first with salt and vitriol, or crystallised with *Aqua fortis*, and then it may be dissolved by boyling with Tartar and water, and reduced into a balsame, like other metals, but it is not to be used inwardly, unless it be digested a sufficient time, so that its fierceness be allayed: Externally it may safely be used in all desperate, especially venereal sores, and it is a very effectual and profitable medicine for them. But most of all it doth serve for Alchymie, although few do know this guest, because he will not be seen by every one. The spirit which comes over from it by distillation, is an admirable thing not only in physick, but also in Alchymie: yet you must take heed, that in stead of a friend, you do not harbor a great enemy: for its force and vertue is very great and powerful.

How to make a Tartarised spirit of Gold and Silver.

GOld and silver also can by no means be dissolved with Tartar in a wet way: but in a dry way adding its helper to it, it will easily dissolve, which doth not belong hither; but if you will draw a spirit of it, then the gold and

silver must first by dissolving and coagulating be reduced to crystals, and then dissolved with purified Tartar and water, and of Gold you will get a yellow solution, and of silver a white inclining unto green, which being reduced to the consistency of honey, may be used safely and without fear. The solution of Gold doth loosen and keep the body open, it effectually strengtheneth the stomach, heart, lungs, and liver, and other principal members: and that of silver purgeth very forcibly, according to the quantity given, like another purge, but without harme or danger, so that in all diseases where purging is necessary, it may be used safely from ℈i. to ʒß. but that of gold is used in a smaller quantity: and both the liquor of gold and of silver may very successfully be used externally: but because for external uses inferior metals will serve the turn, it is needless to use costly things thereto.

The spirit which is forced from it by distillation, is endued with great vertue: for the volatile part of the metal cometh over joyned with the spirit of Tartar, the remainder may be reduced, so as it was taught of other metals. This spirit especially that of Gold is exceeding good in the plague and other diseases, where sweating is necessary: for it driveth not onely by sweating all malignities from the heart, but also doth strengthen the same and preserveth it from all hurtful symptomes. Likewise also that of silver is very commendable, especially if it be first dephlegmed from its *Caput Mortuum*, as above was taught in the preparation of the common spirit of Tartar. For any Physitian expert in Chymistry may easily gues what the spirit of Tartar well rectified and impregnated with the vertues of gold may effect, and therefore it is needless to make any further mention of it, but it shall be left to the tryal thereof.

To make a Tartarized spirit of Antimony.

CRude Antimony cannot be dissolved in such a manner as above hath been taught: but if it be first prepared into flores, or a *vitrum*, it yeildeth easily its vertue in boyling, and it is done thus: Take to one part of the flores or of smal ground *vitrum Antimonii* made *per se*, three parts of pure Tartar, and 12. or 15 parts of clean water, boyle the Antimony with the Tartar and water in a glased pot for three or four hours, and the evaporated water must be still supplyed with other that the Tartar may not burn for want of water, and the *vitrum* must be sometimes stirred about with a wooden spatula (which the flores being light do not need) This done, the Tartar water will be deep red coloured by the Antimony, and leave the remaining Antimony settled in the bottom, from which powre off the solution, and after having filtred it, evaporate the water from it, and then extract it once more with spirit of wine, and you will get a blood red *Extractum*, whereof 1. 2. 3. to 10. or 12. drops given at once, causeth gentle vomits and stooles, which may be safely used by old and young people in all diseases that have need of purging, and you need not fear any danger at all: For I know no vomit, which purgeth more gently then this, and if you please you may make it work only (*per inferiora*) downward, so that it shall cause no vomits at all: and you need do nothing else but make a toste of brown bread, and hold it hot to your nose and mouth, and when this is almost cold, have another hot in readiness, and so use one after another by turns, till you feel no more loathing, and that the vertue of Antimony hath begun to work downward: This is a good secret for those that would use Antimonial physick, but that they are afraid of vomiting, which they are not able to endure. But if you will not spend so much paines, as to make such an Extract, then do as you was taught above to do with the copper, and take ten or twelve grains of prepared Antimony for

an old body, but for a young one 5. 6. grains or more or leſs according to the condition of the perſon, and ʒß. or ʒvj. of pure Tartar, and together with ʒiiij. or ʒv. of water put it in a little pipkin, and boyle it a quarter of an houre, then poure the ſolution onely into a cup, and diſſolve a little ſugar in it, whereby the acidity of the Tartar will be ſomewhat qualified. This *decoctum* drink warm, and keep your ſelfas it is fit, and it will work much better, then it had been ſteeped over night in wine, which not every one can abide to take faſting: but this *decoctum*, becauſe it taſteth like warm and ſweet wine, is much pleaſanter for to take.

N.B. It is to be admired, that well prepared Antimony is never taken in vaine: for although it be given in a very ſmall quantity, ſo that it cannot cauſe either ſtooles or vomits, yet it worketh inſenſibly, *viz.* it cleanſeth the blood, and expelleth many maligniries by ſweat, ſo that mighty diſeaſes may be rooted out thereby without any great ſenſible operation. Which many times hapned unto me, and gave me occaſion to think further of it: and therefore I ſought how to prepare Antimony ſo, that it might be uſed daily without cauſing of vomits or ſtooles, which I put in execution accordingly, and found it good, as afterward ſhall follow.

Of the ſolution above deſcribed, *viz.* of the flores of Antimony with Tartar make a good quantity, and after the evaporation of the water diſtill a ſpirit of it, and there will alſo come over a black oyle, which muſt be ſeparated from the ſpirit, and rectified *per ſe*; and externally applyed it will not onely do the ſame wonderful operations, which above have been aſcribed to the ſimple oyle of Tartar, but it goeth alſo far beyond it, for the beſt eſſence of Antimony hath joyned it ſelf thereunto in the diſtilling, and ſo doubled the vertue of the oyle of Tartar; and this oyle may with credit be uſed not onely for all podagrical tumors to allay them very readily, but alſo by reaſon of its dryneſs it doth conſume all other tumors in the whole body, whether they be cauſed by winde or water: for the volatile ſalt by reaſon of its ſubtlety conveigheth the vertue of Antimony into the innermoſt parts of the body in

a marvellous and incredible way, whereby much good can be performed in Chyrurgerie.

As for the ſpirit, you may not onely uſe it very ſucceſſully, in the plague, pox, ſcurvy, *Melancholia Hypochondriaca*, feavers and other obſtructions and corruptions of blood; but alſo if you put ſome of it into new wine or beer, and let it work with it, the wine or beer comes to be ſo vertuous thereby, that if it be daily uſed, it doth ſtay and keep off all diſeaſes proceeding from ſuperfluous humors and corrupted blood, ſo that neither plague, ſcurvy, *Melancholia hypochondriaca*, or any other diſeaſe of that kinde can take roote in thoſe that daily uſe it, wherein no metal or mineral (except gold) can be paralleld with it: but in caſe you have no conveniency for to make that ſpirit, and yet you would willingly have ſuch a medicinal drink made of Antimony, then take but of the ſolution made with Tartar, before it be diſtilled, and put ℔ i. or ℔iß. of it into 18. or 20. gallons of new wine or beer, and let it work together, and the vertue of the Antimony by the fermentation of the wine will grow the more volatile and efficacious to work. And if you cannot have new wine (in regard that it doth not grow every where) you may make an artificial wine of honey, ſugar, peares, figs, cherries or the like fruit, as in the following third part ſhall be taught, which may ſtand in ſtead of natural wine.

Theſe medicinal wines ſerve for a ſure and ſafe preſervative, not only to prevent many diſeaſes, but alſo if they have poſſeſſed the body already, effectually to oppoſe and expel them. Alſo all externall open ſores (which by daubing and plaſtering could not be remedied) by daily drinking thereof may be perfectly cured. For not only *Baſilius Valentinus* and *Theophraſtus Paracelſus*, but many more before and after them knew it very well, and have written many good things of it, which few did entertain, and (becauſe their deſcription was ſomewhat dark) moſt deſpiſed and diffamed them for untruths.

In like manner and much more may this my writing be lightly eſteemed of, becauſe I do not ſet down long and coſtly

processes, but only according to truth and in simplicity do labour to serve my neighbour, which doth not sound well in the ears of the proud world, which rather do tickle and load themselves with vaine and unprofitable processes, then hearken unto the truth; and it is no wonder, that God suffereth such men, which only look after high things, and despise small things to be held in error.

Why do we look to get our Medicines by troubling our braines, and by subtle and tedious works, whereas God through the simple nature doth teach us otherwise. Were it not better to let simple nature instruct us? surely if we would be in love with small things, we should finde great ones. But because all men do strive only for great and high things, therefore the small also are kept from them; and therefore it would be well, that we could fancy this maxime, that also things of small account can do something, as we may see by the Tartar and the despicable Antimony, and not only so many coles, glasses, materials, and the like, but also the pretious time would not be wasted so much in preparing of medicaments: for all is not gold that glistereth, but oftentimes under a homely coate some glorious thing is hid; which must be taken notice of.

Some may object why I do teach to joyn the Antimony first with the Tartar by the help of common water before its fermentation with the wine: whether it would not be as good to put it in of it self in powder, or to dissolve it with spirit of salt (which would be easier to do then with Tartar) and so let it work? To which I answer, that the working wine or drinke, receiveth no metallical calx or solution, unless it be first ptepared with Tartar or spirit of wine. For although you dissolve Antimony, or any other metal or mineral in spirit of salt, or of vitriol, or of salt nitre, or any other acid spirit, and then think to let it work with wine or any other drink you will finde that it doth not succeed; for the acide spirit will hinder the fermentation, and let fall the dissolved metals, and so spoyle the work; and besides, Tartar may be used among

among all drinks, and doth more agree with ones taste and stomach, then any corrosive spirit.

In the same manner as was taught of Antimony, other minerals and metals also may be fitly joyned with wine or other drink, & the use of such Antimonized wine is this, *viz.* that it be drunk at meals & betwixt meals like other ordinary drink to quench thirst, but for all that it must not be drunk in a greater quantity, then that Nature be able to bear it. For if you would drink of it immoderately, it would stir vomits, which ought not to be, for it is but only to work in an insensible way, which if it be done, it preserveth not only the body from all diseases proceeding from corrupted impure blood, as the plague, leprosie, pox, scurvy, and the like, but by reason of its hidden heat, whereby it doth consume and expel all evil and salt humors (as the Sun dryeth up a poole) by sweat and urine, & so doth unburthen the blood from all such sharpe and hurtful humors, &c. It doth not only cure the above said diseases but also all open sores, ulcers, fistulaes, which by reason of the superfluity of salt humors can admit of no healing, and it doth dispatch them in a short time in a wonderful manner, and so firmely that there is no relapse to be feared.

This drink is not only good for the sick, but also for the whole (though in a smaller quantity) because that it wonderfully cleanseth the whole body, and you need not fear the least hurt either in young or old, sick or healthy. And let no man stumble at it, that many ignorant men do diffame Antimony and hold it to be poyson, and forbid it to be used: for if they knew it well, they would not do so: but because such men know no more, then what they get by reading or by heare-say, they pronounce a false sentence, and it might be replyed unto them, as *Apelles* did to the Shoe-maker: *Ne sutor ultra crepidam*: but what shall we say? *Non omnis fert omnia tellus.* When an Ass after his death doth rot, out of the carcass there grew beetles, which can flye higher then the Ass from whence they came; In the like manner we wish it may fare with the haters of the royal Antimony, *viz.* that their posteri-

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ty may get seeing eyes, and what they know not, they may forbear to despise and scoffe at.

I must confess that if Antimony be not well prepared, and besides be indiscreetly used by the unskilful, that it may prejudice a man in his health, which even the vegetables also may do. But to reject it by reason of the abuse, would be a very unwise act: If perchance a childe should get into his hand a sharpe-edged knife, and hurt himself or others, because it doth not understand how to use a knife, should therefore the use of a knife be rejected and forbidden to those that are grown up and know how to use it? Good sharpe tooles make a good workman; so good quick working and powerful medicines make a good physitian; and the sharper the toole is, the sooner a stone carver or other crafts man can spoyle his work by one cut which he doth amiss: which also must be understood of powerful medicines, for if they be used pertinently in a short time more good may be done with them, then with weak medicaments in a long time. Now as a sharpe toole is not to be handled but by a good workman, so likewise a powerful medicine ought to be managed by an understanding and conscientious physitian, who according to the condition of the person and the disease knows to increase or abate the strength of the medicine, and not by such an one, as doth minister it ignorantly without making any difference at all.

Let no man marvaile, that I ascribe such great vertues unto Antimony, it being abundantly enriched with the *primum ens* of gold. If I should say ten times as much more of it, I should not lye. Its praise is not to be expressed by any mans tongue; for purifying of the blood, there is no mineral like unto it; for it cleanseth and purifieth the whole man in the highest degree, if it be well prepared first, and then discreetly used. It is the best and next friend to gold, which by the same also is freed and purified from all addition and filth, as we said even now, of man. Every Antimony for the most part agreeth with the gold and its medicine; for out of Antimony, by the cleansing Art may be made firme gold, as in the fourth part shall be taught, and which is more, by a long digestion a good part of

of the same is changed into gold. Whereby it is evident, that it hath the nature and property of gold and, it is better to be used for a medicine then the gold it self, because the golden vertue is as yet volatile in this, but in the other is grown fixed and compacted, and may be compared to be like an old man to a young child, which you may lead whither you please. Therefore it is my advice, that in the Antimony its medicine should be sought, it being hid therein very richly, and not to trifle away time and cost in vaine and useless things.

Further note, That if you desire to contract neerer together the vertue of Antimony or any other mineral or metal, as above was taught to be done with the Tartar, you must by exhalation of the superfluous moystnes in Balneo, reduce the solution to a honey thick liquor, and poure spirit of wine upon it for to extract, and within few dayes it will be very red; then powre it off and powre on other, and let this likewise extract: continue this proceeding with shifting the spirit of wine, till the spirit of wine can get no more Tincture; then put all the coloured spirit of wine together into a glass with a long neck, and digest it so long in a tepide Balneum, till the colour or best essence of Antimony be separated from the spirit of wine and settled to the bottom like a blood red thick fat oyle, so that the spirit of wine is turned white againe; which is to be separated from the faire and pleasant oyle of Antimony, which is made without any corrosive, and is to be kept as a great treasure in physick. The spirit of wine retaines somewhat of the vertue of Antimony, and may be used with success of it self both inwardly and outwardly. But the Tincture as a Panacea in all diseases acteth its part with admiration and as here mentioned of Antimony, so in the same manner all metals by the help of Tartar and spirit of wine may without distilling be reduced into pleasant and sweet oyles, which are none of meanest in Physick: for every knowing and skilful Chymist will easily grant, that such a metallical oyl, as without all corrosives out of the gross metals is reduced into a pleasant essence, cannot be without great and singular vertue.

How to make good spirits and oyles out of Pearles, Corals, Crabs-eyes, and other light soluble stones of beasts and fishes.

TAke to one part of pearles or corals (made into fine powder) three or four parts of pure Tartar, and so much water as will dissolve the Tartar by boyling; put the corals, Tartar & water together into a glass body, which must stand in sand, & give it so strong a fire, that the water boyle in the glass body with the Tartar, and may dissolve the corals. (This solution may be done also in a clean earthen pot that is glased, and the evaporated water must be supplyed with other, as above was taught to be done with the metals.) The corals being dissolved, let them coole, filtrate the solution, and abstract all the moysture from it in Balneo, and there will remaine a pleasant honey-thick liquor, which may be used in Physick either of it self, or else once more extracted with spirit of wine and purified, or else distilled, as you please.

The extract or Tincture is better then the liquor, and the spirit is better then the extract or tincture: and all three may well and safely be used; they strengthen the heart and brains; especially those which are made of the pearles and corals, they expel the urine and keep the body soluble. Those of crabs eyes and of pearches and other fishes open and cleanse the passages of the urine from all slyme and impurity, and they powerfully expel the stone and gravel in the reynes and bladder.

N. B. The distilled spirit of corals being well rectified, is good for the Epilepsie, Melancholy, and Apoplexie. It expelleth and driveth out all poyson by sweating, because it is of a golden nature and quality, whereof in another place more shall be said.

To

To distil a spirit out of salt of Tartar and crude Tartar.

IF you take a like quantity of crude Tartar and of salt of Tartar, and dissolve it with clean water, and then evaporate the water still skimming it, till no skim more do rise, and then let it coole, there will shoote white crystals, which being distilled as common Tartar, they will yeild a purer subtler and pleasanter spirit, then the crude Tartar doth, in al to be used as above hath been taught of the simple spirit of Tartar: therefore it is needless here to describe its use. Before you distill a spirit thereof, you may use them in stead of *Tartarus vitriolatus* for purging, they will cause gentle stooles, and drive also the urine and stone, and are not unpleasant to take. The dose is from ℈i. to ʒi. in waters fit for your purpose. This salt dissolved with water purifieth metals (if they be boyled therein) and maketh them fairer then common Tartar doeth.

How to get a powerful spirit out of the salt of Tartar, by the help of pure sand or peble-stones.

IN the first part of this book I taught how to make such a spirit, but because the materials, which are to be distilled in that furnace must be cast upon quick coales, whereby the remainder is lost, and that also not every one hath the conveniency to set up a furnace that requireth more room then this here doth: therefore I will set down how it may be got with ease in this our present furnace, without the loss of the remainder, which is not inferior to the spirit it self, and it is done thus.

Make a faire white salt of calcined Tartar by dissolution, filtration and coagulation, pulverise that salt in a warmed morter, and add to it a fourth part of small pulverised crystal or flints or onely of fine sand, washed clean, mixe it well, and cast one spoonful thereof at once into your red-hot vessel

(which must be made of earth) and so cover it, and the mixture as soon as it is red hot, will rise and boyle (like common Allome doth, when it cometh to a sudden heate) and yeilda thick white heavy spirit; and when it ceaseth to come forth, and then cast in another spoonful, and stay out the time of its settling, and then another part again, till all your mixture be cast in. When no more spirit goeth forth, then take off the lid from the distilling vessel, and with an iron ladle take out that which stayed behinde, whilest it is yet red-hot and soft, and it will look like unto a transparant cleer white fusible glass, which you must keep from the aire, for it will dissolve in it, till I teach you what you are to do with it.

The spirit which came over, may either be kept as it is, or else rectified *per arenam* in a glass retort, and used in Physick; it is clean of another taste then the spirit of common salt or vitriol, for it is not so sharp; it smelleth of the flints after a sulphureous manner, and tasteth urine-like, and it is very good for those that are troubled with the goute, stone and Tisick: for it provoketh urine and sweat mightily, and (because it cleanseth and strengthneth the stomach) it also maketh one have a good appetite to his Victuals. What it can do else is unknown to me as yet, but it is credible that it may act his part in many other diseases, which is left free for every one to trye. In my opinion (since the spirit of the salt of Tartar is good to be used of it self for the stone, and that here it is strengthned by the sand, which have the signature of the stone of the Microcosme) there is hardly any particular medicine, which can go beyond it, but I leave every one to his own opinion and experience. Externally used it quencheth inflammations and maketh a pure skin, &c. The remainder, which I did bid you to keep, and looks like a transparent cleer glass, is nothing else but the most fixed part of the salt of Tartar and flints, which joyned themselves thus in the heart, and turned to a soluble glass, wherein lyes hid a great heat and fire. As long at it is kept dry from the aire, it cannot be perceived in it: but if you powre water upon it, then its secret heate will discover it self. If you make it to finde powder in a warme

warm morter, and lay it in a moyst aire, it will dissolve & melt into a thick and fat oyle, and leave some faeces behinde. This fat liquor or oyl of flints, sand or crystal may not only be used inwardly and outwardly of it self, but also serveth to prepare minerals and metals into good medicines, or to change them into better by Chymical art. For many great secrets are hid in the contemptible peble or sand; which an ignorant and unexpert man (if they were disclosed to him) would hardly beleeve: for this present world is by the divels craft so far possessed with cursed filthy avarice, that they seek for nothing but money, but honest and ingenious sciences are not regarded at all; and therefore God doth close our eyes that we cannot see what lyeth before our eyes, and we trample upon with our feet. That worthy man *Paracelsus* hath given it us sufficiently to understand, when he saith in his book (containing the vexations of Alchymists) that many times a despicable flint cast behind a Cow is more worth then a Cow, not only because that gold may be melted out of it, but also that other inferior metals may be purified thereby, so that they are like unto the best gold and silver in all tryals; and although I never got any great profit by the doing of it, yet it doth suffice me that I have seen several times the possibility and truth thereof, which in its proper place likewise shall be taught.

This liquor of the flints is of that nature toward the metals, that it maketh them exceeding faire, but not so, like women do scowre their vessels of tin, copper, iron, &c. with lye and smal sand, till all filth be scoured off, and that they get a bright and faire gloss: but the metals must be dissolved therein by Chymical art, and then either after the wet or dry way digested in it for its due space of time; which *Paracelsus* calleth to go into the mothers wombe, and be born again: if this be done rightly, then the mother will bring forth a pure child. All metals are engendred in sand or stone, and therefore they may well be called the mother of metals, and the purer the mother is, the purer and sounder child she will bear, and among all stones there is none found purer then the peble,

cryſtal or ſand, which are of one nature (if they be ſimple and not impregnated with metals:) And therefore the peble or ſand is found to be the fitteſt bath to waſh the metal withal. But he that would take this bath to be the Philoſophers ſecret Menſtruum, whereby they exalt the king unto the higheſt purity, would be miſtaken; for their Balneum is more friendly to gold by reaſon of its affinity with it then with other metals, but this doth eaſier diſſolve other metals then gold. Whereby it is evident, that it cannot be *Bernhards* his fountaine (*Bernhardi fontina*) but muſt be held only to be a particular cleanſer of metals. But omitting this and leaving it to the further practiſe and tryal of thoſe that want no time nor conveniency for to ſearch what may be done with it, let us take notice of the uſe of this liquor in phyſick, for which uſes ſake this book is written. That which hath been ſaid, was onely done to that end, that we may obſerve, that we muſt not alwayes look upon dear and coſtly things, but that many times even in mean and contemptible things (as ſand and pebles) much good is to be found.

How to extract a blood-red Tincture with ſpirit of wine out of the liquor of peble-ſtones.

IF you will extract a Tincture out of peble-ſtones, for uſe in Phyſick or in Alchymie, then in ſtead of the white take a faire yellow, green or blew peble, or flint, whether it hold fixed or volatile gold, and firſt with ſalt of Tartar diſtil the ſpirit thereof, or if you do not care for the ſpirit, then melt the mixture in a covered crucible into a tranſparent, ſoluble and fuſible glaſs, and in a warme morter make it into fine powder; put this powder in a long necked glaſs, and powre upon it rectified ſpirit of wine (it needeth not to be dephlegmed, it maters not if it be but pure) let it remaine upon it in a gentle warmth, till it be turned red (the glas with the prepared peble or flints muſt be often ſtirred about, that the peble be divided and the ſpirit of wine may be able to work upon it) then

then powre off the coloured ſpirit of wine, and powre on other, and let this likewiſe turn red: this powring off and on muſt be iterated ſo often, till the ſpirit of wine get no more colour out of it. All the tinctured ſpirit of wine put together, and abſtract in a Balneum through a Limbeck from the Tincture which will remaine in the bottome of the glaſs body like a red juyce; which you muſt take out and keep for its uſe.

The uſe of the Tincture of pebles or flints in Phyſick.

THis Tincture if it be made of gold pebles or ſand, is to be held for none of the leaſt medicines, for it doth powerfully reſiſt all ſoluble Tartareous coagulations, in the hands, knees, feet, reins and bladder; and although in want of thoſe that hold gold, it be extracted but only out of common white peble, it doth act its part however, though not altogether ſo well as the firſt. Let no man marvel, that ſand or pebles made potable, have ſo great vertue; for not all things are known to all; and this Tincture is more powerful yet, if firſt gold have been diſſolved with the liquor of pebles before the extraction. And let no man imagine that this tincture comes from the ſalt of Tartar (which is taken to the preparing of the oyle of ſand) becauſe that of it ſelf alſo doth colour the ſpirit of wine, for there is a great difference betwixt this Tincture and that, which is extracted out of the ſalt of Tartar: for if you diſtil that of the ſalt of Tartar in a little glaſs body or retort, there will come firſt a cleer ſpirit of wine, then an unſavory phlegme, and a ſalt will remaine behinde, in all like unto common ſalt of Tartar, wherein after its calcining not the leaſt colour appeareth, and becauſe none came over neither, it might be queſtioned where it remained then?

To which I anſwer, that it was not a true Tincture, but only that the ſulphur in the ſprit of wine was exalted or graduated by the corporeal ſalt of Tartar, and ſo got a red colour, which

which it loſeth as ſoone as the ſalt of Tartar is taken from it, and reaſſumeth its former white colour: even as it happeneth alſo, when the ſalt of urine, or of hartſhorn or ſoot or any other like urinous ſalt is digeſted with ſpirit of wine, that the ſpirit turneth red of it, but not laſtingly, but juſt ſo as it falsout with the ſalt of Tartar; for if by rectification it be ſeparated again from the ſpirit of wine, each (*viz.* both the ſalt and alſo the ſpirit of urine) doth recover again its former colour, whereby it appeareth, that (as above ſaid) it was not a true Tincture. He that will beleeve it, let him diſſolve but ℥i. of common white ſalt of Tartar in ℔i. of ſpirit of wine, and the ſpirit will turn as red of it, as if it had ſtood a long time upon ſeveral pounds of blew or green calcined ſalt of Tartar; and if I had not tryed it my ſelf ſeveral times, I ſhould have alſo been of that opinion: but becauſe I found it to be otherwiſe, therefore I would not omit to ſet down my opinion: though I know I ſhall deſerve ſmal thanks of ſome, eſpecially of thoſe which rather will err with the greater number, then to know and confeſs the truth with the leſs number. However I do not ſay, that the ſuppoſed tincture of the ſalt of Tartar is of no vertue or uſeleſs; for I know well enough that it was found very effectual in many diſeaſes: for the pureſt part of the ſalt of Tartar hath been diſſolved by the ſpirit of wine, it being thus coloured thereby, and therefore that tinctured ſpirit of wine may very fitly be uſed. But as for the Tincture, which is extracted out of the prepared pebles, it is clean of another condition: for if you abſtract the ſpirit of wine from it, though it alſo cometh over white, yet there remaineth a deep tinctured ſalt, whoſe colour is laſting in the ſtrongeſt fire, and therefore may be counted a true Tincture.

How

How by the help of this liquor out of Gold its red colour may be extracted ſo that it remains white.

THis oyle or liquor of pebles is of ſuch a condition, that it doth precipitate all metals which are diſſolved by corroſives, but not after that manner as the ſalt of Tartar doth; for the calx of metals which is precipitated by this liquo, (becauſe that the pebles do mingle themſelves therewith) is grown much heavier thereby, then if it had been only precipitated with ſalt of Tartar.

For example, diſſolve in *Aqua Regia* as much Gold as you pleaſe, and powre of this liquor upon it, till all the Gold fall to the bottome like a yellow powder, and the ſolution turn white and cleer, which you muſt powre off, and edulcorate the precipitated Gold with ſweet water, and then dry it (as you was taught to do with the *Aurum fulminans*) and you need not fear that it will kindle and fulminate in the drying, as it uſeth to do, when it is precipitated with ſalt of Tartar or ſpirit of urine, but you may boldly dry it by the fire, and it will look like yellow earth, and will weigh as heavy again as the Gold did weigh before the ſolution; the cauſe of which weight are the peble ſtones, which did precipitate themſelves together with the Gold. For the *Aqua Regia* by its acidity hath mortified the ſalt of Tartar, and robbed it of its vertues ſo, that it could not chooſe but let fall the aſſumed pebles or ſand: on the other ſide, the ſalt of Tartar which was in the liquor of pebles, hath annihilated the ſharpeneſs of the *Aqua Regia*, ſo that it could not keep the diſſolved gold any longer whereby both the gold and the pebles are freed from their diſſolver.

This edulcorated and dryed yellow powder put into a clean crucible, and ſet it between live coals, that it begin to be red hot, but not long, and the yellow will be changed into the faireſt purple colour, which is pleaſant to behold, but if you let it ſtand longer, then the purple colour vaniſheth, and it

turns to a brown and brick colour: and therefore if you desire to have a faire purple coloured gold, you must take it off from the fire, as soon as it is come to that colour, and let it not stand any longer, else it loseth that colour again.

This faire gold-powder may be used by the rich (which are able to pay for it) from ℈i. to ʒß. in convenient vehicles; and in all diseases, where sweating is needful: for besides the provoking of sweat, it comforteth not onely the heart, but also by the vertue of the peble it expelleth the stone in the reines and bladder (if it be not grown to the height of hardness) like sand together with the urine: so that it may be safely used as well to prevent, as to cure the plague, gout and stone.

How to make further out of this purple coloured gold a soluble Ruby for medicinal use, shall be taught in the fourth part: for in regard that it must be done by a strong fire in a crucible, it doth not belong hither, but to its proper place, where other like medicaments are taught to be made.

If you will extract the colour out of this precipitated gold, then powre upon it (before it be put into the fire for to calcin) of the strongest spirit of salt, and in a gentle heat the spirit will dissolve part of the gold, which will be much fairer and deeper in colour then if it had been done with *Aqua Regia*: upon this solution powre five or six times as much of dephlegmed spirit of wine, and digest both together its due time, then by the digestion of a long time part of the Gold will fall out of the solution to the bottome like a faire white powder, which may be reduced with Borax or salt nitre and Tartar; it is white like silver and as heavy as other gold, and may easily get its colour again by the help of Antimony. The residue out of which the white gold is faln, *viz.* the spirit of salt mingled with the spirit of wine, must be abstracted from the Tincture, and there will remaine a pleasant sowre liquor coloured by the gold, upon the bottome of the glass body, which is almost of the same vertue, which above

above hath been ascribed to other tinctures of the gold. Especially this liquor of gold strengthneth the heart, braine and stomach.

N.B. Sometimes there comes over with the spirit of wine a little red oyle, which the strong spirit of salt hath separated from the spirit of wine, and it is impregnated with the Tincture of gold. It is an excellent cordial, few are found like unto it, whereby weak people decayed by sickness or age may be kept alive a long time, they taking daily some drops of it, who else for want of the *humidum radicale* would be forced to exchange their life for death.

Here some body may ask, whether this Tincture is to be counted or taken for a true Tincture of gold; or whether there be another better to be found?

To which I answer, that though many hold it to be such, and I my self do call it so here, yet that after due examination it will not prove to be such: for although some vertue is taken from the gold by this way, yet it doth stil keep its life, though it be grown weak and pale, because it can so easily recover its former sound colour by a contemptible mineral: if its true Tincture or soul were gone from it, surely an inferior mineral could not restore it to life, but of necessity there would be required such a thing for to do it, which hath not onely so much, as it hath need of for it self, but hath a transcendent power to give life unto dead things. As we may see by a man or any sensible beast, that if they have lost their vigor by adversities, in that no life more is perceived in them, yet by medicines fit for the purpose, they may be refreshed and brought to their former health, so that their former disease appeareth no more in them; but if their soul be once gone, the dead body can by no medicines be restored unto life again, but must remaine dead so long, till he in whose power it is to give and to take life, have mercy upon it. So likewise it is to be understood of the gold, when its colour is taken from it, and yet its life is left, which by the help of Antimony, being its medicine, as also by the help of iron or copper can be restored unto it so that it recovereth its

former faire colour, so that you cannot see at all, that it ailed any thing before. But if its life be gone from the body, it is impossible for any ordinary metal or mineral to restore it to life, but it must be done by such a thing, which is more then Gold it self hath been: for even as a living man cannot give life unto a dead man, but God must do it, who hath created man, so Gold cannot restore to dead gold the life which hath been taken from it, and how could it then be done by an unfixt mineral? but there is required a true Philosopher for to do it, such a one as hath good knowledge of gold and its composition.

Now as we heard that like cannot help its like, but he that shall help must be more then he that looks for help from him; Hence it is evident that the Tincture, whose remaining body (from which it is taken) is still gold, can be no true Tincture; for if it shall be a true Tincture, it must consist in its three principles, and how can it consist therein, the body from whence it came being yet alive, and possessing indivisibly all its three principles? How can a mans soul be taken from him, and yet the body live still? some will say, that for all that, this may be counted a true tincture, although the body still remaine gold, and have kept its life: even as man may spare some blood out of his body, which though it will make him somewhat pale, yet he liveth still, and the lost blood may be supplyed again by good meat and drinke. But what lame and senseless objections are these? who would be so simple as to think, that a handful of blood may be compared to a mans life? I believe no wise man will do it. Although life goeth forth with the blood, yet the blood is not the life it self; else the dead could be raised thereby, if a cup full of it were poured into a dead body; but where was such a thing ever heard or seen? With such groundless opinions some did presume to censure the truth, set down in my treatise *de Auro Potabili vero*, saying, *Geber* and *Lullius* were also of opinion, that a true tincture can be extracted out of gold, the same nevertheless remaining good gold: but it may be asked, what it hath lost then

for

for to yeild a true Tincture, since it remained good gold? Here no body will be at home for to answer I doubt. What are the writings of *Geber* or *Lully* to me? what they have written I do not despise, they were highly enlightned and experienced Philosophers, and would defend their writings sufficiently, if they were alive: and what I write, I am also able to maintain.

Do those men think, that the writings of *Geber* and *Lully* are to be understood according unto the bare letter? shew me a tincture of gold which was made by the writings of *Geber* or *Lully*? if it were so, then every idiot or novice, that could but read Latine, would not only by their writings be able to make the Tincture of gold, but also the Philosophers-stone it self, whereof they have written at large; which doth not follow, because it is seen by daily experience, that the most worldly learned men spent many yeers, and have been at vast charges, and taken great paines and studied in their books day and night, and found not the least thing in them.

Now if such Philosophers were to be understood literally, doubtless there would not be so many poor decayed Alchymists. Therefore the writings of such worthies are not to be understood according to the letter, but according to the mystical sense hid under the letter.

But because the truth is eclipsed in their books by so many seducing and sophistical processes, there will hardly any man be able to pick it out from so many seducements, unless a light from God be given to him first, whereby he may be able so to peruse the darke writings of those men, that he know how to separate the parabolical speeches from those that are true in the letter it self: or if an honest godly Chymist by the grace of God in his labours do hit upon the right steps, and yet do doubt, whether he be in the right way or no, then by reading of good and true Philosophers books, he may at last learn out of them the firme and constant truth: else hardly any ones desire may be obtained out of their books, but rather after the pretious time spent, means and health wasted, a man shall be forced to fall a begging at last.

In like manner, if the true tincture be taken from copper the reſt is no more a metal, nor by any Art [or force of fire can be reduced to a metallical ſubſtance.

N B. But if you leave ſome tincture in it, then it may be reduced into a brittle gray body, like unto iron but brittle.

Another way to extract a good Tincture out of gold by the help of the liquor of ſand or peebles.

TAke of that gold calx (which was precipitated with the oyle of ſand) one part, and three or four parts of the liquor of cryſtals or of ſand, mix the gold calx in a good crucible with the liquor, and ſet this mixture into a gentle heat ſo that the moyſtneſs may evaporate from the oyle of ſand which is not eaſily done; for the peble or ſand, by reaſon of their dryneſs keep and hold the moyſteneſs, and will not let it go eaſily; it riſeth in the pot or crucible, as borax or Allome doth when you calcine them; therefore the crucible muſt not be filled above half, that the liquor together with the gold may have roome enough, and do not run over the pot: and when it riſeth no more, then ſtrengthen the fire, till the pot be red-hot. The mixture ſtanding faſt, put a lid upon it, which may cloſe well, that no coals, aſhes or other impuritie may fall into it, and give it ſo ſtrong fire in a winde furnace, that the liquor together with the gold-calx may melt like water; keep it melting ſo long, till the liquor and gold together be like unto a tranſparent faire ruby, which will be done in an houres time or thereabouts; then powre it forth into a clean copper morter, let it coole, and then make it into powder, and powre ſpirit of wine upon it for to extract, which will look like unto thin blood: and it will prove more effectual in the uſe, then the above deſcribed Tincture.

The reſidue from which the Tincture is extracted, muſt be boyled with lead, and precipitated and driven off as you do oares, and you will get the remaining gold, which went not into

into the ſpirit of wine: but it is very pale and turned like unto ſilver in colour, which if it be melted through Antimony, it recovereth its former colour without any conſiderable loſs in the weight. How the melting in crucibles, and boyling of the remaining gold is to be done ſhall be more punctually ſet down in the fourth part, I know ſeveral other fine proceſſes, for to extract the colour eaſily out of the gold, but becauſe the gold muſt be firſt made fit for it by melting in the crucible, and that it is not pertinent to ſpeak of that operation here in this ſecond part, therefore it ſhall be reſerved for the fourth, where you ſhall be informed at large, not onely how to prepare gold, Antimony and other minerals, and make them fit for extraction, but alſo how to reduce them into a tranſparent, ſoluble and fire-proof ruby (which are none of the meaneſt medicines) and as it was done here with the gold, ſo you may proceed likewiſe with other metals and minerals for to extract their colours. And therefore being needleſs to deſcribe each metals tincture by it ſelf, all the proceſſes of them ſhall be diſcloſed in one, *viz.* in that of the gold. The book would grow too big, if I ſhould deſcribe them ſeverally, which I count needleſs to do. Let this ſuffice for this ſecond part, that we be taught how to extract out of the gold its colour after a common way. Which indeed are good medicines, but for ought I know of no uſe in Alchymie. But he that ſeeketh to have a true Tincture out of the gold, let him endevor firſt to deſtroy the gold by the univerſal Mercury, and to turn the inſide outward, and the outſide inward, and proceed further according unto art, then the ſoul of gold will eaſily joyn it ſelf with the ſpirit of wine, and come to be a good medicine, whereof more in my treatiſe *de auro potabili* is handled. If one know the *Chalybs* of *Sandivogius*, which is well to be had, he might with little labour quickly get a good medicine: but becauſe we ſhew our ſelves ſtill ungrateful children unto God, therefore it is no marvel, that he withdraweth his hand from us, and leaveth us in errors.

What further may be done with the liquor of pebles.

MAny more profitable things, as well in Alchymie, as in medicine may be compaſſed by the oyle of ſand: as for example, to make faire painting colours out of metals, which abide in all Elements: Alſo to frame all ſort of tranſparent hard ſtones out of cryſtal, which in beauty are like unto the natural, yea fairer ſometimes: alſo how to make many fair Amauſes and the like profitable arts: but they belonging not to this ſecond part, ſhall be reſerved for the fourth, where all ſuch ſhall be taught very punctually with all the circumſtances thereunto relating.

How by the help of this liquor to make trees to grow out of metals; with their colours.

Although this proceſs in Phyſick may be of no great uſe: yet in regard that to a Chymical Phyſitian it gives good information of the condition of natural things, and their change. I thought it not amiſs to ſet it down here.

TAke of the above deſcribed oyle made of ſand pebles or cryſtals as much as you pleaſe, mixe therewith a like quantity of the lixivium of Tartar, ſhake both well together, ſo that the thick liquor may not be perceived in the lixivium, but be throughly incorporated therewith, both being turned to a thin ſolution, and then your water is prepared, wherein the metals do grow.

The metals muſt be firſt diſſolved in their proper corroſive *Menſtruum*, and the *Menſtruum* muſt be quite abſtracted from thence again, but not too hard, that the calx of the metal may not grow red-hot, whereby its growing vertue would be taken from it. Then take it out of the little glaſs-body, and break it in peeces about the bigneſs of a pulſe, and lay them in

in the above deſcribed liquor in a cleer bright glaſs, that the growing of the metals may be diſcerned through it, and as ſoon as the prepared metals are taken out of the glaſs body, they muſt be kept from the aire, elſe they loſe their growing vertue. Therefore thus drye they muſt be broken in peeces, and laid in the bottome of the glaſs (wherein the liquor is) a fingers breadth one from another aſunder, and muſt not be laid together on a heap: The glaſs muſt ſtand ſtill in a quiet place, and the metal will preſently ſwell in it and thruſt forth ſome bulks, out of which branches and twigs do grow, ſo finely that one ſhall admire at it: and let none think that this growing ſerveth onely for to pleaſe the eye, for ſome ſpeciall thing is hid in it: for all ſand or pebles, although they be white, inviſibly containeth a hidden tincture or goldiſh ſulphur, which none without experience will be able to believe; for if for a time you digeſt the pure filings of lead in it, there will gold come to ſtick to the outſide thereof (which gold may be waſhed off with water) and lead will look as if it were gilded. Which gold came from no where elſe but from ſand or pebles, although they were white and clear, ſo that it could not be perceived in them It ſheweth alſo its meliorating vertue, when the metals do grow therein, and for a certain ſpace of time are digeſted therewith. For it may be ſeen apparently, that the metals in the growing do increaſe from this liquor, and attract what is for their turn; which hence alſo may be perceived, that when but as much as the bigneſs of a pea groweth therein, it will grow twice or thrice as big, which is worthy to be conſidered of. Alſo the pebles or ſand-ſtones are the natural matrixes of metals, and there appeareth a great ſympathy between them, eſpecially between the unripe metals and them; as if nature ſhould ſay to ſuch raw or unripe metals, return into thy mothers wombe, and ſtay there the due time, till you have attained there to perfect ripeneſs, for you were taken thence too ſoon againſt my will. Further out of this liquor there may be made a good borras to reduce the metals thereby. There may be made alſo with this liquor faire glaſed and firme colours

upon earthen vessels like unto Porcellan or China. Also by boyling it with water, a tender impalpable snow-white earth may be precipitated out of it, whereof there can be made vessels like unto Porcellan.

Many other useful things may be brought to pass thereby in mechanical businesses, needless here to relate.

Also the unripe and volatile minerals may be tyed and ripened thereby, so that not only they may be the fitter to be used in Physick, but also the volatile gold and silver contained in them may be saved thereby, whereof more in the fourth part.

N. B. Hither belongs also the process of the spirit of lead, virgins-milk and Dragons blood.

Of the spirit of urine and of the volatile spirit of salt Armoniack.

OUt of urine or salt Armoniack a powerful and penetrating spirit may be made several wayes, which not only is to be used in physick for many diseases, but is also found very useful in mechanical and Chymical operations, as followeth.

Take of the urine of sound men living chaste gather a good quantity together in a wooden vessel, let it stand for its time to putrefie, and distil a spirit thereof, which afterward in a great glass retort with a wide neck must be rectified over calcined Tartar, and still that which cometh over first, may be saved by it self, and so the second and third also; the strongest may be used for the preparing of metallical medicines, and the weaker for a medicine alone by it self, or else mingled with fit vehicles: and the stronger may serve for the preparations of metallical medicines: the salt which in the rectification cometh over with the strongest spirit; may be put to the weakest, to make it the stronger, or else it may be saved by it selfe in a good strong glass.

But because the spirit of urine is tedious to make, therefore I will shew, how to get it easier out with salt Armoniack. The preparation is thus:

Take of salt Armoniack, and *lapis calaminaris*, ana, make each by

by it self into powder, and then mixe them together, and cast of it into the red hot vessel at once no more then ʒß. or ʒi. Unto the vessel there must be applyed a great receiver: for this spirit goeth with such a force and power, that it were impossible to distil it in a retort without danger or loss, for I broke more then one receiver with it, before I did invent this instrument. The spirits being wel settled in the receiver, cast in more of your mixture; this continue so long till all your matter is cast in; then take off the receiver, and powre the spirit into a strong glass, which must be well closed at the top, but not with wax and a bladder, because it softeneth the wax and doth penetrate through the bladder; but first stop it with paper, then melt Lacca or sulphur and powre it upon it, so that it come to be very well closed, and then it will not be able to exhale, or thou mayest get such glasses made, as in the fifth part shall be taught, for to keep all the subtle spirits in them, for more security sake. And this spirit if no water have been mixt with it in the receiver needeth no rectifying: but he that will have it stronger yet, may rectifie it through a glass retort, and so keep it for use.

And this is the best way to make a strong spirit out of salt Armoniack: the same may be done also, by taking of filed Zinck, in stead of *lapis calaminaris*: also by adding lof salt of Tartar, salt made of the Lee of wood ashes, unquencht lime, and the like: but the spirit is nothing neer so strong (although all those things may be done with it, that are done with the former) as that which is made with *lapis calaminaris* or Zinck.

The process or the manner of making it is this.

TAke ℔ i. of salt Armoniack made into powder, and as much of salt of Tartar, mixe both together by the help of a lye made of Tartar, or only with common water, so that all come to be like a pap, and cast in one spooneful thereof at once, into a distilling vessel, then cast in more till you have spirit enough.

 N. B. The

N. B. The salt of Tartar may also be mixed drye with the salt Armoniack without any lye or water, and so distilled: but it is not so good, as when the mixture is tempered with lye or water: for if it be cast in dry, the spirit will come over in the form of a volatile salt: but if the mixture have been moystened, then most part thereof will come over like a fiery burning spirit: in like manner also the mixture of lyme and salt Armoniack may be tempered moist, and it will yield more spirit then if it be distilled dry.

It may be asked: why *lapis calaminaris*, Zinck and unquencht lyme, calcined Tartar, salt of pot-ashes, fixed salt nitre or the like things prepared by the fire, must be added unto salt Armoniack, and whether it be not as good to add some bolus, or other earth, (as usually is done to other salts) and so to distill a spirit of it? To which I answer, that there are two sorts of salts in salt Armoniack, *viz.* a common acide salt, and a volatile salt of urine, which without mortifying of one of them, cannot be separated: for as soon as they feel the heat, the volatile salt of urine carrieth the acid salt upwards, and they both together yeild a sublimate, of the same nature and essence with common salt Armoniack which is not sublimed, salt Armoniack is purer then the common. And no spirit would come over from it, if it should be mingled with bole, brick, dust, sand, or any other strengthless earth, and so distilled, but the whole salt as it is of it self (leaving its earthy substance behinde) would sublime thus dry: but that it falleth out otherwise with the *lapis calaminaris* (which is also like an earth) so that a separation of the salts is wrought thereby, and a volatile spirit commeth over, the reason is that the *lapis calaminaris* and Zinck are of such a nature, that they have a great affinity with all acid things, and do love them, and are loved by them likewise (whereof some mention hath been made in the first part) so that the acide salt sticks to it in the warmth and uniteth it self with it, and the salt volatile is made free, and distilled into a subtle spirit; which could not have been done, if the acide salt had not been kept back by the *lapis calaminaris* or Zinck. But that a spirit is distilled off by addition of fixed salts, the reason is because that fixed salts are contrary unto acid salts, and (if they get the upperhand) do kill the same, and rob them of their strength, whereby those things which are mixed with them are freed from their bond: and so it fals out here with salt Armoniack, that when by addition of a vegetable fixd salt the acidity of the salt Armoniack is killed, the salt of urine, which formerly was bound therewith, gets its former freedom and strength, and sublimated turnes into a spirit. Which could not have been done, if common salt had been added to the salt Armoniack in stead of salt of Tartar; for the salt of urine would thereby (as by a far greater enemy be killed and kept back, so that it could yield no spirit. I thought it fit to give notice hereof to the ignorant (not for those, who knew it before) and to the unknowing it will do much good, and that they may have a light for other labours: for I have many times seen, and see it still by daily experience, that the most part of your vulgar Chymists, whatsoever they do (having got it either by reading, seeing or hearing) they hurle it over like botchers, and are not able to give any solid reason, why this or that must fall out in such or another manner, not labouring to finde out the natures and conditions of salts, minerals and other materials, but contenting themselves onely with the Receipt, saying this or that Author hath written so, and therefore it must be so, whereas many times such books are patcht up out of all sorts of authors. And those that stick to so many books, will hardly ever come to get any good, but are lead out of one Labyrinth into another, spending their life miserably in watching and cares: but if they would first seriously consider things, and learn to know nature, and then take their worke in hand, then they would sooner attaine unto true knowledge; and so much of this matter by the way. I hope that he that hath been in error will be pleased with it, and the knowing will not grudge to have it imparted to the ignorant.

That which remaines after the distillation is done, is also good for use: if the addition have been of salt of Tartar, a mel-

melting powder may be made of it, to reduce metals. Of *lapis calaminaris* or Zinck, yeilds *per deliquium* a clear, white and heavy sharpe oyle; for the sharper part of salt Armoniack, which did not turn to spirit, hath dissolved the *lapis calaminaris*, and is almost of the same vertues for external use in Chyrurgury with that, which above in the first part which was taught to be made out of *lapis calaminaris* and spirit of salt, save onely that this in the distilling doth not yeild so strong a spirit as the other, but onely yeilds a sharpe sublimate.

Of the use and vertue of the spirit of salt Armoniack.

THis spirit is of a sharppenetrating essence, and of an airie, moyst and warm nature; and therefore may with credit be used in many diseases, 8. 10. 12. (more or less) drops thereof used in a convenient vehicle, doe immediately penetrate all the body over, causing suddaine sweating, opening the obstructions of the spleen, and dispersing and expelling many malignities by sweat and urine, it cureth the quartane, colick, the suffocation of the Matrix, and many more diseases.

In brief, this spirit is a safe, sure and ready medicine for to disperse and expel all tough, gross and venemous humors. Also, this spirit acteth his part externally, quenching all inflammations, curing the Erysipelas and Grangrene; it allayeth the pains of the gout, clothes being dipt in it and applied: and although it draw blisters, it matters not; laid to the pulse, it is good in ardent feavers, it asswageth swellings and paines; discusseth congealed blood, helpeth strayned limbs, and benummed nerves: onely smelled unto it cureth the megrim and other Chronical diseases of the head: for it dissolveth the peccant matter & evacuateth it through the nostrils; it restoreth the lost hearing, being externally laid on with a little instrument fit for the purpose. Also in the obstructions of womens courses applyed by a fit instrument in a spiritual way, openeth presently and cleanseth the wombe and maketh wo-

women fruitful, &c. Mingled with common water, and held in the mouth, asswageth the tooth-ach, proceeding from sharp humors which are faln into the teeth. A little of it applyed in a glister, killeth the wormes in the body, and allayeth the colick.

This spirit can also further be used to many other things, especially by means thereof many pretious and effectual medicaments may be made out of metals and minerals, whereof some shall be described as followeth.

N. B. There is yet another matter, which is found every where and at all times, and is to be got by every one without distillation and charges, and is as good for the abovesaid diseases, as the distilled spirit, and if all men knew it, there would not be found every where so many sick people, nor so many Doctors and Apothecaries.

To distil a blood red oyle of vitriol by the help of the spirit of urine.

DIssolve Hungarian or other good vitriol in common water, and let it run through a filtring paper, powre of this spirit upon it so much, till all the green be vanisht, and the water be made cleer, and a yellow sulphur be settled: then powre off the cleere, and the rest which is muddy, powre together in a *filtrum*, that the moysture may run off, and the earth of the vitriol remaine in the paper, which you must dry, and distil to a blood-red oyle, which will open the obstructions of the whole body, and perfectly cure the epilepsie. The cleere water must be evaporated dry, and there will remaine a salt, which being distilled, yields a wonderful spirit. Before it be distilled, it is a *specificum purgans*, whereof 8. 10. 12. to 24. grains taken, may safely be used in all diseases.

The

The tincture of Vegetables.

SPices, seeds or flowers being extracted therewith and digested and distilled, the essence of them will come over with it, in the form of a red oyle.

Vitriol of copper.

IF you powre it upon calx of copper, made by firing and quenching it againe, it will extract within an houres time a faire blew colour, and having dissolved as much thereof as it could, powre it off and let it shoote in a cold place, and you will get a fair sky coloured vitriol, a smal quantity whereof will cause strong vomits; the rest of the vitriol remaineth a blew oyle, good to be used in ulcers.

The Tincture of crude Tartar.

IF you take common crude Tartar, and powre of this spirit upon it, and set it in digestion, the spirit will extract a blood-red Tincture, and if the spirit be abstracted from it, there will remaine a pleasant red oyle, of no small vertue and power.

To make the oyles or liquors of salts.

THis spirit also dissolveth crystals and other stones, they being first dissolved, precipitated and reduced to impalpable powders, turning them into oyles and liquors, good to be used in Alchymy and Physick.

To precipitate all metals with it.

ANy metal being dissolved in an acid spirit can be precipitated better and purer therewith, then with the liquor of the salt of Tartar; for *Aurum fulminans* which is pre-

precipitated with it fulminateth far stronger then if it were done with oyle of Tartar.

R. Some juyce of Lemon with the solution of gold, before it be precipitated, and then not all the gold will precipitate, but some of it will remaine in the solution, and in time many small green stones (not unlike unto common vitriol) will appear; which in a small dose will purge all noxious humors.

The oyle and vitriol of silver.

IF you dissolve silver in *Aqua fortis*, and powre so much of this spirit into it till it ceaseth to make a noyse, some of the silver will precipitate in the form of a black powder, the rest of the silver remaineth in the liquor: the phlegme abstracted from it in Balneo, till it get a skin at the top, and then set into a coole place, there will grow white crystals in it, which being taken out and dryed are a good purge in madness, dropsie, feavers and other diseases, safely and without danger to be used to young and old. The rest of the liquor which did not crystallise may be extracted with spirit of wine, and the fæces being cast away the extraction will be pleasanter. The spirit of wine abstracted from it, there will remaine a medicine of no small value in all diseases of the braine.

To extract a red Tincture out of Antimony or common sulphur.

BOyle sulphur or Antimony made into powder in a lye of the salt of Tartar, till the lye turn red, and powre this spirit upon it, and distil gently in a *Balneum*, and there will come over a faire Tincture with the volatile spirit, silver anoynted therewith will be guilt, though not lastingly. It serveth for all diseases of the lungs.

How to ripen Antimony and common ſulphur, ſo that ſeveral ſorts of ſuch ſmels, as vegetables have, ariſe from thence.

DIſſolve Antimony or ſulphur in the liquor of pebles or ſand, coagulate the ſolution to a red mass; upon this maſs powre ſpirit of urine, and let it extract in a gentle warmth. The ſpitit being coloured red, powre it off, and powre on other ſpirit, let it extract likewiſe, and this you muſt iterate ſo often, till the ſpirit will extract no more tincture; then powre all the extracts together and abſtract the ſpirit of urine from it in Balneum through a limbeck, and there will remaine a blood red liquor, and if you powre upon this ſpirit of wine it will extract a fairer tincture then the former was, leaving the fæces behinde, and this tincture ſmelleth like garlick: and if it be digeſted three or four weeks in a gentle warmth, it will get a very pleaſant ſmel, like unto the yellow prunes or plums: and if it remaine longer yet in digeſtion, it will get a ſmel not inferior to musk and ambar; This Tincture having been digeſted a long time, and got ſeveral ſmels, is not only notably by the fire increaſed in pleaſantneſs of ſmel and taſte, but alſo in vertue: for ſo many and various ſweet ſmels are perceived in it, that it is to be admired, which variety and exaltation proceedeth onely from the pure and ripening ſpirit of urine for there is hid in it a fire, which doth not deſtroy but preſerve and graduate all colours, whereof in another place more ſhall be ſaid.

N.B. Betwixt the ſpirit of urine and the animal and mineral Copper there appeareth a great ſympathy; for it doth not onely love copper above all other metals, and mingleth eaſily with it, and maketh it extraordinary faire and of good uſe in Phyſick, but it prepareth it alſo to ſuch a medicine, whereby all venereous ſores (both by inward and outward uſe) how deep ſo ever they took roote in the blood, without the uſe of any other medicaments, are perfectly cured; it maketh fruitful and barren according as it is uſed; it cleanſeth the matrix, hindreth the riſing thereof, and miraculouſly furthereth

furthereth womens courſes that have been ſtayed, above all other medicamenes of what name ſo ever.

If this ſpirit be mingled with the volatile (but not corroſive) ſpirit of vitriol or common ſalt there will come a ſalt out of it, which is inferior to none in fuſibleneſs, and uſeful both in Alchymy and Phyſick.

N.B. The liquor of the ſalt of Tartar, and the ſpirit of wine do not mixe without water, this being the mean partaking of both their natures, and if you add unto it ſpirit of urine it will not mingle but keep its own place: ſo that theſe three ſorts of liquors, being put in the ſame glaſs, and though they be ſhaked never ſo much will not encorporate for all that: the liquor of the ſalt of Tartar keepeth to the bottome, next to it will be the ſpirit of urine, and on the top of that is the ſpirit of wine: and if you powre a diſtilled oyle upon it, they will keep uppermoſt of all, ſo that you may keep four ſorts of liquors in one glaſs, whereof none is mingled with the other.

Although this be of no great profit, yet it ſerveth for to learn thereby the difference of ſpirits.

Of the ſpirit and oyle of Hartſhorn.

TAke Hartſhorn, cut it with a ſaw into peeces, of the bigneſs of a finger, and caſt in one of it at a time in the aforeſaid diſtilling veſſels, and when the ſpirits are ſettled, then another; and continue this untill you have ſpirits enough; and the veſſel being filled with the peeces that were carryed in, take them out with the tongs, and caſt in others, and do this as often as is needful. The diſtilling being finiſhed, take off the receiver, and powre into it dephlegmed ſpirit of wine, which will cleanſe the volatile ſalt: powre the oyle with the ſpirit and ſalt volatile through a filtring paper made wet firſt & lying in a glaſs funnel, and the ſpirit of wine together with the ſpirit of Hartſhorn and the volatile ſalt will run through the paper, and the blackiſh oyle will ſtay behinde, but it muſt quickly be powred out, elſe it will through after

them. The ſpirit together with the volatile ſalt rectifie through a retort, and the beſt part of the ſpirit will come over together with the ſpirit of wine and volatile ſalt: and when the phlegme is coming, take off the ſpirit, which is come over, that the naughty phlegme may not come amongſt it; keep it wel, for it is very volatile, the oyle may be mingled with ſalt of Tartar, and rectified through a glaſs retort, and ſo it wil be cleer; if you will have it fairer, you muſt rectifie it with ſpirit of ſalt.

The firſt, which is done with ſalt of Tartar, is of more vertue; it cureth the quartane, provoketh ſweating extreamly, cureth all internal wounds and pains, which were cauſed by fals, blows, or other wayes: 6. or 8. 10. to 20. drops of it taken in wine and ſweated upon it in the bed. The ſpirit is very good for all obſtructions of the whole body, from ℈ß. to ʒß. thereof taken in a fit vehicle, provoketh urine, and forceth down womens courſes, it cleanſeth the blood and maketh ſweat mightily. In the Plague, Pox, Leproſie, Scurvy, *Melancholia Hypochondriaca*, malignant feavers and the like where ſweating is neceſſary, it proveth a rare medicine.

To make the ſpirit of mans haire an excellent medicine.

After the ſame manner you may make ſpirits out of all kinde of horns and claws of beaſts: but ſince by reaſon of their ill ſmel the uſe of them is not liked of (though in ſeveral heavy diſeaſes, as in the fits of the mother and Epilepſie, they do admirably well:) therefore I will acquieſce. However it is worth obſerving, that the ſpirit made of mans-haire is not to be rejected in metallical operations; for it diſſolveth the common ſulphur, and reduceth it into a milk, which by further ripening may be turned into blood, the like whereunto no ſpirit is able to do. The ſame ſpirit may alſo of it ſelf, without addition of ſulphur be fixed into a ruby; but that which is ripened with ſulphur is the better: and if it be brought ſo far by the fire, that it have loſt its ſtink and be made fixe, then

then it will be able ſufficiently to pay for the paines and coals beſtowed upon it.

N. B. Hither belongeth the Proceſs to powre diſſolved metals upon filed hartſhorn, and ſo to diſtil them.

Of the oyle of Ambar.

Ambar yeildeth a very pleaſant oyle and of great vertue, eſpecially the white Ambar: the yellow is not ſo good and the black is inferior to this: for by reaſon of its impurity it cannot be well uſed inwardly: and there cometh over alſo along with it a volatile ſalt and an acid water, which muſt be ſeparated: the water (for ought that I know) is of little vertue: the ſalt if it be ſublimed from the ſalt of Tartar and purified, is a good diuretick, and in the ſtone and the Gout, and may ſucceſſefully be uſed both inwardly and outwardly. The oyle if it be rectified, eſpecially that which comes over firſt, is an excellent medicine againſt the plague, epilepſie, riſing of the mother and megrim, 6. 8. 10. to 20. drops being taken thereof at once, and the noſtrils alſo being anoynted therewith for to ſmel to it: and it is to be obſerved, that when it is rectified through ſpirit of ſalt, it proveth much cleerer, then done by it ſelf without addition: but if it be rectified with ſalt of Tartar, it is of much more vertue: though it fall not ſo cleer, as that which is done by ſpirit of ſalt.

N. B. If it be rectified over a ſtrong *Aqua Regia* having before once already been rectified with ſpirit of ſalt, it will turn ſo ſubtle, that it is able to diſſolve iron or copper in ſome ſort, and to reduce them into good medicines: and in this ſecond rectification by *Aqua Regia* all will not come over, but part of it will be coagulated by the corroſive water, ſo that it turneth thick, like unto maſtick, which in the warmth is ſoft, and may be handled with ones fingers like wax: but in the cold it is ſo hard, that it may be broken and made into powder, and gliſtereth like gold.

Of the oyle of soot.

OF the soot, which is taken from Chimneys, where nothing is burnt else but wood, there may be distilled a sharp volatile salt and a hot oyle. The salt is in vertue not unlike unto that which is made of hartshorn or ambar; and it quencheth inflammation, from what cause so ever it do proceed: The oyle may without rectification externally be used very successefully for all loathsome scabs and for a scald head, *&c.* But if it be rectified, as hath been taught to be done with the oyle of Tartar, of Ambar, and of Hartshorn; then it may safely used inwardly, as the above written oyles are used; for it be doeth prove, as good as these, yea better in some special cases.

How to make a good oyle out of soot without distilling.

BOyle the soot in common water, till the water turn blood-red (urine is better then water) and set this solution (being in an earthen pot) in winter time into the greatest frost so long till all in the pot be frozen into one peece and turned white: then brake the pot and the ice, and in the midst thereof you will finde the hot oyle unfrozen and liquid in colour like blood, which is not much inferior in vertue unto that which is distilled, yet afterward it may be rectified, and so exalted in its vertue, when you please, and is to be noted, that this separation doeth only succeed in the greatest frost and cold, and not else.

Of the spirit and oyle of haney.

OF honey there may be made a subtle spirit and a sowre vinegar, if it be mingled with twice as much of pure calcined sand and so distilled; and it falleth much better yet if it be made with the flores of Antimony, which were taught to be made in the first part, whereby the spirit is increased in its vertue,

vertue, and its running over hindred thereby; and so distilling it, there will come over a pleasant spirit, a sharp vinegar and some red oyle also, which must be separated: the spirit after the rectification inwardly used is good in all diseases of the lungs. It openerh and enlargeth the breast, strengthneth the heart, takes away all obstructions of the liver and spleen: it dissolveth and expelleth the stone, resisteth all putrefaction of the blood; preserveth from and cureth the plague; all agues, dropsies, and many other diseases, daily used from ℈j. to ʒj. taken with distilled water proper for the diseases: the sowre vinegar coloureth haire and nayles as yellow as gold: it cureth the itch and scabs of the skin; it cleanseth and healeth old and new wounds, they being bathed and washed therewith.

The red oyle is too strong to be used of it self, it may be mingled with the subtle spirit which came over first and so used, and the spirit will be exalted thereby in its vertue.

Of the oyle and spirit of sugar.

IN the same manner as hath been taught of honey, there is also made a spirit and oyle of sugar, *viz.* adding pure sand to it; or (which is better) of the flores of Antimony, and then according to the rules of Art one spoonful after the other of this mixture cast in, it will yeild a yellow spirit, and a little red oyle, which after the distillation must be digested in Balneo so long together, till the spirit have assumed the oyle and be turned thereby very red colour; it needeth not to be rectified, but may daily be used either by it self, or with such vehicles as are proper for your purpose: in all it is like in vertue unto that which was made of honey: yet this of sugar is more pleasant then the other: it reneweth and restoreth all the blood in man, in regard that it received great vertue from the diaphoretical flores of Antimony; and this spirit may fitly be used in all diseases, it can do no hurt, neither in cold nor hot diseases: it doth help nature mightily, and doth so much good, that it is almost beyond belief. Especially if

for

for a time it be daily used from ℈j. to ʒj. The residue of it is black, and may be kept for the same use again, *viz.* for an addition to other honey or sugar, or else you may sublime it again into flores in the furnace described in the first part, or in the furnace described in the fourth part of this book with an addition of iron or Tartar or salt nitre into a *Regulus*, &c.

To distil an excellent spirit and a blood red tincture of corals and sugar.

IF you mix sugar with red corals made into powder and distil it, there will besides the spirit come over a blood-red Tincture like a heavy oyle, which is to be joyned with the spirit by digestion in Balneo, and it will be as vertuous as that which was made with Antimony diaphoreticum. It doeth perfectly and lastingly cure epilepsie in young and old; it cleanseth the blood from all filth, so that leprosie together with its several species may be cured thereby, *&c.* Its use is the same as was taught above of the Antimonized spirit of sugar.

Of the spirit of Muste or new wine.

TAke sweet Muste or juyce of grapes, as soon as it is squeezed out, boyle it to the consistency of honey, and then mix it with sand, corals, or (which is better) with flores of Antimony, and so distil it, and it will yield such another spirit as that which is made of honey or sugar: onely that this is somewhat tarter then that of honey. With honey, sugar and the juyce of grapes several metals may be dissolved in boyling and so prepared and made up into divers medicaments, both with and without distillation, after the same manner as was taught above with Tartar: for honey, sugar and the juyce of grapes, are nothing else but a sweet salt, which by fermentation and addition of some sowre thing, may be changed into a sowre Tartar, in all like unto that which is gathered in the wine vessels. There can be made also a Tartar out

out of cherries, pears, apples, figs, and all other fruit, yielding a sweet juyce: as also of rye, wheate, oates, barley and the like, whereof in the third part more shall be said.

For every sweet liquor of vegetables, if it be turned inside out, by fermentation may be changed to a natural sowre Tartar; and it is utterly false, that (as some do suppose) onely wine yeilds Tartar, which by daily use made of it by those that have very hungry stomachs (like Woolves) indistinctly together with the nourishment went into the limbs, and there turned to a stony matter. If this were true, then in cold countries, where no wine groweth, men would not be troubled with the gout or stone; the contrary whereof is seen daily: though I must confess, that among all vegetable none yeildeth more then the vine, the concurrent acidity being cause thereof; for it turneth the sweetness into Tartar: for the sowrer the wine is, the more Tartar it yeildeth; and so much the sweeter, so much the less Tartar. By this discourse an industrious Chymist may easily come to know the original nature and proprieties of Tartar, and in default of wine, how to make it out of other vegetables, the common salt or the salt of Tartar may be distilled with honey, sugar, or sodden wine (*sapa*) and it will yeild as strong spirits, as that metals may be dissolved with them, and they are not to be despised in Physick and Alchymie.

Of oyle Olive.

OUt of oyles made by expression (as oyle olive, rape oyle, wallnut oyle, hempseed oyle, linseed oyle and the like) there may be distilled a penetrating oyle, useful both outwardly and inwardly, which is done thus: Take common potters clay not mingled with sand, frame little bals of it, as big as a pigeons or hens-egg, burn them (but not too strong) to a hard stone, so that they may attract the oyle; and when they are no more quite red-hot, but pretty hot, then throw them into oyle olive which is the best; let them lye in it, till they be quite ful and drunk of the oyle, which will be done

in two or three hours (ſome caſt them red hot into the oyle, but amiſs, becauſe the oyle contracts thence an *Empyreuma*) Then take them out, and caſt in one or two of them at once into your diſtilling-veſſel made red-hot, and let it go; and within a while after carry in one or two more, and continue this till you have oyle enough. If the veſſel be full of the bals, take them out with the tongs or ladle, that you may proceed without let in your diſtillation, & in this maner you need not fear the breaking of your retort or receiver, or the burning of your oyle. The diſtillation being performed take off your receiver, powre the oyle that came over into a glaſs retort, and rectifie it from calcined Allome or Vitriol, and the Allome will keep back the blackneſs and ſtinck, and ſo the oyle will come over cleer, which muſt be yet rectified once or twice more with freſh calcined Allome, according to the intenſneſs of penetrating which you look for: that which cometh over firſt, ought ſtill to be caught by it ſelf, and you will get a very faire, bright and clear oyle, which is very ſubtle; but that which cometh after is ſomewhat yellow, and not ſo penetrating neither as the firſt; and therefore it is but for external uſe to extract flowers and hearbs therewith, and to make pretious balſames for cold and moyſt ſores. Alſo you may diſſolve with it ambar, maſtick, myrrhe and the like attractive things, and with wax and Colophony reduce it to a plaſter, which wilbe very good in venemous ſores and boyles, for to attract the poyſon and to heal them out of hand. If you diſſolve in it common yellow ſulphur made into powder, you will get a blood red balſame, healing all manner of ſcabs, and other like defects of the skin; eſpecially when you add to it purified *Spaniſh green*, and in hot ſores *Saccharum Saturni*, which in a gentle heat and by continual ſtirring about do eaſily melt and mingle therewith. It needeth not to be done in glaſſes, but may be done in an ordinary earthen pot or pipkin.

The uſe of the bleſſed oyle.

THe firſt and cleer is of a very penetrating nature: ſome drops thereof given in ſome *Aqua vitæ*, preſently ſtayes the colick, proceeding from windes that could not be vented; as alſo the riſing of the mother, the navil being anoynted therewith: and a cold humor being faln upon the nerves, whereby they are lamed; if you do but anoynt them with this oyle, and rub it in with warm hands, it will quickly reſtore them, and therefore in regard of its preſent help may well be called *Oleum ſanctum*. If you extract plate of iron or copper with this oyle, it will turn deep red or green, and is a ſoveraigne remedy for to warm and dry up all cold and watery ſores. It conſumeth alſo all ſuperfluous moyſture in wounds and ulcerous ſores, as alſo all other excreſcencies of the skin: it healeth tettars and ſcald-heads and other like defects proceeding from ſuperfluous cold and moyſture. You may alſo diſſolve in it Euphorbium and other hot gums, and uſe them againſt great froſt, for what limb ſo ever is anoynted therewith no froſt how great ſo ever can do it any hurt. The balſames made with gum or ſulphur may be alſo diſtilled through a retort, and in ſome caſes they are more uſeful then the undiſtilled balſame.

Of the oyle of Wax.

IN the ſame manner may be diſtilled alſo the oyle of wax, the uſe whereof is in all like unto the former; and for all cold and infirmities of the nerves, this is found more effectual yet then the former.

A Spirit good for the Stone.

OUt of the ſtones which are found in grapes, there may be diſtilled a ſowre ſpirit, which is a certain and ſpecifical

remedy for the ſtone in the kidneys and bladder, and alſo for all paines of the goute. It is not onely to be uſed internally but alſo externally, wetting clothes in it, and applying them to the places affected, and it will aſſwage and drive away the paines.

Of the ſpirit or acid oyle of Sulphur.

TO reduce ſulphur into a ſowre ſpirit or oyle hath been ſought hitherto by many, but found by few. Moſt of them made it in glaſs-bels, but got very little that way; for the glaſſes being quickly hot, could not hold the oyle, ſo that it went away in a ſmoak. Some thought to get it by diſtilling, others by diſſolving, but none of all theſe would do the feat. Which is the reaſon why now adayes it is found almoſt no where right and in the Drugſters and Apothecaries ſhops they uſually ſell oyle of Vitriol in ſtead of it, which by far is not to be compared in vertue to the oyle of ſulphur. For this is not onely of a far pleaſanter ſowre taſte, but in efficacy alſo much exceeds the other. And therefore being of ſo great uſe both in Phyſick and Alchymie, as in all hot diſeaſes, mingling the patients drink therewith, till it get a pleaſant ſowre taſte, for to quench the intolerable drowth, to ſtrengthen the ſtomach, to refreſh the lungs and the liver: Alſo externally for to cure the gangrene: Alſo for to cryſtalliſe ſome metals thereby and to reduce them into pleaſant vitriols, uſeful as well in Alchymie as Phyſick; I thought good to ſet down the preparation, though it be not done in this our diſtilling furnace, but in another way by kindling and burning it as followeth.

Make a little furnace with a grate, above which a ſtrong crucible muſt be faſtned reſting on two iron bars, and it is to be ordered ſo that the ſmoake be conveighed (not above by the crucible, but) through a pipe at the ſide of the furnace: the crucible muſt be filled with ſulphur even to the top; and by a cole-fire without flame be brought to burn and kept burning. Over the burning ſulphur, a veſſel is to be applyed of good ſtony earth like unto a flat diſh with a high brim, wherein is alwayes cold water to be kept, and whereunto the burning ſulphur do flame: Which thus burning its fatneſs conſumeth, and the acid ſalt is freed and ſublimed to the cold veſſel, where it is diſſolved by the aire, and in the form of a ſharpe oyle runs from the hollow veſſel into the receiver, which muſt be taken off ſometime, and more ſulphur ſupplyed in ſtead of that which hath been conſumed, to the end that the ſulphur may ſtill burn in the crucible: and beat with the flame to the cold head: and within few dayes you will get a great quantity of oyle, which elſe by the (*campana*) glaſs-bell in many weeks could not have been done.

N. B. Such a ſowre ſpirit or oyle may alſo be got by diſtillation together with the flores, *viz.* thus: If you take pieces of ſulphur as big as hens eggs, and carry them one after another into the hot diſtilling veſſel, a ſowre oyle together with flores will come over into the receiver, which muſt with water be ſeparated out of the flores and the water abſtracted from it againe in a cucurbit and in the bottome of your glaſs body you will finde the oyle, which in vertue and taſte is equal to the former, but you get nothing neer ſo much in quantity by this way, and if you do not look for the oyle, you may leave it with the flores, which by reaſon of their pleaſant acid taſte are much toothſomer to take then the ordinary ones.

To the courteous Reader.

THus I conclude this ſecond part; I could have ſet down more medicinal proceſſes in this Treatiſe: but having as many as will be a ſufficient guide for the diſtilling of other things alſo, I thought it good here to acquieſce; and whatſoever is proper for this Treatiſe, and hath been forgotten or omitted, ſhall be made amends for in the following parts.

FINIS.

THE

THIRD PART

OF THE

PHILOSOPHICAL FURNACES:

IN WHICH

Is described the Nature of the

THIRD

FVRNACE;

By the help whereof, and that without Stils, and Caldrons, and other Copper, Iron, Tin, and Leaden Instruments, various Vegetable burning Spirits, Extracts, Oyles, Salts, *&c.*

By the help of a certain little Copper Instrument, and wooden vessels are made for Chymical and Medicinal uses.

By JOHN RUDOLPH Glauber.

LONDON,

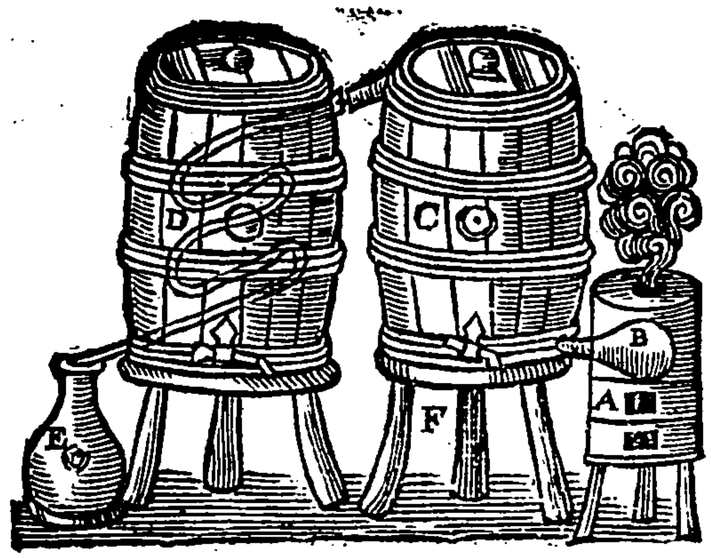
Printed by *Richard Cotes*, for *Tho: Williams* at the signe of the Bible in *Little-Britain*. 1652.

A Preface of the Copper Instrument and Furnace.

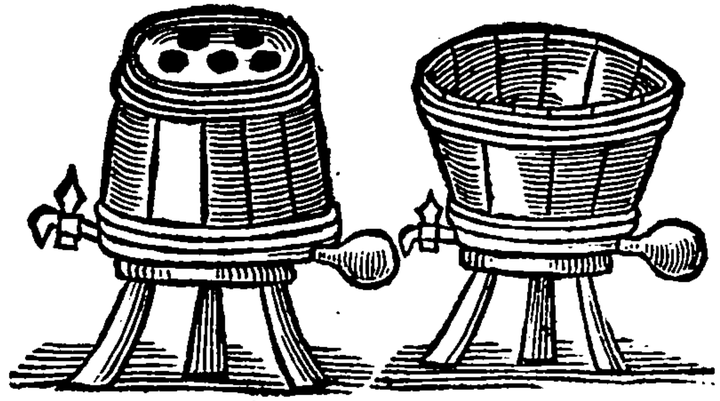
NOW *this Instrument is made of strong Copper plates after the following manner. You must make two strong hemispheares of Copper or Latten of the bigneſſe of a mans head (or thereabout) and joine them together with a most strong soder, and that without tin, whereof the one must have a pipe: Now the pipe must be of a most exact roundneſſe, that it may most accurately fit the hole that is made with an auger or wimble to keep the water from flowing out like to a tap, of the length of one span at least, wider on the hinder part towards the globe, then on the forepart, which also must bee according to the bigneſſe of the globe, greater or lesser, and be exactly joined with the best soder to its hemisphеare, and the diameter of the forepart being very round like a tap, and most exactly filling the round hole must be of two fingers breadth. Now there is required to the foresaid instrument or globe a certaine peculiar little furnace made of iron or copper, viz. most strong*

copper plates, covered within with ſtones or the beſt lute, into which is put that globe like a retort, ſo that it may lye upon two iron barrels of the diſtance of a ſpan, or ſpan and halfe from the grate; the work whereof (that pipe) goeth forth of the furnace one ſpan at leaſt. The furnace alſo muſt have below a place for the aſhes, and above a cover with its hole for the letting forth of the ſmoke, and for regulating the fire, as you may ſee by the annexed figure. It muſt alſo below have a tree-foot on which the furnace muſt be ſet, and on the ſides two handles by the help whereof it may be removed from place to place; the which is very neceſſary; for it is not only uſed for the diſtilling of burning ſpirits by wooden veſſels inſtead of copper, but alſo for ſuch diſtillation, and digeſtion that is performed in gourds, bolt-heads, and other inſtruments, of glaſſe, ſtone, copper, tin, &c. which are to be ſet in Balneo: alſo in the boyling of beer, methegline, wine, and other drinkes, which are to be performed by the help of wooden veſſels.

THE

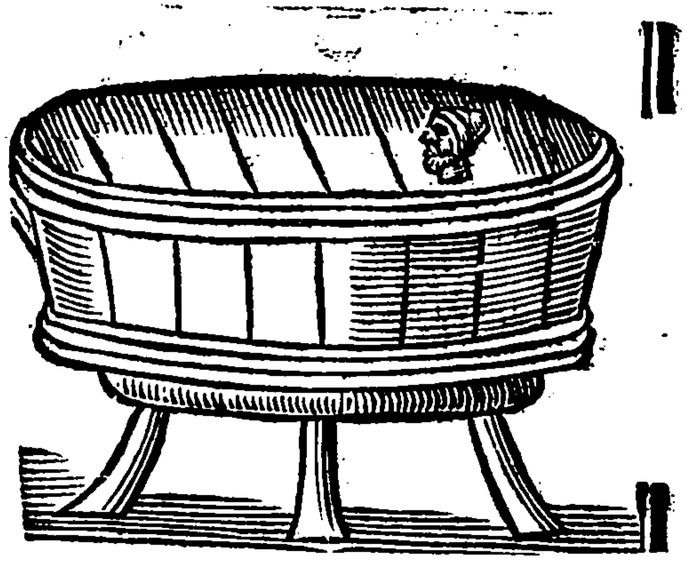


A. The furnace with a Copper globe. B. The Copper globe. C. The diſtilling veſſel. D. The refrigeratory with a worme. E. The receiver. F. Stooles on which the veſſels ſtand.

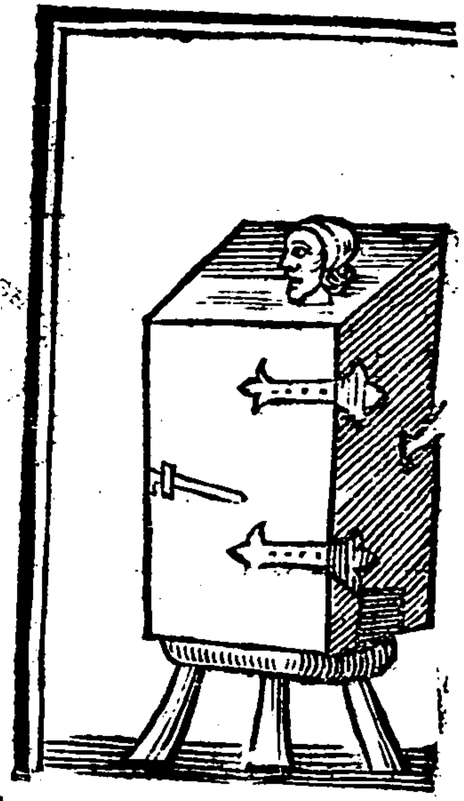


A *Balneum* with a cover having holes in it for the glaſſes, ſet upon a treefoot.

A wooden veſſel for the making of Beer.



A Tub for a moyſt Bath, which is to be warmed by the Copper Globe.



A wooden Box for a dry Bath to provoke ſweat with volatile ſpirits.

THE

THE THIRD PART OF PHILOSOPHICAL FURNACES.

Of Wooden Inſtruments of that are to be uſed inſtead of Still's, Baths, and Cauldrons.

IN the firſt place I ſhall ſpeak of wooden veſſels that are to be uſed inſtead of Copper ſtils, in the diſtilling of burning ſpirits, out of wine, beer, lees, malt, wheat, meal, roots, hearbs, flowers, ſeeds, and other vegetables, as alſo oyles of vegetables.

See that thou haſt an oaken barrel, like to thoſe wherein wine and beere are kept, of a juſt bigneſs, *viz.* anſwerable to the bigneſs of the globe, as is ſufficient for the coction: For a barrel that is too big will make the coction ſlow, and tedious. A greater globe may be fitted to a leſſer barrel, but not on the contrary, a great barrel to a little globe: For by how much bigger the globe is and the leſs the barrel, ſo much the ſooner is the work haſtned. Now ſeeing that this Art was invented for

the ſaving of coſts, which otherwiſe would have bin expended in providing of ſtils, cauldrons, furnaces, &c. it is beſt not to have too great a globe, which requires a greater furnace, and is more hardly to be carryed, becauſe it is to be covered within with lute, or a wall; for it is ſufficient if it be big enough for the coction. Wherefore I wil give you a juſt and due proportion of both, *viz.* of the globe, and veſſel, which in diſtillations and other operations, the curteous reader may imitate.

A globe of the bigneſs of a mans head, containing three or foure cannes, whereof each containing four pints, is ſufficient for the heating of a barrell of 30, 40, 50, 60 and 100 gallons, which by how much the more remote from 100 and neerer to 30, ſo much the ſooner is it heated, and the coction furthered; and on the contrary, by how much the neerer it is to 100 and more remote from 30, ſo much the ſlower is the coction. I do not therefore adviſe that a huge barrell be choſen for a ſmall globe, by reaſon of a long and tedious operation: And if all and every thing be not ſo accurately obſerved to a hair, yet it matters not much, becauſe it ſufficeth to do the ſame thing by the help of any ſmall copper inſtrument, which otherwiſe is done by divers copper inſtruments of divers forms. For in this way of diſtilling, wooden veſſels that are requiſite to the diſtilling of ſpirits, and boiling of Beer, and for baths are more eaſily provided, then ſo many copper veſſels in the common way. For by this means not only coſts are ſpared, but alſo it is in ſtead of building of furnaces; becauſe when any barrell hath been uſed, you may remove it, and ſet another in the place of it for another operation, the which cannot be done with ſtils and cauldrons faſtened into a furnace. And this invention is for thoſe that want Artificers, as Copperſmiths, &c. becauſe wooden inſtruments are more eaſily provided: alſo by the help of this globe may moſt ſecret operations be performed.

For the furnace with the copper globe may be built in one place, and in another place the *Balneum, viz.* places divided with a wall, ſo that he that looks to the fire may not know what is done in the Elaboratory; for oftentimes the care of the

the fire is committed to heedleſſe ſervants, that breake glaſſe inſtruments by their careleſſeneſs, by which means oftentimes a moſt pretious medicine is loſt; which danger this invention is without.

Wherefore this copper globe with its wooden veſſels is more convenient then thoſe copper ſtils and cauldrons. But this I would have thee know that this new invented diſtillation is ſlower, then the common way which is performed by ſtills, and conſequently requires a long fire. I deſire therefore the rich that dwell in large and ſpacious houſes, that they would uſe the old way of diſtilling; but the poor, who have but little houſhold conveniences, and the covetous, that they would uſe this little copper globe with its wooden veſſels: for although there be a longer fire required, yet theſe are not to be compared to thoſe coſts which are otherwiſe expended upon ſo many copper veſſels of ſo many divers formes. Let him therefore keep to his copper veſſels, who cannot underſtand me, for it concernes not me. Without doubt there are ſome whom this my new invented way of diſtilling will pleaſe, before other, being communicated for the ſake of the poor labouring houſe-keepers, that cannot boil Beer, and diſtill burning ſpirits for lack of veſſels: for a globe of five or four pound is more eaſily provided, then other copper veſſels of 60, 80, 100 pound: alſo thoſe wooden veſſels are more eaſily provided then furnaces, which ſome for want of place only cannot build. Chooſe therefore which way thou wilt, for theſe things which I have wrote, I have wrote for the poores ſake rather then of the rich. Certainly rich men that have ſpacious Elaboratories need not be aſhamed to follow this way, for it is free for every man to goe a ſhorter way, unleſs they had rather prefer the old and true way before a new and compendious, whom I cannot help, being contented with a publication which is made for the ſake of my neighbour, whether it be taken well or ill, with a good minde, certainly knowing that more profit then diſprofit may be obtained by the help thereof. It ſhall not therefore repent him of his labour, who knows rightly to prepare and uſe copper and wooden veſſels.

There

There follows now the preparation of the vessel.

THE vessel being made is to be placed with one bottome, upon a stool that is fitted for it, which being done, make a hole with a wimble neer the bottome, for the receiving of the neck of the copper globe, which is to be covered over with a linnen cloth: make also about the lower bottome another hole for a tap, by the help whereof the remainder of the distillation is drawn forth: also you must make a large hole in the upper bottome, the diameter whereof must be one span for to poure in the water to be distilled, with a funnell. Also there must be made a hole neer the upper bottome of two or three fingers breadth, into which is to be sent a copper pipe of a span long, which is to be fastened closely therein; and to this pipe another oaken vessell with a copper worm and cold water like to other refrigeratories, must be applyed. Also the joints of the aforesaid short pipe, *viz.* of the first barrell, and of the second barrell, *viz.* the refrigeratory must be straightly, and closely united together, which afterward may be the better joined together with a fit lute for the distilling. And this is the form and fashion of the wooden vessell, that is to be used in the place of copper vessels, in the distilling of burning spirits and oiles. But thou wilt object that these kinde of wooden vessels are porous, and drink up great part of the spirit and oyls.

I answer; none of the spirits seeketh a violent passage out, in case the wayes be open. There is no danger therefore, when there is passage enough given them by a pipe that is wide enough. Neither doth oil stick to them in distillation, for whatsoever is by force of the boiling water to be separated from the spirit, and seeds that also is sublimable by the force of the seething water, so as to distill in the refrigeratory no more is lost then in the stils. Distillation being made, the aforesaid spirits may be rectified in these wooden vessels, (being first washed) as well as in the copper stils.

The making of a wooden vessell for a Balneum, which is to be used in stead of copper and leaden Cauldrons for digestion, and distillation by glasse vessels.

MAke an oaken vessel as big or as little as you please, according to the greatnesse, or littlenesse, multitude, or formes of the vessels, of two or three spans high, a little narrower above then below, and so fashioned above, that a cover of wood, copper, or lead, may most closely be joined to it: the cover must have holes greater or lesser, according to the glasses, as is wont to be in the making of a *Balneum*, as you may see by the annexed figure. This vessel also must be placed upon a stool of the height of an el, or such height as is required for the joining of the copper globe with the *Balneum*, which must have a hole neer the lower bottom, for the receiving of the neck of the aforesaid globe. In defect of such a vessell, which yet you may provide easily enough, take a wine or beer vessell divided in the middle and make a hole neer the bottome for the neck of the globe, make also a wooden cover with holes, &c. He that will be curious may provide all things according to the best Art.

A wooden vessell serving for boiling of beere, metheglin, vinegar, &c. as well as copper Iron and tin vessels.

MAke a wooden vessel, which shall be more high then broad, a little under above then below, as you please; or take a wine or beer barrel divided in the middle, and neer; the bottome make a hole for the neck of the globe, which is to be covered with boards, which serves as wel for the boyling of beer, &c. as those of copper.

A wooden veſſel for a bath for ſweet, or minerall water, which may be accoruing as you plaaſe, kept warm, for the preſerving of health.

MAke a long wooden tub convenient to ſit in, which is to be ſet upon a ſtool of a juſt height, *viz.* that the bottome of the veſſel may anſwer the neck of the globe which is put into the furnace: you may alſo have a cover, that may cover the whole tub, which may be divided and united in that place where the head goes forth, as appeates by the annexed figure; or you may cover it with a cloth, laying it upon ſmall crooked ſticks faſtned in the tub, yet ſo that the head may have its liberty, eſpecially in a vaporous bath of common ſweet, or medicinall water; or make a high wooden coaer ſhutting very cloſe, for a dry ſweat, where it is no matter whether the head be ſhut in or no.

Of the uſe of wooden veſſels in diſtilling, boyling, bathing, &c. And firſt of the diſtilling veſſel.

HE that will diſtill any burning ſpirit by help of the diſtilling veſſel, out of wine, methoglin, beer, barley, wheat, meal, apples, pears, cherries, figs, &c. alſo out of flowers, ſeeds, and other vegetables, hath need ſo to prepare his materials, that they may yeeld their ſpirit. Where I thought it convenient, and indeed neceſſary to ſay ſomething of the preparation of each vegetable, for better information ſake, or elſe a profitable diſtillation is not to be expected; but labour in vain to be feared.

And firſt of the preparation of the lees of wine, beer, hydromel, and other drinkes.

THe lees of wine, beer, hydromel, &c. have no need to be prepared, becauſe they doe eaſily enough of themſelves yeeld their ſpirit, unleſs haply having loſt all their humidity they be dryed, which you may make moiſt again by the admixtion of common water, leſt they be burnt in diſtilling and ſtick to the veſſel; of which thing more in the diſtillation it ſelfe. Now flowers, roots, hearbs, ſeeds, fruites, apples, pears, cannot be diſtilled without a foregoing preparation. You muſt therefore firſt prepare them, as followeth.

Of the preparation of all kind of corn, as wheat, Oats, Barly, &c. which muſt goe before the diſtilling of the ſpirit.

AND firſt of all a malt muſt be made of the corn, as it is wont to be in the making of beer. Now the manner of making of malt is known almoſt to all, wherefore I need not ſpeak much of that, becauſe in all places that have no wine, there is ſcarſe any houſe found in which Malt and Beer is not made, as well in the country as cities. But however there is a great deal of difference of making of it, for a long knife doth not make a good Cook, nor all drinkers of wine are good planters. For many have perſwaded themſelves, that, if they follow the footſteps of their fathers, they have done well (although they have been in an errour) and being ſcornfull refuſe inſtruction. Wherefore ſomething is to be ſaid of the difference of malting. Although I never exerciſed the Art of making Beer, yet I am certain I doe in that excell all other diſtillers, and Brewers. For I often ſaw, and indeed with admiration, the ſimplicity of many in their operations, although common, and dayly, to whom though an age ſhould be granted, yet they would never bee more thrifty, being content with their ancient cuſtomes. Good God! How perverſe is the world, where no body labours to find out any good, neither is there any one that thinks of perfecting, and amending things already found out: Where all things run to ruine, and all manner of vice increaſe: for now almoſt every one ſeeks only after riches *by right or wrong*; for it is all one with them, if they have them, not thinking that things ill gotten ſhall periſh, and that the third heir ſhall not injoy them, and that unjuſt riches ſhall devoure

hoſe that have been honeſtly gotten, with danger alſo of eternall damnation. I pray you if our Anceſtors had been ſo negligent, and had left nothing to us, I pray you, I ſay, what Arts and Sciences ſhould wee have had now? It is come to this paſs now that vertues decreaſe, and vices increaſe.

Of the difference of malting.

THe difference of malt, by reaſon whereof it yeelds better or worſe beer, and ſpirit, conſiſts for the moſt part in the preparation thereof: for being made after the vulgar way it retaines its taſt, wherefore it cannot yeeld good ſpirit, nor good beer, which is obſerved of very few, wherefore they could not draw forth good ſpirit out of corn, but ſuch as ſavours of the taſt and ſmell of the malt. Which is not the falt of the corn, but of the artificer not operating aright in the preparation of his malt, in diſtilling and rectifying. For if it were prepared a right in all things, corn yeelds the beſt ſpirit, not unlike to that which is made out of the lees of wine, in taſt, odour, and other vertues. Which Art, although it be not known to all, yet it doth not follow that it is impoſſible: Now I did not ſay that it is that common way, whereby that ſpirit, which is like to the ſpirit of wine, is diſtilled, but another which is more ſubtill, and witty. Out of all vegetables is drawn a burning ſpirit, yet ſuch as is perceived by ſome difference of the taſt, and odour, but that is not the ſpirits fault, but of the vegetable, as of hearbs, ſeeds, corn, &c. communicating their vertues, taſt, and odour to the ſpirit: whence that ſpirit deſerves to be called not ſimple, but compounded; for elſe all the burning ſpirit (being rightly rectified from its flegm) is made out of any thing, having the ſame vertues with the ſpirit of wine, although it ſeem unprobable to ſome. I do not deny that one ſimple may yeeld more or leſs ſweet ſpirit then another. For ſweeter wines yeeld ſweeter ſpirits: Alſo cleere wine yeelds a ſweeter ſpirit then the lees of wine, although they

they come forth out of one and the ſame veſſel: For clarified wine, and that which is ſparated from the faces yeelds a ſweeter ſpirit then the Lees, and impure & heterogeneal ſediment which corrupts the ſimple, and ſweet ſpirit, with a ſtrong taſt and ſmell: ſo that that may deſervedly being as it were ſimple, be preferred before this which is accidentally corrupted. And this is to be underſtood of all other ſpirits. What hath hitherto been ſaid, hath been ſpoken for the ſakes of them, who have perſwaded themſelves that they could not perform chymical operations ſo well by the ſpirit of corn, as with the ſpirit of wine, for I never found any difference of both in the extraction of minerals, as vegetables. Let him therefore that can receive my opinion, and experience, ſeeing I will have nothing to doe with contradicting Carpers: Without hurt to others I dare not reveal the Art of diſtilling ſweet ſpirit with great profit out of corn, in all things like to that which is made of the *fæces* of wine, *viz.* without preparation or grinding of malt, which ſhall haply be communicated elſewhere at ſome time or other. For this Book is not written for the publiſhing of ſecrets, but of a new invented diſtillation. But thou that wilt make a ſweet burning ſpirit out of malt or honey; know this, that the corn muſt be brought after a certaine peculiar manner into malt, and loſe its ungrateful ſavour before its diſtilling, and fermenting, or elſe after the wonted manner a certain ungrateſull ſpirit will be drawn from thence, that cannot be compared to the ſpirit of wine. The whole Art therefore conſiſts in a true preparation; For ungrateful things are by Art brought into a grateſulneſs, and on the contrary grateful things are made ungrateful by negligence. And thus much for information ſake.

Of the fermentation of Malt.

TAke of malt ground in a mil as much as you pleaſe, upon which in a wooden veſſel ſet up right, pour cold water, as much as will moiſten it, and ſerve for mixtion and commi-

nution; then alſo pour as much warm water as will ſuffice for the making the mixture moiſt, and thin, and alſo warm; for it muſt be neither hot nor cold; which being done mix with it ſome new barm, and cover it with a cloth, and in a ſhort ſpace being expoſed to heat, it will begin to ferment (wherefore the veſſel is not to be filled to the top) and leave it ſo long in fermentation, until the mixture deſcends, which for the moſt part is wont to be done the third day, and the malt will be ready for diſtillation.

Of the fermentation of Honey.

NEither hath honey any need of a ſingular Art in its fermentation, becauſe being mixed with 6, 7, 8, 10 parts of warm water, it is diſſolved, and unto the ſolution is added ferment, as hath been ſpoken concerning malt, which afterward is left covered in ſome heat for to be fermented, being fit for diſtillation when it becomes to wax hot. Now know that too great a quantity of honey makes a very ſlow fermentation, *viz.* of ſome weeks and months; wherefore for acceleration ſake, I adviſe that a greater quantity of water bee added; although otherwiſe it yeelds plenty of ſpirits, but ungrateful, which therefore I adviſe no body to diſtil as being unprofitable, unleſſe any one know how to take away the ungratefulneſs thereof.

Of the preparation of fruits, ſeeds, flowers, hearbs, roots, &c.

THe fruits of trees, as cherries, plums, apples, pears, figs, juniper-berries, elder-berries, dwarf-elder, and mulberries, &c. are bruiſed in wooden veſſels, with wooden peſtils; and upon them being bruiſed is poured warm water, and ferment added to quicken it, as hath been aboveſaid of malt. Seeds are broken in a mill; flowers, hearbs, and roots, are cut ſmall, and are ſtirred up to fermentation by mixing of warm water and barm.

An

An Annotation.

BEfore thou diſtil the aforeſaid vegetables prepared by the help of fermentation, diligently weigh, and accurately obſerve whether the mixture be ſufficiently fermented, for ſometimes there is ſometimes too much cold, or hot water put to it; ſometimes the veſſel is not well covered, by which meanes the cold air is let in, whence the fermentation is hindered, and conſequently the diſtillation of the ſpirit: For by the help of fermentation the burning ſpirit of the vegetables is ſet at liberty, without which it cannot be done; alſo the diſtillation is hindred by too much haſt, as wel as by too much delay: for if thou begin to diſtil before the time, *viz.* fermentation not being yet perfected, thou ſhalt have but few ſpirits; wherefore alſo the better part is by many that are unskilful caſt to the ſwine, but without any great loſs, if the matter were malt, becauſe that ſwine are fed therewith: But not ſo if other vegetables were the matter of the diſtillation. Alſo too much ſlowneſs where the matter begins to be ſowre before it be diſtilled, yeelds very few ſpirits, that which often happens, whileſt hearbs, and flowers, &c. are out of ignorance left in fermentation 3, 4, 5, and more weeks, before they be diſtilled, for the greateſt part of the ſpirit is then turned to vinegar, which would not be ſo very ill done, if ſo be theſe men knew how to clarifie the remainders, and torn it into vinegar, that nothing thereof be loſt; for the vinegars of hearbs, flowers, ſeeds, and roots are not to be contemned. And ſo often times (a thing to be lamented) the better part, if they be ſpices, and pretious things, is loſt.

The matter of the diſtillation, and other choice things, as ſeeds, and hearbs are caſt away with loſs: wherefore for admonition ſake I was willing to adde ſuch things that the operators may have an opportunity to conſider the matter a little more profoundly with themſelves, or at leaſt of learning the art of diſtilling from countrymen, who do not ſuffer their malt to putrefie, grow ſowre or mouldy, before they fall upon their diſtillations, but preſently fermen-

tation:

tation being made (the third or the fourth day) begin their distillation.

But some one will object, that my vegetable spirits are not pure by reason of the ferment that is mixed, having in it self a spirit. I answer, there is not so great a portion of the ferment mixed which can corrupt the vegetable spirit. For although some spoonfuls of ferment yeelding but a few drops of spirit be added to a great quantity of the vegetables; yet there can come no hurt or detriment to so many quarts of the vegetable spirit. I have seen some supercilious men that would not adde ferment to the matter of their spirit, but sugar or honey, by which they would promote fermentation, and so have thought to get a pure spirit not considering that honey, and sugar after fermentation are made to yeeld their spirits also, whereof one spoonful yeelds more then ten or twenty of Barm: But honey and sugar fermenting not without difficulty themselves, how can they promote the fermentation of other things? Who also have had experience, that the addition of their ferment hath been superfluous, whilest their flowers and hearbs have stood some weeks in maceration, before they begun to ferment, and that oftentimes they have contracted an acidity, mustiness and stink, the reason of which was an unsutable ferment. There are indeed the fruits of some trees that have a sweet and ful juice, as grapes, cherries, apples, pears, figs, &c. which need not the addition of any ferment, having a natural ferment of their own, but other vegetables not so, being lean, as hearbs, flowers & roots. It is necessary there to promote the fermentation of them by the addition of a sutable ferment, lest in length of time these hearbs and seeds lose their spirit exhaling in maceration. And thus much I was willing to say for information sake, and indeed for the sake of them who seek after the best, and choicest medicines, wanting a good burning spirit as a companion applicable to them. For this spirit came not only by it self, as *Aqua vitæ* into a medicinall use as well internal as external, especially that which is prepared of cordial, and cephalick hearbs; but also being united with the proper oyls of those hearbs in many desperate diseases, where it could put forth its vertues eminently.

And thus much sufficeth concerning the preparation of vegetables that goes before the distillation of burning spirits.

The manner of distilling in generall followeth.

HE that is going to distil hath need to stir his fermented matter very well with a stick, that the thicker parts may be well mixed with the thinner, and then he must fill therewith his distilling vessel set upon a treefoot, and joined to the copper globe in the furnace on one side, and to the refrigeratory on the other, the joints in all places being well closed either with Oxe bladders, or with starch and paper. Also the interiour part of the globe in the distilling vessel must be fenced with a copper or wooden basket, that the hearbs, seeds, and other things enter not into the globe, into which only water must come. Also the upper hole must be close stopped with a fitting stopple wrapt about with linnen clouts, (*viz.* that hole by which the matter to be distilled is put in) like to vessels of wine that are stopped. Which being well done, you must kindle the fire in the furnace under the globe; until all the matter in the whole vessel boil wel, and that burning spirit rise, and go out, though the refrigeratory (where it is condensed) into the glass receiver that is set under it, no less then distilled out of a stil; and you must continue the fire til all the spirit be come forth, which you may know by the tast. Which being done and all things being cold, let the remainders be taken out by the lower large tap hole, for meat for swine, or other uses. The spirit that is drawn off may be exalted, and rectified at your pleasure in the same vessel, being first made clean together with the refrigeratory. Note wel, that sometimes there is left a fat oil with the flegm in rectifying of the spirit, proceeding from that hearb of which that was the spirit, which did distil off with the spirit from the matter with a strong fire in the first distillation, but in the rectifying could

could not aſcend with the ſpirit in a gentle fire, but is conſtrained to remain with the inſipid flegm. And this oyl alſo hath its vertues, eſpecially that which is rectified by a glaſs gourd in Balneo, with ſpirit of ſalt, and clarified. Now the like oyl is got almoſt from all hearbs, roots, ſeeds, flowers, and fruits, but out of one ſubject more then another, according to the hot and cold temper thereof. Eſpecially the ſediment of wines yeelds a good quantity of ſuch oyl, which is as medicinable as the true oyl of wine, being rectified not before it be endued with a ſweet ſavour, and it is an excellent cordiall, although I knew no body that knew this before.

And thus I have ſhewed the generall way of diſtilling, burning ſpirits, by help of the aforeſaid wooden diſtillatory. Now alſo follows,

The manner of diſtilling ſpices, ſeeds, flowers, hearbs, roots, Woods, &c.

Firſt, the ſeeds muſt be broken in a mill, flowers, hearbs, and roots cut ſmal, the woods broken are filed, upon which afterwards a good quantity of water (in which they may ſwim) muſt be powred for the maceration of them, ſo that when the diſtillation is ended there may remain ſome water, leſt for want of water they be burnt in the diſtilling, and yeeld an oyl ſavouring of the *empyreuma*, and not ſweet. Neither is too great a quantity to be powred on them, but as much as ſhall ſerve to prevent the burning of the aforeſaid vegetables in the diſtilling of the oyl thereof. And indeed freſh vegetables may preſently without any foregoing maceration, being put with their proper waters into the diſtilling veſſel be diſtilled. But they that be dry may for the ſpace of ſome dayes be macerated before they be diſtilled. Alſo the water appointed for maceration muſt be ſalted, for the better mollifying, and opening the aforeſaid materials, that they may the ſooner yeeld their oyl. Now green and freſh need not any ſalt water, yet it wil not be hurtful to mix ſome therewith, becauſe ſalt helps the boiling water, ſo as to make the oyl more

more eaſily to aſcend. It alſo helps and furthers diſtillation as doth Tartar and Allome, if they be rightly mixed and ordered. Which being all rightly done, the materials that are macerated muſt be put by a funnel into the diſtilling veſſel, and fire muſt be given as hath been ſpoken concerning the burning ſpirit, and the oyle of the ſeed, or wood macerated in the water will come forth in the coition together with the water. And although by this way more oyle comes forth, *viz.* Maceration being made by the addition of ſalt, then without ſalt, by the help of the ſweet water alone, as is the faſhion in all places almoſt to diſtil oyls of ſpices; yet much remaines inſeparable by the water, and conſequently not to be ſublimed with the water. Therefore the better way is that which I ſhewed in the firſt part to be performed with the ſpirit of ſalt, which if you pleaſe you may follow. All the oyle being come forth (that which is perceived by the changing of the receivers) the fire is to be extinguiſhed, and the remainder is to be taken out, which if it be of ſeeds, hearbs, or fruits, may being yet warm be fermented by the addition of ferment for the diſtilling of the ſpirit, of which there cannot be ſo great a quantity by reaſon of taking away of the oyle, as otherwiſe is drawn out of things that have not loſt their oyle: For all burning ſpirit partakes of much oyl, of the eſſence, and nature whereof more a little after. Now the oyls muſt be made without the addition of any ſalt, for ſalt hinders the fermentation, without which the burning ſpirit cannot be had. But the water that is diſtilled together with the oyle, is to be ſet in a certain temperate place, until the oyle aſcend, and ſwim upon the water, from whence it is to be ſeparated with a Tunnel (of which in the fifth part,) alſo there are ſome oyles which doe not aſcend, but fall to the bottome, which are are alſo to be ſeparated with a Tunnel, and kept for their uſes. Now how theſe oyles may be kept clear long, and not contract any clammineſs, ſhall be taught in the 5 part: but how they ſhall after they have loſt their clearneſs by long ſtanding, and are become

tenacious, be reſtored and clarified again, is taught in the firſt part, wherefore I need not here repeat it.

How Oyles are to be coagulated into Balſames.

IT hath been the cuſtome a long time to turn aromaticall oyles into Balſames, where alwayes one hath been willing to excell another in this Art, which nevertheleſs was nothing hitherto, but for a waſhing and cleanſing; for they could not be uſed inwardly, but only outwardly for their odour to comfort the heart and brain. Now the aforeſaid oyls are coagulated many ways and are made portable in Tin, Silver, and ivory boxes.

Some have mixed the fat of a lamb with them by help of heat and have turned them into a liniment, which they have colored with divers colours; as for example, they have corrupted the oyles of green hearbs; as roſemary, majoram, lavender, rue, ſage, with a green colour, by the admixtion of verdigreaſe (which is noxious to the head and heart) where one corroborates and refreſheth, another deſtroyes. They have tinged the Balſame of Cinnamon, and *ligmum Rhodium* with a red colour by the help of a poyſonous Cinnabar. Others that are more induſtrious have tinged their Oyles with extracted colours of vegetables, which balſames are more ſafely taken inward: But they are not durable, acquiring a ſhimineſs and ſtink; wherefore they have mixed a white wax to coagulate them: By which means they are become more durable without ſtinking; but yet in length of time ſo tenacious, that being ſmeared or rubbed upon the skin, they ſtick faſt by reaſon of the wax that is mixed with them: at laſt others have found out a better way of coagulating aromatical oyles, and other things, *viz.* by the addition of the oyle of Nutmeg made by expreſſion, having loſt its odour and colour by ſpirit of wine; which they called the *Mother of Balſames*. And this way hath been a long time concealed by Apothecaries as a great ſecret, until at length it be made of publick right) ſo that balſames prepared

pared after this manner are ſold almoſt in all ſhops: But however that be the beſt way, yet they are not durable balſames that are made that way, becauſe they lack ſalt. I doe not contemne and diſapprove of Balſames made after this way, for if a better way were knowne, better had been made; for no man is forced beyond his power. Wherefore they are not onely to bee excuſed that have uſed Lambes fat, Waxe, and the oyle of Nutmegs in the making of their Balſames, but alſo to be honored for their communication. Now ſeeing the aforeſaid Balſames cannot bee taken inward, nor bee ſo well outwardly adminiſtred by reaſon of their unctuoſity, others have conſulted to congelate the Oyles by the admixtion of their owne proper fix-ſalts: and Balſames prepared after this manner are made free from clammineſſe, or tenaciouſneſſe, and may be diſſolved in wine, beer, or any liquor.

Wherefore they may be not onely conveniently taken inward, but alſo more conveniently then thoſe old be rubbed outwardly for the odours ſake, becauſe they are eaſily waſhed off againe with water. They doe not onely give a moſt ſweet odour being rubbed, but alſo by reaſon of the admixtion of a fixed ſalt, having the nature of ſalt of Tartar, doe beautifie the skin. Wherefore they are commended, being diſſolved in fair warme water for a waſhing for the head, and face; not onely becauſe they beautifie, but corroborate with their excellent odour: that which thoſe fat Balſames cannot doe. Wherefore this way is to be preferred farre before the other.

Let him therefore that will, receive what I have ſaid, for *rare things and new things are not alwayes accepted*, eſpecially *being obſcure*: but I hope for the approbation of the age to come.

The manner of preparing follows.

TAke the remains of the burning ſpirit, and being put into a ſack, preſs it hard: reduce the water preſſed out into vinegar, and of roſes thou ſhalt have a roſe vinegar, and of other things another, being the beſt in a family for to ſeaſon meats: then take the remains out of the ſack, and reduce it to white aſhes in a potters furnace, upon which pour the flegme of its own burning ſpirit (being ſeparated) to extract the ſalt, from which evaporate again all the humidity in a glaz d earthen pot: calcine the coagulated ſalt gently in a clean crucible, and it will be white and be like to ſalt of Tartar in taſt; from which abſtract ſometimes its owne proper burning ſpirit, calcining the ſalt firſt every time; and the ſpirit will be ſo exalted by its proper ſalt, ſo that it will preſently aſſume its proper oyle, and will being powred upon it aſſociate it to it ſelf ſo as to be perceived no more in the ſpirit which will remaine very clear: Which being done calcine the ſalt yet once more very well in a crucible, and diſſolve ſo much of it in its proper flegme, as ſufficeth for the coagulation of the oyle, then mix this ſolution with the burning ſpirit, mixed with its oyle, and ſet it in a vial of a long neck well ſtopt, in a Balneo, that the ſpirit may not exhale, for the coction of it, and in the ſpace of a few hours there will be an union of the mixture which will be as white as milke. Which being done, let the glaſs coole, for there is a conjunction of the ſpirit, oyle, and ſalt, ſo that neither can be diſcerned from another, which is to be powred into a veſſel of a wide mouth, and it will be congealed in the cold like a white oyntment, not only to be annoynted with all, but alſo to be diſſolved in any liquor, being of an excellent odour, which may alſo be given inwardly very conveniently, and being uſed outwardly it makes the skin beautiful and ſweet; wherefore this is that moſt deſired balſame of Princes and Ladies. And by this way the three principles of vegetables, being ſeparated, and purified, are againe remitted, in which union there is of that

that whole vegetable, found the whole vertue, taſt, and odour.

Note well, That he that will colour balſames, muſt draw the colour out of vegetables with ſpirit of wine, which he muſt make to be coagulated together with it. After this aforeſaid manner, therefore you may draw out of any vegetable that hath in it ſalt, ſpirit, and oyle, ſoluble and well ſmelling balſames without the addition of any other ſtrong thing, which are not to be contemned.

And becauſe here alſo is taught that moſt odoriferous balſame of roſes, for roſes yeild but a little oyle, without which that cannot be done, know that not only roſes or roſe leaves alſo are to be taken for the making the aforeſaid balſame, but alſo together with the leaves thoſe whole knots; for that yellow that is in them yeilds that oyle, not the roſe leaves, &c. And let what hath been ſaid ſuffice concerning our preparation of balſames, which if they be rightly made are not I ſuppoſe, to be contemned, neither do I reject thoſe that are made without ſalt: Let him that hath bettet communicate them, and not carp at ours. And ſo I would that all and each proceſs ſhould be comprehended under ſome one general, *viz.* of diſtilling burning ſpirits, and oyles, by the help of a wooden diſtilling veſſel, and their conjunction by the help of their proper fixed ſalt, I could here add more things concerning the uſe, and vertues of ſpirits of wine, and of thoſe moſt ſweet vegetable oyles; but becauſe they are cleerly enough ſpoken of by others, I account it a ſuperfluous thing to repeat the ſayings of others, being contented with the deſcription of one onely general proceſs, which you may imitate in other particulars.

There

There followes now the use of the second wooden vessel, which is to be used in stead of those of copper or lead, serving for distillations, digestions, extractions, and fixations.

THe vessel being made ready according to the prescription set down before, there is nothing else to do, then to fit the furnace with the globe, and at your pleasure to heat water in it, with a government of the fire in the furnace. Now all things may here be done, which otherwise are done in a common *Balneo*; where there is no other difference but of vessels; here is used a wooden vessel, there a copper, leaden, or iron, *&c.* In this operation also is used the same furnace with the same globe, which was used above in the distillation, whrefore you need add nothing else beside, for nothing is more common then a *Balneum* in distillation; let the demonstration therefore of the use of a copper globe suffice. Now I thought it worth while to set down some Chymical medicinal extracts, not common, which may be made by the help of this *Balneum*, which being rightly prepared do many things in many diseases.

And first of a vomitive Extract.

TAke an once of the flowers of Antimony, of purified Tartar ℥ij. of sugar-candy ℥vj. of raine water two pints, being mixed together set them in a strong vial in *Balneo* for to be cocted, and make them to boyle strongly the space often or twelve hours. Then the *Balneum* being cold, take out the glass, and powr forth the decoction, and filter it through a brown paper put into a tunnel; the filtred water will be reddish betwixt sweet and sowre, which take (the fæces in the filtre being cast away) and in a smal gourd glass draw off all the moysture with a gentle fire in *Balneo* unto the consistency of honey of a browniſh colour, upon which again powre a pint of spirit of wine, powred forth into a vial of a long neck; and set it in *Balneo* with a moderate heat the space of eight

eight or sixteen hours, and then the spirit of wine will separate, and extract the essence, which will be more pure and noble, the fæces being left in the bottome; which after all things are cold are to be separated by the help of filtration through a double brown paper. Then take the red tincture that is filtred, and in a gourd glass in a gentle Balneo draw off almost all the spirit of wine until there remaine a mattet like a very sweet syrup, which being taken out keep as a most excellent vomitive, most profitable in many diseases, where other Catharticks can do nothing. For this medicine works most gently, wherefore it may be given to children of a yeer and half old without danger, and also to old men. This medicine purgeth all humors and attracts all humours from the nerves, and veins, opens all obstructions of the liver, spleen, lungs, and kidneys, by which means many most grievous diseases are cured.

I never found a vomitive comparable to this, which works quickly and safely. The dose of it is from grain 1.2.3.4. to 10, and 30 according to the age and sickness. It may be taken by it self, or in wine, beer, *&c.* and it will within a quarter of an houre begin to work, and ceaseth within two hours. Sometimes it doth not provoke vomit at all, but only stools, where a glyster is very helpful if it be given a little before the administring of the aforesaid medicine, being made of two or three spoonful of oyle Olive, and salt water; for the glyster prepares the way below, so that it seldome then works by way of vomit: when also the patient may presently after the taking of the medicine hold hot tosted bread to his mouth, and nose, which hinders vomiting and promotes the operation by stool. But in my judgement it is better not to hinder the medicine seeking a spontaneous way of operation, and not forced: For vomiting is more convenient for some, then purging by stoole. Now these things I have spoken for the sake of those, who although they abhor vomiting, yet desire to be purged by the essence of Antimony, which is of all that I know the most safe, and sweet Cathartick. For it searcheth the whole body far better then all others, and frees it from many occult

diſeaſes, that which all other vegetable Catharticks could not do. It hath alſo this commodity in it, that although by littleneſs of the doſe, or the ſtrong nature of the patient it doth not work by vomit, or ſtool, yet it doth not like other medicines hurt the body, but works either by ſweat, or urine, ſo that Antimony being rightly prepared is ſeldome adminſtred without profit. When as on the contrary vegetable Catharticks being given in leſs doſe or by reaſon of ſome other cauſes do not work, although they do not make the body ſwel, and produce manifeſt diſeaſes, yet they may threaten to the body occult ſickneſſes.

Now the *Arcanum* of Antimony doth not only not do hurt, if it do not ſenſibly operate, but by inſenſible working doth much good to the body of man. Wherefore there is a great difference betwixt purging minerals, and vegetables. For minerals are given in a leſs doſe without nauſeouſneſs, but vegetables with a great deal of nauſeouſneſs, and ſometimes with danger to the ſick in a greater doſe. Now that nauſeouſneſs alſo proceeding oftentimes from the great doſe of the ungrateful bitter potions does more hurt then the potion it ſelf. I wiſh that ſuch kinde of groſs medicines were aboliſhed, and the ſweet extracts of vegetables and eſſences of minerals were ſubſtituted in their place.

A purging Extract.

TAke of the roots of black Hellebor gathered in a fit time, and dryed in the aire one pound, the roots of Mechocan, Jallap, of each four ounce; Cinnamon, Anniſſeed, and Fennelſeed, of each one ounce; of Engliſh Saffron a dram, powder all theſe ingredients, then powre upon them the beſt rectified Spirit of wine, in a high glaſs gourd, and upon this put a blind Alembick, and ſet it in digeſtion in Balneo, until the Spirit of wine be tinged red, which then decant off, and powre on freſh, and ſet it againe in digeſtion; untill the ſpirit be red, which alſo decant off: then powre on freſh again, and do this ſo often until the ſpirit will no more be tinged red, which commonly is done at three times. Mix theſe tinged ſpirits, filter them, and in Balneo by a glaſs Alembick with a gentle heat draw them off from the Tincture, and a thick juyce will remaine at the bottome of a brouniſh colour, which you muſt take out whileſt it is yet hot, and keep it in a clean glaſs for its uſes. The Spirit of wine drawn off from the extract may be reſerved for the aforeſaid ſame uſe. Now this extract is given from grains 3. 6. 9. 12. to 31. according to the age, and perſon, beeng mixed with Sugar, it hath not an ungrateful taſt, and it works gently, and ſafely if it be not given in too great a doſe. And if thou wilt have it in the form of a pill, mix with it being yet hot an ounce of cleer Aloes, and half an ounce of Diagridium powdered, being mixed bring it into a maſs for pils, and keep it for your uſe. The doſe is from grains 1. to a ſcruple. It evacuates all ſuperfluous humors, but it is not to be compared with the medicine of Antimony And this extract I put down for the ſakes of thoſe that fear minerals, and abhor vomits, which in my judgment is the beſt of all vegetable Cathartickes.

A Diaphoretical Extract.

TAke the Wood Saſſafras, Saſſaparilla, of each ſix ounces; Ginger, Galangal, Zedoary, of each three ounces; long Pepper, Cardamoms, Cububs, of each an ounce; Cinnamon, Mace, of each half an ounce; Engliſh Saffron, Nntmeg, Cloves, of each a dram: Let the woods be raſped, the roots and ſpices powdered, powr upon them being mixed the ſpirit of wine, and let the tincture be drawn forth in Balneo, as hath been above ſaid of the purging Extract, evaporate away the ſpirit to the conſiſtency of honey; which keep for your uſe. It is good in the plague, feavers, ſcorbute, leproſie, frenchpox and other diſeaſes proceeding from the impurity of the blood, curing them by ſweat. The doſe of this Extract is from a ſcruple to a dram with proper vehicles: it provoketh ſweat preſently, driveth away all venenoſities from from the heart, and mundifies the blood.

And although it be a moſt effectual vegetable Diaphoretick,

yet it may not be compared to thoſe ſubtile ſpirits of minerals, of which in the ſecond part. Alſo animal diaphoreticks have their commendations, as the fleſh of vipers, the fixed ſalt of ſpiders, and toads, in their peculiar operations, where each alone without the mixture of any other thing puts forth and ſheweth its operations; neither are animal, and vegetable diaphoreticks to be compared to the mineral, as *bezoarticum minerale*, *antimonium diaphoreticum*, and *aurum diaphoreticum*.

A Diuretical Extract.

TAke the ſeeds of Saxifrage, Caryoway, Fennel, Parſly, Netles, of each 3. ounces, the root of liquoriſh, the greater bur, of each an ounce, the powder of woodlice half an ounce. Let theſe being mixed and powdered be extracted with ſpirit of Juniper according to art: then mix theſe following things with the extracted matter: Take the ſalt of Ambar, ſoot, netles, of each half a dram, purified nitre a dram: Let theſe be powdered, and mixed with the extract, and this mixture be kept for uſe. The doſe is from a ſcruple to a dram, in the water of parſly fennel, &c. This extract forceth urin, opens the ureters, purgeth the reines, and bladder from all viſcous flegme (the mother of all tartareous coagulation) *viz.* if it be uſed timely: In this caſe is commended alſo the ſolution of flints, and cryſtals made with ſpirit of ſalt. A greater commendation have ſalts of nephretick hearbs made by expreſſion, and cryſtalliſation, without calcination, the preparation whereof ſhall not here, but elſewhere be taught.

A Somniferous Extract.

TAke of *Thebaic opium* four ounces, of Spirit of Salt two ounces, purified Tartar one ounce, ſet them being mixed in maceration in Balneo in a glaſs veſſel for a day and night, and the ſpirit of ſalt with Tartar will open the body of the *opium*, and prepare it for extraction, upon which powre half a pint of the beſt ſpirit of wine, ſet it in a gentle Balneo to be extracted,

extracted. Decant off the ſpirit that is tinged, and powre on freſh, ſet it in digeſtion till the ſpirit be coloured. Then mix the extractions together, and put to them in a glaſs gourd two drams of the beſt Saffron, of oyle of Cloves a dram, and draw off the ſpirit of wine in Balneo, and there will remaine a thick black juyce, which is to be taken out, and kept in a clean glaſs veſſel. The doſe thereof is from grain one, to five or ſix, for thoſe of a mans age, but to children the ſixth or eighth part of a graine. It may be uſed in all hot diſtempers without danger. It provoketh quiet ſleep, mitigates pains as well outward, as inward, it cauſeth ſweat; but eſpecially it is a ſure remedy for the epilepſie in children that are new born; for aſſoon as it is given to them to the quantity of the eighth part of a graine in wine, or womans milk, there preſently follows reſt, and ſweat with ſleep, by which means the malignity is expelled, the children are refreſhed, and deſire victuals, and the fit returns no more afterward. Although haply the like ſymptomes may be perceived againe, yet if the aforeſaid doſe be adminiſtred againe, the children are refreſhed, and cured wholly, whereas otherwiſe they would have dyed, &c. whereof I have not reſtored few with this medicine. Moreover alſo there are very effectual anodyne medicines, as thoſe volatile ſpirits of vitriol, allome, antimony, and other minerals, with which, as alſo with that narcoticke ſulphur precipitated from the volatile ſpirit of vitriol, nothing may be compared.

A Cordial Extract.

TAke of red roſes four ounces, of the lilie of the valley two ounces, the flowers of borage, roſemary, ſage, of each an ounce; cinnamon, lignum aloes, of each two drams; cloves, mace, nutmeg, galangal, cardamoms the leſſer, of each half an ounce; the ſhaving of ivory, hartſhorn, of each an ounce; of Engliſh ſaffron a dram, of *nux vomica* a dram: Mixe them and reduce them to a fine powder, and let the tincture be extracted with ſpirit of wine in Balneo, which is to be drawn off

again, unto a juſt conſiſtency. Let the extract be kept for uſe. It may be uſed in almoſt all faintings, and other affects that are not joyned with a preternatural heat. The doſe thereof is from grains 3. 6. 9. to a ſcruple with proper vehicles; being often admininiſtred it refreſheth the ſpirits, corroborates the braine, and other parts of the body. It is made more efficacious by the adding of the eſſences of minerals, eſpecially of gold, of which thing ſee the firſt part concerning the ſweet oyle of gold.

Of an odoriferous Extract.

I Need not teach the making of any odoriferous vegetable extract, becauſe the manner of drawing forth, or diſtilling oyles of vegetables that have ſweet odours, hath been ſhewed a little before, as of hearbs, flowers, and ſeeds, which are the moſt noble, and ſweet eſſences of vegetables, by the odour whereof the heart, and braine are corroborated, which being reduced into balſams are made tranſportable. Better extracts therefore, and more excellent cannot in my judgement be made out of vegetables, then thoſe aforeſaid oyles, unleſs any one would mixe aromatical extracts made with ſpirit of wine with metallick ſolutions, and being mixed digeſt them, then there will a certain moſt odoriferous oyl go from the extract not only more efficacious, but more excellent then that common diſtilled oyl by reaſon of the admixtion of the ſpiritual metallick vertue, eſpecially of gold and ſilver, diſſolved in the acid *Menſtruum* communicating its vertues to the Aromatical oyle. Moreover any vegetable oyle may be exalted in vertues and odour by the help of ſpirit of urine, or ſalt Armoniack, by the help whereof not only odoriferous oyles are exalted, but alſo the inodorous oyles of vegetables are made odoriferous, if they be a while digeſted in ſpirit of urine: and not this only, but every mineral, and metallick ſulphur, although the odour thereof be bound up with moſt ſtrong bonds, is opened by the benefit thereof, and is reduced by digeſtion in a very little time into a moſt ſweet and odoriferous eſſence. Lixivial ſpirits exalt the odours, and colours of

of ſulphurs; acid purge ſulphurs, but change their colours, and odours. Muske and Civet get the ſweetneſs, and excellency of their odour from the ſubtile urinous ſpirit of a certain Cat, digeſting ſome certain fat and converting it into ſuch a kinde of moſt odoriferous matter.

And let this that hath been ſaid ſuffice concerning Extracts, which might have been omitted, becauſe many of theſe kinde of Extracts are found in the writings of other authors in many languages: but I was willing to ſet down theſe, leſt this book might ſeem to contain in it nothing elſe beſides the new way of diſtilling, being furniſhed alſo with good medicines.

Of Baths.

A Little before hath been given a deſcription of a Tub for a Bath in which any one may ſit with his whole body except his head, not only to be waſhed in ſweet warm water, whether medicinal and mineral, but alſo to ſweat in without water, where the veſſel is heated by warm vapours, either of ſweet waters, or minerals. And every one may provide ſuch Baths for himſelf according to his neceſſity at home, whereby the ſame diſeaſes are cured as thoſe that are cured by the help of natural Bathes, ſo that he need not for the Baths ſake go a great journey, but may ſtay at home with his family and follow his calling without trouble, when he hath occaſion and need to uſe them.

And whereas it cannot be denyed, that by the uſe of the Baths moſt grievous diſeaſes which cannot be cured by Phyſitians, are happily cured; I was willing for the ſake of my neighbour to publiſh this inſtrument together with the preparation of mineral waters; which publiſhing will not without doubt be without profit, and advantage. Wherefore I will in brief ſhew you the preparation of mineral, and ſweet waters, and their uſe, and firſt,

Of

Of a Bath of ſweet or common water.

THere is no art to make a Bath of ſweet water, for you have nothing elſe to do, then to fill your veſſel with river or raine water, and to make a fire, which by the help of the copper globe will heat the water, which being ſufficiently heated, you may ſit in it, and cover the Tub, that the hot vapors evaporate not, nor the cold aire enter in, and coole the exteriour parts of the body: Wherefore alſo you muſt apply a clean linnen cloth about your neck, leſt the warme vapors may evaporate there: which being rightly obſerved, you may ſit the ſpace of 1. 2. 3. hours, or as long as you pleaſe or your ſickneſs require. You muſt keep a continual heat as much as is neceſſary, which may be done by the help of that globe. If you be thirſty in the mean time you may drink ſome proper diſtilled drink according to the nature of your diſeaſe, of which thing nothing now, becauſe I am reſolved to write a peculiar *book de Balneis*, and here only to ſhew the uſe of that copper globe in heating of Baths. And although there be not a perfect inſtruction of all, yet of ſome Baths, and their uſes there ſhall a ſhort inſtruction be given in this place.

Of the nature, and property of natural Baths.

KNow that the greateſt parts of medicinal waters in Germany, and other countries as well hot as cold carry with them from the earth a certaine ſulphureous acidity more or leſs: in which acidity conſiſts that medicinal faculty and vertue of this or that water. And if thoſe waters loſe their odour and taſt by the exhaling of their ſubtile ſpirits, then alſo they looſe their vertues; although alſo there be found ſome waters, which have not only a ſpiritual ſulphur, but alſo are impregnated with a certain mineral, or metallick body mixed with Allome, or Vitriol, which comes not elſewhere then from the common water running through the mines. There are

are found alſo other baths, the power and vertue whereof conſiſts not in any ſpiritual ſulphur, nor in any metallick body mixed with ſalt, but only in a certaine ſpiritual ſalt mixed with a certaine ſubtile fixed earth, which waters do not run through metallick mines as others do, but rather ſtones of the mountaines calcined with a ſubterraneal fire, whence alſo they borrow their ſubtile acidity with their inſipid earth. And this no man will deny that hath the knowledge of volatile and fixed ſalts of minerals, and metals: that which I am able to demonſtrate with very many, and moſt evident reaſons, if time and occaſion would permit; but it ſhall be done ſometime or other as hath been ſaid in a peculiar treatiſe. Now therefore I will only teach how by ſalts, minerals, and metals artificial Bathes may be made, which are not only not inferiour to the natural in vertue, but alſo oftentimes far better, and that without much coſt or labour, which any one may uſe at home in ſtead of natural for the expelling of diſeaſes, and recovering of health. And although I am reſolved to ſet forth a book that ſhall treat largly of the nature, and original of Bathes, and of their uſe; yet I am willing now alſo to ſay ſomething in brief concerning it, and that from the foundation, ſeeing that there are ſo many different opinions of learned men, and thoſe for the moſt part uncertain.

As concerning therefore the original of the acidity as well volatile, as corporeal, as alſo the heart of Baths, though that is not one, and the ſame; for elſe each would have the ſame properties, but daily experience teſtifies the contrary: For it is manifeſt that ſome Bathes help ſome diſeaſes, and others are hurtful for them, which comes from nothing elſe but from the difference of the properties of the mineral waters proceeding from a diverſity of mines impregnating thoſe waters. In a word, ſweet waters attract their powers, and vertues in the caverns of mountaines from ſome metal and minerals of divers kinds, that have naturally a moſt acid ſpirit of ſalt, as are divers kinde of marcoſites containing copper and iron, and ſometimes gold and ſilver; alſo kinds of vitriol and allome called by the ancients *Miſii*, *Rarii*, *Chalcitis*,

Melanteria, and *Pyritis*, whereof ſome are found white like metals, but others diſperſed in a fat earth, of a round figure in greater or leſſer pieces : which ſulphureous ſalt mines whileſt the water runs through, and humectates, that ſpirit of ſalt is ſtirred up, having got a *vehiculum*, and fals upon the mines by diſſolving them, in which ſolution the water waxeth warme, as if it had been powred on quick lime, or like ſpirit of vitriol, or ſalt mixed with water, and powred on iron, and other metals; where continually and daily that water running through the mines whoſe nature and properties it imitates, carryes ſomething with it : wherefore there are ſo many, and ſuch various kinds of Baths as are the mines by which the water is heated. Let him that will not believe take any mineral of the aforeſaid quality, and wrap it up in a wet linen cloth for a little while, and he will ſee it experimentally that the minerall ſtone will be heated by the water, and ſo heated, as if it were in the fire, ſo as thou canſt ſcarce hold it in thy hand, which at length alſo by a longer action will cleave in ſunder and be conſumed like quick lime.

I will publiſh ſome time or other (God willing) more fully, and cleerly in a peculiar treatiſe this my opinion, which I have now delivered in very few words. Although to the ſick it be all one, and it matters not them, from what cauſe the baths come, and whence they borrow their vertues, if ſo be they may uſe them; this controverſie being left to natural Philoſophers that will controvert it, which none of them can better decide then a skilful Chymiſt, that hath the knowledge of minerals, metals, and ſalts.

And firſt of ſulphureous Bathes that have a ſubtil acidity.

IN the ſecond Treatiſe I have demonſtrated the manner of diſtilling ſubtile, volatile, ſulphureous ſpirits, *viz.* of common ſalt, vitriol, allome, nitre, ſulphur, antimony, and other ſalts of minerals, and metals, and their vertues, and intrinſecal properties, now alſo I will ſhew their extrinſecal uſe, as they are to be mixed with waters for Baths. The vertues there-

therefore of Baths coming not from inſipid water, but from thoſe moſt ſubtile, volatile, ſulphureous, and ſalt ſpirits, but theſe being of themſelves not mixed with water unfit for Baths, to be uſed for recovering of health, by reaſon of their too great heat, and ſubtilty; the moſt high God hath revealed to us unworthy and ungrateful men his fatherly providence ſhewing to us by nature the uſe of them, and the manner of uſing of them for the taking away of diſeaſes; which (nature) being never idle, works unceſſantly, and like a handmaid executes the will of God, by ſhewing to us the various kinds of diſtillations, tranſmutatious, and generations. From which teacher we muſt learn all arts and ſciences, ſeeking a certain, and infallible information, as it were out of a book writ with a divine hand, and filled with innumerable wonders, and ſecrets. And this is a far certainer knowledge then that empty, and imaginary Philoſophy of thoſe vulgar diſputing Philoſophers. Doſt thou think that that true Philoſophy can be ſold for a hundred Royals? How can any one judge of things hid in the earth, who is wilfully blind in things expoſed to the light of the Sun, hating knowledge? I wiſh knowledge were ſutable to the name: how can any one that is ignorant of the nature of fire, know how to work by fire? fire diſcovers many things, in which you may as in a glaſs ſee things that are hid; The fire ſhewes to us how every thing, waters, ſalts, minerals, and metals, together with other innumerable things are generated in the bowels of the earth by the reflexion of that central, and aſtral fire: for without the knowledge of fire all nature remaines vailed, and occult. Fire (always had in great eſteem by Philoſophers) is the key for the unlocking of the greateſt ſecrets, and to ſpeak in a word, he that is ignorant of fire is ignorant of nature with her fruits, and he hath nothing, but what he hath read, or heard, which oftentimes is falſe, according to that; *He eaſily ſpeakes untruthes that ſpeaks what he hath heard.*

He that is ignorant knows not how to diſcern betwixt the truth and falſhood, but takes the one for the other. I pray thee, thou that art ſo credulous, doſt thou think that thy

teacher writ his books from experience, or from reading other Authors? May they not be corrupted and sophisticated by antiquity, and frequent description? Also dost thou understand the true, and genuine sense of them? It is better to know, then to think; for many are seduced by opinions, and many are deceived by faith that is without knowledge.

There are many indeed ambitious of sciences, that are too covetous, and idle, loathing the blackness of coals, and the rust of the tongs, who had rather handle the viol and bandore, then coals, *&c.* And these are deservedly compared to that young man of whom in the 19. *Cha.* of *Mat.* it is said, he had a desire to learn the truth, but was unwilling to follow Christ in poverty, and misery. From proud Peacockes, and pratling Parrots, nothing but tedious clamours: whereas on the contrary, the auditors are refeshed with the voyces of birds. Therefore that perverse condition of man is to be bewailed, affecting rather the vanities of a proud world, then vertues and praise-worthy arts, then which nothing is more honest, and nothing more profitable after the word of God, revealing to us the will of God concerning charity towards our neighbor. And thus much for youths sake I was willing to say, that they would not spend their tender yeers in vanities, but rather would make tryal in the fire, without which no man obtaines a true knowledge of natural things; which although it seem hard in the beginning, yet it is pleasant in old age.

Now follows the mixture of those subtile mineral, sulphureous, and salt spirits with water.

AS concerning the weight of the aforesaid spirits that are to be mixed with sweet water, giving it the nature, and property of natural bathes, I would have thee know, that of those, which in the second part I shewed to be various, and divers, being, *viz.* not equal in vertue, the same weight cannot alwayes be so accurately observed: seeing also there is a con-

consideration to be had of their strength, and of the strength of the patient.

Now you may at the beginning mix one or two pound of the spirits to a sufficient quantity of the water, and then by sitting in it make tryal of the strength of the artificial bath, which if it be too weak, is to be increased by adding a greater quantity of the spirits, but if it be stronger, then it is to be diminished by abstraction; of which more at large in *Arte nostra Balneatoria.* Now this observe, that it is best to make Baths in the beginning weak, then stronger by little and little by degrees, as the nature of the sick is accustomed to them, that it be not overcome by the unaccustomed use of them being too strong. Wherefore Baths are to be used with discretion, and cautiously, for which matter I refer the reader to my *Artem Balneatoriam*, in which he shall find plaine, and perfect instruction; Let it suffice therefore that I have shewed the use of that Copper Globe, in heating Baths, which let the sick take in good part, until more come. Now follows the use.

Of Sulphur Bathes.

APply the furnace with the Copper globe to the tub after the manner aforesaid, and powre in a sufficient quantity of sweet water, which make hot with the fire kindled in the furnace by the help of the globe: which being sufficiently warmed make the patient sit in it, and powre into it so much of the sulphureous spirit as is sufficient; which being done cause that the tub be covered all over, that the volatile spirit vanish not, and as necessity requires, continue the heat till the patient come forth. Know also that the water is to be changed every time, and fresh spirits to be mixed. And this is the use of the Copper globe, in heating bathes of sweet or medicinal water, and that either of vegetable, or mineral; and this made sulphureous is by art or nature; whereby most grievous, and otherwise incurable diseases are happily cured: Of which enough now in this Treatise.

The use of the Copper Globe in dry Baths, which are more excellent then the moist in many cases.

I Might have put off this matter unto its proper Treatise, where all things shall be handled more largely, and cleerly: yet by reason of some unthought of impediments for a while procrastinating the edition of the promised Treatise, I am resolved to say something of their use, after I have made mention of the humid, and indeed not only of the use of those subtile, sulphureous, and dry spirits, but also of the use of subtile, vegetable and animal spirits which are medicinal, because in some diseases dry baths are more commodiously used, then moist. He therefore that will provoke sweat by a dry bath without water, let him provide a wooden box, or wooden instrument convenient to sit in, standing upon a stoole boared through that you may raise it up more or less according as you please, and having boards appoynted for the armes and feet to rest upon. This box also besides the great dore must have also a little dore serving for the puting in of a burning lamp with spirit of wine, or of any earthen vessel with coals for to heat it. The box being well warmed, let the patient go in, and sit upon a stool, let the box be very close shut all about, and the furnace with the Copper Globe be fitted thereunto, under which let there be a small fire kindled, by help whereof the volatile spirit growing warm, goeth forth into the box like a most subtile vapour, penetrating all about the patient. But when this spirit is not sufficient to heat the box, set in it a burning lamp with spirit of wine, or some earthen pot with coales (the best whereof which are made of Juniper or the vine, especially of the roots as being such that will endure long, and cannot easily be extinguished by the vapours of those spirits) that the patient take not cold, and the vapours of the spirits may the better penetrate the body of the patient. Let the wick for the spirit of wine in the burning lamp be incombustible made of the subtle threads of gold, of which thing more in *Arte Balneatoria*. In the mean time that

that volatile spirit penetrates, and heates the whole body, and performes its office, being this way used better then by being mixed with water. When the patient hath sate there long enough let him come forth, and go into a warme bed to sweat. Now before he go into the box let him take a dose of that volatile spirit, which is used outwardly to provoke sweat, and accelerate the action. And by this means not only those volatile sulphureous spirits of salts, minerals and metals, are used outwardly without water to procure sweat, but also the spirits of many vegetables, as of mustard seed, garden cresses, crude Tartar, also of animals, as hartshorn, urine, salt Armoniack, &c. for the expelling of most grievous, and desperate diseases. Now the aforesaid spirits have divers properties, the volatile spirits of salt, minerals, and metals have some, those of vegetables and animals have others; those have a sulphureous and fiery essence; these a mercurial, and aerial; wherefore they serve for different uses. In some diseases those sulphureous are preferred; but in others vegetable and animal, where also a consideration is to be had of the sickness, and bath it self, that one be not used for the other, to the great dammage of the sick. For almost all natural baths, and volatile spirits of salts, minerals and metals partake of some most subtile penetrating, heating, and drying sulphureous salt spirit; but the spirits of vegetables, and animals partake of a certain volatility that is most subtile, penetrating, heating, opening, cutting and attenuating, both urinous, and nitrous, *viz.* contrary to the former; as appeares by the pouring on of any volatile sulphureous spirit, as of common salt, vitriol, allome, minerals, and metals, upon the rectified spirit of urin, or salt Armoniack: where presently the one mortifies the other, and takes away its volatility, and subtilty: so that of both subtile spirits of divers natures there cometh a certaine salt of no odour and efficacy. Whence it is manifest that all spirits partaking of divers natures, and essences have not the same faculties. Therefore be thou cautious in giving most potent spirits, lest thou give an enemy in stead of a friend, and learn their natures, vertues, and essences, before thou usest them in

in medicine. But thou doſt aske, whether is that great force of thoſe ſpirits gone as it were in a moment? did it evaporate in that duel? No I ſay, but tranſmuted into a corporeal ſubſtance, for of a moſt pure, mineral, ſubtile, and moſt volatile ſulphur, and a moſt penetrating animal, *Mercury* is made a certain corporeal ſalt, which is wonderful, and deſerves to be called *Aquila Philoſophorum*, becauſe it is eaſily ſublimed with a gentle heat, in which many things lye: for it doth not only conduce to the ſolution of metals, eſpecially of gold, but alſo of it ſelf by the power of maturation doth become a moſt efficacious medicine: Of which no more at this time, becauſe I will only adviſe the reader, that he be diligent in ſearching out the ſpirits of nature, which although they change their bodies, yet are not therefore to be called dead, but rather reduced to a better perfection. And let this ſuffice concerning the dry uſe of baths in provoking ſweat for the expelling of diſeaſes: now for what diſeaſes this or that ſpirit ſerves, thou ſhall reader, find in its proper Treatiſe, of which there hath been mention above but in a word, know that thoſe volatile ſulphureous ſpirits of ſalts, minerals, and metals are good in all obſtructions of the inward parts, *viz.* of the ſpleen, lungs, and liver, but eſpecially are moſt excellent in heating the cold nerves, becauſe they do moſt efficaciouſly heat, attenuate, cut, expel, and mundifie, wherefore they are good in Contractures, Palſies, Epilepſie, Scorbute, Hypochondriacal Melancholy, Morbus Gallicus, Itch, and other corroſive ulcers, and Fiſtulaes, *&c.*

But the ſpirit of another kinde, as of Tartar, Hartſhorn, ſalt Armoniack, Urine, *&c.* are hot alſo, but not ſo dry, and beſides the heating vertue, have alſo a penetrating, cutting, mollifying, attenuating, abſterging, and expelling power; wherefore alſo they work wonderfully in all obſtructions of the inward and outward parts: for they do better then all others, open the pores of the skin, and provoke ſweat, mollifie, and open the hemorrhoides; proyoke the *menſes* of young and elder women, purge and heat the womb, and therefore cauſe fruitfulneſs; they heat and purge a cold and moiſt

moiſt braine, acuate the intellect, and memory, let they that be great with child take heed of them, and alſo they that have a porous open skin. Such and other more properties, and that deſervedly are aſcribed to theſe ſpirits. Now thoſe two aforeſaid baths (in one whereof thoſe ſpirits are uſed in a humid way, being mixed with warm water, for the whole body to be bathed and ſweat in, but in the other in a dry way where the vapours are by force of the fire made under the Globe, forced up into the ſweating box towards the patient, which being uſed after this manner do oftentimes penetrate, and operate more efficaciouſly then that humid way) are not to be ſlighted for the recovery of health, as doing things incredible. Now thoſe ſpirits not being found in ſhops, nor being to be made by any according to the manner that I have ſhewed in the ſecond part, I would have thee know that there is yet another matter, which needs not to be diſtilled, and it is mineral; which being put into the Copper inſtrument doth of its own accord without fire yield ſuch a ſulphureous ſpirit, which penetrates very much and goeth into the ſweating box, like in all things to that which is made out of ſalts, minerals, and metals. Nature alſo hath provided us another matter that is to be found every where, which being in like manner put into the inſtrument doth by it ſelf, and of its one accord without fire yeild a ſpirit, in vertue not unlike to that which is made out of crude Tartar, or ſalt Armoniack, Soot, Urine, *&c.* Of which in the ſecond part, doing, *viz.* the ſame things with that which is made with coſts and labour. Thoſe foreſaid 2. matters therefore can do the ſame things, which are required for a bath and ſweating, which thoſe two foreſaid kinds of ſpirits, *viz.* mineral and ſulphureous, vegetable and animal can do, *&c.* Now what thoſe two matters which are eaſily every where to be found are, thou deſireſt to know; but I dare not if I would, for the ſake of the pious, to reveal them for the ſake of the ungrateful, and unworthy. For it is an offence to caſt pearle before ſwine, which yet the pious may, by the bleſſing of God, finde out by the reading of the reſt of my writings.

Now follows a wooden veſſel which is to be uſed in ſtead of a Caldron in boyling of Beer, Metheglin, Vinegar,&c.

MAny things might be ſaid concerning this matter, for although men may be found in any part of the world who know how to make malt of corne, and of this beer and vinegar; yet many things may be ſaid of this matter for the correcting of it; but becauſe it is not my purpoſe to ſhew ſuch things now, yet I ſhall ſay ſomething of the uſe of that copper globe which any one may provide in ſtead of Caldrons, and which is to be uſed with a certain wooden veſſel in the boyling of beer, which by this way he may, as hath been ſpoken above concerning the operations, make as well as by the help of Caldrons. Moreover I could here alſo teach ſome other moſt profitable ſecrets, *viz.* how honey may be freed from its ungrateful odour, and taſt by the help of precipitation; and how afterwards a moſt ſweet ſpirit is to be drawn out of it very like in all things to the ſpirit of wine: alſo how the beſt and ſweeteſt wine cleer, and durable like to Mallago, may be made thence: alſo how after purging it is to be cryſtalliſed, ſo as to reſemble Sugar-candy in goodneſs and taſt: alſo how the ſweetneſs thereof may be converted into Tartar, very like to the natural: Alſo how out of fruits of trees, as cherries, apples, pears, *&c.* a very good, and durable wine in goodneſs, colour, taſt and vertue, like to the natural, may be made; alſo how out of unripe grapes, that are not maturated either by the inclemency of the country, or aire, their acidity being changed into ſweetneſs very good wines like to the Rheniſh may be made: alſo how out of ſorrel, and other vegetables a very good Tartar may be made, and that in a great quantity without much coſts, reſembling the Rheniſh in colour, taſt and other vertues: Alſo how out of Corne, (whether malted, or ground in a mill) a very good ſpirit is to be made, and alſo a very good vinegar like to the Rheniſh; alſo how of corne, ground in a mill, or meale, a very good ſpirit is to be diſtilled without any loſs of the meale,

meale, continuing yet fit to make bread. Such and more of this ſort may be taught in this place, but becauſe it is not good to divulge all things together, and at once, and this book would by this means grow bigger then I am willing it ſhould, if ſuch things ſhould be here taught, I ſhall make an end of this book (omitting other excellent poſſible ſecrets of nature) which although it be but little, yet will without doubt be profitable to many. And ſo Reader farewell.

FINIS.

THE FOVRTH PART OF THE PHILOSOPHICAL FURNACES:

IN WHICH

Is deſcribed the Nature of the

FOURTH

FVRNACE;

By the help whereof Minerals, and Metals are tryed, and examined after a more compendious way, then hitherto after that common manner;

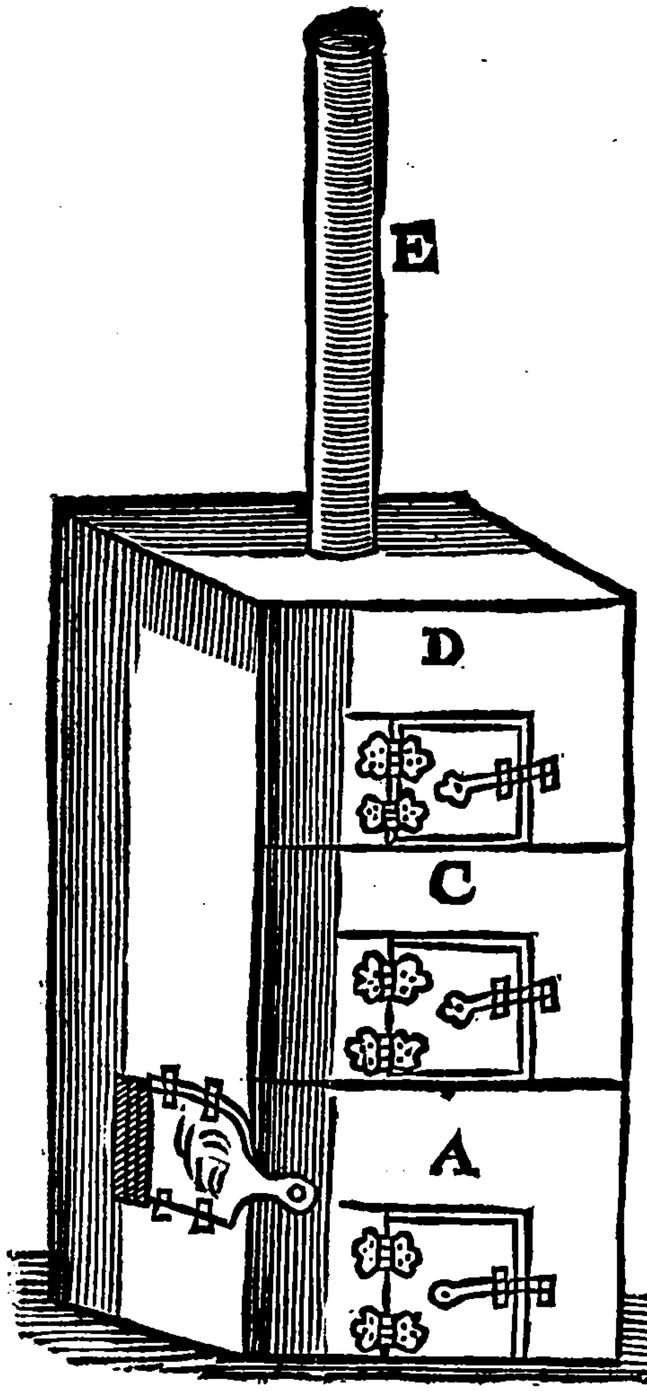
ALSO

The ſeparation of Metals by the force of Fuſion, and other neceſſary things that are done by the power of fuſion or melting.

Moſt profitable for Chymiſts, Tryers, and Diggers of *MINERALS.*

By JOHN RUDOLPH Glauber.

LONDON,
Printed by *Richard Cotes*, for *Tho: Williams* at the ſigne of the Bible in *Little-Britain.* 1652.



A. The place of aſhes with its dore.

B. The Regiſter appointed for governance of the furnace.

C. The hole with its dore aſſign'd to receive the crucibles & coals

D. The hole with the dore of the firſt Story.

E. The long pipe of Iron in the top of the furuace.

THE FOVRTH PART OF PHILOSOPHICAL FURNACES.

Of making the Furnace.

THis Furnace may be made greater, or ſmaller, as you pleaſe, according to the matter to be tryed: and if the *Diameter* thereof within, be but of one foot, you may in it ſet a crucible containing two or three pound: but greater crucibles require a greater furnace. Now this furnace muſt be quadrangular, and be built of ſtones, and lute, ſuch which abide the fire, of the height of one or two feet from the bottom to the grate, which muſt be ſuch as may be cleared from the droſs mixed with coals, or ſuch as was the grate of the firſt furnace, conſiſting of two ſtrong croſs iron bars faſtned in the furnace with certain diſtances for the receiving of 5, 6, or 7 other leſſer, iron bars which are to be moveable, ſo that when they are obſtructed they may be re-

moved; and cleared from the droſs; the lower part of the furnace muſt have near the bottom a hole (in the forepart) of the height, and breadth of a little ſpan, with an iron or copper doore, ſhutting cloſe: the lower part alſo muſt have another hole near the grate on the other ſide with its regiſter for the government of the fire, and for the attracting of wind. Above the grate, and a hand breadth from the grate muſt be another hole for the putting in of coals, and crucibles, ſutable to the proportion of the furnace, and the height thereof muſt be of one foot, and the latitude of half a foot, if the inward Diameter of the furnace be of one foot, whereby the crucibles may be the more conveniently handled, and the coals be caſt in with a fire-pan; Let this hole alſo have a very ſtrong doer of ſtone covered over with lute, either of which may endure the fire, and ſhut very cloſe, that the fire may thereby (when the crucible is placed in the fire) attract air, but onely from the collateral hole under the grate. Let the height of the furnace (being coated above) from the hole appointed for the putting in of coals and crucibles, be of one great ſpan: Let there alſo be a round hole in the furnace, having the third part of the intrinſecall diameter of the furnace, appointed for the flame, and ſmoak; to which if you will uſe a very violent fire, put to it a ſtrong iron pipe of the height of 5, 6, 8, or 12 feet; for by how much the higher you ſet your pipe, the ſtronger fire may you give, and if you will you may erect above the furnace 1, 2, or 3 partitions with their doores ſerving to divers uſes according to the flame that is gathered into them, by reaſon of divers degrees of fire, which is in them, for the loweſt is ſo hot, that it can eaſily contain in the flux-fuſible metals, minerals, and ſalts; and ſerve for cementation, calcinations, and reverberations; alſo for burning of crucibles, and other earthen veſſels, made of the beſt earth (of which in the fifth part) and for vitrifications, and ſometimes for trials and burnings, &c. The ſecond diviſion of heat which is more remiſs, ſerves for the burnings of minerals and metals, as of lead, tin, iron and copper, that are neceſſary for calcinations; alſo for the neceſſary calcination of Tartar, and the fixed ſalt

ſalt of other vegetables, that is required in chymical operation, as alſo the calcining of bones, & horns for cuples, and the aſhes of wood. The third diviſion or chamber is yet more remiſs, and ſerves for the drying of crucibles, and other veſſels that are made of the beſt earth, and are afterwards to be burnt in the firſt partition. There may alſo other things be done by the help of theſe partitions, ſo that thou needeſt not for their ſakes kindle a peculiar fire. But if thou wilt give a melting fire the ſtrongeſt of all, put a long pipe to the lower hole appointed for drawing wind, and having a regiſter; for by how much the fire attracts the air more remotely and another flame is forced to beat upon the metals, ſo much the greater power of the heat is there in the fuſion of them. For which buſineſs ſake thou haſt need to have as that inferiour pipe, ſo alſo that ſuperiour pipe in the top of the furnace. And if thou haſt a fit chamber, in which another may goe up from below by the proper chimney, thou mayſt build another furnace in the ſuperiour chimney, and perforate the wall with the applying of a regiſter, that the fire may be forced to attract the air from below through the collateral chimney, where you need not that long pipe but onely may open a doore, or window of the lower chamber, that the aire may come into the chimney; and the fire attract the wind out of the collateral chimney, which it doth very vehemently, yea and ſtronger, then if it were helped with bellows, ſo that even the furnace, unleſs it were built of very good and fixed earth, would by too great a heat be deſtroyed; For oftentimes the ſtrongeſt crucibles melt with too much heat, wherefore a regiſter is made for the governing of the fire.

And by the help of this furnace, with Gods bleſſing, I found out my choiceſt ſecrets. For before, and indeed from my youth I under went the trouble of thoſe vulgar labours performed by bellows, and common vents, not without loſs of my health, by reaſon of the unavoidable malignant and poyſonous fumes, which danger this furnace was without, not onely of poyſonous and malignant fumes, but alſo of all exceſſive heat: For our furnace ſends forth no fume (but above,

o drawing, that the dore being opened for the putting in of coals, it attracts by the vehemency of the fire, another fume, that is remote by the diſtance of halfe an ell. And becauſe the fire doth ſo vehemently attract, it keeps its heat within it ſelf, ſo that there is no fear of burning; yet you muſt cover your hand that holds the tongs with a linnen glove twice double, and wet in water, and with the other hand a wooden fence that is perſpectible to preſerve your eyes: otherwiſe it wants all danger of vapours, or fumes, as hath been ſaid, and all exceſſive heat: that which is a great benefit in Art. I doe ingenuouſly confeſs, if I had not found this a few years ſince, I had not without loſs left off all Alchymy together with its tedious labours. For I had ſpent many years of my life in great miſery of my labours, in ſuperfluous cares, and watchings, as alſo in ſtinks, ſo that going into my Elaboratory with loathing, I ſhould behold ſo many materials in ſo many, and ſuch various pots, boxes, and other veſſels, and alſo as many broken as whole inſtruments of earth, glaſs, iron, and copper, and did judge my ſelf ſo unhappy that I had made my ſelf a ſlave of this Art, and eſpecially becauſe ſcarſe one of 100, whereof I was one, did get his victuals and cloths thereby. For theſe reaſons I was determined to bid farewel to Chymiſtry, and to apply my ſelfe to Phyſick, and Chirurgery, in which I was alwayes happy. But what? Whileſt I thought to do as I reſolved, and to caſt forth of the doores all and each veſſel of divers kinds, I found ſome crucibles broken, and in them many grains of gold and ſilver, formerly melted in them, which together with others gathered together, I thought to melt; but ſeeing I could not melt ſuch things being very hard to be melted, without the helpe of bellows (which I had ſold) I began to conſider the matter with my ſelf more ſeriouſly, and ſo I found out this furnace, and being invented, I preſently built and proved it, which in tryings I found ſo good, that I did again take hope of my labours, and would no more deſpair.

Seeing therefore an eaſie, and compendious way of melting metals, I began to work, and to begin a new ſearch, and every

every day I found more and more in nature, *viz.* the greateſt and moſt pleaſant ſecrets of nature; wherefore I did without ceaſing ſeek, until God had opened mine eyes to ſee that which I ſought a long time for in vain. Where alſo I obſerved, that although I had before had more knowledge of nature, yet without this furnace I could ſcarſe have done any thing that had been ſingular. And ſo God willing, by the help of this furnace, I found out more and more dayly, for which bleſſing I give to the immortal God immortal thankes, reſolving to communicate this new invention candidly, and faithfully for the ſake of my neighbour. Judge therefore O Chymiſt! whether this, or that which is made by the help of bellows and common vents, be the beſt? For how long doth he that will melt a hard metal in a wind furnace give fire to it before it will flow, and with what loſs of time, and coals? He that doth melt by the help of bellows hath need of a companion to blow, with great danger of breaking the crucible with the winde, and of making it fall when the coals are abated, or of impurities falling into the crucible in caſe the cover thereof ſhould fall off, although there can be no detriment by impurities falling in, if the matter be metallick, but not ſo if it be a ſalt or a mineral, (without which that cannot be perfected in the fire) not indaring the impurities of the coals, but boyling over by reaſon of them. Now our furnace is free from this danger, becauſe the wind comes from beneath and crucibles come alwayes into ſight, not being ſo overwhelmed with coals as in the common way, &c. For by this means the matter to be melted is flowed, although the crucibles be not covered over with coals, nor with a cover, and although thou haſt not a companion to blow, for you may at pleaſure give any degree of fire by the direction of the regiſter. When therefore thou makeſt any trial in the fire have this furnace, which is recommended to thee, which build rightly with its regiſter for the governing of the fire, and for the drawing of wind, and without doubt this labour ſhall not be in vain.

How minerals are to be tryed.

THe manner of trying minerals hath been already made known, wherefore it is not needful here to write many things, becauſe divers authours, as *Georgius Agricola*, *Lazarus Ercker*, and others have ſufficiently wrote thereof, to whoſe writings I refer thee, eſpecially to that moſt famous *Lazarus Ercker* which is ſo much commended, *De Probatione Mineralium*, as well malignant (obſtinate) as mild. But thus much know being that which experience hath alſo taught us, that neither he nor his predeceſſours had a perfect knowledge of all things, nor would reveal all things they knew. For many excellent things doe yet lye hid, and perhaps ſhall yet for a while lye hid by reaſon of the ingratitude of the world; although the moſt famous Philoſophers doe with one conſent affirm that imperfect metals, as lead, tin, iron, copper, and Mercury, are intrinſecally gold, and ſilver, although it may ſeem very improbable to many that are not curious, but contented with the opinions of their parents; ſuppoſing thoſe minerals to be barren that leave nothing in the cuple, when they are tryed with lead: when as yet that proof by cuples although famous, is not yet that true Philoſophical trials of metals, but only vulgar, according to the teſtimony of Philoſophers, as of *Iſaac Hollandus*, and others, eſpecially of *Paracelſus* in many places treating of metals, but eſpecially in his book *Vexationum Alchymiſtarum*, containing a true deſcription of the properties, and perfection of metals. Which although not being to be underſtood by all, matters not; for a very eaſie art is not to be communicated to all, according to *Paracelſus* ſaying. Imperfect metals being freed from their impurities have in them aboundance of gold, and ſilver. But how metals are to be purged, and ſeparated he doth not teach, but only commends *lead* to be the authour; which made the Alchymiſt beleive that it was common lead, not knowing that the water thereof (lead) did not only purge other metals, but alſo lead it ſelf; ſuppoſing alſo that the trial of tin, copper, and iron,

iron made in a cuple with lead to be that true genüine bath thereof; not obſerving that lead hath no affinity with iron, and tin in a ſtronger fire, but to reject what is black, and unclean: without any perfection. Now this lead can doe, if *viz.* it be mixed with a mineral that hath gold or ſilver in it, and be melted in the fire being incorporated with it, it may together with their impurities enter into the Cuple, the good gold and ſilver being left in the Cuple, which is the proofe of minerals that are digged, and uſed; and it is done upon this account, *viz.* gold and ſilver may be naturally purged of their ſuperfluous ſulphur, ſo as never to be any more radically united, and mixed with thoſe that be imperfect, as being polluted with aboundance of crude, impure ſulphur, although they may, be melted together in the fire; yet that mixture being retained in the fire, the combuſtible ſulphur of common metals, acts upon its own proper argent vive, and turnes it into droſs, which being ſeparated from the metals enters into the porous matter of the cuples, that which doth not happen in teſts, fixed in the fire, which that droſs being ſeparated from the metals cannot enter into, being made of an earth that is durable in the fire, the droſs remaining in them, which otherwiſe was wont to enter into thoſe cuples that are made of the aſhes of bones, or wood. Wherefore by little and little it goes away into the cuple, *viz.* as much as the fire reduced into a Litharge, or droſs, until all the Lead mixed with the Gold, and Silver together with other imperfect metals mixed with it goe into droſs, and hide themſelves in the cuple, the pure gold and ſilver being left in the cuple. For Lead in a plain veſſel, feeling the heat from above, but beneath cold, is turned into a Litharge, which if it be in an earthen fixed veſſel, the Litharge remaines, and goes into a yellow tranſparent glaſs at laſt, if it be not mixed with other metals, as iron, copper, tin; which being mixed therewith give to the glaſs a green, red, black or white colour, according to the quantity of the metallick matter: but in a porous cuple made of aſhes, the Litharge, or droſs finding pores enters into the cuple by little and little, and ſucceſſively, until all the Lead be entred in,

in, which it could not be if it were turned into Litharge. This vulgar trying is therefore nothing elſe but a tranſmutation of Lead, with the imperfect metals mixed with it, into droſs, which entring into the cuple leaves in the cuple pure gold, and ſilver, that cannot be turned into droſs by reaſon of their purity.

But perhaps this diſcourſe may ſeem to thee unprofitable, and ſuperfluous, becauſe this triial of metals is known all the world over: but for anſwer, I ſay that is not ſuperfluous, becauſe many refiners erre, ſuppoſing that corporeal Lead together with the imperfect metals that are mixed with it, goes into the cuple, not being yet turned into Litharge, becauſe corporeal Lead is again melted from thence; for whoſe ſake this diſcourſe is not properly ordained as being thoſe that operate out of uſe, and cuſtome onely without diſcretion; but rather for their ſakes, who doe inceſſantly ſeeke after, and ſearch into the ſecrets of nature, *viz.* ſeeking after that philoſophical tryal, which is known to few, by the help whereof more gold and ſilver is obtained then by that common way, but it is not to be diſcovered in this place; for all muſt not have the knowledge thereof; It is ſufficient that I have demonſtrated the poſſibility thereof. Yet know this, if thou knoweſt how to prepare Lead, Tin, Copper, and Iron, and to fit them to the radical union, *viz.* that aforeſaid water of Saturne, ſo as they may endure the force of the fire together, thou mayſt ſeparate and attract gold, and ſilver from the aforeſaid imperfect metals, and with gain leaving them in the cuple, or elſe you ſhal draw little or nothing from thence. And if you do intend to try them with Lead after the vulgar way, and bring them into droſs, yet you doe nothing becauſe tin, and iron abounding with gold and ſilver, do not remain with the lead in a ſtrong fire, but are lifted up like a skin or droſs, by reaſon of their ſuperfluous ſulphur, ſwimming like fat upon water, without any ſeparation, unleſs it be tin or iron, which got gold or ſilver from the mine in their firſt fuſion.

And by this means it fals out ſometimes, that ſome may mak

make a good proof but out of ignorance, not knowing a reaſon of their operation, wherefore they cannot do the ſame again. For if Chymiſts, and Refiners did conſider the matter more profoundly, enquiring the cauſe, wherefore lead being tryed, deprived of its ſilver, and melted in a cuple, ſhould yet contain in it ſelf ſilver, without doubt they would hit upon a good foundation; without which knowledge all their labour in imperfect metals would be in vain. And let this ſuffice concerning that Philoſophical tryal, which is known to few; There is no need of ſpeaking any thing of that vulgar, being everywhere known, of which *Lazarus Ercker* wrote plainly and fully.

There is alſo another proof of minerals, which is without Lead, with Venice, or any other good fuſible glaſs, where one or two ounces of the powdered mineral are mixed with half an ounce of the powdered glaſs, and being mixed and covered in a crucible, are melted, and powred out; by which means the glaſs attracts, and diſſolves that mineral, and is thereby coloured, which ſhews what metall is contained in the mine, after which may be made another tryal by Lead afterwards, tryal being firſt made to know the firſt proof. And this is the fitteſt proof for the hardeſt minerals, which are even invincible, as are the ſtone *hemalitis*, *ſmiris*, granats, talck black and red, and thoſe which abound oftentimes with gold, and ſilver, which becauſe they cannot be mixed with Lead are not eſteemed, but are oftentimes caſt away, although they abound with gold and ſilver, and this becauſe they cannot be tryed, Which being tryed after the aforeſaid, and conſequently the treaſures lying therein being diſcovered, thou maiſt afterward with more confidence handle them, and reduce them to better profit. Now thoſe colours which follow, indicate the tenure of them. Glaſs reſembling the greenneſs of the Sea ſignifies meer Copper, but the greenneſſe of graſs, ſignifies copper, and iron mixed together: glaſs of a rufty colour ſignifies iron: yellowiſh glaſs ſignifies tin: glaſs of a yellow golden colour, or like a red rubie ſignifies ſilver: Blew glaſs like a ſaphir ſignifies pure gold; a ſmarag-

dine signifies gold mixed with silver: An Amethyst colour signifies gold, silver, copper, and iron mixed together. Besides these, glass sometimes gets other colours, according to the diversity of the weight of divers metals mixed together; which use will teach with a further practise that is to be made with Saturn.

There is also another precursory tryal of minerals, and metals, which is made with Salt Petre; where especially tin, iron, and copper doe largely draw forth their treasures hid in them, which they will not yeeld being tryed by Lead, that which is not a sign of their poverty, but rather of not a true tryal made by Lead, which is not the true, and genuine judge, and trier of metals. For otherwise (if it were) it would draw forth their treasure as well out of a greater quantity of metallick matter, as out of a lesser. Now followes the tryal by Nitre: Make a mixture of one part of sulphur, of two parts of pure Tartar, and four parts of purified Nitre, then take an ounce of this mixture, and one dram of the mineral or metal ground small, mix those together, and being put into a crucible, put a red hot iron or burning coal to them, and that mixture will be enflamed, and yeeld a most vehement fire, reducing that mineral or metal into dross: And what is not brought into dross must again be mixed with the aforesaid mixture, and be burnt as before, until the whole be consumed by the fire. Then make that dross or salt containing in it the metal that is destroyed, to flow so long in a strong crucible, until it be made glass; which being powred out there are found graines of gold or silver, which came from the mineral or metal that was tryed. And this operation (if it be well done) will be a pleasant sight, but without profit, because it cannot be done in a great quantity, and by reason of the price of the Nitre. Where I set this way of tryal only for demonstration sake that it might appear how almost all tin, iron, and copper, contain in them gold and silver, although they doe not draw it forth in the Cuple.

Now doe not suppose that this is transmutation, which is onely separation; wherefore thou must consider with thy-

self

self how that may be performed otherwise. But take heed that thou do not kindle this mixture from beneath, being put upon the coals, but from above by reason of the danger of flashing: Also metals are easily fusible by the following mixture. Take one part of the saw dust of the wood of the teil tree being well dryed, two parts of sulphur, eight or nine parts of pure Nitre. Make *stratum super stratum* in a crucible, and take to 11, or 12 parts of this mixture, one part of the metall subtilly ground, and kindle them, and the mine being melted will yeeld grains of pure Gold, and Silver, if the mine were not too impure, the impurity thereof being consumed by that most vehement fire. And if this tryal be not for thy profit, yet it is rational, and may be for thine instruction.

Of the melting of mixes and metals.

THe melting of these in a greater quantity is not for this place, because they cannot be done by this furnace, but it is treated of plainly enough by others in their writings of minerals.

Of the separation of metals.

THis is a most ancient and profitable Art, whereby one metal may be separated from another: And it is for the most part done 4 wayes, *viz.* by *Aqua Fortis*, by cement, by flux with sulphur, and lead, and lastly by Antimony, which wayes that most witty *Lazarus Ercker*, hath clearly, and distinctly described, whose description is not to be found fault with, although some necessary things may be added thereunto, which being but few I thought it superfluous to adde them in this place.

And that separation consists in three chief metals, Gold, Silver, and Copper: he made no mention of other metals, and two of the aforesaid four wayes are in use, as very easie, for they are done with *Aqua fortis* and Cement, the two

others moſt commonly neglected, which are done by benefit of melting with Sulphur and Lead; and alſo by Antimony: that which is admirable, becauſe metals are eaſier ſeparated by benefit of theſe two wayes then by *Aqua fortis* and Cements, ſuſpected of waſt, whereas not Sulphur and Antimony, but the ignorant worker, not knowing the nature of Sulphur and Antimony, is rather to be blamed, becauſe he knows not how to order them, and withall leaves the nearer way of ſeparation: and I muſt needs confeſs it that without this furnace I would not ſeparate with them, becauſe with that common way of furnaces and bellows, that ſtink of Sulphur and Antimony hurtful to the Liver, Lungs, Brain, and Heart, is received by the Noſethrils to the hazard of health: for which cauſe I do not wonder that thoſe two wayes requiring greater diligence than thoſe two former by *Aqua fortis* and Cements are rejected. But this Furnace being known with which without danger one may melt, I doubt not of excelling the two former wayes hereafter as more profitable than them. For he who knowes Antimony may not onely eaſily with ſmall coſt ſeparate Gold from the addition without any loſs of it, and ſpeedily refine it, but alſo eaſier ſeparate gilt ſilver, than by Sulphur, Lead, &c. in great ſtore without any loſs of Gold or Silver.

And this is the eaſieſt way of the ſeparation of Gold and Silver which is done by the benefit of melting, requiring no more charge then the coals; for there is Antimony which hath Gold in it as much as it is worth, which will be the Separatours gaine: I would have you know this how Antimony may again be ſeparated from Gold and Silver, not by the common way which is done by bellows, but by the ſpeciall way of ſeparation wherewith Antimony is preſerved, ſo that it may be uſed again for the ſame purpoſe; which I will treat of in another place. Beſides the four wayes ſpoken of, there is alſo another way, beſt of all, by the nitrous ſpirit of ſalt, namely after this manner: ℞ the ſpirit of ſalt (prepared by our firſt and ſecond Furnace) exaſperated with Nitre diſſolved in it, to which adde grain Gold mixed with Silver and

and Copper; put it in a glaſs vial in hot ſand to diſſolve, and the Gold together with the Copper will be diſſolved in it, and the Silver left in the bottom of the vial: decant off the ſolution, to which adde ſomething, precipitating Gold, and make them boil together and the pure fine Gold will be ſeparated and precipitated like the fineſt meal, ſerving writers and Painters; the Copper being left in the water; which thou mayſt if thou wilt precipitate from the water, but it is better to take away the water, which will ſerve again for the ſame uſe. If the precipitated Gold be waſhed and dryed it gives in the melting (by which nothing is loſt) the beſt and pureſt Gold. For finer gold can neither be made by *Aqua fortis* nor by Antimony.

Therefore this is the beſt way of all, not onely for the ſmall coſt, but alſo for the eaſineſs yeelding the beſt Gold of all others.

Then take calcin'd Silver left in the gourd, ſweeten and dry it, which done make a little ſalt of Tartar to melt in a crucible, to which by courſe put a little refined ſilver with a ſpoon, and it will be preſently made a body without any loſs. You may alſo boil that Calx as yet moiſt newly taken out of the gourd with the Ley of Salt of Tartar, even to the evaporation of all moiſture: and melt the dry remnant, wherealſo nothing is loſt. Without this medium of Silver the calcination (drawn from *Aqua Regia*) is not fuſible of it ſelfe, turning into brittle matter, like horn that is white or of a middle colour between white and yellow, called therefore of Chymiſts the *Horn of the Moon*; in reducing which many have tried much, which reduction we have already taught. For want of ſpirit of ſalt take *Aqua Regia* made of *Aqua Fortis* and ſalt Armoniack, which doth the ſame, but with greater charges. This alſo is to be preferred before other wayes, which makes to the ſeparation of any Gold of any degree, if ſo be it exceed Silver in weight; which is neceſſarily required in the ſolution made with *Aqua Fortis*.

But that you may ſee the prerogative of this ſeparation, marke a little when thou ſeparateſt by *Quarta & Aqua fortis*,

you must put just two or three parts of refined Silver to one of course Gold, where first the cost and labour of refining the Silver to be melted and grained with Gold are required: then a good quantity of *Aqua fortis* to dissolve, precipitate, edulcorate, dry and melt a great deal of silver. Consider then I pray my labours and charges of my separation and the vulgar. When thou separatest with Cemen:s there is need of boxes, and continuall fire of one degree, which labour is tedious for times sake, and costly for coals, which labor you must twice or thrice take in regard of the mixt dross. Now again consider the labour and charges of both separations. When thou separatest by Sulphur and Antimony which is the best way, without great charges, if thou knowest to separate Gold from Antimony without blowing, but this is tedious for thrice greater labours then our way, tedious indeed for hard and perfect separation of Gold and Silver from Antimoniall drosse. Think therefore what way of separation you will use to refine Gold speedily, surely you will chuse mine.

This Prerogative also hath this way of separation, that it hath no need of refined silver which is done by the benefit of burning, but only it's granulation, solution or separation by the use of *Aqua Fortis*, where though copper mixt with silver makes wast, yet by the help of this salt it is soon precipitated. By this means gilt silver is soon separated, the gold being dissolved by a nitrous spirit, and precipitated with the aforesaid matter precipitating, it's for the separation of gilt silver done by help of fusion, none is easier done then what is with Sulphur and Antimony, where when the necessary manual (ingredients) are known; a great deal is separated in short time, but knowing not to use Antimony and Sulphur (for which our Furnace very well befits) leave them and use the common way; therefore lay not thy fault afterward on me writing for thy good.

Of

Of separating courser metals.

THe manner of separating Tin from Lead and Copper from Iron, whithout loss of both metals, by preserving both; which seemes impossible to me for the combustibility of both metals; and superfluous for the small profit and saving charges. How Gold and Silver may be separated from Tin with which commonly this abounds, without any wast, hath been long sought to no purpose: but a possibility will appeare to a serious considerer; and though I never tryed in great quantity, content with precipitation made with a little; I am yet perswaded this busines will succeed in a great quantity and with much profit; namely by the help of a Furnace made on purpose where gold and silver precipitated with lead and *Halb Kopf* by extream heat of fire; that tin is extracted to the quantity of the tenth part, which remainder you must peculiarly take and keep. Which done you must precipitate new tin in the foresaid Furnace, and so extract to the remainder of the *Regulus* which extract again: the first receiv'd is to be added and reserved; which labor is to be reiterated, till thou hast a sufficient quantity of *Regulus* filling the Furnace; which again thou must precipitate; for by this means gold and silver are brought together, so that they may easily afterward be separated from the superfluous tin. By this means I count the separation profitable, where but little substance is lost, which is turned into ashes and smoke. Nor doth adding lead and *Halb Kopf* hinder, because sometime lead is mixt with tin, and *Halb Kopf* separated againe. It is good therefore to separate pots and old dishes, for the mixture of lead, and to precipitate gold and silver from them, by the adjection of *Halb Kopf* only, where the residue is no way altered from *Halb Kopf*, therefore thou mayst self it or refine it again: which I suppose will be to thy great advantage.

What

What is to be held concerning the perfection of Metals.

THis knot is ſcarſe ſoluble, for ſo many and divers opinions of ſo many ages, ſo that moſt men ſleighting the teſtimonies of true Philoſophers, will not beleive the truth, eſpecially becauſe ſcarſe one of an hundred can be found who is not impoveriſh't with this art: the incredulous therefore is not to be blamed for his doubting, no ſigns of truth appearing, yet experience teſtifies a poſſibility by art and nature, though examples are rare. I pray with how great abſurdity ſhould one deny heaven and hell never ſeen? But thou ſayeſt we muſt beleeve this as revealed by God his Prophets and Apoſtles; but ſo is not this, but the Philoſophick traditions of heathens. I anſwer, though moſt Philoſophers were heathen (yet ſome have been Chriſtians) yet their works are not to be deſpiſed, becauſe not handling our ſalvation: to whom if Chriſt had preached, ſurely they had beleived him. For it appears by their Books that they were pious and honeſt men, who though not profeſſours of Chriſt, yet they did his will indeed, which we though not in words, in action deny; who if they had been wicked, why took they ſuch paines in making bookes for the good and profit of their neighbour about vertue and piety? Why ſpent they not rather their life[time in leiſure and pleaſure, as is the cuſtome now adayes with them who are appointed to inſtruct us? Why ſhould they gul poſterity with trifles and lyes, expecting from thence no profit? for moſt of them were not poore, but very rich Kings and Princes. Beſides theſe there have been many Chriſtians ſeriouſly confirming the truth of the Art, men indeed of ſpeciall note, namely Biſhops, Doctors, &c. Such were *Thomas Aquinas*, *Albertus Magnus*, *Lullius*, *Arnoldus*, *Roger Bacon*, *Baſill*, *&c.* Why ſhould very pious men deceive poſterity with their workes, and reduce them into errors? Though there remain not the works of famous Worthies, yet there would be a plain confirming the truth of this Art. For I am perſwaded there are ſome to be found having this knowledge and privately poſ-

ſeſſing

ſeſſing it. For who is ſo madd to reveal himſelf to the world, to receive nought but envy for his reward? Let no man therefore doubt of this ſecret Art's truth. But ſay you: Why ſtand you ſo much for the Art? Did you ever ſee or perform any thing in it? I reply, though I never made projections to perfect metals, nor ſaw tranſmutations; yet I am ſure of this, I have often from metals with metals, leaving no gold and ſilver in the cupel, extracted gold and ſilver by the help of fire: But I will not have you think that one imperfect metal will perfect another, or turn it into gold or ſilver, impure and droſſie without, in compariſon of gold and ſilver; for how can ſuch metals perfect another imperfect? which thus underſtand. For as in the vegetable kingdom water cleanſeth water, or juice with ſcething as is wont to be done in purifying honey and ſugar, or any other vegetable juice, with common water and white egges: ſo alſo you muſt underſtand of mineral juices or metal, of which if we know the water and white, ſurely we might refine the impurity, in which gold and ſilver lye hid, as in black ſhales, and powerfully extract gold and ſilver, which is not a tranſmutation of metals, but an eduction of gold and ſilver from the dunghil; Doſt thou ask how gold and ſilver can be educed from copper, iron, tin, and lead, to wit, by the help of lotion, out of which none is drawn with that beſt probe, (as 'tis thought) of Cupels? to which we anſwered before of the probe of cupels not to be ſufficient for all ſeverall metals, I need therefore ſay no more, but I refer the ſtudious Reader to *Paracelſus* his booke the *Vexation of Chymiſts*, where thou ſhalt finde another lotion and purification of metals which heretofore was unknown to Miners and dealers in minerals. As for example: A Miner finding the oar of copper, uſeth his skill delivered by the ancients to his utmoſt endeavour, whereby he may cleanſe it and reduce it to metal: where firſt he breaks it into pieces, and boils it, for to take away the ſuperfluous ſulphur, then by vertue of melting he brings it into a ſtone (ſo called) which afterward again he commits to fire, and freeth it by the addition of lead, of its gold and ſilver; which done he blacks and reddens it,

turning it into copper, which is his laſt labour, whereby the copper is made malleable and vendible: which done the Chymiſt coming tries another ſeparation, by whoſe help gold and ſilver is extracted, as yet tryed of very few, of which mention is here made. *Paracelſus* alſo ſaith in the ſame place, that gold hath given ſome an eaſier way of ſeparating gold and ſilver from courſer metals, and indeed without refining the oar, which is a ſpecial and curious Art, which he teacheth not in plain tearms, but onely ſaith it is ſufficiently taught in ſeven rules of that book, where he treats of the nature and propriety of metals; in which you may ſeek it. And this purification of courſer metals I count moſt eaſie, which I have often tryed in ſmall quantity: and I doubt not but God hath ſhewn other Artizens alſo other purifications, which imperfect metals are perfected; for example, if one would purge the fruit of the earth by diſtillation, ſo that the dregs and impurities being taken away, it would grow up with a new clear clarified body: as if one diſtil black and impure Amber by a retort, the ſeparation would be made by fire, of the water ſavouring of the *Empyreum* of the oyl and volatile ſalt, and the *Caput mortuum* be left in the bottome of the retort; by which meanes, in a very ſhort time without great labour, is made a great alteration and emendation of Amber, though the oyl be black, impure, and ſtinking: but if it be again diſtilled by the retort with ſome mundifying water, as with the ſpirit of ſalt (namely through a freſh clean glaſs retort) ſhall be made a new ſeparation by that ſpirit of ſalt, and a far clearer oyle ſhall be extacted; the dregs with the ſtink left in the bottom of the retort, which afterward may be twice or thrice rectified againe with freſh ſpirit of ſalt, until it get the clearneſs of ſalt, and ſweetneſs of ſent reſembling amber and muſk.

And this tranſmutation makes of a hard thing a ſoft; unlike the former in ſhape, which though never ſo ſoft and liquid, oily, may again be coagulated, ſo that it become as it was at firſt, after this manner following. Take the ſaid oyle very well clarified, adde to it new ſpirit of ſalt, yea

yea ſalt enough for its own recoagulation, and againe it requires the hardneſs of amber, of an excellent clear and admirable colour; of which half an ounce is worth more than ſome pounds of black amber; of which ſcarſe the eight or tenth part remains in purifying, all the foul ſuperfluities caſt away.

By this means I think one may cleanſe and mend black metals, if ſo be the manner of their cleanſing were known by diſtillation, ſublimation and recoagulation. But thou ſay'ſt that metal cannot like vegetables be purified by force of diſtillation, to which I preſent our firſt furnace not given to peaſants, but Chymiſts trying metals; ſo alſo the poſſibility of their perfection is ſhown by help of fermentation. For as freſh leaven may ferment the vegetable juices, which are perfected with fermentation, the dregs being caſt away as one may ſee in wine, ale, and other liquors, whoſe laſting and perfection proceeds from no other thing but fermentation purifying the vegetable juices, without which they could not otherwiſe withſtand the Elements, ſubject to corruption in a very ſhort time, which fermented laſt ſome years: ſo alſo if we knew the proper ferment of metals, ſurely we might refine and perfect them, ſo that they would not be any more ſubject to ruſt, they would prevaile againſt fire and water, and be nouriſhed and fed by them. For ſo the world heretofore periſhed with water, and ſhall at laſt periſh with fire, and our bodies muſt rot and be purified with fire before we come to the ſight of God. And thus far of the fermentation of metals, wherewith they are refiſted and perfected. Metals alſo are pur'd and mended like milk ſet on the fire; whoſe cream the better part (the ſubſtance of butter) in the top is ſeparated from whey and cheeſe, and according to the heat of the place the ſeparation is ſpeeded: even ſo it is with the ſeparation of metals; where metals put into a fitted hot place by themſelves without any addition of another thing (for metals were before reduced to a milky ſubſtance or curd) are ſeparated in time, by parting the nobler parts from the ignobler, opening a great treaſure: and as in winter time milk

is hardly ſeparated with a weak heat; juſt ſo metals if not not helped with fire, as one may ſee in iron, which in long time under the earth is turned into gold without Art. For often iron oar is found with golden veins very goodly to behold, ſevered from the courſe, earthy and crude ſulphur, by force of the centers heat. And commonly in ſuch oar no vitriol is found, ſeparated and bettered by its contrary. But a long time is required for that ſubterraneous ſeparation, which Art very ſpeedily performes; as is wont to be done with milk in winter when wee preſently make butter of it, when we put it to fire to part the cream ſpeedily; which ſeparation, precipitation made with acid things, mortifying the urinous ſalt of milk much helps; by which means all principles are ſeparated by themſelves, as butter, cheeſe, whey: ſo in a quarter of an houre ſeparation is made by boiling, which elſe without acid things could not be done in ſome wecks. If then it be poſſible in vegetables and not animals, why not in minerals? For what but gold and ſilver is found in lead, iron, tin and copper, though they doe appear? Why is all goodneſs denyed to courſer metals, granted to vegetables and animals not equal to them for laſting? Whence is the naturall perfection of lead, tin, iron, and copper to be proved? Nature ever ſeeks the perfection of her fruits; but courſe metals are imperfect; Why then is not nature helped with Art in perfecting them? But the bond of metallick parts is worth obſervation, which being broken, the parts are ſeparated. Urinous ſalt (as I may ſay) is the bond of the parts making milk, as of butter, whey, and cheeſe, which is to be mortified by its contrary acid for ſeparation. But in iron the parts are bound with vitriol ſalt, as with a bond, which is to be mortified with its contrary, urinous or nitrous ſalt for ſeparation. He therefore who knoweth to take away the ſuperfluous ſalt of iron, either by moiſt or dry means, doubtleſs ſhall have iron not ſoon ſubject to ruſt.

Fire alſo hath incredible force of it ſelf in changing metals. Is not ſteel made iron by force of fire, and iron of

of ſteel by different proceeding? Experience dayly teacheth us alſo divers kinds of changes and refinings by fire; why is it not poſſible in metals by an expert Chymiſt having skill in them? Who would beleeve that a live bird lurkes in an egg, and an hearb having leaves, flowers, and ſent, in the ſeed? Why may not then abortive metals, getting not yet perfection, be perfected by Art, with help of fire? Is not an unripe apple or pear ripened by the heat of the Sun? which ſome curious and induſtrious marking have imitated nature in their works; and have found ſome metals not deſtroyed with the heat of fire, but enriched with a ſecret gainfull heat, ſo that melted (digeſtion being made) they have yeelded double weight of gold and ſilver. Yea I my ſelf have ſeene the common oar of lead digeſted after the aforeſaid manner, which was not only inriched with ſilver thereby, but alſo partaked of gold which it wanted before in ordinary trial. Beſides one might work this in great quantity, as with an hundred pounds; which work of minerals will without doubt bring great profit to the skilful triers of lead. But know this not every one by this tryal of lead to be furniſhed with gold, but the oar to be ever enriched with ſilver, experience being witneſs.

More ſuch things are found in Nature incredible to the ignorant, & thoſe that are unacquainted. But if we mortals were more diligent in reading the book written with the hand of God in the pages of the four Elements, ſurely we ſhould find more ſecrets and wonders in them, but skill and wealth is got with ſweat of face and not by ſloth; therefore *labour* and *pray*. Metals are alſo by help of gradation equal to germination.

For it is well known, that the ſhoot or graffe of ſome fruitful garden-tree implanted in a wood, makes after that tree to bear not wild fruits, but very good and ſweet like them of the implanted ſhoot, as one may ſee in iron diſſolved in an acid ſpirit, fermented with Venus and turned into Copper: by which means doubtleſs copper is turned into Silver, and ſilver into gold, if by manner of fermentation, the true way were known.

Now this tranſmutation is like digeſtion, making beef or horſe fleſh of graſs in the ſtomach of oxe and horſe; and mans fleſh of beef in the ſtomach of man.

The better parts alſo are ſeparated from worſer by the attractive ſtrength of the like, as is to be ſeen in metal abounding with ſulphur, to which if iron be added in fuſion, the ſulphur deſerts its native metal (by which meanes it is more pured) and joins its ſelf to iron, with which it hath more affinity and familiarity, then with its own. For example, if iron be added to lead oar ful of ſulphur in the melting, this melted metal is made malleable, which elſe would be black and brittle. And if ſomething elſe to be put to the melted malleable metal were known to us, to take away in the melting the redundant, crude combuſtible ſulphur, queſtionleſs it would yet be made purer, which thing unknowne, metals remain in their impurity. And indeed God hath done well in this as in all other his works, that he hath concealed his knowltdge to us: for if it were known to the covetous, they would buy up all lead, tin, copper and iron, to turne into gold, ſo that rurall and poor Labourers could hardly buy metallick inſtruments for their uſe, for the ſcarcity; but God will not have all metals turned into Gold.

By a given ſimilitude of taking away the ſuperfluous ſulphur of ſome metals in fuſion, for to keep the purer parts; ſo likewiſe is given, of ſeparating the purer parts from the impure, namely by the attractive power of the like, where the purer parts are drawn together by their like, the impurer and heterogeneous part is rejected: and that may be ſhown us well by a moiſt or dry way: an example of the moiſt way enſueth.

If quick Mercury be added to impure gold or ſilver diſſolved in its proper *menſtruum*, the mercury drawes with it inviſible gold and ſilver from the *Menſtruum* and mine with the refuſe, and aſſociates what is pureſt to it ſelf. which ſeparation ſoon ſucceeds. Mercury performes the ſame likewiſe a dry way: namely when ſome earth having ſome gold and ſilver is moiſtened with acid water, and they are ſo long bruiſed to-

together, till Mercury drawes the better part; which done you muſt waſh the dead earth left, with common water, and ſeparate Mercury dryed from the attracted gold and ſilver, by trajecting them through a skin. And Mercury drawes but one metal from the earth, and indeed the beſt for one time; which ſeparated, it draws the ſecond another metal; for example, if in ſome one earth, gold, ſilver, copper and iron lye hid, the firſt time mercury draws gold, the ſecond ſilver, but copper and iron hardly for the droſs, but tin and lead eaſily, but eaſieſt of all gold for its purity like to Mercury.

Another Demonſtration by a dry way.

PUt under a tile the cuple with lead, to which adde a grain of very pure gold, moſt exactly weighed (for memories take) make the gold in the cuple to fulminate, and lead will enter the cuple, the gold left pale in the cuple: of which pale color there is no other cauſe then the mixture of ſilver, drawn from the lead by gold. But thou ſayeſt, that thou knoweſt this, that gold fulminated with lead, to be made paler and weightier, for ſilver in the lead, left with gold in the trial, augmenting the weight, and thence making it pale: to which I reply, though lead leave ſome ſilver in trying in the cuple, mixt with gold added to it, the weight of gold augmenting, and changing the colour; yet it is proved by weight, that lead leaves more mixt with gold in the cuple, then tryed without gold. Hence it is proved, that gold in fire draws its like from other metals, augmenting its waight: and this alſo gold doth in the moiſt way: for if it be diſſolved in its own *menſtruum*, together with copper, & put in digeſtion, it draws gold ſeparated from copper which labor though not done with profit, yet witneſſeth a poſſibility. But if the *menſtruum* of gold augmenting the attracting power of gold: or multiplying the ſame were known, but diminiſhing the retentive power of copper, doubleſſe ſome gain were to be expected; & indeed more, if gold and copper together be melted in fire with the dry mineral *menſtruum*: by which means the weight of gold would be increaſed. according to *Paracelſus* ſaying:

Metals

Metals mixt together in a ſtrong fire, continued a pretty while, the imperfection to vaniſh, and leave perfection in its place.

Which ſurely well done is a work not wanting gain. For I freely confeſs, that I would ſometime incorporate ſilver with iron, when as gold from iron gave me a good increaſe of pure gold, inſtead of fixt ſilver ſought after. And by this means often ſome not thought on thing happens to Artiſts, as to my ſelfe with fixt ſilver, uot rightly conſidering the buſineſs. Therefore medling with metals be ſure when you finde ſome increaſe, to weigh well what it was at firſt. For many think, long trying ſilver with iron, by the Bloud-ſtone, Loadſtone, Emraud, *lapis calaminaris*, red talc, granats, antimony, arſenic, ſulphur, flints, &c. having mature and crude, volatil fixt gold in them, finding in the trying good gold; that this gold is made of ſilver by help and uſe of the foreſaid minerals; it is falſe. For ſilver drew that gold out of thoſe minerals, in which before it lurked volatile. Yet I deny not the poſſibility of changing ſilver, as being inwardly very like gold, but not by help of cementation with the ſaid minerals, becauſe that gold proceeds not from ſilver but thoſe minerals, attracted by ſilver. This labour is compared to ſeed caſt into good ground, where dying by its owne power it draws the like to it ſelfe, when it is multiplyed an hundred fold.

And it behoveth in this work now and then to wet the metallick earth, with their proper metallick waters, dryed with heat (which operation is called of the Philoſophers inſeration) elſe the earth will be barren, and it behoveth that this water be neer in kind to earth, ſo that when they are united they yeeld a certain fatneſs. For as it appears from ſandy, dry earth moiſtened with rain water, not bringing forth fruit agreeable to its ſeed, for the ſmall heat alſo of the Sun conſuming the moiſture, and burning the ſeed in the earth, which mixt with cows dung or other, keeps the water ſo as that it cannot be ſoon conſumed. By the ſame reaſon it is neceſſary that thy earth and water be mixt, leſt thy ſeed be burnt up. Which work if well handled, it wil not be in vain, requiring the

exceeding diligence of nouriſhing the earth with warmth and moiſture when the earth is drown'd with too much moiſture, and with too little it cannot increaſe, and this is one of the beſt labours, with which I draw forth good gold and ſilver of baſer metals, requiring the beſt veſſels, retaining ſeed together with their earth, and water in its proper heat. I doubt not but this work alſo in a greater quantity, may be performed, firmly beleiving that the courſer metals eſpecially lead, the fitteſt of all not only to be perfected into gold and ſilver, but alſo into good medicine: which without queſtion is the Philoſophers labour granted from God, as a great comfort to the Chymiſt, but warily to be uſed. For that all and ſingular Gods gifts he will not have common; as indeed I have found to be an inventer of a very excellent work, that I ſhewing it to a friend, neither could I afterwards teach it to him, nor doe it again for my ſelf. Therefore and indeed juſtly men are doubtfull in writing matters: for many ſeek not at pleaſure to detract the inventions of others performed with great coſts and labour. Therefore it is ſafer to be ſilent and to give leave to ſeek, then to publiſh, ſecrets, that they may undergoe the paines and charges to be born in inventing high matters; nor any more hereafter may the ingrateful ſo impudently gape after others Labours. Therefore I would entreat all men both of high and low degree that they would not moleſt and tire me hereafter with their petitions and Epiſtles, and that they would not turn my good will of benefiting others to the ruine of my ſelfe, contented with my writings publiſhed with the profit of my neighbour. Nor doe you think that I poſſeſs and promiſe golden mountaines. For what I have written I have writ to diſcover nature, in theſe diſcourſes of the perfection of courſe metals in ſmall quantity, For I never made triall in a great quantity, trying truth and poſſibility in a leſſer only, in ſmall crucibles: therefore thoſe things which I have writ are written to that end that the poſſibility of the Art may appear, of perfect metals to be wrought out of imperfect, therefore hee who hath occaſion may make triall in a greater quantity: but a

for my part wanting opportunity, I expect Gods blessing, whereby upon occasion I may make tryall in a greater quantity, and so receive the fruit of my labour and great charges.

Also metallick bodies are transmuted by another means, namely by that benefit of a tinging metallick spirit, as one may see in *aurum fulminans*, sometimes kindled upon a smooth clean metallick plate, fixing a very deep gold tincture upon the plate, so that it may bear the touch-stone. The same also happens in a moist way, where plated metals put on a gradatory spirit made of nitre and certain minerals, pierc't by the spirit obtain another kinde agreeing to the spirit. But if one doubt of the metallick gradation, made with *aurum fulminans*, he shall try the certainty from the often fireing of fresh *aurum fulminans*, upon the same plate, for he shall see that it is not the colour of the metal, and outwardly gilded but deeply tinged. Likewise one may try the certainty by a humid spirit, if transformed metals are tryed, whence the mutual action and passion of subtilized spirits plainly appeares, for the power of spirits is very great, and incredible to one not exercised: and this gradation of inferiour metals Philosophers both ancient and modern, doe not onely confirm, but also diggers of minerals taught by experience, that mineral vapours by penetration change courser and to purer metals. *Lazarus Ercker* being witness, that Iron is changed into a good natural copper in green salt waters, and that he saw a pit, in which iron nailes and other things cast in, by the penetration of a cupreous spirit were turned into a good copper. I do not deny that metallick dissolutions of some metals do stick precipitated to the plates and to make them of a golden, silver, or cupreous colour; for it is wel known, that iron cast into a vitriol water not to be turned into copper, but to draw copper out of the water, of which thing we treat not here, confirming the possibility of metallick transmutations by a tinging and piercing spirit; therefore I againe maintain that great power is in metallick spirits; look only upon course and o-[illegible]ke earth, and besides that clear and limpid water with which the

the clearer and more powerfull air proceeding from the water cometh from the earth. Are not whole countries drowned with water sometimes, Towns and Cities taken away? cannot the aire destroy the strongest houses; especially shut up in the earth shake the land for some miles; and after ward demolish whole cities and mountaines with the death of men? all which things are done naturally. Wind artificially raised by Nitre threatens a far greater danger, which no man can deny. Although that corporeal Elements exercise so great power, yet they cannot pierce metals without hurt, nor stones and glass, and things soon penetrated by fire. Therefore not by an occult but a manifest power of Sun and fire, which it hath over metals, stones and glass, which are easily pierc't by them without any impediment: and why should not metals compact of a certain metallick subtile and piercing spirit be penetrated by help of fire, and changed into another species? As is already spoken of *Aurum fulminans* and *aqua gradatoria*. Therefore there is no doubt of the possibility of the metallick tingent spirit changing courser metals into finer both by a dry and moist way; For metals may be purified the same way that Tartar and Vitriol and other salts, namely by the benefit of much water. For it is manifest that vitriol is purged with iron and copper mixt with it, namely dissolved and coagulated in much water, so that it waxe as white as allum; which purification is but a separation of metal from salt, made by benefit of much water debilitating salt, so that it cannot longer return mixt metal, which is precipitated like some slime, not unprofitable, because the chiefest part of vitriol, from which is the greennesse, *viz*, Copper, Iron, and Sulphur. And as by help of separation metals are drawn from vitriol, more perfect then salts; so also to be taken from metals with the perfecter and better part is separated by help of precipitation: as for Tartar it is purified by the addition of water, but its better part is not precipitated as in vitriol, but the courser part by reason of blackness and fæculency. As for example: Tartar by the often solution of the vulgar (made with a sufficient quantity of water) and coagu-

lation made very pure and white, becauſe in every ſolution made with freſh clear water, it alwayes becomes purer, and not only by this means white Tartar, but alſo red and feculent, is reduced into tranſparent cryſtals, and indeed very ſpeedily by vertue of a certain precipitation; whoſe limoſity, for obiecuration ſake of the ſalt of cryſtalline Tartar, is nothing elſe but an unſavory thing, dead and uſeleſs, mixt with Tartar in its coagulation in Hogs-heads of wine, and ſeparated again by power of ſolution.

And theſe are the examples of the two ſalts of Vitriol and Tartar, not in vain ſet down, becauſe they ſhew the difference in precipitation: for in ſome metals by force of precipitation the courſer part is ſeparated; but in other the better and choicer according to the prevalency of this or that part.

In vitriol, the better part (copper and iron) is the leaſt, which is precipitated and ſeparated from the courſer and greater part, *viz.* ſalt. But in Tartar the courſer and leſs part is precipitated and ſeparated from the greater and better pare clarified: the like is in metals. Therefore let every one be wary in ſeparating, and conſider before, whether the better or courſer part of metal is to be precipitated, without which knowledge no man can meddle with this buſineſs, let alſo the workman be ware who expects any profit from his labour of corroſive waters, as *Aqua fortis*, *Aqua Regia*, ſpirit of ſalt, vitriol, allome, vineger, &c. in the ſolution from which no good proceeds, as utterly deſtroying and corrupting all and each of them; proving the ſame in theſe words, *From Metals, by Metals and with Metals metals are made perfect*, metals are alſo purified, matured and ſeparated from their vitioſities by Nitre burning up the ſuperfluous ſulphur.

And all the aforeſaid perfections of metals are but particular. For every particular medicine, as well humane, as metallick, purgeth, ſeparateth and perfecteth or amendeth by the taking away the ſuperfluity. For univerſal medicine worketh its perfections and emendations, by ſtrengthening and multiplying the radicall moiſture as well of animals as metals, expelling

pelling then by its own natural vertue his enemy. But thou ſayſt excellent examples indeed are delivered by me, but not the manner of doing them. *R.* I have delivered more then you think, although you don't perceive it: for I am ſure after my death that my books will be in greater eſteem, from which it will appear that I have not ſought vain glory, but the profit of my neighbour to the utmoſt of my power. But doe not ſeeing my freeneſs of writing think that you may wreſt many things from me. For aſſure your ſelf that although I have written many things for the publick good, yet I intend not by this means to trouble my ſelf. For I cannot ſatisfie the deſires of all men, nor anſwer their Epiſtles, nor inrich all men, who neither am rich my ſelf nor have ſought riches. For although I have gotten the knowledge of theſe things by Gods bleſſing, and have tryed the truth of it in ſmall quantity, yet have I never made experience in great ſtore for wealth ſake, contented with Gods bleſſing. Therefore I would advice all illuminated by God, that they fall not into this ſinne of ingratitude; but that they be mindful of the poore, as in thankfulneſs to God, as hoping to eſcape eternal damnation. Nor let the envy of the malitious move thee famous for knowledge by divine favour, for the covetous and ambitious wiſh well to none but to themſelves; who ought to conſider, that as they brought nothing with them, ſo alſo they ſhall carry away nothing. Be thou onely a good husband in the gift from God intruſted to thee, and do thou juſtice undauntedly.

And let this ſuffice of the ſeveral purifications of metals according to my experience, as for that univerſal medicine ſo famous, I cannot judge of it being a thing unknown to me; but the poſſibility thereof I am forc't to affirm, moved with the ſeveral tranſmutations of metals; which unknown it behoves us to be contented with that favour which God hath beſtowed on us. For oftentimes queſtionleſs it is better to know little, for Eternal Salvations ſake; for moſt commonly wealth and learning puffe up. And pride brings to the Devil the author of it, from whence God of his mercy preſerve us.

Of the Philosophers Stone.

THe Universal Medicine is beleived from many ages, by many very famous men, Jews, Ethnicks, and Christians, to bring men and metals to the highest degree of perfection, and the possibility thereof by Art; nor is only beleived, but also proved by many sure reasons, for which thing numberlesse writings of divers tongues are true and false: there is no need to adde any thing of my self; altogether ignorant of this thing: although I have some times heard, how many times in divers places pure fine gold is made of courser metals, especially of lead, prepared by some medicine artificially: yet I have left this kinde of discourse in its worth, never yet resolved to undertake such a business, scared with the example of other men as well of high as low degree, learned and unlearned loosing their labour and charges in this Art; but I am rather perswaded that such a wondeful universal medicine cannot be found in the world. And though I have often seen wonders in my labours giving occasion, yet I never durst try wanting the opportunities of time and place; until at length a belief of the possibility comes into my hands, seeking something else of no great moment. For I have undergone much charge and labour for many years to extract the tincture of salt of gold, for a medicine made therewith, which at length I have obtained, where I have observed the remainder of the gold, the soul or better part being extracted to be no more gold, nor longer to endure fire. Whence I conjectured, that such like extraction being fixt again, can perfect courser metals and turn them to gold: But I could not hitherto try the truth of my conceived opinion living at this time in a forraign place; therefore againſt my will, although greedy of novelty, I have been forc't to abstain from the work. In the mean time considering the opinions of Philosophers concerning their gold, not the vulgar, asserting the universall medicine to be prepared therewith. I have again affused some Philosophical Vineger to the Copper for

for to extract the tincture, where almost all Copper like whitish earth is separated from the tincture in digestion, which earth by no Art I could againe reduce into a metallick body.

Which experiment again confirmed me of the possibility of this Medicine. Which labour though I never followed, yet I doubt not but it is humane medicine, thought not also metallick, attainable thence by a diligent workman. The soul therefore with all the metallick attributes, consisting in so small a quantity, which is scarse the hundredth part of the weight, which extracted and separated the remaining body is no more metal but a useless and dead earth; not to be doubted but fixt againe may reassume and perfect another metallick body. Therefore I am confident perswaded with the aforesaid reasons, that such a medicine is to be made of mineral and metallick things, *viz.* in the flowing, changing base metals into better. But doe not think that I writing these things make gold or copper the matter of this medicine; which I doe not hold, well knowing that there are other subjects easily to be handled, abounding with tinctures.

Which medicine though rare and hardly can be obtained, yet Art and Nature are not to be blamed therefore, but we rather slothful, covetous, proud and impious: for no wicked man is worthy this Art, or a despiser of God and his Word, and an ambitious hater of his neighbour. Thou'lt say this is a work of Nature and Art, not therefore to be attributed to our life, heretofore given to Ethnicks, not to be compared to us for piety, as not having the true knowledge of God. Therefore my life (though wicked) cannot hinder me: because this Art consists in the knowledge of naturall things. I answer, O pretty fellow! thou art quite mistaken; dost thou think that the Ethnick Philosophers did not know the true God? They had greater knowledge of God then thou; to whom although Christ was not preacht, yet they knew from Nature; and according to the rule of this knowledge they led their lives, obtaining this profit from.

from God, that they put it not to ill uſe but to the profit of their neighbour. But thou then perſwadeſt thy ſelf to excel thy neighbour in learning, whoſe mote thou ſeeſt, knowing not the beam in thine eye, ſpending thy life in covetouſneſs, pride, envy, hatred and other ſinful pleaſures, doſt thou ſo think thy ſelf hid from the ſight of God that he cannot hinder thy endeavours? Truly ſo great a gift is not given of God to covetous and proud falſe Chriſtians. Therefore every one muſt ſpecially examine himſelfe undertaking this work, whether he come with waſht or polluted hands. For it is very certain and true, that never a wicked man though running ſhall obtain this profit, which is of God alone, not of man.

So thou haſt heard now my opinion of the Univerſall Medicine, which my experience in Gold, Copper, and other Minerals, and metals hath cauſed: which I will not preach for *Goſpel*, becauſe it is humane to erre.

Therefore no certainty is to be had, before its final and compleat perfection, and indeed once or twice tryed for certainties ſake. For it is not lawful to try often an excellent way once found out, which happens doubtleſs as well to others as to me. Therefore we muſt not triumph before the victory for unthought on impediments fruſtrating hope; but God is rather to be implored in our labours, that he would be pleaſed to bleſs our endeavours, that we may uſe well his gifts in this life as good ſtewards and afterward beſtow the free reward of our labours, watchings and cares on us ſinners, namely everlaſting reſt and ſalvation out of his meer mercy.

Whether

Whether minerals, As Antimony, Arſenic, Orpin, Cobolt, Zinck, Sulphur, &c. may be tranſmuted into metals, and into what?

IT is long ſince debated among Chymiſts, whether the aforeſaid minerals proceed from the ſame principles with metals, and whether to be counted metals; in which controverſie they have not agreed to this day, when as one approves this which another denyes, ſo that a ſtudent of Chymiſtry knows not to what ſide he had beſt aſſent.

But this knowledge not a little concerning the purifying of metals I would put my opinion alſo grounded upon experience, for the ſatisfying the doubtful, the ſimplicity of them is ſtrange who hold not one and the ſame beginning to be of minerals and metals, but if metals might be made by nature, ſurely it had long ſince been done; but it never was, experience witneſſing, for permanent minerals are never tranſplanted into metals. I Anſwer, metals grow one way, alſo vegetables another, ſoon budding and again ſoon dying; but it is not ſo with metals, for all laſting things have long time of digeſtion; according to the ſaying, *That which is ſoon made doth ſoon fade*, this is to be underſtood not only of vegetables and minerals, but alſo of animals, as appears from that budding of ſome vegetables, coming in ſix moneths ſpace to their perfection and then again iron periſhing: when as things requiring longer time of digeſtion and perfection are much more laſting. A Muſhroom in the ſpace of one or two nights grows out of rotten wood, again ſoon vaniſhing: not ſo the Oke. Oxen, and horſes in the ſpace of two or three yeer come to perfection, ſcarce living the twentieth or the twenty fourth yeer: but a man requiring twenty four yeers to his perfection, lives ſixty, eighty, or a hundred yeers. So alſo we muſt conceive of laſting metals requiring many ages, and alſo very long times of digeſtions and perfections; metals therefore requiring very long times of digeſtions to their perfection, it is granted to no man ever to ſee the beginning, and end of them, the tranſplantation of minerals into metals by na-

ture cannot be divided; especially because that in the oares of metals, especially of course ones, minerals are also found; wherefore diggers of minerals, when they finde them, conceive good hopes of finding metals, of which they are termed the *Coverlids*, for seldome metals are found without minerals, or minerals without metals; nor also are ever minerals found wanting gold or silver; therefore minerals are properly termed *Embryon metals*, because by art and fire a good part of gold and silver is drawn out of them by fusion; which if they do not proceed from the metallick root, whence proceeds that gold and silver? for an Oxe is not born of an infant, nor man of a Calf; for alwayes like is produced of its like.

Therefore minerals are counted but unripe fruits in respect of metals, not yet obtaining their ripeness and perfection, nor separated from the superfluous earth; for how should a bird be hatcht of an egg by heat, not predestined for the generation of the bird? for so we must understand of minerals, which if they be deprived of their metallick nature, how should by fire metals be produced from thence? But thou saist that thou never sawest the production of perfect metals out of course, therefore that it is neither likely, nor credible to thee to whom many things as yet lie hid from most men, perversly and foolishly denying things unknown: for daily experience witnesseth, that the viler minerals and metals by taking away the superfluous sulphur (however it be done) to obtaine a greater degree of perfection, therefore should not thy heart believe, and thy tongue speak what thou seest with thine eyes? for experience shews that good gold and silver might be drawn out by art almost out of all course minerals and metals, yet more out of some then of others and speedier; for there is not that dark night, that is altogether deprived of light, which may not not be manifested by a hollow glass; nor is there an element (though never so pure) not mixt with other elements, nor any malignity deprived of all good, or on the contrary. And as it is possible to gather the hidden beams of the Sun in the aire, so also hidden perfect metals dispersed

dispersed in imperfect, and minerals by fire, and an expert Artist; if once they are placed in fire with their proper solvents where the homogeneous parts are gathered, and the heterogeneous separated, so that there is no need to go into the Indies to seek gold and silver in those new Islands which is possible to finde plentifully here in Germany, if so be the merciful God would please to turn away those present cruel plagues, and bring them out of old metals, *viz.* Lead, Iron, Tin and Copper, there left by the dealers in minerals; indeed without the husbanding of metals. Let no man therefore judge himself to be poor, because he is only poor and in want (although otherwise very rich and abounding in wealth, which yet in a moment he is forc't to forsake) that being ungrateful, neither knoweth nor acknowledgeth God in his works.

What I pray is in less esteem in the world then old Iron and Lead? which are acceptable to the wise to use in the Lotion of Copper and Tin with the mineral white. But how they are to be washed, is a difficulty to the unexercised in the fire, and shall be delivered by similitudes: You see Antimony fresh digged out of the earth very black and impure; which by fusion separated from its superfluity (which though nature gave to it not in vain, but as a help to its purification, according to that: *God and Nature do nothing in vaine*) is made more pure and endowed with a body nearer to metals then its mineral, which if afterwards cast with salt of Tartar, the crude and combustible sulphur is mortified thereby, and is turned into dross separated from the pure mercurial part, so that hereby is made a new and fresh separation of the parts, of which one portion white and brittle sinks to the bottome, the other lighter, to wit, the combustible sulphur is on the top with salt of Tartar; which powred out into a Cone, when they are cold, may be separated with a hammer; the inferior part of which is called by the Chymists *Regulus*, which is purer then Antimony cast the first time out of its mineral, and this is the usual purging of Antimony used by Chymists, to which (*Regulus*) if afterward any thing should be added, for a third purification, without doubt it would not only be made purer

but more fixt and malleable. For if white *Regulus* be preparable out of black Antimony, why not as well malleable metal out of the *Regulus* ?

Another away of ſeparating the ſuperfluous Antimonial ſulphur.

℞ ANtimony powdred one part, ſalt petre half as much, mingle them, and kindle the mixture with a live coal, and let that Antimonial ſulphur with the nitre be burnt up, the darkiſh maſs being left, to wit, of a brown colour, which melted for the ſpace of an hour in a ſtrong fire yeilds an Antimony like to that which is made with ſalt of Tartar, but ſomewhat leſs in quantity, like to theſe the parts of animals are ſeparated, *viz.* if Antimony, nitre and crude Tartar be mingled in an equal weight, and they being mixt are kindled and melted. There is alſo another ſeparation of Antimonial parts; when of ſmal bits of Iron one part is put into a ſtrong crucible, in a winde furnace, to which being red hot, caſt two parts of ground Antimony, for fuſion, and the ſuperfluous combuſtible ſulphur will forſake the Antimony, and joyn to the iron a metal more amicable to it then ſulphureous; mixt with which forſaketh its own proper pure Mercury and ſulphur or *Regulus*, which is almoſt the half part of the Antimony.

And theſe four wayes, by which the ſuperfluous combuſtible ſulphur of Antimony is ſeparated are moſt common, not ſet down as ſecrets, but for demonſtrations ſake, that it may appeare how ſulphureous minerals are to be perfected and purified, which are little amended, yet ſhewing a better way not only for Antimony; but alſo for Arſenick and Orpin, although theſe two cannot be ſo done with iron, nitre and tartar by reaſon of their volatility, but with oyle or other fat things in cloſe crucibles, giving a *Regulus* like to the Antimonial, And theſe *Reguli* make tin hard, to ſound and be compact, if to one pound one ounce be added in fuſion, for making good houſhold ſtuffe. And in tryal they give good Gold.

And

And as it is ſaid of purging Antimony, ſo alſo it is to be underſtood of the reſt, as *Wiſmuth*, *Zinck*, *lapis calaminaris*, lead, tin, iron and copper to be purged from their ſuperfluous ſulphur, if thou wilt draw more perfect metals, *viz.* gold and ſilver out of them with gaine. And ſo I make an end of metallick lotions, recommending to Chymiſts, *nitre*, *tartar*, *flints*, and *lead*; for who knoweth to uſe them, ſhall not loſe his labor in Chymiſtry; but tis to be lamented, that every where good earth and fixt in the fire is not to be gotten, retaining lead and ſalts; for without our old lead little or nothing can be done in the refining metals; therefore who goes to try any thing in this art, let him ſeek the beſt earth retaining lead twenty four hours ſpace; afterward let him conſult with tin, what Vulcan has to be done with iron; who will tell him what he muſt ſuffer, before he obtain the Crown.

Of the tincture of Sol and Antimony.

SOmetimes another alteration happens to mans body from the attraction of mineral vapors (which cannot be done by my furnace) in the tryal, therefore here I will ſet down a certain medicine for the workmans ſake, as well for preſerving as curing, namely a cleer rubin fixt and ſoluble of gold and Antimony. Take of pure gold half an ounce, diſſolve it in *Aqua Regia*, precipitate the ſolution with liquor of flints, as before ſaid in the ſecond part, edulcorate and dry the calx, and it wil be prepared, take *Regulus Martis* (of which is ſpoken a little before) beaten fine, to which mixe three parts of the pureſt nitre: place the mixture in the crucible between burning coales, putting to fire by degrees: which done make a ſtronger, *viz.* for fuſion, for then the maſs will be made purple; which taken forth and cooled bake very ſmal, of which take three or four parts and mixe with one part of the aforeſaid golden calx; place it mixed in a ſtrong crucible covered over in the aforeſaid winde furnace, and make the maſs to flow together like metal, and it will aſſume that Antimonial nitre in the fuſion, and it will diſſolve gold or the

calx of gold, and a maſs of an Amethyſt colour will be made therewith; which ſo long leaveth the fire, till it get the cleerneſs of a Rubie, which one may try with a clean wier of iron bowed and put therein, although in the mean time the maſs deprived of fuſibility is thickened, it is meet to add ſome nitre or tartar, for ſpeeding fuſion, and that as often as ſhall be needful. Laſtly pour the maſs when it ſhall come to the utmoſt redneſs of a rubie, hot into a clean copper morter, which there leave until it coole, and it will be in colour very like to an Oriential Rubie; then bruiſe it hot into powder, alſo taking aire it would melt, and extract the tincture by the fuſion of the ſpirit of wine in a vial; and the gold together with the Antimony will remaine very white like the fineſt talc, to be waſhed with cleer water, in a glaſs edulcorated and dryed, which melted with a ſtronger fire, gives a green glaſs, in which no gold appears, yet ſeparable by way of precipitation with the filings of iron and copper, from which it recovers its ancient colour, but without profit by reaſon of the waſt, the tinged ſpirit is to be taken away from the tincture, which is a very ſoveraigne medicine in many grievous diſeaſes.

Although thou maiſt ſuſpect this not to be the ſimple tincture of *Sol*, but of nitre and tartar mixt, be ſure that the quantity of nitre added not to exceed; & ſuppoſe that tincture of Tartar and nitre, I pray what waſte is there? ſince that is ſo good a medicine by it ſelf, and I am perſwaded, this tincture of *Sol* to be better then thoſe ſet down in the ſecond part. That Ruby may be ſo uſed by it ſelf with the proper vehicles, ſeeing it is a ſoveraigne medicine of it ſelf; or elſe expoſed to the aire and reſolved to a liquor, for the medicine is not leſs then its tincture becauſe gold in it ſelf and the purer part of Antimony are made potable without corroſives. Wonderful is the power of ſalts in metals to be deſtroyed, perfected and changed by fuſion: for it happened to me one time making this Ruby, placing two other crucibles alſo with metals, by this containing gold with the prepared *Regulus* of Antimony (for eaſily two or three, or more crucibles may be placed in this furnace, to be ruled with one fire which cannot be done in

in a common furnace by that means) about to put in a certain ſalt in the crucible next to the crucible of gold, that by a miſtake I caſt it into the crucible with gold onely, whence ſo great a conflict aroſe, that there was danger of boyling over; therefore forced to remove it out of the furnace preſently with tongs and to effuſe it, ſuppoſing that the Ruby was loſt by my raſh putting in of ſalt, therefore I would only keep the gold. And I found the effuſed maſs red like blood, purer then a ruby but no gold, but white graines like lead diſperſed here and there in the ſalts, ſeparable for the ſmalneſs, not by the ſolution of ſalts which ſeparated by the ſolution of water with red tincture like blood, remained in the bottome of the glaſs, which afterward for fuſions ſake together I placed in a new crucible in that furnace, but willing to try the fuſion I found the crucible empty, and all the gold vaniſhed, a little excepted ſticking on the top to the crucible and the cover, which I took away and melted for experience ſake in a new cloſe crucible, but all of it preſently feeling heat flew away, no ſigne being left in the crucible like Arſenick; And ſo I was deprived of my gold.

At length I took the red ſolution and took the water from the ſalts, and I found the red ſalt like blood, which I pût in a clear crucible in the furnace for to try whether any metallick body might thence be extracted; but I found the effuſed ſalt deprived of all tincture and redneſs: which ſeems ſtrange to me even to this day, that by help of this ſalt the whole ſubſtance of gold, *viz.* the tincture together with the remainder flew away, having ſo great volatility.

Which labor afterward I would reiterate, but it happened not ſo at all as at the firſt time; there was indeed ſome alteration of gold made, but its volatilization was not ſo great, the cauſe of which thing, I think was the ignorance of the weight of the aforeſaid ſalt, caſt in at the firſt time againſt my will.

And two reaſons chiefly moved me to inſert this hiſtory, firſt that it may appear how ſoon one may miſtake in a ſmal thing fruſtrating the whole proceſs. Secondly, that the truth of Philoſo-

Philoſophers may appear writing that gold by art is reducible into a lower degree, equal to lead (which happened to me in this work) and that it is harder to deſtroy gold and make it like to an imperfect metal, then to tranſmute imperfect metal to gold; therefore I am glad in my heart that I ſaw ſuch experiment; of which thing our phantaſtick Philoſophers will hear nothing, writing whole volumes againſt truth, ſtifly affirming, gold to be incorruptible, which is an arrant lye; for I can ſhew the contrary (if need be) many wayes. I wonder indeed what moves ſuch men to ſlight a thing unknown, I do not uſe to judge things unknown to me.

How dare they deny the tranſmutation of metals, knowing not to uſe coales and tongs? truly I confeſs thoſe rude and circumforaneous Mountebanks, not a little to defile and diſgrace true Chymiſtry, every where ſurprizing men by their fraude, needy and oppreſt with penury unleſs peradventure they finde ſome credulous rich man giving them food and raiment for the conceived hope of gain and skil, of which alſo ſome covetous men furniſht with gold, go clad like painted Parrots, whom I judge to be hated worſe then a dogg or a ſnake; but harmleſs Chymiſtry is not therefore to be deſpiſed. Some covetous men beſotted with folly and madneſs, laying out their moneys with an uncertain hope of gain, who afterward the thing ill ſucceeding, are forced to live in poverty, whoſe caſe is not to be pityed laying out of covetouſneſs, ſome ſeek wealth not out of covetouſneſs, but rather that they may have wherewith to live, and may ſearch nature, which are to be excuſed if they are deceived of knaves, yet not to be praiſed if they ſpend above their ability.

Another tincture and medicine of gold.

DIſſolve gold in *Aqua Regia*, precipitate it diſſolved in liquor of the ſalt of flints, powre ſome part of the aforeſaid liquor to the precipitated gold, then place them in ſand to boyle for ſome hours ſpace, and that liquor of flints ſhall extract the tincture of gold, and ſhall be dyed with a purple colour;

colour; to which powre in rain water, and make it to boyle together with that purple liquor, and the flint ſhall be precipitated, the tincture of an excellent colour with ſalt of Tartar left; out of which it is neceſſary to extract water even to drought, and a very fine ſalt of a purple colour will remaine in the bottome of the glaſs, out of which with the ſpirit of wine may be drawn in a tincture as red as blood, little inferior in ſtrength to potable gold; for many things lye hid in this purple ſalt, of which more things might be ſpoken if occaſion permitted; therefore let it ſuffice to ſhew the way of deſtroying gold, for that golden ſalt can in a very ſhort time, *viz.* an houre, be perfected with ſmall labor and tranſmuted into miracle of nature; confuting the ſlanders of the noble art of Alchimy; for which gift we ought to give immortal thanks to immortal God.

Of looking glaſſe.

I Have made mention in the treatiſe of potable gold, not only of the material heat of fire, but alſo of turning the fineſt beams of the Sun into a material bodily ſubſtance, by help of certain inſtruments by which they are gathered. I have alſo mentioned there the preparation of the hollow glaſs; I will here give it being not known to all men, the beſt that I know as followeth. Firſt patternes are to be made of the beſt mold, namely haire and clay, of which thing in the fifth part, conformable to the glaſſes in form and figure circularly round; for elſe they cannot gather the Sun beams together and againe put them forth; the fault of which thing is to be aſcribed only to the pattern, for the fuſion and poliſhing of glaſſes is not an excellent art known even to bel-founders, but to melt them very well ſhap't of the beſt matter and rightly to poliſh them this is art: and firſt to cut the patternes round very well ſhaped by uſe of a ſharp inſtrument cannot briefly be demonſtrated; therefore I wil ſend the Reader to Authors prolixly handling this thing, *viz. Archimedes* & *Johan. Baptiſt. Porta*, and others, though thou wanteſt thoſe Authors, or doſt not

underſtand them, ſee thou have a globe exactly turned for making patternes as followeth; and firſt make a mixture of meale and ſifted aſhes, which ſpread equally between two boards as the manner is to ſpread paſte made of meale and butter for pyes and Tarts, anſwering in thickneſs to the glaſs to be ſhaped, then put on a compaſs and make a meaſure as you pleaſe, which cut with a knife, and put it on a globe, and ſprinkle quick lime on it out of a ſearce or ſive, and put clay well prepared with haire of the thickneſs of two fingers breadth: although it be a great piece you muſt lay acroſs wires ſtrengthning the pattern, leſt it be bent or broken. Afterward one part hardened with the heate of the Sun or fire, take away all that from the round, and put it on ſome hollow, on which it may on all ſides ſtand well, and alſo ſprinkle quick lime on the aſhes of coals on the other ſide, and put upon this the other part of the pattern, and again expoſe it by degrees to be dryed by the heat of Sun or fire, leſt it crack, which done take away the ends making thoſe parts of type or patterne from that inward or middle, which ends ſet one againſt another to the inward parts the diſtance at leaſt of a ſpan, and put between in the top a few live coales to harden the type all over, to which put on other coales, and then more, and ſo by degrees even to the top, that they may be wel kindled in their lighter parts. Although the types are very thick one fire will not ſuffice, and it will be neceſſary to add more coales, untill they be throughly kindled in the inner parts: afterward let the fire be kindled by degrees that the types may grow cold, but not altogether, but ſo that you may touch them: and preſently beſmeare finely the ſifted aſhes mixt with water with a pencil to ſtop up the chincks ariſen for burning the haire and ſmoothing the types, then again make both parts (after thou haſt framed the firſt hole in them for a Tunnel) clean by being wary leſt any foul thing fall upon them, and carefully binde them with iron or copper wier; and very wel lute over the joining with clay prepared with haire; and put on an earthy tunnel, and the type on the top of dry ſand: And thou oughteſt in the mean while thou burneſt and prepareſt

pareſt the type to melt the metallick mixture, that it may be powred on the hot type, the metal well melted put on a ſear-cloth, which burning powre out melted metal into the burning type, being wary leſt coales or ſome other thing fall into the crucible, and be powred with the metal into the type ſpoiling the glaſs; then let the glaſs cool of it ſelf in the type, if the matter be not mouldred in the cooling. And though it do moulder in the cooling, which indeed would be leſſened, it behooves that the caſt glaſs be preſently taken out of the type, and covered over with a hot earthen or iron veſſel that it may coole under it, which otherwiſe cooling ſhut up in the type not able to moulder, is broke in pieces, but ſoone after you ſhall perceive, what be thoſe mouldering metals.

And this is the common way (and the beſt) of melting, if ſo be thou art exerciſed; there are alſo other wayes; firſt when types are made of wood or lead, agreeing to the glaſs to be printed the ſand, in the fineſt powder of tyles or other earth as is the cuſtome of copper ſmiths; and this way only ſerveth for leſſer glaſſes.

The third way beſt of all, but hardeſt to one not exerciſed, is as followes, make a waxen type with a cylinder to be placed between two boards as is aforeſaid of the firſt way, which put upon the globe for to ſhape it, and let it be hardned in the cold: then take it away, and ſpread the following mixture with a pencil; which ſee that it be dryed in the ſhadow, then apply the clay prepared with haire the thickneſs of one or two fingers broad: then take away the waxe from the earthen type, make a round hole in the earthen type with a knife coming even to the wax, which done, place neer that coale fire the type bending down, and the melted waxe will run through the hole, into which powre hot (not burnt) metal, *&c.* that liniment which is anoynted on the waxe muſt be very wel prepared leſt while the wax melt, it fall and melt away with the wax, nor let the waxe pierce the earthen type and ſpoyle it. Now the liniment follows: Burn clay well waſht in an earthen furnace even till redneſs; afterward bruiſe it and take

away its fineſt part with waſhing of water, ſo that thou take the fineſt duſt, which dry and again burn with a ſtrong fire: after grinde the duſt with rain water and ſalt Armoniack ſublimated, upon a ſtone, as painters uſe to make their colours, bring it to the juſt conſiſtence of a paint, and mixture will be made; ſalt Armoniack keeps that fine powder left it melt away with the waxe: but prepared earth makes a tender and fine fuſion.

Metallick mixture for the matter of the glaſs.

THere are diverſe of theſe mixtures of which one is alwayes better then the other, which by how much tis the harder, by ſo much the glaſs is the better; and by how much the harder the metal is, by ſo much the better it is poliſht, nor doth the hardneſs of the mixture ſuffice but its whitneſs is required: for red proceed from too much copper; becoming black from too much iron, or duskie from too much tin, doth not make the true repreſentations of things, but changeth the ſhape and colour of them: for example ſake, too much copper makes ſhapes too red, and ſo of the reſt; let therefore the metallick mixture be very white, but if burning glaſſes are made, it is no matter what colour it be of, if ſo be that the mixture be hard. I will ſet down one of the beſt, ℞. of copper plates the thinneſt beaten to pieces one part, of white Arſenick a quarter, firſt moiſten the plates with the liquor of the ſalt of Tartar, and make a bed upon a bed with plates and Arſenick powdred, by ſprinkling this on them, until the crucible be filled; to which powre to the oyle of flax as much as ſufficeth to cover the copper and Arſenick: which done put to the cover with the beſt lute, then place the crucible (the lute being dryed) in ſand, ſo that only the upper part of the cover may ſtick out and adminiſter fire by degrees, at firſt little; Secondly, ſomewhat ſtronger, till at length it be hot that all the oyle may evaporate; in the mean time the oyle ſhall prepare the copper and retaine the Arſenick and ſhall make it enter into the plates like oyle piercing dry leather: Or place the crucible upon a grate and put fire on it, which

which adminiſter by degrees, until the oyle evaporate in the boyling. Laſtly when it ſhall coole, break the crucible, and thou ſhalt finde the copper of diverſe colours, eſpecially if thou ſhalt take Orpin in ſtead of Arſenick, twice or thrice increaſed in bigneſs and friable.

℞ of this copper one part, and of latton two parts, melt it with a very quick fire, and firſt indeed the latton to which afterward add the friable copper; powre out the mixture melted and thou ſhalt have a very hard metal unfileable, yet not ſo brittle but like ſteele, of which diverſe things may be ſhaped ſerving in ſtead of iron and ſteele inſtruments; take of this hard metal the third part, of the beſt tin without lead one part, effuſe it and the matter of looking glaſſes will be made. This mixture is a hard white metal making the beſt looking glaſes, but if this labor ſeem tedious, take of copper three parts, of tin one part, of white Arſenick half for the matter of looking glaſſes, which are fine but brittle as well in the melting as poliſhing, therfore carefully to be handled. I muſt here ſet down a thing worthy to be obſerved, and knowen to few; falſe is the opinion of many, eſpecially of thoſe who attribute knowledge to themſelves of the proprieties of metals, in the ſecond part (of ſubtile ſpirits) mention is made of the pores of metals, for experience witneſſeth, that thoſe ſubtile ſpirits as of hartſhorn, tartar, ſoote, and ſometimes thoſe ſulphureous of ſalts and metals do evaporate through pewter veſſels, which at the firſt time no man conceives, for whoſe ſake this diſcourſe is made. Make two bals of Copper, and two of pure Tin not mixt with lead, of one and the ſame forme and quantity, the weight of which bals obſerve exactly, which done again melt the aforeſaid bals into one, and firſt the copper, to which melted add the Tin leſt much Tin evaporate in the melting; and preſently powre out the mixture melted into the type of the firſt bals, & there wil not come forth four but ſcarce three bals, the weight of the four bals reſerved; if then metals are not porous, how I pray doth that great alteration of quantity proceed? therefore know that metals are porous more or leſs, gold hath the fineſt pores, ſilver hath more, Mercury more then

that, Lead more then Mercury, Copper more then Lead and Iron then copper, but tin hath moſt of all.

If we could deſtroy metals and again educe them deſtroyed from power to act, ſurely they would not be ſo porous. And as a child without correction is unfit to any goodneſs, but corrected is endued with all kinde of vertue and learning, ſo alſo we muſt underſtand of metals which left in their natural ſtate, namely drawn out of the earth without correction and emendation remaine volatile, but corrupted and regenerated are made more noble, even as our bodies deſtroyed and corrupted, at length ſhall ariſe clarified before they come into Gods ſight. Well ſaid *Paracelſus*, that if in one hour metals were deſtroyed an hundred times yet they could not be without a body, reaſſuming a new ſpecies and indeed a better, for, it is rightly ſaid, *Unius corruptio, alterius generatio*; for the mortification of a ſuperfluous ſulphureous body is the regeneration of the Mercurial ſoul, for without deſtruction of metals perfection cannot be; therefore metals are to be deſtroyed and made ſhapeleſs that after thereby the ſuperfluous earthy combuſtible ſulphur ſeparated the pure fine Mercurial ſpecies may ſpring, of which thing more *de amauſis*.

Of the ſmoothing and poliſhing looking glaſſes.

A Looking glaſs though it be very exactly fuſed and proportioned, yet it is of no value not rightly poliſhed and ſmoothed, for eaſily in the ſmoothing ſome parts it may ſuffer ſome dammage hurtful to it, and it is neceſſary to take from them firſt the groſſer part by the wheel as the cuſtome is with Pewterers and Copperſmiths with a ſandy ſtone, then to apply to them the purer whetſtone with water, until they are ſufficiently ſmoothed by grinding, which done the looking glaſſes are again to be taken from the wheele and to be moved to the wooden wheele covered with leather, rubed over with a fine prepared glazing ſtone until the creviſes contracted in the turning no more appear having got a croſs line, afterward another wheele covered with leather is required, to which

which a blood ſtone prepared and waſht with the aſhes of tin rubbed on, to which likewiſe by the aforeſaid meanes according to the ſame time looking-glaſſes are ſo long to be moved till they get a ſufficient fineneſs and brightneſs. You muſt keep ſuch looking glaſſes from the moiſt aire, and breathing, and to wipe them infected with aire and breathing not with any woolen or linen cloth, but with a Goats or Harts skin, and not any where but on the croſs line, with which ſleeked looking glaſſes are ſmoothed. They can alſo be ſmoothed with lead artificially melted with an emrald and water, firſt by grinding; ſecondly with a purer emrald and lead; laſtly with a blood ſtone aſhes of tin: likewiſe alſo with whetſtones, by putting in another purer every time, whence at length brightneſs is procured to them by aſhes of tin.

Alſo the outward part of the looking glaſſes convexe may be ſmoothed, which repreſents ſhort ſhapes, and ſpreads the diſperſed rayes: but the inward part hollow gathers and multiplies, and preſents a ſhape.

Let theſe things ſuffice of melting looking glaſſes and poliſhing requiſites to the collection of the Sun beams, and although from the aforeſaid mixture other kinds of looking glaſſes might be made repreſenting wonderful ſhapes and ſeveral excellent things, as Cylindrick, Pyramidal, Parabolick, *&c.* yet they are omitted as impertinent, yet I could ſhew a way to make them, becauſe I have not undergone ſmal labors and charges in the ſearching of their preparation and uſe if it were neceſſary. But of all looking glaſſes that is moſt uſeful whoſe preparation we have ſhewn, whoſe diameter is at leaſt two or three ſpans, if thou wilt perform any ſpecial thing, although it be but of one or two ſpans, yet it gathers abundance of beams, ſo that thou maiſt melt tin and lead with it, if it be well ſhaped: yet the larger are the better. Nor ought they to be too broad that they may further caſt their beams, and better performe their actions or functions, let them have the twentieth or thirtieth part of the ſphere the ſection exactly obſerved which is the fundament of the Art.

Of

Of metallick glaſſes.

AS for metallick glaſſes much conducing to the perfection of metals and eſteemed by the Ancient Philoſophers, I would not omit in this place becauſe they are eaſily made by this furnace.

And indeed the Ancients have found theſe glaſſes queſtionleſs by chance, reducing the calcined bodyes into glaſs by a ſtrong fire, for very many ſecrets by this means not ſought for are found out. Oftentimes it happens to our labors that paſt hope we finde ſomething better or worſe, then the thing ſought; and I think this happens with theſe glaſſes, but however it be I am ſure theſe glaſſes have ſtood us in much ſtead, for *Izaak Holland* ſaith plainly, that vitrified metals brought to metals by that reduction do give better and nobler metals then the firſt vitrified, and indeed gold gives a tincture, but ſilver gold, and copper ſilver; and ſo conſequently the glaſs of other metals give better metals in reduction, the truth of which experience proves, and although I have not yet made great tryal in this work, yet I know that metals brought into dead aſhes to be turned into cleere glaſs cannot be again reduced into metals without great profit: yet one metal is more pliable then another, nor are our glaſſes the metallicks of goldſmiths fixed to other large ones for ornaments ſake, made by the addition of glaſſe made of fuſile ſand; but ours of the juice of metals. But I do not deny the vertue of Venice glaſs, mundificating another fuſile of metals, chiefly copper and tin, which though is not comparable with metallick peeces. I freely confeſs I have tryed this thing twenty times, and I never was deceived by it: but I know not whether it may prove ſo in a greater quantity becauſe I never tryed it, doubting of my veſſels not fit to retaine fuſible glaſſes a requiſite time: for I have ſpent much labor in making theſe kinde of veſſels, but hitherto in vaine. For there is very great hope of gaine if thou haſt very ſtrong crucibles. But this perfection is not without reaſon, for whileſt the metal is burnt to aſhes, much of the ſuperfluous combuſtible

ble ſulphur is burnt (as you may ſee in Lead, Tin, and Copper, from the ſparks appearing in their calcination whileſt they are ſtirred and ſeparating) which if again reduced (*viz.* calcined) its better part (by benefit of melting) and the weightier ſinketh, the worſer flowing on the top is changed into droſs or glaſs. And the ſeparation of metal is done by the help of fire alone, to the ignorant and unexpert incredible: but conſider gilt ſilver to be ſeparated in fuſion, which is as it were corrupted by that common ſulphur, and the metallick ſpecies, being loſt it turns to black droſs before in melting it forſake the gold: which way alſo ſilver is ſeparated from copper, and this from iron. Obſerve alſo that black and crude Antimony, which reduced into aſhes by calcination, and melted is ſeparated by a ſtrong fire, the purer parts deſcending pure and white like ſilver, but the impure parts aſcending changed into glaſs or droſs, which ſeparation was never made without incineration although the Antimony ſtood long fluid.

Thou ſeeſt therefore the power of fire alone in melting metals, wherefore believ thou that thy labor ſhal not be in vain if thou knoweſt how to help the fire. Exerciſe thy ſelf therefore in it, for thou art ſufficiently inſtructed, and this furnace will help thee, without which it is impoſſible to meddle with ſuch things as experience teſtifies confirming my words.

Mention being made of metallick glaſſes, which belongs to the perfection of metals, I am forced to ſay ſomething alſo of other *Amauſæ*, or coloured glaſſes, which are called Gemmes, and are worn for beautifying, which though it be not profitable, yet it is a delightful labour, which knowledge as well noble as ignoble have long ſought, not for gain, but recreation ſake, erring from the true way (although prolixly deſcribed in many tongues) through ignorance of the art to render cryſtal or flint fuſible and colouring it, content with lead glaſſes made of one part of cryſtals or flints, and three or four parts of minium or ceruſs, glaſs of no worth, as not only very ſoft and unapt for poliſhing, but alſo heavier then it ought by means of lead, and having a yellow or green colour,

or every glaſs of cryſtal or flint and minium or ceruſe by themſelves, *viz.* without the addition of other colours, the lead gets a yellow colour hindering and altering other mixt colours, therefore a good ſtone is not made this way of lead and flint, but there may be of theſe Saturnine glaſſes, Venice glaſs, Aſhes of Jupiter and colours being added to them, be uſed diverſly of the goldſmiths, namely to colour gold; otherwiſe of no moment.

Therefore I will give another preparation, namely out of the flints &c. cryſtals of Sol with minium and ceruſe, with metallick colours, natural in colour and elegancy of excellent ſtones; but not harder then glaſs; for although cryſtal is harder then iron, yet it is deprived of its hardneſs in ſome meaſure, and is made like to glaſs, yet ſo much hardneſs reſerved, as ſerves to write in another glaſs, which glaſſes are eaſily poliſhed, in all things and by all moſt like, hardneſs excepted, to natural ſtones; with which not only various kinds of ſtones be made, and other gold, ſilver, and wooden works or pictures adorned; but alſo diverſe ſupellectils, as ſalts, hafts or hilts, cups, &c. and alſo images and antiquities may be formed (by fuſion) with gold, ſilver and ſtones of impreſſes, like to thoſe cut out of gems by the hand of an ingenious workman moſt delightful.

They are made after this manner: and firſt you muſt look for flints and cryſtals not coloured, but very white, gathered out of ſand or ſtreams, which you muſt heat in a covered crucible, and quench them glowing in cold water, that they crack and may be pulveriſed; otherwiſe they are ſo hard that when they are powdred, they take part of the morter and ſo are defiled; therefore it is worth your labor to handle them well. Afterward ℞ of flints prepared, and the pureſt ſalt of Tartar, equal parts, made in glaſed veſſels, but not in copper or iron, equal parts, mingle them and keep them to uſe.

And if thou wilt make this maſs into a gem, you muſt firſt mingle ſome colour (what you deſire) afterward ſo long place it (being put into a clean covered crucible 'ſcarce half full) in a very

a very ſtrong fire till all the ſalt of Tartar hath evaporated, and the flint together with the colour come into ſubſtance fuſible like glaſs: you muſt then put a ſmal clean iron wier, and draw out a little of the melted maſs for tryal; whether it have ſtood long enough in the fire, whether there be yet puſtles and little ſands, or whether it being exactly melted it ſhall deſcend to the bottome, which done you muſt take off the crucible and place it under ſome hot iron or earthy veſſel, that it may wax cold with the melted ſtone; otherwiſe the maſs will be broken in the crucible into very ſmal parts, and would be unfit for greater works: neither muſt you powre out the melted maſs for fear of the attraction of aire, ad puſtles to ariſe thence. But willing to make out of the maſs by fuſion, not carving, money or pictures; there is no need to leave the maſs in the crucible to coole, but preſently to powre it perfect and hot into a copper morter, & nothing will ſtick to the crucible, but all the maſs will be poured out without any waſt; And this maſs if thou wilt thou mayeſt powder or break into very ſmal bits for fuſion and impreſſion. But the maſs cooled in the crucible is to be taken by breaking the crucible, and to be reduced into greater or leſſer ſtones by cutting. But melting for money or images, you muſt place the money or image, which you will imitate, with the backſide or hinder dart downward in an iron ring a fingers breadth broad of greater capacity then the money, upon a ſtone or plaine wood, and ſpread a little earth or fine ſand, or earth through a cloth, namely as much as ſufficeth to cover the type, and upon this to put more of the beſt moiſtened with water like aſhes of cupels, and to impreſs it being moſt tenacious firmely to the type, but warily leſt the type be moved; which done you muſt turn the ring, and with a knife liſt up the type, and to take it lifted up with ones hands or tongs, the image being left in the ſand, to be dryed by the heate of the Sun or fire. Afterward caſting the image, place the ring with the image of ſand impreſſed under a tile, and adminſter a ſtrong fire, that the whole ring with the ſand and the image of ſand may be very hot: then take off the ring to ſee if the image have ſuffered any loſs; which if it have not, you muſt put upon it ſo much of the aforeſaid

glaſs courſly beaten, as ſufficeth in the fuſion to fill the image impreſſed on the ſand, which done put the ring again under the tile, and adminiſter the fire of fuſion till the glaſſe melt in the ring; to which touch with a ſmooth iron and light (with a handle) being hot, the ring taken firſt out of the furnace with tongs, preſſing the glaſs well to the type; and then place it under a hot iron, or earthen veſſel to coole; and being cold take image from the type which anſwers to it in all things, if thou haſt aright proceeded, exactly repreſenting the Carvers art or a ſeale impreſſed to a jewel, which excellent work is moſt fit to faigne, and repreſent ſantiquities and rarities.

The colouring of the aforeſaid maſs follows, in which it is made moſt like to Gemmes.

IT behooveth that colours be taken from metals and minerals, namely from copper, iron, gold, ſilver, Wiſmuth, Magneſia and Granate: of other colours I know nothing of certainty, copper commonly makes a colour green like the Sea, copper of iron graſs-green; Granate ſmaragdine colour, iron yellow or Iacynth; Gold the beſt skie colour; Wiſmuth common skie colour; Magneſia Amethyſtine: mixt, they give other colours; E. gr. Gold mixt with Silver gives an Amethyſt colour; Iron and Copper, a pale green; Wiſmuth and Magneſia, a purple; Silver and Magneſia various colours like an Opal.

Images are alſo made of diverſe colours, if the maſſes of diverſe colours be broken into bits and mixt be put upon the type, *&c.* And if thou deſireſt an opac maſs (green, red, skie colour, *&c.*) add a little calx of Tin darkning, on which as on a Baſis the colours inſiſt. For example; in making a Turcoiſe ſtone or a Lazulus, mingle to the Azure made of the ſilver Marcaſit or Zafora (to colour the maſs) the calx of tin, that they may melt together, and before the impreſſion be made, put upon the type ſome prepared gold, then ſpread and put upon this the aforeſaid glaſs; and the fuſion and impreſſion being made

made, let be made thence having golden veines like *lapis Lazulus* very delightful; But there muſt be *calx*, gold is not looſing its ſplendor in the fire, ſuch as is made by Mercury, or that, which better is precipitated out of *Aqua regia*, of which above.

Of the preparation of the colours for colouring the maſs of flints and Cryſtals.

THe plates of copper often heated, are quenched in cold water, of which more in the fifth part, from three to ſix grains of it may be mixed to ℥j. of the maſs for a ſea green colour. Iron is reduced into crocus by reverberation; of which from four to ten grains are added to the maſs for a yellow or Iacynth colour; Silver is diſſolved in *Aqua fortis* and precipitated with the liquor of flints, after it is edulcorated and dryed, whereof from one to ſix grains, added to ℥j. of the maſs, they make mixt colours.

Gold is diſſolved in *Aqua regia*, edulcorated and dryed, precipitated firſt with liquor of flints, whereof from grain four to ℈ß. mixt with one ounce of the maſs make a moſt elegant Saphire. And if from three to ſix of that ſoluble ruby made of the nitrous gold and ſilver of iron be added to ℥j. of the maſs they make a very polite ruby, Magneſia pulveriſed, whereof from ſix to fourteen grains to ℥j. of the maſs, make an Amethyſt.

Marcaſit diſſolved in *Aqua regia* precipitated with the liquor of flints, let be edulcorated and dryed, whereof from one to five grain to ℥j. of the maſs give a Saphire, but not comparably ſo polite as one made with gold.

But being unwilling to calcine Marcaſit, let him take Zafora, and mingle to ℥j. from five to ten graines; Granates of *Bohemia* or Oriental pulveriſed add from ſix grains to ℈j. to ℥j. of the maſs, for little green ſtones like to the natural ſmaragd or emrald: other things which remaine of the mixture of the colours are to be learned by experience.

To what uſes coloured flints and cryſtals are appointed is not here to be treated of; one uſe being excepted, which I ſet down for the eys, which are weakened by too much watching,

the heate of fire and ſmoake; ſee thou have a waxen type circularly round, of the bigneſs of a diſh or trencher (The Optiques are wont to call ſuch *lentes*) to which put the beſt clay well mixed with haire: anoint the waxen type with oyle, and exactly apply the beſt prepared earth of crucibles (and durable in the fire) the thicknes of a finger, which dryed perforate in ſome part, that the waxe being melted by the fire may flow forth; afterward burn the type in an earthen furnace; being burnt fill it with prepared glaſs, and place it in a winde furnace till the glaſs melt; which at length cooled take off the type by attrition; and there ſhalt thou have the cryſtal reſembling the force of the type; which afterward thou muſt make and poliſh like ſpectacles in an iron diſh on both ſides; and take cover it wrought with a ſtrong iron wier, and thou ſhalt have a good cryſtalline *lent* bought for ſmal price which otherwiſe is ſcarce made of cryſtal of ſo great a bigneſs. And if thou wilt thou mayeſt colour the glaſs green very pleaſant to the ſight, and fit the foot to it for greater benefit. And the glaſs doth not only make in this for the multiplication of light in the night time that you may ſee a thing afar off in a chamber, but alſo for the fixing and calcining minerals by the ſun beams, and melting of metals & multiplying of pictures like a hollow glaſſe, and alſo ſo to compare it for other uſes with a hollow looking glaſs which doth the ſame of an equal bigneſs which the hollow glaſs; nor is there any other difference of them but reflexion. This glaſs inſtrument is made likewiſe another way and by leſs coſt & labor, if it be of a poliſht looking-glaſs if 2. great orbes are cut out with a diamond, and if they are ſomewhat ſoftened with fire and are left there ſo long in the heate untill they ſhall ſtick like waxe very cloſe to the ſtone, which done let them be cooled again, which afterward taken out will repreſent the forme of a hollow glaſs, to which it behooves to fixe a leaſe on the convex part. And theſe glaſſes do the ſame that a hollow metallick looking glaſs doth; the reflexion excepted, which is not ſo ſtrong as of the hollow glaſs: And although the glaſſes are ſooner broke, yet they are very fit for the making of the following inſtrument.

And

And they are bound together by ſtrong wier applyed acroſs on the concave part, and a hole is cut in the brim with a diamond on one ſide of the bigneſs of a pea, to which is put an Aſcent, then the creviſes are exactly cloſed in every place with the beſt lute, which done, a ſilver or copper ring is to be tyed about it, holding thoſe glaſſes ſtraightly, ſo that the inſtrument may be fitted to the foote, all which well done thoſe ſtrong wiers are ſeparated or cut off, with which the glaſſes were bound at firſt, namely neer the copper ring; afterward it is infuſed with very pure *Aqua vitæ* through a funnel as much as is required for the filling it up, the inſtrument being filled the Aſcent is ſhut up, which is to be laid up to uſe; and this inſtrument is better then the hollow glaſs, eſpecially if it have in its diameter the breadth of one foote, and may be applyed to proſpective pictures, it doth excellently repreſent and multiply them.

Behind which if you place a candle in the night, it gives ſo much light in the chamber, that you would think it came from the Sun. It doth alſo many other things which here are omitted as ſuperfluous. And you may gather the diſperſed light in the aire in the night time with it, ſo that you may read the ſmalleſt writing. Such and others of the like things may be done by this furnace, all which to ſet down would ſwell the book too much. Other things of the metals examination and purification by fuſion, in another place.

Take this, Reader, which is given to thee, in good part, at another time thou ſhalt have better; and do not miſtake my writings, as if I did reprove the examinations of metals by the Ancients, fuſions and ſeparations, who only would communicate my opinion, and yeild my aſſiſtance for further proceeding; for I know that dealers in metals giving too much credit to their ſmall probes, when they finde nothing, do contemn oares as barren, often abounding with gold and ſilver; yet when he, *John Matheſ.* ſayes expreſly in his *Sarepta*, that minerals oftentimes tryed in a ſmal quantity do yield no gold and ſilver, which in a great quantity yeild a great deale, wherefore credit is not alwayes to be given to ſuch probes, often deceiving, as experience teſtifies.

But

But this not only in thoſe minerals which are digged out of the earth; but alſo in thoſe clayie and ſandy minerals, abounding with ſilver and golden flames; out of which neither by the leſs nor greater probes, nor ablution nor Mercury is drawn with gaine that thin and fiery diſperſed gold: which by ſome waters is done without fire eaſily; for I know ſuch mines are found neer many rivers of Germany and many places in other Nations of Europe, out of which honeſt gaine without much coſt and labor may eaſily be gotten. Neither are they dreams, which I have ſpoken parabolically of the perfection of metals, for it is poſſible by art to help nature in the perfecting things. There is therefore no more need of any thing then of knowledge; therefore the nature of metals being known, and their properties, they are eaſily ſeparated, purged and perfected.

But what I have written of the univerſal medicine, I have done for the aforeſaid cauſes, which have made me believe the thing, not as profeſſor of the Art. The other things of coloured red glaſſes and looking glaſſes I have added, becauſe they are eaſily prepared by this furnace, as ſometimes neceſſary in ſome works. Other things of the handling metals are not without cauſe now omitted, which happily may be ſometime delivered in another place, wherefore now we end.

FINIS.

THE

FIFTH PART

OF THE

PHILOSOPHICAL FURNACES:

WHERE

It is treated of the wonderfull

NATVRE

OF THE FIFT

FVRNACE;

ALSO

Of the eaſie preparation of the Inſtruments and Materials belonging to the foreſaid four

FVRNACES.

Moſt profitable for Chymical PHYSITIANS.

By JOHN RUDOLPH Glauber.

LONDON,
Printed by *Richard Cotes*, for *Tho: Williams* at the ſigne of the Bible in *Little-Britain*. 1652.

THE FIFT PART OF PHILOSOPHICAL FURNACES,

Of the preparation of the Furnace.

AS concerning this, of which though I made no mention in the Preface, for it was not my resolution to mention it in the last part, because I was purposed only to treat of the instruments, as wel earthen as those of glass, and also of the other necessary things belonging to those four parts premised; yet I am willing now in this part, (which I have judged to be the most convenient place for it, for which I did before design another) to discover the wonderful nature thereof, as far as I may for the studious Artists sake. And although I know that more in this part then in all my other writings, especially the ignorant and unskilful, will be offended; yet I will not therefore pass it by, perswading my self that by this means I shall do a work that will be most acceptable to the searchers of Art, and Nature. For I do devoutly affirm, that this is the choicest of all my se-

crets that I confide in, in which I have already ſeen wonderful things, hoping that the divine benediction will ſome time or other be obtained upon the practice thereof. And as for the ſtructure thereof, much cannot be ſaid thereof, becauſe it is not built as other furnaces are, but it is every where found extructed by Nature, being ordained for no other works then thoſe of Nature, *viz.* for the making of any *menſtruum* that ſhall diſſolve gold, ſilver, and all other metals, and minerals without any noiſe, as alſo pretious, and common ſtones, and alſo glaſſes: the original of which is the original of the *Menſtruum*. Now what, and what manner of furnace that is that produceth this royal *menſtruum*, (coming from the *menſtruum* it ſelfe) and that eaſily without any labour, you may eaſily conjecture, that it is not any common one, by the help whereof other things are diſtilled, that can yeeld ſuch a *menſtruum* that is not corroſive: which certainly is not any common *menſtruum*, becauſe there is but this one *menſtruum* that I know, which doth not partake of any corroſive quality, that doth more then any or all other corroſive waters whatſoever. For all corroſives whatſoever they are, as *aqua fortis*, *aqua regia*, ſpirit of ſalt, vitrioll, alome, and nitre cannot together, and at once diſſolve the cloſe union of gold, and ſilver, and other moſt hard ſubjects, that cannot be diſſolved in waters, though never ſo cauſtick.

This indeed is wonderful, and ſtupendous, that a thing every where found moſt vile and baſe ſhould doe ſo great a miracle, I know not what moved me to write of it, knowing that I ſhall in this part offend not onely the wiſe by writing ſo openly, but alſo the ignorant detractors, and ſlanderers that will accuſe mee of falſity. And truly theſe conſiderations might juſtly have deterred me but that I knew I might doe a good work, recalling many from their errors. For many being perſwaded that there is no other diſſolving *menſtruum*, beſides the aforeſaid corroſive ſpirits; but thoſe are Chymiſts that are ignorant of nature; yet the Philoſophers with one conſent ſay that thoſe corroſive deſtructive ſpirits make

make a fruitleſs ſolution of metals. For experience teſtifies that the ſolutions made by the help of *aqua fortis*, and *regia*, and other ſpirits, colour the hands, being that which a true Philoſophical ſolution doth not, and furthermore teſtifies that thoſe, *viz.* which colour the hands, are not to be reckoned among the true Philoſophical ſolutions, but to be contemned as Malignant. Wherefore I was willing to write theſe things to inſtruct thoſe that erre. Let no man therefore perſwade himſelf that a *menſtruum* is ſo vile, and contemptible is of leſs efficacy then thoſe corroſive ſpirits. I my ſelf did once ſcarſe beleeve that ſo great vertues could be in ſo moſt vile a *menſtruum*, untill I had experience of the truth in good earneſt. And the ſame thing happens here, which happens every where: *viz. great and coſtly things are ſought after, but ſmal and vile things are neglected*, contrary to the courſe of nature, doing all her works ſimply: let no man therefore be offended at the vileneſs of any thing. The Jews alſo were offended at the poverty of Chriſt, who was all things in all. Theſe, although they did ſee miracles, which no man but the Meſſias could doe, yet did not beleeve, being obſtinate by reaſon of the ſimplicity of his form, which if he had not aſſumed, being humane, he could not have been our Mediator before God. For we were wholly ſeparate from God by that fall of *Adam*, ſo as that being hardened in ſins we became the ſlaves of death, and hell, and ſo ſhould remain for ever by reaſon of the looſing of the Holy Spirit, which we had. Now that divine dew, or celeſtial Manna that doth from heaven water our dry hearts refreſhing us by his ſaving Word, and bloud ſhed for us, that holy Spirit, which otherwiſe we could never have received, was again communicated to us. Hence therefore we may ſee, how we were reconciled by a diſeſteemed man, and that neceſſarily. And as formerly the Phariſees and Prieſts were offended at the poverty of Chriſt being the ſon of a Carpenter, not acknowledging him for the Meſſiah; ſo alſo that univerſal *Menſtruum* (openly named) no man doth eſteem, as being baſe, and found in every dunghill. But doe not thou account it as a fault that I have here alleadged:

alleadged the poverty, and humiliation of Chriſt: for the diſcourſe doth not tend to his diſparagement, but to his great honour; becauſe he alone amongſt the ſonnes of men, although moſt contemptible could deliver mankinde from the power of the devil; as that univerſall Mercury the baſeſt of all ſubjects, being overcome by death, doth riſe again glorioufly for the metallick *genus*.

Now here may and that not without cauſe be brought in ſome ſimilitudes demonſtrating our diſcourſe; and firſt of all how two contraries or extreams can without a *medium* be joined together: as for example, the ſubtile ſpirit of wine, as alſo of urine, cannot be reunited to its proper ſalt, *viz.* ſeparation, and purification, being once made, although they are of one and the ſame original, without a *medium*, that is, water, which is in ſtead of a mediator in this reunition. So alſo before the fall, God was with *Adam*, afterwards having tranſgreſſed the command of God, he was thereby deprived of that Divine ſociety, and made ſubject to divers kindes of miſeries, to an eternal, and ſpiritual death, until the incarnation of Chriſt the Mediator, who unleſs he had partaked of both natures, could never have reconciled and reunited us; as that moſt ſubtile ſpirit of wine or urine can never again be reunited to its proper fixed ſalt, without water which partakes of both natures. And if it were lawfull I could, and that eaſily compare the Philoſophical work with the incarnation and nativity of Chriſt, with his life and death; as alſo his reſurrection; but this is not my worke at this time, for it ſufficeth to make mention of it at this time. I wiſh it were lawful to compare terreſtrial with celeſtial miracles; without doubt the unbeleeving *Thomas* would have opened his eys. But now it is not lawful; and although *Moſes*, *Daniel*, *Joſephus*, and others that were skilled in naturall Philoſophy, and Magick, by the help whereof as well celeſtial as terreſtrial miracles are known, made mention of this thing in their writings, yet it is taken notice of by very few readers. Finally, if we might, and time would admit, we could demonſtrate, that God doth not alwayes eſteeme of great

great things, but rather threaten ruine to them; for he is no reſpector of perſons, or creatures, of which there are extant many examples. Now the world judgeth all things amiſs, eſteeming, and reſpecting only glorious things; but our care ſhould not be about them; for alwayes great things are done even by the ſmalleſt, and moſt contemptible.

I could here adde more things concerning the originall of the univerſal *menſtruum*, which is ſo contemptible, which doth by its wonderful powers and vertues diſſolve all metals, minerals and ſtones radically without any noiſe, unites and fixeth them; the ſolution whereof doth not colour the hand; the conjunction is inſeparable, and the fixation incombuſtible, I ſay I could adde more things concerning it, but that divers inconveniences, which by this means I might incur, as alſo the envy and hatred of others do deter me. For although any one doth think to diſcover the poſſibility of Art, and Nature; yet few would be content therewith, being very deſirous of all manner of revelation; and if we ſhould not gratifie them, we ſhould forthwith incur their hatred and envy, who would without doubt judge otherwiſe of the matter, if they had but any experience of our labors. Be thou therefore (curteous reader) contented with this diſcourſe, that ſhews thee the poſſibility of Art and Nature; and diligently ſeek after it in the fear of God, and without doubt thy labour ſhall not be in vain.

Of the Building of the Furnaces.

HOw thoſe furnaces of the firſt and ſecond part are to be built and made of potters clay, and ſtones; I need not ſay much, becauſe there be many books extant treating of this matter ſufficiently, yet this caution is to be obſerved in the building of the furnaces, *viz.* that thoſe furnaces in which a very ſtrong fire is not kindled, need not ſo ſtrong wals, as thoſe in which we diſtill, ſublime, and melt, with a moſt ſtrong fire. And for what belongs to ſubliming and diſtilling furnaces; you may erect them of thoſe common

bricks which are made of the beſt clay, and well burnt, compaſſing them about with very ſtrong wals, that they may the longer retain the heat: or elſe you will continually have ſomething to doe in mending them, and cloſing their chinks, which hinder the regiment of fire. Wherefore they muſt be compaſſed about with iron hoops, that they may be durable and not gape. Now what concerns the melting furnaces, the aforeſaid bricks are not of uſe in the building of them, becauſe they not being durable melt in the fire, wherefore you muſt make other bricks of a very good earth that is fixed in the fire, ſuch as is that of crucibles, &c. of which afterwards, which are to be made in a brazen or wooden mould, and to be burnt, and it matters not whether they be round or ſquare, a regard being had of the furnace, that ſix or eight of them make one courſe, or row. But you need not build the whole furnace of thoſe ſtones, for it is ſufficient, if the place only where the coals ſtill lye, be made of them, and the other part of the furnace be made of common bricks.

A Lute for the erecting of Furnaces.

LUte may be made divers wayes for this buſineſſe; for men prepare their lute ſeveral wayes as they pleaſe. Some mix with ſifted potters earth, the beaten hairs of cows, oxen, harts, or the chaffe of barley, tow, flocks, horſe-dung, and the like, that hold together the clay, and prevent chops, to which they adde ſometimes ſifted ſand, if the clay be too fat, beating the mixture together with water, and bringing it to a juſt conſiſtency. And this is the beſt mixture, that is not ſubject to cleaving, yet weak, becauſe in length of time the hair and chaffe are burnt, wherefore the furnace becomes thin and weak. Many leave out combuſtible things, and mix potters clay, and ſand together, and temper them with brine, for the making of their furnaces. And this is the beſt mixture, becauſe it is not combuſtible as the other is, neither is it ſubject to cracking by reaſon of the ſalt: and for this purpoſe the brine of fiſh and ſalt fleſh doth ſerve, and is very good, becauſe the bloud helps the joining of them together: but if

if the *caput mortuum* of vitriol or *aqua fortis*, being mollified, be mixed with potters clay and ſand, you goe a better way to work: for this lute is not at all ſubject to cracking, but fixed in the fire and permanent. With this lute are retorts, and goards very well luted, and coated, alſo the joints of retorts, and receivers cloſed: this being mollified with a wet cloth applyed to it may again be ſeparated, and taken off, as that alſo with which ſalt is mixed: but the other lutes that want ſalt will not be ſeparated, by reaſon whereof glaſſes oftentimes are broken. Wherefore in defect of the *caput mortuum* of Vitriol, temper the clay and ſand with brine. But many mixe the filings of iron, powdered glaſs, flints, &c. but you need not them for the building of the furnaces, but only for the coating of certaine glaſſes uſed for ſeparation, and diſtillation, becauſe the filings of iron being helped with ſalt binds and joins together moſt ſtrongly.

Of the cloſing of the joints, hindring the evaporation of ſubtile ſpirits.

THe aforeſaid lute is ſufficient for the cloſing of the joints of the firſt furnace where air is not kept from the ſpirits, but not of the veſſels of the ſecond furnace, where moſt ſubtile ſpirits are diſtilled, which it cannot retain, penetrating the ſame with the loſs of the better part: wherefore you muſt make choice of another; unleſs upon the other being well dryed beſmeared over with a pencil, a mixture made of quick lime moſt ſubtilly powdered, and Linſeed oil, which the porous clay attracting to it is fortified, ſo as to be able to retain thoſe moſt ſubtile ſpirits: but this lute can hardly be ſeparated again; becauſe refuſing water it cannot be mollified, wherefore the clay is to be tempered only with the white of egges, and to be applyed with linen clouts: but you muſt prevent the burning of the linen by reaſon of the extream heat of the neck of the receiver, by putting between an iron or ſtrong glaſs neck, *viz.* betwixt the receiver and the retort. The joints alſo may be cloſed with oxe bladders wet in the

white of egges, alſo with ſtarch tempered with water, if it be ſometimes applyed, being ſmeared on paper. For by this means thoſe moſt ſubtile ſpirits are eaſily retained, but not corroſive, for which uſe the *caput mortuum* of *aqua fortis* is more convenient, which after it is dryed muſt be ſmeered over with a mixture made of linſeed oyle, and quick lime.

And divers kinds of theſe lutes are had being deſtined to divers uſes.

Another lute for broken glaſſes.

IT happens ſometimes that glaſs veſſels, as receivers, and retorts have ſome cracks, but otherwiſe are whole and ſound; which are greater in thoſe glaſſes that doe again ſuffer the heat of the fire, wherefore at laſt the glaſſes are broken, which if you will prevent, make a liniment or thin lute of linſeed oyl, quick lime, and red lead; which being ſmeered over a linen cloth apply to the crack, upon which being dryed apply another: but if the crack be very great, you may apply 3 or 4 linen cloths, for the greater ſafety ſake: as you may apply the whites of egges beaten together, upon the cracks with linen and caſt upon it quick lime ſifted very fine, and preſs it down hard with your hand: which being done, you may apply over them more linen clouts wet in the whites of egges, and caſt upon them quick lime again: which when the lute is well dryed, retaines the ſpirits, but ſooner ſubject to the corroſion of corroſive ſpirits then the former.

Note well that quick lime is not to be mixed with the white of eggs, and ſo uſed upon linen clouts, as the manner of ſome is; becauſe the whites of egges acquire a hardneſs from the lime before they be united, and therefore cannot ſtick, but linen clouts wet firſt therewith before the quick lime be caſt upon them, ſo that the lime doth not immediately touch the glaſs, being applyed betwixt two linen clothes.

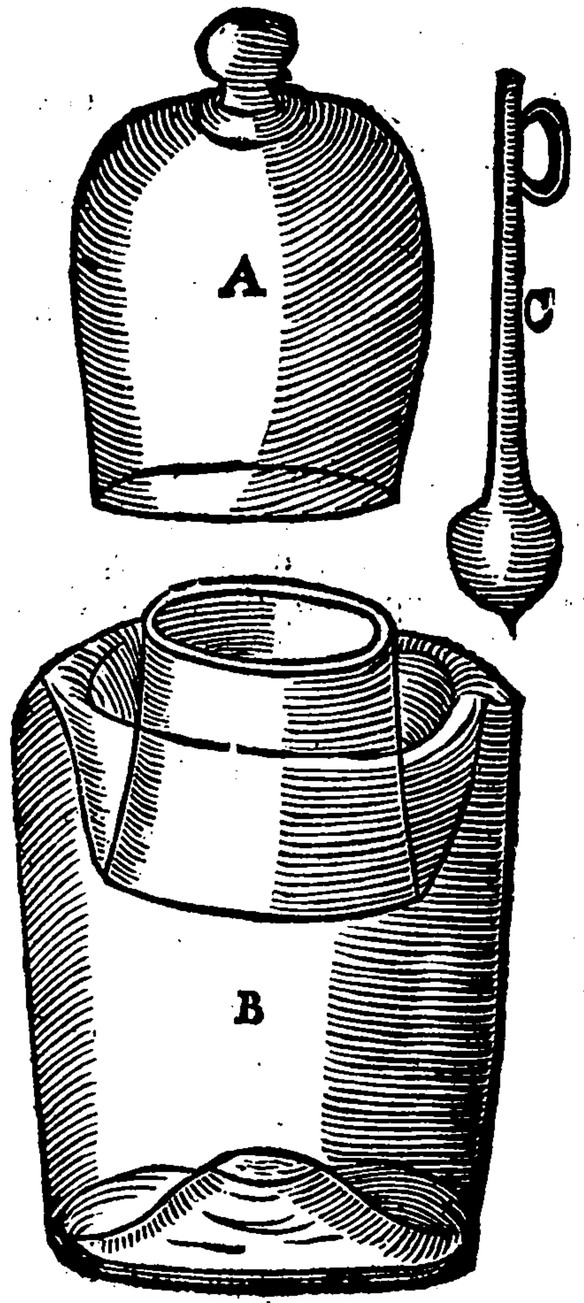
How

How thoſe ſubtile ſpirits when they are made may be kept that they evaporate not.

THoſe glaſſes in which thoſe ſpirits are kept are for the moſt part ſtopt with cork, or wax, upon which afterward bladders are bound: which ſtopping is convenient for ſome ſpirits, that doe not prey upon cork or wax: For all corroſive ſpirits, as of vitriol, allome, common ſalt, nitre, &c. corrode cork; and lixivial ſpirits, as that of hartſhorn, tartar, ſalt armoniack, urine, wine, &c. melt wax, and penetrate it.

And although other ſtopples might be made, which might retain both ſorts of ſpirits, yet it would be tedious and laborious to open thoſe ſo often, and to ſtop them againe. Wherefore I have found out a fit kind of glaſſes, *viz.* of ſuch, whoſe mouths have diſtinctions, and are fit to receive their covers; as it appears by the delineation. *A.* ſignifies the cover: *B.* the glaſs containing the ſpirit. *C.* a drawer by the help whereof the ſpirits are taken out of the glaſs, when there is occaſion, into the diſtinction in the brim of the mouth; *viz.* of the glaſs that contains the ſpirit, is put quick ſilver, and upon this is put a cover; this being done the Mercury cloſeth the joints of both glaſſes running in the brim, ſo that nothing at all can evaporate: for the ſpirits doe not penetrate the Mercury, unleſs they be very corroſive (a thing to be noted) which then in proceſs of time turn the Mercury into water, but very ſeldome; and then the Mercury is to be renewed. But we need not give ſo much honour to corroſive ſpirits, as not to be compared to thoſe volatiles, which being abſtracted from corroſives doe not prey upon Mercury; and much leſs then theſe, doe lixivial ſpirits corrode Mercury: and for the ſake of theſe were theſe glaſſes invented, by the help whereof moſt ſubtile ſpirits are without any loſs of their vertues, if you pleaſe, a very long time preſerved and kept. And becauſe when there is occaſion the ſpirits cannot be poured forth by reaſon of the Mercury in the brim, you

muſt get a drawer like to that, by the help whereof wine is taken out of the veſſell, but leſſer, having a belly with a little mouth made very accurately. This being let downe you maytake up as much as you pleaſe, as is needful; the upper orifice whereof being ſtopped with the finger nothing drops out; being put into a leſſer glaſs is thence poured forth for your uſe. Then you muſt again cover the remainder of the ſpirit that is in the glaſs, and as oft as is needful take out with that drawer as much as is uſefull. And this is the beſt way by which moſt ſubtile ſpirits are retained; which alſo are very well retained in thoſe glaſſes, whoſe ſleeples are of glaſſe ſmoothed with grinding. But this is a more coſtly way of keeping in ſpirits, and it is done after this manner.



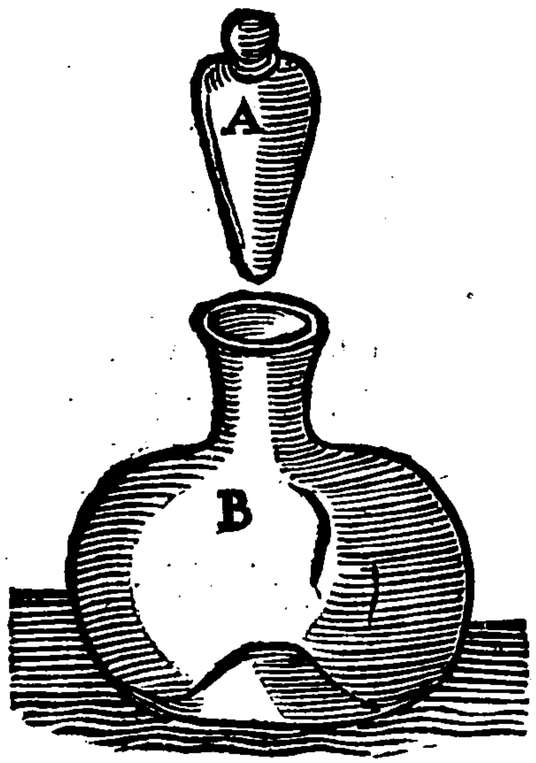
How

How glaſſe ſtopples are to be ſmoothed with grinding for the retaining of ſpirits in their glaſs veſſels.

FIrſt of all order the matter ſo that you have glaſs bottles of ſeveral ſorts, ſome greater, ſome leſſer, with ſtrong necks, and mouths, with their glaſs ſtopples, which being ſmoothed by grinding ſhut the orifice of the bottle very cloſe: Now they are ſmoothed thus. Put the ſtopples in the turn, being ſet or faſtned in ſome wood, bring it into a round ſhape, then being moiſtned with *Smiris*, and water mixed together, let it be put to the mouth of the bottle, ſo as to be turned round in the mouth of the bottle, which you muſt often take away from the ſtopples being faſtened to the turn, for the oftener moiſtening of it, which is with that mixture of prepared *Smiris* and water, with the help of a pencil, or feather; and that ſo often and ſo long, untill the ſtopple ſtop the mouth of the bottle moſt cloſely; which being done, you wipe off the *Smiris* with a lint from the ſtopples and mouth of the the bottle, then ſmeer over the ſtopple with a liniment made of ſome fine waſhed earth, and water, or oyl, and again turn it round in the mouth of the bottle, and often ſmear it over with this freſh mixture, untill the ſtopple be moſt exactly ſmoothed, which afterward is to be tyed to its proper bottle; the ſame alſo is to be underſtood concerning the reſt, that one may not be taken for an other, &c. And that you may not need to take away ſo much from the ſtopples, and bottles, get ſome copper moulds made for the ſtopples, which ſtopples muſt be taken whileſt they bee yet warm, ſoft, and new drawn from the furnace, that they may be made of a juſt roundneſs, as alſo other copper moulds. Which muſt bee put into the mouths of the bottles, whileſt they be yet hot and ſoft, for the better making of them round, whereby afterwards the ſtopple may more eaſily, and quickly become fit to ſtop the mouths

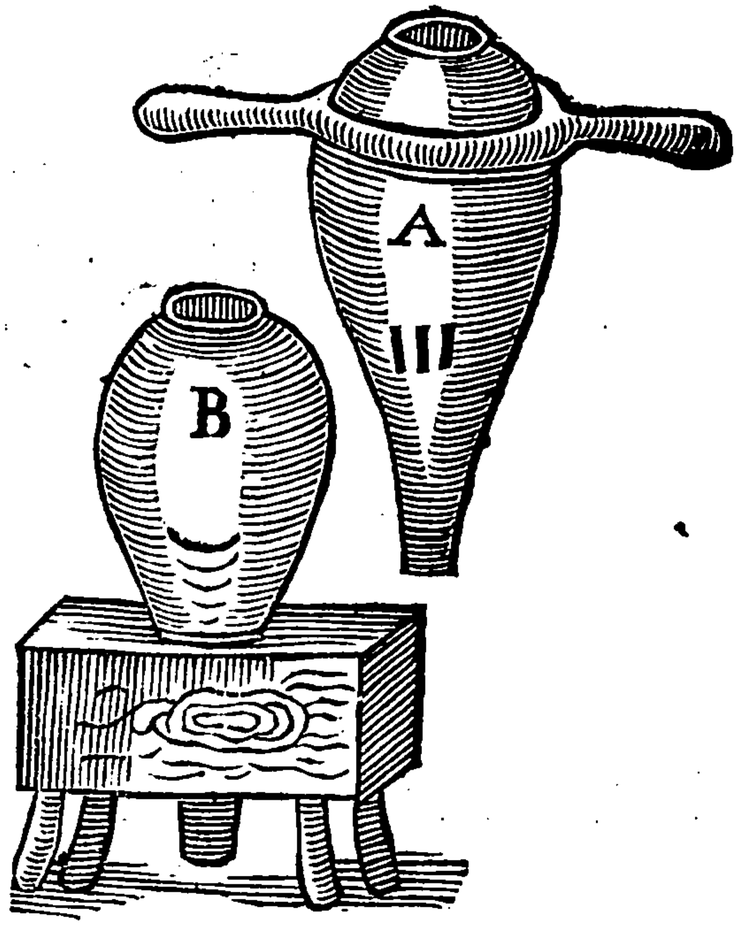
of

of the bottles very close, (as for example: *A.* is the ſtopple, *B.* the glaſs or bottle) if thou knoweſt how to order them rightly, they will quickly and eaſily fit one the other.



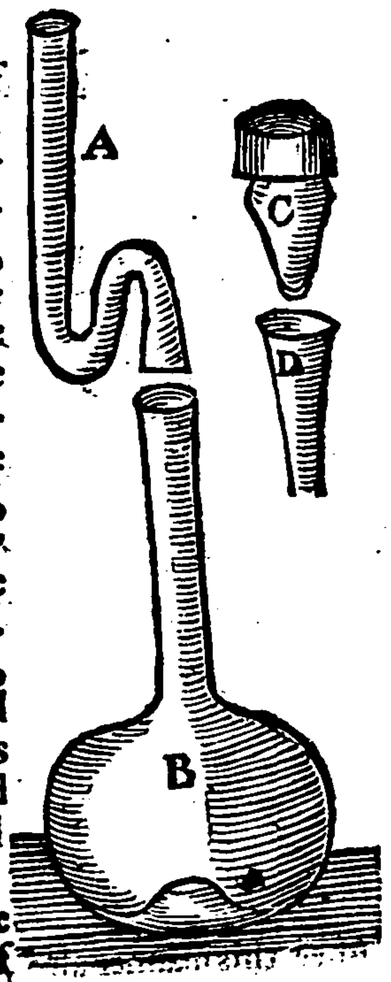
In defect of a turn, proceed after the following manner, which is ſlow, yet ſafe, becauſe in a turn the glaſſes oftentimes waxing hot are broken by reaſon of the over great haſt; and it is thus, make an iron or wooden receptacle fit to receive the glaſs bottle, which being covered about with linen, and put in, join both parts of the receptacle warily and ſoftly, with the help of a ſcrew, that the bottle be not broken, and becauſe that inſtrument, or receptacle of the bottle being faſtened to a form with the help of a ſcrew, cannot be moved. Afterwards cauſe that another wooden inſtrument be made for the ſtopple (as for example, *A.* the ſtopple with its

its receptacle *B.* the bottle with its receptacle) that may be ſeparated in the middle, and be again reunited with a ſcrew after the putting in of the ſtopple, which being ſmeered over with the aforeſaid mixture of *ſmiris* and water, take an inſtrument with both hands, and put the ſtopple round about the neck of the bottle, and grind it round upon the other, as Wine Coopers are uſed to doe in ſmoothing the taps; and that ſo long untill the ſtopple be fit for the bottle; then reiterate the ſame labour with the earth *tripolis*, untill it bee compleated; and it will ſtop as well as a ſtopple made by the help of a turn.



After this manner alſo you muſt work thoſe greater glaſs receivers of the firſt furnace, that without luting they

may be closed. Stopples also of vials for fixation may be wrought after this manner, which instead of luting may be put into the mouths of the vials, upon which are put caps of lead; by which means in case of necessity they may be lifted up, *viz.* in case the spirits by too strong a fire be stirred up and rarified, by reason of the danger the glasses are in to be broken, and may again fall down into the mouths of the bottles being pressed down with the leaden caps, and so stop close again. And this way of stopping is better then that which is done with cork, wax, sulphur, and other things: because in case the regiment of fire be well governed, and by consequence an errour is committed, you may preserve your glasses by lifting up of the stopples, *viz.* when the spirits are too much stirred up. And although this be a better way of stopping then the other common way; yet that which follows is better then this, whereby the spirits are easily retained, the glasses being preserved, and without all danger of being broken. And it is thus, *viz.* get a glass pipe to be made crooked according to the figure set down, into the belly whereof is quicksilver to be put from halfe an ounce to an ounce, or thereabouts, and let this pipe which hath a belly be put into the viall containing the matter to be fixed (as for example, *A.* the pipe with a belly, *B.* is the viall, and againe *A* signifies the aforesaid leaden cap with the viall *B*) the joints whereof afterwards are to be covered over with lute, and the viall will never be in danger of being broken.



These foresaid ways of stopping are the best, by which the breakings of glasses, are prevented, *viz.* whilest men

men are in an errour about the fixing of spirits of salts, minerals, and metals, which although they are fixed with great costs and labours, yet doe not satisfie what is promised and expected, because those kinds of fixations are violent and forced, and by consequence contrary to nature: but in the profitable fixation of spirits, not so, where we must follow Nature, and not commit our selves to fortune in our labours. For onely fooles are wont to breake their glasses in their supposed tincture; but Philosophers not so; for *every violent thing is an enemy to Nature*; and all the operations of Nature are spontaneous. They erre therefore, and never shall come unto their desired end, who attempt violent fixations. I cannot bee perswaded that bodies dead, or halfe dead can be so mixed together as to multiply: but I could easily beleeve that the conjunction of male and female of one and the same species, sound and nourished with sound and wholesome meats to be naturall, and to make a spontaneous propagation, and multiplication of their species; *viz.* of those that endure in a good, and adverse fortune, in life, and death; but the conjunction of dead things to be dead, and barren. Doe but consider how many and various instruments both gold, silver, copper, iron, tin, and lead; as also earthen, glass, stone and other vessels of other materials have been already invented, and found out for the fixing of Mercury alone with gold and silver, but in vain, because they have no mutuall affinity. For although Mercury adheres to metals, or metals to it, yet that is not by reason of any affinity for multiplication, or perfection sake: for it appeares by experience that Mercury flies away in the fire, and leaves the gold, silver, and other metals. Where it is clear that they have no mutuall affinity requisite for the multiplication of metals, nor is it ever possible: For they that have a mutuall affinity embrace one the other and abide together for ever, although volatile, yet never leave one the other like gold and Mercury, when they are united together with the strongest bond, so that they can

never be ſeparated although with the ſtrongeſt fire. Wherefore a great care is to be had in the fixation of things joined together; which if they have a mutuall affinity, will embrace and retain one the other, without the help of any curious glaſſes with long necks. Of which things if thou art ignorant, abſtain from medling with them, as being more hurtfull then profitable, as dayly experience both mine owne, and others doe witneſſe. But that thou mayſt the better underſtand what things have a mutuall affinity one with the other: attend a little what I ſhall ſay.

Is not hee to be laughed at for his folly who will poure raine, or common water on gold, ſilver, and other metals to fix them? See therefore the unwiſe actions of many covetous Alchymiſts in ſo hard a matter, that ſpend their time in trifles, reaping according to what they have ſowed, and at laſt leave off their work which they have undertaken, after they have expended much coſt, and ſpent their labour in ſtenches, watchings, and cares. For I have oftentimes ſeene thoſe, that although they have not choſen common water for their *menſtruum*, yet have made choice of *May*-dew, ſnow or rain gathered in *March*, and water diſtilled out of Noſtock, or excrement of Starres; vegetables and animals, for their ſolvent, in which they have loſt their labour.

For as the radicall union of the aforeſaid things with metals is impoſſible: ſo never is any good to be produced from thence, by reaſon of their difference. And ſuch may deſervedly be compared to thoſe, who aſcending a very high ladder that hath many ſteps, doe preſently endeavour to flye from the lowermoſt to the uppermoſt; which is a thing impoſſible: ſo neither can there be any conjunction of things that doe ſo much differ. But as any one may eaſily aſcend the higheſt ſtep by degrees, ſo alſo any one may (which yet hee need not doe) join together extreames, by adding firſt a thing that is moſt neer to one of the extreames, and then to this another next to it, and ſo by conſequence untill you come to the other extream, which is a thing that requires a very long time, and is a worke without profit.

And

And if things be joined together that have the next affinity, the one will be delighted in the other, and the one will embrace the other, will overcome, and retaine it. As for example, there is a certaine ſalt, and that onely that can coagulate and turne into a body like to it ſelfe, even common water, which can be fixed in a very little time with and by one onely certaine minerall, which is very volatile. Minerals alſo may bee fixed by metals, and metals, (a thing which I never yet tryed) by a certaine thing more excellent then metals, without all doubt. But therefore it is not needfull in the fixation of minerals to begin with the coagulation of water, whereby it is turned into ſalt; and this afterward into a minerall; which would bee too tedious; but it is ſufficient to begin in things moſt near, in which nature hath begun to operate, but hath left imperfect: for then there is hope of gain, if contrary things are not joined together, elſe not. Behold how ready Nature is at hand to help any thing that is adminiſtred to it, which it can help: as for example, make ſalt of calcined Tartar by the help of ſolution and coagulation (but doe not take that for it, of which a little before mention hath beene made, which is farre better then ſalt of Tartar) of which after it is calcined obſerve the weight; upon which afterwards poure halfe the weight of moſt pure raine water; diſtilled to avoid the ſuſpition of impurity, then draw off the water gently in *Balneo*, or ſand, which againe poure upon the remaining ſalt of Tartar, and againe draw it off; and this doe ſo often as is needfull, untill all the water be conſumed. Which being done take out the ſalt, and weigh it being firſt made red hot in the fire, and thou ſhall find it to be increaſed in weight, which increaſe came from the water, and not elſewhere.

Note well that the cohobution of the water is to be reiterated often upon the ſalt of Tartar. Obſerve that by this means the water is convertible into ſalt by Art, &c. And if thou doſt not beleeve the converſion of things materiall

and corporeall, how wilt thou beleeve the converſion of things immateriall, as of the Sunne, and fire into a materiall fixed ſubſtance; of which thing ſomething ſhall bee treated in our treatiſe of *Aurum potabile*, and more at large afterwards in a treatiſe *De Generatione Metallorum*, if God permit: For you muſt know that the circulation of the elements, and things elementated, *viz.* how one is converted into another; and how they nouriſh and cheriſh one the other. As for example, The earth yeelds water, the water aire, the aire fire, and the fire againe earth, which if it be pure yeelds pure earth. But that thou maiſt underſtand aright how any thing to be fixed, may be retained by another by reaſon of affinity, obſerve the following example. The Husbandman caſting ſeed into the earth for to multiply, doth not chooſe any earth, but that which is convenient for multiplication, *viz.* an earth that is neither too dry, nor too moiſt. For the ſeed caſt in ſand cannot grow, and is loſt. For whatſoever is to be preſerved is to be preſerved by an equall temper; which by how much it is more equall or like, ſo much the more perfect ſubſtance it doth produce. Humidity therefore being neceſſarily requiſite for the growth of vegetables, without which they can neither grow, nor multiply, but the ſeed being caſt into moiſt ſand, and the raies of the Sunne acting upon that ſand, and ſuddenly conſuming the humidity thereof, whence followes the burning up of the ſeed in the dry ſand, becauſe there was no affinity betwixt the water, and ſand, without which the water could not be retained by the ſand, and conſequently the ſeed deprived of its nutriment; it followes neceſſarily, that ſome *medium* bee required, or bond joining and binding the raine, and ſand; *viz.* ſalt by the help whereof the raine water is retained by the ſand, that it be not ſo eaſily conſumed by the heat of the ſun.

The ſand therefore retaines the ſalt, and the ſalt the raine water for the nutrition of the bud. But every ſalt is not convenient for this buſineſſe. For although Chriſt ſaith

ſaith, *Luke* Chap. 14. verſe the laſt, that earth without ſalt is barren, yet any common ſalt is not to bee underſtood thereby. For ſome ſalts, as common ſalt, ſalt of Vitrioll, Allome, &c. doe not onely not doe good, but doe hurt to vegetables, hindring by reaſon of their dryneſſe their growth and increaſe. Now lixiviall ſalts promote them, that which country-men doe better underſtand, then our ſuppoſed Philoſophers: For they know how to help their barren ground with the excrements of animals, which are nothing elſe but a lixiviall ſalt mixed with ſulphur, makeing the earth fat and fertile. And by this meanes a *vebiculum* (rather a bond) is adminiſtred to the raine water, that it may the leſſe be conſumed by the heat of the Sunne. Moreover all ſeed (conſiſting in lixiviall ſalt and ſulphur) loves its like, from whence it borrowes its nutriment, which is obſerved by a few learned as unlearned. Husbandmen may wel be excuſed of their ignorance, becauſe they work onely out of uſe and cuſtome. But others that beare the title of learning not ſo: whoſe duty it is to render a reaſon of germination, who may deſervedly be aſhamed of their ignorance, being leſſe knowing then husbandmen. It is manifeſt that dung makes the earth fruitfull; but how and for what reaſon, not ſo; but if it did want nitrous ſalt, it would neither make it fertile, nor promote germination. For it is not unknowne that Nitre is made out of the excrements of animals. The goodneſſe therefore of the dung conſiſts only in the lixiviall ſalt contained in it, and not in the ſtraw.

But you will ask perhaps, why doth not any other ſalt help germination? Why is the ſalt of dung required to germination, and no other? Wee have already anſwered that, like are helped with like, and contraries are deſtroyed by contraries. For experience doth teſtifie that any ſeed conſiſts in lixiviall ſalt and ſulphur, and not in any acid ſalt; wherefore alſo it doth deſire and embrace its like. Let him therefore that will not beleeve it make triall

of

of the diſtillation of the ſeed of any vegetable, of which let him force over a pound by retort; and he ſhall ſee by experience, that not an acid ſpirit, but a flegme together with plenty of oyle, and volatile ſalt whitening the whole receiver, comes over; being that which no root or ſtalk can doe: For the chiefeſt vertu, odour, and taſt of vegetables, animals, and minerals is found in the ſeed, in which thing provident Nature hath done very well, whileſt ſhe attributes the chiefeſt faculties to the ſeed, being more obnoxious to injuries then the reſt, which is alſo preſerved, nouriſhed, and cheriſhed by its like.

Now this diſcourſe which might otherwiſe have beene omitted, was therefore appointed, that the cauſe of the germination of vegetables might bee made the more manifeſt; and that what things have beene ſpoken of attraction, and fixation of all things might the better be underſtood. The germination therefore, and multiplication of both minerals, vegetables and animals muſt bee ſpontaneous, and not forced, as is that barren and fruſtraneous of the falſe Chymiſts, becauſe preternaturall. Wherefore when you fix any thing bee cautious in the adding of any thing that ſhould retaine it, with which nothing can bee fixed. Fire indeed doth alwayes doe its office; but it knowes not how to help any preternaturall thing; which it doth wholly deſtroy, againſt which nothing can bee prevalent, unleſſe it bee rightly ordained according to Nature.

And thus much bee ſpoken for inſtruction ſake, to thee that intendeſt to fix any thing, leſt otherwiſe thou loſeſt thy labour.

Of

Of the making of the beſt crucibles.

THe beſt crucibles that are requiſite for the fourth furnace, not being found in every place, I thought it worth while to ſet down the manner of making them: for I am not ignorant how oftentimes many for want of theſe are conſtrained to be content with thoſe that are uſeleſs, and truly with great loſs of metals, whileſt the crucibles are broken in the fire, and conſequently with a tediouſneſs in drawing them out of the aſhes.

Chymiſts have been in a great error a long time, and not only they but alſo goldſmiths, and they that ſeparate metals, as alſo others that need the help of crucibles, who perſwade themſelves that the beſt earth that is fit to make the beſt crucibles is to be found no where but in *Haſsia*; and therefore with great charges have cauſed that Gibſenſian crucibles be brought over; not conſidering that almoſt in every place in Germany ſuch earth is to be found, which indeed is a very great folly of men, proceeding from the not knowing of good earth which is to be found almoſt every where. I do not deny but that the earth of *Haſsia* is very good for crucibles, tyles, retorts, and other veſſels which are to be ſet in a very great fire, for which cauſe alſo is commended Gibſenſian, and Waldburgenſian crucibles.

A few yeers ſince ſome have made their crucibles, and other veſſels that will endure the fire well, of earth brought out of *England*, and *France* into *Holland*, which have retained metals very well in the fire, but not ſalts, becauſe they are too porous and not ſo compact as thoſe of *Haſsia*, wherefore thoſe of *Haſsia* are ſtill preferred before others, retaining better, metals, and ſalts. But although this earth be brought from thence to other places, yet ſuch ſtrong crucibles could not be made thereof, the cauſe whereof being not the conſtitution of the aire, and place to which ſome have falſly imputed it, but an error in the making and burning of them. For in *Haſsia* there is a great abundance of wood, of which there is no ſparing

in the burning the crucibles even to a ſtony hardneſs, which could not be done by a ſmal fire of turffes.

The like errour is committed about ſtone pots, and other veſſels which are made at *Frechemium* and *Siburgus* and other places neer *Colen*, which are carryed almoſt through all Europe, the goodneſs whereof is aſcribed only to the earth, and not to the making. But now experience hath taught us that any good earth doth become ſtony in a violent fire, without reſpect of the place where it is taken. Wherefore it is very probable, being a thing poſſible, that ſuch veſſels are made elſ where : for every earth being burnt retaining a white colour, *viz.* with an indifferent fire, makes pots, and crucibles porous, but with a ſtronger, and with a longer delay, compact like glaſſe, eſpecially if common ſalt be caſt in a plentiful manner upon them, being burnt with a very ſtrong fire, becauſe it addes to them being very well burnt within an external glaſſes ſmoothneſs, by which means they will be the better able to retaine ſpirits in the fire. Wherefore let no man doubt concerning the making the foreſaid veſſels of any other earth that is white in burning, with the help of a very ſtrong fire: which by how much the greater whiteneſs it gets in burning, by ſo much the better and excellent pots it makes; and ſeeing there is a great difference of making crucibles to be ſet in the fire, and of ſtone pots retaining liquid things, I ſhall ſhew the manner of making both, *viz.* of ſtone pots belonging to the firſt and ſecond furnace, and of crucibles to the fourth, and thus it is.

He that will try the goodneſs of white and pure earth, *viz.* whether it grows ſtony in the fire, let him caſt a peice of crude earth of the bigneſs of a hens egge into a very ſtrong fire, obſerving whether it doth quickly or ſlowly cleave and break in pieces; which if it doth not cleave and become powder, although it may have ſome cracks, is good earth, and fit for burning, if ſo be the mixture be well made, in which lyes the art.

The earth that is to be burnt for pots, receivers, and botles, need no other preparation then that for bricks, which becauſe for

for the moſt part it is too fat, you muſt mixe with it clean ſifted fuſible ſand, tread it with your feet, and knead it with your hands before veſſels be made thereof; which being made are to be dryed in the heat of the Sun, or in ſome other warme place; and being dryed are to be burnt in a very ſtrong fire for the ſpace of twenty four or thirty hours, on which in the mean time you may caſt ſalt if you pleaſe, which being thus burnt do like glaſs retain eaſily all liquid things. But let him that makes crucibles, tyles, bricks and other veſſels appointed for a very ſtrong fire, uſe more diligence in the making of them. And truly firſt he muſt pound very ſmal with a wooden hammer, the earth being dryed wel in the Sun, or elſwhere, and being pounded ſearſe it through a great ſearſe, & to one part of the ſifted earth mix two, three, or four parts (the ſaltneſs of the earth being conſidered) of the earth burnt in a potters furnace, and powdered, which being mixed with a ſufficient quantity of water he muſt tread with his feet, and afterwards knead with his hands, and the earth will be prepared for the making of veſſels, and when he makes crucibles and teſts, let him provide for wooden moulds both greater and ſmaller, made in a turn, by the help whereof they may be made; for the aforeſaid veſſels cannot be formed by the uſual art of the potters; becauſe the matter of them muſt be very lean, appointed for a moſt ſtrong fire, wherefore commonly they are made by the help of moulds after the following manner.

Let a piece of the prepared earth be applyed with your hands to the mould, which you muſt hold in one hand, applying and fitting the earth thereto with the other, or hold it with your legs, that the earth may be applyed with both your hands. Alſo you muſt firſt rub the mould very well with clean ſifted ſand, for elſe the earth will ſo ſtick to the wooden mould, that a crucible can ſcarce be taken off without danger, which being done, it is further fitted by ſtriking it with a wooden inſtrument ſmoothed for the purpoſe, by which means the crucible lyes very exactly upon the mould, for by this means crucibles are made very ſtrong; which being done alſo let the crucible be taken off, and ſet upon a board, and be

 dryed,

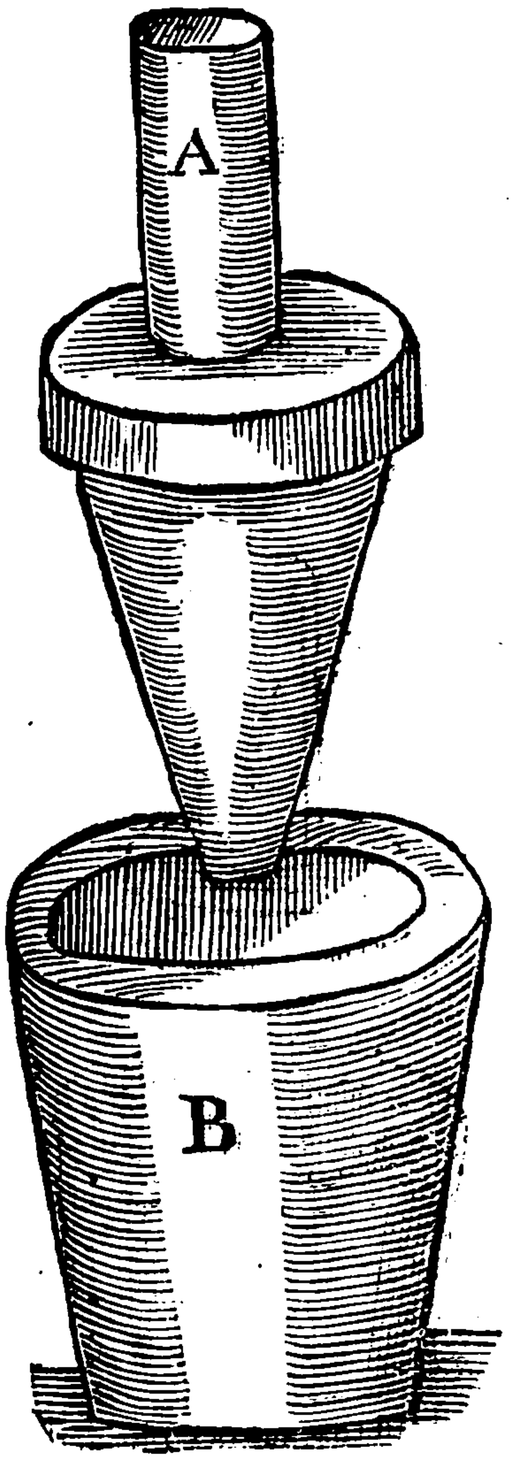
dryed, firſt in the aire, then by the heat of the fire, or ſun, and then be burned in the firſt chamber of our fourth furnace, or in a potters furnace. And if you intend only to melt metals, and not ſalts, you need not burn the crucibles if they be well, and exactly made.

Now this caution is to be obſerved in melting by the help of crucibles not burnt, that you muſt give fire above by little and little, for fear of breaking the crucibles feeling a ſuddaine heat.

Now that they may be made equal in ſtrength, weight, and thickneſs, you muſt weigh one crucible rightly made by the help of the mould in one ſcale, and a piece of the prepared earth, which is to be put into the other ſcale, and if they be equal in weight, take out that piece, and put in another; and this do ſo often, till you be come to the number of the crucibles which you have made: By this means they are made equal, and you need not cut off any overplus of the earth when it is fitted to the mould, becauſe all are made equal, by reaſon of the equal weight of the matter of each of them, and the work is ſooner done then otherwiſe.

This indeed is the beſt way but tedious and laborious, where conſidering the matter a little more ſeriouſly, I found at laſt that the following way is far better then the former: whereby not only ſtronger crucibles are made, but alſo more in one hour, then in that former common way in three or four. Where firſt the mould is made of latten (on which I adviſe you to apply the earth) ſignified by the letter *A. viz.* that being the beſt, which is made by the help of fuſion. Then the counter-mould anſwering this, ſignified by the letter *B.* yet ſo that that do not enter too deep into this, not touching the bottome by the diſtance at leaſt of one fingers breadth; but in greater crucibles a greater thickneſs of the bottome is required, as the practiſe will teach thee.

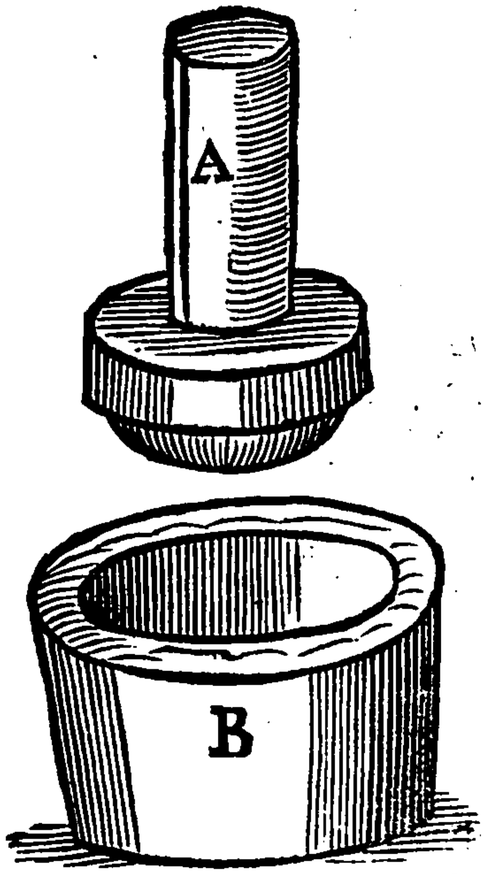
Let



Let him therefore that is making crucibles apply the earth to the mould, as hath been above ſaid in the firſt manner, which being done, let him again take off the crucible that is formed or caſt, and ſet it in the aire to be dryed. Then having firſt made a ſufficient number of crucibles, let him make the mould clean from the earth or ſand, and annoynt it with greaſe, or oyle Olive taken up with a ſponge, as alſo the counter-mould, into which let him put the crucible being halfe made and dryed, and into this the mould, which he muſt ſtrike above twice or thrice with a heavy wooden mallet, that the earth may be rightly, and exactly applyed to the mould; which being done let him take off the mould, and turn the counter-mould together with the crucible, which let him knock a little againſt the forme (where the crucibles are made) and let him take in his hand the crucible falling from thence; which he muſt afterwards dry and burn, as hath been above ſaid in

the firſt manner. And by this way are made the beſt, and the beſt proportioned crucibles, fixed and ſmooth, not only for melting of metals, but alſo for minerals and ſalts; the like to which I never yet ſaw, as being without all danger, if ſo be rightly made of the beſt earth. And that they may be made equal in weight and ſtrength, they muſt be weighed as before hath been ſaid. And this labour is eaſie and pleaſant, when they are made with ones owne hand, and that greater or leſſer at pleaſure.

After the ſame manner alſo are made teſts *viz.* by the help of the like kinde of moulds, which muſt not be long but plain like teſts, as it appears by the annexed figure, *A.* and *B.* Not only teſts but alſo cuples are made by the help of theſe moulds.



Now teſts are made more eaſily this way then crucibles, becauſe the earth only is weighed, and being handled with the hands is put into the counter-mould, which then you muſt with the upperpart preſs hard; that it may be made conformable to the mould, *viz.* plaine, not long, that which may eaſily therefore be made; and for this cauſe thoſe crucibles are eaſily again taken out, *viz.* if the mould be turned, or the counter-mould be a little knocked againſt the ſides of the form. And if the earth be beaten in too faſt that it goes out at the ſides, you muſt cut it off with a knife, or elſe the crucible, or teſt

teſt is hardly taken out, ſticking to the brims, that which practiſe will teach thee. For all things cannot be ſo accurately demonſtrated by pen.

And take this for a caution, that thou do not make thy teſts and crucibles of earth that is too ſoft, but of that which is half dry, otherwiſe they are hardly taken out of the moulds; for that is more eaſily and rightly applyed to the mould. And if thou proceed rightly according to the preſcript, ſcarce one crucible of a hundred will be loſt.

This alſo is to be obſerved, that the ſuperfluous earth which is cut off muſt not be mixed againe to the maſs for crucibles, becauſe it is ſpoyled with the fat, or oyle that is ſmeered over the moulds, and therefore cannot be ſo well mixed againe, and being burnt cleaves, for which cauſe bad crucibles are made. Wherefore it is to be kept apart for mending of furnaces that are ſpoiled with an extraordinary heat of the fire; or for cover of crucibles that are to be made by the help of the hands only, or of moulds, which we cannot want, if we would work all things exactly.

Now for tyles, and other veſſels that ſerve for diſtillation, and melting, they are made by the help of wooden moulds after this manner. Let the mould be made exactly like to tyles, and other veſſels, then cut off leaves from the earth being very well prepared, with a copper wier upon two equal tables of wood, and then a piece of the earth is to be laid with a knife upon the mould, that it may there get ſome hardneſs; which afterward is to be taken away, dryed well, and burnt. And if any thing further is to be done, *viz.* by cutting off, or adding, it muſt be done by earth half dryed, or a little hardened. For by this means any one may get for himſelf earthen veſſels that are neceſſary, without much coſt or paines for certainty ſake. For thoſe that are ſold are negligently made, in which oftentimes in the drying cracks which are made are filled up with ſome earthen liniment, before they are burnt, which therefore are not durable in the fire, but are broken, and that oftentimes not without great loſs of the metal, which is again to be gathered out of the aſhes by the help of a tedious waſhing.

washing. It is better therefore to work those vessels with ones own hand for certainty sake. For not all & every crucible can alwayes and every where be made equal, and be of a like durableness in the fire, though they are made most diligently: and therefore a consideration being had of their goodness they may be used for divers uses, and the better may be used in the melting of the better metals. But let no man perswade himself that all these can indifferently hold in the fire, although they be the best of all, how many so ever you make; for I never yet saw any earth which could hold litharge in the fire and salt of Tartar, because the best that ever I saw is not free from penetration of them, that which is the greatest impediment of some profitable operations, which therefore are omitted.

And let this which hath been spoken suffice concerning the making of crucibles: let every one therefore that hath a care of his business use better diligence for the time to come in the making crucibles for more certainty sake, and he will not repent of his labor. Now how tests and cuples may be exactly applyed to the aforesaid moulds is not my work at this time to shew, because many yeers since it hath been done by others, especially by that most ingenious man *Lazarus Ercker*, whose writings concerning the manner of making of tests and cuples I cannot mend, to which Authors I refer the reader, where he shall finde sufficient instruction and information concerning this matter. But there are also other tests of which I shall say nothing in this place, but elswhere happily may, by the help whereof lead is bettered in tryal if it be sometimes melted againe.

Of the vitrification of earthen vessels belonging to the first and second furnace.

IN the defect of glass instruments belonging to our first furnace you may make such as are very useful of the best earth, which being well glazed or double glazed are sometimes better then old glasse, especially those that are made of earth that

that do not drink up the spirit such as is found almost every where, which becomes stony being burnt; now the art of burning hath not hitherto been so well known, of which something hath been said already where the earth being burnt with a very strong fire is made so compact as that it becomes hard and solid as a stone. The potters furnaces being too weak for this strong burning, there is required a peculiar furnace for this work, in which the strongest fire for the burning of them may be made; But because no body thinks to build such an one onely for some few vessels not worth the spending of costs and labors: there is yet another way of vitrifying of any sort of earth (red clay only excepted) not to be slighted if well done, especially if the matter vitrifying when it is cold after the burning is ended, doth not cleave and chop, and it is not hurt by corrosive spirits as that glass made of lead retaining spirits, as well subtile as corrosive, as that white vitrification of the *Italians* and *Hollanders*; you must therefore in defect of a fitting furnace, wherein vessels being burnt become stony, make them of the best earth and glaze them with the best glass of tin, but not of lead; and by how much the calx of tin goes into the vitrifying mixture, so much the better is it made; for tin being reduced into a calx with lead, hath no more affinity with corrosive spirits; wherefore it is more fit for vitrification. But he that will not not be at so much costs, let him vitrifie with Venice glass powdered, which vitrification also is not to be slighted, requiring a very great heat for the burning, and therefore flowing with great difficulty in these common potters furnaces; wherefore you must mix some borax with the glass that it may flow so much the more easily in the potters furnace. Else you must prove upon the earthen vessels being burnt, water mixt with glass, so that the glass may stick to them every where exactly, which afterwards being very well dryed, shall be gathered together into one heap artificially, lest they take up two great a space like earthen dishes that are to be burnt, and afterwards compass them round about every where with burnt bricks, a hole being left open above for the casting in of

coals, yet ſo that the bricks be diſtant from the veſſels the breadth of a hand, whereby the coals being caſt in above, may the more freely round about go down to the bottome: which ſpace being filled with dry coals you muſt put upon them other living coales, that the fire being kindled above, may by little and little burn downward and perform its work; which being ſo done the veſſels will be out of all danger, if ſo be they are well dryed.

The fire being kindled and burning, you muſt cover the hole with ſtones, untill the fire of its own accord be extinguiſht; the coals being ſpent and the veſſels become cold.

N. B. Now if there be a great heap of veſſels, you muſt the firſt coals being burnt, add freſh coals once more; for elſe the veſſels being placed in the midle, cannot be ſufficiently burnt, nor the glaſs ſufficiently flow; wherefore caution is required in the governing of the fire this manner, where if all things are rightly done, the veſſels are better and more truly burnt and vitrified then in any common Potters furnace whatſoever; yet with greater danger to the veſſels then in a potters furnace compaſſed about with wals. But let him that burns crucibles and other ſmaller veſſels, burn them in our melting or diſtilling furnace, being covered with coals, giving fire firſt above, for ſo I my ſelf was wont hitherto to burn all my crucibles, and burn and glaze all other diſtilling veſſels; and this in defect of fitting furnaces is the beſt way of burning and vitrifying, where in three or four hours ſpace, the veſſels are exactly burnt and vitrified. Now the earth that is burnt quickly muſt be the beſt and durable in the fire, for fear of the breaking of ſome of the veſſels. Let him therefore in this caſe for ſecurity ſake uſe our fourth furnace, who hath built it with his chambers, in the firſt whereof he may burn and vitrifie without any danger. But that foreſaid way of burning and vitrifying, is not to be ſlighted; wherefore I would have thee be admoniſhed to be cautious in giving of fire that you give no more or leſs then you ſhould, leſt afterwards you impute the cauſe of your error committed to me whileſt the veſſels are broke as if I had not wrote the truth, but to thy ſelf that

that erreſt, and muſt for the future be more diligent and cautious in this work.

I know other vitrifications of divers colours hitherto unknown, and indeed moſt ſecret, not to be communicated to every one indifferently. But he that knows to reduce metals into a true glaſs, retaining the colour of his metal, is indeed the inventor of a very great ſecret, to whom if he conſider the matter more profundly, and exerciſe himſelf therein, a gate is open, with the bleſſing of God, to a greater light.

There are alſo other vitrifications, with which the earth being covered doth appear, as if it twere adorned with gems, but becauſe it is not our purpoſe now to treat of ſuch kinds; I ſhall make an end of vitrifications, onely one excepted, which yet I ſhall communicate for the ſake of the ſick and Phyſitians, and it is this.

Make little earthen cups very ſmooth and white of the beſt earth being burnt: then make the following glaſſes to flow in a very ſtrong crucible, in which dip one cup after another, being held with tongs, and firſt made red hot in ſome little furnace, letting them lye covered therein for a while, that the earth may the better attract the glaſs, which being done, let them be taken out and be ſet again into the aforeſaid collateral furnace, where they were before made red hot, when one is taken out dip another in the molten glaſs in its place, which alſo is again to be ſet as the firſt into the aforeſaid furnace; and this is to be reiterated ſo often untill all the pots be covered over with glaſs: all which being done, the furnace is to be ſhut cloſe every where, that the winde enter not into it, and ſo it is to be left untill it become cold of it ſelf, and the glaſs covering over the cups remaine intire, which otherwiſe cannot be if the cups be ſet in a cold place; now the glaſs is made after this manner.

Take of crude Antimony two parts, of pure nitre one part, grinde them well being mixt together, kindle the mixture being put into a crucible with red hot iron, and the ſulphur of the Antimony will be burnt together with the nitre, a maſs of brown colour being left behinde, which you muſt take

out while it is hot with a ſpatle that it may coole, which afterwards being melted in another ſtrong crucible for the ſpace of half an hour, or an hour, makes that glaſs with which the aforeſaid cups with their covers are covered over.

Of the uſe of the aforeſaid cups.

THere is no one that can deny that Antimony is the moſt excellent of all vomitives, wherefore ſo many and ſo various preparations have been invented by Phyſitians for the taking away of the malignity thereof; whereof I have ſhewed ſome, together with the uſe thereof in the firſt and ſecond part of this book, where alwayes one is better then another; yet nothing withſtanding tis conſeſt that Antimony reduced in o glaſs, is ſufficient to purge the ſtomach and bowels from all corrupt humors, and that without all danger (being rightly adminiſtred) as well by vomit as by ſtoole, by which means many grievous imminent diſeaſes are not only prevented, but alſo preſently are cured.

But you inſer, that this is yet a crude and imperfect preparation, and therefore not ſo ſafe. To which I anſwer, that Antimony that purgeth, needeth no great preparation, for if all the crudity thereof were wholly taken away by fixation it would no more cauſe vomiting or ſtools; wherefore the aforeſaid glaſs of Antimony is not to be feared, becauſe it is not dangerous, but may ſafely be given to children that are one or two yeers old, but not in form of a powder, but in infuſion or extraction of its chiefeſt vertue made with honey, ſugar and wine, ſweet or ſowre. After which manner being given it attracts from all the bowels all vitious humors, and evacuates them aſwel upward as downward without danger, of which thing elſewhere more at large. Let him that uſeth the aforeſaid cups infuſe one or two ounces of wine, and ſet them a whole night in ſome warm place, and the wine will attract from the glaſs ſo much as doth ſuffice it, which afterwards being drunk in a morning, doth perform the ſame as infuſion made with the powder of Stibium; and this is a more delicate way

way then the other, becauſe a cup is ſent to the patient that he may infuſe in it the ſpace of a night two or three ſpoonfuls of proper wine, placing it in ſome warm place, which he may drink up blood warm in the morning, with a due ordering of himſelf afterwards. Which in my judgement is a more delicate way, being made with ones own wine, and ones own hand, then that tedious way of potions both large, bitter, and nauſeous. And this cup may oftentimes be uſed, and if at length the wine ſhould not attract ſufficiently, the cup with the wine is to be ſet in ſeething hot water for a little time, that the wine might the better attract, and work, when need ſhall require. Now he that gives ſuch kinde of cups to others muſt inſtruct them concerning the ordering, and adminiſtring of the ſame. One cup is ſufficient for the maſter of a family, with his whole family for all the dayes of their life. It is not to be uſed by all and every one, and in all diſeaſes indifferently, but only by thoſe that are ſtrong and young, and where the principal parts are not hurt. Cups may alſo after another way be covered over with glaſs without Antimony, as follows.

Sublime *auripigmentum* in a glaſs or earthen gourd; and take the gallant golden coloured flowers thereof, which being after a peculiar manner melted yeeld a red and moſt beautiful glaſs, almoſt like oriental ruby, wherefore being broken in peices may be uſed in ſtead of an ornament; but this is more ſoft, and brittle then glaſs of Antimony. This glaſs or thoſe flowers of *auripigmentum*, which are not yet reduced into glaſs, do notably devitreat the aforeſaid cups with a red beautiful colour.

He therefore that will vitrifie the aforeſaid cups muſt firſt heat them red hot in a fire made with coals, and being thus hot dip them in the aforeſaid melted flowers, and being taken out thence put them under an earthen, or iron red hot veſſel, and there let them coole; which do perform the ſame things as thoſe which are ſaid of the Antimonial cups.

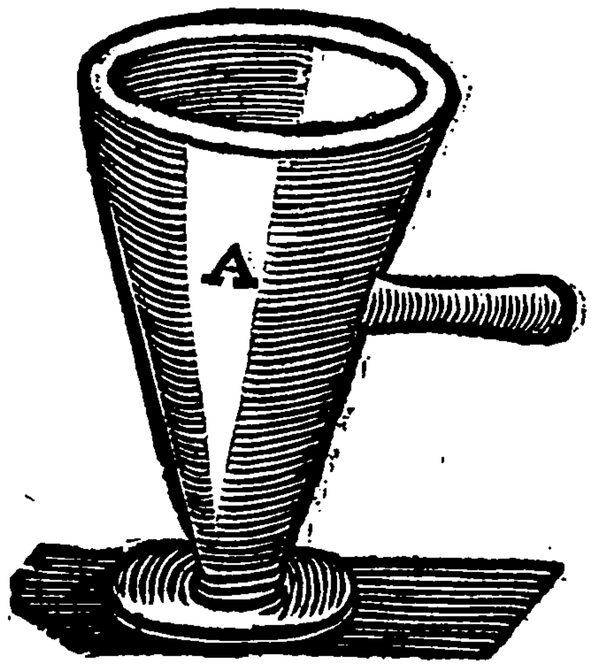
Theſe cups are not dangerous, as to be feared, becauſe as Antimony is corrected by calcination, ſo *auripigmentum* is by ſublimation: from which if all the malignity be taken away either

ther by fire, or by nitre, the vomitive vertue is taken away, as afterward ſhall be demonſtrated more at large in theſe five parts, when they ſhall come forth again with enlargements, *viz.* what purging things are, and how they put forth their vertues, a conſideration being had of their malignity.

There are alſo other wayes of vitrification, and indeed very fine, and moſt deſireable by all, if they ſhould be communicated; but becauſe it is not now my purpoſe to treat here of mechanical things, but onely of ſome particular vitrifications of veſſels belonging to our furnaces, I am reſolved to omit them at this time, and make an end of theſe things. I am reſolved, God willing, to ſet forth theſe parts more corrected, and in a larger manner, where many excellent things now omitted for ſome reaſons ſhall be publiſhed, and commuincated.

Wherefore I wil now put an end to this fift part, where although I might have added ſomething that is ſingular concerning artificial furnaces, yet becauſe time will not now permit, it ſhall be deferred to another time and place, where we ſhall treat further of the examining, trying and ſeparation of metals: For the beſt way of melting of metals in a greater quantity hath not yet been known: And although they that deal in minerals perſwade themſelves of the perfection of their art, yet I can demonſtrate an eaſier, and more compendious way of melting of metals in a ſhorter time, in a greater quantity, and with leſs coſts and paines. Of which more at large elſewhere, wherefore (Courteous Reader) be contented with theſe things, and if I ſhall ſee that theſe few things ſhall be acceptable to thee, I will ſometime hereafter for thy ſake and to thy profit communicate *wonderful ſecrets* which the world will not believe, and which hitherto are hid, either out of envy or ignorance.

A



A Cup or melting veſſel belonging to the fourth Furnace.

N

AN APPENDIX.

TWO yeers since I began to publiſh my new invented furnaces where alſo there was mention made of ſome ſecrets, which though I thought never to divulge; yet nevertheleſs I underwent many troubles for the communicating of them. Wherefore I beſeech every body that they would no more create troubles to me or to themſelves by their petitions or writings, becauſe for certaine cauſes I ſhall for the future communicate nothing but thoſe things which follow. Expect therefore patiently the time of another Edition, when theſe five parts ſhall come forth more corrected and enlarged, and many moſt choice ſecrets ſhall be communicated, which were for certain cauſes omitted in the firſt Edition.

I ſhall now God willing communicate thoſe things which follow, yet upon this condition (becauſe many are ſuch, that by means thereof thou maiſt with a good conſcience, without hurt to thy neighbour, through Gods bleſſing, get great riches) that thou be mindful of the poor, and a good ſteward of riches

riches got honeſtly, and uſe them to the glory of God and the eternal ſalvation of thy ſoul.

The preparation of corn, as of Barley, Wheat, Oates, *&c.* of Apples, Pears, Cherries, *&c.* where fermentation being made they do yeeld by way of diſtillation a pure ſpirit very like the to ſpirit of wine without great coſts; of the remainders whereof if the matter were corn, may be made good beer, or vinegar; but if the matter were any kinde of fruit, as apples, pears, a very good drink like to wine, ſo that by this means thou maiſt finde a double profit, by which thou maiſt not onely have whereby to live honeſtly, but alſo to lay up for thy heirs.

An excellent and wholeſome drink of fruite, and corn, that is durable and like to Spaniſh, French, and Rheniſh wine.

A diſtillation of the *Aqua vitæ* of certaine vulgar things not coſtly and like to the *Aqua vitæ* of French and Rheniſh wine.

A preparation of ſugar like to the Weſterne, and of tartar like to the natural Rheniſh, out of honey and not coſtly; where one pound of ſugar doth not exceed the price of eight or ten ſtivers, and a pound of tartar, that doth not exceed the price of two ſtivers.

A peculiar purification of crude tartar without loſs, and a reduction of it into great cryſtals not coſtly, ſo as the price of one pound doth not exceed ſix ſtivers.

The taking away of the ingrateful taſt and odour of honey ſo as afterwards there may be made from thence a certain good *Aqua vitæ* retaining no more the ſmel and taſte of honey: alſo a very good Meade or Methegline like unto very good wine, with which the ſame things may be done as with the beſt wine.

A preparation of Meade out of raiſins, great and ſmal, very like in all things to Spaniſh wine; out of which alſo is made a very good vinegar without great coſts.

A preparation of wine and good vinegar of wilde grapes.

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Durable and wholeſome drinks of gooſeberries, barberries, mulberries, ſtrawberries, and the like.

The mending of troubled acid muſty wines, *&c.*

The preparation of a very good vineger out of certain vegetables which are to be found every where, which may be compared to that which comes out of France, and in a great abundance, whereof two runlets of nine Gallons do not exceed the price of one Ryal.

The promoting of the ripening of wines of the cold countries of Europe (a very few that are very cold being exempted) that they may yeeld very good ſweet and durable wines, whereas otherwiſe they could come to no maturity being very like to thoſe which hotter countries yeild.

A certain ſecret way of carrying wines from mountainous places, where carts, ſhips, and other commodities are wanting, where the carrying of ten pipes, doth not exceed the price of one pipe otherwiſe carryed, ſo that by this means, outlandiſh wines may be brought to any place with great profit.

A very good and eaſie preparation of verdegreaſe out of copper, whereof one pound doth not exceed the price of ſix ſtivers.

A new and compendious diſtillation of vinegar, of which a runlet of eighteen gallons doth not exceed the price of half a ryal, with which many things may be done, eſpecially the cryſtallizing of verdegreaſe, of which one pound prepared after this manner, doth not alſo exceed the price of halfe a Ryal.

A compendious and very eaſie way of diſtilling a very ſtrong ſpirit of urine, and that without any coſt and paines, ſo that twenty or thirty pints ſhall not exceed the price of one ryal, being very excellent in medicine, Alchimy and Mechanique affaires, by the help whereof a moſt beautiful blew vitriol may be made out of copper, being very profitable in Alchimy and medicine, making ſilver ſo fuſible, that by the help thereof glaſs veſſels, as baſons, diſhes, and candleſticks, *&c.* may be ſo guilded as to be taken for ſilver.

A way

A way of diſtilling the ſpirit of ſalt in a great quantity, and that with ſmal coſts, ſo that one pound thereof will ſcarce exceed the price of *6.* ſtivers being very excellent in Alchimy, medicine & other arts, eſpecially for the doing of theſe following things, *viz.* the ſeparation of gold from ſilver without hurt to the cups or other things, alſo the ſolution and ſeparation of gold mixt with copper and ſilver by the force of precipitation, where the *menſtruum* that is preſerved, may again be uſed for the ſame uſes, which ſeparation is the eaſieſt of all other humid ſeparations, whereby gold is reduced to the higheſt degree.

The ſeparation of volatile ſparkling gold out of ſand, *&c.* very profitable, without which otherwiſe it could never be ſeparated, neither by the helpe of waſhing, nor by Mercury, nor by the force of melting.

An Artificial ſecret, and hitherto unheard of trying of ſtubborn metals finding out their tenaciouſneſs, which otherwiſe could not be found out: for oftentimes there are found golden mines, which are ſtubborn, in which nothing is found out by that common way, and therefore they are left unlaboured in, and ſometimes elſewhere, where there are not found mines of metals, there are found other things, as white and red talc, that yeeld nothing, being tryed the common way, or very little, all which yet abound with gold and ſilver which may be ſeparated this way.

A new and unheard of compendious way of melting mines in great plenty, where in the ſpace of one day by the heate of a certaine ſeparating furnace, more may be melted then by the common way in the ſpace of eight daies, where not onely coſts are ſepared, but where alſo is hope of greater gaine.

Another way for the better proving of things melted, and a new way of ſeparating ſilver from lead.

A very ſpeedy way of melting minerals, whereby they are melted in great plenty, by the help of pit coals, in defect of other coales.

The fixation of minerals, ſulphureous, Arſenical, Antimonial; and others that are volatile, which cannot be retained

and melted by the force of fire, by the help of a certain peculiar furnace with a grate, so that afterwards they may by infusion yeeld gold and silver.

The melting of gold and silver, that sparkles, and is rarified, out of sand, pure clay, flints, *&c.* by the help of melting.

The separation of gold lying hid in baser minerals and metals most profitable, which cannot be done the common way.

A very quick Artificial and easie separation of melted gold and silver by the help of fusion, so that in the space of one day, by the help of one furnace, some hundreds of Marks may be separated with far less costs and labour, then that common way by cement and *Aqua fortis*.

The reduction of elaborated gold of chaines and other ornaments unto the highest degree; also the separation of gold from guilded silver, by the help of fusion, by which means a hundred marks are more easily separated then twenty of the common way.

A certain way whereby more silver is separated from lead them by copper.

A separation of good gold from any old iron, which although it be not a labour of great gaine, yet it is sufficient for those who are contented with a few things.

A separation of gold and silver, from tin or copper, according to more or less. The maturation of mines, so that they may afterwards be able to yeeld more gold and silver, then by the common way, also the separation of gold and silver out of Antimony, Arsenick, and *Auripigmentum*.

The separation of the external sulphur of *Venus*, that the son *Cupid* may be born.

The separation of silver from the cuples, into which it enters in the tryal without melting or any other labour or cost.

The preparation of divers earthen things to be done in any part of the world, like to the Porcelane, that hold fire and retaine spirits.

A cer-

A certain Allome exalting and fixing any colour, especially requisit for scarlet and other pretious colours, with a certain prepetual cauldron, that doth not alter colours, and is not costly.

A making of colours for painters, as of purple gum, ultramarine, not costly, and especially of that rich white, never before seen, like to pearl and Margarites, also a peculiar colouring of gold and silver.

FINIS.

A Preface to the Reader.

WHAT moved me to annex an Appendix to those five books of my Philosophical Furnaces, you may presently see in the entrance thereof, which therefore I accounted superfluous to repeat. Moreover my aime was to declare to the world, how great, and hitherto unknown, and most profitable secrets God hath reserved for this age for the sustaining of our life, not doubting, but to provoke, and excite many perverse men to a due thankfulness to God. But the contrary fals out: For the Appendix which you have seen hath begot great admiration in many, as well learned, as unlearned, that God should reserve so great and hitherto unknown secrets to be revealed to this age, who therefore have given God thanks. But others, and indeed very many, have according to their usual manner derided the Appendix, and have proclaimed the contents thereof for things impossible and lyes, whereof even some that are scornful, and slanderous (being ignorant of nature and art) have broke forth into these words. It is a wonder that Glauber doth not teach how to make bread of stones, since he hath taught the possibility of making wine out of water, that husbandmen for the future may not be at so great labors. Such sort of cavillations as these, men have such devised in their meetings, whereof some would seem learned and wise, who by reaso

reason of too much wisdome (folly) know not themselves, who indeed are blockish, unlearned, rude, and proud asses, although puffed up, despising others far more skilful; whose ignorance I do so much admire, as they do my writings, seeing now with open eyes the reasons of many mens silence, to whom God hath given a singular knowledge of natural things, who left nothing to posterity. But it matters not much, For it is impossible to please all; as experience can witness from the beginning of the world till this day, wherefore there is nothing strange. But how ever it be, yet it is no wonder that any one should take it ill that the ingratitude of wicked men should be a reward of his labours, as also their cavillations and contumelious reporting of mens writings to be false and lyes. Why doth not Glauber, if he had the knowledge of so great things, of which he made mention in the Appendix, make himself rich, but lives in idleness? Therefore they are nothing but vaine dreams. Thou dost judge very excellently of colours, which thou never sawest, to whom I am not constrained to give an account of my idleness; of which if thou hadst asked me, without doubt I had given thee satisfaction, and had prevented thy foolish censure. But such kind of men betray their own ignorance of things that are to be performed by fire; for he that goes about to catch fishes, doth not cast his net upon the mountaines, but into the water; so he that gets his living in metals must needs be conversant in these places where metals are found.

Now that I have lived in these places so many yeers with disprofit besides my will, hath been a hindrance to my fortune, which elswhere, where I might have operated, perhaps might have happened to me. But it is better to possess a few things in peace, then many things in the hazardousness of a dreadful war. But now I am fully resolved, whether that most desired peace of Germany succeed or no, to betake my self to such places, where I may have opportunity to handle coales and mines; which when I have done, let cavillers, if they will, enquire, whether I do any thing, whereas indeed in this place I was not minded to attempt any thing whereby to be rich, by reason of inconveniences: For in this place I had enough to do, all things being dear, to get an honest livelyhood, and to search into the secrets of nature for thy good, and to make experiment in less things, greater being neglected. Hence the cause of my slothfulness will appear to thee; wherefore do not thou any more judge rashly, but minde thine own affaires, and let other men alone. And this is

is the cause of explaining the Appendix which was made not for the general and universal communicating of those secrets, the knowledge whereof (as you may guess) is not so easily to be attained to, but for the demonstration of the truth, that toyes and and trifles may no more be esteemed by the incredulous and ignorant, but the profitable secrets of nature (the inventor whereof I can boldly pronounce my self to be) prized, and received by all, and every one.

Wherefore from the beginning to the end I shall treat of each of them briefly, and shall give the explanation of each, as far as I may without prejudice, that they may be received not for dreams, but for natural sciences, certaine, and most profitable, for the confutation sake of cavillers.

Annotations upon the Appendix of the *FIFTH BOOK.*

PARAGRAPH I.

A preparation of corn, wheat, barley, oates, &c. also of pears, apples, cherries, and other tree fruits, to be performed by the help of a certain fermentation, whereby through the help of distillation they yeeld a very good and most pure spirit, very like to that which is made of the lees of wine, without great costs: where also from the remainders of the corn (the burning spirit being drawn off) may be made a very good beer or vineger; and of the remains of the fruits a very good drink like to wine. Whence there is a double benefit, so that any one may not only have from thence wherewith to live, but also to lay up.

THis Art hath appeared to many very strange, of which no man yet hath made mention. Some having knowledge of the common distilling Art, have thought that that which is to be distilled, having a burning spirit is to be put into a still, yeelding all its spirit in the fire, nothing thereof being left in the remainders: This is to be ascribed to their ignorance, they not knowing to give an account of their operations, operating only out of use and custome things which they have seen & heard, not considering with themselves, that there may be

be given a better or nearer way of distilling of spirits; with whom I will not contend, but only shew in brief, which way all kindes of corn, and fruits being distilled yeeld more spirits then that common way, or at least how, the spirit being abstracted, something may be made of the residue of the matter, being equall in the price to the matter distilled, so that by this means the burning spirit may be had almost for nothing: and it is done after this following manner. It cannot be denyed, that all vegetables whatsoever, as all kinds of corn and fruits, also grass it self, being prepared and fermented, yeeld a burning spirit more or lesse in quantity and quality, *viz.* a consideration being had of the maturity, or immaturity, fatness or dryness of them. For those things which are fatter, and sweeter, yeeld more spirits, then things which are unripe, sowre and dry; for by how much more the subjects are dry and less ripe, so much the fewer spirits doe they yeeld, and that not before fermentation, which gives them such a maturity as to make them yeeld their spirit in distillation, which otherwise they would not doe. Hence therefore it doth necessarily follow that fermentation is the onely cause of the burning spirit, and by consequence the onely *Medium* whereby plenty of spirits are obtained, *viz.* if the things be rightly and well fermented, whereby they are so qualified as to be able afterward to yeeld their burning spirits the more easily; which by how much the better they are fermented, doe yeeld the more. But seeing that common fermentation is not sufficient for the totall elevation of the burning spirit, it comes to pass that the best part thereof is left in the still, which hitherto by reason of ignorance hath been used to no other purpose then to feed hogges, which is ill done, for the matter that is left ought first to have lost its fatness, and that either by distilling of more spirits, or by the making of beer or vineger, before the reliques be cast to Hogges; whence there comes a double profit to the operator. But you must not be ignorant that for this operation you must not make choice of any common Cauldron in which fruits are used to contract an *Empyreuma*, *viz.* an ungratefull taste, and smell, but

another certain inſtrument of the ſame Nature, which wil hinder and not permit the aduſtion of the matter which is to be diſtilled, though it be thick, by the help whereof there is obtained a very ſweet ſpirit, & in a great aboundance by the help of our ſecret fermentation. And ſo thou doſt underſtand the reaſons, by the help whereof more, and ſweeter ſpirits are obtained from corn, and fruits (whence a double gain) *viz.* by the help of a certain veſſel or inſtrument, and of our *ſecret* fermentation.

PARAG. II.

The making of wine not unlike to Rheniſh, French, or Spaniſh, that ſhall endure for the ſpace of many yeares, out of corn and fruits.

IN this Paragraph the matter is otherwiſe then in the firſt, for in the firſt is ſhewed how out of corn, and fruites are drawn ſpirits, both more and better then by that common way; but in the ſecond, how out of thoſe may be made a drink like to naturall wine, of divers kinds, colors, taſtes, and odors, according as you pleaſe, and indeed like to Rheniſh or French wine, for ordinary drink, or to Spaniſh, being ſweeter and fatter then that; alſo ſuch as ſhall be durable for many years, and ſerve for the ſame uſes to which naturall wine is appointed: ſo as that there can ſcarce any difference be perceived. Which indeed is a moſt excellent and profitable Art, becauſe clear wine is deſervedly preferred before muddy beer. But thou wilt ſay that that beer which is made of corn, although it be like to wine, *viz.* in colour and taſt, yet it is not true wine, as not being made of grapes, but rather cleer beer of a good taſt. But know that I am not the firſt that put the name of wine upon drinks that reſemble wine in odour, taſt and colour. For that expreſſed juice of pears and apples is called new wine, or the wine of pears and apples, and that not without cauſe; for if any individuall things agree in all and each property, why may they not be called by one and the ſame name? Is not that burning ſpirit which is drawne out of corn every where called the wine of corn, which if men knew (as they know not) how to prepare, it would be like in all things to ſpirit of wine, that which no body

body yet beſides my ſelfe, as I ever knew, could do. Where let no man judge this ſecret to be impoſſible, but rather let him conſider the matter profoundly, or enquire the truth of the thing of thoſe who know it, and he will find it to be an Art moſt excellent and uſefull for the preſerving of life. If any one could in cold countries that have no wines, make out of corns, and fruits, a drink like wine, cleare, wholeſome, well relliſhed, and laſting, would he not do a thing that would be acceptable to all? Truly although men would chooſe for their drinking muddy beer as an accuſtomed drink, yet that would be more acceptable for the comforting of the old and weak. Beſides alſo there is made out of the ſame wine a very good and clear vineger, better then that which is made out of beer. Although thou ſayeſt that that making of wine, *viz.* out of peares and apples is a very common thing, and that theſe wines may in ſome qualities agree with thoſe naturall that are out of expreſſed grapes, yet in ſome they doe not, becauſe they will not laſt above halfe a year, or a yeare, but will be corrupted; and that vineger made thereof is not durable, but corruptible, and will grow red and contract a ſlimyneſs; and therefore for goodneſs not to be compared with thoſe expreſſed out of grapes: To which I anſwer, I confeſs that this wine made out of apples and peares, is not comparable to that which is expreſſed out of grapes. For apples, and pears, and other fruits of trees want ſome qualities which grapes have; and on the contrary have ſome qualities which grapes have not; which being taken away, and thoſe added, they yeeld a wine in all things comparable to that which is expreſſed out of grapes: Such as I have alwayes by me for my ordinary drink, being drunk of many for Rheniſh wine, being better then that French ſulphurated and ſophiſticated wine. Wherefore this is a very profitable and excellent art, not only for countryes that lack wine, but alſo for thoſe that abound with it: For in any place of the world corn is had and tree fruits are had, yea even in the coldeſt countries, out of which a very good wine may be drawn, which may be uſed inſtead of dearer wine, that is brought from other places, or

is made at home with greater coſts; for grapes are propagated with greater coſts, then corn, and tree fruits, whereof ſome alſo are had for nothing, & are produced in all places, in fields, and every where with manuring; whereas grapes require the beſt manuring, and a due heat of the Sun, and other labors. I was brought up in *Franconia*, a country abounding with wine; where the moſt common drink of moſt that keep vineyards is water, for they ſell their own wine for to buy neceſſary things, becauſe wines require a great care, and diligence, through out the whole ſummer, which if it be hot, yeeld better wine then if otherwiſe, and dearer, which is ſent into other countries that have no wine. It is very little that thoſe that keep vineyards reſerve for themſelves for recreation ſake: but when the coldneſs of *May* ſpoils the buds; or a blaſt in *June* the flowers, or hail the grapes when almoſt ripe (that which often happens in mountainous places) then they have little hope for the preſent, being conſtrained for the future, to dreſs vineyards for a livelyhood, who are oftentimes forced for the avoiding of poverty, to ſell one vineyard that they may manure another, or elſe to borrow money which they muſt return with intereſt in the harveſt. What counſell then ſhall I give them in caſe there ſhould be a ſcarcity of ſome yeares? Wherefore I teſtifie that thoſe Vinedreſſers are for the moſt part very poor, and drink water and not wine, which they are wont to make for others; but others who are wel monyed, and are able in the time of great ſcarcity, to dreſs their vineyards become richer, lending for putting their money to uſe to the poorer, &c. Now that this Art of making wine is very profitable, not only for countries that have no wine, but alſo for thoſe that abound with wine, I will thus prove: Moſt of thoſe places that have much wine want beer, wherefore the rich drink wine, and the poor are conſtrained to drink water, or ſuch drink which is made out of expreſſed grapes, & water, with which they quench their thirſt in ſummer time, becauſe neceſſity of buying things to eat, forceth them to ſell the wine, and forbids them to drink it. Who if they knew how to make this kind of drink of pears & apples which

which are every where had there in woods in great abundance, they might refreſh themſelves a whole yeare therewith, and ſell their own native wine to buy neceſſary things therewith: which art being unknown they muſt be content to drink fountain water, &c. Perhaps thou wilt demand whether thoſe places have any corn, out of which they may make bear. Truly they have abundance, but the Inhabitants care not for beer, the poor whereof had rather drink water, that is clear and pure, then beer that is as muddy as horſe piſs, being without doubt mindfull of that German Proverb, *Eat things boyled, drink things clear, and ſpeak things true, that thou mayſt live.*

Let theſe things therefore which have been ſpoken and demonſtrated concerning the poſſibility of the art of making wine out of corn and fruit, in any place of the world, ſuffice, &c.

PARAG. III.

A making of a burning ſpirit out of the baſer ſort of things which are commonly known, like to that made out of Rheniſh and French wine, and at an eaſie rate.

THis Paragraph needs no long demonſtration, becauſe you may eaſily underſtand it out of what hath beene already ſaid, which are very like to thoſe things which are ſpoken in the third Paragraph, of which you need make no doubt, but take them for truths.

PARAG. IV.

The making of ſugar (like to that of Weſt-India) and of Tartar (like to the Rheniſh) out of honey, not coſtly: ſo that the price of one pound of ſugar doth not exceed 8 or 10 ſtivers: and a pound of Tartar exceed not the price of 2 ſtivers.

THe poſſibility of this operation will eaſily appear to him that ſhall rightly conſider the Nature, and properties of honey. For there is a great affinity betwixt ſugar and honey, as

as it appears by the ſeparation of the principles of both, of which it is not now my purpoſe to treat, but only to demonſtrate the poſſibility of the Art. Sugar is a certain ſweet juice found in a cane or reed, like marrow, where being maturated in hotter countries by the heat of the Sun, it is cut off, broken in a mill, and preſſed forth, being not unlike in colour to brown honey: which afterwards is purified and clarified, and being clarified is carryed from thence into *Europe*. So alſo is honey a certain ſweet vegetable juice attracted by Bees out of the flowers of trees, and other vegetables growing in medows, and fields, and gathered together with a great deale of diligence for their livelihood: reſembling for the moſt part courſe and crude ſugar, but yet a little impurer, and cruder then ſugar, as experience can teſtifie. The matter being ſo, why may not honey be by Art purged from all impurities, and be made like to ſugar? Is not ſugar oftentimes uſed in Apothecaries ſhops in the place of honey, and honey in the place of ſugar, *viz.* in the preparing of ſyrops, and Conſerves, becauſe there is no difference betwixt them, then that ſugar is naturally a little purer then honey, and of a more gratefull taſt? but the unpleaſantneſs of the taſt of honey is eaſily taken away, ſo as that it may be made like to honey in all things. Which art at length without doubt will become known to the world, (with the help of theſe my writings) *viz.* the making of ſugar out of honey, that we need no more obtain it at ſuch great coſts.

As for the making of Tartar out of honey, we need not doubt of the poſſibility thereof, as neither of the making of ſugar thereout; but this ſeemes more probable then that; becauſe both are ſweet, *viz.* honey and ſugar; but tartar not ſo, being hard and acid; whereforeI will demonſtrate the poſſibility thereof by a few certain ſimilitudes, and examples, beginning with the example of new wine that is ſweet in the beginning before fermentation, which by decoction is inſpiſſated, and reduced to the conſiſtency of a thick ſyrop, like to honey and ſugar in taſt; which being kept in clean earthen veſſels, or rather glaſſen, yeelds of its own accord in proceſs of

of time an eſſentiall proper ſalt ſticking to the brims of the bigneſs of egges, like to red ſugar candy; the fæces being left apart, together with the reſidue of the ſugar, which by reaſon of its too great filthineſs could not produce cryſtals: This is not inferiour in ſweetneſs to the Indian ſugar, that grows in Canes, which ſweetneſs being alterable by fermentation is converted into acid Tartar. In this example there is given to us by nature an opportunity to conſider better of the poſſibility of this Art, whileſt ſugar is made of new wine, by taking away the filthineſs and ſuperfluous aquoſity thereof. The ſame alſo is apparent in raiſins (grapes dryed by the heat of the Sun) in which there is found corned ſugar, if they are kept for the ſpace of an year, like to that which is produced in new wine inſpiſſated: Wherefore good houſewifes in countries that abound with wine are wont often to inſpiſſate their new wine to the thickneſs of honey, which they keep for the ſpace of a year, and uſe in meats and drinks. The ſame is done with ſweet pears and cherries being bruiſed, expreſſed, and inſpiſſated to the conſiſtency of honey, which being reſerved for the ſpace of ſome years, yeeld a ſugar as muſte doth: the purer part whereof oftentimes in defect of ſtrong earthen veſſels penetrates the pores of thoſe that are infirm, *viz.* the eſſentiall ſalt ſticking to the outſide of the earthen veſſell, coagulated and cryſtallized, moſt beautifull, and very white even as the pureſt ſugar, becauſe the pureſt part only penetrates the porous earth, the fæces being left behind in the pot. Hence therefore it appears that every ſweet vegetable, and every ſweet juice yeeld a ſalt as ſweet as ſugar, which ſweetneſs is converted into Tartar. Why then doſt thou make any doubt of honey which is more pure then thoſe expreſſed juices? But thou ſayſt that the converſion of honey into ſugar is indeed probable becauſe the ſame thing happens in other inſpiſſated ſweet juices, that are of affinity with ſugar in ſweetneſs, but not the converſion of it into Tartar, becauſe Tartar is an acid ſalt, but ſugar ſweet, and therefore they cannot come from one and the ſame root.

I anſwer, the cauſe of incredulity is the ſtupidity of the

brain, which if it were ſo porous as the womens pots penetrated by the ſugar of the new wine, without doubt a belief of the poſſibility would finde entrance into it, and that in as great a plenty as the ſugar that ſweats out of the pots. Behold now thy long aſſe eares, which thou canſt not cover, and thy little underſtanding of naturall things! What advantage is it to contradict the truth with ignorance?

Now I will tell thee how an acid tartar may be made out of ſweet things, and that not for thy ſake (who art wiſe onſy to thy ſelf to the deceiving thy ſelf, and others) but for their ſakes, who are not aſhamed to learn. Conſider that new ſweet wine is preſſed out from grapes, and that moſt ſweet ſalt comes from thence by the help of inſpiſſation, which is made by evaporating the aquoſity, which not being ſeparated, there is by fermentation produced plenty of Tartar; the cauſe of the ſeparation of which is nothing but the fermentation, congregating the purer parts, and ſeparating the thicker. But thou doſt yet further demand, whether this be to be aſcribed to fermentation only, that ſweet things produce tartar, and wherefore it is not produced in water dulcified with honey and ſugar, *viz.* Mead or Metheglin; in whoſe veſſels is never found Tartar; wherefore thou concludeſt that it cannot be done by any common fermentation. Now thou doſt rightly urge; but that is not a vulgar or common fermentation, by which that Tartar of Hydromell is obtained, becauſe by that operation the ſeparation of tartar cannot be: wherefore ſuch kinde of drinks are unwholeſome, and ungrateſull, and laxative, although old, becauſe nothing is added to the honey that may cauſe that ſeparation. For he that knowes not how to make Tartar out of honey cannot alſo make wine thereof. But I may not now publiſh that ſecret by the help whereof theſe things are done, but it muſt a little while be reſerved for friends untill the time (in which all things are changed) of revelation ſhall draw nigh. In the mean let the demonſtration of the poſſibility ſuffice. I had truly ſooner attained to this Art at the firſt, if any one had given me ſo much light: And becauſe I never could read or

or hear any ſuch thing, thou mayſt eaſily conjecture, what great coſts, and what great labours I underwent for this things ſake.

PARAG. V.

A peculiar purification of vulgar impure Tartar, without any loſs, and the cryſtallizing or reduction of it into great cryſtalls, a pound whereof being purified doth not exceed the price of 6 ſtivers.

THis Art conſiſts only in a convenient precipitation, whereby together, and at once all the muddineſs is ſeparated from the diſſolved Tartar. Wherefore nothing or little is loſt; and therefore Tartar is eaſily converted into great cryſtals.

PARAG. VI.

The taking away of the ungrateſull odour, and taſt of honey, which being taken away there is drawn forth out of the honey a very good burning ſpirit which ſavours not of the qualities of honey, and alſo a hydromel like to naturall wine in taſt and other vertues, &c.

THis ſecret alſo conſiſts in the precipitation of the ſuperfluous muddineſs, and ungrateſull odour. Whereby the honey obtains a grateſull taſt, and odour, ſo that from thence may be made a good wine and vineger.

PARAG. VII.

The making of a hydromell, very good and clear, out of Raiſins, both greater and ſmaller, reſembling the beſt Spaniſh wine; out of which alſo is made a very good and clear vineger.

RAiſins are nothing elſe but ripe grapes dryed, which in *Spain*, and other hot countries are cut off in a juſt ſeaſon, and are dryed upon warm Earth, and being dryed are ſent

into *Germany*, and other countreys; which in their nature and property are nothing elce but the juice of grapes dryed in the husk, for the aquosity whileſt they are in drying, leaves in the husk a ſweet juice, as the ſugar or eſſence of grapes; which being loſt by the heat of the Sun, the humidity may be reſtored again by other water, ſo that wine may be made thereof; that which hath been tryed of many, who have poured upon raiſins whole or cut, warm water, and fermented them in a tub or other veſſel, that by this means they might obtain Spaniſh wine or Sack: but it hath not ſucceeded according to their expectation, for they have not got wine, but a certaine ſweet liquor; becauſe the raiſins in drying have aſſumed another nature, by reaſon whereof they cannot yeeld ſuch a wine as thoſe that are new are uſed to do. Wherefore hitherto the making of ſack out of raiſins hath not been known, like to that which is made out of new grapes, which is now found out. It is beleived by many that raiſins by the pouring on of water, recover that which departed from them in the drying, and therefore that the making of wine out of them is poſſible, like in vertue and taſt, to that which is made out of new grapes. But this is not done by the common way, but by another, *viz.* by the help of a certain precipitation, or taking away of the taſt of the raiſins, by the promoting of fermentation, and ſeparation of the heterogeneall parts. For it is not any peculiar Art to make a certain ſweet drink out of raiſins by the addition of water after that common known way, which cannot undergoe the proof of true durable wine, but being not yet clarified by the fermentation that is made, doth by little and little grow ſour, that which good *Spaniſh* wine (although that grow ſowre before others) doth not, being durable for the ſpace of ſome years, if it be rightly ordered. Wherefore becauſe thoſe wines made after that common way out of raiſins, are not durable (as experience can witneſſe) the making of them was afterward neglected, becauſe of an opinion which men had of the impoſſibility thereof; which fault is not to be imputed to the raiſins, but to the Artiſt; for if in the drying nothing but the inſipid humidity evaporate

rate, all the goodneſs being left in the raiſins, why ſhould the making of wine out of them be impoſſible by reſtoring of a humidity like to the naturall? But the ſtrong taſt of the raiſins which is got by drying which no one can take away hinders it: But in caſe any one knew how to doe it, he ſhall not be able only to make thereof a *Spaniſh*, but alſo a *Rheniſh* wine. But thou wilt ask, how can *Rheniſh* wine be made of *Spaniſh* raiſins; which being new yeeld only a ſweet wine? The anſwer is given in the preceding Paragraphs, where the poſſibility of making divers kinds of wines out of any ſweet matter is demonſtrated.

I dare devoutly affirm that I have ſometimes made out of thoſe common raiſins, and honey, ſweet wines, which have been drunk by moſt for *Spaniſh*. No more therefore of this thing which will be confirmed by experience.

But I ſhall ſay this in the place of concluſion, that if thou didſt know to take away the ungratefull taſt and odour of hony, thou mayſt in any place of the world, where honey is to be had, or ſweet pears, make good ſack, or haply any other, as Mallago, or that which is called the wine of *Simon Peters Mount*, *viz.* without raiſins, becauſe the matter of them is to be had in every place. Theſe kinds of wine yeeld alſo a white, cleer, and very ſharp vineger, and indeed better then the *French*, and *Rheniſh*. Such kinds of wines may alſo be made all the year long, ſo that thou needſt not be tyed to any certain time of the year; that which is a great profit for thoſe, who every year have a great loſs of wine.

PARAG. VIII.

How good wines, and good vinegers may bee made in thoſe places, where grapes grow in unmanured places, and are acid.

THis ſecret alſo is very profitable; grapes indeed may be planted in colder places, but not coming to a maturity, cannot yeeld good wine, being immature and ſowre; witneſs *Germany*, where oftentimes in a cold ſummer ſeaſon, as alſo in

in other places otherwiſe hot, not attaining to a ripeneſs yeeld a thin and acid wine, wherefore alſo oftentimes the maſters of the vineyard ſuffer great loſs, not knowing how to ſell their wines, not being worth tranſportation, being left for themſelves to drink, or for another year to be mixed with better for the better ſelling of them, and indeed not without great diſprofit to them: for if there follow a barren yeare alſo, they know not how to help their ſowre ſpring wine; and if there follow a yeare fertile enough, producing ſweet grapes, yet thoſe wines cannot wanting their own proper goodneſs, be ſold, wherefore they cannot adde any goodneſs to the ſowre wines of the former year, their own being ſcarſe ſufficient for them. Wherefore thoſe have need of a very good helper, which yet they have not found; For I have often had experience for the ſpace of many yeares, of the various corruptions of thoſe wines being loſt. Alſo it often fals out that the vinedreſſers doe in a bad harveſt chooſe only the better grapes, the worſt being left on the wine, to their great diſprofit, who if they knew how to take away the ſowreneſs of the unripe grapes, would not without doubt caſt them away thus, For ſowre wine being expreſſed from unripe grapes, may eaſily be corrected and amended, ſo as to be taken for the beſt, that which I know by my own experience, *viz.* that very good wine may be made out of unripe hard grapes being pounded, and preſſed, like to *Rheniſh* in the judgement of all. Let others alſo judg of the excellency of this ſecret, by the help whereof, not only in colder places, where wine cannot at all come to maturity, but alſo in hotter countries by reaſon of the inclemency of the air, may be ſo corrected and amended by helping the unripe grapes, that it becomes to be the beſt and moſt excellent, which being known to many it may be ſo helped, that afterwards they may ſell wines corrected by their Art ſo much the better. Moreover unripe grapes growing natural in vineyards unmanured by reaſon of the diſtemper of war, left upon the vines, and otherwiſe unprofitable, may by the help of this Art be corrected and bettered, as to yeeld good wine. This Art therefore, if it be practiſed is very good and profitable, yet not

not to be communicated to all, and each indifferently, becauſe it may being publiſhed be helpfull to enemies as to friends: wherefore it is rather to be concealed, then to be revealed to the diſprofit of others, untill it ſhall pleaſe God at laſt to have it done. Let this ſuffice therefore to have been ſaid of the poſſibility therefore.

PARAG. IX.

Alſo the preparation of wholeſome drinks out of Gooſeberries, Barberries, Mulberries, and other wild fruits.

THis refers it ſelf to the ſecond, and 8 Paragraph: for the ſame Art which makes for the maturation of immature grapes ſerves alſo for this buſineſs, and it is one and the ſame proceſs on al ſides, only one excepted, which is the correcting of that wild odor of thoſe wild fruits, which is not in grapes, for which cauſe grapes are to be preferred before thoſe; but thoſe before theſe for the aboundance of them in every place; and theſe alſo may be planted ſooner, and eaſier then grapes, which cannot be propagated in unmanured places. For if any ſprout of one or two ſpans, of gooſeberries, or barberries, be ſet in the earth in the ſpring, it can produce fruits the very ſame yeare, even in cold countries, and unmanured places: yet a fatter place produceth fatter, and greater kernels, and fruits.

PARAG. X.

The correcting of troubled, viſcous, wines, and ſuch as begin to be red, muſty, and ſowre.

THis Paragraph ſeems to be of no moment, yet vintners cannot well be without this ſecret. For we often ſee that whole buts of wines are ſpoiled, and contract a viſcouſneſſe, redneſs, filthineſs and ſtink. Are ſuch now to be caſt away? No; for it would be a great loſs, but we may help them by medicaments, as we doe ſick men. If therefore thou chance to have ſuch wine, thou muſt precipitate all its filth, and within

within a few dayes it will recover all its former goodneſs, color, and clearneſs. Alſo that which begins to be ſowre, and is not yet turned to vineger, may recover its former goodneſs; *viz.* being helped by due means: but that which is too acid is rightly turned into vineger which no one can want, and that without loſſe.

PARAG. XI.

A very eaſie making of vineger in great quantity out of certain vegetables, that are every where to be had, viz. very good, clear, and durable, like to French vineger, &c.

THis is a very excellent ſecret, by the help whereof very good and durable vineger may be made in any place of the world out of certain vegetables, and that in great quantity, and with little coſts. And this ſecret is for thoſe great Sea Mart-towns, where there is great trading, whence with great gain, it may be carryed into other Provinces.

PARAG. XII.

A production of wines in cold places, which otherwiſe by reaſon of the cold air doe not bring forth wines, (the coldeſt places of all only excepted) viz. of the beſt, ſweeteſt, odoriferous, and durable, not giving place for goodneſs, clearneſs, ſweetneſs, durableneſs, to thoſe that are made in Germany, France, Italy and Spain.

THis ſecret agrees almoſt with 8 or 9, but this here is required in the firſt place, that the Vine-dreſſer apply to the root of the Vine, that is to be helped, a nouriſhing, comforting and fructifying medicine, which may alſo preſerve it from the cold, which is neceſſary for the production of grapes; which although they doe not attain to a m urity may yet afterwards as well as in the fermentation be perfected, ſo as you may have very good and excellent wine from thence.

PARAG.

PARAG. XIII.

A certain ſecret, by the help whereof wines are eaſily tranſported from mountainous places, remote from rivers, and deſtitute of other conveniences of carriage, ſo that the carrying of ten veſſels is of a cheaper price then otherwiſe the carrying of one.

THis Paragraph offends many, as well learned as unlearned, ignorant of ſecrets, judging the thing impoſſible, and nothing elſe but dreams and fancies. Which comming to my ears made me repent of what I had wrote, becauſe I have created to my ſelf divers troubles, and the contradictions of many: Yet I was comforted again, conſidering, that this is the faſhion of this perverſe and ignorant world, being wont to carp at honeſt men, and their knowledge. Many judge this thing incredible, becauſe of the want of winged Carts, that need not horſes, confirming one the other in unbeleife, leading one another after the manner of the blind, by the hands, and concluding the impoſſibility thereof. But wherefore I pray thee doſt thou judge ſo perverſly? for if thou waſt maſter but of one ſecret before others, thou wouldſt not judge ſo raſhly, but rather wouldſt judge of things unknowne to thee, as not to be contemned; for it is the manner of detractors to ſeek their own glory, deſpiſing the opinions of others, who if they were not blockiſh and ſluggiſh, need not play the Paraſites and Sycophants, being crafty appendixes of Courts, doing all their buſineſſes cunningly, whoſe miſfortunes are not to be lamented, being aſhamed to learn, and to handle coals. But to my purpoſe that I may demonſtrate the truth. New wine decocted, and inſpiſſated before its fermentation loſeth nothing of its vertues, beſides an acid inſipid humidity, as experience teſtifies, when as yet when fermentation is made, feeling heat loſeth its burning ſpirit, *viz.* its better part, the inſipid and unprofitable being left behind, as you may ſee in the diſtilling of wine. It follows therefore, that new wine aſſoon as it is preſſed forth, muſt before

its fermentation be boiled to the conſiſting of honey, but not after that tedious way in a cauldron, which gives an ungrateſull taſt to the new wine, but in a certain peculiar ſecret veſſel. The humidity being evaporated there remains the eight or tenth part, which reſembles honey in its form, in which all the vertue lies. Which juice being thickned, and brought into a narrow compaſs, and ſhut up in a veſſell may more eaſily be tranſported into other places, then thoſe ten parts not inſpiſſated, the carrying or tranſportation whereof is not only far dearer, but alſo oftentimes is ſuſpected of being ſophiſticated by the wagoners, mixing water with the wine.

That inſpiſſated juice being tranſported to other places is turned into wine, if it be diſſolved in a ſufficient quantity of water, *viz.* as much as went from it in the decoction or inſpiſſation, or in a leſs quantity, if thou deſireſt a ſtronger and better wine, and being diſſolved is put up into the veſſels to be fermented.

Not only one kind, but divers kinds of wines may be made out of new wine inſpiſſated, *viz.* according to the different quantity of water, that is to be mixed with it, and indeed not without great gain, ſo that we need not that tedious & coſtly tranſporting of outlandiſh ſweet wines, out of *France*, *Spain*, and *Italy*.

N. B. that the new wine is not to be inſpiſſated in a cauldron, by reaſon of the ungrateſull odour, and taſt, which it contracts thence, or aduſtion. But there is required a certain peculiar precipitation, by the help whereof that yellowneſs, and taſt contracted in the decoction of the new wine is ſeparated for clarification ſake: without which two ſecrets, *viz.* the ſecret decoction and precipitation, or clarifying in time of fermentation, good wine cannot be made. He therefore that knows thoſe may within a few yeares get great riches by the making of divers ſorts of wines: but let the ignorant abſtain from this wine-making. Thou maiſt firſt make tryall in a Cauldron, inſpiſſating new wine of a leſſer value, and thou ſhalt ſee by experience that no wine goes from the new juice, that which inſpiſſated being left in the bot-

bottom of the veſſell, and to this thou maiſt again mix a ſufficient quantity of water, for the diſſolving of it, and thou ſhalt have a new wine having the ſame ſweetneſs of the firſt, except the taſt attracted from the Cauldron, which diſſolution, fermentation being made, yeelds a wine, but ungrateſull by reaſon of the yellowneſs, and taſt contracted from the Cauldron. But if thou knoweſt thoſe two aforeſaid ſecrets withous doubt thou ſhalt make moſt excellent wines of new wine inſpiſſated.

PARAG. XIV.

A very eaſie preparation of verdygreaſe out of old copper, of which a pound doth not exceed the price of 6 ſtivers.

THis indeed is a very good ſecret, whereby after a moſt eaſie, not tedious, or coſtly way, verdy-greaſe is made in great quantity very uſeſull for Painters, whereby any one may be able to maintain his family honeſtly.

PARAG. XV.

A new and unheard of diſtillation of vineger in great quantity, of which two runlets of nine gallons exceed not the price of half a ryall, with which many excellent things may be done, eſpecially the cryſtallizing of verdy-greaſe, of which one pound doth not exceed the price of half a ryall.

THis way of diſtilling hath yet hitherto been altogether unknown, and worthy to be mentioned in this place, becauſe no body can be without diſtilled vineger in Chymicall operations, and the rather becauſe by the help thereof colours are purged, and clarified, ſo as to be ſold for a greater price, by which means any man may honeſtly maintaine his family. Which otherwiſe cannot be done in the diſtilling of vineger in glaſs veſſels, which is tedious and coſtly.

PARAG. XVI.

A very easie distillation of the most strong spirit of urine, very speedy, not costly, nor tedious, where 20 or 30 pints may be made for a ryall, by the help whereof many excellent things may be done in Physick, Alchymy, and Mechanicall affaires, but especially with it vitrioll is made out of copper, very beautifull, blew, and most excellent in Medicine, and Alchymy: with which silver is made so fusile, that by the help thereof glass vessels (as cups, basons, dishes, and other vessels) may as well inwardly, as outwardly be gilded: so as to appear like silver.

IN the second treatise of the Philosophicall Furnaces, I made mention at large of the distllling of this spirit, and I shewed divers wayes of it; but of this way, of which here I treat, I made none; because this distillation hath no affinity with all others that are to be done by instruments, whether of earth, glass, or metall, but only by wooden without any fire, so that 100 pints require not one pound of coals: where not onely 20, 30, but even 100 pints may be made for one ryall: Which distillation indeed is artificially.

N. B. After the same manner almost is the distillation of vineger performed. Now what I said in the appendix of making 20, or 30 pints for one ryall, I did it therefore because it might be more probable then if I had said 100. And because that price of 20 or 30 pints doth not seem probable to the ignorant, I say now openly, that the price of 100 pounds doth not exceed one ryall; let him therefore beleeve it that will, it is all one to me, whether thou beleevest or not, because the truth is certain. Although this spirit be most excellent in divers Chymicall operations, yet I shall communicate only the medicinall uses thereof, for if it be made in a great quantity easily without costs and labour, it may be used liberally in medicine, but especially in moist and dry baths, by the help whereof may grievous and otherwise incurable diseases are oftentimes happily cured. For this spirit doth many wonderfull

wonderfull, and incredible things; so that honours and riches follow it. Hence therefore it is manifest that this paragraph is not to be contemned, after the manner of detractors. I could adde more things concerning the power and vertues thereof, but time will not now suffer.

PARAG. XVII.

A most easie, and not costly way of distilling of the spirit of salt, of which one pound may be sold for the price of 6 stivers, and it is very profitable in medicine, Alchimy, and other mechanicall arts, but especially for the doing of those things which follow.

IN the first part of our Philosophical furnaces, I shewed an easie way of distilling of spirit of salt in a great quantity: But this Paragraph treats of another certain peculiar distillation, which I will not divulge; new spirit of salt being necessarily requisite for divers excellent operations (unknown to the vulgar) I thought it worth while to speak of the commendation thereof. I shall at this time for brevities sake speak onely of the chymicall uses thereof, reserving the rest for some other place and time.

PARAG. XVIII.

The separation of gold from silver without hurt to the jewels: also the solution, and separation of gold that containes silver, and copper, and the precipitation of gold from the water, without any hurt to the water, so as that it may serve for the same uses again; wherefore this is the best way of separations which are done by a humid way, reducing gold to the highest degree.

THe separation of gold from gilt silver by *aqua regis* is well known to Chymists, as also the dissolving, and separation of gold, containing sylver, and copper: but it is seldom used for these following reasons, *viz.* because that separation of gold from gilt silver, (*viz.* when the silver is not covered

thick with gold) doth not quit coſt, by reaſon of the coſt and pains that is required for the making of the *aqua regia*. Now the ſpirit of ſalt that is made this way is with coſts. Secondly, although the gold be diſſolved in *aqua regia*, yet it is hardly ſeparated again: Some have precipitated gold that is diſſolved in *aqua regia* with *lixivium* of ſalt of Tartar, and being precipitated have edulcorated it, and with borax have reduced it, and becauſe this calx when it feels this heat of the fire is kindled with a great noiſe, they have mixed it with common ſulphur, and being mixed have calcined it to take away the cracking and kindling of it, *viz.* before they have reduced it with borax.

This operation requires a great deal of diligence, great labours, and not ſmall coſts, if thou wouldſt not loſe any of the gold, wherefore it is not the beſt way. Others have by the help of diſtillation ſeparated the *aqua regia* from the diſſolved gold, but beſides their labours and ſtenches, as alſo the danger of breaking their glaſs, have loſt ſome of the Gold by means of the *aqua regia*. Wherefore this way of ſeparation alſo is not to be eſteemed as good. Some have precipitate the diſſolved gold from the *aqua regia* with the ſolution of vitrioll, and allome, into a black powder, which in the melting have been found mixed with iron; and copper attracted from the vitrioll: wherefore this alſo is an unprofitable way of ſeparation. But in our ſeparation there are not ſuch obſtacles, for the gold being diſſolved in the ſpirit of ſalt, there is preſently put a certain precipitating thing to it, and the ſolution being in a copper veſſell (where there is no danger of breaking veſſels) is ſet upon the fire to boil, in the interim whereof a moſt fine gold is ſeparated, and precipitated; the copper being left in the ſpirit of ſalt, which you muſt decant off from the gold (which you muſt edulcorate, dry, and melt afterwards) and keep for your uſe By which means all things are done without loſs, or coſts. Which indeed of all humid ſeparations is the beſt and moſt profitable; whereby gold that contains copper and ſilver is diſſolved. Of which thing more in the fourth part of Furnaces.

PARAG.

PARAG. XIX.

The ſeparation of gold from pure fat clay (argilla) ſand, flints, and other mines, which is ſparkling, ſpongeous, and light, which otherwiſe could not be ſeparated either by the help of waſhing, or with Mercury, or by melting; viz. by a certain eaſie way of elixation not without much gain.

THis Paragraph treats of a certain operation to be performed with ſpirit of ſalt; whereby any one may in any part of the world, where mountains, rocks, ſtones, ſand, or pure fat clay are, eaſily get an honeſt livelyhood, & more then that. For in every part of the world may be found potters clay, ſand or flints that have ſubtile gold in them, *viz.* inviſible in clay, and ſand, but viſible ſometimes in flints, and ſtones, when they are broken, which if they be too hard muſt be heated red hot, and quenched in cold water, that they may clear, and be brought to a powder by grinding, or pounding, by which means the gold is made more manifeſt in them. There are ſometimes found whole mountains full of thoſe ſtones, which have ſuch a ſpirituall or ſubtile gold in them, which is ſo ſubtile, light, and thin, that it will not quit coſt to melt them. But by this way it is eaſily drawn forth with ſpirit of ſalt, ſo that any one may privately, honeſtly, and plentifully get his maintenance. Now you muſt have a knowledge of theſe ſtones, of all which flints are beſt known, in which being made red hot, quenched, and broken in water, if there be gold, it appears every where in all and each part thereof, of a reſplendent yellow and red colour, which if it be ground to powder, appears with a red colour, which flints had not before they were made red hot in the fire: theſe kinds of ſtones have alſo in them iron, which yet is no prejudice to this buſineſs, becauſe only the gold is precipitated from the ſpirit of ſalt, the iron being left in the water. This is a very excellent and eaſie labour, which in a great quantity of the matter may be practiſed with a great deal of gain, ſo that by this means thouſands of men may get their live-

livelyhood without any prejudice to their neighbour. Now this ſecret conſiſts in two things, *viz.* in a plentiful and moſt eaſie preparation of ſpirit of ſalt, and a due precipitation.

PARAG. XX.

A new and unheard of proving of tough and ſtubborn minerals, viz. *of all and each, whereby their nature and form is found out, that which cannot be done otherwiſe by any vulgar way: And this ſecret is eſpecially for thoſe places, where there are abundance of mines. For oftentimes there is found a ſtubborn mine of gold, which if examined yeelds nothing, but is left unlaboured in*, &c. *Sometimes there are found other things, where there are not found mines of metals, as white and red talc*, &c. *which being tryed after the common way, yeld little or nothing, yet abound with gold, and ſilver occult in them, which cannot after any other way be ſeparated with advantage.*

THis trying or proving is far different from that vulgar made in teſts, and cuples, eſpecially being ordained for thoſe tough and ſtubborn minerals, that will not mix with lead; of which if they will not be mixed with lead, how ſhall we know their form and nature? This ſecret therefore is very profitable and excellent, for thoſe eſpecially, which ſeek their fortunes in mountaines, in the earth, mines and ſtones: For by this means their form, although it be never ſo litle, is eaſily found out, which being known, you may alſo know, whether ſuch things, as clay, ſands, ſtones, &c. may be operated in with gaine or diſprofit. Now this ſecret conſiſts chiefly in the joyning of lead therewith. For it is impoſſible to finde out the form of minerals and other things digged out of the earth, if they cannot be mixed with lead, whereof many abounding many times with gold are, becauſe they have not affinity with lead, left unlabored in as unprofitable ſtones Which if by help of any *medium*, they can rightly be united to lead, do not leſs yeeld their form or golden parts, then other milder minerals, and that not without profit: wherefore this ſecret is to be accounted the foundation of Alchymy.

PARAG.

PARAG. XXI.

A new compendious, and unheard of way, whereby minerals are ſpeedily in a great quantity melted, and that not without great profit. Where in the ſpace of one day by the help of a certain peculiar furnace by way of abſtraction, more is melted than in that common in the ſpace of eight dayes: by which means there is not only a great deal of coſts ſaved, but alſo more gaine, then if otherwiſe.

THis way of melting, whereby metals are in a great quantity melted hath not yet been known, but without doubt ſhall at one time, or another be publiſhed becauſe it is far to be preferred before that common way. Now this ſecret conſiſts in this, *viz.* that it is performed without bellows, but by certain vents, blowing the coales as ſtrongly as bellows. For they that operate in minerals know well how much coſts they are at every yeer upon bellows, and mils that move, and lift them up. Moreover you muſt tranſport your minerals and coals into valleyes for the waters ſake, without which the bellows cannot be ordered, which labour is tedious and coſtly. Alſo there is this commodity in it, that in this way of melting you may make your furnace as great as you pleaſe, which you may not do in the other way: becauſe greater furnaces require greater bellows, and a grater quantity of water, and therefore greater and larger milles; but there is not ſuch a commodity in every place. In this our new way of melting we need not bellows, nor mils although we erect never ſo great furnaces, for by how much the greater they are, ſo much the greater quantity may be melted in them. Wherefore I do not doubt but that of all, this is the moſt noble, profitable, and excellent way of melting. Now whether or no all minerals may be melted in this furnace, I know not, for I made tryal only in the mine of lead, and in no others by reaſon of defect of mines, and place convenient for the erecting of the furnace. But I hope ſhortly to live in a more convenient place, where I ſhall neither want coals, nor mines whereby to make tryal in fire and mines.

PARAG. XXII.

A better way to separate things melted. A better separation of silver from lead.

THis secret is nothing else but a certain peculiar separation of lead from silver contained in the lead. For as every where in shops lead that hath silver in it is separated, being in the fire by the force of blowing, turned into lytharge; so almost after the same manner is this our separation: where lead is reduced into lytharge, but not by the force of blowing, but by the help of a certain furnace, wherefore this is far better then the vulgar. And this is to be understood concerning that separation, which is done in great quantity, but there is also another separation, which is practised in the separation of metals of a less weight, *viz.* of a hundred pound weight, which is not done by the help of common copples made of ashes, but of crucibles, whereof four, or six, or eight are placed together in a little furnace amongst coals, *viz.* immediately, not under a tyle, by which means more proofes are made in one day then under a tyle by the help of copples in eight; because by this means in a short and at one time separation is made in one vessel; but in the common way minerals (if they be stubborn) must be burnt, and then be boyled in a crucible with some certain addition in a wind furnace, or by the help of bellows; then being boyled in a test under a tile be converted into dross, then the dross be coppled. Which four labours, *burning, decoction, scoriation, and coppling* can scarce be done in three or four hours times; but in this separation minerals whether mild, as stubborn, are not dryed, nor decocted, but all by one and the same labour are finished in a quarter or half an houre, and in one crucible.

Which trying of minerals is most excellent, and profitable, without which I had scarce ever attained to so much knowledge of metals. For it is an easie matter to conjecture how much labour, and time is required (to say nothing of coals) every

in every proofe, if a particular fire should be kindled in its own furnace for every particular proofe, *viz.* for divers separations; All which are performed by one fire, and in one furnace, *viz.* by this new way of separation. And this is a speedy separation of metals for the studious searchers of nature, who by reason of multitude of other occasions cannot practise that common way, as also for those that digg and are imployed about minerals of all sorts, also for Chymists that operate in gold, & silver, for the tryal of the goodness of their work. Also this secret separation may be practised not only in a lesser but also in a greater quantity; for ten or twenty pound may as easily be tryed as one or two ounces, but because in a greater quantity a greater weight of lead is required, greater crucibles are required also. But in this new separation there is not so great a quantity of lead required as in that vulgar. For if a double, or threefold quantity of lead be added to one of any metal, or mineral although it be copper (which requires otherwise sixteen or eighteen parts of lead) it shall be as well and truly purged. Moreover neither the lead nor the copper is by this means lost, neither is it again to be melted out of the copple into which being porous it entred in that common way; because in this copper is easily separated from the lead, *viz.* in a small fire.

Wherefore it is no smal Chymical secret, opening a gate to divers others. But thou sayest; you do indeed promise many things, but perform few; you do indeed make mention of many secrets, but teach nothing; who can ever I pray you by the acuteness of his own wit finde out such things? I answer, It is not my purpose to offer to thee a morcel chewed before, wherefore seek, and labour incessantly as I have done, and others have done, thou who coveteest new things. No body taught me besides exercise, use, and fortune, according to the Proverb. *Use makes an artist, and by working we become workmen.* If I had had so much guidance, as here I have given to thee, I had without doubt attained to greater things with less costs and charges. America a most vast and fourth part of the world being searched and examined by *Christopher Columbus*, and that not without great care and paines, how much

priviledge I pray you have others with leſs danger, and labour to deport from thence treaſures? Did not he deſerve praiſe, being a finder out of a moſt rich country, although he did not demonſtrate with his finger to every one? Did not many follow his direction, and tranſport from thence through the wide ocean moſt vaſt riches? What now if thou ſhouldeſt betake thy ſelf to ſome labour for this ſecret ſake, by the help whereof gold, and ſilver might be obtained without the danger of Navigation. But thou wilt ſay with the Fox; *Foot ſteps make me afraid*, I have ſeen many loſe their labour and coſts, and ſpend their houſes and lands. I anſwer; I confeſs it, but the fault is not the arts but the Artiſts. But I do not doubt but that theſe my writings will illuſtrate the whole body of Alchymie, and recal many from their errors. But know thou that there is another *Saturne*, with which wonderful things are done in Alchymie (where that vulgar is not uſed) *viz.* that, which *Paracelſus* doth ſo much commend in his *Cœlum Philoſophicum*. Now in this ſeparation that common lead which is known to all is uſed, being no way inferiour to that of the Philoſophers its brother, which being waſhed, and ſpiritualized dares no leſs then the other enter into the kings cloſet for to receive its preferment.

PARAG. XXIII.

How minerals in defect of coales made of wood, may be melted by the help of pit coales, after a moſt eaſie, and profitable manner.

NEither is this labour performed with bellows, but by the flame of the fire of coals, whether they be made of wood, or are pit coals, compaſſing the minerals, as if they were compaſſed about with a crucible. Now this way is only for metals that are ſoft, and eaſily fuſible, where there is not ſo much loſs of the minerals, as in the other way.

PARAG.

PARAG. XXIIII.

The fixation of ſulphureous, arſenical, antimonial, cobolts, and other volatile poyſonous minerals, which otherwiſe by reaſon of their volatility cannot be retained, and melted in the fire, viz. *by the help of any cementing furnace, or ſuch that hath a grate, that gold and ſilver may the better be drawn from thence.*

IT is not unknown to the diggers of minerals that ſometimes there are immature minerals found which have neither gold nor ſilver in them, which being a little while expoſed to the aire, and then being tryed yeeld gold and ſilver as wel in a greater as in a leſſer proofe; ſuch are Biſmuth, Coboltum, Auripigmentum; and other Antimonial, and Arſenical minerals. The aire therefore cauſing this maturation (*viz.* exciting the active, and maturative ſalt of the minerals) why may not ſuch minerals be perfected, and maturated by ſuch kinde of fixing ſalts? certainly it may be done by art, and nature, although it cannot be conceived by a dull wit. What adviſe therefore is to be given? Is this ſecret to be revealed to the incredulous & ignorant? By no means, let them ſeek it as others did, and they that ſhall finde it out are predeſtinated of God ſo to do, or elſe they ſhall not, although they ſhould be informed more of this thing. But be not thou ignorant that the gold and ſilver that was drawn forth out of thoſe immature minerals after maturation, did not lye in them corporally; for then they might be ſeparated by that artificial ſeparation, but ſpiritually like an infant in its mothers wombe compaſſed about with many coverings. As *Paracelſus* cals ſuch minerals *ſulphura embryonata*, wanting nothing but maturation, of which they are deprived by being taken too untimely out of the mines by the miners. Now which way they are fixed, is not to be taught in this place; yet this I will ſay that every volatile immature ſulphur hath not affinity with corporeal fixed gold, and therefore ſcarce to be mixed with it; as it appears by the ſeparation of metals by the help of fuſion, where

ſome metals are melted together, *viz.* fixed, and unfixed, for in the adjection of common ſulphur, which being mixed with the unfixed being next to it, converts them into droſs, but the fixed, *viz.* the gold and ſilver (eſpecially the gold) will not mix with it, but reject it, and ſeparate themſelves naturally from that mixture, and falling to the bottome are turned into a *regulus*, eſpecially the gold, which being purged from all droſs refuſeth to be againe polluted with impurities, by reaſon of the antipathy, which is betwixt ſulphur fixed, and unfixed.

N. B. Now common ſulphur fixed is eaſier mixt with gold then with other imperfect metals; that which is wonderful in the eyes of the ignorant, in which there lyes a great ſecret worthy to be taken notice of Arſenicall minerals, and Kobalta alſo are fixed ſo as that afterward they being united with ſilver will remaine with it. But Antimony and *Auripigmentum* partake of both natures, *viz.* golden, and ſilver, in which in part they may be fixed. Now I muſt confeſs that this is a very dangerous labour, where it is to be handled cautiouſly, and not but in our fourth furnace. As for my part I profeſs that Arſenical fumes never hurt me, who never uſed any other preſervative then that I never entered upon thoſe operations faſting: wherefore let him that ſets upon ſuch operations eat firſt a piece of bread with butter, and drink a draught of wormwood beer, and avoyd the fume as much as he can.

PARAG. XXV.

A certaine profitable ſeparation of ſparkling, and ſpongious and thin gold, and ſilver from ſand, pure clay, and flints, &c.

I Said above in the 19. Paragraph of ſuch gold, that it could be ſeparated from ſand neither by the help of waſhing, or amalgamation, becauſe being lighter then the ſand cannot be reduced a part into a ſtraight place, yet it may be ſeparated with

with profit by elixation with ſpirit of ſalt: but here it is ſaid, that it may be ſeparated by the help of fuſion, that which will ſeem incredible to many by reaſon of that ſmall quantity of gold that is mixed with a great quantity of ſand, *viz.* how that little quantity of gold may with profit be ſeparated from that great quantity of ſand or clay. To whom I anſwer, that it cannot be ſeparated by the help of flowing or addition of any thing (though never ſo vile) I ſay with profit by the force of liquefaction, becauſe the melted gold will not quit coſt: It muſt therefore be done another way. There are ſome leſſer metals, which being to be deſtroyed, and perfected by art require the addition of ſand or flints, without which their deſtruction, or perfection cannot be done, in the place of which if ſuch flints and ſand be added, then their gold which otherwiſe cannot be melted is produced into lig[illegible]h that which the deſtroyed, and amended metals yeeld, and that with greater profit.

PARAG. XXVI.

A certain profitable and ſecret melting of gold contained in baſer metals and minerals, which cannot be done in any other common way.

THis Paragraph treats of the ſame buſineſs as the foregoing did, And this operation is nothing elſe but the deſtruction of baſer metals, as of lead, tin, iron, and copper, and a reduction of it into a certaine earthy being, like to glaſs, or droſs, by which deſtruction and reduction the metals are by force of the fire maturated, and partly purged by the help of addition, ſo that afterwards they may yeeld their gold, and ſilver in ſeparation, which otherwiſe they could not.

PARAG. XXVII.

A certain ſpeedy and not coſtly ſeparation of melted gold, and ſilver by the help of fuſion, ſo that by one man in one day in one furnace ſome hundred

hundred pounds weight may be ſeparated, and indeed with leſs coſt, and labour then by Aqua fortis *or* Cements.

THis operation indeed is very excellent, ſpeedy, and profitable (becauſe it is done without *Aqua fortis*) whereby gold is ſeparated from ſilver; there is no man that is experienced who is ignorant of the tediouſneſs of the ſeparation made by the help of *Aqua fortis*. But this operation is thus. Silver is broken into pieces, with which a crucible is filled, then a ſeparating flux being given, the ſilver being melted the gold is precipitated in the ſilver with a certaine thing precipitating it into a *regulus*, which being done let all be poured forth together into a cone, which being cold, the *regulus* is ſeparated from the reſt of the maſs bythe ſtriking of a hammer, but yet [illegible] having loſt all the ſilver, but containing to one part of gold two or three of ſilver, which after cupellation is done muſt be ſeparated by *Aqua fortis*. And by this means gold contained in a hundred marks (or fifty pounds) of ſilver is reduced into two or three, which afterward are ſeparated by *Aqua fortis*: where you need not, firſt purge thoſe 100. markes by burning, or break them into ſmall bits, and then ſeparate them by *Aqua fortis*; but now we have need of *Aqua fortis* only for a few Marks, where much charge is ſaved in buying abundance of *Aqua fortis*, as alſo in glaſſes being ſubject to breaking; as alſo much labour. Secondly, a very great quantity of gilt ſilver may in the ſpace of one day be ſeparated by this way, and that with little labor and coſts, which by *Aqua fortis* could not be done. But do not thou think that this is that way of which *Lazarus Erker* wrote, becauſe there is a great difference betwixt them. For although that way of ſeparation ſpoken of by *Erker* be not to be ſlighted, yet it is ſomewhat tedious, and coſtly; but ours is not.

PARAG. XXVIII.

A very ſpeedy reduction of wrought gold, as of chaines, rings, &c. to the higheſt degree; alſo an eaſie ſeparation of gold from gilt ſilver, ſo that

that by this way a hundred mark may be more eaſily ſeparated, then twenty the common way, where much labour, coſts and time is ſpared.

HEre is mention made of another certain ſeparation having no affinity at all with the foregoing, reſpecting only gold, which is to be ſeparated after a moſt eaſie way from ſilver and copper, and to be reduced to the higheſt degree. Which labour alſo is very profitable and eaſie, becauſe it is not done *per quartam*, by Cement, or Antimony, but by a certaine peculiar flux which is to be added to the metal when it is to be melted, which being melted, that flux congregates the ſilver, copper and other metals, and turnes them into droſs, which afterwards being poured out are ſeparated by knocking them, the pure gold is to be taken away being ſeparated from the addition. Afterwards alſo the addition of the flux is ſeparated from the addition of the gold by precipitation; ſo that firſt ſilver only is precipitated (if you pleaſe) from the flux, then the copper; or let the ſilver only be ſeparated, the copper being left in the flux. By this way gold, ſilver and copper are ſeparated in the ſpace of one hour, and every one apart, which otherwiſe could not be done in the ſpace of a day; This indeed is the moſt excellent ſecret of ſeparation.

PARAG. XXIX.

The ſeparation of ſilver in a greater quantity out of any lead, then by proof of cuples.

THeſe words being read, there will without doubt ariſe a diſputation amongſt Chymiſts and refiners of the poſſibility of this thing; but to them anſwer is made in the fourth part of our furnaces, where alſo it is treated concerning the proving of metals, where it is demonſtrated that the proof of cuples is not ſufficient for all manner of ſeparation of ſilver from lead, to which I refer the reader. Now that in any lead there is contained great quantity of ſilver I can teſti-

fie that oftentimes have made tryal of this ſeparation. I do religiouſly proteſt before all honeſt Chymiſts, that lead is nothing elſe but impure, and unripe ſilver; he therefore that knows how to purge, and maturate it, without doubt ſhall have a moſt ſingular thing. I indeed have tryed many things, ſeeing the poſſibility of it, but could never attaine to my deſired end, becauſe I could never have fitting veſſels, that could hold lead with its ſope the whole time appointed for that operation: Yet I could do it with leſſer crucibles by placing them, one in another, ſo that the matter that penetrates the firſt may be retained by the ſecond, or third, but not with profit. The time therefore of mercy is to be expected till God ſhall at length ſhew the matter, out of which ſuch veſſels may be made, which may ſhorten the other leg of old *Saturne*, with which he is uſed to eſcape, that he may againſt his will abide the due time of maturation, and purification.

PARAG. XXX.

The melting of good gold out of old iron, which although it cannot be done with great profit, yet ſufficeth them that are contented with few things.

THat iron partakes of a golden nature, not only Philoſophers but alſo ancient and modern diggers of minerals teſtifie: Now they did not ſay that all iron was of one, and the ſame goodneſs, becauſe alwayes one is more pure, and more golden then another, wherefore there is a great difference in iron. Sometimes it is ſo rich with gold, that ſometimes in a mine that is digged (before the iron be melted) there are found graines, veines, and little ſtones of pure gold, witneſs *John Mattheſius* in his *Sarepta*, together with other Philoſophers, ſaying that they have in divers ſtones (mines of iron) brought out of the mines of a mountaine, which is called *Fichtelberg*, as alſo out of the mines of *Stiria* ſeen pure gold like little veines. *Paracelſus* alſo doth much cry up the Iron mines of *Stiria* and *Corinthia*, and their riches, and that without

out doubt not for their iron and ſteel, but for the plenty of gold hid in them, unknown to the diggers. On the contrary the Swediſh, and German iron hath ſometimes no gold in it, as I have often tryed. Whrefore let him that will ſearch into it be cautious in the choice of his iron.

Now let this melting de done with Antimony, which alſo for the moſt part hath gold in it ſelf (yet one more then another) that of *Hungarie*, *Tranſilvania*, and Cranachia are the beſt; the reſt have but little in them; now gold may be melted though never ſo little, in iron and antimony, but not with ſo much profit, as if a greater quantity thereof were in them. But thou wilt ask if it be ſo, why is it not ſeparated from them by the miners? I anſwer, the miners are ignorant of this ſeparation, labouring only out of uſe and cuſtome, as mercenary, without any other conſideration. That moſt witty *Lazarus Erker* himſelf alſo confeſſeth, that the mine of iron hath much gold in it; which is ignorantly by the miners put under the hammer, who alſo teacheth the ſeparation of ſilver from iron, but of gold makes no mention; which haply he knew not: for *no man can know all things*. But if the miners did know that gold was in the foreſaid mines, yet it is a queſtion whether in thoſe places be afforded the conveniences of ſeparating it with profit. For I do eaſily believe if the ſeparation of gold from Antimony were known to them, that they would not neglect it, but rather ſeparate the gold, then to ſell it being left in Antimony, at a low rate. They indeed do know that there is gold in Antimony, as alſo how to ſeparate, it but with loſs. What profit I pray you by the ſeparation of gold which will coſt more then the gold is worth? Wherefore they do rather ſell the gold with the Antimony, then ſeparate it. For the miners are ignorant of that Antimonial ſeparation by which not only the gold, but the Antimony it ſelf is preſerved: and they that will ſeparate that, do it by the addition of a great quantity of lead by the help of cupellation, but with the loſſe both of the lead and Antimony. But after this manner our ſeparation is not performed, but gold is ſeparated from iron, and Antimony being melted,

without the addition of any ſtrange thing (corrupting the iron or antimony) ſo that the ſeparation of the gold being made, the iron and antimony may be uſed again, ſo that nothing thereof periſheth, but what evaporates in ſeparation; or is unwittingly caſt away. And by this, and by no other way gold is ſeparated from iron and antimony with profit. Now this ſeparation is not uſed about iron, and antimony only, that have gold in them, but alſo about others; as for the ſeperating of gold from ſome Marcaſites, *lapis calaminaris* and other ſtubborn minerals, in which there is a very ſpiritual, and thin gold (and therefore not to be ſeparated thence by the help of the common ſeparation with profit) and that with great profit without the loſs of the Antimony, *viz.* whileſt thoſe minerals are melted with antimony, and the gold thence precipitated by iron into a Regulus of one pound weight proceeding from a hundred of the mine and antimony containing in it all the gold of the mine, iron, and antimony, which Regulus may afterward be further elaborated for the ſeparation of all thoſe ſorts of gold, and that without much coſts; where alſo the antimony is preſerved, which may againe be uſed for other things. This ſeparation therefore is a moſt profitable ſecret (although iron and antimony having gold in them ſhould be found in no place) for the ſeparating of gold, *viz.* out of other ſtubborn minerals, where gold is without any loſs reduced into a narrow compaſs, or Regulus, which may eaſily be elaborated further, where the whole Antimony melted with the mine, need not to be boyled, and ſo deſtroyed with lead, and that rather with loſs, then profit, becauſe in this operation not only the gold is drawn forth, but the antimony alſo is preſerved.

Which way of ſeparation I ſubmit to the cenſure of all Chymiſts, and honeſt refiners that are skilful, and that for divers cauſes. I queſtion not but to have the approbation of all and every one of them that will not contradict the truth. Moreover there is alſo another ſeparation of gold from iron, and antimony, which is not done in crucibles; where they are firſt mixed together, then immediatly reduced with a ſtrong fire

fire of coals for the obtaining of the Gold of Iron and Antimony.

PARAG. XXXI.

Alſo a ſeparation of gold and ſilver from any tin and copper, according to more or leſs.

THis ſeparation is performed otherwiſe, not with antimony, but with lead, *viz.* when before tin and copper are in a ſpiritual manner mixed with it, without which ſpiritual mixtion the corporeal mixtion of metals is nothing worth. For every one that is skilled in metals is not ignorant, that tin melted with lead after the common way is not radically mixed with it, without which radical union of metals they cannot be perfected, nor bettered one by another. They erre therefore whoſoever they be that endeavor to ſeparate gold, and ſilver from tin, copper, and other imperfect metals by the force of common liquation; let them therefore whileſt that Philoſophical union, or conjunction is unknown to them, timely abſtaine from ſuch vaine and unprofitable labours, being that which I counſel them faithfully, having tryed the truth of the thing with loſs of time and coſts. But now what that ſpiritual mixtion is which may be done by the help of waters as well humid as dry, that excellent Philoſopher and Chymiſt *Theophraſtus Paracelſus*, wonderfully magnifies it, and wrote many things of it.

Yet here I would eſpecially have you take notice that to this radical mixtion of imperfect metals there is alſo required gold by the help whereof there is a ſeparation of the pure from the impure, in impurer, and imperfect metals: And this may be compared with that divine ſeparation, where Chriſt being preſent the good ſhall be ſeparated from the bad (their bodies be-firſt corrupted) God attracting the pure in heart, but rejecting the impure. Which alſo ought to be done in this ſeparation of imperfect metals, *viz.* they muſt firſt lay aſide their impure bodies, which muſt be corrupted and purified; for then

gold doth radically associate it self to them, and makes a separation attracting like to it self, and reject what is unlike. For as every man hath a soul, which is a Divine spark, but polluted with sin, infernal sulphur, the craft and deceit of the devel; so also metals have in their center something that is incorruptible, which is yet so compassed about with impure terrestial sulphur, that (in my judgement) cannot be mended unless they be corrupted and brought to nothing, out of which nothing gold doth afterward attract that good spark, and converts it into a good substance, which before the taking away of that sulphureous, black accidental impurity could not be done. In like maner we also cannot be with God before our hearts are purified from that old leaven (left to us by *Adam*) and put on Christ, and become like children. Which few words truely, with which nature doth in this place agree, inculcating faith in us, are observed by few. And as it hath been said of gold, so also it is to be understood of silver, which being mixed with corrupt metals attracts its like to its self as its nutriment, like to divers seeds in the earth, whereof every one doth attract its like, the superfluity being left. As for example, if any one should cast into the earth fennel-seed, cummin, and onyon-seed, the fennel-seed would attract from the earth only that which is proper to it self for the production of fennel, with leaves, stalks, and seeds, the same is to be understood of the seeds of onyons, &c. The same also fals out in the mineral matallick kingdom, whilest perfect metals are sowed into imperfect, where they putrifie, and attract for their nourishment their like. Now I did not say by this similitude that gold and silver were the *general seed of metals*, for gold is only a receptacle of that of the metallick seed, and not the seed in its whole substance. Moreover this similitude is brought in, that it might appear, how like things being spiritualized, embrace and retaine one the other. But I would not have thee perswade thy self that metals are to be dissolved in corrosive waters, and to be distilled; which labour of the Chymists is noxious to metals, and therefore sterile, fraudulent, and Sophistical; by which many men, yea very learned have

have been deceived, thinking to make the tincture by this way, contrary to the course of nature; wherefore never any good fruit could be produced from thence; Neither could ever any artist insisting in this vaine way have any hope of profit thereby, until he decline from this to the true and right way.

Now metals must be Chymically spirituallized without corrosive waters, and without various artificial instruments, by the help of their proper *humidum radicale* without much costs and labour. For that whole business (*viz.* the purification, vivification and spiritualisation of metals; which is done by solution, putrefaction, distillation, and circulation (*viz.* Philosophical) may be done by a skilful Chymist without glasses in the space of one hour, so that it then needs not the space of so many moneths to be with corrosive waters vexed, and macerated. And this is to be understood of the humid Philosophical way of a particular separation. But he that knows how to drown gold, or any other golden subject in any most pure, most penetrating, fixed, and fusile substance which hath ingression into other slowed metals, and would be radically mixed with the purer parts thereof, he without doubt will come speedily to a particular transmutation or separation of the pure from the impure with a legitimate and true manuduction to that universal work, with which many hitherto have in vaine been intricated.

PARAG. XXXII.

A maturation of mines, that they may give more gold and silver in the fusion.

THis concerning the maturation of minerals, and metals is one of the most excellent of my secrets of the mending of metals. For I have often endeavored by a certaine secret way to fix metals and minerals, and I found that they might be in some part maturated, so as to leave gold and silver in the cuple, which before they could not leave, *viz.* before they

they were maturated. Now I never had experience of the truth in a greater quantity, *viz.* of many pounds; and what the cause of this thing is, you may see in the beginning of these Annotations; it is needless therefore here to repeat it.

But this I must yet say, that this fixation is somewhat costly, which moreover cannot be done in any part of the world with gaine (although it may in a greater quantity, which yet I am ignorant of) for that fixation is done by the benefit of a certaine water, which also nature useth in the earth (which you cannot have in every place, where there is not good earth) And if you expect good by the water, the minerals, fixation being made, must yeeld plenty of gold and silver, or else we labor in vaine. I often made tryals with a hundred pound weight of the lesser immature minerals, or semimetals, and I found in a hundred pound weight of coboit a Mark and half of pure silver, and in bismuth 2.3.5. ounces of gold, Also *lapis calaminaris* and Zinck (being digged in a due place) yeelded their gold abundantly. But oftentimes computation being made of the price of the mineral to be fixed, and of the matter fixing, and abstraction of this price being made from the price of the gold and silver produced from thence I found very little and sometimes no gaine at all, so that for the present I left the work, until I shall obtaine a water at a lesser price, or shall be able to maturate metals in a shorter time for the getting of a greater quantity of gold and silver, being that which experience will teach.

Although I never attaine to the fruitful perfection of this maturity, yet I would not have it be contemned, as being most profitable in other Chymical operations, and confirming me in my conceived opinion of perfecting metals by nature, and maturating imperfect minerals and metals (nothing withstanding) as well by art, as by nature in the bowels of the earth, and in converting them into gold: of which thing more at large in *my book of the generation of metals.*

PARA-

PARAG. XXXIII.

A separation of gold and silver out of Arsenick, Auripigmentum *and Antimony.*

THese volatile minerals have in them commonly volatile gold and silver, especially those that come from the mines of gold and silver, leaving nothing in the cuple. But he that knows how to fix a little of them, and to add to them a metal in which those volatile may hide themselves, shall certainly see a possibility of drawing good gold and silver out of those volatile and contemptible minerals yet not out of all Antimony, Arsenick, and *Auripigmentum.*

PARAG. XXXIV.

A separatoon of extrinsecal sulphur of Venus *for the production of her son* Cupid.

COpper (and also iron) is next in nature to gold by reason of a great mutual affinity, as experience testifies.

Very probable it is therefore that it may be so purged, if so be the art of which *Paracelsus* in his book *Vexationum* speaks, were known to any that it may leave behinde it gold and silver in the cuple; that which cannot be done by the ignorant. My secret respects chiefly that mine of copper which is found neer the mines of gold, and not every sort. If that superfluous combustible sulphur be separated by water, there is found pure gold. But this art cannot be practised in a greater quantity, demonstrating only the possibility of the art, but not promising riches; out of which haply some profit may come, if it be made with the true *Venus* after a right manner; but this shall be demonstrated more at large elsewhere, but not in this place. But this I would here have you know that the superfluous sulphur of the mine of copper is not to be taken away with the burning of common fire, according to the manner of them that deal in minerals, but spiritualized

with a certain ſecret fire, by which its proper body may be amended, and exalted as to become partaker of a golden nature. For ſuch copper mines being melted and purged after the common way yeeld not gold but ſilver only: whence it appears that they attaine to perfection, not but by that ſecret fire of lotion or gradation. For skilful Chymiſts have not only that common fire, but alſo another, by the help whereof metals are tryed and melted; without the knowledge whereof metals cannot be rightly handled. As for example; in the common melting, and burning of minerals, which is done by a common fire, the volatile part of the metal, which is the ſpirit and vegetable life thereof is driven away by the force of that fire, the more fixed & thick part being left. But if the more impure parts only be by any peculiar fire ſeparated, the gradatorious ſpirit being left with the body, there is found a better and more excellent body then that which is melted in a violent common fire. The greateſt ſecrets lye in fire as being the ſtrongeſt element, but of theſe nothing is manifeſt to the vulgar Philoſophers and Chymiſts. In the droſs that is caſt away, undergoing a greater force of fire there lyes ſomething of what is perfect, which is drawn from thence, if they be melted againe after a peculiar manner, which laſt operation is not but by a common fire. But this amending of copper proceeds from a certaine fire that waſheth, purifieth, and exalteth. I have often tryed the mine of copper by both fires, and I never found any thing but ſilver to be melted thence by that common fire, as well after as before fixation and not gold but by that ſecret fire only gold and no ſilver. As alſo tin tryed by the common way yeelds only ſilver; but being reduced into aſhes and droſs, yeelds not ſilver but gold, as having paſſed the greater force of fire. This therefore is to be aſcribed to fire, operating diverſly according to the diverſity of the regiment thereof. Wherefore the differences of fires is to be known, for one deſtroyes and the other digeſts, and maturates metals; one mundifies and waſheth; another penetrates, heats, exalts, and tranſmutes metals into a better kind, ſo that it may be truly ſaid: *In gold and ſalt are all things.*

Be-

Beſides the hot and dry fires, there are alſo found thoſe that are cold and moiſt, having no affinity with thoſe, by the help whereof nature doth as well in the bowels of the earth, as out of the earth, like an artiſt deſtroy, and regenerate metals; of which you ſhall ſee more amongſt the Philoſophers, and I could ſay more if it were needful. But why? Mention made of unknown ſecrets begets envy. Out of old cloth I will not make a new garment; becauſe there are ſome Authors of new books, that know nothing but what they have read or heard. As for my part, I had rather be ſilent, then publiſh ſecrets, or write or repeat things already writen. For its all one to write ſecrees, or common writ things, *viz.* in this age. Wherefore I thought it better to give others an opportunity of ſearching out ſecrets, then to publiſh and communicate them to all indifferently. Let it ſuffice therefore what hath been ſpoken of the difference of hot and cold fires, by the help whereof metals are as well within as out of the earth, generated, and deſtroyed: Of which I have decred more at large to treat in my book of the *Original of Metals*, where what is here wanting ſhal not be omitted.

PARAG. XXXV.

The ſeparation of ſilver from the teſts, which entered into them in time of trying without melting, and without labour and coſts.

THis is for thoſe that want conveniences of melting their teſts, for the ſeparating of ſilver, which together with the lead entered into them in the time of trying. And it is a very eaſie ſecret, without coſts and labour.

PARAG. XXXVI.

A cheap preparation or making of moſt fine earthen veſſels, like to the porcellane, retaining ſpirits, reſiſting the fire, and to be made in any place of the world.

WE can ſcarce be without thoſe earthen veſſels, as in houſhold affaires, ſo in a Chymical elaboratory, and

Apothecaryes ſhops, wherefore mention is made of them not without cauſe. For the houſhold affaires, there may be made baſons, diſhes, cups, pots, &c. For an elaboratory, alembicks, cucurbits, retorts, platters and other neceſſaries. For Apothecaryes ſhops, pots, greater or leſſer for ſyrups, conſerves, electuaries, and for waters of hearbs in defect of thoſe of glaſs. And ſuch veſſels may well be preferred before thoſe of glaſs, becauſe they are not ſo ſoon broken, and retaine any ſubtile, and ſharp humidities. They are alſo to be preferred before pewter baſons and diſhes, becauſe they do as well in winter, as ſmmer retaine their cleaneſs; and more eaſily made clean without waſhing.

PARAG. XXXVII.

A confection of Allome exalting, and fixing any colours: eſpecially requiſite for ſcarlet and other pretious colours; As alſo a preparation of a cauldron that ſhall be cheap, and not alter colours.

THis allome is not to be ſold, becauſe it is made by art of ſome certain minerals, having this vertue, as to be able to fix, and exalt colours of any kind that they ſuffer no injury from the ſun, aire, water, which do otherwiſe alter colours, to which buſineſs is required alſo a certain peculiar cauldron.

For diers of ſcarlet know that the ſcarlet die which is the beſt, and moſt pretious of all colours, is altered in copper cauldrons, wherefore they are wont to cover them over with tin, or to make them of tin. But this our allome and our cauldron are far to be preferred before thoſe vulgar, although they are ſold at a cheaper price; wherefore this art is not to be ſlighted, becauſe much profit may redound to the poſſeſſours thereof.

PARAG.

PARAG. XXXVIII.

A certaine cheap preparation of co'ours for painting, as of purple, ultramarine, vermillian, &c. but eſpecialy of a certain moſt fine white, never yet ſeen, moſt like the fineſt pearles; alſo of a ſilver, and golden colour.

THe aforeſaid colours were yet never common, nor could be made ſo plentifully, and with ſo great profit as now, &c. whileſt therefore theſe ſerve for the art of painting, whereby for memories ſake as well ſacred, as profane hiſtories are painted, it will not be amiſs if they be taught; becauſe we can hardly want them: And although it ſeem a mean, yet it is a moſt uſeful art, and alſo profitable, becauſe thoſe colours are much uſed in many places, whence much profit muſt of neceſſity redound to the poſſeſſours thereof.

The concluſion.

LET no man doubt of the truth of what hath been ſaid in theſe Annotations. For nature and art can do many things, but our art is little in vegetables, and almoſt nothing in metals, and this is the reaſon, that things never ſeen or heard, ſeeme incredible and monſtrous to the ignorant. Wherefore I proteſt, and proteſt againe that theſe my writings are neither dreams nor trifles, but true natural ſecrets. For nature is rich, and the earth is ful of hid treaſures; that which is believed by few. And not only within, but alſo without in the circumference, the treaſures of the earth are to be found in abundance, although we know not the manner of finding of them out. I will now ſay nothing of the fineſt clay, ſand, and ſtones, nor of the baſer and abject minerals, out of which gold and ſilver may be ſeparated, being eaſily to be found in any part of the earth without coſts. Moreover in what places there have been metals melted many yeers ſince, and ſtill are melted; there are great mountaines of droſs, out of which according to art, gold, and ſilver (left in them) may be melted. It ſeems as if God had by his divine providence reſerved ſomething for our good for us his diſobedient children in Europe, and eſpecially in Germany, (being chaſtiſed and deprived of outward comforts by ſtrange Nations for the impiety of our lives) which formerly we could

could not in time of peace, but now in time of war our enemies might uſe. As we alſo by nature being corrupt uſe providence for the ſakes of our diſobedient ſons, conſuming a patrimony ill, which hath been gotten wel; laying up mony for a certaine time of extream need, that they do not altogether deſpaire to the infamy of their parents, and may return to a better thriftineſs, and be reclaimed.

And why may not that moſt high and wiſe God, our merciful Father, ſeeing our penitency provoke us by his reſerved treaſure to a due gratitude and repentance and obedience. God doth nothing in vaine, being not ignorant of what he hath to do, and what may profit us; who without doubt ſeeing our filial obedience will provide for us with his divine bleſſing both temporal and eternal.

And truly it ſeems as if upon this account the whole Provinces may riſe againe, for after that ſome have gotten riches, they may be able to help others either by lending, or giving them wages for working and doing buſineſſes for them. But let no man wonder that I ſaid that ſome good might lye in abjected droſs, ſaying, If there be any good in them, why was it not melted by our Anceſtours? I anſwer, though it be granted that at that time nothing more could be drawn out by the violence of the fire, yet it doth not follow that there can no good be drawn from thence now.

For, firſt of all refiners, as well thoſe of former yeers as latter are not ignorant that the droſs that hath been caſt away and left for ſome yeers in the aire, hath oftentimes been again impregnated by reaſon of a magnetick power, and hath afterwards yeelded more and better metals then before (of which thing let the ignorant ſee the books of them that treat of Minerals and Metals) for in this art there is not uſed any ſingular art, but that which is common and uſed in all places.

Secondly, there may alſo from the droſs of ſome metals (whether impregnated from the elements or no) by a certain ſecret may be drawn forth, and melted gold and ſilver, when as before there could be none found in them. But thou wilt

ſay

ſay, How could that be, that in the firſt fuſion imperfect metals could be produced, but in a repeated liquefaction, *viz.* of the droſs, gold and ſilver is produced. But I anſwer that all imperfect metals containe in them ſomething of what is perfect, which by the tryal of cupels cannot be drawn forth, unleſs they be deſtroyed and converted into droſs (of which thing elſewhere) for imperfect metals contain much incombuſtible ſulphur, which doth not ſuffer a ſufficient purification of them in the examining of them by cupels, but cauſing a combuſtion of the good together, and a converſion of it into litharge, entring into the ſubſtance of the cupels: but the remainders of the metal, which could not be melted by that moſt vehement fire of the firſt liquefaction being by combuſtion turned into droſs, hath ſuſtained a greater violence of the fire, then that which was melted the firſt time, wherefore being more purified is made more neer to gold and ſilver then that metal, from which it was ſeparated. He therefore that knows how to melt that droſs, in which oftentimes there is much leſt, eſpecially the droſs of tin, and that with a fit addition, ſhal without doubt finde better metals, then thoſe which were melted by the diggers of the minerals the firſt time. Now I do not ſay that there is ſo great a power in common fire to purifie and perfect baſer metals.

Fire indeed hath a greater power to purifie and maturate metals, but it is too violent for thoſe that are volatile. Without doubt there are alſo other things that can help the fire, which being known we may eaſily be able to do great things. And becauſe it hath been ſaid in the foregoing Paragraphs, that ſome metals cannot yeeld that gold and ſilver that is hid in them, unleſs they be firſt deſtroyed, and reduced to droſs, it is not needful to deſtroy thoſe metals for profit ſake, ſeeing there are found in great quantity metals deſtroyed, and brought to droſs already, out of which thou maiſt draw forth gold and ſilver for to maintaine thee. But eſpecially ſome certain droſs of tin is commended, that comes out of a certain mine thereof by reaſon of the abundance of gold, as I can witneſs by my one experience, and that indeed not without cauſe,

cauſe; and although all tin be of a golden nature, yet that (which is called in Germany *Saiffen Zinn* from ſope) is doubly golden; and that indeed firſt by reaſon of the gold that is accidental to it, where alſo commonly graines of gold are found, which whileſt the mine of tin is waſhed, becauſe they cannot be ſeparated by the help of waſhing, are mixed with the tin in the infuſion, which oftentimes refiners know, but of the manner of ſeparation they are ignorant. For oftentimes there is found tin, of which a hundred pound weight is ſold for the price of twenty, or twenty four ryals, which containes gold of a greater price in it. But what is your adviſe worth if it cannot be ſeparated without loſs, for all that which is ſeparated by lead after the common way cannot have ſo much in it, becauſe the greater part thereof is turned to droſs; and if it were granted that it were not turned to droſs, yet the charges expended for the ſeparation of tin by lead would exceed the price of the gold contained therein. Now thus much information being given, let no man doubt but that ſome at laſt will finde out this ſecret, whom alſo I ſhall aſſiſt as much as I can with my counſel.

And that which hath been ſaid of the droſs of tin is alſo to be underſtood of the droſs of other imperfect metals, yet not ſo as if all without any difference had gold in them, and truly the droſs of iron, which hath undergone a great force of fire being converted into green or blew glaſs (out of which ſome have extracted gold, by common *Aqua regis* but without profit, for the coſts that have been expended have exceeded the price of the gold that hath been brought forth) are to be preferred before others that have not undergone ſo great a force of fire. But there be ſome, that do affirm that a true tincture may be made out of that droſs, tranſmuting imperfect metals into gold; but this I leave as being not experienced therein, treating only of thoſe things which experience hath taught me, giving my teſtimony of the treaſure that lies in iron, which you cannot draw forth from thence by the ſeparation of Antimony, of which above, ſo eaſie, or by other wayes and mediums, expecting your ſelf the ſtronger, ſo as to be the victor taking away the ſpoyle thereof: for there is no one that ſhall not at ſome

time finde himſelf the ſtronger, ſo as to be able to diſpenſe to that as he hath been diſpenſed to by others. That old Saturne of a moſt vile aſpect is the higheſt in the firmament, and can do many things in metallicks, without which we can do nothing that is of any moment; wherefore deſervedly is he to be honored above the reſt. But this ſeparation may be practiſed not only about the abjected droſs of metals; but alſo about metals themſelves, if they may be procured at an eaſie rate, as now in the time of war, where in the ſpace of thirty yeers ſuch abundance of copper and tin hath been tranſported from elſewhere into great cities and ſold of a low rate, that the owners thereof have been co[illegible]ained to tranſport it with their ſhips to other places. Now if any one had known this ſeparation, might not he have got great riches from thence as well as by the culture of the mines, and withall reſerve the metals, and being preſerved in ſeparation to diſpoſe of them for metallick uſes, *viz.* Eccleſiaſtical and martial, as for the making of bels and guns? by which means the greater part might have been keept in his own country, which otherwiſe muſt be carryed into other Provinces with great loſs, by reaſon of the want of thoſe that are skilled in metallick affaires. But no wonder that ſo little is now done in Alchymy, ſeeing moſt Chymiſts have no knowledge of metals, which being wanting, the Chymiſt is alſo wanting; whether learned as unlearned: for this knowledge is not got in the univerſities, conſiſting in a profound ſpeculation, and daily practiſe. Formerly amongſt the Chaldeans, Perſians, Arabians, and Egyptians, arts were more honoured, then now amongſt Chriſtians; chooſing a magiſtrate out from amongſt the wiſe men, whoſe Kings brought up their ſons in Philoſophy. Chymiſtry eſpecially was very famous amongſt the Egyptians, by which they did get wealth and great riches; ſo that *Diocletianus* the Emperour could not overcome them till he had burnt all their books. In which time arts were had in great eſteem as it appears by that annual ſalary of *Alexander* the great, which he gave to *Ariſtotle*, *viz.* four hundred and eighty thouſand crowns, & by thoſe 3000. aſſociates which he joyned to him for the ſearching out of nature. But now *Thraſoes*, *Sycophants*,

phants, and *Morions*, wiſe men being neglected, are honored, whence this preſent calamity of ſo many countries and cities, *&c.* In brief, arts, and ſciences are now ſo rare, as is ſnow in hotter countries in the middle of ſummer. For pride doth not permit honeſt tutoring and education, ſeeking nothing but wealth and riches, which if any one have he is honoured without reſpect of his worth and vertues. Some have perſwaded themſelves that it derogates from their honour to bread up their ſons in honeſt arts, being content with a patrimony for the conſervation of their condition. But it often appears how a patrimony ſufficeth, when riches and wealth that have been ill gotten are taken away by ſome miſhap at ſea and land; are; for then they ſtand like butter againſt the ſun, when their riches is loſt, nothing remaines for the ſupport of their lives, who therefore are not in a little danger. I wiſh the time would once haſten, when vertues ſhall be embraced in ſtead of vices, and children ſhall be educated in good arts, for then ſo many calamities would not abound in the world, nor ſpoiles or man-ſlaughters, but men would live in peace, and get their bread with the ſweat of their brows without wronging their neighbour. And this thou haſt heard concerning the remaining honeſt mediums that conduce to the honeſt maintenance of a family without uſury, or fraud, or the violence of the ſword. For thoſe things which have been gotten by fraud, and deceit, or by war, do for the moſt part periſh as being contrary to the Scripture and the good of our neighbor. It is better therefore to leave to every one his own, and to get in the ſweat of the brows, according to the will of God, an honeſt living, that which may well be done by the way that I have now demonſtrated: although hitherto no profit hath come to me from theſe moſt ſecret arts, for certain cauſes, neither (God willing) ſhall I hope that hereafter there will, yet I am contented with the knowledge of nature. In the interim I hope I ſhall once again by the bleſſing of God ſee my moſt deſired country, where I may be able to labour, and maintaine my houſhold affaires honeſtly: and then indeed I ſhall be able to ſet forth and publiſh ſomething more, and that

more boldly. For I am reſolved to write a *book the like to which was never ſeen;* very profitable for many men for the ſuſtaining of life: For as a woman with child deſires nothing more then to be freed of her burden: ſo alſo I, that I may as a divine inſtrument be helpful to my neighbour, according to the talent that God hath truſted me withal. Now I lack nothing ſo much as time: For every wiſe man may eaſily conjecture what great paines I have been at (I will not ſay coſts) in this place where all things are moſt dear in ſearching out the ſecrets of nature only, ſetting aſide greater labours. I will ſay yet one thing more, and that ſincerely, *I am conſumed by ſerving others.* If I were given to covetouſneſs I would practiſe but only one ſecret, which I knew long ſince, and I could thereby get great riches: that which I will not do, for my genius hath not ſuffered me to exerciſe things that are perfectly found out, or any mechanick art, like an aſs that daylie carries hither and thither ſo many ſacks, but would that one ſecret being found out I ſhould finde out another, and indeed from another ſecret being found out already, for alwayes one opens the gate to another. That which hitherto I have done without ceaſing, and without any conſideration of coſts, or labour for the good of my neighbour; neither ſhall I ceaſe (God permitting) until I come unto my deſired way. In the mean while I am reſolved to ſerve my neighbour by things found out and tryed; hoping that thoſe that are honeſt will take my ſtudies in good part, not regarding the wonted contumelies of cavillers (from whence there is no profit) betraying at length their great aſs-like ignorance.

I will conclude therefore, and refer the Courteous Reader unto the reſidue of my books, that treat of thoſe ſecrets more plainly, which I am reſolved ſhortly to put forth. Farewell therefore Reader, I recommend thee to God the Father of lights.

To

To the Malitious.

WHoſoever thou art, O malitious carper, marke what I ſay, Do not deſpiſe things unknown, for there is no man in the earth can pleaſe all. Be therefore cautious in thy actions. Do not judge without judgement, leſt thou thy ſelf be at laſt judged. Truth ſhal remaine, when haters of truth ſhall periſh. And if thou haſt companions of iniquity, yet thou ſhalt not ſtand, nor eſcape puniſhment. Wherefore do not touch the innocent, that ſeeks nothing but thy good; and ſhews the right way to get wealth and honour. If thou haſt any thing better communicate it; there is no body will hinder thee: if not, bridle thy tongue, and do not carp at him that is through the bleſsing of God, eminent in arts; or elſe thou wilt not eſcape the vengeance that hangs over thee; from which the Zoiles were never free, from the creation of the world, and let theſe things being candidly ſpoken be for thy admonition.

FINIS.

OF THE TINCTVRE OF GOLD,

Or the true

AVRVM POTABILE;

VVhat it is, and hovv it differs from the falſe and ſophiſticated *AVRVM POTABILE,*

How it is to be Spagirically prepared and how to be uſed in MEDICINE.

By JOHN RUDOLPH Glauber,

LONDON,
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OF *AURUM POTABILE.*

THere is no man that can deny, that the true and ancient Philoſophers did ſtudy long life, and the conſervation of their health. Whence it came to paſs that they did diligently ſeek out the ſubject of preſerving health, and prolonging life: wherefore by the help of fire they did practiſe the ſeparations, and proofs of all vegetables, animals, and minerals, ſeeking out their powers and vertues: Who found out the greateſt harmony of all things as well in the heavens, as on earth betwixt the Sun and Gold, Man and wine. For it cannot be denyed, that the life of all things proceeds from the heat of the Sun; wherefore they ſought to unite gold, the terreſtriall ſunor body fixed and perfect, cauſed by the rayes of the Sun, with man by the help of ſpirit of wine.

But haply there will be ſome, whom this my narration may offend denying that gold is the Son of the Sun, or a metallick body fixed and perfect, proceeding from the rayes of the Sun; asking how the Solary immateriall rayes can be made materiall and corporeall? But they are very ignorant of the generation of metals, and minerals. And although I

am not now resolved to write of the generation, and originall of metals, yet endeavouring to demonstrate that there is a vivifying power of the Sun to be found in gold (destroyed and volatilizated) and to be prepared into a most wholesome medicine for man, I will not omit for the sake of the ignorant and incredulous, to demonstrate the truth by one or two examples, which although I could demonstrate by most certain and firm reasons, yet for brevities sake I am now resolved to omit them, recommending to the searcher of the Nature, and propriety of metals, my treatise *De Generatione Metallorum*, which without doubt will take away all scruple from him; objecting only against him that opposeth the truth, two questions and reasons which are to be confuted: and the first is, whence comes that increase of both the quantity and quality of any viscous, minerall liquor, that hath been exposed long to the Sun in an open glass vessell? Whether from the Sun or elsewhere? But thou sayst that that increase comes from the air, the vehicle of all things. I answer, if from the air, whether was not that air impregnated by the Sun? and whether there be any thing in the air, which it received not from the stars? But place this liquor in a cold cellar in a moist air, and thou shalt by experience know that no weight is added thereto, even as in the Sun, or (in his stead) fire: that liquor will draw some phlegmatick moisture which will be easily separated by heat, the weight of the former liquor being left. This may be shewed by this example: dissolve some sulphureous metall, as Iron, Copper, or Zinck, with any acid spirit, and at length take away the spirit, make the remainder red hot; yet not too much, but as much as sufficeth to take away the spirits, which afterward (its weight being observed) put in a crucible on the fire, but take heed left the metall run over, but at length let it darkly glow with the crucible, for the space of three or four weeks, which done, take it away again, and weigh again the metall, and thou shalt finde the evident increase of the metall, which thou shalt perceive more evidently by this way, as follows; put copper, or some sulphureous metall with 16 or 18 parts of lead in

in a well burnt cupel; made of the ashes of wood, or bones in a tryed furnace (the weight of the cupel; copper and lead first exactly observed) and cause the copper to evaporate by fire with the lead, which done take the cupel when it shall be cold, and again weigh it, and thou shal find it far more weightly, so that its weight (though much of the lead goes into air in the cupellating) not only exceeds its former weight, but also of the copper and Lead by the said cupellation; therefore it is justly demanded whence this increase proceeds, whether the heat of the fire was not coagulated into a metallick body by meanes of that melted metall? Therefore it is probable that if you knew the metallick matrixes in the surface of the earth in which the beams of the Sun and the heat of fire being received may be coagulated, metals may as well be generated in them as in the bowels of the earth.

But thou replist it is probable the heat of vulgar fire to have some thing metallick in it, which comes by attraction of the melted metall in the Corbill, but not in the Sun-beams.

He that will thus try the truth, let him put the cupel very well burnt in the beams of the Sun, together with copper and lead, to which let him adde a hollow looking-glass, so that it may be operated upon by the Sun-beams gathered into a center and may thence be made hot: But thou must continually hold the Looking-glass in thy hand that thou maist turn or direct it to the Sun according to the course thereof, left the cupel wax cold, the beams of the Sun being turned away, but if it be rightly observed, a work shall be done no less than in a furnace of fire with glowing heat.

You must have a looking-glass at least in *diameter* two feet, nor must it be too deep; but bee in depth the 18 or 20 part of the globe, that so it may the further cast beams: it must be very artificially smoothed, that it may more exactly gather beams to the center. Now the preparation of these Looking-glasses is not of this place, but shall be in the fourth part of our Furnaces, where wee shall teach not only how it is to be made of metals, but also of glass, and how polisht and used.

This demonſtration which may be otherwiſe omitted is therefore ſet downe that it may be knowne how Gold proceeds from the Sunne, and is ſecretly endued with its proper ſtrength and proprieties by Chymiſtry, reducible into that which it was before its coagulation, namely into a heating and living ſpirit, communicating its ſtrength and faculties to mans body. Therefore the Ancients uſed great diligence in the melting of gold, in which nothing is found more excellent then the pureſt and fineſt ſpirit of wine made by diſtillation, and they did not uſe common gold melted out of ſtones or waſht out of ſand, but purged by benefit of fire, & Philoſophically quickened and unlocked, not by help of corroſive ſpirits, the uſuall way of vulgar Chymiſts, but by ſome water which Nature freely gives without help of violent diſtillation; by which they manifeſt that which is hid in gold, and they have hid what is manifeſt, and therefore they have made it fit for the ſeparation of its tincture from a groſs and black ſuperfluous body. For they knew that the compact body of gold hath no affinity with vitall ſpirits, therefore they have choſen onely the fineſt part of gold to their Elixir, *viz.* its tincture which they have radically joined with the ſpirit of wine, and being joined have made them ſpiritual or volatile, ſo that neither can be ſeparated from each other in the fire, and being in the fire are ſublimed or fixed with a longer digeſtion, and coagulated into a fixt ſtone, which they count for the greateſt treaſure in this world. Therefore the ancient Philoſophers affirming that there is not a better medicine under the Sun than it, which is made from the Philoſophicall union of wine and gold, both by an inſeparable recoagulation and fixation; nor without gold can ſpirit of wine, nor this without it be made a medicine, becauſe gold without ſpirit of wine cannot be made volatile, nor this be coagulated and fixt without it. We therefore their poſterity juſtly follow the opinions of the moſt famous men, not for their authorities ſake, but for ocular demonſtration which is the trueſt tryall.

Therefore the knowledge of the preparation of this medicine

cine being beſtowed on me from the higheſt, I have intended, becauſe a man is not born for himſelf, briefly to deliver its preparation and uſe: but I will not caſt pearls before ſwine; but I'le only ſhew the way to the ſtudious ſearchers of the work of God and Nature, who doubtleſs will underſtand my writing, but not the ignorant and unskilfull; let therefore the brevity of the preparation offend no man, becauſe I mean not to proſtitute this Art (divinely obtained, not with idleneſs, but with much watching, labours and pains) nor give to the unworthy a bit before chawed but only to communicate it to the pious, who ſhall ſee with open eyes that the thing is ſo. I deſire therefore, the ſimplicity of my ſtile offend no man being not adorned with rhetoricall figures after the wonted manner, for truth wants not many and elegant words, being contented with ſimplicity and brevity, with which it is eaſier and better demonſtrated, then with thoſe intricate and ſophiſtick diſcourſe s

Before I will begin the preparation, I will briefly deſcribe the qualities of a true ſpagirick undertaking ſo great a work, that every one may examine himſelf, that takes this task upon him. For it doth not ſuffice to know to make fire, or to diſtill vegetable waters, but the true knowledge as well of the fruits of the ſuperior as inferior elements is required, and eſpecially piety.

Not prating, but much knowledge makes a Chymiſt, there is no man, who can deny, that the Art is long ſince ſought by divers for many years, even untill this day, with much labour and charges; but found by very few. I doe not wonder that ſo great a gift of God hath hitherto been communicated to very few; for all modern Chymiſts (very few excepted) have gone a wrong way. For ſome truſted to their riches, thinking violently to get the Art, becauſe they were able to make a fair elaboratory, maintain many journey men and get ſtore of veſſels, minerals, and coals, not conſidering the ſaying of the Apoſtle, *'Tis not of him that willeth, or him that runneth, but of God only that ſheweth mercy.*

Others whoſe learning conſiſted in divers tongues were

honoured for their elegancy of prating, attributing skill on'y to themſelves, and perſwading themſelves that they had all the elements at their beck, for their ſuppoſed wiſdome and learning, not conſidering the work of Chriſt, *thou haſt revealed it to little ones, and haſt hid it from the great and wiſe.* Who perſwade themſelves, that they ſee graſs grow not knowing the earth its mother, to whom if all things ſuceed not according to their pleaſure, they fear not to ſlander the moſt pious Philoſophers, and to impeach them of falſehood, and to palliate their ignorance with the nullity of their art; who would judge that the thing is far otherwiſe if they knew the myſtical meaning of the Philoſophers, but becauſe they are blinded with pride; no marvell if they take the ſhell in ſtead of the kernell, and ſo come not to the wiſhed end.

The third ſort is of covetous ſlothful men, ſeeking wealth of thoſe mountebanks, being as ignorant of Chymiſtery and Nature, as thoſe they teach, having neither knowledg of minerals nor metals, nor underſtanding the works of the Philoſophers, with whom if one diſpute of the nature and proprieties of metals, they have nothing to anſwer, but what they read and hear, *viz.* it is ſo writ, and ſo we have proceeded, and thus we muſt proceed, and ſuch a matter and no other is required, keeping cloſe to the letter, not conſidering whether the Authour of his proceedings be skilfull or not, whether he hath borrowed his writings from the experience or readings of other books, to whom although a true and genious information of the nature and the knowledge of minerals and metals, and Chymick ſecrets ſhould be delivered, yet they would not beleeve, deſpiſing plain truth as folly in her ſimple labors, which are, not chargeable nor tedious. Wealth is ſought by ſuch like covetous fellows, ſpending in ſome proceſs of no worth ſome hundreds or thouſand crowns, ſuppoſing the art to be venall, not conſidering that the Merchant will keep a good and ſure art to himſelf, and not ſeek mony of others.

I doe not deny that ſome Artiſt may be the poſſeſſor of ſome ſecret, or thing found by his own experience, or diſcloſed to him

him by ſome friend, which for poverty he cannot effect, and therefore hath need to crave the help of others, for not alwayes wealth and skill meet together, which deſervedly are helpt by the rich, truſting to Gods bleſſing.

But this caution is to be taken, leſt there be a half-penny-worth of profit in time of harveſt from a crowns-worth of corn, both of wealth and credit. Who is ſo blind, though but with one eye, who doth not obſerve the trifles of ſuch like covetous boaſters? although the Sun by Gods mercy doth ſhine on both good and bad, yet it was never heard that ever any true Philoſopher handling ſecrets ſecretly was a prating trifler. And it is much to be wondered at, that the learned of this age have been ſo blinded, that they would be gulled by ſuch vagabond knaves.

The fourth kind of ſeekers are men of a different condition, not ſeeking wealth and honour but Gods glory and their neighbours profit, contented with mean food and apparell, not proud and vain-glorious, but pious and honeſt, handling coals in ſtead of gold rings, not the companions of many men, ſilent knowers of naturall ſecrets, ſeeking and finding by Gods aſſiſting grace, not truſting to the writings of the Ancient Philoſophers, but to God the prime teacher of all things, whoſe mercy is the ſame now, as it was in the time of thoſe Philoſophers, which obtained their Art with earneſt prayers from God. Unto theſe came Arts beyond hope and expectation, and the uſe and method of uſing them.

Therefore all that undertake this Art, let them diligently examine themſelves, for none of this laſt number will be furthered by their wealth and conceited learning, becauſe this skill is the gift of God alone, and not man. Therefore the proprieties of a true Chymiſt, reaping the fruit of the Golden tree being known: I will now begin the preparation of the tincture of Gold, by the hand of a skilfull and exerciſed workman, and will ſhew the difference of the true and falſe tincture, and the phyſicall uſe of the true gold, to expell many diſeaſes, as follows.

℞ of living gold one part, and three parts of quick Mercury, not of the vulgar, but the Philosophicall every where to be found without charges and labour (thou maist also adde living silver of equall weight with the gold, and indeed better then only gold for the greater variety of colours proceeding from the mixture of male and female: but one perswaded that better tincture proceeds from gold alone may mixe gold only, not so, one skilfull of metals, who knoweth the power of the cordiall union of gold and silver dissolved in one and the same *menstruum*) put them mixt in a Philosophicall vessell to dissolve, and in the space of one quarter of an houre, those mixt metals will be radically dissolved by Mercury, and will give a purple colour; after encrease the fire by degrees, and it will be changed into a very fine green, to which taken out, poure the water of dew to dissolve, which may be done in half an houre, filtre the solution, and abstract the water, through a glass alembick in B. which poure out again fresh, and abstract, which doe three times, in the mean time that greenness will be turned into a black colour like ink stinking like a carkase, and therefore odious: and it behoves sometimes to take away the water reaffused and digested, and that blackness and stink will depart in the space of forty houres, and will produce a pure milky whiteness, which appearing take away all the moisture till it be dry, which will be a white mass and in few houres of a pleasant colour, divers colours first appearing it is turned into a fine greenness better then the former, to which you must affuse the spirit of wine well rectified to the depth of two or three fingers, and that green gold dissolved will draw that spirit of wine for the great amity like a dry sponge drawing water, and will communicate to it a quintessence as red as bloud, by which meanes the greenness is deprived of its quickning tincture, the superfluous ashy body being left.

You must decant and filtrate the tinged spirit, and in a B. by a glass alembick, abstract it from the red tincture, attracting the fiery essence of spirit of wine, so that they may be very close

close and inseparably conjoined, for which an unsavoury water only distills, the vertue of the spirit of wine left with the tincture of gold like a red fiery salt, fusile and volatile; of which graine 1. can tinge ℥ i. of spirit of wine, or any other liquor, with a bloud red colour, for it is soluble in any moisture; and therefore may be kept in a liquid form for the Panacea of most desperate diseases. Now I will communicate the proprieties of the true tincture by which true potable gold is known. This tincture next the stone is the best of all medicines, betweene which and that there is but this difference, the soule of gold is volatile nor hath entrance into imperfect metals, & therefore cannot transmute into pure fine gold, which vertue is attributed to the Philosophers Stone. The soul of gold though it be the best part, yet it is not fixt in fire but volatile; but the Philosophers Stone is fixt in fire and remains by reason of a longer digestion. But whether that soul or volatile tincture, and red Lion may be fixt by help of fire, may be turned into the Universal medicine, and tinging stone, that I know not; because hitherto I have not tryed, &c. therefore he may who extracts the soul of gold make further tryall, whether he can finde any thing better. For this work treateth of nothing but the best medicine of gold, but other things I know not.

Therefore the deceit of the Distillers of wine, and other vegetable waters, selling potable gold, is not unknowne, being not ashamed to sell any water colored yellow or red to the ignorant, for a great price. And the errour of others, dissolving the body of gold in *aqua Regia*, or spirit of salt, which again they abstract tō a dry remainder, to which for extraction they affuse the spirit of wine: which is not an extraction, but some particular solution of gold, made by help of corrosive spirits left in the gold, tinging the spirit of wine with a yellow colour, which so coloured they call their potable gold, which notwithstanding is reduced into gold, the spirit of wine abstracted, which can doe more then any other *Calx* of gold, which the *Archeus* cannot digest, but separates being indigested, with the excrements. And also it is the error

of others, ignorantly deceiving themſelves and others, extracting the calx of gold with peculiar *menſtruums* and ſpirits, knowing not that the *menſtruum* affuſed to gold to be red of it ſelf by a long digeſtion, which decanted, they adminiſter inſtead of potable gold, who if they weighed the remaining calx, would by experience ſee that nothing departed from the gold; which you may try by ſetting the ſpirit or *menſtruum* in a remiſs heat, or longer in cold, which of it ſelf doth wax red, as it had been affuſed to the *Calx* of *Sol*. But the cauſe of this redneſs is (unknown to them) nothing but a certain nitrous ſalt and volatile, as of Antimony, Urine, Tartar, Hartshorn, Haire, &c. exalting the colour of any Sulphur.

Wherefore it neceſſarily follows if Artiſts, mingle with the ſpirit of wine in which is a ſulphur, ſuch exalting ſalts, that it will thence be exalted in colour, and wax red! which alſo happens to them, who uſe to extract a tincture with diſtilled oyls having a volatile ſalt, as are oyl of juice of Lemmons, Cloves, of Soot, &c.

For ſuch like tincture or potable gold is ineffications, as experience witneſſeth But I would not ſay there is no other tincture to be prepared out of gold, beſide this tincture: for being diſſolved in ſweet *menſtruums*, that it cannot be ſeparated by precipitation, it can doe wonderfull things in many grevous diſeaſes; but alwayes the living metal is to be choſen in ſtead of dead.

But true potable gold is not ſo only in name and ſhew (as are divers waters tinged with a yellow or red color) but alſo endued with golden faculties & vertues, ſo that it may actually appear to be made of gold, but irreducible by fire into gold, ſpirituall and penetrative ſtrengthening the vitall ſpirits, that they may overcome their enemies. But it muſt alſo be endued with this vertue that it may change imperfect metals, chiefly Mercury, Lead, and Silver into pure Gold; not truely like a fixt tincture, tinging with profit baſer metals in flux; but only perfecting particularly in a moiſt way by digeſtion, where ſome part of the metall alone is turned into better

better. For this tincture or ſalt of gold is very volatile, ſo that it cannot reſiſt the fire; but with a gentle heat it melteth like wax, and is ſublimed like red ſalt, ſoluble in ſpirit of wine that it may be fit for Phyſicall uſes.

Alſo true potable gold being taſted, is neither corroſive, nor aſtringent like other ſolutions of gold: neither doth it pollute the hands, the nails and hair with black or yellow color; but rather makes them more fine; neither doth it infect copper, iron, tin, lead, with ruſt or a black colour, but rather maketh them more clear; neither is it a body of gold reducible by extraction, nor into white gold, which may recover its former colour by Antimony and *Aqua Regia*, but it is like an earthen wax, and ſublimable in a gentle heat like Arſenic, not enduring the tryall of the cuple, which vertues if it have it may be called the true tincture of gold: but if not, not ſo but rather a ſophiſticated potable gold, not to be medled withall.

Of the medicinall uſe of this golden Medicine.

WE have before demonſtrated, the Sun to be the originall of gold, or endued with the incredible vertues of the terreſtriall Sun. For the ſtrength and vertues of all vegetables, animals, and minerals lie hid in it; which cannot be manifeſted but by a Philoſopher, and that by ſeparation, to wit, of the intrinſecall and pure parts, from the impure.

This ſpeech will happily ſeem to thee incredible, or not very likely, to ſay that gold is reducible into a ſpirituall eſſence, agreeable to humane nature, endued with the ſtrength of all animals, vegetables and minerals. Surely thou ſhalt hardly perſwade him whom *Vulcan* hath not made a Philoſopher, to beleive it. But who will trouble himſelfe ſo much as with ſure reaſons to decide all controverſies; which if poſſible, yet for many reaſons is here omitted; but for ſureties ſake I will ſend back the Reader to the ſecond part of our Furnaces, where he ſhall finde how out of Antimony and

Sulphur, by a good chymiſt with the help of fire may be drawn not only the force and facultie of divers vegetables, but alſo their naturall odour; which yet did not appear in them before they were radically diſolved, which if it may be done by any imperfect and fetid mineral, why not alſo by a perfect and mature mineral?

If we were good naturaliſts, and very diligent Chymiſts, then we need not to fill Elaboratories with ſo many pots and boxes, nor ſpend ſo much coſt in fetching in ſo many forreign medicinall ſpecies, becauſe without queſtion the ſtrength and properties of all vegetables animals and minerals by an eaſier way, may be found in ſome few ſubjects. And as the true tincture of *Sol* well fixed is endued with all the vertues of all vegetables, animals and minerals; ſo alſo deſervedly is aſcribed to it the force of curing all diſeaſes; but with a difference. For there are divers kinds of the Gout in hands and feet, as alſo of the Stone, and Leproſie; which ſometimes are inveterate and uncurable diſeaſes, ſometimes new and curable. Who therefore not madde would promiſe to cure all and every diſeaſe indifferently, by any certaine Medicine? Certainly no man although he had the very Stone of the Philoſophers.

For oft-times the Stone of the bladder is purged away or broken being moſt hard and inſoluble by *Aqua Fortis*, which not any medicine not corroſive could diſſolve; which ſtrength although they aſcribe to their medicine, yet they cannot perform it. Promiſes therefore do not ſuffice, which none can perform: for *promiſes become debts*, which is obſerved by few; wherefore by the haters of the Art the truth ſuffers and the hope of good ſucceſs of Chymical Medicines dyeth. *It is beſt* therefore *to performe more then promiſe*, and the work ſhall praiſe the workman. How can a medicine penetrate to the extream parts of the body; to wit, the hands and feet, and diſſolve the coagulated matter waxing hard, which out of the body no corroſive Medicine can diſſolve? It is ſufficient if a medicine finding a viſcous tartareous and ſalt matter, not yet coagulated, doe diſſolve and expell it. The like is to be underſtood of the

the ſtone in the reins and bladder. In this manner I wil aſcribe the curing of the Gout in the hands and feet, the ſtone in the kidneys and bladder, to my tincture of *Sol*, as well in old as young; but ſo that if need be ſpecifical cathartick may be adminiſtred, and extrinſecally Bathes for promoting the cure, whereby Nature may the ſooner doe its office. But above all things we muſt not ſlight Divine Providence: For oft-times God ſmites us with a diſeaſe incurable by Art, unleſſe Divine wrath be firſt appeaſed *by humble repentance*, which is the beſt medicine of all. As alſo the cure of all diſeaſes coming of the corruption of the bloud, as the Leproſie, the French diſeaſe, and other impurities; which are taken away by this Tincture, if withall *Cathartick* and *Diaphoreticks* are adminiſtred, cleanſing and renewing the bloud above all other medicines. This Tincture alſo takes away all the obſtructions of the Liver, Spleen, Kidneys, and other parts, becauſe it warms, attenuates, weakens, and evacuates, the originall of divers diſeaſes. It alſo cures all violent and acute diſeaſes, as the Epilepſie, Plague, Feavers, &c.

It provoketh the Menſtrues of old and young, chiefly if alſo extrinſecally it be rightly adminiſtred: which way many are well cured, who otherwiſe are like to periſh miſerably; it warms and cleanſeth the Matrix above all other Medicines, and renders it fit to perform its office: It preſerves it alſo from all accidents of *Sterility*, & other very grievous diſeaſes, cauſing death. It expels the water of the Dropſie by urine it rarifieth and dryeth up the ſuperfluous moiſtures of the internall and externall parts, like the Sun drying and conſuming waters, by which means the body recovers its prinſtine ſanitude: of other diſeaſes to write in particular it is not need, becauſe in all and every one without difference it may be uſed, as a generall medicine, in old as well as young. This medicine doth not only reſtore, but alſo conſerve health till the predeſtinated time.

The Doſe is from 3 graines or drops to twelve or more, but to children 1, 2, or 3, with its appropriated vehicle, or in wine or beer to be adminiſtred dayly, which Doſe may

be oftener in a day took, reſpect being had to the ſick party.

Thou mayſt not be offended with the reproaches of the calumniator of this book (of which the Divell with his filthy lyes is alwayes the Authour) beleeving ſtedfaſtly that the time is neer, when at length by the Divine wrath theſe Goats will be conſumed like chaffe, the ſheep being not hurt, for their meat recompenſing their Maſter with milk and wool.

And ſo I make an end, hoping to have pleaſed my Neighbour: for without doubt, who uſeth this golden medicine well, ſhall doe well, chiefly lifting up his heart, (acknowleding his ſins) to God the Giver and Creator of all good, in filiall humility, imploring his help and bleſſing; which Omnipotent God and merciful Father, that he would beſtow on us his temporal bleſſing in this life with ſound health, and hereafter life eternal, of his free grace, *Let us pray, Amen.*

FINIS.

OF THE

Minerall Work,

THE

FIRST PART,

Wherein is taught the ſeparation

OF

GOLD

Out of Flints, Sand, Clay, and other Foſſiles by the Spirit of Salt, which otherwiſe cannot be purged.

ALSO,

A *Panacea* or Vniverſall Antimoniall Medicine, and the uſe thereof.

Invented and publiſhed in favour of the ſtudious in the Chymick Art.

By JOHN RUDOLPH Glauber.

LONDON,
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A Preface to the Reader.

THere *will be ſome without doubt, becauſe the Edition of other peices (of which I made mention in ſome former tractates a few years paſt) hath been hitherto by reaſon of divers journeys and other various impediments, neglected, who will think (having no knowledge of me) that I am unable to perform my promiſe; and there are others, who knowing my condition, and the contumelies of my enemies, will fear that I being diverted from my purpoſe by theſe reproaches, will make void my ſecret promiſes. But I have reſolved to ſtand to my promiſe, that theſe men may ſee that I am neither moved nor altered with the taunts of the envious; but that they may be convinced by reall demonſtration of my ſecrets, ſome of which, I ſhall now for the publique good endeavour to communicate. And although the ingratitude of the world be cauſe enough for my ſilence, yet the uprightneſs of my heart would not permit me to conceal thoſe things, notwithſtanding the malevolent and ungratefull. Beſide alſo the following reaſon moved me, becauſe there are ſome ambitious men, who falſly boaſt of the knowledge of divers of my ſecrets; wherefore ſome have been moved to think that mine are not mine own, but the works and writings of others; by which means I have been deprived of my due praiſe, being attributed to another. And this I have often found, that one or other having by entreaties obtained a ſecret from me, have afterward through oſtentation aſcribed it to themſelves.*

There are others alſo who fear not to reproach me, and my writings,

as though they were trifles, not attaining their desired end, who (rather then I who have written plain enough) are themselves to be blamed, for being ignorant how to work. Such and other things might deter me, but I would not omit the publishing of these writings for those mens sake who are pious and honest. Wherefore I openly affirm, that these things published by me are not only no trifles, but most true, and also my own and not the invention of another; And I call him a lyer, who shall boast himself the Authour without any of my help. But of these enough! Yet I would have the Reader know, that for the meanesse of the stile, I am not like many writers, who more look after the flourish of words then the thing it selfe; I rather seek that my neighbor may profit by me. Wherefore for his better understanding I had rather be prolixe in words, tedious to delicate ears, then obscure brevity adorned with rhetoricall figures. For I know that the studious in the Art doe affect a prolixe, plain, and distinct information or instruction, rather then a Ciceronian or obscure. And now in the Name of God I will begin my worke, which is most profitable to all, and will faithfully communicate and publish the same in that manner as it was found by me in my travell, under the title of The Minerall Work, *divided into three parts. In the first of which shall be taught how out of sand and golden flints, corporeall golden may be drawn by the help of Spirit of Salt. Which secret although it may seem small, yet it is that whereby (a knowledge of the true stones and true sand being obtained) life may be sustained, and also the cost laid out may be recompensed as shall be proved in the following parts.*

In the second part shall be treated of the originall and generation of metals, and also of the destruction of Minerals and Metals.

In the third part shall be demonstrated the possibility of metallicall transmutation by Nature and Art, and that with divers reasons: which demonstration is not (unlesse I am deceived) performed yet by any, being the foundation of all metallick Philosophy and the Golden Crown *of all my writings. Which God grant I may perfect to the glory of his Divine name, and the good of my neighbour.* Amen.

The

The first Part of the Minerall Work.

A most profitable process of the separation of gold, out of flints, sand, clay, red and black Talck and other Fossiles, containing very subtile Gold, thin and spongeous, which otherwise cannot be separated either for its scarcity or the obstinacy of the Minerall by reason of the great cost to be bestowed; viz. very easily with the spirit of salt.

KNow first (good Reader) that not all sand, clay, nor all flints, and other Fossibles do contain gold, but only some, without the knowledge of which this secret availeth nothing. And because the knowledge of these are very necessary for the Artist, I will shew how they are to be proved whether they contain gold or not, that he labour not in vain, but that it may prove to his commodity or profit.

The madnes of men, searching after uncertain things is wonderful, but neglecting certain, although exposed to every ones view: For many seeking the perfection of metals to gain riches, are busied about an uncertain thing, because of a thousand scarce one obtaines his end; although they may be perfected and purified, I mean imperfect and impure metals, so that good gold and silver may thence be extracted, but this Art is given to few, neither is every one fit to perform the bu-

fineſs, becauſe it requires an ingenious and experienced Artiſt. But the thing which is certain may be performed with ſmall coſt and labour by any vulgar Chymiſt, having any knowledge of the Art of fuſion and ſeparation, being an ingenious man, and not ſeeking things too high or too gainfull at the firſt tryall. Be cautious therefore in the extraction of the aforeſaid ſtones, for if thou ſhould'ſt with the ſpirit of ſalt extract many of them, having no gold, without doubt thou ſhalt find no gold there: And if thou ſhouldſt extract ſome contained in them, and if thou be ignorant of the ſeparation of it by Antimony, thou canſt thence hope for no profit.

Firſt then, the knowledge, *viz.* of thoſe ſtones is neceſſary afterward of that ſeparation by Antimony. Impute therefore the fault if thou erreſt, not to me but to thine own ignorance, if thou knoweſt not to extract the gold, for I have written clearly, though thou ſhouldſt not know any thing that were omitted. And I before admoniſh thee to be cautious in thy work, leaſt thou labour for nought. For it is certain, & no fiction, that in many places there are found golden flints, and golden clay, and ſand, oft-times abounding with gold. And if they doe not abound with it, yet may they be extracted with profit: but the flints abounding with it are extracted with greater gain. There are alſo found whole Rocks and Mountains of Gold, and great mountains filled with golden ſand and clay, not returning the charge of waſhing, either for its too great rarefaction or ſpungioſity and levity by reaſon of which it's waſhed away with the ſand; all which how poor ſoever, may be extracted by the ſpirit of ſalt with gain, and by antimony fixed and purified In breif, this is ſuch a ſecret by which no man can be an impediment to another, as in other mechanicall operations, whereof no man may be aſhamed, for God did therefore create gold in the earth and ſtones that we might thence extract it to the glory of his name and the benefit of our neighbour, neither hath he forbidden the true and genuine uſe of it. I ſay therefore in truth that I have here deſcribed this Art, how ever deſpiſed

ſed by the ignorant, yet of greateſt moment and almoſt incomprehenſible. Now conſider the thing a little farther, thou ſhalt finde every where in the earth great treaſures to be hidden, which only through ignorance are not diſcovered. Truly it is known to all, that there is found golden ſand and clay in divers places, which for the aforeſaid reaſons are left unlaboured, but by this our Art may eaſily be worked upon.

There are found alſo ſilver mountaines, out of which ſilver cannot be extracted for the little weight it yeelds; there is alſo found in many places a certain yellow or reddiſh earth, or ſuch like clay, which though it contain ſtore of ſilver, yet it cannot be extracted with profit by this way, yet ſeparable, with gain, but not by the ſpirit of ſalt which leaves it untoucht, but by ſome other thing, every where to be found in plenty, of which for ſome reaſons we ſhall ſpeak nothing here.

And this way of ſeparation makes much for the poore minerall of copper, which with profit cannot be worked upon by the vulgar way, to be ſeparated from the Copper, afterward by ripening it into a better metall, or turning it into verdygreaſe for want of a better art, which buſineſs alſo may well and honeſtly more then maintain a family. This way alſo may the rejected droſs of the gold, ſilver, and copper be with profit ſeparated. But becauſe I have decreed to handle here only the extraction of gold out of ſtones, therefore theſe menſtrues which are uſed in the extraction of copper and ſilver, are deſervedly omitted, and reſerved for another place, where ſometime they ſhall be delivered, to wit, if I ſhall ſee that this demonſtration ſhall be accepted in mens eyes, which more very excellent ſhall follow. As now I have undertaken a more excellent matter in love to my countrey, by which it may appear, that *Germany* however reduced to want, is yet rich enough, if it would but at laſt look upon its hidden treaſures. There is no need to offer a fore-chewed bit, for demonſtration is ſufficient, neither will we obtrude a good upon the negligent; for to the ungratefull the beſt things are unacceptable. Theſe therefore being waved

in ſhort we will give the demonſtretion and extraction of thoſe flints, not doubting but the expert, and experienced, though the ſluggiſh may not, will thence reap profit, and give God the praiſe.

What belongs then to the aforeſaid ſtones, out of which gold may be extracted, thus the matter ſtands. All kind of flints for the moſt part have inviſible gold, ſometimes viſible and inviſible, volatile and corporeal together; but many commonly contain impure iron-like volatile gold, and alſo mature, and a few ſulphureous and copper-like.

Stones which the *Germans* call *Quartzen* and *Horſtein*, containing pure and corporeal gold, although mixt with ſilver and copper, may be burnt and ground, and extracted with Mercury, and if they abound with gold, be purged by flux; which labours are uſual with diggers and dealers in metals, of which I doe not intend to write, becauſe others have heretofore writ of them. But thoſe flints *Quartzen* and *Hornſtein* every where almoſt to be found, containing but a mean quantity of diſperſed iron-like Gold, Marcaſite-like, and that either fixt or volatile, cannot be ſeparated with gain, to wit, neither by Mercury nor by Flux, wherefore they are neglected by the Miners, either out of ignorance or for the intolerable coſts. But I having tryed thoſe baſe ſtones, that how little gold ſoever they poſſeſſe; yet may it be ſeparated with great gain, I would not intermit to publiſh this knowledge for my Chriſtian neighbours ſake, not doubting but this publication will be profitable to very many. For I am not ignorant that there are as well learned as unlearned, noble as ignoble, ſecular as ſpirituall, either by war or otherwiſe expoſed to poverty, ſo that they are hardly able to maintain their family, &c. and for their ſakes and others in want. I have publiſhed this ſecret, which rightly handled may bring no ſmall gain yeerly, but eſpecially where thoſe ſtones are plentiful, and alſo that ſpirit of ſalt, whereof the deſcription is given in the 1 part of the Philoſophical Furnaces, and hereafter there ſhall be given a better, if nothing hinder; in the mean while uſe and enjoy theſe. And if it happen ſo that thou canſt not rightly

rightly perform all things of the aforeſaid tractate, bluſh not to learn the manual [Operations] which cannot be ſo exactly deſcribed from thoſe that are experienced, leſt you hereafter unprofitably ſpend your labour and coſts. As for thoſe ſtones know that very many of them are found in ſeveral places, chiefly in thoſe that are ſandy and mountainous, but in ſome more & better than in others: for there is ſeldom ſeen ſand without flints, and oft-times the ſand it ſelfe, though very little doth not want Gold. But they are very likely to be found on the ſhoars of Rivers, where the water waſhing away the ſand from the flints they are found in great aboundance, though they are not ſo eaſily known by their outſide, as thoſe which were found clean in the ſand, becauſe they are covered with ſlime. Wherefore they muſt be broken with a hammer, that that may be ſeen which is in them, what may better appear if they be burnt, and quencht in cold water. For the ſtone retaining its whiteneſs where it is burnt and quencht doth contain nothing; but acquiring a redneſs it ſhews there is ſomething in it, and the more red it is the better token it is.

N. B. But this is not to be underſtood of ſandy ſtones, waxing red in ſome part in the fire, containing no gold, but of flints out of which by a mutual percuſſion fire is brought forth, which the more pure they are the purer gold do yeeld. There are alſo flints out of which fire is forced by percuſſion being red in the fire, which contain no gold but Iron; which you may know by that clear redneſs before the burning, which being burnt is changed into an obſcure redneſs, not ſhining and crude: but the flints containing Gold, being burnt doe acquire fair golden yellowneſs, or reddiſh colour, as if they were covered gold, and that through the whole ſubſtance if they be broken in pieces. And theſe give a pure gold, but thoſe other yeeld a red extraction like bloud, yeelding not gold, but the pureſt and malleable iron, good in Chymick uſes, (but chiefly for ſilver to be cemented and exalted) for gold is ſeldome to be found in them; that which is well to be obſerved leſt thou draw out iron inſtead of gold, and ſo looſe thy labour.

Alſo

Also the best stones containing gold, are those which are white and shining, here and there throughout having in the whole substance green spots and lines, red, yellow, skie-colored and brown. There are also black flints out of which fire is forced by percussion, having gold and iron, which may be separated with profit, yeelding sometimes plenty of ironish Gold, which may in like manner, be separated of which afterward.

They are very good flints also which being burnt retain a whiteness, with veins green, skie-coloured, and such like, neither are they dis-esteemed which burnt, have black spots, and not veins.

But the stones (*Quartzen* and *Hornstein*) although they in burning are not altered, yet if there be seen before gold volatile and spiritual, they by separation of themselves yeeld gold.

Gross and subtle sand having light and yellow gold, yeelds in the burning a skie-coloured smoak, and is exalted in color, *viz.* brownish: but that hath nothing which is not altered.

Subtle earth, yellow or red, passing through sand or a mountain like a vein contains also gold, which is for the most part volatile, and not mature, flying away in reduction, having ingress into silver and other metals, and therefore for this reason conservable.

For thy better knowledge thou maist prove the stones, with white fusile glass, which thing is treated of in the fourth part of the Philosophical Furnaces, that thou mayst not have cause to impute the fault of thy errour to me; therefore I would have thee understand, *viz.* that all stones containe not gold, neither in all is it separable by the spirit of salt: they are therefore to be known before they be applyed to the work.

Now

Now follows the preparation of flints, and the extraction of the gold contained in them, by the spirit of salt.

FIrst the flints being made red hot in the fire, they must be quencht in cold water, after taken out and cooled, be finely powdered.

N. B. When they are broken in a Mortar the better parts may easily be separated from the baser; for while they are finely powdered, alwayes the best part goes into red powder first, the worser part thicker and harder, containing little or nothing, being left: And if they be coursly powdered and sifted through a fine sieve the more subtle part like red powder goes through the sieve, the unuseful part being left in the sieve like white dust, which may be cast away: and if yet some redness appeares, it must again be powdered in a Mortar, and the better part shal go into a red powder, the baser part being left in the sieve hard and white which is to be cast away, but you must observe that not all & every of these flints are thus separable by powdering; for some being beaten doe every where retain the same colour,; without any separation of the better parts, which you must finely powder and extract in the whole substance: But they (*viz.* those separable) are more easily extracted, because all the gold contained in one pound for the most part may be gathered out of 3 or 4 ounces finely powdered and separated in the aforesaid manner; so that it is not need to extract the whole stone, nor to spend so much spirit of salt. But sand and clay need not such a preparation, but without a preparation being made before, are extracted by the affusion of the spirit of salt.

℞ then of the flints as aforesaid prepared and separated 2, 3, 4, 6 pound, to which being put into a cucurbit of glass whole (undivided) powre of the spirit of Salt to the depth of 3 or 4 fingers breadth, and place it in hot sand or *Balneo*, that there the spirit of salt may be hot, and may extract the Gold, and so let it continue for 5, 6 or more howres space, untill the spirit tinged with a deep redness, can extract no more. And

perchance at the first time (though seldome) it may not be tinged with so great a redness, then must you decant that same imperfectly tinged spirit, and powre to other flints after the manner expressed, prepared in another cucurbit, and place it with the flints in a moderate heat for to extract the gold; which done poure it off again, and poure it to fresh flints, and doe so often untill it hath drawn to it a sufficient quantity of gold; which afterward thou must keep, untill thou hast gotten a greater quantity, and all the Gold may bee separated at one time from it, as afterward shall be said.

Which done poure to the reserved flints in the first cucurbit, a fresh spirit of salt, and leave that so long in heat, untill it be colored, and extract the gold that is left in the flints, and was not at the first time extracted; which spirit being afterward decanted, pour it to the flints reserved in the second & third cucurbit, to extract the residue of the gold which was left at the first time; and so consequently to the others reserved, untill the spirit be sufficiently coloured, and can attract no more; which afterward poure off and put it to the first, which was reserved. You must also poure a fresh spirit to the remainder of the extraction for the extracting of all the gold. At length pour to it also common water to wash away the tinged spirit of gold remaining in the flints, that none of the Gold may be lost.

And this labour is so long and often to be repeated till there remain neither flints nor spirits; in the meane while you should cast away the flints extracted and washed, that the cucurbits may be filled with fresh flints, and so continue the work; and if there be no more spirit left to continue the extraction, you may then separate the extracted gold from the spirit, which is done as followeth: but first you must have plenty of glass vessels or retorts of the best earth, which may retain the spirits; which you may so far fil with the impregnated spirit, that the spirit in the abstraction run not over, which done it is to be extracted in a dry *Balneo* by little and little from the Gold, which spirit ye may use again in the aforesaid work. And the Gold which is left in the bottom of the ves-

vessels, is to be separated from the vessels with a crooked iron wier and (kept being very like to red earth) for its use, untill thou hast gotten a good quantity, *viz.* so much as sufficeth for separation and purgation (of which afterward) to be made by Antimony.

N. B. But when thou shalt extract red Talc with spirit of salt, red or black granates, *Smiris*, or *Lapis Calaminaris*, and other Fossiles, which beside fixt Gold contain much immature and volatile Gold; you must in the abstraction cast in a little iron, *viz.* to the solution, which retains & fixes the gold which otherwise flyes away in fusion. Wherefore those solutions and extractions of Talc and other things containing volatile gold are better extracted out of iron Cucurbits by earthen alembicks than out of glass and earthen retorts, because then that volatile gold doth attract only somuch thence as is sufficient for its fixation; which iron is after easily separated by the Antimony from the gold, as shall after be taught. And this is to be noted, that not the whole granate is soluble in the spirit of salt, although it be long left in digestion, always retaining its former colour; wherefore there is a difference to be made, or a preparation to be learned, requisite for the solution of the gold contained in them.

And you must extract Talc not with too much or excessive heat, lest its substance be totally dissolved in the spirit and be a hinderance to the work; because there is little profit then, for it is therefore appointed, that a little gold dispersed in a great quantity of Talc may be reduced into a little compass that it need not that all the quantity of Talc be made fusile, because it will thereby procure losse. But there is no danger in flints, because the spirit of salt doth not dissolve them as it doth Talc, but only extracts gold from thence, the stony body being left. The *lapis calaminaris* may also otherwise be handled in the extraction and fixation than granates, flints and Talc, because it is almost wholly soluble in the spirit of salt; which work is not here to be handled, because the extraction and fixation is taught in a peculiar way in another place, neither doe I mean to treat of it here, but only of the extraction of

gold out of flints every where to be found. And this is the way of extraction of Gold out of flints and ſand in heat by the ſpirit of ſalt, to be done in glaſs veſſels. But there is another way too, which is done in cold without glaſs veſſels which I thought worth the ſetting down, that in the aforeſaid work you may chooſe which you pleaſe, this or that, and it is done as followeth. We muſt have in this way ſtore of earthen funnels well burnt, and not ſucking up the ſpirits; for want of which we muſt have ſuch as be of ſtrong glaſs: there muſt alſo be a form with many holes in it to receive the aforeſaid funnels, under which muſt be placed glaſs diſhes or baſons to receive the ſtrained ſpirit.

Here follows the work to be performed by Funnels.

FUnnels being put in the holes of the form, you muſt firſt put a big peice of flint in the ſtraighter part of the funnel, to which after put leſſer peices, and on theſe again leſs, *viz.* as much as ſerveth to fill the ſtraight part of the Funnel, of which the larger part is after to be filled with powdred flints, but ſo that there be left a depth of three or four fingers bredth for the ſpirit of ſalt. By this means thoſe greater peices in the lower part will hinder the paſſage of the fine powder in the affuſion of the ſpirit of ſalt.

Which being done as it ought pour to the flints contained in the funnels the ſpirit of ſalt, to two or three fingers breadth in deepneſs which forthwith ſhall work on the flints and attract their gold, and then run into the diſh or baſon ſet underneath: and becauſe for the moſt part at the firſt time ſome of the powder paſſeth through with the ſpirit, you muſt ſo often poure the ſame ſpirit on the flints untill there be a ſtoppage and the ſpirit come clear; afterward poure this ſpirit into the ſecond funnel with flints; and then into the third, and ſo conſequently until it be ſtrained through the flints of every funnel; or til the ſpirit be ſufficiently colored, which you muſt keep untill you have gotten a ſufficient quantity to be diſtilled by retort for the ſeparating the ſpirit from the gold. Then that

that firſt ſpirit being ſtrained through the flints of each funnel according to order and coloured, pour a freſh ſpirit to the flints of al the funnels according to order beginning at the firſt till you come to the laſt. untill that be ſufficiently coloured, which being done poure a freſh ſpirit of ſalt to the flints (according to their order) contained in every funnel. And when you ſee the ſtrained ſpirit not to receive a tincture, it's a ſign that all the gold is extracted; and then poure on no more ſpirit but common water that it may be ſtrained, and the water will attract the ſpirit of ſalt left in the flints that none ſhall be loſt, which acidiſh water ſave by it ſelf to the ſame and the like uſes: which being done, take out the extracted flints and fill the funnels with freſh as before, *viz.* to be extracted; and doe this ſo long as you have flints and ſpirit. But you muſt not poure a ſpirit not ſufficiently tinged into the ſpirits that are well coloured and impregnated with gold, but keep it a part, and poure it ſtill to freſh prepared flints according to order contained in divers funnels, *viz.* untill it bee ſufficiently coloured, and being coloured, ſeparate it by the glaſs retorts with the reſt, extracting it from the gold by abſtraction; and being abſtracted again uſe it to a new worke like the former. And by this means with 100 pound of ſpirit of ſalt may be extracted ſome thouſand pounds of flints prepared and ſeparate the gold contained in them, which otherwiſe by fuſion cannot be done. But the chief point conſiſteth in the extraction (the ſpirit of ſalt being well and rightly firſt adminiſtred) *viz.* that the ſpirit may not be waſted, whereby many ſtones may be abſtracted with a very little ſpirit. But this caution is to be obſerved in this extraction which is done in cold, that it requireth a ſtronger ſpirit of ſalt than that, which is done in heat by the cucurbits, or elſe the buſineſſe goes on ſlower: but with a ſtronger ſpirit by this (the cold) way they are extracted ſooner and eaſier than by that which is done in heat; and neither ſo dangerous, laborious or coſtly: this extraction then, *viz.* the cold, requires a ſtronger ſpirit of ſalt (which is worth noting) than the hot.

And this is that way by which those golden flints, and other golden fossiles are prepared, and with the spirit of salt are extracted, and by which it is again separated from them: Now shall follow the manner of purification, *viz.* of the Gold left in the Retort.

N. B. The pure gold being extracted out of the flints, not the iron-like, there needs no great businesse of purification, for thou mayst purifie it by fusion with borace, or with the flux made with the equall weight of Nitre and Tartar: but if the gold extracted out of the flints be mixt with iron, as for the most part it is, then you must not fuse it with flux, because it is not thereby purified or rendred malleable Gold, but separate it by lead by which way it is purged and made malleable. And if such gold have any sulphureous impurities mixt besides, it is not to be separated with lead, because it is then partly turned to dross and other impurities by the Iron with losse; wherefore it is to be purged with three parts of Antimony and separated, by which means nothing is lost; which is the best way of separation and purification of Gold; *viz.* the ferreous, without which it cannot otherwise be separated without losse.

How impure Gold may be separated and purged by Antimony.

THis work is necessary to be known if you think to have any benefit by the aforesaid extraction of flints by the spirit of Salt, which without this separation and reduction is of no moment: and what profit I pray is there by the extraction of immature Gold which by the common way cannot be purged, requiring the industry of the Artist in fusion, whereby it may be separated from its sulphureous fæces and fixed? For it is easie to conjecture, that such spirituall and volatile gold mixed with Iron, by that common flux is not reducible into a body, but rather into drosse: for experience testifies that gold dissolved with the spirit of salt, & also iron, or any other sulphureous thing, the spirit of salt being abstracted cannot be reduced whole by the vulgar flux made of Nitre and Tartar, going into dross: which if it happen to cor-

corporeall, pure and fixt gold, how shall it be otherwise with that which is incorporeall, unclean and volatile? for the Gold being ironish commonly, which is extracted out of stones, and iron having great affinity with gold (by reason of which being neerly united, it is difficultly separated, so that it easier goes with iron into drosse than parted from it) you must of necessity make a flux not only attracting that impure gold, but also purifying and cleansing it; that which antimony alone doth, which with its combustible fusible Sulphur works upon that ferreous Gold, or iron easily mixt: But by its Mercury it attracteth the pure corporeall gold, and cleanseth it, and separates it from all dross without any losse: wherefore there cannot be a better flux, but requiring industry, or an ingenious separation of the Antimony from the gold, without wasting the gold; which is done as follows.

And first your ferreous gold, that is left in the abstraction of the spirit of salt, must be finely powdered in iron retors or pots, & mingled with it two or three parts of Antimony powdred, and mixt in a very strong crucible filled and covered, & then fused in our fourth furnace, until that flow like water; which soon appearing poure them together in a heated Cone, smeered within with wax, and when they be cold separate from the drosse the *Regulus* (having most of the gold) with a hammer, and keep it by it selfe. Which done you must again melt the drossie Antimony (as yet containing much gold) that was left, in the crucible, and adde to it a little filing of Iron, mixing them with a crooked wier, and that antimoniall combustible sulphur will be mortified by addiug iron and will yeeld a *Regulus* containing the rest of the gold, which as a regard is had to the quantity of iron added, will be more or less, and for the most part will answer weight to the weight of iron; then cast the mass (well flowing) into a Cone heated and smeered on the inside with wax, which being cold separate again the *Regulus* from the drosse with a hammer, which also is to be kept by it self; melt the drosse again as before, and precipitate it with iron, and extract the *Regulus* thence, which keep by its self, for it contains gold and silver mixt. For the best gold is precipitated the first time,

but

but afterward the baſer ſort, and at laſt only ſilver. Wherefore every *Regulus* is to be kept by it ſelf, that the pureſt gold may be a part, and the ſilvered gold by it ſelf.

N. B. And if the antimony by the the addition of iron doe looſe its fuſibility, and therefore can yeeld no *Regulus*, it's required that you at every time when precipitation is made, by adding iron, that you doe alſo caſt in ſome *Miſy*, to make the maſs to melt in the crucible and precipitate the *Regulus*. All the gold and ſilver being reduced into three or four *Regulus*'s you muſt keep the droſſie parts by themſelves that were left, of which we ſhall ſpeak hereafter.

Now follows the way of ſeparating gold ſilver from Antimony.

THe aforeſaid antimoniall *Regulus*'s may many wayes be purged, and firſt by help of bellows on a plain earthen teſt, as the cuſtome is with Goldſmiths when they make gold fuſile by antimony, which labour is tedious and dangerous; which cannot be done often without the loſſe of health, nor in great quantity: wherefore when a better way is known 'tis a folly to doe it ſo. The *Regulus*'s alſo may be purified by lead on a teſte, which work may be done in a great quantity, but it requires aboundance of coals and lead, where the antimony cannot be preſerved: but it may be done with gain, and is to be preferred before the former wayes: Thou maiſt if thou pleaſeſt calcine the aforeſaid *Regulus*'s and then fuſe them; which way gold and ſilver may eaſily be drawne out. Thou maiſt alſo fuſe them in a crucible, and by the addition of ſome ſalts ſeparate the antimony from the gold and ſilver, turning the antimony into droſs, which being ſeparated thoſe are found purified and malleable, which though it be the eaſieſt way, it is yet alſo very dangerous, for the ſalts often, if you doe not warily proceed doe ſpoil much gold and and ſilver, and ſometimes leave gold immalleable, and ſo double the pains.

But he who knows how to doe this by Nitre only, he may with great gain and in a ſhort time purifie a great quantity of the

the aforeſaid *Regulus*'s with out loſſe of gold, ſilver, or antimony. There are alſo other means for the doing of it which to relate were tedious and indeede impoſſible. Wherefore I will ſet downe, the beſt of all, moſt profitable in the ſeparations of great quantities of *Regulus*'s. Where firſt is required ſome peculiar little Furnace with a fire almoſt like to that in our firſt part of Philoſophicall Furnaces, built for the ſubliming of flowers; it wants indeed a grate, but it hath little vents for to make the coals burn that thy antimony ſeparated from the gold may be ſublimated or elevated into ſublimatory veſſels. Which being rightly built and heated, let ſo much of the *Regulus* be caſt in with a ſpoon as the fire can bear, which wil quickly melt and elevated the air being attracted by the vents, without any trouble: which being ſublimed you may caſt in more, if you have more until all the *Regulus* be ſeparated & ſublimated from the gold and ſilver, which are left in the fire pure and malleable; the furnace being cold you may take out the flowers, and keep them (of which afterwards) for uſes, which way you may not only ſeparate a great number of *Regulus*'s from gold and ſilver in a ſmal time, but alſo keep all the antimony which may many ways be uſed in Alchymy and Medicine with great profit. Which ſure is an excellent knowledge, for not only hereby may any one get aboundantly without wronging his neighbour, but alſo help many ſick people, *viz.* by that excellent medicine made of the flowers: which is a ſpeciall gift of God, for which we owe immortal thanks. And this is of all others that I know the beſt way of ſeparation of gold from antimony, which is not only done in great quantity, in a ſhort time, and with ſmall charge, but alſo without loſſe of the antimony.

Here follows the uſe of Antimoniall Flowers.

FIrſt you may take the whiteſt of the Flowers out of the lower hole and keep them for a Univerſall Medicine; but reduce the reſt (being leſſe pure) into *Regulus* by the ſalt of Tartar, for divers uſes; as ſhall bee ſaid afterward; or

you may mingle them with an equall weight of common sulphur, or antimony, which being mixt in a covered crucible, melt them, and they will yeeld an antimony like to a naturall, good to purifie gold: or thou maist mingle them with other metals, or minerals that by this means they may be made beter; or thou maist use them in Chirurgery, for they of all sliptick plaisters make the best. In breif the aforesaid flowers may many wayes be used with good gain and successe.

The aforesaid antimoniall drosse may also be reduced into flowers and used in the same manner; which indeed are endowed with as excellent properties, as they which are made out of *Regulus*'s; because in that fusion and separation of gold extracted out of flints and talc, the gold only that was fixt and mature was separated from the *Regulus*'s, (the immature and volatile being left in the drosse) and elevated with the flowers: it follows thence that these are better as well in medicine as in the transmutation of metals.

Or if thou wilt, adde to the antimony, (as aforesaid used) old iron to reduce it in a furnace, and take the *Regulus*, having gold and silver, which may therefore be used in other operations of Chymistery, where there is need of *Regulus* as we may shew hereafter. But the drosse doth yeeld a *Regulus*, *viz.* in a very strong fire, and a furnace with a peculiar separatory by abstraction, which although it contain not gold, yet it may bee used not without gain, as if it be mingled with Tin in fusion, it procures to it a hardnesse and sound, usefull for fashioning divers sort of houshold-stuffe, which is not so easily darkened as the common Tin, or if thou wilt not, thou maist make weights of it.

Hitherto we have treated of the extraction of gold out of flints, and of its purification by antimony; now wee will teach you how to use the rest of the antimony as well in the perfection of base metals as in medicine, as well for the preserving of Health as the curing of Diseases.

But seeing wee have made mention of an Universall Medicine, to be made out of antimony aforesaid, I would not have thee think that that is such as can take away all distempers

pers, in generall, without distinction, which vertue is only ascribed to the *Philosophers Stone*, but not by me. to this medicine; to which I attribute no more then I have tryed: But this in truth I dare affirm, that there is besides the stone scarce any comparable to it; for it doth not onely preserve the body from divers diseases, but also happily frees it from the present, so that it may deservedly be tearmed a *Universall Medicine*.

The preparation followeth.

℞ of the flowers purified from the drosse a pound, *viz.* of Antimony, by which the extracted gold was purified, which for the most part are of a yellow colour having gold volatile and immature: in defect of which take the flowers made out of the golden *Regulus*'s being for the most part white, to which powre in a glasse Phiall strong and long necked, of spirit of wine tartarised three or four pound, mingle and stir them wel together, and put on it another crooked pipe (within which let there be some ounces of quicksilver as is described in the fifth Part of our Philosophicall Furnaces) and make strong the joints with a bullocks bladder thrice folded, made wet, which dryed, place the glass in *Balneum*, and give fire by degrees that the spirit of wine with antimony may digest, in which leave it for 24 houres space, and so soon as the fire is out, take out the glasse, when it is cold, pour off the spirit tinged red from the flowers, and poure on fresh; and place it as before in *Balneum* to digest 24 houres space, till it be red, and doe this the third time, or so often till the spirit be no more coloured, for then no more is to be poured on, and that which is coloured is to be filtred with Cap-paper. The rest of the flowers after the extraction, as not requisite to this businesse, are to be either kept by themselves or thrown away. But the tinged spirit is to be abstracted out of a glasse cucurbit by an alembick to the half, from the tincture, which distilled spirit may again be used in the same work: but the tincture left in

the cucurbit is the medicine, of which mention has beene made.

Now mention being made also of tartarised spirit of wine, that I may satisfie the doubtfull concerning that I will here also give its description which is as followeth.

℞ of tartar 20 or 30pound, put it in a large coated retort, and place it in sand, and distill the spirit off with a soft heat.

N. B. This work may better and sooner be performed by that instrument of our second Furnace, and because it requires great and large receivers as being very penetrative, thou maist first apply a tin or copper serpent to the neck of the retort instead of a receiver, which is placed in a tub filled with cold water, that the spirits being thereby cooled may be retained which afterward you must abstract to the halfe out of a glasse cucurbit by an alembick: for the other half with black oil is unprofitable in this work, and therefore to be taken away. After that mingle the more subtile part distilled with half of the *Caput Mortuum* of the aforesaid spirit calcined to a whiteness, and abstract it half again in a gentle *Balneum* out of a glasse cucurbit by an alembick, the joints whereof are every where to be well closed, and the calcined Tartar shall receive with it selfe the stench together with the phlegm, only the purer part of the spirit and more subtle distilling forth, which is again to be mingled with the other halfe of the Tartar calcined to a whiteneſſe, and to be rectified by another alembick, the *Caput Mortuum* may again be calcined to take away the fetidneſſe, that it may be used again. And this is that tartarised spirit of wine, with which the aforesaid tincture and essence is extracted, and truly not only this, but of all other metals, which no other can doe. And if it were lawfull, I would write something more of its wonderfull force and vertue, which it hath in purifying baser metals, with which it hath a great affinity; for it can separate the pure from the impure, of which more in another place. But when it is to bee used in mending of metals, it needs not so much rectification, as is required in the extraction of metallick medicines; where you may draw it in plenty out of the dry lees of wine. But there is

is also another tartarised spirit of wine, which may also be used in this same work, which is made after the following way, Dissolve in a pound of the spirit of wine six ounces of crystall of Tartar; which solution use in the aforesaid extraction in the same manner.

An Admonition.

I Desire thee not to be offended at the plainnesse of the preparation, *viz.* of this medicine, made out of a very meane thing, and without much acuteneſſe of understanding, say not to thy self, if this be true, that such a famous and excellent medicine can be gotten by such easie meanes, what needs we so many various decoctions both pretious and nauseous bee prepared; why is not this substituted in their places? Certainly this should rather be used. But who is so audacious as to dare to displease the multitude defending those kinds of decoction? Surely none; and there are few who are able to turn from their old custom. An ancient custom therefore whatsoever need it hath of being amended, yet prevails. Would to God the time would come when Physitians would practise not out of avarice, but out of charity which we owe to our neighbour, which is desired by, and full of comfort to the sick.

But for the vertue of so great a medicine, I shall open to those that are younger and lesse skilful than my self, not it to those who in yeers and learning doe goe before me, but let every man enjoy his own judgement.

Of the vertues of this Medicine.

THis antimoniall tincture doth above all other medicines evacuate vitious humours, & insensibly purgeth impure bloud; opens any obstructions of the liver, Spleen, Reins, and the other vessels, attracting to it all malignities, and leaving no impurities behinde it. And because it cleanseth the bloud it cures the Leprosie, French pox, and itch, and other diseases proceeding from the impurity of the bloud. By its penetrative

netrative and attenuative vertue, it resolves all tartareous humours and evacuateth them, *viz.* which ingender the gout, the Stone of the Bladder and Reins; but not the Stone perfectly coagulated, onely it mitigateth its pain, and hinders its increase; but being not hardened or coagulated it attracteth and evacuateth it totally and fundamentally out of all parts, it takes away also all Feavers and other diseases ,comming from the superfluity of humours. It gently evacuateth the water between the skin,by siege and urine. In brief it strengthens and purges the principall parts,and preserves them from all preternaturall accidents. It is a most excellent preservative in the time of Pestilence, and other contagious diseases; and of them being caught it is a most absolute remedy, expelling the disease suddenly from the heart and evacuating it. In few words; 'tis of all others a most excellent Universall Medicine, very profitable to both old and young,and also very safe; but warily to be ministred by reason of its strength with which it is endued,which is most powerfull,for it is as a great fire which extinguisheth the lesser. Truly a better Medicine cannot be desired than this which is extracted of a very mean thing, in a short space of time, and with very small cost and pains. I ingenuously confesse I never saw its like, which I doubt not to be the best in the world. Wherefore then do we seek any other but this,*viz.* which excels in those things which are desired from the reall medicine? But as it is most excellent, yet I am certain, that many deluded people will bee offended at it,being prepared out of Antimony, a mean and despised thing,and after a plain way. But 'tis no matter, *For the world will be deceived*, looking after gay things, disrespecting and despising mean things; when all good things, yea even when God himself doth rejoice in simplicity, for which by wicked and proud men he is not sought unto. But this is the effect of sinne by which man is so blinded,that though he know not good, when set before his eyes,yet he is studious of evill.

Of

Of the use and dose of this Medicine.

SEEing of all Medicines it is the most powerfull; it had need be warily used,for a smaller dose is alwayes safer then a greater; which therefore may after be given; that which is to be observed in all diseases of young and old. To children of 2, 3, 4, or 6 months old,against the Worms,Scabs, Feavers and Epilepsie,you need not give above half a drop with a proper vehicle,which you may repeat three or four times a day: it killeth the Wormes, it emptyeth the stomach of evill humours; it refresheth them, and preserves them from scabbinesse; and because it evacuateth evill and corrupt humours, it preserveth them from the small pox and measels,*viz.* if it be used every month, but to children of 1, 2, or 3 yeeres old you may give a drop,and to children of 4 or 5 yeeres old a drop and a half: to young people between 15 and 24 years may be given 2,3, or 4 drops. To stronger bodies from 25 to 50 yeares 4,5,6,or 7 drops. But the dose must be greater or lesse with a regard had ~~to the~~ sickneſse of the patient. And in the Stone and Gout may be dayly administred in some drops of wine or beer, *viz.* in the morning fasting, unlesse the patient be very weak;for then you may give it twice or thrice in a day,and continue this till the cure be perfected;where is to be observed that he must keep a temperate dyet.

In the Leprosie, French-pox, and Scurvy, every morning may a dose be given and the disease shall totally bee rooted out. Otherwise,*viz.* the strength being too much wasted and weakened, you may give only every other day, *viz.* so long as shall be need.

In the Epilepsie it may be given dayly; and also in the Dropsie. In all Feavers two or three houres before the fit. In the Plague it is to be given presently, and every day to be repeated:but for a preservative to be drunk every week once. In all other internall affects it must be given dayly,untill the declining of the disease;but afterward by little and little the medicine is to be used till the disease be fully cured.

In

In externall, as in fresh wounds by a blow, thrust, or shot; broken bones, &c. every day once; with a necessary extrinsecall application of a plaister. In old Fistula's and Cancers, it may be used once every day intrinsecally, and extrinsecally, the place affected may be cleansed with Minerall ointments, For by this meanes every inveterate evill how desperate soever, is throughly cured, and pleasantly without all pain.

But although this be most pretious of all Medicines, yet there is a *menstruum*, not corrosive, with which not only more easily than with the spirit of wine tartarised, a Universall Medicine may be extracted out of Antimony and endued with better then the aforesaid vertues so that for the charge of one royall, in three dayes time, so much may be gotten as may serve to cure some thousands of men, but also all vegetables, animals, and minerals and metals are radically dissolved and reduced into their first matter: by which means not onely very great poisons are changed into most wholesome medicines; but also bitter things are deprived of their bitternesse: for by it things are so corrected, that they doe no more provoke stool and vomit, *viz.* which are very vehement Cathartick's (by Nature) being changed into most excellent restoratives. Also fetid things being corrected by it doe acquire a sweet odour. And it doth not only (which seems a wonder) dissolve vegetables, animalls, and minerals with those things which come of them, but also the very Glasses; wherfore you must alwayes chuse the strongest glasses for digestion and solution, or in the defect of such the weaker are to be changed every 6 houres. And yet it is not at all altered by those things that it doth reduce and turn into their first matter medicinall, neither in vertue nor colour; for it alwayes keeps the middle place between pure and impure, of which this falls to the bottome, but that swims on the top of the *menstruum*, which may again be used. In briefe its vertues in preparing medicines cannot bee enough praised. But it may bee compared with the Mercuriall water of *Basilius Valentinus*; and the *Alcahest* of *Paracelsus* and *Helmont*, which

which I judge to be the *Fire* of the *Maccabees* turned into a thick water underground. It is a perpetuall fire but not alwayes burning visibly; it is a water permanent not wetting the hands, the Sope of the Wise, the Philosophers *Azoth*, and the Royall-bath.

Which Menstrue though I have known some yeares, and have often used it with metallicks, and by it have found out many secrets, yet I never thought of its use in Physick, untill being askt of one who was a great student of *Helmont*, whether I knew the preparation of the liquor *Alcahast* of *Paracelsus*; and naming some of the vertues of this liquor in preparing Medicines; I began to be think my selfe, and I observed that it was my *secret Balneum* that purifies minerals. Wherefore I presently made tryal with vegetables & animals (for I knew the vertues thereof in metallicks) and I found wonderfull and astonishing things in it which before were incredible to me. I affirm and confesse therefore sincerely, that all and every the invented medicines published by others and my self how rare and costly soever, are most mean things in my estimation. For this *Universall Key* was wanting to us. For our vegetables and minerals hower by art macerated cannot bee perfectly resolved, and therefore we hitherto have had but part of their vertues. But now we need not much art, labour and cost to reduce a whole body without corrosives, into the first matter, like in shape to some clear and excellent water, of its own accord casting forth its superfluous terrestreity, and becomming a most wholesome medicine, consisting of the three purest principles; that which cannot be done without this *menstruum*. For what else could Physitians extract out of hearbs than syrups, Electuaries, Conserves and Waters? with which preparations they were not amended but only qualified with the addition of Sugar or Honey; because there is no separation made of the pure from the impure or good from bad. For all are left mixt together in the Electuaries and Conserves, but in the syrups and waters distilled there is only some part. Extracts indeed by the spirit of wine are not to be disesteemed if rightly prepared, but they are no better

than their ſimples; and beſides want that which the ſpirit of wine cannotdraw out, whichremainder though being calcined for the drawing out the ſalt, which is mingled with the extract yet that is not of much moment, for fire deſtroyeth the vertue of hearbs, ſo that fixed ſalts, as cryſtalliſed, do perform nothing in medicine, thoſe excepted which without combuſtion are made out of the juice of hearbs, of which in the third part of our furnaces Philoſophical. But none dares extract the moſt ſtrange or efficacious ſort of hearbs for medicine, becauſe they in preparation are not corrected or amended.

But by this means the moſt ſtrong hearbs, which without this preparation are poiſons, are matured and purified by the liquor *Alcaheſt*, ſo that they may ſafely be taken againſt moſt grievous diſeaſes. For God did not create theſe hearbs in vain, as ſome think, which he purpoſely created that his wonderful works might appear, and that it is poſſible to take away the curſe from them by a man, being freed from the malediction by the regeneration through Chriſt. See *Opium*, Maudrake, Henbane, Hemlock and other ſtupifying things, how deadly they are being cautiouſly uſed? which corrected by this Menſtrue become moſt ſafe and excellent medicines. How dangerous is ſpurge, ſcamony, hellebor, gambugium and other ſtrong purgers (being adminiſtred unwarily) no man is ignorant: all which are by this way corrected, and changed into moſt wholeſome medicaments. Who I pray dares eat wolfesbane, and poiſonous toad-ſtooles and other venemous vegetables? which are all ſo corrected by the liquor *Alkaheſt* as that not only they are not poiſonous, but are alſo turned into moſt ſafe and wholſome medicines of many diſeaſes, *Nux vomica*, *Levant* berries, and other things that diſturbe the braine are by this means made wholſome, alſo poiſonous Animals, as Spiders, Toads, ſerpents, vipers, &c. are by it corrected, as that not only they are not poiſonous but do reſiſt and expel poiſon.

N. B. Conſider the ſpiders ſigned with the croſs, who change their skin every month and renew themſelves, which the ſerpents and halcyon do but once in a yeer. How great

great may the vertue of worms earthy and crude, &c. in reſolving tartareous humors and the French diſeaſe is, many know, what then will they do being corrected with this Menſtrue? The *Cantharides* and *Millipedes* are alſo ſo corrected that they may more ſafely be uſed in provoking urine. And if that moſt venomous Baſilisk, of which there are ſo man fables, whoſe ſight only kils men (which according to the letter is falſe) could be had, he might be changed into medicine by the liquor *Alkaheſt*; as that mineral Baſilisk, Gun-powder may be, which in a moment kils innumerable men; alſo Arſenick, Orpiment, Kobolt and the like; ſo that they be deprived of their malignity and be reduced into very excellent medicines. In brief, its excellent vertues which it manifeſts in correcting of venemous ſimples cannot be ſufficiently deſcribed. Wherefore its worth our paines to ſearch it with all our power, that we may prepare admirable medicines, that the ſick may not for the future be ſo vexed with thoſe tedious and bitter cups. Truly I cannot enough admire its great vertues which have been hid ſo long. It is not a corroſive thing and yet diſſolves every thing, but ſome things ſooner then others. It changeth and amendeth their natural vertues; wherefore it may be the comfort of Spagiriſts, having a long time ſought for rare medicines, *viz.* being that by which vegetables are ſeparated and corrected, and alſo animals and minerals. Wherefore al conſcientious Phyſitians may have commended to them the preparation of this univerſal menſtrue by the help whereof to prepare their medicines; of which the orginal and preparation is vile, but its vertues moſt efficacious, the finding out and uſes abſtruſe. Wherefore it is not obtained, but from *God from whom proceeds every good gift*. Do not think then that gluttonie and drunkenneſs, idleneſs, pride and lying, the contempt of thy neighbour, malice, avarice with an impious life, to be the means by which it is to be obtained, for it is only the *gift of the merciful God*, *viz.* this menſtrue, the gate and key of which is only divine mercy. But that thou maiſt know what is to be determined concerning medicines prepared out of poiſonous ſimples, I will in brief expound that by exam-

ple: for all vegetables, animals, and minerals, called poisons, making war with humane nature being intrinsecally used, and therefore not undeservedly shunnd of al, are like some powerful unvanquishable enemy, with all his power seeking the oppression and destruction of his contrary, who being checked by a mediator of no less strength, & reconciled with his contrary, does no more (being unable before the reconciliation to resist his powerful enemies) fear the contrariety of his enemie, which now is made his friend bringing aid for the exstirpating and vanquishing of all such like (otherwise) invincible enemies. Even so is it with venemous vegetables, animals and minerals, destructive to humane nature: which by the liquor Alkaheſt (a checker and reconciler) are so corrected and reduced, that they hurt not, being deprived of their malignity and made friends with men: whereby they are not longer poisonous enemies but very safe and wholesome remedies, agreeing to humane nature overcoming and expelling other the like enemies otherwise poisonous, and invincible, for by how much the more enemie before reconciliation it was, by so much the more help is brought by it, the reconciliation being made. There is not the like found in nature; which can so suddenly correct poisons, and reduce them into their first matter and bring them into very wholesome essences. Let religious Physitians then that can, get this. And so I end this declaration (not without cause set down) which will move those hearts which are not as yet hardened. This certainly is a true Philosophical correction, with which that which is maligne is turned into a wholesome substance. What profits that correction, I pray, which is made by the admixtion of other things, as in the mixture of Catharticks and cordials? Truely nothing, neither can the cordials do any thing but debilitate the Catharticks; for nature is not at once able to expel a purging poison, and attract a thing confortative and corroborative: For a purge being given, forthwith that shews its strength in the body, whose malignity nature resisting desireth to expel it; before that it can attract the confortative; wherefore that friend is expelled together with the disease. The same happens in the mixture of sugar, honey, and other sweet

sweet things with bitter, sharpe, and tart, *&c.* whose unpleasantness is not corrected by sweet things, but only dulled, thereby acquiring another smel and tast, without any other essential alteration. Which correction is like to that, which is made in Taverns amending the aire with sweet fumes, which before was infected with the spittings, spuings, and stinks of rustick drunkards, which is to rusticks, an excellent correction, attracting the ill as well as the good aromatick odour being by drunkenness deprived of their judgement, but not so to sober men enjoying the use of understanding, to whom that seems a rustick correction. In this manner (not to be commended) are at this day simples corrected. But a true and Philosophical correction is done by it self without the addition of other things, by benefit of the fire only as well actual as potentially moist, by ripening, mending and separating the malignity; which is done by the liquor Alkaheſt, as it is called by *Paracelsus* and *Helmont*.

But whether this my liquor be the same Alkaheſt of *Paracelsus* and *Helmont*, it matters not if it performe the same things.

Fire and a fiery vertue may do much, but not by burning and destroying, but by maturation and nutrition; and feeding and moistening. Of which moist fire see *Artephius*, *Bernhardus*, *Basilius*, *Paracelsus*, &c. for maturation is not done with cold things but hot, promoting germination. Aud what ever nature hath left imperfect in the vegetable kingdome, mineral and animal, *viz.* accidentally; that may be amended by art with the liquor Alkaheſt, which is the best way of correction, untill by benefit of art and the help of nature some better thing be found out, *&c.*

And these are the vertues of that wonderful liquor Alkaheſt which is made use of in the preparation of medicines: And because it is said before that it shews its vertues on metallicks also, I could not conceale them from the studious. But all its vertues shall not here be related, for it is indued with so many that no mortal is able to number them. As for me, although by divine favor, and the instruction of the excellent

man *Paracelsus* (excellently in a certain place, but obserued in few words; describing it, speaking of it briefly, but very plainly and cleerly naming it) I did obtaine the knowledge thereof which afterward daily I did more and more encrease, so that I could hardly believe that any ever had spent so much money and pains in the searching of its vertues, for the trying of metals: yet I must needs confess although happily I have made more tryal therein than any other; that many of its vertues are as yet unknown to me. Seeing then that its vertues and strength cannot all be tryed by any man by reason of his short life, although searching a hundred yeers; and that by our merciful father only to a few, and but part of the knowledge of its wonderful and incredible force, is granted, to the glory of his divine name, in favor of the poor sick, which none how learned soever, with his ambitious learning and craft could ever obtaine. Therefore some excellent gifts being given from the father of lights the omnipotent God, to some of his children, gratis and out of meer mercy, *viz.* for some causes, I easily believe, that it is not his will that it shall long be kept close, but be revealed to the world to the glory of his name, and the benefit of our poor neighbour. Wherefore I could not longer hold my peace, hiding my talent which I received gratis though smal, but communicate it gratis to my neighbor; but so that the divine mystery may not be gotten by those ungodly abusers, but only by the worthy through divine favor. I affirm therefore expressly that in whole nature such a thing may not be found, for not only by its help all animals, vegetables, and minerals may be reduced into very excellent and safe medicines; but also be brought into the first matter, minerals and metals may be purified, washed and fixed, and so changed into better bodies. That which is worthy admiration, that in so vile and mean a subject should ly hid so great vertues, by which alone without any other art, may be acquired riches and honours, and lost health. Then which thing what doth mortal man more need in his misery, besides the divine word, the comfort of the soul, the for necessary sustentation of life, soundness of body

body and honest report before God and men? All these things may be had with this subject, so that one need not to involve himself into any other troublesome art or vanity of this world, having this secret, whereby all necessaries may in abundance be proccured: of which gift that this unclean world is unworthy, I do affirme sincerely, because it swels with ambition & avarice; for which we are not able to give God the donor sufficient thanks in our whole life, wherefore I would have all what state or order soever earnestly admonished, that they do not use this gift from heaven to the destruction of their souls, but in thankfulness to him that gave it, and every way to the good of their Christian neighbour.

Now follow the vertues which it manifesteth in metallicks.

FIrst it, *viz.* the Philosophical menstrue, doth radically dissolve all minerals and metals without noise, and reduces them into very safe and wholesome medicines. Out of gold it makes potable gold; out of silver potable silver, and so consequently of other metals potable metals; so that it may well be called the *universal Mercurie*.

Secondly this secret menstrue purgeth, washeth and transmuteth minerals, and metals to a more noble species, wherefore it may well be called *Sapo Sapientum*, by which the saying of the Philosophers is confirmed: *Ignis & Azoth abluunt Latonem*.

Thirdly, by it all minerals and metals are matured and fixed, so as that afterward immature gold or silver incorporated with it, may by cupellation be drawn out with gain; wherefore tis deservedly compared to *Hermes seale*.

Fourthly, it makes metals volatile and radically conjoynes them that they abide together, and one act on the other in the fire; it distroyes and revivs, kils and renews, wherefore it is compared to the Phenix.

Fiftly, it separates metals without any loss and that speedily: but after another manner then corrosives, so that each of them may be had by themselves. For example, being about

about to separate gold, silver, copper, iron, tin, lead mixt; one or two three or four of them mixt that they may appear each by themselves, without the loss of any, you need not cupellate the mixture with tin, which way only gold and silver are gotten out with the losse of all the rest: but by this way they are all preserved, where by turns one after another they are extracted wonderfully and swiftly, in half an hours time by this sharpe *vinegar of the Philosophers*, &c.

Sixtly, By it metals may suddenly be mortified and reduced into transparent glass, irreducible and like *Amausa*, but reserving the propriety and nature of every metal: which in the reduction of gold, do give perfect silver: whereby is confirmed that saying of the Philosophers; *the corruption of one thing is the generation of another*, and that of *Paracelsus*: *Ex aliquo fiat nihilum, & ex nihilo aliquid.* But this incombustible water or permanent water shews the truth of the Philosophers writings generally mentioning it; in it the solution, putrefaction, distillation, sublimation, circulation, ascension, descension, cohobation, receration, calcination, coagulation, fixation and fermentation, &c. in their work to be done at one time and one way: in which onely operation all the colours appear of which the Philosopherrs make mention; As the head of the crow, virgines milk, dragons blood, peacocks tayles, green and red lyon, &c. There is also by it demonstrated the truth (by the liquor Alkaheſt) of that Hermetical saying, *That which is above, is as that which is beneath*, &c. and many other things are performed by its help, as making that secret Sandivogian *Chalybs*; also that long sought for oyle of Talc.

So far (Courteous Reader) hath come my experience; neither doubt I but by it to obtaine that universal *Salamander* which lives in the fire.

These things which I write are true and no fallacies. And though this secret be incredible to the ignorant for the wonderful vertues it sheweth in the preparation of medicines, I would willingly publish it to the world for publike good, but on consideration I held it not meet to communicate it for certain causes. But only lest the knowledge of it should perish,

perish, and that the true (and almost extinct) medicine for the curing of diseases vulgarly incurable might flourish, I have revealed this secret menstruum to two friends, *viz.* its preparation and use.

But do thou not think because I write of these high things, that I do intend to make common the secret to all in general; not so, but I endeavor to confirm him that seeketh, and give him occasion to search this secret deeper; which being found he shall not only finde the truth of my words, but he shall daily by exercise obtaine far greater things then these.

And because I have never aspired after vaine riches and honors, nor never desire them; I might well be perswaded, to leave to others as yet not hating the wicked world, my troublesome labors; because in this my painful age such tedious labors are very burdensome, besides Philosophy hath pointed me another way, so that what I am able I have determined to abstaine from these vanities, and to seek a perpetual good, the life of rest, but my counsel shall not be wanting to those that seek it: for besides moved with the former reasons, also seeing innumerable many vaine Philosophers, as well learned as unlearned, uncessantly working, and losing their time and labour, and at last despairing, are perswaded that there is no truth in the Philosophers writings but to be all filled with lyes and deceits; whence royal Chymistry is disgraced.

But seeing and marking the infallible truth of ancient writings, suffering injury by unskilful Zoilus's; I could not but defend their worth and vindicate them from injuries, *viz.* in a few words demonstrating the possibility of metallical transmutation. But I do not affirme that by the art which I have many yeers exercised and the possibility of which I defend I have gotten much wealth; because hitherto I could not make trial but in smal quantity for finding out the possibility without any gaine, and only particularly; for I have never tried any thing in the universal work, reserving it to a more convenient time and place. But I will not deny such a universal medicine: because I have seen the principles of it, and foundations of the art, wherefore houshold cares being removed,

I intend to make tryal of it. For who will longer doubt of the p..ſſibility of it being proved by moſt excellent men, yea Kings and Princes? which godly and honeſt men have not written for gaine; ſome of whom though they lived with Ethnicks, yet were they not Heathens, who had more knowledge of Chriſt by the light of nature then thoſe fooliſh detractors of Chriſtian truth, as they appear to be by their writings. But thou wilt urge that if thoſe things were true which they write, then it might be found in them: but it is not, becauſe all and every one miſs of it in their practice, ſo that their time, labor and charges are ſpent in vaine. I anſwer, Their writings are not to be underſtood according to the letter, but according to the hidden ſenſe, according to which they have written the naked truth which to the illuminated is conſpicuous.

And this *menſtruum* ſufficeth to defend the writings of the Philoſophers without the metallick tranſmutations; ſo that I verily beli..ve the time to be neer, when the omnipotent God before he judge the world in fire, will ſhew his omnipotency to the nations by the revelation of the wonderful and incredible things of nature; of which, tranſmutation of metals is not the leaſt, which in the third part of this mineral work I ſhall deliver to the laſt age (being acceptable to God) to the profit of my neighbor, and for demonſtration ſake. Wherefore I now paſs over ſuch things, with a firme hope, that this faithful admonition ſhall be received as an undoubted and infallible truth.

How the aforeſaid Regulus, *of the flowerss and droſs of Antimony, is to be uſed in the bettering of courſe metals, ſhall be ſhewen, that art may not be abuſed.*

THe Antimonial *Regulus* a radical metallick humor, may help to perform wonderful things, for being reduced to a water without a corroſive, it reſolveth all metals, cleanſeth, waſheth and purifieth them, and turns them into a better ſpecies, ſo that particularly not a ſmal gaine may be from thence received

ed. But how it may be redueed into water, and how by its help metals may be reſolved, volatized and again fixed, hath been demonſtrated by *Artephius*, *Baſilius* and *Paracelſus*; wherefore we need not here repeat their writings, but refer the readers to their works.

But not only the *Regulus*, but alſo all Antimony may many wayes be uſed in the ſeparation of metals, *viz.* For the extraction of hidden gold, which cannot be done without Antimony; as ſhall appear by the following example. When you finde a marcaſit or other ironiſh foſſile, that will not yeeld to the tryal by lead, add to it three parts of Antimony, and being well mixt, melt them in a covered crucible, and being melted powre it into a cone; and when all is cold, ſeparate the *Regulus*, which purge againe by fire as before, and thou ſhalt finde gold contained in the aforeſaid foſſile: And if it be indued with more plenty of gold, for it is not all drawn out at one time, *viz.* with the firſt *Regulus*, another *Regulus* is to be melted by adding more iron and ſalt-peter which is alſo of a nature near to *Sol*. And if theſe marcaſit foſſiles are not ferreous, you muſt in the firſt fuſion, adde iron and nitre to them, or elſe they yeeld no *Regulus*. By the adding more ſcals, of iron more *Regulus* is made, and for the ſame uſe as that is of which above in the fuſion and ſeparation of extracted gold; weights alſo may be made out of the droſs. And thus are *lapis calaminaris*, marcaſit, kobolt, zinck, talc, and other foſſiles ſeparated, *viz.* containing gold.

But all gold containing iron (as that of Stiria, Carinthia, the Granecia and of Tranſylvania, &c.) may this way be eaſily ſeparated with profit by the help of iron. And if the iron have no gold, yet if the Antimony have it, it may thence be ſeparated by fuſion with iron, *viz.* if it be brought to a *Regulus*. The reſt of the Antimony may again be fuſed with new iron and new glaſs of more weight then it, but leſs then this, and be reduced into a *Regulus* fit for the following uſes. Out of the droſs let weights (that nothing may be loſt) be made, that thou maiſt have the more gaine as may appear from the following example.

When you have the Antimony, a hundred of which contains two duckats, if you will separate the gold; take a hundred [weight] divided into three or four parts, fuse it according to art adding a little iron and salt of ashes and reduce them into smal *Regulus* weighing a pound or two. Then use the dross with half the weights of the iron in a large & strong crucible, and thou shalt have more *Regulus's* about fifty pound or more, dross 40. *lib.* which make weights of, or else guns, *&c.* the rest, about eight or nine pounds will vanish into smoake. And so thou hast reduced the gold contained in a hundred weight into one or two pounds, which thou maist sublime by fire into flowers (leaving the gold in the fire) for its uses, but those 50 or 60. pounds of the *Regulus's* prepared by adding much iron, they having little or no gold, you may mingle with tin for its beauty, hardness and sounding, to make diverse sorts of houshold-stuffe, as platters, dishes, *&c.* For tin mixt with the *Regulus* looks like silver for whiteness and hardness, and sounds like it, nor is it so easily dulled, as unmixt.

Now let us weigh what gaine may come from the separation of the meanest Antimony. Put case that a hundred weight of Antimony be sold for three Royals (for so for the most part the Polonian is sold, than which although that of Hungaria and Transilvania be deerer, yet this hath more gol) to which adde 60. pound of iron, which is sold for half a royal, and the charge of coals and crucibles requisite be half a royal more: the total of the expences is four royals, for which take two duckats in gold, sixty pound of *Regulus*, eighty pound of dross, and one or two pound of flowers. Those 60. *lib.* of *Regulus* may be sold at the price of tin, whereof a pound is sold for a quarter of a royal, and then their whole price is fifteen royals. Then the eighty pound of refuse made into weights may be sold at fourty shillings, or at least twenty four shillings, or half a royal; And all things being considered and abhracted as they ought there may remaine the value of ten royals.

And though the Antimony should yeeld but one duckat; and a pound of *Regulus* should be sold at the eighth part of a royal, yet the remainder would be above six royals: And in a day there

there may easily be two hundred weight separated by two men, And then suppose it should containe no gold (as some Antimony doth not) yet may four or five royals be gotten daily

But when you have Antimony one hundred a ℔. whereof containes three four or five duckats, and iron requisite to the separation containing one or two duckats, then there is so much more gained. Then let him that undertakes this busines seek for the best copper and iron, and he may well gaine in a day twenty, thirty, and sometimes sixty royals.

N. B. And if you should have so much *Regulus* that you could not mix all of it with tin, for want thereof, then it may be sold in parcels, so that one ℔ may go at a fourth part of a royal; by which means the daily gaine may not be diminished, but may be rather encreased as may be seen by what follows. The *Regulus* of copper is the masculine species of lead; whose first being is gold impure and mature: but the first being of common lead impure and immature is silver as experience witnesses, for copper purged and fixt yeelds gold, but the common lead only silver. And because Antimony which is better than common lead is called the *Philosophers lead*, or their *secret lead*; of many so named but known of few; not that the thing is unknown or of an unknown original, but by reason of its hidden properties; therefore I say that its vertues are not all to be known by any mortal though he should have a hundred yeers to search into wonderful nature for it is unsearchable and the Creator of all wonders, let him injoyne himself silence, neither let him glory in the knowledge of it who hath not made tryal of it, for in it, through it and by it nature and art do strive for perfection: of which more else where.

Now follows its use.

HAving mentioned *Antimonial Regulus*, which is lead, and better then the common, It must also purifie impure metals, wash them, separate the occult gold and silver in them; that which common can do, to which if those be added, it at-

tracteth the more impure part in the cupel, which it converteth into droſs, and draweth down with it into the porous aſhes, leaving the purer gold and ſilver in the cupel: but from ſome tin and copper not yeelding to the lead nor willing to be waſhed by it, it cannot extract their gold and ſilver; neither hath any one written the way of ſeparation by it. *Lazarus Erker* indeed hath deſcribed (and others alſo) the way of ſeparating ſilver from tin and iron, which is not to be diſeſteemed if it be accidentally mixed with ſilver, which is ſeparable that way, but not ſo being generated in, and radically mixt with them, requiring other lead willingly embracing tin and iron, which nothing but *Regulus* can perform.

But ſeeing tin and iron do for the moſt part containe much gold and iron (but chiefly tin) *viz.* inſeparable by the common way, it will be worth our pains to ſeek another lead and way of ſeparation; as it is apparent to refiners, proving tin and iron by the common way on a teſt; whileſt tin and iron melted in the lead, do forthwith ſhew their ſtubbornneſs by inate proprieties and forſake it, *viz.* as a contrary riſing to the top like droſs or aſhes, without any ſeparation, gold and ſilver being excepted if accidentally mixt together, which are left with the lead; but not ſo being hid in their middle or center. But that the truth hereof may appear I will demonſtrate it by example, Place on a teſt under a tyle 16. parts of lead and one of tin, after the manner of proofes, give a fuſing fire for to ſeparate the droſs; and all the tin almoſt flying away will at the bottome be burnt, and ſeparated like aſhes, being ſublimated on the top of the lead; not deprived of its gold and ſilver incorporated together, which afterward I ſhal demonſtrate when all the tin is ſublimated from the lead, and calcined, and the tyle taken from under the teſt, and the reſt of the lead powred off, and you ſhall finde after cupellation no more ſilver than the ſixteen parts of lead did containe before, if they had been cupelled without tin; ſometimes leſs, ſome part being taking away by tin in the examination: the ſame is done with iron, although thou ſhouldſt add copper with glaſs of lead to retaine the tin

tin and iron thereby to ſeparate their gold and ſilver, you would effect nothing: for although ſome more ſilver may hereby be extracted, yet that would not come from tin or iron but copper: it may therefore be extracted another may of which hereafter.

In the mean while I will prove cleerly that the ſeparation of tin and iron by common lead, thereby to get their gold and ſilver, is of no value, which being left in them are turned into aſhes and droſſe.

Take any Tin and reduce it into aſhes by lead, or agitation on a ſmooth earthen veſſell (tryed before by the common way for diſtinction ſake, which calcine well, that the corporeall tin powdered may be calcined, or being melted may be ſeparated from the aſhes. Then take of theſe aſhes one part, and of the following flux, or of that a little after ſix parts or more, being mixt fuſe them in a ſtrong crucible with a ſtrong fire; untill the flux have conſumed or drunk up all the calx of the Tin, and of them both ſhall be made one, *viz.* yellow or red glaſſe, which may be tryed with a crooked wier put in: which if it ſeeme not clear the crucible muſt be covered again, and a greater fire be given, untill the fire be perfect; which labour in one halfe houre is finiſhed: which done poure it into a braſſe mortar, afterward to be covered untill it be a cold that it leap not out and be loſt.

Afterward powder it, to which mingle to the calx of Tin, the weight of filings of Iron; being mixt put them into a ſtrong crucible (becauſe the flux is very penetrative) covered, and give a ſtrong fir for fuſion half an houre: which done poure it out for Tin hath made ſeparation, and reduced ſome part of lead out, of the flux, ſinking to the bottom to be ſeparated when it is cold, to be reduced into droſſe on a teſte, and then to be cupelled, and you ſhall finde grain gold drawn from Tin without ſilver. And if before you weigh the calx of Tin leſſe than 100 weight, and after that the graines of Gold, you may eaſily conjecture how much Gold is contained in the whole hundred weight of Tin aſhes, *viz.* at the leaſt 3, 4, 5 or 6 *lotones* if thou work aright.

See

See then the fault is not to be imputed to the metals, but us, being ignorant of the ſeparation of the Gold and Silver.

You ſhould not perſwade your ſelfe by this means to get much wealth out of Tin; for I have not written this for that end, but only to demonſtrate the poſſibility. And if thou think that gold wil come out of iron by the flux, mingle then filings of Iron with the flux, before thou put in calx of Tin, and thou ſhalt find in ſo doing that Gold doth come neither from the flux or iron but out of tin, then being hereby aſſured that 'tis the tin which contains gold, thou mayſt conſider how, moſt conveniently that may be extracted, *viz.* with other Lead, and another way, as ſhal be hereafter taught. Neither think that tin contains no more Gold then you have heard; for more there is if you can wiſely extract it. Neither doe I deny that more Gold may be extracted out of the tin; but more care then this is to be given, if you deſire more plenty. But Gold may thence be extracted not onely by flux but divers other wayes, in divers weights; for what is written is only for demonſtration of the poſſibility, of Gold being contained in imperfect may to be extracted by a ſecret ſeparation.

The flux requiſite to this worke.

℞ one part of very pure and white ſand or flints, having no Gold fuſible; to which add three parts of Litharge of Lead; being mixt fuſe in a very ſtrong fire, that thereof a tranſparent glaſſe may be made of it, which poure out that it may be cold, and reduce it to powder, which uſe in the aforeſaid manner. But you may ask why ſand & flints are mingled ſeeing they are not of a metallick nature: to which I ſay; the calx of tin, cannot, as alſo other foſſiles, be examined by lead alone, for the following reaſons, *viz.* becauſe in the calcination of tin, its metallick nature is hidden, but the impure and earthy parts are manifeſt, wherefore it hath no longer affinity with Lead and other metals; unleſſe the hidden parts of the lead be manifeſt and alſo other metals and the manifeſt be hidden, for th

then they eaſily embrace one the other, and are again mingled well, and not altered.

What belongs to the alteration of other metals doth not belong hither; for to this place only pertain Lead and Tin, the alteration of which is demonſtrated by this triall; whereby it appeares to be thus.

Lead reduced into aſhes by it ſelfe or into Lithargie, and deprived of its metallick form, cannot ſo in this worke be uſed without the flints or ſand, for the following reaſon. The lead and glaſſe thereof made by it ſelfe is very fuſible and volatile; but the *calx* of tin is very difficutly fuſed: which two *calx*'s although they ſhould be mingled to fuſe in a crucible, yet would not be mingled, nor being fuſed imbrace one the other for the difference of their fuſibility; becauſe the *calx* of lead alone being fuſed by a ſmall fire will perforate and penetrate the crucible the *calx* of Tin being left in the crucible: wherefore you muſt adde ſand or flints to the lead, *viz.* to hinder its fuſibility, that it may endure the ſame degree of heat with thoſe that are difficultly fuſed and further their flux. For like things doe mutually affect and embrace each other; as water doth water, oyl oyl, and glaſſe glaſſe; and metals other metals; but water is not mingled with oyl; neither are glaſſes mingled with metals, but metals with metals, and glaſſe with glaſſe, whether it be made of metals or out of ſand. Wherefore they greatly erre who mingle the *calx* of metals difficultly miſcible, or other hard things with lead to prove or examine, not conſidering that corporeall lead hath no affinity with them: who remaining in their errour and not weighing the thing further, conſequently can find nothing of any moment.

But when the *calx* of metals united with lead by a *medium* as flints or ſand, are brought together into tranſparent glaſſe; then the lead being precipitated and ſeparated from the mixture, it cannot be but that the gold and ſilver contained in them muſt be carried away with it. This is a true and philoſophicall tryall and not to be contemned, for many things may by it be performed.

N. B. But this is not to be passed by, that in the mutuall mixture and fusion of the glasse of lead and the *calx* of tin, and other hard metals, one may easily erre, *viz.* in the precipitation (which is done with the mixture of iron) of the gold with the lead into *Regulus*, by either the excesse or defect so that nothing may be gotten, which is committed in precipitation. For if the mixture stand long in the fire not fused, it is burnt, so that it cannot well be separated, and if it stand too long fused in the fire, the gold is attracted by the drosse, by reason of the mixture of the iron, having great affinity with the gold, so that by this meanes nothing can be gotten: wherefore the work is to be done warily, and with wisdome and industry. You must have a care you burne not the *Regulus* of lead with too much fire, when you reduce it into drosse; for fear of attracting the gold from the iron and turning it into drosse. And although this may by art be prevented, yet we must not presently create every one *Master* of *Arts*, it requiring diligence and daily exercise, besides the reading of Bookes. But this secret shall other where be communicated.

This admonition then I give that thou doe not impute thy errour (if thou dost erre) to me, but to thy selfe, for what I have written is true: and doe not thence infer an impossibility of attracting gold by iron out of lead, and of turning it into drosse, which is no wonder to me though it may so seem to thee. Which he who hath the knowledg of metals wil himselfe easily perceive. But that thou maist be certain, try the certainty after the following manner: take two hundred *lib.* of lead of the lesser weight of the refiners, put it on a test under a tyle; adde eight or ten *lotons* of pure gold, of tin two or three *l.* six or eight of iron, *viz.* of the lesser weight: make them flow together an houre to make drosse; as examiners use to doe: then poure it out and separate the lead from the dross, *viz.* to cupell that which is eparated, then weigh the grains of gold left, and thou shalt finde half of it consumed by the drosse. If this happen to corporeall gold and fixt, how will it be with that which is newly extracted out of an imperfect metal?

metall? therefore you must diligently search out the natures of metals and then such cases shall not seem incredible.

From hence then and other examples mentioned it appeares, that that separation which is done by tests and cupels is not true and legitimate; and consequently that another profitable separation of metals is to be sought; because by this the greater part of gold and silver burns into drosse, witnesse experience, for which cause the former example was alleadged; whither belongs the proof, *viz.* how much gold the drosse hath attracted, which is done as followeth: ℞ the remaining black drosse; to which adde a double weight of salt of tartar, put in it a crucible filled but to the half (for fear of boiling out) and covered that nothing fall in, under a tyle or among live coals, one or two hours space to digest; and a new *Regulus* of lead shall be precipitated, which separated from the dross you may cupel, and you shall finde new graines of gold attracted by the iron to the dross, but now separated by the salt of tartar, overcoming the rage of the iron. And so you have heard from two examples, how in the coction of the separation gold may be drawn out of the lead by tin and iron, and that therefore there is need, that gold be separated by the *Antimonial Regulus* out of the aforesaid metals, and not by lead, if you would extract the true substance with gaine.

N. B. Gold may likewise be separated out of the glass of lead (being first dissolved with the ashes of tin) with coal dust, adding it in the flux and stirring it with an iron wier; and also with common sulphur, by burning it on it: but the aforesaid way with iron, is to be preferred before those two which spoyle the gold, *&c.* wherefore the remaining dross is to be gathered, which by some abstracting furnace by other means may be tryed for to recover the spoyled or lost gold and silver.

And all these are alleadged to demonstrate that the gold in tin and iron is to be separated by the *Antimonial Regulus* and not by lead. But how this separation may be perfected, you shall here in that third part where we will treat of lead explained by *Paracelsus* in his book called *Cælum Philosopherum*, and

other artificial Chymical labors: wherefore here we omit it being superfluous to handle one thing in diverse places. In the mean while exercise thy self in lesser things, that thou maist be more fit for greater when they shall be set forth. But wonder not at my liberality in publishing so great secrets, for I have reasons for it. Such a burden is too much for me alone, neither doth it profit the covetous to sell his goods to them which keep not their words, nor pay the mony, after they have obtained their art, which hath happened to me. Wherefore I have determined to communicate some secrets to all the world indifferently that the poor may receive some profit by them: knowing that though I write plainly, yet that al wil not at the first view obtaine their desires. For some are so dull that they cannot imitate a work though often seen. For some have often visited me to see my new maner of distilling, which though it was sufficiently demonstrated to the eye, yet they could not imitate it, till with often perusals at length they have found the right path. Others have left it as too hard a work when it would not presently succeed, which if it happened to those who had an occular demonstration, how much more difficult will it be and hard to them who have nothing but what they have heard or read. Wherefore I am certain that though I should publish every one of my secrets, yet could they not be performed by all men, my coals and materials being left sufficing for my necessity. Wherefore I fear not to publish, the next opportunity offered, diverse profitable and exeellent secrets, *viz.* in favor of all and every one.

As for that spirit of salt necessary to this work, you may finde it in the first part of my Philosophical Furnaces corrected and amended; but the way of separation in the fourth part.

And so I finde this work published in favor of those who by war (though honest men) are reduced to poverty. But what things are deficient in this little tract shall (God willing) be delivered in the next (which shall follow in a short time) largely and cleerly without fraud.

FINIS.

The Contents of the first Part.

The Contents of the second Part.

How

The

Of

The Contents of the third Part.

The Contents of the fourth Part.

The Contents of the fifth Part.

Annotations upon the Appendix of the fifth Book.

The Contents of the first part of the Mineral Work.

FINIS.

READER, Impute the multiplicity of Errata's partly to my absence whilest this treatise was under the press, considering also that the second part thereof was translated by a German, who (though otherwise very learned) yet might not haply be exactly skilled in all the proprieties of our English tongue, whence sometimes the singular number is put for the plural, his for its, he for it and on the contrary: and such like petty mistakes; considering also that the fourth part was translated by another, who might not be acquainted sufficiently with tearms of art, and a smooth English stile; besides the Printers aptness sometimes to mistake the copy being writ with diversity of hands and some bad. If thou please with thy pen to correct what here I have observed thou will hardly meet with any more that may pervert thy judgement or occasion thy mistake, unless in a cursory survey I might omit some few, for the mending of which thy ingenuity and candor, which is craved, will be sufficient.

Page 1. *line* 3. *p.* 2. l. 1. l. 9. l. 18. *p.* 4. l. 19 *p.* 5. l. 25. *p.* 6. l. 31. l. 37. *p.* 7. l. 22. l. 33. *p* 36. l. 30. *for water* read *matter*. Page 1. l. 12. r. *necesss* p. 2. l. 5. r. *furnace* l. 7. r. *by which* l. 26. r. *luteing* p 3. l. 33. r. *neck* p. 5. l. 22. r *humidity* l. 23. r. *metals* p. 7. l. 15. r *luteing* p. 8 l. 3. r. *repeate* p. 9. l. 19. r. *in a* p. 20. l. 6. r. *humors* l. 34. r. *humours* p. 28. l. 24. r. *will not* p. 29. l. 22. r. *will* p. 45 l. 2. r. *scoriæ* p. 52. l. 6. r. *in an* l. 12. r. *with a copple* p. 53. l. 4 r. *cast* l. 29. *or they* p. 54 l. 30. r. *any time* p. 58. l 4. blot out *it* p. 60. l. 1. blot out *green* p. 66. l. 23. blot out *they* p. 57. l. 18. r. *spoyled* p. 69. l. 26. r. *also the* p. 73. l. 11. r. *saying* l. 28. r. *aire is* p. 78. l. 16. blot out *now* p. 84. l. 17. r. *set upon the warm bottom* l. 28. r. *is taken out* p. 87. l. 5. r. *and in* p. 100. l. 22. r. *sulphur auratum* p. 108. l. 36. blot out *it* p. 117. l. 25. r. *concerning the* p. 123. l. 3. blot out *they* p. 227. l. 22. blot out *it* p. 134. l. 3. r. *heat* p. 135. l. 15. r. *but use four* p. 144. l. 15. *but if he be not wary* p. 148. l. 37. r. *fine* p. 149 l. 27. r. *whose coure* p. 162. l. 7. r. *be fixed* p. 169. l. 3 r. *and mixe it with* p. 171. l. 26. *cast in* l. 34. *read, will pass.* page 178. l. 5. *read, cast.* page 181. *line* 14. r. *cast* p. 187. l. 3. r. *bars* l. 4. r. *neck* p. 191. l. 32. r. *write* p. 192. l. 11. r. *set* p. 193. l. 3. r. *or fewness* l. 19. r. *wider* p. 196. l. 1. r. *those* l. 14. *fault* p. 202. l. 16. r. *or filed* p. 203. l. 7. r. *distillation* p. 206. l. 34. r. *reunited* p. 217. l. 25. r. *heat* l. 25. *know* p. 221. l. 32. blot out *is* p. 222. l. 26. blot out *which* p. 223. l. 6. r. *inwardly* p. 241. l. 23. r. *hematitis* l. 28. r. *aforesaid manner* p. 243. l. 7. *super* p. 247. l. 30. r. *sell* p 248. l. 31. r. *seduce* p. 250. l. 6. r. *God hath* p. 251. l. 1. r. *set it in digestion and the oyles will attract out of the spirit of salt, salt enough* l. 2 *acquires* l. 12. r. *and as by these two examples the perfection of metals is proved, so also* l. 28. *refined* p. 252. l. 7. r. *separated by its contrary, and bettered* l. 20. *not appear* p. 254. l. 33. r. *which was mixed with* l. 35. r. *in a* l. 37. r. *long ground* p 255. l. 21. r. *augmenting the weight of gold* l. 30. blot out, *of gold* p. 256. l. 2. r. *imperfect, perfect* l. 24. r. *whence* p. 257. l. 2. r. *for the earth* l. 11. r. *operation* l. 13. r. *his gifts will not should be common* l. 14. *being an* l. 27. *many fear* l. 28. r. *for the* p. 258. l. 27. r. *into* p. 259. l. 2. r. *coming* l. 12. r. *the power of the sun, and fire being discovered* l. 23. r. *from iron* l. 27. r. *retaine the mixt* l. 31. *to be understood of metals where* p. 260. l. 28. r. *giving credit to these* p. 261. l. 27. r. *concerning the* p. 262. l. 15 *have been rather* p. 263. l. 37. r. *gift* p. 265. l. 11. r. *nature say they* l. 21. r. *againe quickly perishing* p. 266. l. 1. r. *be denyed* l. 8. r. *imbrionated* l. 23. r. *as from* l. 27. blot out *to* l. 33. r. *conceive* l. 37. r. *hidden in the aire* p. 267. l. 10. r. *minerals* l. 21. blot out *though* l. 25. r. *being afterward melted* p. 268. l. 8. r. *regulus* l. 10. r. *minerals* l. 18. r. *then that which is sulphureous, with which being mixed it forsaketh* 269. l. 10. r. *old Saturne* l 29. r. *grind very* l. 33. r. *and that antimonial nitre will assume* p. 270. l. 2. r. *leave in* l. 10. r. *for taking* l. 32. r. *in destroying, perfecting and transmuting metals by fusion* p. 271. l. 17 r. *not but by* l. 32 r. *and drawed off* p 272. l. 19. *being sure fast with the gold of covetous men* p. 273. l. 7. *out a* l. 20. *conceive* p. 274. l. 6. r. *a paire of compasses* l. 15. *lime or the* l. 21. *the bottome* l. 24. *smoother parts: if the* l. 31. r. *and to smooth* l. 36 r. *put an earthen tunnel, and the mould into dry sand to the top* p. 275. l. 17. *impressid in sand or the* l. 34. blot out *let* p. 276. l. 14. r. *acquired* l. 26. *linseed oyle* p. 282. l. 10. r. *without minium* l. 32. blot

lot out *equal parts* p.284.l.4.r.*ſmooth and light iron* l.13.r.*by which* 285 l.1.r.*there will be made thence a ſtone* p.286.l.12.r.*forme* l.14.*take out* p.287.l.10.r.*afterward is poured into it* p.295.l.9.blot out *is* p.296.l.10.r.*cannot* p.302 l.27.r.*ſtopples* p 310.l.6.blot out *that* p.314.l.17.r.*glaſſes* p.315.l.14.r.*ſatneſs of* p.321.l.31.r.*pour* p.322.l.37.r.*and not to* p.331.l.30.r.*ſpared* p.352.l 27.r.*yet by art* p.354.l.1.r. *conſiſtency* p.359 l.5.r. *pure clay*: p. 403. *l.* r.*wax-like earth.* Page 358. *The copper glõbes are here through miſtake left out, but the manner thereof you may ſee in the foregoing page.* Part 4. *for patterne, and types read moulds.*

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