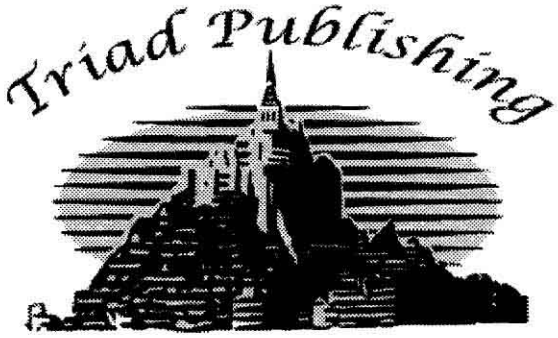
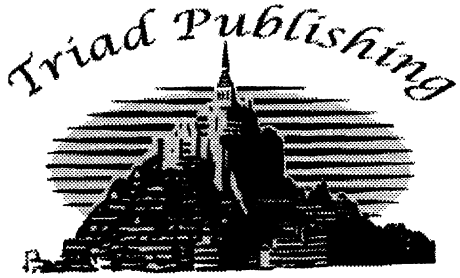
THE ACETATE PATH

Resource Papers, Volume 1

Collected by

Russell House





P.O. Box 116
Winfield, IL 60190 USA
www.triad-publishing.com
Email: info@triad-publishing.com

Dear Reader,

I originally collected these papers as a resource for students who would participate in the seminar I conducted on this topic for The Philosophers of Nature in September 1997. Mr. Jean Dubuis knew of my plans for this seminar and decided to travel from France to share his considerable experience on the acetates with us. The videotapes of this seminar are available from Triad Publishing.

Compiled from a number of resources, ancient and modern, the writings collected here have been useful to me in my research on the 'Acetate Path'. Nothing, however, can compare in value with the generous and knowledgeable instruction that I received in 1985 from a teacher I will refer to as *'Artofferus'*. I hope that the videotape will show procedures and processes that will save much wasted labor, and remove the fear of the unknown. In addition, perhaps some things are said by way of veiled comments that will open new portals for your investigations.

Our hope is now, as it was then, to provide the best information and techniques known to us so that others can go further that we have been able to do.

With best wishes for you in your path of self-discovery,

Russ House

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THE ACETATES PATH: A Paper by Jean Dubuis

In the Antimony paths, such as Basilius Valentine's, Nicolas Flamel's or others', the principle induced is the one of the "Immortal" energy of the Antimony. We incorporate it to the mercury, liquid metal that will be able to transfer it to gold. The philosophical stone obtained by this system is only revivified and evolved gold. The advantage of this method is that the life of antimony is not fragile.

In the acetates path, the principle engaged is different. It consists in incorporating the plant life, the plant consciousness, in the metal and thus accelerate its evolution and give it some kind of mineral-plant life. One of the big difficulties of this system is due to the fragility of the plant life.

We have explained in another text that the plant or the animal life could be sustained only by elements that had 4 electrons on their external layer.

In the mineral realm, the possible elements will therefore be: lead, tin, germanium, and silicon. Only lead and tin are metals, germanium and silicon being only semi-conductors, semi-metals.

Several alchemists have tried the tin path, but it presents big chemical problems, so this path has been abandoned despite its esoteric interest since it should theoretically give access to an important occult knowledge on the level of Jupiter.

Thus, lead is revealed to be the most interesting metal for the acetates path.

One of the important problems on this path is distillation or decomposition of the acetates. We have mainly experimented with 3 decompositions in this area: copper, calcium, and lead.

Concerning copper, regular vinegar easily attacks copper oxide. After filtration, the concentration of the solution gives copper acetate crystals. The decomposition of this acetate gives the radical vinegar that is, in fact, acetic acid very close to 100 %, but having a blue color because of some principles issued from copper. This preparation remains long and unpleasant because of the odors, so we gave it up after setting up the concentration of the vinegar through congelation. It is certain that in concentrating the vinegar through congelation, the plant life is maintained, which is not the case during the decomposition of the copper acetate.

Concerning calcium, its acetate is the only one which decomposition gives acetone. If the calcium used to produce the acetate contains a part of animal life (oyster shells for instance), the acetone obtained is the Acetone of the Ancients. A long decanting gives a red oil with interesting and beneficial properties.

Yet, the real alchemical acetates path will only be obtained through lead.

The problem of the purity of products exists in alchemy. However, the most important one remains that of **life**. It is why <u>it is useless to purify a product if this purification destroys life</u>.

In order to follow the path of **life** - the lazy man's way - we must obtain a little oak barrel having an opening on top and a faucet in the bottom. In it, throw all the left-overs of bottles of red wine, and even, of the glasses of red wine left over after meals. But only red wine and nothing else is to be used. Some time after a "mother" will build up in the barrel.

Remove the vinegar and pass it through a paper filter.

Pour this vinegar in a plate. Add slowly natural cerussite as long as the vinegar can dissolve it. (No Soxhlet, no heating). Place this plate in a sunny place. Protect it from dust with a fabric made of proper netting.

When all has evaporated, there remains in the plate an impure acetate in which the life of the acetate was not destroyed though the solar evaporation.

Prepare, through distillation of red wine and concentration through carbonate, an alcohol at 97-98%.

Pour it on the residues of the plate by trying to dissolve as much as possible of the product before filtration. The alcohol will dissolve the acetate but will not dissolve the impurities of the cerussite ore based on silicon.

Pour this alcohol in a clean plate and proceed with a solar evaporation. The small quantity retrieved will be a **living** acetate.

Have this living acetate evolve for several months at a temperature of 40 degrees Centigrade. When **life** will have had the elements of the acetate evolve, its decomposition will give evolved products.

It must be noted that the solar evaporation has interesting and irreplaceable chemical and alchemical properties. For example, let us follow the process of the Spirit of Menderenus, a very interesting experience:

Prepare acetic acid from vinegar, through congelation, in order to obtain an acid of about 60-70 %. Pour this acid in a solution of commercial ammonia until the pH indicates 7. Try to concentrate the solution with a regular fire. All will evaporate.

Place the solution in a plate under the Sun. Crystals will form in the solution. Retrieve the crystals in a flask. Otherwise they will sublime around 70 degrees Centigrade. These crystals are what is called "Spirit of Mendelenus", or, in our modern language, "ammonium acetate". It is even said that, at small doses, these crystals wipe out any trace of alcohol in the body.

During the dry distillation of the lead acetate, we obtain a red-orange liquid, the Sulfur. Then come gases very hard to condense. To obtain this condensation, Frater Albertus advised cooling with dry ice in acetone.

Another, easier, process for condensation, gives an identical result: mix ice and calcium chloride. It is possible to reach minus 55 centigrade.

According to Frater Albertus, the liquid obtained is the Philosophical Mercury. This Philosophical Mercury will be **animated** if the plant **life** has not been destroyed. It should then extract the tincture from gold. This liquid is close to acetaldehyde.

For the sake of curiosity, we tried to transfer the life of antimony into this liquid. Piecesof stibnite immersed in this liquid give very long and very thin translucent crystals. Our thinking is that these crystals are the Salt of Nature described in the text "the simplest path". We never succeeded in getting a significant quantity of these acetaldehyde crystals.

After this operation, this liquid does not extract the tincture from gold.

Jean DUBUIS

accomplished astrologer and musician.

3/24/94 UPDATE ON MELISSA EXPERIMENT.

We are imbibing Melissa salts on several different days and hours to see the results.

Imbibing Melissa salts on Thursday at the Jupiter hour: We have been imbibing for three months. The salt is still accepting the tincture. We made the tincture by recovering the red honey [as shown in Fall, 93 seminar by Michel Auger. - Ed] and adding some tincture of Melissa saved from the original extraction.

Imbibing Melissa salts on Saturday at the Jupiter hour: We have been imbibing for one month and the salt is accepting the tincture. We made the tincture the same way as in the example above.

The imbibed salts are being kept in an incubator at the correct temperature and out of the light.

Another batch of Melissa salts is being prepared to work in the same way as the above. We have decided to work the salts and do the imbibing on Sunday at the Jupiter hour to see the results.

Hint: It is helpful to color code the jars according to the day of the week on which they are imbibed. This helps to avoid mistakes.

Hint: If you are using a closed system for water circulation when using a condenser, it is helpful to use frozen cold packs in the water being circulated. Freezing 4 or 5 of them allows you to exchange them when they get warm, and then refreeze.

METALLIC ALCHEMY:

Some Comments on the Acetate Paths

Jean Dubuis and the officers of LPN France are aware that there are difficulties related to the Flamel and Urbigerus paths because of the use of metallic mercury. Considering the problems of safety and issues of legality related to mercury work, Jean decided to share his insights on the acetate work. There are still issues of toxicity and other potential problems (corrosive acids, problems of flammability, pressure, cost of equipment, and lengthy processes), the path can lead to results of some value, with less danger.

The following notes are taken from the lecture given by Jean. They are not a complete transcription, nor are they adequate for someone who is just beginning laboratory work to proceed. Jean has prepared some lessons on this topic, which are published in various places in Mineral Lessons numbers 23 through 51, with a more concentrated study given in lessons 31-40. Jean is considering publishing 12 new lessons on the topic, which would incorporate materials given in the lecture. If there is a large interest on the topic, I will arrange for one or more practical seminars on the acetates. Please write to the address on the cover stating your interest. If you are able to arrange for facilities and wish to host for class of 10-12 persons for a weekend class, please indicate that as well.

Theoretical Aspects

Jean spoke of his researches on the Table of Mendeleyev which arranges the chemical elements in columns and rows according to atomic properties. Column 4, wherein we find carbon, silicon, germanium, tin and lead is considered the most important column for the acetate path. Simply stated, the method of this path is to fix vegetable life on a metal so that the metal will evolve like a vegetable. In the column, we will find carbon, the basis of organic chemistry, and lead, the easiest metal to use in the path.

For the acetate work, we will need two alchemical liquids which must carry the secret fire. These are fermented by living things. The secret fire comes into our realm through the media of the air, and descends to the earth through dew and rain. In the earth, it is determined to the vegetable kingdom, generally through potassium salts. The grape is rich in these salts. The vine produces the grape, and from the grape juice, through a fermentation comes wine. A further acetic fermentation produces vinegar. Wine and vinegar are separately distilled.

A Delicate Matter

Alcohol distilled from wine which is over 70% pure, and concentrated vinegar over 20% acetic acid are delicate matters, and are readily influenced by the psychic energy of the alchemist and others. For this reason, these liquids must be preserved out of the sight and presence of all but the alchemist or their mate, to avoid the contamination. Aluminum is in the column of elements which are toxic to alchemical life. As a result

aluminum and boron compounds are not permitted to contact these, or other living products. Aluminum foil can be used, however, to wrap a bottle and to act as a shield against their interference. These should be stored in the oratory, in the dark.

Liquid Batteries

These vegetable kingdom mercuries, philosophical alcohol and vinegar, act as storage batteries to retain, and then to give back the alchemical life in the acetate process. These liquids are not in themselves 'mercuries', the mercury being an invisible energy. Rather, these liquids are suitable vehicles for the energy.

Vinegar is more difficult to process by distillation than wine alcohol, requiring 30 or more distillations for purification. A alternative method is to take plastic bottles, and to fill 3/4 full with red wine vinegar of approximately 7% acidity. These are put in the freezer horizontally, and frozen at -30 degrees C.

The portion which does not freeze is decanted into a graduated vessel. 30 to 50 ml per liter will be acid. The portions which are 60 to 80 percent acid are distilled separately from the batches which are 20 to 50% acid. See *ORA ET LABORA* #2 for details.

Radical Vinegar

A radical vinegar, which is blue in color can be prepared as follows: One needs copper oxide. It is best to prepare it yourself using old copper wires. The purity of copper in electrical wire is often quite high. The wires are put in the furnace and heated until they form a black material. The 20 to 50% acetic acid attained as above is poured over the wires in a flask and allowed to digest at moderate heat for a week. A Soxhlet extractor is not suitable for this step. The resulting blue liquid is quite toxic. It should be filtered, and then distilled to remove 3/4 of the liquid. The fumes are hazardous and the stink is horrible, so the process should take place outdoors. Distillation must stop before the material is dry! Permit the liquid to crystallize, in a beaker for example. When crystal form, remove them from the container. One should work in this manner to obtain 2 kilograms (about 4.4 pounds) of copper acetate crystals, and dry them at 110 to 120 degrees C.

These crystals are distilled slowly, and an acetic acid of 99% or higher will distill over. This is called 'radical vinegar'. It is blue in color. Jean stated that Paracelsus College taught that the acid thus obtained should be redistilled to remove the blue color, as the copper was a toxic contaminant. It should not be distilled, as it would then lose its philosophical nature, effectively losing its determination on the level of Netzach (the sphere of Venus, which corresponds to copper), and returning to Malkuth on the Qabalistic tree of life. The coloration is due to the acid drawing the alchemical sulfur of the copper.

On the Other Hand...

The problems of alcohol preparation are better known, in general. A method for distillation was suggested in the previous issue of the newsletter. Alcohol of 95% purity is digested on potassium carbonate for 1 or 2 days. Jean states that the potassium never metalizes the alcohol. One can redistill to get rid of the yellow color if desired. This must be prepared so that it is 100% pure alcohol.

Acetate Purity Issues

The preferred material to be used to form a lead acetate is galena, a lead sulfide. Previously Jean had used cerussite, a lead carbonate ore. It is easier to work with, but presents certain drawbacks. The Australian ore was not a crystalline ore, and had many impurities. During extraction in a Soxhlet, the various color changes were one of the indications of the impure material. The resulting product is not lead acetate, but rather a mixture of various acetates.

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Roasting of Galena

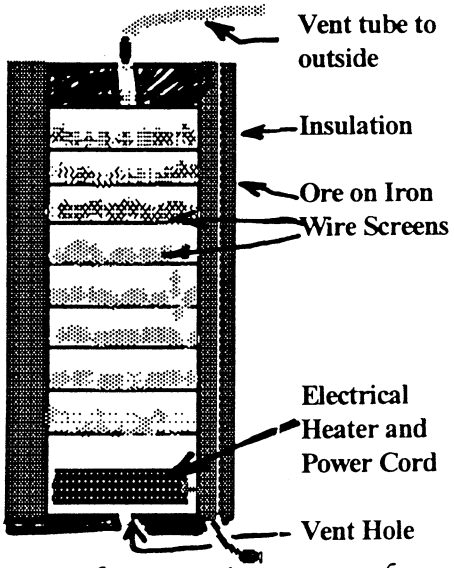
Lead sulfide ore is not easily attacked by acetic acid, so a lengthy roasting process is required in order to create a suitable material. A sketch of the device used to permit a slow, progressive roasting is published in the newsletter. A number of racks made of metal screen are stacked in a closed, vented furnace with an electrical heater producing heat in the range of 150 to 300 degrees C. All trays are loaded. After a month of continual heating, the lower tray is removed, all other trays lowered one level, and a tray of new material placed on top. The diagram indicates a tube leading outside to vent noxious fumes. The 150 degree heat should work in a month, a 300 degree heat in a week. The resulting material is extracted in a Soxhlet with the radical vinegar. The liquid is then filtered and slowly crystallized, yielding philosophical crystals of lead acetate.

Transfer of Life

The acetic acid content must be removed from the crystals, to permit the transfer of vegetal life. Absolute alcohol, the 100% alcohol previously obtained, is circulated over the crystals. The added alcohol forms an acetic ether, with a distinct

odor. After circulation the material is recrystallized, then circulated again in pure alcohol. The lead dissolves very slowly in the alcohol. An acetic smell at any stage indicates that it is necessary to continue. The cycle of circulation and crystallization continues for 2 to 3 months. The resulting material is placed with philosophical alcohol in the incubator for a month at 40 degrees C during a lunar cycle to facilitate the transfer of the energy in it into the metal.

NEXT MONTH we will continue with distillation of the lead acetate, various cooling methods, calcination of the black lion, making the philosophers egg, imbibition, lighting the secret fire, and formation of the white stone. Also, a useful acetate path with oyster shells will be revealed.



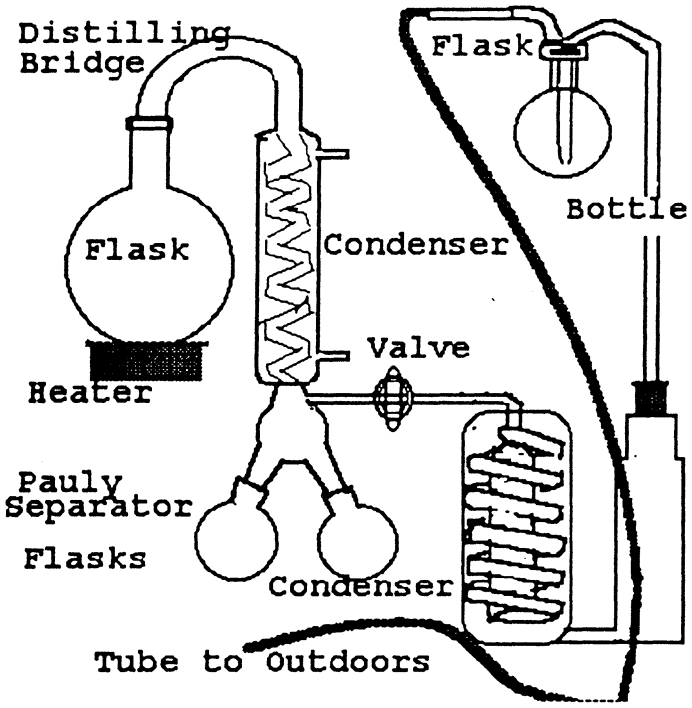
Please continue to send your donations to help support the costs of publishing & mailing Ora et Labora. Our next issue should be available in April.

Russ House

Comments on the Acetate Paths - Part 2

This is the final portion of the notes I took during the lecture by Jean Dubuis in San Jose, California. The first part of the notes was published in the March, 1994 issue of ***Ora et Labora. - Russ House***

After incubation for a month, the material is ready to be distilled. Please refer to the figure below. [The details of the lower coil condenser are inadequate to construct such a piece of apparatus. Full details will be provided upon request. Please enclose SASE...].



The Pauly Separator is to be considered mandatory. The lower condenser should be well insulated. The outer chamber is filled with cooling liquid. For example, 100 grams of ice with 143 grams of $CaCl_2$ -$6H_2O$ (Calcium chloride), will give a temperature of 55-60 degrees below 0 Celsius. This is easier to use than mixtures like acetone and dry ice.

Distillation causes a variety of liquids to be driven off and condensed, which necessitates the Pauly separator. First will come any residual alcohol, with the 'water of crystallization'. There should be no acetic acid distillate. When red oil begins to appear, there will also be white smoke throughout the system. When the white fumes start, stop the heat.

There should be about 250 ml of volatile distillate in the lower condenser. In the high-placed flask, 5 or 6 ml of distillate will collect. It is to be kept closed for a full day, after which time, some red oil may separate from the mixture.

The volatile distillate should be frozen in a silicone sealed flask until required. This is the so-called Philosophical Mercury according to some.
To test the 'mercury' pure gold should be placed in a well sealed flask or tube with some of the volatile liquid and incubated for one month at 40 degrees C. If the mercury is good, it will take a tincture from the gold.

The black-gray material in the bottom of the distilling flask, the so-called "Black Lion", will self calcine if it comes into contact with the air when it is hot. It will heat to 700-800 degrees C! Therefore, only open it when it is cold. Crush to dust on a ceramic plate, making a layer 1-2 mm thick. Ignite it with a hot poker, and it will rapidly combust. This will yield the *terra foliata*, or foliated earth. This is a metallic earth.

One now has the earth, which is a *salt*, the red oil which is the *sulphur*, and the volatile *mercury*. Don't be greedy, use lots of mercury. In any case, you will make only a small stone. Imbibe the earth with the red oil. Saturate and digest for a week. Repeat 3 or 4 times. The material is then placed in a 'philosophical egg', and the mercury from the freezer is added, to a proportion of 1/3 of the volume of earth. Place in the incubator. It must not see the light at all while in incubation, as we are working to light the 'dark fire'. In 2 to 3 days at the appropriate temperature, the

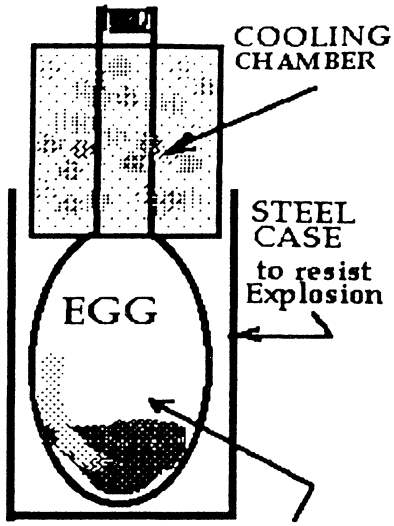
secret fire is lighted, and after 8 days, the mercury is fixed. Remove the egg from the incubator, and dip the egg into hot water, at the same temperature as the temperature to light the fire. Now one uses dry ice and NaCl (sodium chloride or salt) in the collar around the egg. Additional mercury from the freezer is added slowly, with the egg inclined or banked so that the mercury is not rapidly heated when it contacts the earth. There is a problem of high pressures at this time. This is repeated seven or eight times over a 3 or 4 month period, after which time it is possible to get a stone.

A completed stone appears like a hard, white wax. It is the white stone. Copper, silver or mercury can be transmuted with it. Copper is transmuted at a 1:1 ratio of copper to stone. Jean has not multiplied this white stone. It is thought that it could be multiplied with silver. In trying to take the stone to the red work, Jean thinks that it may be possible to use the mercury to dissolve gold, and then use that mercury in the work.

In another method of making the stone, which method was given to Jean by a good German alchemist, the *terra foliata* is imbibed with the red oil, and placed in a sealed ceramic crucible. The crucible lid was clamped to the crucible with a clamp made of metal plates above and below, with asbestos pads between the ceramic and metal surfaces. Jean used 12 crucibles for the work. In this process, to fix the life or oil is critical. Begin with incubation at 40-50-60 degrees C. At each stage, open one crucible to see if it is yet fixed. Raise the temperature slowly, open another and examine the matter. It is an initiation of the matter, which will follow a specific color sequence: black (Earth), blue (Water), yellow (Air), red (Fire), white again (Quintessence). Raise the heat slowly 50 degrees a month to 300 degrees C. After 150 degrees C in this process, the matter is generally fixed.

USES OF THE WHITE PHILOSOPHERS STONE

Even if not multiplied it is a certain maximum sephirothic level. White stones go up to level 7 (Netzach), red stones to 6, 5, and 4 (Tiphareth, Geburah, Chesed). It is a medicine of the heart and soul, giving initiatic experiences. In an alcoholic distillation (?) it gives initiatic experiences on Yesod (level 9). If multiplied once, it gives experiences on Hod (level 8), and multiplied again on Netzach (level 7). This only applies to the alchemist who made the stone. For others there will be light experiences, conscious dreams, but significant healing effects.



PHILOSOPHICAL EGG

CAUTION

The sulphur of gold (gold tincture) can cure many illnesses. Even in homeopathic dilution, it modifies the blood. One should be careful with gold preparations. If $AuCl_3$ (gold chloride) was used in the preparation, it can be very toxic. Native gold should be used, and the tincture dispensed homeopathically.

Since giving this lecture and returning to France, Jean has begun seminars on the topic on France. Further, he plans to write a series of lessons on the acetate path. I apologize for the number of 'holes' in the notes which relate to the distillation of the acetate. The processes were not unlike those already known to me in those particulars, so I was not taking detailed notes on that aspect of the work.

this alloy renders it much more ſolid, and the mixed maſs continues tolerably ductile.

If, on the contrary, to one part of tin ten parts of copper be added, together with a little zinc, a ſemi-metal to be conſidered hereafter, from this combination there reſults a metalline compound, which is hard, brittle, and very ſonorous; ſo that it is uſed for caſting bells: This compoſition is called *bronze* and *bell-metal*.

Tin hath an affinity with the vitriolic, nitrous, and marine acids. All of them attack and corrode it; yet none of them is able to diſſolve it without great difficulty: So that if a clear ſolution thereof be deſired, particular methods muſt be employed for that purpoſe; for the acids do but in a manner calcine it, and convert it to a kind of white calx or precipitate. The ſolvent which has the greateſt power over it is *aqua regis*, which has even a greater affinity therewith than with gold itſelf; whence it follows, that gold diſſolved in *aqua regis* may be precipitated by means of tin; but then the *aqua regis* muſt be weakened. Gold thus precipitated by tin is of a moſt beautiful colour, and is uſed for a red in enamelling and painting on porcelain, as alſo to give a red colour to artificial gems. If the *aqua regis* be not lowered, the precipitate will not have the purple colour.

Tin hath the property of giving a great luſtre to all red colours in general; on which account it is uſed by the dyers for ſtriking a beautiful ſcarlet, and tin-veſſels are employed in making fine ſyrup of violets. Water does not act upon this metal, as it does upon iron and copper; for which reaſon it is not ſubject to ruſt: nevertheleſs, when it is expoſed to the air, its ſurface ſoon loſes its poliſh and ſplendor.

Tin mixed with nitre, and expoſed to the fire, deflagrates with it, makes it detonate, and is immediately converted to a *refractory calx*; for ſo all ſubſtances are called which are incapable of fuſion.

Tin readily unites with ſulphur, and with it becomes a brittle and friable maſs.

Of Lead.

Next to gold and mercury, lead is the heavieſt of all metalline ſubſtances, but in hardneſs is exceeded by every one of them. Of all metals alſo it melts the eaſieſt, except tin. While it is in fuſion there gathers inceſſantly on its ſurface, as on that of tin, a blackiſh, duſty pellicle, which is nothing but a calx of lead.

This calx further calcined by a moderate fire, the flame being reverberated on it, ſoon grows white. If the calcination be continued it becomes yellow, and at laſt of a beautiful red. In this ſtate it is called *minium*, and is uſed as a pigment. *Minium* is not eaſily made, and the operation ſucceeds well in large manufactures only.

To convert lead into *litharge*, which is the metal in a manner half vitrified, you need only keep it melted by a pretty ſtrong fire; for then, as its ſurface gradually calcines, it tends more and more to fuſion and vitrification.

All theſe preparations of lead are greatly diſpoſed to perfect fuſion and vitrification, and for that purpoſe require but a moderate degree of fire; the calx or earth of lead being of all metalline earths that which vitrifies the moſt eaſily.

Lead hath not only the property of turning into glaſs with the greateſt facility, but it hath alſo that of promoting greatly the vitrification of all the other imperfect metals; and, when it is actually vitrified, procures the ready fuſion of all earths and ſtones in general, even thoſe which are refractory, that is, which could not be fuſed without its help.

Glaſs of lead, beſides its great fuſibility, hath alſo the ſingular property of being ſo ſubtile and active as to corrode and penetrate the crucibles in which it is melted, unleſs they be of an earth that is exceeding hard, compact, and withal very refractory: for glaſs of lead being one of the moſt powerful fluxes that we know, if the earth of the crucible in which it is melted be in the ſmalleſt degree fuſible, it will be immediately vitrified; eſpecially if there be any metallic matter in its compoſition.

The great activity of glaſs of lead may be weakened by joining it with other vitrifiable matters; but unleſs theſe be added in a very great proportion, it will ſtill remain powerful enough to penetrate common earths, and carry off the matters combined with it.

On theſe properties of lead, and of the glaſs of lead, depends the whole buſineſs of refining gold and ſilver. It hath been ſhewn, that as theſe two metals are indeſtructible by fire, and the only ones which have that advantage, they may be ſeparated from the imperfect metals, when mixed therewith, by expoſing the compound to a degree of fire ſufficiently ſtrong to vitrify the latter; which when once converted into glaſs can no longer remain united with any metal that has its metalline form. But it is very difficult to procure this vitrification of the imperfect metals, when united with gold and ſilver; nay, it is in a manner impoſſible to vitrify them entirely, for two reaſons: firſt, becauſe moſt of them are naturally very difficult to vitrify: ſecondly, becauſe the union they have contracted with the perfect metals defends them, in a manner, from the action of the fire, and that ſo much the more effectually as the proportion of the perfect metals is greater; which being indeſtructible, and in ſome ſort coating over thoſe with which they are alloyed, ſerve them as a preſervative and impenetrable ſhield againſt the utmoſt violence of fire.

It is therefore clear, that a great deal of labour may be ſaved, and that gold and ſilver may be refined to a much greater degree of purity than can otherwiſe be obtained, if to a mixture of theſe metals with copper, for inſtance, or any other imperfect metal, be added a certain quantity of lead. For the lead, by its known property, will infallibly produce the deſired vitrification; and as it likewiſe increaſes the proportion of the imperfect metals, and ſo leſſens that of the perfect metals, in the maſs, it evidently deprives the former of a part of their guard, and ſo effects a more complete vitrification. As the glaſs of lead hath the property of running through the crucible, and carrying with it the matters which it has vitrified, it follows, that when the vitrification of the imperfect metals is effected by its means, all thoſe vitrified matters together penetrate the veſſel containing the fuſed metalline maſs, diſappear, and leave only the gold and ſilver perfectly

perfectly pure, and freed, as far as is poſſible, from all admixture of heterogeneous parts.

The better to promote the ſeparation of ſuch parts, it is uſual to employ in this proceſs a particular ſort of ſmall crucibles, made of the aſhes of calcined bones, which are exceedingly porous and eaſily pervaded. They are called *cupels*, on account of their figure, which is that of a wide-mouthed cup: and from hence the operation takes its name; for when we refine gold and ſilver in this manner, we are ſaid to *cupel* thoſe metals. It is eaſy to perceive, that the more lead is added, the more accurately will the gold and ſilver be refined; and that ſo much the more lead ought to be added as the perfect metals are alloyed with a greater proportion of the imperfect. This is the moſt ſevere trial to which a perfect metal can be put, and conſequently any metal that ſtands it may be fairly conſidered as ſuch.

In order to denote the fineneſs of gold, it is ſuppoſed to be divided into twenty-four parts called *carats*; and gold, which is quite pure and free from all alloy, is ſaid to be twenty four carats fine; that which contains $\frac{1}{24}$ part of alloy is called gold of twenty-three carats; that which contains $\frac{2}{24}$ of alloy is but twenty-two carats; and ſo on. Silver again is ſuppoſed to be divided into twelve parts only, which are called *penny-weights;* ſo that when abſolutely pure it is ſaid to be twelve penny-weights fine; when it contains $\frac{1}{12}$ of alloy, it is then called eleven penny-weights fine; when it contains $\frac{2}{12}$ of alloy, it is called ten penny-weights fine; and ſo on.

In treating of copper, we promiſed to ſhew under the article of lead how to ſeparate it from iron. The proceſs is founded on that property of lead which renders it incapable of mixing and uniting with iron, though it readily diſſolves all other metalline ſubſtances. Therefore if you have a maſs compounded of copper and iron, it muſt be fuſed with a certain quantity of lead, and then the copper, having a greater affinity with lead than with iron, will deſert the latter and join the former, which being incapable of any union with iron, as was ſaid, will wholly exclude it from the new compound. The next point is to ſeparate the lead from the copper; which is done by expoſing the maſs compounded of theſe two metals to a degree of fire ſtrong enough to deprive the lead of its metalline form, but too weak to have the ſame effect on the copper: and this may be done, ſince of all the imperfect metals lead is, next to tin, the eaſieſt to be calcined, and copper, on the contrary, reſiſts the greateſt force of fire longeſt, without loſing its metalline form. Now what we gain by this exchange, *viz.* by ſeparating copper from iron, and uniting it with lead, conſiſts in this, that as lead is calcined with leſs fire than iron, the copper is leſs expoſed to be deſtroyed: for it muſt be obſerved, that, however moderate the fire be, it is hardly poſſible to prevent a certain quantity thereof from being calcined in the operation.

Lead melted with a third part of tin forms a compound, which being expoſed to a fire capable of making it thoroughly red hot, ſwells, puffs up, ſeems in ſome ſort to take fire, and is preſently calcined. Theſe two metals mixed together are much ſooner calcined than either of them ſeparately.

Both lead and tin are in ſome meaſure affected by water, and by a moiſt air; but they are both much leſs ſubject than iron or copper to be corroded by theſe ſolvents, and of courſe are much leſs liable to ruſt.

The vitriolic acid acts upon and diſſolves lead much in the ſame manner as it doth ſilver.

The nitrous acid diſſolves this metal with much eaſe, and in great quantities; and from this ſolution a ſmall portion of mercury may be obtained.

When this ſolution of lead is diluted with a good deal of water, the lead precipitates in the form of a white powder; which happens becauſe the acid is rendered too weak to keep the lead diſſolved.

If this ſolution of lead be evaporated to a certain degree, it ſhoots into cryſtals formed like regular pyramids with ſquare baſes. Theſe cryſtals are of a yellowiſh colour, and of a ſaccharine taſte: they do not eaſily diſſolve in water. This nitrous metalline ſalt has the ſingular property of detonating in a crucible, without any addition, or the contact of any other inflammable ſubſtance. This property it derives from the great quantity of phlogiſton contained in, and but looſely connected with the lead, which is one of its principles.

If ſpirit of ſalt, or even ſea-ſalt in ſubſtance, be added to a ſolution of lead in the nitrous acid, a white precipitate immediately falls; which is no other than the lead united with the marine acid. This precipitate is extremely like the precipitate of ſilver made in the ſame manner; and that being called *luna cornea*, hath occaſioned this to be named *plumbum corneum*. Like the *luna cornea*, it is very fuſible, and, being melted, hardens like it into a kind of horny ſubſtance: it is volatile, and may be reduced by means of inflammable matters combined with alkalis. But it differs from the *luna cornea* in this chiefly, that it diſſolves eaſily in water; whereas the *luna cornea*, on the contrary, diſſolves therein with great difficulty, and in a very ſmall quantity.

As this precipitation of lead from its ſolution in ſpirit of nitre is procured by the marine acid, lead is thereby proved to have a greater affinity with the latter acid than with the former. Yet, if you attempt to diſſolve lead directly by the acid of ſea-ſalt, the ſolution is not ſo eaſily effected as by the ſpirit of nitre, and it is always imperfect; for it wants one of the conditions eſſential to every ſolution in a liquor, namely tranſparency.

If lead be boiled for a long time in a lixivium of fixed alkali, part of it will be diſſolved.

Sulphur renders this metal refractory and ſcarce fuſible; and the maſs they form when united together is friable. Hence it appears that ſulphur acts upon lead much in the ſame manner as upon tin; that is, it renders both theſe metals leſs fuſible, which are naturally the moſt fuſible of any, while it exceedingly facilitates the fuſion of ſilver, copper, and iron, metals which of themſelves flow with the greateſt difficulty.

Of QUICK-SILVER.

WE treat of quick-ſilver in a chapter apart, becauſe this metallic ſubſtance cannot be claſſed with the metals properly ſo called, and yet has ſome properties which

intimately mixed by diſtillation, form a liquor ſlightly acid, uſed in medicine, and known by the name of *ſweet* or *dulcified ſpirit of nitre*: a very proper name, ſeeing the nitrous acid, by uniting with the ſpirit of wine, actually loſes almoſt all its acidity and corroſive quality.

Fifthly, when the diſtillation is finiſhed, there remains in the bottom of the veſſel a thick, blackiſh ſubſtance, nearly reſembling that which is found after diſtilling oil of vitriol and ſpirit of wine.

Spirit of ſalt hath likewiſe been combined with ſpirit of wine; but it does not unite therewith ſo eaſily or ſo intimately as the two acids above mentioned. To mix them thoroughly, the ſpirit of ſalt muſt be highly concentrated, and ſmoking; and moreover the aſſiſtance of the ſtill muſt be called in. Some authors pretend, that from this mixture alſo a ſmall quantity of oil may be obtained; which probably happens when the liquors have the qualities above ſpecified. The marine acid likewiſe, by uniting with ſpirit of wine, loſes moſt of its acidity; on which account it is in like manner called *ſweet* or *dulcified ſpirit of ſalt*. A thick reſiduum is alſo found here after diſtillation.

Of the ACETOUS FERMENTATION.

BESIDES an ardent ſpirit, wine affords a great deal of water, oil, earth, and a ſort of acid which ſhall be conſidered preſently. When the ſpirituous part is ſeparated from theſe other matters, they undergo no further change. But if all the conſtituent parts of wine remain combined together, then, after ſome time, ſhorter or longer as the degree of heat in which the wine ſtands is greater or leſs, the fermentation begins afreſh, or rather arrives at its ſecond ſtage. The liquor once more grows turbid, a new inteſtine motion ariſes, and after ſome days it is found changed into an acid; which, however, is very different from thoſe hitherto treated of. The liquor then takes the name of *vinegar*. The acetous fermentation differs from the ſpirituous, not only in its effect, but alſo in ſeveral of its concomitant circumſtances. Moderate motion is of ſervice to this, whereas it obſtructs the ſpirituous; and it is attended with much more warmth than the ſpirituous. The vapours it produces are not noxious, like thoſe of fermenting wine, Laſtly, Vinegar depoſites no tartar, even when the wine employed in this operation is quite new, and hath not had time to diſcharge its tartar: inſtead of tartar, vinegar depoſites a viſcid matter which is very apt to putrify.

Of VINEGAR.

IF wine, which has gone through this ſecond ſtage of fermentation, be diſtilled, inſtead of an ardent ſpirit, only an acid liquor is obtained, which is called *diſtilled vinegar*.

This acid has the ſame properties as the mineral acids; that is, it unites with alkaline ſalts, abſorbent earths, and metallic ſubſtances, and therewith forms neutral ſaline combinations.

Its affinity with theſe ſubſtances obſerves the ſame order as that obſerved by the mineral acids with regard to the ſame ſubſtances; but in general it is weaker; that is, any mineral acid is capable of expelling the acid of vinegar out of all matters with which it is united.

Vinegar hath likewiſe a greater affinity than ſulphur with alkalis: whence it follows, that it is capable of decompounding that combination of ſulphur with an alkali called liver of ſulphur, and of precipitating the ſulphur it contains.

The acid of vinegar is always clogged with a certain proportion of oily parts, which greatly weaken it, and deprive it of much of its activity; and for this reaſon it is not near ſo ſtrong as the mineral acids, which are not entangled with any oil. By diſtillation, indeed, it may be freed from this oil, and at the ſame time from the great quantity of water which in a manner ſuffocates it, and by that means may be brought much nearer to the nature of the mineral acids: but this attempt hath not yet been proſecuted with the aſſiduity it deſerves. Beſides diſtillation, there is another way of freeing vinegar from a good deal of its phlegm; and that is, by expoſing it to a hard froſt, which readily congeals the watery part into ice, while the acid retains its fluidity.

Vinegar, ſaturated with a fixed alkali, forms a neutral oily ſalt, of a dark colour, which is ſemi-volatile, melts with a very gentle heat, flames when thrown upon burning coals, and diſſolves in ſpirit of wine, of which, however, it requires ſix parts to complete the ſolution. This ſolution being evaporated to drineſs leaves a matter in the form of leaves lying on each other; on which account it hath obtained the name of *terra foliata*. The ſame foliated matter will be obtained, though the ſalt be not previouſly diſſolved in ſpirit of wine; but not ſo readily. This ſalt is alſo called *regenerated tartar*. Under the head of tartar we ſhall ſee the reaſon of theſe different appellations. Regenerated tartar is alſo in ſome degree capable of cryſtallizing: for this purpoſe a reſolution thereof in water muſt be ſlowly evaporated to the conſiſtence of a ſyrup, and then ſuffered to ſtand quiet in a cool place; by which means it will ſhoot into cluſters of cryſtals, lying one upon another, not unlike the feathers on a quill.

With vinegar and ſeveral abſorbent earths, ſuch as calcined pearls, coral, ſhells of fiſh, *&c.* are alſo formed neutral ſaline compounds, each of which take the name of the particular earth employed in its compoſition.

Vinegar perfectly diſſolves lead, and converts it to a neutral metallic ſalt, which ſhoots into cryſtals, and has a ſweet ſaccharine taſte. This compound is called *ſugar of lead*, or *ſal Saturni*.

If lead be expoſed to the bare vapour of vinegar, it will be thereby corroded, calcined, and converted into a white matter much uſed in painting, and known by the name of *ceruſe*, or, when it is finer than ordinary, *white-lead*.

Vinegar corrodes copper likewiſe, and converts it into a beautiful green ruſt, which alſo is uſed in painting, and diſtinguiſhed by the name of *verdegris*. However, vinegar is not commonly employed to make verdegris: for this purpoſe they uſe wine, or the rape of wine, from which fire extricates an acid analogous to that of vinegar.

To extract Lead from its Ore.

HAVING roaſted your lead-ore, reduce it to a fine powder; mix it with twice its weight of the black flux, and one fourth of its weight of clean iron filings and borax; put the whole into a crucible capable of containing at leaſt thrice as much; over all put ſea-ſalt four fingers thick; cover the crucible; lute the juncture; dry the whole with a gentle heat, and ſet it in a melting furnace.

Make the crucible moderately red: you will hear the ſea-ſalt decrepitate, and after the decrepitation a ſmall hiſſing in the crucible. Keep up the ſame degree of fire till that be over.

Then throw in as many coals as are neceſſary to complete the operation entirely, and raiſe the fire ſuddenly, ſo as to bring the whole mixture into perfect fuſion. Keep up this degree of fire for a quarter of an hour, which is time ſufficient for the precipitation of the regulus.

When the operation is finiſhed, which may be known by the quietneſs of the matter in the crucible, and by a bright vivid flame that will riſe from it, take the crucible out of the furnace, and ſeparate the regulus from the ſcoria.

To ſeparate Lead from Copper.

WITH luting earth and charcoal-duſt make a flat veſſel, widening upwards, and large enough to contain your metalline maſs. Set it ſhelving downwards from the back towards the fore-part; and in the fore-part, at the bottom, make a little gutter communicating with another veſſel of the ſame nature, placed near the former and a little lower. Let the mouth of the gutter withinſide the upper veſſel be narrowed, by means of a ſmall iron plate fixed acroſs it, while the loam is yet ſoft; ſo as to leave a very ſmall appertnre in the lower part of this canal ſufficient to diſcharge the lead as it melts. Dry the whole by placing lighted coals round it.

When this apparatus is dry, put your mixed maſs of copper and lead into the upper veſſel: both in that, and in the other veſſel, light a very gentle fire of wood or charcoal, ſo as not to exceed the degree of heat neceſſary to melt lead. In ſuch a degree of heat the lead contained in the mixed maſs will melt, and you will ſee it run out of the upper veſſel into the lower; at the bottom of which it will unite into a regulus. When in this degree of heat no more lead flows, increaſe the fire a little, ſo as to make the veſſel moderately red.

When no more will run, collect the lead contained in the lower veſſel. Melt it over again in an iron ladle, with a degree of fire ſufficient to make the ladle red; throw into it a little tallow or pitch, and while it burns keep ſtirring the metal, in order to reduce any part of it that may be calcined. Remove the pellicle or thin cruſt which will form on the ſurface; ſqueeze out all the lead it contains, and then put it to the maſs of copper left in the upper veſſel. Check the fire, and in the ſame manner take off a ſecond ſkin that will form on the ſurface of the lead. Laſtly, when the metal is ready to fix, take off the ſkin that will then appear on it. The lead remaining after this will be very pure, and free from all alloy of copper.

With regard to the copper itſelf, you will find it in the upper veſſel covered with a thin coat of lead, and if the lead mixed with it was in the proportion of a fourth or a fifth part only, and the fire applied was gentle and ſlow, it will retain nearly the ſame form after the operation that the mixed maſs had before.

The Calcination of Lead.

TAKE what quantity of lead you pleaſe; melt it in one or more unglazed earthen pans: a dark grey powder will be found on its ſurface. Keep ſtirring the metal inceſſantly till it be wholly converted into ſuch a powder, which is the *calx of lead*.

In the calcination of all metals, and particularly in this of lead, there appears a ſingular phenomenon which is not eaſily accounted for. It is this: though theſe matters loſe a great deal of their ſubſtance, either by the diſſipation of their phlogiſton, or becauſe ſome of the metal perhaps exhales in vapours, yet, when the calcination is over, their calxes are found to be encreaſed in weight, and this increaſe is very conſiderable. An hundred pounds of lead, for example, converted into minium, which is nothing but a calx of lead brought to a red colour by continuing the calcination, are found to gain ten pounds weight; ſo that for an hundred pounds of lead we have one hundred and ten pounds of minium: a prodigious and almoſt incredible augmentation, if it be conſidered that, far from adding any thing to the lead, we have on the contrary diſſipated part of it.

To prepare Glaſs of Lead.

TAKE two parts of litharge, and one part of pure cryſtalline ſand; mingle them together as exactly as poſſible, adding a little nitre and ſea-ſalt: put this mixture into a crucible of the moſt ſolid and moſt compact earth. Shut the crucible with a cover that may perfectly cloſe it.

Set the crucible thus prepared in a melting furnace; fill the furnace with coals; light the fire gradually, ſo that the whole may be ſlowly heated: Then raiſe the fire ſo as to make the crucible very red, and bring the matter it contains into fuſion; keep it thus melted for a quarter of an hour.

Then take the crucible out of the furnace, and break it: In the bottom thereof you will moſt commonly find a ſmall button of lead, and over it a tranſparent glaſs of a yellow colour nearly reſembling that of amber. Separate this glaſs from the little button of metal, and from the ſaline matters which you will find above it.

Lead diſſolved by the Nitrous Acid.

PUT into a matras ſome *aqua fortis* precipitated like that uſed to diſſolve ſilver; weaken it by mixing therewith an equal quantity of common water; ſet the matras in a hot ſand-bath; throw into it, little by little, ſmall bits of lead, till you ſee that no more will diſſolve. *Aqua fortis* thus lowered will diſſolve about a fourth of its weight of lead.

There is gradually formed upon the lead, as it diſſolves, firſt a grey powder, and afterwards a white cruſt, which

When no effervescence appears upon stirring the liquor, add a little more cream of tartar, and the same phenomena will be renewed. Go on thus till you have obtained the point of perfect saturation.

Then filter your liquor. If the alkali you made use of was the salt of Soda, evaporate your liquor quickly to a pellicle, and there will shoot in it crystals of nine sides resembling a coffin; the bottom part thereof being concave, and streaked with a great many parallel lines; and this is *Suignette's salt*. If you have employed any other alkali but soda, or the basis of sea-salt, evaporate your liquor slowly to the consistence of a syrup: let it stand quiet, and there will form in it crystals having the figure of flatted parallelopipeds; and this is the *vegetable salt*, or *tartarised tartar*.

All soluble tartars are easily decompounded, by means of a certain degree of heat. They yield in distillation the same principles as tartar; and the alkali that remains when they are perfectly calcined, consists of that which the tartar naturally affords, and of the alkaline matter with which it was converted into a neutral salt.

Crystal of Tartar combined with Iron. Chalybeated Tartar. Tincture of Steel with Tartar. Soluble Chalybeated Tartar.

Mix four ounces of iron in filings with one pound of white tartar finely pulverised. Boil the mixture in about twelve times as much water as you took of tartar. When the saline part of the tartar is dissolved, filter the liquor boiling-hot through a flannel bag, and then set it in a cool place. In a very little time crystals of a russet colour will shoot therein. Decant the liquor from these crystals; evaporate it to a pellicle, and set it again to crystallise. Go on in this manner till it will shoot no more. Collect all the salt you have thus obtained, and keep it under the name of *chalybeated tartar*.

To make the tincture of steel with tartar, mix together six ounces of clean iron filings, and one pound of white tartar in powder. Put this mixture into a large iron kettle, and pour thereon as much rain-water as will moisten it. Make a paste of this matter, and leave it thus in a mass for twenty-four hours. Then pour on it twelve pounds of rain-water, and boil the whole for twelve hours at least, stirring the mixture frequently, and adding from time to time some hot water, to supply the place of what evaporates. When you have thus boiled the liquor, let it stand quiet for some time, and then pour it off from the sediment at bottom. Filter, and evaporate to the consistence of a syrup; and you have the *tincture of Mars with tartar*. The dispensatories generally order an ounce of rectified spirit of wine to be poured on this tincture, in order to preserve it, and to keep it from growing mouldy, as it is very apt to do.

Soluble chalybeated tartar is prepared by mixing four ounces of tartarised tartar with one pound of the tincture of Mars with tartar, and evaporating them together in an iron vessel to dryness; after which it is kept in a well stopped phial to prevent its growing moist in the air.

Crystal of Tartar combined with the reguline part of Antimony. Stibiated or Emetic tartar.

Pulverise and mix together equal parts of the glass and of the liver of antimony. Put this mixture, with the same quantity of pulverised cream of tartar, into a vessel capable of containing as much water as will dissolve the cream of tartar. Boil the whole for twelve hours, from time to time adding warm water, to replace what is dissipated by evaporation. Having thus boiled your liquor, filter it while boiling hot; evaporate to dryness; and you will have a saline matter, which is *emetic tartar*.

Of the Product of Acetous Fermentation.

Substances susceptible of the Acetous Fermentation turned into Vinegar.

The wine, the cyder, or the malt-liquor, you intend to convert into vinegar, being first thoroughly mixed with its lees, and with the tartar it may have deposited, put your liquor into a fat used before either for making or for holding vinegar. This vessel must not be quite full, and the external air must have access to the liquor contained in it. Set it where the air may have a degree of warmth answering nearly to the twentieth degree above 0 in Mr de Reaumur's thermometer. Stir the liquor from time to time. There will arise in it a new fermentative motion, accompanied with heat: its vinous odour will gradually change, and turn to a sour smell, which will become stronger and stronger till the fermentation be finished and cease of itself. Then stop your vessel close; the liquor it contains will be found converted into vinegar.

All substances that have undergone the spirituous fermentation are capable of being changed into an acid by passing through this second fermentation, or this second stage of fermentation. Spirituous liquors, such as wine, cyder, beer, being exposed to a hot air, grow sour in a very short time. Nay, these liquors, though kept with all possible care, in very close vessels, and in a cool place, degenerate at last, change their natures, and insensibly turn sour. Thus the product of spirituous fermentation naturally and spontaneously degenerates to an acid.

For this reason it is of great importance, in making wine, or any other vinous liquor, to stop the fermentation entirely, if you desire the wine should contain as much spirit as possible. It is even more advantageous to check the fermentation a little before it come to the height than afterwards: because the fermentation, tho' slackened and in appearance totally ceased, still continues in the vessels; but in a manner so much the less perceptible as it proceeds more slowly. Thus those liquors, in which the fermentation is not quite finished, but checked, continue for some time to gain more spirit; whereas, on the contrary, they degenerate and gradually turn sour, if you let the spirituous fermentation go on till it be entirely finished.

The production of the second fermentation, which we are now to consider, is an acid of so much the greater

strength.

ſtrength, the ſtronger and more generous the ſpirituous liquor in which it is excited originally was. The ſtrength of this acid, commonly called *vinegar*, depends likewiſe in a great meaſure on the methods uſed in fermenting the vinous liquor, in order to convert it into vinegar: for if it be fermented in broad, flat veſſels, and left to grow ſour of itſelf, the ſpirituous parts will be diſſipated, and the liquor be ſour indeed, but vapid and effete.

The vinegar-makers, to increaſe the ſtrength of their vinegar, uſe certain methods of which they make a myſtery, keeping them very ſecret. However, Mr. Boerhaave give us, from ſome authors, the following deſcription of a proceſs for making vinegar:

"Take two large oaken vats or hogſheads, and in each of theſe place a wooden grate or hurdle, at the diſtance of a foot from the bottom. Set the veſſel upright, and on the grates place a moderately cloſe layer of green twigs, or freſh cuttings of the vine. Then fill up the veſſel with the foot-ſtalks of grapes, commonly called the *rape*, to within a foot of the top of the veſſel, which muſt be left quite open.

"Having thus prepared the two veſſels, pour into them the wine to be converted into vinegar, ſo as to fill one of them quite up, and the other but half full. Leave them thus for twenty-four hours, and then fill up the half-filled veſſel with liquor from that which is quite full, and which will now in its turn be left only half full. Four and twenty hours afterwards repeat the ſame operation, and go on thus, keeping the veſſels alternately full and half full during every twenty-four hours, till the vinegar be made. On the ſecond or third day there will ariſe, in the half-filled veſſel, a fermentative motion, accompanied with a ſenſible heat, which will gradually increaſe from day to day. On the contrary, the fermenting motion is almoſt imperceptible in the full veſſel; and as the two veſſels are alternately full and half full, the fermentation is by that means, in ſome meaſure, interrupted, and is only renewed every other day, in each veſſel.

"When this motion appears to be entirely ceaſed, even in the half-filled veſſel, it is a ſign that the fermentation is finiſhed; and therefore the vinegar is then to be put into common caſks cloſe ſtopped, and kept in a cool place.

"A greater or leſs degree of warmth accelerates or checks this, as well as the ſpirituous fermentation. In France it is finiſhed in about fifteen days, during the ſummer; but if the heat of the air be very great, and exceed the twenty-fifth degree of Mr de Réaumur's thermometer, the half-filled veſſel muſt be filled up every twelve hours; becauſe if the fermentation be not ſo checked in that time, it will become ſo violent, and the liquor will be ſo heated, that many of the ſpirituous parts, on which the ſtrength of the vinegar depends, will be diſſipated; ſo that nothing will remain, after the fermentation, but a vapid waſh, ſour indeed, but effete. The better to prevent the diſſipation of the ſpirituous parts, it is a proper and uſual precaution to cloſe the mouth of the half-filled veſſel, in which the liquor ferments, with a cover made alſo of oak wood. As to the full veſſel, it is always left open, that the air may act freely on the liquor it contains: for it is not liable to the ſame inconveniences, becauſe it ferments but very ſlowly."

The vine-cuttings and grape-ſtalks, which the vinegar-makers put into their veſſels, ſerve to increaſe the ſtrength of the liquor. Theſe matters contain a very manifeſt and perceptible acid. They alſo ſerve as a ferment; that is, they diſpoſe the wine to become eager more expeditiouſly and more vigorouſly. They are the better and the more efficacious for having been once uſed, becauſe they are thereby thoroughly drenched with the fermented acid: and therefore the vinegar-makers lay them by for preparing other vinegar, after waſhing them nimbly in running water, in order to free them from a viſcid oily matter which ſettles on them during the fermentation. This matter muſt by all means be removed; becauſe it is diſpoſed to grow mouldy and rot; ſo that it cannot but be prejudicial to any liquor in which you put it.

As the acetous fermentation differs from the ſpirituous in its production, ſo it doth in many circumſtances attending it. 1. Motion and agitation are not prejudicial to the acetous fermentation, as they are to the ſpirituous; on the contrary, moderate ſtirring, provided it be not continual, is of ſervice to it. 2. This fermentation is accompanied with remarkable heat; whereas the warmth of the ſpirituous fermentation is ſcarce ſenſible. 3. We do not believe there ever was an inſtance of the vapour that riſes from a liquor in acetous fermentation proving noxious, and producing either diſorders or ſudden death, as the vapour of fermenting wine doth. 4 Vinegar depoſites a viſcid oily matter, as hath juſt been obſerved, very different from the lees and tartar of wine. Vinegar never depoſites any tartar; even though new wine, that hath not yet depoſited its tartar, ſhould be uſed in making it

To concentrate vinegar by Froſt.

EXPOSE to the air, in froſty weather, the vinegar you deſire to concentrate. Icicles will form in it; but the whole liquor will not freeze. Take out thoſe icicles: and if you deſire a further concentration of your vinegar by this method, the liquor which did not freeze the firſt time muſt be expoſed to a ſtronger froſt. More icicles will form therein, which muſt likewiſe be ſeparated, and kept by themſelves. The liquor which doth not freeze this ſecond time will be a very ſtrong concentrated vinegar.

Vinegar analyſed by Diſtillation.

INTO a glaſs or ſtone cucurbit put the vinegar to be diſtilled; fit to it a glaſs head; place your alembic in the ſand-bath of a diſtilling furnace, and lute on a receiver. Apply a very gentle heat at firſt. A clear, limpid, light liquor will riſe, and fall in diſtinct drops, like water, from the noſe of the alembic.

Continue diſtilling this firſt liquor, till the vinegar contained in the cucurbit be diminiſhed about a fourth part. Then ſhift your receiver, and increaſe the fire a little. A clear liquor will ſtill come over, but heavier and more acid

acid than the former. Diſtil in this manner till you have drawn off into your ſecond receiver two thirds of the liquor that was left in the cucurbit.

A thick matter will now remain at the bottom of the ſtill: put it into a retort; lute on a receiver; ſet your retort in a reverberating furnace, and diſtil with degrees of fire. There will come over a limpid liquor, very acid and ſharp, yet ponderous, and requiring a great degree of fire to raiſe it; on which account it makes the receiver very hot. It hath a ſtrong empyreumatic ſmell When the diſtillation begins to ſlacken, increaſe your fire. There will riſe an oil of a fetid, quick ſmell. At laſt when nothing more will riſe with the ſtrongeſt fire, break the retort, and in it you will find a black charred matter: burn it, and from the aſhes lixiviated with water you will obtain a fixed alkali.

The Acid of Vinegar combined with different Subſtances.

The Acid of Vinegar combined with Alkaline Subſtances. Foliated Salt of Tartar, or regenerated Tartar. Decompoſition of that Salt.

INTO a glaſs cucurbit put ſome very pure and well dried ſalt of tartar; and pour on it ſome good diſtilled vinegar, by little and little at a time. An effervescence will ariſe. Pour on more vinegar, till you attain the point of ſaturation. Then fit a head to the cucurbit; ſet it in a ſand bath; and, having luted on a receiver, diſtil with a gentle heat, and very ſlowly, till nothing remain but a dry matter. On this reſiduum drop a little of the ſame vinegar; and if any effervescence appears, add more vinegar till you attain the point of ſaturation, and diſtil again as before. If you obſerve no effervescence, the operation was rightly performed.

It is not eaſy to hit the exact point of ſaturation in preparing this neutral ſalt; becauſe the oily parts, with which the acid of vinegar is loaded, hinder it from acting ſo briſkly and readily as it would do, if it were as pure as the mineral acids: and for this reaſon it often happens, that, when we have nearly attained the point of ſaturation, the addition of an acid makes no ſenſible effervescence, though the alkali be not yet entirely ſaturated; which deceives the operator, and makes him conclude erroneouſly that he hath attained the true point of ſaturation.

But he eaſily perceives his miſtake, when, after having ſeparated from this ſaline compound all its ſuperfluous moiſture by diſtillation, he drops freſh vinegar upon it: for then the ſalts being more concentrated, and conſequently more active, produce an effervescence, which would not have been ſenſible if this laſt portion of acid, inſtead of coming into immediate contact with the dried alkali, could not have mixed therewith till diffuſed through, and in a manner ſuffocated by that phlegm from which the acid of the vinegar before neutraliſed was gradually ſeparated by its combining with the alkali; that phlegm keeping in ſolution both the neutral ſalt already formed, and the alkali not yet ſaturated. And for this reaſon it is neceſſary to try, after the firſt deſiccation of this ſalt, which is called *regenerated tartar*, whether or no the juſt point of ſaturation hath been attained.

From what hath been ſaid, concerning the deſiccation of this neutral ſalt, it is plain, that the uſe of it is only to free the ſalt from the great quantity of ſuperfluous moiſture wherein it is diſſolved: which proves, that the acid of vinegar, like all other acids diſſolved in much water, is ſeparated from moſt of this redundant phlegm by being combined with a fixed alkali. And hence we muſt conclude, that the acid of vinegar, contained in regenerated tartar deſiccated, is vaſtly ſtronger and more concentrated than it was before.

Though the acid of vinegar is freed, by combining with a fixed alkali, from a great quantity of ſuperfluous phlegm, yet the oily parts with which it is entangled ſtill cleave to it: theſe parts are not ſeparated from it by its converſion into a neutral ſalt, but, without quitting it, combine alſo with the fixed alkali; and this gives regenerated tartar a ſaponaceous quality, and ſeveral other peculiar properties.

Regenerated tartar, when dried, is of a brown colour. It is ſemi-volatile; melts with a very gentle heat, and then reſembles an unctuous liquor; which indicates its containing an oil: when caſt upon live coals, it flames; and, when diſtilled with a ſtrong heat, yields an actual oil; all which evidently proves the exiſtence of that oil.

This ſalt is ſoluble in ſpirit of wine; a quality which it probably owes alſo to its oil. It requires about ſix parts of ſpirit of wine to diſſolve it; and the diſſolution ſucceeds very well in a matras, with the help of a gentle warmth. If the ſpirit of wine be abſtracted from this ſolution, by diſtilling with a ſmall fire, it remains at the bottom of the cucurbit, in the form of a dry ſubſtance compoſed of leaves lying one upon another; which hath procured it the name of *terra foliata tartari*, or *foliated ſalt of tartar*.

It is not abſolutely neceſſary that regenerated tartar be diſſolved in ſpirit of wine to make the foliated ſalt: for it may be procured in this form only by evaporating the water in which it is diſſolved. But the operation ſucceeds better with ſpirit of wine; probably becauſe the ſucceſs thereof depends on uſing an exceeding gentle warmth: now ſpirit of wine evaporates with much leſs heat than water.

Regenerated tartar may alſo be cryſtalliſed. If you deſire to have it in this form, combine the acid with the alkali to the point of ſaturation; evaporate the liquor ſlowly to the conſiſtence of a ſyrup, and ſet it in a cool place; where it will ſhoot into cluſters of cryſtals lying one upon another like feathers.

Vinegar perfectly diſſolves abſorbent matters alſo, and particularly thoſe of the animal kingdom; ſuch as corals, crabs eyes, pearls, *&c.* In order to a diſſolution of ſuch matters, you muſt pulveriſe them, put them into a matras, and pour on them ſpirit of vinegar to the depth of four fingers breadth: an effervescence will ariſe: when that is over, ſet the mixture to digeſt two or three days in a ſand-bath; then decant the liquor, filter it, and evaporate it to dryneſs with a very gentle heat. The matter which remains is called *ſalt of coral, of pearls,*

of

of crabs-eyes, &c. according to the ſubſtances diſſolved. If, inſtead of evaporating the liquor, a fixed alkali be mixed therewith, the abſorbent matter, that was diſſolved by the acid, will precipitate in the form of a white powder, which is called the *magiſtery of coral, of pearls*, &c.

The Acid of Vinegar combined with copper. Verdegris. Cryſtals of Copper. This Combination decompounded. Spirit of Verdegris.

INTO a large matras put verdegris in powder. Pour on it diſtilled vinegar to the depth of four fingers breadth. Set the matras in a moderate ſand-heat, and leave the whole in digeſtion, ſhaking it from time to time. The vinegar will acquire a very deep blue-green colour. When the liquor is ſufficiently coloured, pour it off by inclination. Put ſome freſh vinegar into the matras; digeſt as before; and decant the liquor again when it is ſufficiently coloured. Proceed in this manner till the vinegar will extract no more colour. There will remain in the matras a conſiderable quantity of undiſſolved matter. The vinegar thus impregnated with verdegris is called *tincture of copper*.

Mix theſe ſeveral tinctures, and evaporate them with a gentle heat to a pellicle. Then ſet the liquor in a cool place: in the ſpace of a few days a great many cryſtals of a moſt beautiful green colour will ſhoot therein, and ſtick to the ſides of the veſſel. Pour off the liquor from the cryſtals; evaporate it again to a pellicle, and ſet it by to cryſtalliſe. Continue theſe evaporations and cryſtalliſations, till no more cryſtals will ſhoot in the liquor. Theſe are called *cryſtals of copper*, and are uſed in painting. To this combination of the acid of vinegar with copper the painters and dealers have given them the title of *diſtilled verdegris*.

Verdegris is prepared at Montpellier. To make it they take very clean plates of copper, which they lay, one over another, with huſks of grapes between, and after a certain time take them out. Their ſurfaces are then covered all over with a very beautiful green cruſt, which is *verdegris*. This verdegris is nothing but copper corroded by the acid of tartar, analogous to the acid of vinegar, which abounds in the wines of Languedoc, and eſpecially in the rape, huſks, and ſtones of grapes that have a very auſtere taſte. Verdegris is a ſort of ruſt of copper, or copper corroded and opened by the acid of wine, but not yet converted entirely into a neutral ſalt: for it is not ſoluble in water, nor does it cryſtalliſe. This ariſes from its not being united with a ſufficient quantity of acid. The deſign of the operation here deſcribed is to furniſh the verdegris with the quantity of acid requiſite to make it a true metallic ſalt; for which purpoſe diſtilled vinegar is very fit.

Cryſtals of copper may be obtained, without employing verdegris, by making uſe of copper itſelf diſſolved by the acid of vinegar, according to the method practiſed with reſpect to lead, as ſhall be ſhewn hereafter. But verdegris is generally uſed, becauſe it diſſolves ſooneſt; it being a copper already half diſſolved by an acid correſpondent to that of vinegar.

Cryſtals of copper are decompounded by the action of fire alone, without any additament; becauſe the acid of vinegar adheres but looſely to copper. In order to decompound this ſalt, and extract its acid, it muſt be put into a retort, and diſtilled in a reverberatory furnace with degrees of fire. An inſipid phlegm riſes firſt, which is the water retained by the ſalt in cryſtalliſing. This phlegm is ſucceeded by an acid liquor, which riſes in the form of white vapours that fill the receiver. Towards the end of the diſtillation the fire muſt be violently urged, in order to raiſe the ſtrongeſt and moſt fixed acid. At laſt there remains in the retort a black matter, which is nothing but copper, that may be reduced by melting it in a crucible with one part of ſaltpetre and two parts of tartar. A ſimilar acid, but more oily, and in a much ſmaller quantity, may be obtained from verdegris by diſtillation.

The acid, which in this diſtillation comes over after the firſt phlegm, is an exceeding ſtrong and concentrated vinegar. It is known by the title of *ſpirit of verdegris*.

The Acid of Vinegar combined with Lead. Ceruſe. Salt or Sugar of Lead. This Combination decompounded.

INTO the glaſs head of a cucurbit put thin plates of lead, and ſecure them ſo that they may not fall out when the head is put upon the cucurbit. Fit on this head to a wide-mouthed cucurbit containing ſome vinegar. Set it in a ſand-bath; lute on a receiver, and diſtil with a gentle heat for ten or twelve hours. Then take off the head; in it you will find the leaden plates covered, and, in a manner, cruſted over with a white matter. This being bruſhed off with a hare's foot is what we call *ceruſe*. The leaden plates thus cleanſed may be employed again for the ſame purpoſe, till they be wholly converted into ceruſe by repeated diſtillations. During the operation there will come over into the receiver a liquor ſomewhat turbid and whitiſh. This is a diſtilled vinegar in which ſome lead is diſſolved.

Reduce a quantity of ceruſe into powder; put it into a matras; pour on it twelve or fifteen times as much diſtilled vinegar; ſet the matras in a ſand-bath; leave the matter in digeſtion for a day, ſhaking it from time to time: then decant your liquor, and keep it apart. Pour freſh vinegar on what is left in the matras, and digeſt as before. Proceed thus till you have diſſolved one half, or two thirds, of the ceruſe.

Evaporate to a pellicle the liquors you poured off from the ceruſe, and ſet them in a cool place. Greyiſh cryſtals will ſhoot therein. Decant the liquor from the cryſtals; evaporate it again to a pellicle, and ſet it by to cryſtalliſe. Proceed thus evaporating and cryſtalliſing, as long as any cryſtals will ſhoot. Diſſolve your cryſtals in diſtilled vinegar, and evaporate the ſolution, which will then ſhoot into whiter and purer cryſtals. This is the *ſalt*, or *ſugar of lead*.

Lead is eaſily diſſolved by the acid of vinegar. If it be barely expoſed to the vapour of that acid, its ſurface is corroded, and converted into a kind of calx or white ruſt, much uſed in painting, and known by the name of *ceruſe*, or *white lead*. But this preparation of lead is not combined with a ſufficient quantity of acid to convert

it into a ſalt: it is no more than lead divided and opened by the acid of vinegar; a matter which is to lead what verdegris is to copper. And therefore if you deſire to combine ceruſe with the quantity of acid neceſſary to convert it into a true neutral ſalt, you muſt treat it in the ſame manner as we did verdegris in order to procure cryſtals of copper; that is, you muſt diſſolve it in diſtilled vinegar, as the proceſs directs.

The ſalt of lead is not very white when it firſt ſhoots; and for this reaſon it is diſſolved again in diſtilled vinegar, and cryſtalliſed a ſecond time. If ſalt of lead be repeatedly diſſolved in diſtilled vinegar, and the liquor evaporated, it will grow thick; but ſtill cannot be deſiccated without great difficulty. If the ſame operation be oftener repeated, this quality will be thereby more and more increaſed; till at laſt it will remain on the fire like an oil or melted wax: it coagulates as it cools, and then looks, at firſt ſight, like a metallic maſs, ſomewhat reſembling ſilver. This matter runs with a very gentle heat, almoſt as eaſily as wax.

The ſalt of lead hath a ſaccharine taſte, which hath procured it the name alſo of ſugar of lead. For this reaſon, when wine begins to turn ſour, the ſure way to cure it of that diſagreeable taſte, is to ſubſtitute a ſweet one which is not diſagreeable to the taſte, by mixing therewith ceruſe, litharge, or ſome ſuch preparation of lead; for the acid of the wine diſſolves the lead, and therewith forms a ſugar of lead, which remains mixed with the wine, and hath a taſte which, joined with that of the wine, is not unpleaſant. But, as lead is one of the moſt dangerous poiſons we know, this method ought never to be practiſed; and whoever uſes ſuch a pernicious drug deſerves to be moſt ſeverely puniſhed. Yet ſome thing very like this happens every day, and muſt needs have very bad conſequences; while there is nobody to blame, and thoſe to whom the thing may prove fatal can have no miſtruſt of it.

Salt of lead may be decompounded by diſtillation without additament. In order to perform this, you muſt put the ſalt of lead into a glaſs or ſtone retort, leaving a full third thereof empty, and diſtil in a reverberating furnace with degrees of fire. A ſpirit riſes, which fills the receiver with clouds. When nothing more will come over with a fire that makes the retort red-hot, let the veſſels cool, and then unlute them. You will find in the receiver an auſtere liquor, which is inflammable; or, at leaſt, an inflammable ſpirit may be obtained from it, if about one half thereof be drawn off by diſtillation in a glaſs alembic. The retort in which the ſalt of lead was decompounded contains, at the end of the operation, a blackiſh matter: this is lead, which will reſume its metallic form on being melted in a crucible; becauſe the acid by which it was diſſolved, and from which it hath been ſeparated, being of a very oily nature, hath left in it a ſufficient quantity of phlogiſton.

What is moſt remarkable in this decompoſition of ſalt of lead, is the inflammable ſpirit which it yields, though the vinegar which entered into the compoſition of the ſalt ſeemed to contain none at all.

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JOHN FRENCH

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extracted. Filter and clarify all the menstruum being put together. Then evaporate it half away and set the other part in a cold place until it crystallizes. These crystals dissolve again in fresh spirit of vinegar. Filter and coagulate the liquor again into crystals, and this do often until they be sufficiently impregnated with the sal ammoniac of the vinegar as their proper ferment. Digest them in a temperate balneum that they may be resolved into a liquor like oil. Then distill this liquor in sand in a retort with a large receiver annexed to it, and well closed that no spirits evaporate, together with the observation of the degrees of the fire. Then there will distill forth a spirit of such a fragrant smell that the fragrancy of all flowers and compounded perfumes are not to be compared to it. After distillation when all things are cold, take out and cast away the black feces which is of no use. Then separate the yellow oil which swims on the top of the spirit and the blood red oil which sinks to the bottom of it. Separate the phlegm from the spirit in balneum. You shall by this means have a most fragrant spirit that even ravishes the senses, and so balsamical that it cures all old and new sores inward and outward, and so cordial that the dying are with admiration revived with it.

They that have this medicine need scarce use any other either for inward or outward griefs.

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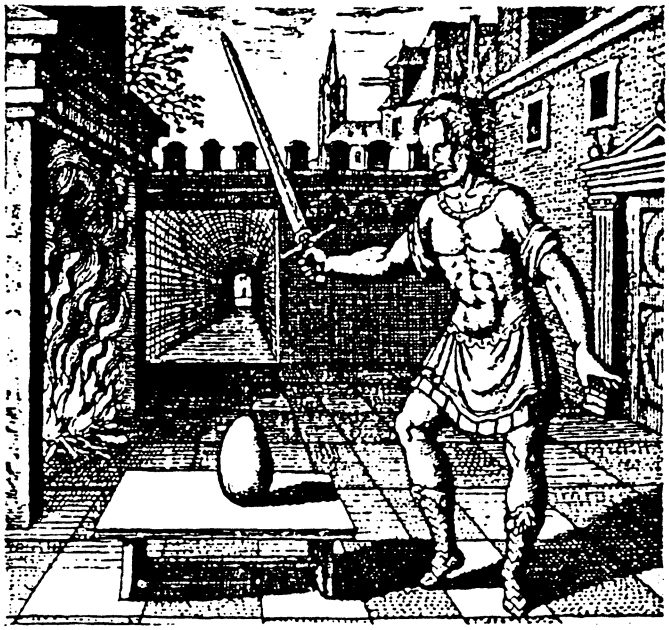

Christopher Glaser

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in the fire reduces them into Droſs by the devouring *Sulphur* predominant in it. The *Chymiſts* call it *Saturn*, from its ſympathy with that Planet; and though it be of a very courſe and impure compoſition, yet it affords good Medicines both internal and external.

Tis to be obſerved that *Lead* in it ſelf without having paſſed through the Artiſt's hands is a Metal friendly to Man, and cauſes no prejudice by it ſelf through any malignant quality either within or without. For we ſee perſons every day, who being ſhot, keep the Bullets in their Bodies without any inconvenience; and Plates made of *Lead* being applied outwardly ſoften the hardneſs of Nerves and Tendons, and take away divers external Tumors, which would not eaſily yield to other Remedies.

The Purification of Lead.

BEfore you can imploy *Lead*, 'tis neceſſary firſt to purify it as much as its imperfection admits, in order to extract out of it what is profitable. Melt it in a great Iron-ſpoon, then put to it by degrees ſome ſmall pieces of *Wax* or *Soot*, which pieces preſently flame and leave a little Scum upon the *Lead*, which muſt be taken off with an *Iron Spatula*.

Caſt

Caſt new little pieces of *Soot* or *Wax* and take away the Scum in this manner, till the *Lead* remain as bright as a Looking-glaſs; then pour it into a Baſin, and let it cool.

The Calcination of Lead.

PUT *Lead* thus purified into a Glaſs not Verniſht, and ſet the ſame in a Wind-Furnace amidſt the burning Coals. Yet the Fire muſt not be violent; but 'tis enough that the Pot be red, and the *Lead* melted. Stir it continually with an Iron rod till it be turned into Powder, or a grayiſh *Calx*, inclining to green; which let cool, and then by ſifting ſeparate its impurities.

Another Calcination of Lead.

LAY ſome purified *Lead* upon a Tile that reſiſts the Fire, and hath edges to keep the melted *Lead* from running into the Fire. Place the Tile in a Reverberatory Fire, ſo that the flame may beat continually upon the *Lead*. But the Fire muſt not be too violent; for then it will remain always melted, or elſe Vitrifie; to prevent which, the Fire muſt be

be moderate, and the *Lead* muſt be ſtirred continually with an Iron-rod; ſo the *Lead* will firſt turn to a gray Powder ſomewhat greeniſh, and by continuing the motion it will become yellow, and at laſt red, at which time 'tis called *Minium*. The *Calx* of a Pound of *Lead* will be found encreaſed above two ounces, by reaſon of the Particles of Fire incorporated with it, and by their activity reducing it into very ſubtle parts. This augmentation is alſo obſerved in the *Calcination* of *Tin* and other imperfect Metals.

Lead is reduced into Droſs, which is a ſort of *Calcination*, in great *Cuppels*, near the Mines, or in Mint-houſes, when they purifie *Gold* and *Silver* by *Lead*, which deſtroys the imperfect Metals mixt with the perfect, and reduces them into Droſs; which is called *Litharge* of *Gold* when it is drawn from the Cuppling of *Gold*, and *Litharge* of *Silver* when it is ſo drawn from *Silver*; and imploy'd for the purifying of theſe Metals.

Another Calcination of Lead.

TAke a Pound of *Lead* purified as above; melt it in an Earthen Pot not Verniſht, that reſiſts the Fire, Then caſt into it half a pound of *Sulphur* groſly powdered, and ſtir it all together with an Iron-rod, till the *Sulphur*

Sulphur ceaſe to flame and be conſumed; and then you ſhall find the *Lead* in the bottom of the Pot in a black powder which is called *Plumbum Uſtum*, or *Burnt Lead.*

Another Calcination of Lead.

LEad is alſo *calcined* by *acid* vapors, and by this means reduced into a white *Calx*. The proceſs is as follows. Hang Plates of *Lead* in a covered Veſſel, into the bottom of which there is ſome *Vinegar*; place the Veſſel upon ſome gentle heat, or in Horſe-dung; and the ſteams of the *Vinegar* will corrode the *Lead-plates*, and cauſe to come out of them a white Powder, like Flower, which gather off with a *Hare's-Foot*; and put the Plates again into the Veſſel till they be all reduced into *Ceruſe*. You may make uſe of any of theſe *Calx*'s for the preparations which are to be made upon *Lead*; but the grayiſh powder mentioned firſt is the moſt convenient of all.

Salt

Salt or Sugar of Saturn.

TAke a pound of grayiſh powder of *Lead*, put it into a great *Matrace*, and pour upon it three pounds of diſtilled *Vinegar*. Set the *Matrace* in digeſtion in a *Sand-Furnace* during the ſpace of twenty four hours, in which you muſt ſhake the *Matrace* now and then; otherwiſe the *Calx* will harden in the bottom of the Veſſel and endanger to break it. Then pour off the diſtilled *Vinegar* by inclination into another Veſſel; you will find it charged with the ſubſtance of the *Lead*, and its acidity turned to a great ſweetneſs. Put new diſtilled *Vinegar* upon the *Lead*, and proceed as before, mixing and keeping all the *Solutions*. Continue to put new *Vinegar*, to digeſt, and to pour off by inclination, till the diſtilled *Vinegar* diſſolve no more *Lead*, nor become ſweet, or till all the *Lead* be diſſolved, which it will not fail to be, provided the *Calx* of *Lead* be well made. Then filtre all the *Solutions* through gray Paper, and put them into a *Gourd* with its *Alembick*, and *Recipient* in *Balneo Mariæ*; and you ſhall firſt draw off an inſipid Water, the diſſolved *Lead* retaining all the *acid* Spirits of the *Vinegar*; which incorporate with it and make a very white Criſtalline Salt like Needles, reſembling

Saltpeter refined. This Liquor muſt not be diſtilled to *ſiccity*; but you muſt obſerve this proportion, that if you have diſſolved a pound of *Lead* there muſt remain about four pounds of Liquor in the *Gourd*, to the end the Salt may Chriſtallize. For when the Liquor is too clear, the Salt is too much diffuſed in it, and will not Chriſtallize; and being too much deprived of moiſture, the whole turns to a confuſed Maſs.

Wherefore then take the *Gourd* out of the *Bath*, and ſet it in a cool place, during three or four days, at the end of which you ſhall find a good part of the Liquor turned into Salt. Separate the floating Liquor, and dry the Salt between two Papers. Afterwards put the Liquor which you had poured off by inclination, into a leſs *Gourd*, and diſtill off about a third part; then ſet the *Gourd* a day or two in a cool place, and you ſhall again find Cryſtallized Salt, which you ſhall dry as the firſt. Evaporate and Criſtallize again the remaining Liquor, and reiterate the ſame operation, till you have reduced into *Criſtals* all that is ſo reducible. And in caſe your Salt be not white enough the firſt time, diſſolve it with the Phlegm of *Vinegar*, which filtre through gray Paper, and Criſtallize as before; you ſhall thereby have a very fair Salt of *Saturn*. This Salt is a very good Medicine in the *Aſthma*, and other diſeaſes of the Breaſt, being given in ſome Pectoral Decoction. The Doſe is from five

to

to fifteen grains. Tis alſo uſed outwardly with good ſucceſs in Wounds, and Ulcers; for it kills and deſtroys the corroding Salts of them; it is likewiſe excellent for Inflammations, being diſſolved in *Night-ſhade* water, or ſome other appropriate Water, and then applied. Moreover it ſerves well in *Lotions* for Inflammations and Itchings of the Eyes. But it is ſuſpected inwardly for thoſe that have weakneſs in the Kidnies, and parts neceſſary to Generation. And therefore in this caſe it muſt be uſed diſcreetly; and with great circumſpection.

The Magiſtery of Lead.

DIſſolve the *Calx* of *Lead* in *Vinegar*, Diſtilled as is taught in in the preceding *Chapter*. Pour off the *Solution* by Inclination, and paſs it through gray Paper. Then put upon it ſome Oil of *Tartar, per deliquium*, and you will inſtantly ſee the Liquor as white as curdled Milk, whereon pour a good deal of common Water very clean; and let it ſettle, and the *Lead* will precipitate to the bottom in a white powder; and this is by reaſon of the Oyl of *Tartar*, which being an *Alkali* Salt diſſolved, breaks the force of the diſtilled *Vinegar*, which had reduced the *Lead* into Liquor, and conſtrains it to let go

its former hold. Pour off the floating Liquor by inclination, and put ſome common Water upon the Powder, to *Dulcify* it, which pour away when it is well ſettled. Repeat this waſhing ſo often till the Powder be wholly freed from the *Acrimony* of the Salts. Then dry it and keep it for uſe.

This *Magiſtery* is exceeding white, and good for *Pomatums*. But 'tis alſo uſed in *Unguents* and *Eye-Waters* as a good *Diſiccative*.

If out of curioſity you deſire to reduce the *Salt*, or *Magiſtery* of *Saturn* into *Lead* as it was before; melt a little Salt of *Tartar* in a *Cruſible*, then put thereto a little of this *Salt* or *Magiſtery*, and you ſhall ſee it preſently return to *Lead*; for the *acid* Spirit of *Vinegar*, which kept the *Lead* in the form of a Salt or white Powder, is deſtroyed by the *Salt* of *Tartar*, by which it is at the ſame time both melted and reduced back to Metal.

A burning Spirit of Saturn, (*as it is called*) *but rather, A Spirit of the Volatile Salt of* Vinegar.

TAke two pound of *Salt* of *Saturn*, well purified by ſeveral *Solutions* and *Cryſtallizations* with diſtilled *Vinegar*. Put it into a

a *Retort*, ſo as to fill the ſame but half way, and place it in a *Furnace* of Sand, fitting thereunto a large *Receiver*. Lute the joynings well, and make the Fire gentle at firſt. There will come forth in the firſt place a phlegmatick Water and afterwards the Spirit; which will cauſe the reſemblance of Veins in the *Receiver*, as when you diſtill *Aqua-vitæ*: for this Spirit is almoſt of the ſame nature, proceeding from the *Volatile Salt* of the diſtilled *Vinegar*, which the *Lead* fixt and retained in its diſſolution. But when this Spirit is urged by the Fire, it forſakes the body whereunto it adhered. Encreaſe the Fire by little and little and continue it to make the *Retort* red. There will come forth a red earthy Oil towards the end, but in very little quantity; which Oil ſome account the true *Red Oil of Saturn*, but erroneouſly, it being nothing elſe but the more heavy and earthy part of the diſtilled *Vinegar*. The Diſtillation being ended leave the Veſſels to cool: then unlute the *Receiver*, wherein are the Phlegm, the Spirit and the Oil confuſedly together, and there remains a black earth in the *Retort*. You muſt rectify what is in the *Receiver*, in a little *Gourd* in *Balneo Mariæ*: The Spirit will come forth firſt, which is inflammable like that of Wine, but it will ſmell like the Spirit of *Lavendar* or *Roſemary*: The Phlegm and the thick Oily Liquor will remain in the bottom of the *Gourd*. This Spirit is an excellent Remedy

againſt the *Plague*, *Putrid Feavors*, and *Hypochondriacal Melancholy*. The Doſe from 4 to 12 drops in ſome convenient Liquor. The Phlegm may ſerve to waſh Wounds and *fœtid Ulcers*. The Earth left in the *Retort*, is very black whilſt incloſed; but as ſoon as you have broken the *Retort*, and it takes Air, it grows hot of it ſelf and turns from black to yellow, and at the ſame time is rarified to the eye. If you put it into a *Crucible* to melt, it returns eaſily to *Lead*.

an acid Liquor which we call Vinegar. We treat here onely of Wine-vinegar, as most imployed in Medicine.

Distillation of Vinegar.

PUT five pounds of good Vinegar in a Body of Glass, and fit thereto an Head and Receiver, set it in a Sand-furnace, and distill with a slow fire about two pounds of Liquor, which will have scarce any force, whence we call it phlegm of Vinegar: then change your Receiver, and increase your fire by little and little, and distill all over till there remain onely in the bottom of the Body a matter of the consistence of hony; then slack your fire, that the Distillation taste not of burning, and keep what is distilled; the use thereof is to dissolve calcined Minerals, and to reduce them into the form of Salts. The hony-like consistence which remains in the bottom may be put in a Retort, and forced over by gradual fire, it will yield an acid Spirit, and after a stinking Oyl, and a fixed Salt which remains behind in the Retort, which purified by many Solutions and Coagulations resembles the fixed Salt of Tartar.

CHAP.

The Works of the Highly Experienced and Famous Chymist, John Rudolph Glauber; containing, Great Variety of Choice Secrets in Medicine and Alchymy In the Working of Metallick Mines, and the Separation of Metals, Also Various Cheap and Easie Ways of making Salt-Petre, and improving of Batten-Land, and the Fruits of the Earth. Together with many other things very profitable for all the Lovers of Art and Industry. Translated into English, and Published for Publick Good by the Labour, Care and Charge, of Christopher Packe, Philo-chymico-Medicus.

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upon that which it hath assumed, and then you will find, that the dissolvent doth let fall the assumed metal or mineral, and falls upon the other, which it doth sooner seize 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 than 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 may write out of a pen.

To make a subtile spirit and pleasant oil 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 oil out of it by the help of vinegar, which is thus to be done. Take of the flores (which were taught to be made in the first part) one part, put them into a glass (fit for digestion) and pour 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, pour off the clear, which will look yellow and after you have filtered it abstract the phlegm, and there will remain a red liquor or balsome, to which you must add pure sand,

well calcined, and distill it, and first there will come over an unsavory phlegme, afterward a subtle spirit, and at last a yellow and red oil which are to be kept by themselves separated from the spirit, as a treasure for to heal all wounds very speedily. The spirit is not inferior unto the oil, not only for inward use to provoke sweat thereby, but also externally for the quenching of all inflamations, and doubtless this spirit and oil 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 trial to others.

To distil a spirit and oil out of Lead.

In the same manner as was taught of Zinck, there may be out of lead also distilled a subtle spirit and a sweet oil, and it is done thus: Pour 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 the lead, and turned quite sweet. Then pour off the clear solution, and pour on other vinegar, and let this likewise 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 moisture, and there will remain a thick sweet yellow liquor, like unto honey, if the vinegar was not distilled and made clear, then no liquor remaineth, but only 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 oil, which will not be much, but very effectual, in all the same uses, as of the spirit, and oil of Zinck was taught.

N. B. This is to be observed, that for to make this spirit and oil, you need no distilled spirit, but that it may be done as well with undistilled vinegar, and the undistilled yields more spirit than the distilled. But if you look for a white and clear salt, then the vinegar must be distilled, else it doth not shoot 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 glazed pot, viz. pouring the vinegar upon the Mineum in the pot, and boiling it on a coal 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 only go an unsavory phlegm. You must also continually stir the lead about with a wooden spatulla, 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 hours: and when both kind 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 a hour.

And if you will have this spirit and oil better and more effectual, you may mix 1 ounce of crude Tartar made into powder with 1 lb. of dissolved and purified lead, and so distil it after the same manner as you did distil it by it self, and you will get a much subtler spirit and a better oil than if it were made alone by it self.

QUERCETANUS

(Jos. Duchesne)

Mineral and Metallic

MEDICINES

Translated by: Lèone Muller

PRODUCED BY:

RAMS

1986

LEAD

Chapter VII

Preparation of Saturn which is efficient against the Lepra of human *and metallic Bodies, and of which an oily Solvent can be made.*

Distill a large quantity of good vinegar, till you have a cask full of it, because it is the basis and the foundation of this Work. To strengthen it more, distill it several times over the feces, then mix everything you have distilled with as much other non-dephlegmatized vinegar, and let them go over together, so that the distillate will become all the more efficacious. The dregs that remain at the bottom are put in a retort over a good fire by means of which one can extract an excellent oil from them, which can burn of its own and dissolve all kinds of minerals.

After preparing this solvent, take 80 lbs of powdered litharge- and NOT white lead or minium of lead calx (oxide), as several artists do, especially Isaac Hollandus. Take, I say, this litharge and put it in several big and very strong flasks. Pour on it as much of your vinegar that it will overfloat by 6 fingers' breadth, and then put it on an ash-fire. Extract the salt of Saturn by a slow digestion, and on the feces that are left after the extraction of the salt and the crystals, pour once more the same amount of menstruum as indicated above. Continue doing this till all your litharge has turned into crystals which are, properly speaking, what the philosophers call the Chaos or the metallic materia prima.

On this crystalline substance, again put for the last time fresh distilled vinegar. Dissolve it over a slow fire and filter it, so as to obtain a perfectly pure and flawless menstruum which, after passing through the steam-bath, will leave a substance that melts like wax at the bottom of the alembic. It hardens in the cold as it melts in the heat. Thereafter, divide this melting substance among several alembics and little by little pour fresh menstruum upon it, as if to feed and water it only. Do this by first pouring on only two drops, then three, then five, then seven, increasing the amount in this way till the materia does not absorb any more. You will recognize this when you see the solvent coming out as acid as it was at the beginning. Therefore, whenever you distill your imbibed materia, take care that you continue till the phlegma is as acid as before, because this is how the child refuses the nurse's milk when its stomach is full. When the materia has been prepared in this way and converted into an excellent and precious gum, digest it in the steam bath for 30 or 40 days, till it becomes black and has a bad smell like

that of liquid pitch. It is from this liquid and black pitch that you must extract, by the same bath, an excellent phlegma which can serve as a proper menstruum for extracting a precious salt from calcined earth, as we will write later. Owing to the continual distillation that you will make of the said pitch on sand, and by finally giving a strong fire above and below through the usual degrees up to a very violent fire, you will extract a red and quite thick oil which, together with the preceding distillations, will constitute as strong and violent a water as that extracted from wine, and will have the same great power. The philosophers call it water of life (brandy) of Saturn. Its substance is so pure and subtle that it must be kept in a well closed vessel lest it evaporate.

To complete the perfection of this solvent, this water of life of Saturn must be put in a gentle bath, in a long-necked alembic, where the purest spirit of this water will rise imperceptibly till you see the appearance of some lines and filaments through the glass of the head. It is an infallible sign that all of the spirit has risen, and you must therefore stop this distillation and extract this first precious spirit. Preserve it carefully in a cold place and in a well sealed container. After this spirit, a milky phlegma will appear in a stronger bath. It will be much better for washing your calcined materia than the first of which we spoke above. Flinally, by a stronger degree of fire and after changing the receptacle, you will still separate an ardent spirit which will first come out white and watery, then red and oily, but it will be heavy and lie at the bottom of the receptacle. However, if you wish, you can make it go over with a stronger fire.

In regard to the earth or the feces that are left at the bottom of the retorts as a black powder, they can also be dissolved with some fresh distilled vinegar and thus turn into new lapilli of a sticky and gummy consistency, and finally, by means of the above-mentioned digestions and distillations, into wonderfully active and burning spirits. There are some who divide this earth into two, but although Isaac (Hollandus) himself adopts this division, I am nevertheless of the opinion that the best and shortest method is to calcine all the earth together and to reverberate it by a gentle flame till it becomes yellow like ochre. When this earth has become yellow due to the cohobation of the phlegmas, the salt can again be separated from it, according to the ordinary rules and operations of the Art.

Having achieved the extraction of this rare and precious salt, take the first salt which you have little by little extracted and which you have preserved. Pour it on 1 oz of the last salt, repeating this imbibition till 1 oz of this salt weighs 3 or 4 oz and has retained the weight of the sal ammoniac of this spirit, till finally the volatile exceeds the fixed. If you work this process exactly, you will find an excellent earth at the bottom. Sublimate it in a very clear and well sealed glass vessel, and you will have the pleasure

of seeing in it the sublimation of a Philsoophical Mercury in the form of a fine talc, which you must keep as a most valuable substance.

To crown this work, take 1 part of this Mercury and add it to 4 parts of the above-mentioned spirit or to as much ardent spirit to make of them a solvent for the Sun and the Moon, such as the philosophers imagined were capable of turning them into spirit without destroying their bodies or losing their characteristics. Therefore, wonderful works can be made with this truly philosophical solvent, both for the health of human and of metallic bodies. It can even be made with coral and litharge, and in that case you will without doubt make the finest and most harmless of all solvents.

ANOTHER SOLVENT OF GOLD BY CRYSTALS OF SATURN

Take minium, or better, litharge. Dissolve it twice in vinegar then filter and congeal it. Repeat this operation of dissolving, filtering, and congealing three times. When at the last time you have congealed to the consistency of oil, put your congelation in a cold place for 8 or 10 days, during which time small ice-like crystals will form. Remove all their humor by inclination and dry them very gently near the fire on a piece of cloth. After that, put the thus dried pieces of crystals in an alembic pot with some good brandy, three times rectified on common salt prepared and melted, each time renewing the same salt or rather passing it over sulphlur or vitriol. Then set everything to digest in the bath for 3 or 4 days. Finally, distill this brandy thus rectified over the pieces of crystal of which we have spoken, to the consistency of honey or oil. That done, coagulate your materia again into small crystal cubes and crush them with calcined gold, that is, 6 weights of ice cubes to 1 of gold. Now put everything into a well-closed retort in the Horse's Belly for 40 days. Then put your vessel on an ash-fire to gently distill all the moisture from it. By putting it on sand afterwards, extract the oil with much white smoke which the philosophers call menstruals. Do this by raising the fire according to the degrees of the Art.

To bring this work to a happy end, take all the oil and put it in a small alembic in a very gentle B. M., first to extract the brandy and secondly the phlegma, which you can discern from the brandy by the tears that fall into the receptacle. Now take this brandy and pour it on the feces of your oil, and leave both thus in the bath for 1 or 2 days, till your water is colored. Thereafter, distill your colored water, pour it back on the materia, and distill it again. Continue distilling and putting your water back on the feces of the oil till you have extracted all the tincture. If the waters extracted from your oil were not sufficient for the complete extraction of your tincture, put them back in a gentle bath to draw out one-third which is to be used once more for extracting the rest of the tincture contained in the feces of your oil, by

the above-indicated process. Finally, withdraw from your bath all your tinged brandy (which can always be useful), and you will find a golden oil at the bottom, excellent for health when flavored with oil of cinnamon and given with the specific waters for the diseases you wish to fight with its power.

OIL OF SATURN

Take lead calx and dissolve it in good vinegar, then filter and evaporate 3 parts of your vinegar with a slow fire. Let the rest coagulate for 24 hours, or in the air if it is in winter, during which time the salt of the lead turns into (crystals) ice cubes. Then separate your vinegar by inclination and put the crystals on a small ash-fire to separate them from the rest of the vinegar, which you may have left. This operation is done by means of the bath, till your crystals are left completely dry. When in this state put them, after powdering them, in a flask and pour on them fresh vinegar of the same strength as the previous. Then dissolve, filter, and evaporate 2 of the 3 parts of your menstruum. Finally, let small pieces of crystals form in the cold air or in a cold cellar, as before. Thereafter, distill the rest of your vinegar in a retort and at a slow fire to begin with, then at such a degree of heat that a red oil appears. When this happens, take immediately another receptacle, and by increasing the flame-fire, you will extract all the oil of Saturn, which has various properties for the medicine of human bodies and that of metals.

ANOTHER EXCELLENT OIL OF SATURN

Extract the calcined salt of Saturn or of white lead according to the method of the Art, then dissolve, filter, and coagulate it with common water till it is perfectly clear and crystalline. Now put it to circulate for some time in B. M. with a good spirit of wine, in order to make it purer than it is after ordinary preparations. Finally, it has to be put back in the same bath with dew water and be circulated as before. The thus prepared salt turns into a precious oil of which 4 or 5 drops only, mixed with a suitable liquid, are a very great and very powerful remedy for all internal inflammations, pneumonias, pleurisies, liver complaints, fevers, and the like. Its powers are even greater because they put an end to all inflammations and heal even ophthalmias if a little of this oil is mixed with tutty (crude zinc oxide). It is also excellent for all kinds of cankerous ulcers.

FLOWERS OF SATURN WHICH ARE A SPECIFIC REMEDY FOR OPHTHALMIAS

Prepare a clay vessel made up of 8 or 9 little pots, put one upon the other, as we said in the chapter on tin. After the vessel is red-hot, throw some lead filings mixed with saltpeter through the tube, little by little. Then you will see the spirit of saltpeter distill through the beak of the first pot counting from the bottom, and the sweetness of Saturn will rise in the other upper vessels in the form of flowers, of which you can make a salt with vinegar. When this salt is turned into oil, you will have an excellent remedy for ophthalmia and all diseases of the eye.

EXTRACTION OF THE MERCURY OF SATURN

Take 2 lbs of minium, such as it is, when it can easily be converted into glass. Put it in a crucible in the midst of a strong fire and imbibe it 6 or 7 times with good vinegar. Then add to the thus prepared minium an equal amount of crude tartar, and finally distill this mixture of minium and tartar through the retort for 12 hours, but take care to make the fire strong from the beginning. You will have 17 oz of Mercury in your receptacle which must be half filled with cold water. At the bottom of the retort there will be real gold. One can reasonably imagine that it is the gold which the philosophers call the fixed grain separated from its Mercury, and in fact such a Saturnian Mercury is much lighter and brisker than vulgar mercury.

ANOTHER METHOD OF EXTRACTING THE MERCURY OF SATURN

Mix 2 lbs of minium with as much good tartar, and put them in a glazed pot pierced by small holes at the bottom. Put this pot on another that is neither glazed nor pierced, and put it underground to serve as a receptacle, but only after you have carefully luted the joints and put some fresh water at the bottom to attract the Mercury and prevent the breakage of the vessel. Finally, cover the pot that contains the materia with another very tightly luted pot and give it a moderate fire for the first 6 hours, then a stronger fire for the next 6, and finally a very strong fire during the last 6 hours- and you will find the Mercury of Saturn at the bottom of your receptacle.

A METHOD OF MAKING THE GLASS OF SATURN

Saturn is a metal whose effects are so great and wonderful for the health of human bodies that it can not only do great things in the state in which we have just prepared it but also if it is vitrified by means of calcinations according to the rules of the true philosophy. Because glass is the extreme degree and the ultimate perfection to which all things can be brought by the Art, you must therefore not doubt that the glass of lead has in itself not only a very pure substance but, in addition, an abundance of salt, even greater than can be found in any other metal. This is so because Saturn abounds so much in salt that the other two Principles, which are the liquids and the sulphurs, disappear completely, with the result that usually only the pure salt is left behind. Often it exceeds the weight of the metal from which it is extracted by more than half. That is why the philosophers who seek the Mercury and the Sulphur of Saturn cry out so loud, *"Cavete, cavete a vitrificatione"* (beware of the vitrification). This teaches us that all metals which contain more Salt than the other two Principles can be entirely vitrified. Among these there is Saturn which, being better provided with Salt than with Mercury and Sulphur, can easily turn into glass. This does not mean that the other metals cannot also be turned into glass by the length and the power of a continual fire. The exception is gold, which, being of a more perfect nature than the other metals due to the great equality and combination of the Elements it contains, can in no way be turned into glass, because it is so richly composed of Water, Earth, and Air that nothing can produce in it any alteration of rust or corruption, and even fire cannot impress any change on its mass. This is all the more so as it is of a fiery nature and that instead of being destroyed by fire, it is rather preserved by it, according to this axiom of Nature: *All like things love and preserve their likes.*

In regard to iron, it is not absolutely impossible to vitrify it, although it can only be turned into glass with great difficulty. This is so because it contains much more Sulphur, which has a fiery nature, than Salt which , as we have said, is the basis of all vitrifications. Salt having an earthy nature, is purified by the continual power of the fire and can easily turn into glass and a pellucid and transparent nature.

It is hardly less difficult to turn silver into glass than iron, because it is of a very fixed substance, and it only occurs if it is partly driven to this perfection by the addition of salts and the length of strong fires. Even then it does not become real glass but rather a stone of a hyacinth color. The violence of the fire will have caused it to lose its own sappphire color, because it is volatile and not completely fixed like the substance of silver.

But let us return to our Saturn which is the *foundation for making all kinds of artificial* stones, after the artists have turned it into small pieces of ice (crystals) with the help of the acid plant solvent (vinegar). Now then, the glass of Saturn is made as follows:

Take 4 parts of minium, 1 part of Etamps sand or small white river pebbles, well calcined. Put them in a crucible over a strong fire, and you will promptly make glass that is yellow in color and of a transparent nature, which can give good ingress to medicines that are too fixed and too dry, consequently deprived of their inceration.

Note that this glass of Saturn is in no way composed of a mixture of pebbles or of anything else that could be added to its vitrification, but that it is such by its own nature. To prove it, do as follows: Restore the metallic nature that it had before, and without calcining it at all; put it, all lead that it is, in a tightly luted crucible in the furnace of a glassmaker or a potter. After removing your materia, grind what has not vitrified the first time, and put it back in the furnace to be reverberated again. Continue doing this 3 or 4 times, and you will find that your Saturn has completely turned into a very beautiful glass, quite suitable for making precious stones. If you wish to avoid pulverizing your materia so often, you have only to put it in the fire of the glassmaker, and at the end of the 5 or 6 days that it has been in this continual fire, it will not fail to become vitrified just as well as by any other method.

I think that if one were to sublimate this glass of Saturn with sal ammoniac, it could be melted with a candle and thus be turned into transparent wax. Also, if this same glass were first powdered and then mixed with camphor or amber or with some other resin or sulphurous and transparent gum, one could make beautiful and pellucid sealing wax from it, which would in truth only be suitable for Lords, as it would be extremely costly.

SATURN'S PREPARATION EXPERIMENTED AGAINST LEPROSY OF HUMAN AND METALLIC BODIES, AND FROM WHICH AN OLYMPIC SOLVENT CAN BE MADE

JOSEPH DUSCHESNE (QUERCETANUS)

translated from: "RECUEIL des PLUS CURIEUX et RARES SECRETS (Paris 1641)

Distil in great quantities a good vinegar as it is the basis and foundation of this work. And, in order to fortify it the better, distil it many times upon its own fæces, afterwards mix all that has distilled with equal parts of another not dephlegmated vinegar, and make them pass together so that it may become more efficacious. The fæces which shall remain at the bottom you may put them in a retort at a good fire, by the force of which an excellent oil may be driven, which may burn itself and solve all kinds of minerals.

After having prepared this solvent, you have to take 80 pounds of litharge in powder, and not ceruse, nor minium, nor lead's calx as many artists do especially Isaac Hollandus, take this litharge and put it in several matrasses of great capacity, and pour upon it all your distilled vinegar, so that it swims ten fingers above; then, on an ash fire, you shall extract Saturn's salt by a slow digestion, and upon the fæces which shall remain after the extraction of the salt and of the crystals, you shall pour new menstruum in the same quantity as we have said, and you shall continue this until all your litharge has been re-

duced to crystals, which, to speak properly, are what philosophers call the chaos or the first metallic matter. Upon this crystalline matter you shall pour again, and for the last time, new distilled vinegar, and you shall make the whole to solve at a slow fire, and you shall filter it, so that a perfectly pure and neat menstruum is made, which, having passed through the vaporous bath, shall leave at the bottom of the alembic a matter melting like wax, which hardens at coolness even as it melts at heat.

You shall then divide this melting matter in many alembics, and shall pour upon it new menstruum, little by little, in order to nourish and moisten it little by little, which you shall do putting at the beginning but only two ounces, then three, then five, seven, augmenting it until the matter does not want to receive anything more, which you shall know when the solvent comes as sharp as it was at the beginning, so that each time you distil your imbibed matter you shall take care to continue until the phlegm comes as sharp as before, because it is thus that the child rejects its nourishing milk after its stomach has been filled up.

This matter, being thus prepared and changed into an excellent and precious gum, you shall digest it at the vaporous bath for 30-40 days, until it remains of a black colour and a stinking smell as liquid pitch, and it is from this liquid pitch that you shall drive out in the same bath an excellent phlegm, which may serve as a proper menstruum to extract from the calcinated earth a precious salt, as we shall later on say.

And, on the other hand, from the repeated distillation which you shall do of the said pitch on the sand bath, eventually giving a good fire above and below, you shall drive out, by the ordinary degrees until a most violent fire, a red and very thick oil which, when united with the preceding distillates, shall compose together a water as strong and violent as the one which is driven out from wine, and even of a higher virtue: which is called by philosophers the water of life of Saturn, whose substance is so pure and subtle that one has to keep it in a most closed vessel so that it may not exhalate. To finish the perfection of this solvent, this water of life of Saturn is to be put again on a mild bath, in an alembic of a very long neck, in which the most pure spirit of this water shall imperceptibly rise the first (. . .) After this spirit, a lacteous phlegm shall come over by a more strong bath, which may serve better than the one of which we have previously spoken, to wash your calcined matter, and eventually, by a stronger degree of fire, after having changed the receiver, you shall separate also a burning water which at the beginning shall come white and aqueous then red and oily, but this one shall be heavy and shall remain at the bottom of the vessel; you may however make it to pass over by the strength of the greater fire.

As for the earth that shall remain at the bottom of the retort as a black powder, you may solve it again by another distilled vinegar, and change it by this means into a new lapis of a sticky and gummy consistency, and finally with the aid of the

digestions and distillations above mentioned, you may take out from it spirits which are marvellously active and ardent.

Some divide this earth into 2, and although Isaac himself thus show this division, I think that it is best and briefier to calcine all the earth together, and to reverberate by a mild flame until it does become as yellow as gold, and when this earth is yellow by the cohobation of the phlegms you may again extract the salt, according to the rules and ordinary operations of the art.

Having attained to the extraction of this rare and precious salt, you shall take the first spirit which you have extracted little by little by several cohobations, and which you have afterwards kept, and you shall pour it upon this last salt, reiterating this imbibition until an ounce of salt weighs three or four of the spirit, so that it has retained the weight of armoniacal salt of this spirit, and that, to finish with, the volatile overcomes the fixt in proportion: if you do work this operation with exactitude, you shall find at the bottom an excellent earth, which you shall sublimate in an appropriate glass vessel, very clear and well sealed, where you shall have the pleasure of seeing the sublimation of a philosophical mercury in the form of a happy earth, or rather of a fair gipsy, which you shall keep as a matter of great price.

To crown this work, one part is to be taken of this mercury which you shall unite with four of the spirit of which we have spoken above, or with the same quantity of the first burning

water, to make with it a solvent of Sol and Luna, even as philosophers have imagined it, capable of reducing them into a spirit, without destroying their bodies nor losing their species; so that from this solution, truly philosophical, you may do admirable works for the health both of the human bodies and of the metallic ones. This same thing may be done both from choral or from litharge, and in this case you shall make from it, undoubtedly, the fairest and most innocent of all solvents.

"Another solvent for gold by the crystals of Saturn"

- Minium or litharge are solved into vinegar and 3 times recrystallised.
- These crystals are digested 3 or 4 days with rectified aqua vitae.
- The aqua vitae is distilled and a honey or oil remains behind.
- This is the congealed into crystals 6 parts of which are grinded with 1 part of calcined gold.
- This is digested for 40 days.
- It is distilled: first an extraceous humidity comes over, then an oil and many white fumes "which the philosophers call menstrual".
- By rectification, first an aqua vitae comes over, then the phlegm.
- The water of life is poured upon the faeces of the oil which remained behind, and this is left 2 days at the bath to digest; it does become coloured.

- By distillation and cohobation the whole of the tincture is extracted.
- The water of life is retired off at the balneum "and you shall find at the bottom an oil of gold, most excellent for health when it has been aromatised with an oil of cinnamon or in other ways."

per reduced into this condition attract the Air more powerfully, and diſſolve into Liquor: which happens not to this of *Silver*; for it preſerves it ſelf always in a ſolid form, and may be carried about in a Box; for which reaſon Surgeons preſer it before others, and make uſe of it.

Many Authors fill their Books with ſeveral *Tinctures* and other preparations of *Gold* and *Silver*; which we omit as either uſeleſs or hurtful, perſiſting in our firſt deſign, to ſet down nothing ſuperfluous, or that may fruitleſly puzzle the Reader, but to communicate to the publick all that is profitable, and that may be underſtood and eaſily perſormed by Artiſts, yea even by ſuch as have no skill but what they derive from their Writings.

CHAP. III.

Of Lead, *or* Saturn.

Lead is an imperfect Metal, conſiſting naturally of an impure Salt, and undigeſted *Mercury*, and a *Terreſtrial Sulphur*, which abounds in this body, for which reaſon it eaſily unites with the Oils of Vegetables, and the Fats of Animals, which are Sulphureous. It eaſily deſtroys all other imperfect Metals, and

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