POLYGRAPHICE;

OR

The Arts of Drawing, Engraving, Etching, Limning, Painting, Washing, Varnishing, Gilding, Colouring, Dying, Beautifying and Perfuming

IN FOUR BOOKS.

Exemplifyed, in the *Drawing of Men, Women, Landskips, Countries*, and Figures of various forms; The way of *Engraving, Etching* and *Limning*, with all their Requisites and Ornaments; The *Depicting of the most eminent Pieces of Antiquities*; The *Paintings of the Antients*; *Washing* of Maps, Globes, or Pictures; The *Dying* of Cloth, Silk, Horns, Bones, Wood, Glass, Stones, and Metals; The *Varnishing, Colouring* and *Gilding* thereof, according to any purpose or intent; The *Painting, Colouring* and *Beautifying* of the Face, Skin and Hair; The *whole Doctrine of Perfumes* (never published till now) together with the *Original, Advancement* and *Perfection* of the Art of Painting.

The Second Edition, with many large Additions. Adorned with Sculptures: The like never yet extant.

By *WILLIAM SALMON* Φιλαλήθης.

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POLYGRAPHICES

LIBER SECUNDUS.

Of ENGRAVING, ETCHING, and LIMNING.

Shewing the Inſtruments belonging to the Work; the Matter of the Work, the way and manner of performing the ſame; togewith all other Requiſites and Ornaments.

CHAP. I.

Of Graving, *and the Inſtruments thereof.*

I. GRaving is an Art which teacheth how to transfer any deſign upon Copper, Braſs, or Wood, by help of ſharp pointed and cutting Inſtruments.

II. The chief Inſtruments are four, 1. Gravers, 2. An Oyl ſtone, 3. A Cuſhion, 4. A Burniſher.

III. Gravers are of three ſorts, round pointed, ſquare pointed, and Lozenge pointed. *The round is beſt to ſcratch withal: the ſquare Graver is to make the largeſt ſtroaks:*

ſtroaks: the Lozenge is to make ſtroaks more fine and delicate; but a Graver of a middle ſize betwixt the ſquare and Lozenge pointed, will make the ſtroaks or hatches ſhow with more life and vigour, according as you manage it in working.

IV. The Oyl-ſtone is to whet the Gravers upon, which muſt be very ſmooth, not too ſoft, nor too hard, and without pinholes.

The uſe is thus: *put a few drops of oyl Olive upon the ſtone, and laying that ſide of it, which you intend ſhall cut the Copper, flat upon the ſtone, whet it very flat and eaven; and therefore be ſure to carry your hand ſtedfaſt with an equal ſtrength, placing the forefinger firmly, upon the oppoſite ſide of the graver. Then turn the next ſide of your graver, and whet that in like manner, that you may have a very ſharp edge for an Inch or more. Laſtly, turning uppermoſt that edge which you have ſo whetted, and ſetting the end of the graver obliquely upon the ſtone, whet it very flat and ſloping in form of a Lozenge (with an exact and eaven hand) making to the edge thereof a ſharp point. It is impoſſible that the work ſhould be with the neatneſs and curioſity deſired, if the graver be not, not only very good, but alſo exactly and carefully whetted.*

V. The Cuſhion is a leather bag filled with fine ſand, to lay the plate upon, on which you may turn it every way at eaſe.

You muſt turn your plate with your left hand, according as the ſtroaks which you grave do turn, which muſt be attained with diligent care and practice.

VI. The burniſhing Iron is of uſe to rub out ſcratches and ſpecks or other things which may fault your work in the plate; as alſo if any ſtroaks be graved too deep or groſs to make them appear leſs and fainter by rubbing them therewith.

VII. To

VII. To make your Gravers.

Provide ſome Croſs-bow ſtell, and cauſe it to be beaten out into ſmall rods, and ſoftned, then with a good file you may ſhape them at pleaſure: when you have done, heat them red-hot, and ſtraight dip it into Soap, and by ſo doing it will be very hard: where note, that in dipping them into the Soap, if you turn your hand never ſo little awry, the graver will be crooked. *If your graver be too hard, take a red-hot Charcoal and lay the end of your graver upon it till it begins to wax yellowiſh, and then dip it into tallow (ſome ſay water) and it will be tougher.*

VIII. Have by you a piece of box or hard wood, that after you have ſharpned your graver, by ſtriking the point of it into the ſaid box or hard wood, you may take off all the roughneſs about the points, which was cauſed by whetting it upon the oyl-ſtone.

IX. Laſtly, take a file and touch the edge of the graver therewith; if the file cut it, it is too ſoft, and will do no good: but if it will not touch it, it is fit for your work.

If it ſhould break on the point, it is a ſign it is tempered too hard; which oftentimes after a little uſe by whetting will come into a good condition.

CHAP. II.

Of Poliſhing the Copper Plates.

I. TAke a plate of Braſs or Copper of what bigneſs you pleaſe, and of a reaſonable thickneſs, taking heed that it be free from fire flaws.

II. Beat it as ſmooth as you can with a hammer, and then rub it as ſmooth as you can, with a pumice ſtone void

void of Gravel (leſt it ſcratch it and ſo cauſe as much labour to get them out) and a little water.

III. Then drop a few drops of oyl Olive upon the plate, and burniſh it with your burniſhing Iron; and then rub it with Charcoal made of Beech wood quenched in Urine.

IV. Laſtly, with a roul made of a piece of a black felt, caſtor, or Beaver, dip'd in oyl Olive, rub it well for an hour, ſo ſhall your plate be exactly poliſhed.

CHAP. III.

Of Holding the Graver.

I. IT will be neceſſary to cut off that part of the knob of the handle of the graver which is upon the ſame line with the edge of the graver; thereby making that lower ſide next to the plate flat, that it may be no hinderance in graving.

For working upon a large plate, that part of the handle (if not cut away) will ſo reſt upon the Copper, that it will hinder the ſmooth and eaven carriage of your hand in making your ſtroaks, and will cauſe your graver to run into your Copper deeper than it ſhould do. This done,

II. Place the knob at the end of the handle of the Graver in the hollow of your hand, and having extended your forefinger towards the point of the Graver, laying it a top, or oppoſite to the edge which ſhould cut the plate, place your thumb on the one ſide of the Graver, and your other fingers on the other ſide, ſo as that you may guide the graver flat and parallel with the plate.

III. Be wary that your fingers interpoſe not between the

the plate and the Graver, for they will hinder you in carrying your graver level with the plate, and cauſe your lines to be more deep, groſs and rugged, than otherwiſe they would be.

CHAP. IV.

Of the way and manner of Engraving.

I. HAving a Cuſhion filled with ſand about nine inches long and ſix broad, and three or four thick, and a plate well poliſhed; lay the plate upon the Cuſhion, which place upon a firm Table.

II. Holding the Graver (as aforeſaid) according to art, in making ſtraight ſtroaks be ſure to hold your plate firm upon the Cuſhion, moving your hand, leaning lightly where the ſtroak ſhould be fine; and harder where you would have the ſtroak broader.

III. But in making circular or crooked ſtroaks, hold your hand and Graver ſtedfaſt, your arm and elbow reſting upon the table, and move the plate againſt the Graver; for otherwiſe it is impoſſible to make thoſe crooked or winding ſtroaks with that neatneſs and command that you ought to do.

IV. Learn to carry your hand with ſuch a ſlight, that you may end your ſtroak as finely as you began it; and if you have occaſion to make one part deeper or blacker than another, do it by degrees; and that you may do it the more exactly, obſerve that your ſtroaks be not too cloſe, nor too wide.

For your more exact obſervation, practiſe by ſuch prints which are more looſly ſhadowed, leſt by imitating the more dark, you ſhould not know where to begin or end.

V. After

V. After you have graved part of your work, it will be needful to ſcrape it with the ſharp edge of a burniſher or other graver, carrying it along eaven with the plate, to take off the roughneſs of the ſtroaks; but in doing it beware of making ſcratches.

VI. And that you may the better ſee that which is engraven, with the piece of Felt or Caſtor (at the fourth Section of the ſecond Chapter) dipt in oyl rub the places graven.

VII. Laſtly, whatſoever appears to be amiſs, you may rub out with the burniſher, and very exactly poliſh it with your piece of Felt or Caſtor and oyl; which done, to cleanſe the plate you may boil it a little in wine vinegar, and rub it gently with a bruſh of ſmall braſs wire or hogs briſtles.

CHAP. V.

Of the Imitation of Copies or Prints.

I. HAving a piece of Bees wax tyed up in a fine holland rag, heat the plate over the fire, till it may be hot enough to melt the wax; then rub the plate with the wax tied up in the rag, till you ſee it covered all over with wax, (which let be very thin:) if it be not eaven, heat it again by the fire, and wipe it over gently with a feather.

II. If you would copy a printed picture, to have it print off the ſame way; then clap the print which you would imitate with the printed ſide next to the plate; and having placed it very exactly, rub the backſide of the print with a burniſher, or any thing that is hard, ſmooth and round, which will cauſe it

to

to ſtick to the wax upon the plate: then take off the print (beginning at one corner) gently and with care, leſt you tear it (which may be cauſed alſo by putting too much wax upon the plate) and it will leave upon the wax the perfect proportion in every part.

Where note, if it be an old picture, before you place it upon the wax, it will be good to track it over in every limb with a black-lead penſil.

III. But if you would have it print the contrary way; take the duſt of black-lead, and rub the backſide of the print all over therewith, which black ſide put upon the waxed plate; and with your needle or drawing point, draw all the out-lines of the deſign or print, all which you will find upon the wax. This done,

IV. Take a long graver either Lozenge or round (which is better) very ſharp, and with the point thereof ſcratch over every particular limb in the outſtroke; which done, it will not be difficult to mark out all the ſhadows as you engrave, having the proportion before you.

V. Laſtly, for Coppies or Letters, go over every letter with black-lead, or write them with ungumm'd Ink, and clap the paper over the waxed plate as before.

CHAP. VI.

Of Engraving in Wood.

THe figures that are to be carved or graven in wood muſt firſt be drawn, traced, or paſted upon the wood; and afterwards all the other ſtanding of the wood (except the figure) muſt be cut away with

with little narrow pointed knives made for that purpoſe.

This graving in wood is far more tedious and difficult than that in Braſs or Copper; becauſe you muſt cut twice or thrice to take out one ſtroak; and having cut it, to be careful in picking it out, leſt you ſhould break any part of the work, which would deface it.

II. For the kind of the wood let it be hard and tough: the beſt for this purpoſe is Beech and Box: let it be plained inch thick, which you may have cut into pieces according to the bigneſs of the figure you grave.

III. To draw the figures upon the wood.

Grinde white Lead very fine, and temper it with fair water; dip a cloth therein, and rub over one ſide of the wood, and let it dry throughly: This keepeth the Ink (if you draw therewith) that it run not about, nor ſink: and if you draw with Paſtils, it makes the ſtroaks appear more plain and bright.

IV. Having whited the wood as before (if it is a figure you would copy) black or red the blank ſide of the print or copy, and with a little ſtick or ſwallows quill, trace or draw over the ſtroaks of the figure.

V. But if you paſte the figure upon the wood, you muſt not then white it over (for then the figure will pill off) but only ſee the wood be well plained: then wipe over the printed ſide of the figure with Gum Tragacanth diſſolved in fair water, and clap it ſmooth upon the wood, which let dry throughly: then wet it a little all over, and fret off the paper gently, till you can ſee perfectly every ſtroak of the figure: dry it again, and fall to cutting or carving it.

CHAP.

CHAP. VII.

Of Etching, *and the Materials thereof.*

I. *Etching* is an artificial Engraving of Braſs or Copper plates with *Aqua fortis*.

II. The Inſtruments of Etching (beſides the plate) are theſe nine. 1. *Hard Varniſh.* 2. *Soft Varniſh.* 3. Prepared Oyl. 4. Aqua fortis. 5. Needles. 6. Oyl-ſtone. 7. *Braſh-penſil.* 8. *Burniſher.* 9. The Frame and Trough.

III. *To poliſh the Plate.*

Although in chap. 2. of this Book, we have ſufficiently taught how to poliſh the Plate, yet nevertheleſs we think it convenient to ſubjoyn theſe following words. Firſt, the Plate being well planiſhed or forged, choſe the ſmootheſt ſide to poliſh; then fix it upon a board a little declining, and rub it firmly and eavenly all over with a piece of Grindſtone, throwing water often on it, ſo long till there be no dints, flaws or marks of the hammer: waſh it clean, and with a piece of good Pumice ſtone, rub it ſo long till there be no rough ſtroaks or marks of the Grindſtone: waſh it clean again, and rub it with a fine Hoan and water, till the marks of the pumice ſtone are rubbed out: waſh it again, and with a piece of Charcoal without knots (being heat red hot and quenched in water, the outſide being pared off) rub the plate with water till all the ſmall ſtroaks of the Hoan be vaniſhed; laſtly, if yet there remain any ſmall ſtroaks or ſcratches, rub them out with the end of the burniſhing Iron, ſo ſhall the Plate be fitted for work.

IV. *To make the hard Varniſh for Etching.*

Take Greek or Burgundy Pitch, Colophonium or

Rozin, of each five ounces, Nut-oyl four ounces; melt the Pitch and Rozin in an earthen pot upon a gentle fire; then put in the Oyl, and let them boil for the ſpace of half an hour: Cool it a little upon a ſofter fire till it appear like a Glewy ſyrrup: cool it a little more, ſtrain it, and being almoſt cold, put it into a Glaſs bottle for uſe. Being thus made it will keep at leaſt twenty years.

V. *To make the ſoft Varniſh for Etching.*

Take Virgin-wax three ounces, Maſtich in drops two ounces, Aſphaltum one ounce: grind the Maſtich and Aſphaltum ſeverally very fine; then in an Earthen pot melt the Wax, and ſtrew in the Maſtich and Aſphaltum, ſtirring all upon the fire till they be well diſſolved and mixed, which will be in about half a quarter of an hour; then cooling it a little, pouring it into a baſin of fair water (all except the dregs) and with your hands wet (before it is cold) form it into rouls.

VI. *To make the prepared Oyl.*

Take Oyl Olive, make it hot in an Earthen pot, and put into it a ſufficient quantity of tried ſheeps ſuet (ſo much as being dropped upon a cold thing, the oyl may be a little hardened and firm) boil them together for an hour, till they be of a reddiſh colour, leſt they ſhould ſeparate when you uſe them. This mixture is to make the fat more liquid, and not cool ſo faſt, for the fat alone would be no ſooner on the pencil, but it would grow cold; and be ſure to put in more oyl in Winter than in Summer.

VII. *To make the Aqua fortis.*

Take diſtilled White-wine Vinegar three pints; Sal Armoniack, Bay-ſalt, of each ſix ounces; Vertegrieſe four ounces. Put all together into a large well glazed earthen pot (that they may not boil over) cover the

pot cloſe, and put it on a quick fire, and let it ſpeedily boil two or three great walms and no more; when it is ready to boil, uncover the pot, and ſtir it ſometimes with a ſtick, taking heed that it boil not over: having boiled, take it from the fire, and let it cool being cloſe covered, and when it is cold, put it into a glaſs bottle with a glaſs ſtopple: If it be too ſtrong in Etching, weaken it with a glaſs or two of the ſame Vinegar you made it of. There is another ſort of Aqua fortis, which is called Common, which is exhibited in *Synopſis Medicinæ*, *lib.* 3. *cap.* 7. *ſect.* 4. *pag.* 656. But becauſe that Book may not be in every mans hand, we will here inſert it; it is thus: Take dried Vitriol two pound, Salt-peter one pound; mix them and diſtil by a Retort, in open fire by degrees.

VIII. *To make the Etching Needles.*

Choſe Needles of ſeveral ſizes, ſuch as will break without bending, and of a fine grain; then take good round ſticks of firm wood (not apt to ſplit) about ſix inches long, and as thick as a large Gooſe quill, at the ends of which fix your Needles, ſo that they may ſtand out of the ſticks about a quarter of an inch or ſomething more.

IX. *To whet the points of the Needles with the Oyl ſtone.*

If you would have them whetted round, you muſt whet their points ſhort upon the oyl ſtone, (not as ſowing Needls are) turning them round whilſt you whet them, as Turners do. If you whet them ſloping, firſt make them blunt upon the oyl ſtone, then holding them firm and ſteady, whet them ſloping upon one ſide only, till they come to a ſhort and roundiſh oval.

X. The Bruſh pencil is to cleanſe the work, wipe off duſt, and to ſtrike the Colours eaven over the ground or varniſh, when laid upon the Plate.

XI. The burniſher is a well hardened piece of ſteel ſomewhat

ſomewhat roundiſh at the end. Its uſes are what we have ſpoken at the ſixth Section of the firſt Chapter, and the third Section of the ſecond Chapter.

XII. *To make the Frame and Trough.*

The Frame is an entire board, about whoſe top and ſides is faſtned a ledge two Inches broad, to keep the *Aqua fortis* from running off from the ſides when you pour it on: the lower end of this board muſt be placed in the Trough, leaning ſloping againſt a wall or ſome other thing, wherein you muſt fix ſeveral pegs of wood to reſt the plate upon. The Trough is made of a firm piece of Elm or Oak ſet upon four legs, whoſe hollow is four Inches wide; and ſo long as may beſt fit your uſe: the hollow muſt be ſomething deeper in the middle, that the water running thither may fall through a hole (there made for that purpoſe) into an earthen pan well leaded. *The inſide of this board and trough muſt be covered over with a thick oyl colour, to hinder the* Aqua fortis *from eating or rotting the board.*

CHAP. VIII.

The way and manner of uſing the hard Varniſh.

I. HAving well heat the poliſhed Plate over a chafing-diſh of coals, take ſome of the firſt varniſh with a little ſtick, and put a drop of it on the top of your finger, with which lightly touch the Plate at equal diſtances, laying on the varniſh equally, and heating the plate again as it grows cold, keeping it carefully from duſt or filth; then with the ball of your thumb tap it upon the plate; ſtill wiping your hand over all, to make it more ſmooth and equal.

And here beware that neither the varniſh be too thick upon the plate, nor your hand ſweaty.

II. Then take a great lighted candle burning clear, with a ſhort ſnuff, (placing the corner of the plate againſt a wall) hold the varniſhed ſide downward over the candle, as cloſe as you can, ſo it touch not the Varniſh, guiding the flame all over, till it is all perfectly black; which you muſt keep from duſt or filth till it is dry.

III. Over a fire of Charcoals hang the varniſhed plate to dry with the varniſh upwards, which will ſmoak; when the ſmoak abates, take away the plate, and with a pointed ſtick ſcratch near the ſide thereof, and if the varniſh eaſily comes off, hang it over the fire again a little, ſo long till the Varniſh will not too eaſily come off; then take it from the fire and let it cool.

If the varniſh ſhould be too hard, caſt cold water on the back-ſide of the plate to cool it, that the heat may not make it too hard and brittle. This done, —

IV. Place it upon a low desk, or ſome ſuch like thing, and cover that part which you do not work on, with a ſheet of fine white paper, and over that a ſheet of brown paper, on which may reſt your hand, to keep it from the varniſh.

V. If you uſe a ruler, lay ſome part of it upon the paper, that it may not rub off the varniſh; and have an eſpecial care, that no duſt or filth get in between the paper and the varniſh, for that will hurt it.

CHAP.

CHAP. IX.

The way and manner of Etching.

I. IN making lines or hatches, ſome bigger, ſome leſſer, ſtraight or crooked, you muſt uſe ſeveral ſorts of needles, bigger or leſſer as the work requires.

II. The great lines are made by leaning hard on the needle; its point being ſhort and thick, (but a round point will not cut the varniſh clear:) or, by making divers lines or hatches, one very cloſe to another, and then by paſſing over them again with a thicker needle; or, by making them with an indifferent large needle, and letting the *Aqua fortis* lie the longer thereon.

The beſt needles for this work are ſuch as are whet ſloping with an oval, becauſe their ſides will cut that which the round ones will not.

III. If your lines or hatches ought to be of an equal thickneſs from end to end, lean on the needle with an equal force; leaning lightly where you would have the lines or ſtroaks fine or ſmall; and more heavy where you would have the line appear deep or large; thereby the needle may have ſome Impreſſion in the Copper.

IV. If your lines or hatches be too ſmall, paſs over them again with a ſhort round point, of ſuch a bigneſs as you would have the line of, leaning ſtrongly where you would have the line deep.

V. The manner of holding the needle with Oval points (which are moſt proper to make large and deep ſtroaks) is much like that of a pen, only the flat ſide whetted is uſually held towards the thumb: but they may be uſed with the face of the Oval turned toward the middle finger.

VI. If you would end with a fine ſtroak, you ought to do that with a very fine needle.

VII. In uſing the Oval points, hold them as upright and ſtraight in your hand as you can, ſtriking your ſtroaks firmly and freely, for that will add much to their beauty and clearneſs.

VIII. In Landskips, in places fartheſt from the ſight, as alſo neareſt the light, uſe a very ſtender point, leaning ſo lightly with your hand as to make a ſmall faint ſtroak.

IX. In working be careful to bruſh off all the duſt which you work off with the needles.

CHAP X.

Of uſing the Aqua fortis.

I. IF there be any ſtroaks which you would not have the *Aqua fortis* eat into; or any places where the varniſh is rubbed off, melt ſome prepared Oyl, and with a pencil, cover thoſe places pretty thick.

II. Then take a bruſh, pencil, or rag, and dip it in the prepared oyl, and rub the back ſide of the plate all over, that the *Aqua fortis* may not hurt it, if by chance any ſhould fall thereon.

III. Before you put the *Aqua fortis* to the plate, gently warm or dry the plate by a fire to dry up the humidity, which it might contract by reaſon of the Air; and to prevent the breaking up the Varniſh upon the firſt pouring the *Aqua fortis* thereon.

IV. Place the plate by the 12th. Section of the 7th. Chapter of this book, and with the *Aqua fortis* in an Earthen pot pour upon the plate, begining at the top,

ſo

ſo moving your hand that it may run all over the plate, which do for eight or ten times: then turn it corner-wiſe, and pour the *Aqua fortis* on it that way ten or twelve times; and then turn it again corner-wiſe the other way, pouring on the *Aqua fortis* eight or ten times as before; doing thus ſeveral times for the ſpace of half a quarter of an hour or more, according to the ſtrength of the water, and nature of the Copper.

For there muſt be leſs time allowed to hard and brittle Copper for pouring on the Aqua fortis, *but more to the ſoft.*

V. But you muſt have ſpecial regard to caſt on the *Aqua fortis* as occaſion ſhall require, and work is; caſting it on at ſeveral times, and on ſeveral places; where you would have it very deep, often; where leſs deep fewer times: where light, leſs yet; where lighter, leſſer yet: and where ſo light as it can ſcarcely be ſeen, once or twice: waſh it with water, and cover it where you would have it lighter.

VI. Having thus covered your plates as occaſion requires; for the ſecond time, place the plate on the frame as aforeſaid, and pour on it your *Aqua fortis* for a full half hour.

VII. Then waſh it with water and dry it, covering the places which require lightneſs or faintneſs (that they may be proportionable to the deſign) then pour on the *Aqua fortis* for the laſt time more or leſs according to the nature of your work, and the deepneſs that it requires.

VIII. You may rub off the varniſh or ground, as occaſion in your work requires with a Charcoal, to ſee whether the water hath eaten deep enough; by which you may judge of the ſpace of time, that you are after to employ in pouring on the *Aqua fortis*, in the works you will have to do, which if the ſhadows

require much depth, or ought to be very black, the water ought to be poured on (at the leaſt time) for an hour or better; yet know *no certain rule of time can be limited for this.*

CHAP. XI.

Of Finiſhing the Work.

I. ALL the former operations being done, waſh the Plate with fair water; and put it wet upon the fire, till the mixture be well melted, and then wipe it very clean on both ſides with a linnen cloth, till you have cleanſed it of all the mixture.

II. Take Charcoal of Willow, take off the rind of it, and putting fair water on the plate, rub it with the Charcoal, as if you were to poliſh it, and it will take off the varniſh.

Where note, that the Coal muſt be free from all knots and roughneſs, and that no ſand or filth fall upon the plate.

III. Take ordinary *Aqua fortis*, to which add two third parts of water, and with ſome linnen rags dipped therein, rub the Plate all over, ſo will you take away its diſcolouring, and recover its former beauty.

IV. Then take dry linnen rags, and wipe the plate ſo as to take off all the aforeſaid water, and then holding it a little to the fire, put upon it a little oyl olive, and with a piece of an old Beaver rolled up rub the plate well all over, and laſtly wipe it well with a dry cloth.

V. Then if any places need touching with the Graver, as ſometimes it happens, eſpecially where it

is

is to be very deep or black, perfect them with care; which done, the plate is ready for the Rolling Preſs.

CHAP. XII.

The way of uſing the ſoft Varniſh.

THE Plate being prepared by cleanſing it with a Charcoal and clean water, waſh it well and dry it, then with fine white Chalk ſcraped and a fine rag, rub it well over, not touching it with your fingers.

II. Lay down your plate over a Chafing-diſh of ſmall coal, yet ſo as the fire may have air; then take the Ground or ſoft Varniſh (it being tyed up in a fine rag) and rub it up and down the Copper, ſo as it may ſufficiently cover it, (not too thin nor too thick:) then take a feather and ſmooth it as well as poſſibly you can all one way, and then croſs it, till it lie very well.

But you muſt take heed that the Plate be not too hot, for if it lie till the Ground ſmoak, the moiſture will be dried up, and that will ſpoil the work, and make the Ground break or fly up.

III. Then grind ſome white Lead with Gum water, ſo that it may be of a convenient thickneſs to ſpread on the Copper; and with a large pencil, or ſmall bruſh, ſtrike the Plate croſs over, twice or thrice till it is ſmooth; and then with a larger bruſh (made of Squirrels tails) gently ſmooth the white, and then let it lie till it is drie.

IV. Or

IV. Or you may black the Varniſh with a candle, as we taught at the ſecond Section of the eighth Chapter, and then warm it over the fire, till the varniſh begin to melt.

CHAP. XIII.

The way of Etching upon the ſoft Varniſh.

I. THE way of Etching is the ſame with that in the hard Varniſh; only you muſt be careful not to hurt your varniſh, which you may do by placing on the ſides of your plate two little boards, and laying croſs over them another thin one, ſo as that it may not touch the plate, on which you muſt reſt your hand whilſt your work.

II. Then place the plate on a Desk (if you ſo pleaſe) for by that means the ſuperfluous matter will fall away of it ſelf.

III. But if you have any deſign to transfer upon the plate from any Copy or Print, ſcrape on the backſide thereof ſome red Chalk all over; then go over that, by ſcraping ſome ſoft Charcoal, till it mingle with the Chalk; and with a large ſtiff pencil rub it all over till it be fine and eaven, and ſo lay down the deſign upon the plate: with a blunt Needle draw over the out ſtroaks: *and as you work, you need not ſcratch hard into the Copper, only ſo as you may ſee the Needle go through the Varniſh to the Copper.*

IV. Always be ſure when you leave the work, to wrap the Plate up in Paper, to keep it from hurt, and corrupting in the air, which may drie the varniſh: and in Winter time wrap the Plate up in a piece of wollen, as well as paper; for if the froſt get to it,

it, it will cauſe the Varniſh to riſe from the Copper in the eating.

An inconveniency alſo will accrew, by letting the Varniſh lie too long upon the Plate before the work is finiſhed; for three or four months will conſume the moiſture and ſo ſpoil all.

V. The marking of the deſign upon the ſoft varniſh, is beſt done with black Lead or Chalk, if the ground is white; but with red Chalk, if the ground is black.

VI. Having graved what you intend upon the varniſh, take ſome fair water, a little warm, and caſt it upon the plate; and then with a ſoft clean Sponge, rub upon the white Lead to moiſten it all over; and then waſh the plate to take away the whiting, and drie it.

VII. Or laſtly, with *Aqua fortis* mixed with fair water, waſh it all over, and by this means you may take away the whiting, which then waſh with common water and drie it; and thus have you the plate prepared for the *Aqua fortis*.

CHAP. XIV.

Of uſing the Aqua fortis, and finiſhing the work.

I. Put ſoft Wax (red or green) round the brims of the Plate, and let it be raiſed above the varniſh about half a Barley corns length; ſo that placing the plate level, the water being poured upon the Plate may by this means be retained. This done,

II. Take common *Aqua fortis* ſix ounces, Common water two ounces; mix them, and pour it gently upon

upon the plate, ſo that it may cover it fully all over; ſo will the ſtronger hatchings be full of bubbles, while the fainter will appear clear for a while, not making any ſudden operations to the view.

III. When you perceive the water to operate a ſmall time, pour it off into a glazed earthen diſh, and throw fair water upon the Plate, to waſh away the *Aqua fortis*, then drie the plate: and where you would have the Cut to be faint, tender or ſweet, cover it with the prepared Oil, and then cover the Plate again with *Aqua fortis* as before, leaving it on for eight or ten minutes, or longer: then put off the *Aqua fortis* as before, waſhing and drying the Plate, and covering with the prepared Oyl other places which you would not have ſo deep as the reſt: Laſtly, put on the *Aqua fortis* again, for the ſpace of half an hour (more or leſs) and then pour it off, waſhing the plate with fair water as before.

As you would have your lines or ſtrokes to be deeper and deeper, ſo cover the ſweeter or fainter parts by degrees with the prepared oyl, that the Aqua fortis may lie the longer on the deep ſtroaks. Then

IV. Take off the border of Wax, and heat the plate, ſo that the oyl and varniſh may throughly melt; which wipe away well with a linnen cloth: then rub the plate over with oyl Olive and a piece of an old beaver roll'd up, which done, touch it with the Graver where need is.

V. But if any thing be (at laſt) forgotten; then rub the plate aforeſaid with crums of bread, ſo well that no filth or oyl remain upon the Plate.

VI. Then heat the plate upon a Charcoal fire, and ſpread the ſoft varniſh with a feather upon it (as before) ſo that the hatchings may be filled with varniſh; black it, and then touch it over again, or add what you intend.

VII. Let

VII. Let your hatchings be made by means of the Needles, according as the manner of the work ſhall require, being careful before you put on the *Aqua fortis*, to cover the firſt graving on the Plate with the prepared Oyl (leſt the Varniſh ſhould not have covered all over:) then cauſe the *Aqua fortis* to eat into the work; and laſtly cleanſe the Plate as before.

CHAP. XV.

of Limning, *and the Materials thereof.*

I. LImning is an Art whereby in water Colours, we ſtrive to reſemble Nature in every thing to the life.

II. The Inſtruments and Materials thereof are chiefly theſe. 1. *Gums.* 2. *Colours.* 3. *Liquid Gold and Silver.* 4. *The Grindſtone and Muller.* 5. *Pencils.* 6. *Tables to Limn in.* 7. *Little glaſs or China diſhes.*

III. The *Gums* are chiefly theſe four, Gum Arabick, Gum Lake, Gum Hedera, Gum Armoniack.

IV. The principal *Colours* are theſe ſeven, *White*, *Black*, *Red*, *Green*, *Yellow*, *Blew*, *Brown*: out of which are made mixt or compound Colours.

V. The *Liquid Gold and Silver* is either natural or artificial.

The natural is that which is produced of the Metals themſelves: the Artificial is that which is formed of other colours.

VI. The *Grinding ſtone*, *Muller*, *Pencils*, *Tables*, *and Shells*, *or little China diſhes* are only the neceſſary inſtruments and attendants, which belong to the practice of Limning.

CHAP.

CHAP. XVI.

Of the Gumms and their Uſe.

I. THe chief of all is *Gum-Arabick*, that which is white, clear and brittle; the Gum-water of it is made thus:

Take Gum-Arabick, bruiſe it and tie it up in a fine clean linnen cloath, and put it into a convenient quantity of pure ſpring-water, in a glaſs or earthen veſſel; letting the Gum remain there till it is diſſolved; which done, if the water is not ſtiff enough, put more Gum into the cloath; but if too ſtiff, add more water: of which Gum-water have two ſorts by you, the one ſtrong, the other weak; of which you may make a third at pleaſure.

But if you be where Gum-Arabick is not to be got, you may inſtead of that uſe the preparation of ſheeps leather or parchment following.

Take of the ſhreds of white ſheep-skins (which are to be had plentifully at Glovers) or elſe of parchments, one pound; Conduit or running-water two quarts, boyl it to a thin gelly, then ſtrain it whilſt hot through a fine ſtrainer, and ſo uſe it.

II. *Gum-lake*; it is made of whites of Eggs beaten and ſtrained, a pint, Honey, Gum-hedera of each two Drachms, ſtrong wort four ſpoonfuls, mix them, and ſtrain them with a piece of ſponge till they run like a clear oyl, which keep in a clean veſſel till it grows hard.

This Gum will diſſolve in water like Gum-Arabick, of which Gum-water is made in like manner; it is a good ordinary Varniſh for Pictures.

III. *Gum-Hedera*, or Gum of Ivy; it is gotten out of Ivy, by cutting with an Axe a great branch thereof, climbing

climbing upon an Oak-tree, and bruiſing the ends of it with the head of the Axe; at a Months end, or thereabouts, you may take from it a very clear, and pure fine Gum, like oyl.

It is good to put into gold ſize and other colours, for theſe three reaſons: 1. *It abates the ill ſcent of the ſize*: 2. *It will prevent bubbles in gold ſize and other colours*: 3. *Laſtly, it takes the fat and clammineſs off colours: beſides which it is of uſe in making Pomanders.*

IV. *Gum Armoniacum*, It is a Forrein Gum, and ought to be brought ſtrained. *Grind it very fine with juyce of Garlick and a little Gum-Arabick water, ſo that it may not be too thick, but that you may write with it what you will*:

When you uſe it, draw what you will with it, and let it dry; and when you gild upon it, cut your Gold or Silver, to the faſhion which you drew with the ſize or gum; then breath upon the ſize, and lay the Gold upon it gently taken up, which preſs down hard with a piece of wool; and then let it well dry; being dryed, with a fine linnen cloath ſtrike off the looſe gold; ſo will what was drawn be fairly gilded if it was as fine as a hair: it is called Gold Armoniack.

CHAP. XVII.

Of the ſeven Colours in General.

I. THe chief *Whites* are theſe, Spodium, Ceruſe, White-lead, Spaniſh-white, Egg-ſhels burnt. *This Colour is called in Greek* λευκὸς *of* λεύσσω, video, *to ſee, becauſe* λευκοτὴς ὅτι διακριτικὸν ὄψεως, *whiteneſs (as Ariſtotle ſaid) is the object of ſight, in Latine* Albus, *from whence the* Alps *had their name, by reaſon of their*

their continual whiteneſs with Snow. The Spaniſh-white is thus made. Take fine Chalk three Ounces, Alom one Ounce, grind them together with fair water, till it be like pap; roul it up into balls, which dry leiſurely: then put them into the fire till they are red hot; take them out, and let them cool: *it is the beſt white of all, to garniſh with, being ground with weak gum-water.*

II. The chief *Blacks* are theſe, Hartſhorn burnt, Ivory burnt, Cherry-ſtones burnt, Lamp-black, Charcoal.

Black, in Latine Niger *is ſo called from the Greek word* νεκρὸς, *which ſignifies dead, becauſe putrified and dead things are generally of that colour.* Lamp-black *is the ſmoak of a Link, Torch or Lamp gathered together.*

III. The chief *Reds* are theſe; Vermilion, Red-lead, Indian-lake, Red-oker. *It is called in Latin* Ruber ἀπὸ τὴν ῥοὴν à corticibus vel granis mali punici; *from the Rinds or Seeds of Pomegranates, as* Scaliger *ſaith.*

IV. The chief *Greens* are theſe; Green Bice, Verdegrieſe, Verditure, Sapgreen. *This colour is called in Latine* Viridis *from* Vires: *in Greek* χλωρὸν à χλόη, *Graſs or Green herb, which is of this Colour.*

V. The chief *Yellows* are theſe; Orpiment, Maſticot, Saffron, Pink yellow, Oker de luce. *This colour is called in Latine* Flavus, Luteus; *in Greek* ξανθὸς, *which is* Homer's *Epithete for* Menelaus, *where he calls him* ξανθὸς Μενέλαος.

VI. The chief *Blews* are Ultramarine, Indico, Smalt, Blew bice. *This colour is called in Latine* Cæruleus, *in Greek* Κυάνεος à Κύανος, *the name of a ſtone, which yields* Ultramarine.

VII. The chiefeſt *Browns* are Umber, Spaniſh-brown, Colens Earth. *It is called in Latine* Fuſcus, quaſi φῶς σκιᾶται, *from darkening the Light, in Greek* φαιὸς.

CHAP.

CHAP. XVIII.

Of Colours in Particular.

I. CErufe, Grind it with glair of Eggs, and it will make a moſt perfect white.

II. *White-lead*, Grind it with a weak water of Gum-lake, and let it ſtand three or four days, after which if you mix with it Roſet and Vermilion, it makes a fair Carnation.

III. *Spaniſh-white*, It is the beſt white of all, to garniſh with, ground with weak Gum-water.

IV. *Limp black*, ground with Gum-water, it makes a good black.

V. *Vermilion*, Grind it with the glair of an Egg, and in the grinding put a little clarified honey, to make its colour bright and perfect.

VI. *Sinoper-lake*, it makes a deep and beautiful red, or rather purple, almoſt like unto a Red-roſe. Grind it with Gum-lake and Turnſole water: if you will have it light, add a little Cerufe, and it will make it a bright Crimſon; if to Diaper, add only Turnſole water.

VII. *Red-lead*, Grind it with ſome Saffron, and ſtiff Gum-lake; for the Saffron makes it orient, and of a Marigold colour.

VIII. *Turnſole*, Lay it in a Sawcer of Vinegar, and ſet it over a chafing-diſh of coals; let it boil, then take it off, and wring it into a Shell, adding a little Gum-Arabick, let it ſtand till it is diſſolved: It is good to ſhadow Carnation, and all Yellows.

IX. *Roſet*, Grind it with Brazil-water, and it will make a deep purple: put Ceruſe to it, and it will be lighter; grind it with Litmoſe, and it will make a fair Violet.

X. *Spaniſh brown*, Grind it with Brazil-water: mingle it with Ceruſe and it makes a horſe-fleſh Colour.

XI. *Bole Armoniack*, It is a faint Colour; its chief uſe is, in making ſize for burniſh'd gold.

XII. *Green bice*, Order it as you do blew bice; when it is moyſt, and not through dry, you may diaper upon it with the water of deep green.

XIII. *Verdegrieſe*, Grind it with juyce of Rue, and a little weak gum-water, and you will have a moſt pure green: if you will diaper with it, grind it with Lye of Rue (or elſe the decoction thereof) and there will be a hoary green: Diaper upon Verdegrieſe green with ſap-green: alſo Verdegrieſe ground with white Tartar, and then tempered with gum-water, gives a moſt perfect green.

XIV. *Verditure*, grind it with a weak Gum-Arabick water: it is the fainteſt green that is, but is good to lay upon black, in any kind of drapery.

XV. *Sap-green*, lay it in ſharp vinegar all night; put it into a little Alom to raiſe its colour, and you will have a good green to diaper upon other greens.

XVI. *Orpiment*, *Arſenicum* or *Auripigmentum*, grind it with a ſtiff water of Gum-lake, becauſe it is the beſt colour of it ſelf; it will lie upon no green, for all greens, white and red lead, and Ceruſe ſtain it: wherefore you muſt deepen your colours ſo that the Orpiment may be higheſt, and ſo it may agree with all Colours.

XVII. *Maſticot*, Grind it with a ſmall quantity of Saffron in gum-water, and never make it lighter than it is: it will endure to lie upon all colours and metals.

XVIII. *Saffron*, Steep it in Glair: it may be ground with Vermilion.

XIX. *Pink-yellow*, If you would have it ſad coloured, grind it with Saffron; if light, with Ceruſe: mix it with weak gum-water, and ſo uſe it.

XX. *Oker*

XX. *Oker de Luce*, Grind it with pure Brazil-water: it makes a paſſing hair colour; and is a natural ſhadow for gold.

XXI. *Umber*, It is a more ſad colour. Grind it with gum-water, or gum-lake; and lighten it (if you pleaſe) with a little Ceruſe and a blade of Saffron.

XXII. *Ultramarine*, If you would have it deep, grind it with Litmoſe-water; but if light, with fine Ceruſe, and a weak Gum-Arabick water.

XXIII. *Indico*, Grind it with water of Gum-Arabick, as Ultramarine.

XXIV. *Blew bice*, Grind it with clean water, as ſmall as you can, then put it into a ſhell, and waſh it thus: put as much water to it as will fill up the veſſel or ſhell, and ſtir it well, let it ſtand an hour, and the filth and dirty water caſt away; then put in more clean water, do thus four or five times; and at laſt put in Gum-Arabick water ſomewhat weak, that the Bice may fall to the bottom; pour off the gum-water, and put more to it, waſh it again, drie it, and mix it with weak gum-water (if you would have it riſe of the ſame colour) but with a ſtiff water of Gum-lake, if you would have a moſt perfect blew; if a light blew, grind it with a little Ceruſe; but if a moſt deep blew, add water of Litmoſe.

XXV. *Smalt*, Grind it with a little fine Roſet, and it will make a deep Violet: and by putting in a quantity of Ceruſe, it will make a light Violet.

XXVI. *Litmoſe blew*, Grind it with Ceruſe: with too much Litmoſe it makes a deep blew; with too much Ceruſe, a light blew: grind it with the weak water of Gum-Arabick.

Take fine Litmoſe, cut it in pieces, lay it in weak water of Gum-lake for twenty four hours, and you ſhall have a water of a moſt perfect Azure; with which water you may

Diaper and Damask, upon all other blews, to make them ſhew more fair and beautiful.

XXVII. *Orchal*, Grind it with unſlak'd Lime and Urine, it makes a pure Violet: by putting to more or leſs Lime, you may make the Violet light or deep as you pleaſe.

CHAP. XIX.

Of Mixt and Compound Colours.

I. *Murry*, It is a wonderful beautiful colour, compoſed of purple and white: it is made thus. Take *Sinaper-lake two ounces; white Lead one ounce; grind them together.* See the 24 Section.

II. *A Gliſs grey*, Mingle Ceruſe with a little Azure.

III. *A Bay colour*, Mingle Vermilion with a little Spaniſh brown and black.

IV. *A deep Purple*, It is made of Indico, Spaniſh brown and white

It is called in Latine Purpureus, *in Greek* πορφύρεος *from* πόρφυρος, *a kind of ſhell fiſh that yields a liquour of that colour.*

V. *An Aſh colour, or Grey*, It is made by mixing white and Lamp-black; or white with Sinaper, Indico and black make an Aſh colour.

It is called in Latine Cæſius, *and* color Cinerius; *in Greek* γλαυκὸς and τεφρώδης.

VI. *Light Green*, It is made of Pink and Smalt; with white to make it lighter if need require.

VII. *Saffron colour*, It is made of Saffron alone by infuſion.

VIII. *Flame colour*, It is made of Vermilion and Orpiment,

Orpiment, mixed deep or light at pleaſure: or thus Take red Lead and mix it with Maſticote, which heighten with white.

IX *A Violet Colour*, Indico, white and Sinaper Lake make a good Violet. So alſo Cerüſe and Litinoſe, of each equal parts.

X. *Lead colour*, It is made of White mixed with Indico.

XI. *Scarlet colour*, It is made of Red Lead, Lake, Vermilion: yet Vermilion in this caſe is not very uſeful.

XII. *To make Vermilion.*

Take Brimſtone in powder one ounce, mix it with Quickſilver a pound, put it into a Crucible well luted, and upon a Charcoal fire heat it till it is red hot; then take it off and let it cool.

XIII. *To make a bright Crimſon.*

Mix tincture of Brazil with a little Ceruſe ground with fair water.

XIV. *To make a ſad Crimſon.*

Mix the aforeſaid light Crimſon with a little Indico ground with fair water.

XV. *To make a pure Lake.*

Take Urine twenty pound, boil it in a Kettle and ſcum it with an Iron Scummer till it comes to ſixteen pound; to which add gum Lake one pound, Alom five ounces; boil all till it is well coloured, which you may try by dipping therein a piece of linnen cloth; then add ſweet Alom in powder a ſufficient quantity, ſtrain it and let it ſtand; ſtrain it again through a dry cloth till the liquor be clear: that which remains in the cloth or bag is the pure Lake.

XVI. *To make a Crimſon Lake.*

It is uſually made of the flocks ſhorn off from Crimſon cloth by a Lye made of Salt-peter, which extracts the colour; which precipitate,

edulcorate, and dry in the Sun or a Stove.

XVII. *A pure Green.*

Take white Tartar and Verdegrieſe, temper them with ſtrong white Wine Vinegar, in which a little gum Arabick hath been diſſolved.

XVIII. *A pure Violet.*

Take a little Indico and tincture of Brazil, grind them with a little Ceruſe.

XIX. *A pure Purple colour.*

Take fine Brimſtone an ounce and an half, Quickſilver, Sal Armoniack, Jupiter, of each one ounce; beat the Brimſtone and Salt into powder, and make an Amalgamie with the Quickſilver and Tinn, mix all together, which put into a great glaſs Goard; make under it an ordinary fire, and keep it in a conſtant heat for the ſpace of ſix hours.

XX. *To make a Yellow Colour.*

Take the yellow chives in white Lilies, ſteep them in gum water, and it will make a perfect yellow; the ſame from Saffron and Tartar tempered with gum water.

XXI. *To make a Red colour.*

Take the roots of the leſſer Bugloſs, and beat them, and ſtrain out the juice, and mix it with Alom water.

XXII. *To make excellent good Greens.*

The Liver of a Lamprey makes an excellent and durable graſs green: and yellow laid upon blew will change into green: ſo likewiſe the juice of a blew Flower-de-luce, mixed with gum water, will be a perfect and durable green or blew, according as it is uſed.

XXIII. *To make a Purple colour.*

Take the juice of Bilberries and mix it with Alom and Galls, and ſo paint with it.

XXIV. *To make a good Murry.*

Temper Roſſet with a little Roſe water, in which a little

little gum hath been diſſolved, and it will be good; but not exceeding that at the firſt Section of this Chapter.

XXV *To make Azure or Blew.*

Mix the Azure with glew water, and not with gum water.

XXVI. *To make a Yellow, Green, or Purple.*

Buckthorn Berries gathered green and ſteeped in Alom water yield a good yellow: but being through ripe and black (by the eighteenth Section of the twenty firſt Chapter of the third Book) they yield a good green: and laſtly, being gathered when they are ready to drop off, which is about the middle or end of November, their juice mixt with Alom water yields a good purple colour.

CHAP. XX.

Of Colours for Drapery.

I. FOR *Yellow garments.* Take Maſticot deepned with brown Oker and red Lead.

II. *For Scarlet.* Take Vermilion deepned with Sinaper lake, and heightned with touches of Maſticot.

III. *For Crimſon.* Lay on Lake very thin, and deepen with the ſame.

IV. *For Purple.* Grinde Lake and Smalt together: or take blew Bice, and mix it with red and white Lead.

V. *For an Orient Violet.* Grind Litmoſe, blew Smalt, and Ceruſe; but in mixture let the blew have the upper hand.

VI. *For Blew.* Take Azure deepned with Indie blew; or Lake heightned with white.

VII. *For black Velvet.* Lay the garment firſt over

with Ivory black, then heighten it with Cherryſtone black, and a little white.

VIII. *For black Sattin.* Take Cherryſtone black; then white deepned with Cherryſtone black; and then laſtly, Ivory black.

IX. *For a pure Green.* Take Verdegrieſe, bruiſe it, and ſteep it in Mulcadine for twelve hours, then ſtrain it into a ſhell, to which add a little Sap green: (but put no gum thereto.)

X. *For a Carnation.* Grind Ceruſe, well waſhed, with red Lead; or Ceruſe and Vermilion.

XI. *For Cloth of Gold.* Take brown Oker, and liquid Gold water, and heighten upon the ſame with ſmall ſtroaks of Gold.

XII. *For white Sattin.* Take firſt fine Ceruſe, which deepen with Cherryſtone black, then heighten again with Ceruſe, and fine touches where the light falleth.

XIII. *For a ruſſet Sattin.* Take Indy blew and Lake, firſt thin, and then deepned with Indy again.

XIV. *For a hair Colour.* It is made out of Maſticot, Umber, yellow Oker, Ceruſe, Oker de Rous, and Sea-coal.

XV. *For a Popinjay green.* Take a perfect green mingled with Maſticot.

XVI. *For changeable Silk.* Take water of Maſticot and red Lead; which deepen with Sap green.

XVII. *For a light Blew.* Take blew Bice, heightned with Ceruſe or Spodium.

XVIII. *For to ſhadow Ruſſet.* Take Cherryſtone black, and white; lay a light ruſſet, then ſhadow it with white.

XIX. *For a Skie colour.* Take blew Bice and Venice Ceruſe: but if you would have it dark, take ſome blew and white.

XX. *For a Straw colour.* Take Maſticot; then white heightened with Maſticot, and deepned with Pink. Or thus. Take red Lead deepned with Lake.

XXI. For Yellowiſh. Thin Pink deepned with pink and green: Orpiment burned makes a Marigold colour.

XXII. For a Peach colour. Take Brazil water, Log water and Ceruſe.

XXIII. For a light Purple. Mingle Ceruſe with Logwood water: or take Turnſole mingled with a little Lake, Smalt and Bice.

XXIV. For a Walnut colour. Red Lead thinly laid, and ſhadowed with Spaniſh brown.

XXV. For a Fire colour. Take Maſticot, and deepen it with Maſticot for the flame.

XXVI. For a Tree. Take Umber and white, wrought with Umber, deepned with black.

XXVII. For the Leaves. Take Sap green and green Bice, heighten it with Verditure and white.

XXVIII. For Water. Blew and white, deepned with blew, and heightned with white.

XXIX. For Banks. Thin Umber, deepned with Umber and black.

XXX. For Feathers. Take Lake frizled with red Lead.

CHAP. XXI.

Of Liquid Gold and Silver.

I. *Liquid Gold or Silver.*

Take five or ſix leaves of Gold or Silver, which grind

grind (with a ſtiff gum Lake water, and a good quantity of ſalt) as ſmall as you can; then put it into a vial or glazed veſſel; add ſo much fair water as may diſſolve the ſtiff gum water; then let it ſtand four hours, that the gold may ſettle: decant the water, and put in more, till the gold is clean waſhed: to the gold put more fair water, a little ſal Armoniack and common ſalt, digeſting it cloſe for four days; then put all into a piece of thin Glovers leather (whoſe grain is peeled off) and hang it up, ſo will the ſal Armoniack fret away, and the gold remain behind, which keep.

Or thus. *Grind fine leaf Gold with ſtrong or thick gum water very fine; and as you grind add more thick gum water; being very fine, walh it in a great ſhell, as you do lice: then temper it with a little quantity of Mercury ſublimate, and a little diſſolved gum to bind it in the ſhell; ſhake it, and ſpread the Gold about the ſides thereof, that it may be all of one colour and fineneſs, which uſe with fair waters, as you do other Colours. The ſame obſerve in liquid Silver; with this obſervation, That if your Silver, by length of time, or humidity of the air becomes ruſty; then cover the place with juice of Garlick before you lay on the Silver, which will preſerve it.*

When you uſe it, temper it with glair of eggs, and ſo uſe it with pen or pencil. Glair of Eggs is thus made. Take the whites and beat them with a ſpoon, till that riſe all in a foam; then let them ſtand all night, and by morning they will be turned into clear water, which is good glair.

II. *Argentum Muſicum.*

Take one ounce of tin, melt it, and put thereto of Tartar and Quickſilver of each one ounce, ſtir them well together until they be cold, then beat it in a mortar and grind it on a ſtone; mix it with gum water, write therewith, and afterwards poliſh it.

III. *Burniſhed Gold or Silver.*

Take

Take gum-lake and diſſolve it into a ſtiff water; then grind a blade or two of Saffron therewith, and you ſhall have a fair gold: when you have ſet it, being throughly dry, burniſh it with a dogs tooth. Or thus, having writ with your pen or pencil what you pleaſe, cut the Leaf Gold or Silver into pieces, according to the draught, which take up with a feather and lay it upon the drawing, which preſs down with a piece of wool; and being dry, burniſh it.

IV. *Gold Armoniack.*

This is nothing but that which we have taught at the fourth Section of the ſixteenth Chapter of this Book.

V. *Size for burniſhed Gold.*

Take Bole Armoniack three drachms, fine Chalk one drachm; grind them as ſmall as you can together with fair water, three or four times, letting it dry after every time: then take glair and ſtrain it as ſhort as water, with which grind the Bole and Chalk, adding a little gum Hedera, and a few blades of Saffron: grind all as ſmall as poſſible, and put them into an Ox horn (I judge a glaſs veſſel better) and ſet it to rot in horſe dung for ſix weeks; then take it up, and let it have air, and keep it for uſe.

Its uſe is for gilding parchments, book covers, and leather, thus; lay this ſize firſt upon the parchment, then with a feather lay the Gold or Silver upon it, which when dry, burniſh it.

VI. *To diaper on Gold or Silver.*

You muſt diaper on Gold with Lake and yellow Oker: but upon Silver with Ceruſe.

VII. *Aurum Muſicum.*

Take fine Cryſtal, Orpiment, of each one ounce, beat each ſeverally into a fine powder, then grind them together well with glair.

You

white fall: *Impudence* in a party coloured garment: *Audacity* in bluſh colour.

XII. *Honour* in a purple robe wrought with gold: *Liberty* in white: *Safety* in Carnation

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CHAP. XVII.

Of Colours for Painting Glaſs.

I. *Yellow.* Take a very thin piece of pure fine ſilver, and dip it into melted brimſtone; take it out with a pair of plyers, and light it in the fire, holding it, till it leaves burning; then beat it to powder in a braſen mortar; then grind it with Gum Arabick water, and a little yellow Oker.

II. *Yellow.* Take fine ſilver one Drachm, Antimony in powder two drachms, put them in a hot fire, in a crucible for half an hour, and then caſt it into a braſs mortar, and beat it into powder, to which add yellow Oker ſix Drachms, old earth of ruſty Iron ſeven Drachms, grind all well together.

This is fairer than the former.

III. *White* This is the colour of the glaſs it ſelf; you may diaper upon it with other glaſs or Cryſtal ground to powder.

IV. *Black.* Take Jet and Scales of Iron, and with a wet feather take up the Scales that fly from the Iron, after the Smith hath taken his heat, grind them with gum water.

V. *Black.* Take Iron ſcales, Copper ſcales of each one Drachm, heat them red hot in a clean fire ſhovel; then take Jet half a Drachm, firſt grind them ſmall and temper them with gum water.

VI. *Red*

VI. *Red.* Take *Sanguis Draconis* in powder, put to it rectified ſpirit of wine; cover it cloſe a little while, and it will grow tender; wring it out into a pot, that the droſs may remain in the cloth; the clear preſerve for uſe. This is a fair red.

VII. *Carnation.* Take tin glaſs one ounce; jet three ounces: red oker five ounces: gum two drachms, grind them together. It is a fair Carnation.

VIII. *Carnation.* Take jet four Drachms: tin glaſs or litharge of ſilver two Drachms: gum, and ſcales of Iron of each one Drachm, red chalk one ounce, grind them.

IX. *Green.* Take Verdigrieſe and grind it well with Turpentine; and put it into a pot; warming it at the fire, when you uſe it.

X. *Blew.* Provide the cleareſt leads you can get of that colour, beat them to powder in a brazen mortar; take Goldſmiths Amel of the ſame colour, clear and tranſparent, grind each by it ſelf, take two parts of lead, and one of Amel, grind them together as you did the ſilver. *The ſame underſtand of Red and Green.*

CHAP. XVIII.

Of the way of Painting upon Glaſs.

I. THere are two manner of ways of painting upon glaſs; the one is for oyl colour, the other for ſuch colours, as are afterwards to be annealed or burnt on.

II. To lay oyl colours upon glaſs, you muſt firſt grind them with Gum water once, and afterwards temper it with Spaniſh Turpentine, lay it on and let it dry by the fire, and it is finiſhed.

III. To anneal or burn your glaſs, to make the colours abide, you muſt make a four ſquare brick furnace, eighteen inches broad and deep; lay five or ſix croſs Iron bars on the top of it, and raiſe the furnace eighteen inches above the bars: then laying a plate of Iron over the bars, ſift (through a ſive) a lay of ſlack'd lime over the plate, upon which lay a row of glaſs; upon that a bed of lime, and upon that lime, another row of glaſs; thus continue *ſtratum ſuper ſtratum*, till the furnace is full.

IV. Lay alſo with every bed of glaſs a piece of glaſs; which you may wipe over with any Colour (theſe are called watches;) and when you think your glaſs is burnt enough, with a pair of pliers take out the firſt and loweſt watch, and lay it on a board, and being cold, try if you can ſcrape off the Colour, if it hold faſt on, take out that row; always letting it abide the fire till the colour will not ſcrape off.

CHAP. XIX.

Of Waſhing, and the Materials thereof.

I. BY waſhing, here we intend nothing elſe, but either to ſet out Maps or Printed Pictures in proper Colours, or elſe to varniſh them.

II. The Inſtruments and materials of waſhing are chiefly ſix, to wit, 1. *Alom-water*, 2. *Size*, 3. *Liquid Gold*, 4. *Pencils*, 5. *Colours*, 6. *Varniſh*.

III. *To make Alom water.* Take Alom eight ounces, fair water a quart, boil them till the Alom is diſſolved.

IV. *To make ſize.* Take glew, which ſteep all night in

in water, then melt it over the fire, to ſee that it be neither too ſtrong nor too weak: then ſet a little of it cool; if it be too ſtiff when it is cold, put more water to it, if too weak more glew, uſing it lukewarm.

V. *Liquid Gold.* It is exactly made by the firſt Section of the 21 Chapter of the ſecond Book.

VI. *Pencils* are to be of all ſorts both fitch'd and pointed; as alſo a large pencil bruſh to paſt Maps upon Cloth; another to wet the paper with Alom water; a third to ſtarch the face of the picture withal before it be coloured; and a fourth to varniſh withal.

VII. The colours are the ſame with thoſe which we mentioned in *Chap.* 17. *lib.* 2. to which add, 1. *Of Black*, Printers black, Franckford black, 2. *Of Red*, Vermilion, Roſſet, 3. *Of Blew*, Verditure, Litmos, Flory, 4. *Of Yellow*, Cambogia, Yellow berries, Orpiment, 5. Brazil, Logwood (ground) and Turnſole, Cochenele, Madder.

CHAP. XX.

Of Colours ſimple for Waſhing.

I. *Printers black.* Vermilion, Roſſet, Verditure, and Orpiment are to be ground, as we have taught at the fifth Section of the 22 Chapter of the ſecond Book.

II. *Brazil.* To ſome ground Brazil put ſmall Beer and Vinegar, of each a ſufficient quantity, let it boil gently a good while, then put therein Alom in powder to heighten the Colour, and ſome gum Arabick to bind it; boil it till it taſte ſtrong on the tongue, and make a good red.

III. *Logwood.* Ground Logwood boiled as Brazil,

CHAP. XXIX.

Of Metals.

I. *To harden Quick-ſilver.*

Caſt your Lead ſeparated from its droſs into a veſſel, and when it begins to cool, thruſt in the point of a ſtick, which take out again and caſt in the Argent Vive, and it will congeal: then beat it in a mortar, and do ſo often; when it is hard, melt it often, and put it into fair water, doing it ſo long till it is hard enough, and may be hammered.

II. *To tinge Quick-ſilver of the colour of gold.*

Break it into ſmall pieces (being hardned) which put into a crucible, with the powder of *Cadmia*, *ſtratum ſuper ſtratum*, mixed with pomegranate peels, Turmerick (beaten fine) and Raiſons; cover the crucible and lute it well, dry it well; and then ſet it on a fire for ſix or ſeven hours, that it may be red hot; then blow it with bellows till it run, which then let cool whileſt covered with coles, and it will have the colour of gold.

III. *To fix Quick-ſilver being hardned.*

This is done with fine powder of Cryſtal glaſs, laid with the metal *ſtratum ſuper ſtratum* in a crucible covered and luted; heating it all over red hot, and then melting of it.

IV. *To make Quick-ſilver malleable.*

Firſt harden it by the firſt Section, then break the metal into ſmall pieces, and boil it a quarter of an hour in ſharp vinegar: then add a little Sal Armoniack, and digeſt all together for ten or twelve days; then boil all together in a luted crucible, till it is red hot, and by degrees

degrees crack: laſtly, hang the Mercury in a pot with brimſtone at bottom to cover it; lute it and ſet it into the fire, that it may grow hot by degrees, and receive the fume of the Sulphur; do thus for a month once a day, and the Mercury will run and be hammered.

V. *Another way of tinging* Mercury.

Take purified Mercury one ounce, *Sulphur* two ounces, *Aqua fortis* three ounces, let them all ſtand till the water grow clear; diſtill this with its ſediment, and at bottom of the Limbeck: you ſhall find the Mercury hard, and of an exact colour.

VI. *To colour and ſoften Gold.*

Diſſolve Verdigrieſe in Vinegar, and ſtrain it through a felt, then congeal, and when it begins to wax thick, put to it ſome Sal armoniack, and let it harden a good while, then melt gold with it, and it will heighten the colour and make it ſoft.

VII. *To make Gold and Silver ſofter.*

Take Mercury Sublimate, Sal armoniack, of each alike, powder them, melt the gold, and put to it a little of this powder, and it will be ſoft.

VIII. *Another way to do the ſame.*

Take Vitriol, Verdet, Sal Armoniack, burnt braſs of each half an ounce, mix them with Aqua fortis, let it ſo repoſe in the heat two days, then let it harden, do thus three times with Aqua fortis, and let it dry, make it into powder, to one dram put one ounce of gold three times and it will be ſofter.

IX. *Another way to do the ſame in ſilver.*

Take Salt-peter, Tartar, Salt, Verdet, boil all together, till the water is conſumed, then put to it Urine, and let it ſo conſume, and you ſhall have an oyl, which put into melted ſilver will do the ſame.

Or thus, *Take as many wedges as you have melted, put them one night into a crucible in a furnace, but ſo as they*

melt

melt not, and they will be ſoft and fair.

Or thus, *Take honey, oyl, of each alike, in which quench the Gold or Silver three or four times, and it will be ſofter.*

Or thus, *Take Maſtich, Frankincenſe,* Myrrh, *Borax, Vernix, of each alike, all in powder.*

Or thus, *Quench the Gold or ſilver in water of Sal armoniack, and it will be ſoft.*

X. *To tinge ſilver of a golden colour.*

Take fine gold, fine ſilver, good braſs, and braſs or copper calcin'd with Sulphur vive, of each alike, melt them down together, and it ſhall appear to be gold of eighteen carets fine.

XI. *Another way to tinge ſilver.*

Take Quick-ſilver purged three ounces, leaf gold one ounce, mix them and put them into a glaſs Retort well luted, put it on the fire till it grow hot; then take it off, and add to it Quick-ſilver purged two ounces, *Sal Armoniack* one ounce, *Sal Ellebrot* half an ounce, *Borax* two drachms; then ſeal up the glaſs hermetically, and put it into a continuual fire for three days; then take it out, let it cool, open the retort, take out the matter, and powder it very fine: of which powder mix one ounce with ſilver five ounces, and it will tinge it into a good gold colour.

Note, Sal Ellebrot is thus made. Take pure common Salt, Sal Gem, Sal alcaly in powder, of each one ounce, juice of mints four ounces, ſpring water four pound, mingle them, and evaporate. And Quick-ſilver is purged by waſhing it in ſharp vinegar three or four times and ſtraining it; or by ſubliming it which is better.

XII. *To bring ſilver into a calx.*

This is done by amalgamating of it with Quick-ſilver, and then ſubliming of it; or by diſſolving it in *Aqua fortis*, and precipitating it with the ſolution of

ſalt

ſalt in fair water, and then waſhing it with warm water often to free it from the ſalts: or elſe by mingling the fillings with ſublimed Mercury, and in a retort cauſing the Mercury to aſcend, which will leave at bottom the Calx of ſilver, fit for jewels, &c.

XIII *To blanch Silver.*

Take *Sal armoniack*, *Roch alom*, *Alom plumoſum*, *Sal gem*, *Argal*, *Roman Vitriol*, *of each alike*; powder and mix them, and diſſolve them in fair water, in which boil the ſilver ſo long, till you ſee it wonderful white.

XIV. *To colour ſilver of a Gold colour.*

Take Salt-peter two pound, Roch Alom five pound, mingle, and diſtil them, keeping the water for uſe. When you uſe it, melt the Silver, and quench it in the ſaid water.

XV. *To tinge Braſs of a Gold Colour.*

Diſſolve burnt braſs in *Aqua fortis* (made of Vitriol, Salt-peter, Alom, Verdigrieſe, and Vermilion) and then reduce it again, and it will be much of a gold colour.

XVI. *To make Braſs through white.*

Heat Braſs red hot, and quench it in water diſtilled from Sal Armoniack, and Egg-ſhells ground together, and it will be very white.

XVII. *To make Braſs white otherwiſe.*

Take egg-ſhells and calcine them in a crucible, and temper them with the whites of eggs, let it ſtand ſo three weeks; heat the braſs red hot, and put this upon it.

XVIII. *To make Braſs.*

Take Copper three pounds. *Lapis Calaminaris* one pound in powder, melt them together the ſpace of an hour, then put it out.

XIX. *The way to colour Braſs white.*

Diſſolve a peny weight of Silver in *Aqua fortis*, putting

ting it to the fire in a veſſel, till the Silver turn to water; to which add as much powder of white Tartar as may drink up all the water, make it into Balls, with which rub any Braſs, and it will be white as ſilver.

XX. *To tinge Copper of a gold Colour.*

Take Copper, *Lapis Calaminaris*, of each four drachms, Tutty two drachms; heat the Copper red hot twice, quenching it in piſs; doing the like by the *Lapis* and Tutty: take of the diſſolved Copper half an ounce, adding to it Honey one ounce, boil them till the Honey look black and is dry that it may be powdered, which then beat with the *Lapis* and Tutty: boil them again, till the Copper is melted and it is done.

XXI. *Another way to make Copper of a gold Colour.*

Take the Gall of a Goat, Arſnick, of each a ſufficient quantity, and diſtil them; then the Copper being bright being waſhed in this water, will turn into the Colour of gold.

XXII. *Another way to do the ſame.*

Melt Coppper, to which put a little *Zink* in filings, and the Copper will have a glorious golden colour.

XXIII. *To make Copper of a white colour.*

Take Sublimate, Sal Armoniack, of each alike; boil them in Vinegar, in which quench the Copper being made red hot, and it will be like Silver.

XXIV. *Another way to whiten Copper.*

Heat it red hot divers times, and quench it in oyl of Tartar *per deliquium*, and it will be white.

XXV. *Another way to whiten Copper.*

Take Arſnick three ounces, Mercury Sublimate two ounces, Azure one ounce, mix them with good and pure greaſe like an ointment, with which anoint any Copper veſſel, then put that veſſel into another, and ſet it into a digeſtive heat for two months, after which cleanſe it with a bruſh and water and it is done.

XXVI. A-

XXVI. *Another way to whiten Copper.*

Take Arſnick calcined with Salt-peter, and Mercury Sublimate, which caſt upon melted Copper, and it will be white like Silver.

XXVII. To ſoften Copper.

Melt burnt Braſs with *Borax in a crucible*, quench it in Linſeed oyl, and then beat it gently on an Anvil; boil it again and quench it in oyl as before, doing thus five or ſix times, till it is ſoft enough; and this will neatly unite with Gold, of which you may put in more by half than you can of other Braſs.

XXVIII. To tinge with Iron a gold colour.

Lay in a crucible plates of Iron and Brimſtone, *ſtratum ſuper ſtratum*, cover and Lute it well, and calcine in a fornace, then take them out and they will be brittle: put them into a pot with a large mouth, and put in ſharp diſtilled Vinegar, digeſting till they wax red over a gentle heat: then decant the Vinegar, and add new, thus doing till all the Iron be diſſolved; evaporate the moiſture in a glaſs Retort or *Veſica*, and caſt the remaining powder on Silver, or other white Metal, and it will look like Gold.

XXIX. To make Iron or Silver of a Braſs Colour.

Take Flowers of Braſs, Vitriol, *Sal armoniack*, of each alike in fine powder; boil it half an hour in ſtrong Vinegar, take it from the fire, and put in Iron or Silver, covering the veſſel till it be cold, and the metall will be like to Braſs, and fit to be gilded: or rub poliſhed Iron with *Aqua fortis* in which filings of Braſs is diſſolved.

XXX. To tinge Iron into a Braſs colour.

Melt the Iron in a crucible caſting upon it *Sulphur vive*, then caſt it into ſmall rods, and beat it into pieces (for it is very brittle) then in *Aqua fortis* diſſolve it, and evaporate the *menſtruum*, reducing the powder by a ſtrong fire into a body again, and it will be good Braſs.

XXXI.

XXXI. To whiten Iron.

First purge it, by heating it red hot and quenching it in a water made of Ly and Vinegar, boiled with Salt and Alom, doing this ſo often till it is ſomewhat *whitened.* The fragments of the Iron beat in a mortar till the Salt is quite changed, and no blackneſs is left in the Liquor of it, and till the Iron is cleanſed from its droſs: then *Amalgamate* Lead and Quick-ſilver together, and reduce them into a powder; lay the prepared plates of Iron and this powder *ſtratum ſuper ſtratum* in a Crucible, cover it, and lute it all over very ſtrongly, that the leaſt fume may not come forth, and put it into the fire for a day; at length encreaſe the fire, ſo as it may melt the Iron (which will quickly be) and repeat this work till it is white enough: It is whitened alſo by melting with Lead, the Marchaſit or fire-ſtone and *Arſnick.* If you mix a little ſilver (with which it willingly unites) with it, it gives a wonderful whiteneſs, ſcarcely ever to be changed any more, by any art whatſoever.

XXXII. To keep Iron from Ruſting.

Rub it over with Vinegar mixt with Ceruſe; or with the marrow of a Hart: if it be ruſty, oyl of Tartar *per deliquium* will preſently take it away and cleanſe it.

XXXIII. To cleanſe Braſs.

Take *Aqua fortis* and water of each alike; ſhake them together, and with a woolen rag dipt therein, rub it over: then preſently rub it with an oyly cloth; laſtly with a dry woolen cloth dipt in powder of *Lapis Calaminaris*, it will be clear and bright as when new.

XXXIV. To ſoften Iron.

Take Alom, *Sal armoniack*, *Tartar*, of each alike, put them into good Vinegar, and ſet them on the fire, heat the Iron, and quench it therein: or quench it four

of

or five times in oyl, in which melted Lead hath been put ſix or ſeven times.

XXXV. To make Iron of a Gold colour.

Take Alom of Melancy in powder, Sea water; mix them: then heat the Iron red hot, and quench it in the ſame.

XXXVI. To make Iron of a Silver Colour.

Take powder of Sal armoniack, unſlak'd lime, mix and put them into cold water, then heat the Iron red hot, quench it therein, and it will be as white as ſilver.

XXXVII. To ſoften Steel to grave upon.

This is done with a *Lixivium* of Oak aſhes and unſlak'd Lime, by caſting the Steel into it and letting it remain there fourteen days. Or thus. Take the Gall of an Ox, Man's Urine, Verjuice, and juice of Nettles of each alike, mix them; then quench ſteel red hot therein four or five times together, and it will become very ſoft.

XXXVIII. To harden Iron or Steel.

Quench it ſix or ſeven times in Hogs blood mixed with Gooſe greaſe, at each time drying it at the fire before you dip it again, and it will become very hard and not brittle.

XXXIX. To ſolder on Iron.

Set the joints of Iron as cloſe as you can, lay them in a glowing fire, and take of Venice glaſs in powder, and the Iron being red hot, caſt the powder thereon, and it will ſolder of it ſelf.

XL. To counterfeit Silver.

Take Cryſtal Arſnick eight ounces, Tartar ſix ounces, Salt-peter two ounces, Glaſs one ounce and an half, Sublimate half an ounce; make them ſeverally into fine powder and mix them: then take three pound of Copper in thin plates which put into a Crucible

(with the former powder *ſtratum ſuper ſtatum*) to calcine, covering it and luting it ſtrongly; let it ſtand in the furnace for about eight or ten hours: then take it out, and (being cold) break the pot, and take out all the matter, and melt it with a violent fire, caſting it into ſome mold. Then take purged Braſs two pound, of the former metal one pound; melt them together, caſting in, now and then, ſome of the aforeſaid powder, after which add half as much of fine ſilver, melting them together, and you have that which is deſired: laſtly to make it as white as Silver, boil it in Tartar.

XLI. Another way to counterfeit Silver.

Take purified tin eight ounces, Quick-ſilver half an ounce, and when it begins to riſe in the firſt heat, take powder of Cantharides, and caſt into it, with a lock of hair, that it may burn in it; being melted put into it the powder aforeſaid, then take it ſuddenly from the fire, and let it cool.

XLII. To purge the Braſs.

It is cleanſed or purged, by caſting into it when it is melted, broken glaſs, Tartar, Sal armoniack, and Salt-peter, each of them by turns, by little and litle.

XLIII. To tinge Lead of a golden colour.

Take purged Lead one pound, Sal Armoniack in powder one ounce, Salt-peter half an ounce, Sal Elebrot two drachms; put all into a crucible for two days and it will be throughly tinged.

XLIV. To purge Lead.

Melt it at the fire, then quench it in the ſharpeſt Vinegar; melt it again and quench it in the juice of Celandine: melt it again and quench it in ſalt water: then in Vinegar mixed with Sal armoniack: and laſtly melt it, and put it into aſhes, and it will be well cleanſed.

XLV. To

XLV. To make Lead of a golden colour.

Put Quick-ſilver one ounce into a Crucible, ſet it over the fire till it is hot, then add to it of the beſt Leaf-gold one ounce, and take it from the fire, and mingle it with purified Lead melted one pound; mingle all well together with an Iron rod, to which put of the filterated ſolution of Vitriol in fair water one ounce; then let it cool, and it will be of a good colour. Diſſolve the Vitriol in its equal weight of water.

XLVI. To take away the ringing and ſoftneſs of Tin.

Melt the Tin, and caſt in ſome Quick-ſilver, remove it from the fire, and put it into a glaſs Retort, with a large round belly, and a very long neck, heat it red hot in the fire, till the Mercury ſublimes and the Tin remains at bottom; do thus three or four times. The ſame may be done by calcining of it three or four times, by which means it will ſooner be red hot than melt.

XLVII. To take away the ſoftneſs and creaking noiſe of Tin.

This is done by granulating of it often, and then reducing it again, and quenching it often in Vinegar and a Lixivium of Salt of Tartar. The creaking noiſe is taken away by melting it ſeven or eight ſeveral times and quenching it in Boys Urine, or elſe oyl of Walnuts.

XLVIII. To take away the deaf ſound of Tin.

This is done by diſſolving it in *Aqua fortis* over a gentle fire, till the water fly away: doing thus ſo long till it is all turned to a calx; which mixed with calx of ſilver, and reduced, performs the work.

XLIX. To make that Tin crack not.

Take Salt, Honey, of each alike, and mix them: melt your Tin and put it twelve or more times into it, then ſtrain out the Tin, and it will purge and leave

cracking; put it into a crucible, which lute, and calcine it four and twenty hours, and it will be like calx of gold.

L. *To take away the brittleneſs of any Metal.*

Firſt calcine it and put it under dung; then do thus; when it is red hot at the fire, or melted, quench it often in *Aqua vitæ* often diſtilled; or uſe about them Roſin or Turpentine, or the oyl of it, or wax, ſuet, Euphorbium, Myrrh, artificial Borax: for if a metal be not malleable, unctuous bodies will oftentimes make them ſofter, if all theſe, or ſome of theſe be made up with ſome moiſture into little Cakes: and when the metal yields to the fire, by blowing with the bellows, we caſt in ſome of them and make them thick like mud, or clear, then ſet the Metal to the fire, that it may be red hot in burning coals, take it forth & quench it in them, & ſo let it remain half an hour to drink in. Or anoint the Metal with dogs greaſe, and melt it with it, for that will take away much of the brittleneſs of it, and make it ſo that it may be hammered and wrought.

LI. *To colour Metal like gold.*

Take Sal armoniack, White Vitriol, Stone Salt, Verdigrieſe, of each alike, in fine powder; lay it upon the Metal, then put it into the fire for an hour, take it out and quench it in Urine, and the Metal will have the colour of gold.

LII. *To make a kind of Counterfeited Silver of Tin.*

This is done by mingling Silver with Tin melted with Quick-ſilver, continuing it long in the fire, then being brittle, it is made tough, by keeping it in a gentle fire or under hot Embers (in a Crucible) for about tweney four hours.

LIII. *To Solder upon Silver, Braſs or Iron.*

Take Silver five peny weight, Braſs four peny weight, melt

melt them together for ſoft Solder, which runs ſooneſt.

Take Silver five peny weight, Copper three peny weight, melt them together for hard Solder.

Beat the Solder thin and lay it over the place to be Soldred, which muſt be firſt fitted, and bound together with Wire as occaſion requires: then take Borax in powder, and temper it like pap, and lay it upon the Solder, letting it dry, then cover it with quick coals and blow, and it will run immediately; then take it preſently out of the fire, and it is done.

Note 1. *If a thing is to be Soldred in two places, (which cannot be well done at one time) you muſt firſt Solder with the hard Solder, and then with the ſoft; for if it be firſt done with the ſoft, it will unſolder again before the other be ſoldred.* 2. *That if you would not have your Solder run about the piece to be Soldred, rub thoſe places over with Chalk.*

LIV. *To make the Silver tree of the Philoſophers.*

Take *Aqua fortis* four ounces, fine Silver one ounce, which diſſolve in it: then take *Aqua fortis* two ounces, in which diſſolve Quick-ſilver: mix theſe two Liquors together in a clear glaſs, with a pint of pure water; ſtop the glaſs cloſe, and after a day, you ſhall ſee a Tree to grow by little and little, which is wonderful and pleaſant to behold.

LV. *To make the Golden tree of the Philoſophers.*

Take oyl of Sand or Flints, oyl of Tartar *per deliquium*, of each alike, mix them well together, then diſſolve Sol in *Aqua Regis*, and evaporate the menſtruum, dry the Calx by the fire, but make it not too hot (for then it will loſe its growing quality) break it into little bits (not into powder) which bits put into the aforeſaid liquor, a fingers breadth one from another in every clear glaſs, keep the liquor from the Air, and let

the Calx ſtand ſtill, and the bits of Calx will preſently begin to grow: firſt ſwell; then put forth one or two ſtems; then divers branches and twigs, ſo exactly, as you cannot but wonder to ſee.

Where note that *this growing is not imaginary but real.*

LVI. *To make the Steel tree of the Philoſophers.*

Diſſolve Steel in rectified ſpirit or oyl of Salt, ſo ſhall you have a green and ſweet ſolution, ſwelling like brimſtone; filter it, and abſtract all the moiſture with a gentle heat, and there will diſtil over a liquor, as ſweet as rain water (for ſteel by reaſon of its dryneſs detains the Corroſiveneſs of the ſpirit of Salt, which remaineth in the bottom, like a blood red maſs, and it is as hot on the tongue as fire:) diſſolve this blood red maſs in oyl of Flints or Sand, and you ſhall ſee it grow up in two or three hours like a tree with ſtem and branches.

If you prove this tree at the teſt, it will yield good gold, which it draweth from the oyl of Sand or Flints; the ſaid oyl being full of a pure golden Sulphur.

LVII. *To make oyl of Flints or Sand.*

Take of moſt pure Salt of Tartar in fine powder twenty ounces; ſmall Sand, Flints, pebbles, or Cryſtals in fine powder five ounces, mix them; put as much of this as will fill an Egg-ſhell into a crucible, ſet it in a furnace, and make it red hot, and preſently there will come over a thick and white ſpirit; take out the crucible whileſt it is hot, and that which is in it, like tranſparent glaſs, keep from the air; after beat it to powder, and lay in a moiſt place, and it will diſſolve into a thick, fat oyl, which is the oyl of Flints, Sand, pebbles or Cryſtals. *This oyl precipitateth metals, and makes the Calx there more heavy than oyl of Tartar doth; it is of a golden nature, and extracts colours from all Minerals; it is fixed in all fires, maketh fine*

Cryſtal

Cryſtals, and Borax, and maturateth imperfect metals into Gold.

LVIII. *To melt Metals quickly.*

Take a Crucible, and make in it a lay or courſe of the powder of any metal, then lay upon it a lay of Sulphur, Salt-peter and Saw-duſt of each alike mixed together, put a coal of fire to it, and the Metal will immediately be in a maſs.

LIX. Laſtly, He that ſhall obſerve the work and reaſon of the ſilver, golden and ſteel trees, may in like manner produce the like out of the Calx of other Metals.

CHAP. XXX.

Of the Inſtruments and Materials of Caſting.

I. HE that would learn to caſt, muſt be provided of all the chief Tools thereto belonging; which are 1. A *Trough*, 2. *Sand*, 3. A *Flask*, 4. *Skrew*, 5. *Tripoli*, 6. *The Medal or form*, 7. A *Furnace*, 8. *Crucibles*, 9. A *Pipe*. 10. *Tongs*, 11. *Two Oak plates*, 12. *Plegets of wool*, 13. *Oyl and Turpentine*, 14. A *Hares foot*, 15. *Bruſhes*.

II. The *Trough* is a four-ſquare thing about half a foot deep or ſomething more; and its uſe is to hold the Sand.

III. Of *Sand* there is various ſorts, the chief are Higate Sand, and Tripoli; the which to make fit for the work you muſt order thus.

If it is Higate Sand, you muſt finely ſift it; if Tripoli, you muſt firſt beat it fine, then ſift it through a fine ſieve;

To either of theſe fine ſands you muſt put of pure fine Bole (an ounce to nine ounces) well beaten, diſſolved in water, and laſtly reduced into fine powder; which powders you muſt moderately moiſten with this Magiſterial water, viz. filterated Brine made of decripitated common Salt: or the ſame, mixed with Glair of Eggs.

IV. The *Flask* is a pair of Oval Irons, containing only ſides to hold the Sand, which muſt be preſſed hard thereinto: and a paſſage or mouth for the metal to run in at.

V. The Skrew is an Iron Preſs, between which the flask is put and preſt, after that it is filled with Sand, and hath received the form or impreſſion to be caſt.

VI. *Tripoli* is that of which the ſecond ſort of Sand is made, which here ought to be calcined and beaten into impalpable powder, to ſtrew over the ſandy moulds; firſt that the ſides of the flask may not cleave together when they are full; ſecondly that the thing caſt may have the perfect form and impreſſion, without the leaſt ſcratch or blemiſh imaginable.

The *Medal* or form, is that which is to be impreſſed upon the Sand, whoſe likeneſs we would imitate.

VIII. The *Furnace* is that which contains the fire, where the Crucible is put, for the Metal to melt in which is generally melted with Charcoal.

IX. The *Crucibles* are calcining or melting pots, (commonly three-ſquare) made ſo as they may endure the fire all over, in which the metal is to be melted.

X. The *Pipe* is a hollow Reed, or piece of Tin, to blow coals and filth out of the Crucible.

XI. The *Tongs* are a crooked Inſtrument to take coals out of the crucible with, as alſo to ſtir and repair the fire; and to take the pot out of the furnace when you go to Caſt.

XII. The

XII. The *two Oak plates* are to be ſmooth, and to be put between the flask and the ſides of the skrew, on each ſide.

XIII. *Pledgets of wool* are to be put between the Oak plates and the ſand to fill up empty ſpaces if there be any.

XIV. The *Oyl and Turpentine* is to wet ſome paper or cotton threads, which muſt be ſet on fire, to ſmoak the Impreſſion or Mould (being dry) that the metal may run the better.

XV. The *Hares foot* is to wipe the hollow places in the Mould, if they ſhould be too much filled with ſmoak.

XVI. The *Bruſhes* ought to be two, to wit one with thick bar Wire ſtrings; another with Hogs Briſtles, wherewith the work (both before and after caſting) ought to be rubbed and cleanſed.

CHAP. XXXI.

The Way and Manner of Caſting.

I. WAſh the Medal in Vinegar, in which put ſome Salt and Straw aſhes; and rub it well with the aforeſaid hair bruſh, then waſh it with water, and dry it well.

II. Place the female part of the flask upon one of the Oak plates; ſo that the middle part, *viz.* that which is joined to the other, may lie downwards.

III. Then put the cleanſed Medal in the flask upon the Oak plate, in a right line to the mouth of the flask: and if there be two, let them be placed ſo, that there may be a place left in the middle for the melted metal to run in at.

IV. Then

IV. Then take of the aforeſaid earth or ſand prepared, (that is, ſo much moiſtned with the Magiſterial water, that being cruſhed between the hands or fingers, it will not ſtick but like dry flower, and will ſtand with the print of the hand cloſed together) and preſs it on well in the flask upon the Medal with the fleſhy part of your fingers or hand; then with a rule ſtrike off all the ſuperfluous ſand that ſticks about the flask.

V. This done, the plegets of wool, or a woolen cloth, muſt be laid upon it, and then the other Oak plate, and then turned up with both hands, the plates being both held cloſe.

VI. Then taking off the upper plate; put upon it the male part of the flask, which fill with ſand in like manner (the Medal being now between) preſſing it down as before, and then with a ruler ſtriking away the ſuperfluous ſand.

VII. Upon which lay a woolen cloth, and gently lift off the top, or upper part of the flask, ſo that the medal may be taken forth.

VIII. All things being thus done with a knife (or ſome ſuch like) cut the paſſage for the metal, which let be a little dried: then,

IX. Either ſtrew over the ſide of the impreſſion (now taken off) with a calcined Tripoli ground impalpable; applying it upon the female flask again; turn the female flask uppermoſt, which take off, and ſtrew it in like manner, with the calcined Tripoli, and putting them together again, preſs them ſo hard, as that the fine Tripoli may receive the moſt perfect impreſſion of the Medal, which then take out, by ſeparating the ſides of the flask, and gently ſhaking that part which holds it, till it falls out:

X. Or with Cotton wet in Oyl and Turpentine and ſet on fire let the Impreſſion be ſmoaked; and if any

ſuper-

ſuperfluous ſume be taken, wipe it off with a Hares foot.

XI. Then join the ſides of the flask together, putting them with the woolen cloaths between the Oaken plates, which put into the Preſs, and skrew them a little.

XII. Then the Metal being melted, put it into the mould being hot, which if it be Silver, or blanched Braſs, or Copper, it will run well enough.

XIII. But if it runs not well, you may caſt in about the hundred part of Mercury ſublimate, and an eighth part of Antimony; for ſo it will not only run well, but alſo be a harder metal.

XIV. Laſtly, the Medal being cooled, take it neatly out and keep it.

Where note 1. *That ſo long as the Impreſſion or mould is not ſpoiled, you may ſtill caſt more* Medals *therein; but when it decays, you muſt perfectly renew the whole work as at firſt.* 2. *That you may blanch them with a pure whiteneſs by the ninth Section of the nine and twentieth Chapter of this Book; or thus, if they be of whitened Braſs, Take Sal armoniack one ounce and an half, Salt-peter two ounces and a half, Leaf ſilver twenty four grains; mix them and evaporate them in a Luted crucible, having a hole in the cover, till all the moiſture is gone; being cold beat all into fine powder; of which take one ounce, Salt, Alom, Tartar, of each one handful, fair water a ſufficient quantity; mix and boil all in a glazed veſſel, in which put the* Medals *boiling them till they are purely white: then rub them with the Tartar in the bottom very well, waſh them in fair water and dry them.* 3. *That if the* Medals *be of Gold, or of a golden colour, you may heighten it with Verdigrieſe and Urine.*

CHAP.

CHAP. XXXII.

Of Glaſs and Precious Stones.

I. *To melt Cryſtal.*

Beat Cryſtal to bits, and put them into an Iron ſpoon, cover it and lute it well, and heat it in the fire till it is red hot, which quench in oyl of Tartar: this do ſo often, till they will eaſily beat to powder in a mortar, which will then eaſily melt.

This is of uſe to counterfeit Jewels with.

II. *To make a Cement for broken Glaſſes.*

Glair of Eggs mixed with Quick-lime will join broken pieces of Glaſs together, and all earthen pots, ſo as that they ſhall never be broken in the ſame place again.

Or thus, Take old liquid Varniſh, and join the pieces with; bind them together and dry them well in the Sun or in an Oven, and they will never unglew again: but put no hot liquor into them then.

Or thus, Take White-lead, Red-lead, Quick-lime, Gum ſandrack of each one ounce, mix all with glair of eight eggs.

Or thus, Take White-lead, bole, liquid varniſh as much as ſufficeth.

Or thus, Take White-lead, Lime, glair of Eggs, as much as ſufficeth.

Or thus, Take fine powder of glaſs, Quick-lime, Liquid varniſh, of each a ſufficient quantity.

Or thus, Take Quick-lime powdered, liquid varniſh, glair of Eggs, of each alike: grind them upon a ſtone: this is a ſtrong glew even for ſtones.

Or

Or thus, Take Calcined flints and egg-ſhells of each alike, and with whites of Eggs and gum tragacanth or diſſolution of Gum Sandrack make glew, this in few days will be as hard as ſtone.

Or thus, Take calcined flints two pound, Quick-lime four pound, Linſeed oyl ſo much as may temper the mixture, this is wonderful ſtrong: but with liquid varniſh it would be ſtronger.

Or thus, Take fiſh glew, and beat it thin, then ſoak it in water till it is like paſte, make rouls thereof which draw out thin: when you uſe it, diſſolve it in fair water over the fire, letting it ſeeth a while and ſcumming of it, and whileſt it is hot uſe it. This not only cements glaſs, but Tortoiſe ſhell and all other things.

III. *To make Glaſs green.*

Green glaſs is made of fern aſhes, becauſe it hath much of an alkaly ſalt. Cryſtal or Venice Glaſs is tinged green with Ore of Copper; or with the Calx of Copper five or ſix grains to an ounce.

IV. *To counterfeit a Diamond.*

Take a Saphyre of a faint colour, put into the middle of a crucible in quick Lime, and put it into a gentle fire, and heat it by degrees till it is red hot, keep it ſo for ſix or ſeven hours; let it ſtand in the crucible till it is cold, (leſt taking it out hot it ſhould break) ſo will it loſe all its colour, and be perfectly like a Diamond, ſo that no file will touch it: if the colour is not all vaniſhed at the firſt heating, you muſt heat it again till it is perfect.

V. *To prepare the Salts for counterfeit Gems.*

The Salts uſed in making counterfeit Gems, are chiefly two, the firſt is made of the herb Kali; the ſecond of Tartar; their preparations are according to the uſual way (but in Glaſs veſſels.)

VI. *To prepare the matter of which Gems are made.*

The

them the next morning with decoction of wheat-bran: after a while waſh them with Salt of Tartar, diſſolved in fair water, perfumed with oil of Cloves, Oranges, Rhodium or Cinnamon. Or this, take Venice Soap diſſolved in juice of Limons one pound, Virgin-honey four ounces, Sublimate, Orice root, Sugar, Salt of Tartar, Alom, Borax of each one ounce, Balſom of Peru two drachms, oil of Cloves one drachm, oil of Rhodium and Cinnamon of each half a drachm, make a mixture to waſh the hands withal: Or this, take powder of Venice Soap one pound, Orice root eight ounces, *Amylum* ſix ounces, mix them and make an ointment with *liquid Storax* and oil of *Benjamin* a ſufficient quantity; it wonderfully whitens, ſmooths and ſweetens the hands. To anoint alſo with a Bulls gall is very good.

XIII. *To help hands which are ſwoln, and look red or blew with cold.*

What we even now ſaid (in the laſt Section) may be ſaid again here: to which we add, that a long bathing of them in a larther of Caſtle Soap, is very good if it be done: or if a repercuſſive plaiſter be applied made of barley meal, *Saccharum Saturni*, and oil of Myrtles; waſhing (after the coming off of the Cataplaſme) with juice of Limons or white wine Vinegar: a plaiſter of Turpentine mixed with Salt is good. Often to anoint the hands with oil of Roſes, Almonds, or *Pomatum* at night, and the next morning with the *Lac Virginis* prevails much. Oil of Anniſeeds, Caraways and Fennel prepared chymically, as alſo Cloves and Oranges, mixed with oil of Almonds and often uſed, are eminent above all other things.

CHAP.

CHAP. XXXIX.

Of making a Sweet Breath.

I. A *Stinking Breath comes from one of theſe four cauſes, viz. putrified Lungs, defective Teeth, a diſtemper of the Head, or obſtruction of the Stomach.*

II. *To remedy a Stinking Breath coming from putrified Lungs.*

Take *Unguentum Nicotianæ* one ounce, *Oleum Succini* two drachms, mix them and anoint the breaſt outwardly; inwardly give cleanſers, (as oil of Sulphur allayed with Roſe water) morning and evening; alſo *Antimonium Diophoreticum* ten grains five times a day for ſeveral days together; then heal by giving oil of Almonds mixed with a few drops of oil of Cinnamon, or Pills of Turpentine: Laſtly, morning, noon and night let this bolus be adhibited; take Nutmegs, Mace, Ginger, of each fifteen grains, honey two drachms, oil of Cinnamon ten drops, mix them, and continue it for ſome weeks.

III. *To help the defects of the teeth.*

1. *If the teeth be furred over*, rub them every morning with *cremor Tartari* in powder, and waſh them with White-wine. 2. *If the teeth be black*; allay oil of Sulphur or Vitriol in Roſe water, and ſcowr them well therewith, with the end of a ſtick and a rag, till all the blackneſs be gone; then rub them with oil of Almonds perfum'd with oil of Cinnamon. 3. *If the teeth be looſe*, firſt rub them with this powder, take Galls, Pomgranate flowers, Sumach, Cyperus, of each one ounce, Roch Alom half a pound, powder them all for uſe: then uſe this Gargariſme. Take Galls one ounce,

Myrrh, Pomgranate peels of each half an ounce, boil them in white wine vinegar for a Gargariſm. Laſtly, morning, noon and night waſh the gums with good red Wine; by this means the teeth will be faſtned and the gums reſtored. 4. *If they be in danger of rotting*; take aſhes of Harts-horn, magiſtery of Corral of each one ounce, musk, or inſtead thereof oil of Cinnamon, ten grains, mix for a dentifrice to rub the teeth withal, it will keep them white and ſound. 5. *If they be rotten and hollow*; make little pellets of ſtrained Opium, Myrrh and oil of Cinnamon, and put them into the hollow tooth. 6. *If they ach*; uſe the aforeſaid pellets, or make little ones of *Laudanum Paracelſi*, and put them into the hollowneſs: or if they be not hollow, tye a little pill of the ſame up in a fine thin rag, and hold it between the aking teeth. 7. *If they ſtink*; often waſh them with wine or ſpirit of wine, in which a few drops of oil of Cinnamon and *adeps Roſarum* is diſſolved.

IV. *To rectify a Stinking Breath ariſing from diſtemper of the head.*

Conſider the cauſe of the diſtemper, whether it ariſes from the Pox, Impoſthumes, or the like, and follow the method inſtituted in the Cure of thoſe diſeaſes, and then the cauſe being taken away, the effects you will find will ſoon ceaſe; yet nevertheleſs theſe following pills are excellent: take *Calx* of refined Silver made by ſpirit of Nitre, and well dulcified by waſhing in warm rain water one ounce, *Reſinæ Scammonii* one ounce and half, mix them for a maſs of pills, of which take eight or ten grains at night going to bed every third, fourth or fifth day.

V. *To rectifie a Stinking Breath ariſing from the obſtruction of the Stomach.*

This is done by opening and cleanſing the Stomach thus.

thus. Take every morning going to bed half a drachm of *Pil. Ruffi* for ten or twelve days together: or thus, firſt vomit with *Vinum Benedictum* one ounce or more, according as Strength requires, twice or thrice; then take *Pilulæ Rudii* halfa drachm at a time, in the morning faſting, drinking after it ſome warm broth or poſſet drink, which repeat every third or fourth day four or five times.

VI. *To reſtifie the Breath, when it ſmells of any thing that is eaten.*

Chew Coriander ſeed or Zedoary in the mouth, drinking a good draught of wine after; the ſcent of the wine is taken away by eating four apples or Quinces, or by chewing troches of Gum Tragacanth perfumed with oil of Cinnamon.

CHAP. XL.

Of beautifying the Hair.

I. *TO Dye the Hair black.*

This is done with the *Calx* of *Lime* (made by Spirit of Nitre) mixed with fair water, and the hair waſhed therewith, with a Spunge: it is the moſt excellent thing of that kind that is yet known.

II. *To keep the hair from falling off.*

Take Myrtle berries, Galls, Emblick Myrobalans of each alike, boil them in oil Omphacine, with which anoint: it is an excellent Medicine, yet as old as *Galen.*

III. *To remedy Baldneſs.*

This is a hard thing to cure, yet the following things are very good. Rub the head or bald places every morning very hard with a courſe cloth, till it be red, anointing immediately after with Bears grieſe: when

ten or fifteen days are paſt, rub every morning and evening with a bruiſed Onion, till the bald places be red, then anoint with honey well mixed with Muſtard ſeed, applying over all a plaiſter of *Labdanum* mixed with mice dung, and powder of Bees: do this for thirty days. If all the former fail, bath with a decoction of Bur-dock roots, made with a Lixivium (of Salt of Tartar) two parts, and muskadel one part; immediately applying this Unguent: take *Thapſi* or *Turbeth* one drachm (in powder) bears grieſe one ounce, mix them, which uſe for ſixty days; if this make not the hair come, the defect is incurable.

IV. *To take away hair from places where it ſhould not grow.*

Take Quicklime four ounces, *Auripigmentum* one ounce and a half, *Sulphur vive*, Nitre, of each half an ounce, *Lixivium* of Salt of Tartar a quart, mix and boil all ſo long in a glazed earthen pot, till putting a quill therein, all the feathers peel off, and it is done. Firſt foment the place with warm water a little before you uſe the aforeſaid medicine; a quarter of an hour after waſh with very hot water; then anoint with the aforeſaid Unguent, and in a quarter of an hour it will do the work: when the hairs are faln away, remember to anoint with oil of Roſes; now to keep them from ever growing again, anoint for ſome days with an ointment made of the juices of Henbane and Nightſhade, *Opium* and Hogs grieſe.

V. *To make the hair curl.*

Waſh the hair very well with a *Lixivium* of Quicklime, then dry it very well, that done anoint it with oil of Myrtles, or oil *Omphacine*, and powder it well with ſweet powder, putting it up every night under a cap: if the party be naturally of a cold and moiſt conſtitution, the waſhing, anointing and powdring muſt be perpetually

perpetually uſed once or twice a week during life, the hair being put up every night.

VI. *To make hair lank and ſtiff that curls too much.*

Anoint the hair throughly twice or thrice a week with oil of Lillies, Roſes, or Marſh mallows, combing it after it very well.

VII. *To make the hair grow long and ſoft.*

Diſtil Hogs grieſe or oil Olive in an Alembick; with the oil that comes there-from anoint the hair, and it will make it grow long and ſoft: uſe it often.

VIII. *To preſerve the hair from ſplitting at ends.*

Anoint the ends thereof, with oil Omphacine, or oil of Myrtles, they are eminent in this caſe to preſerve the hair from ſplitting, ſo alſo an ointment made of Honey, Bees wax and oil Omphacine or Bears grieſe.

CHAP. XLI.

Of the Art of Perfuming in general.

I. IN this Art two things are to be conſidered, *viz.*
1. The way and manner of making of Perfumes.
2. The way and manner of Perfuming.

II. The Perfume it ſelf is conſidered, 1. In reſpect of its Form. 2. In reſpect of its Compoſition.

III. The Form of the Perfume is either Water, Oil, Eſſence, Unguent, Powder, or Tablets.

IV. The Making and Compoſition is taken from the Form and matter.

V. The Matter is either Vegetable, Animal or Mineral.

VI. The way of Perfuming is according to the matter to be perfumed.

VII. The matter to be perfumed is either natural, as Hairs, Skins, Cloaths, Air, &c. or Artificial, as Pomanders, Powders, Wash-balls, Soaps, Candles, and other things of like nature.

CHAP. XLII.

Of the Matter of which Perfumes are made.

I. THe ground of *Vegetable* Perfumes, is taken from *Flowers*, *Seeds*, *Herbs*, *Roots*, *Woods*, *Barks* and *Gums*.

II. The chief *Flowers* for this use, are of Clove-Gilliflowers, Roses, *Jasemin*, Lavender, Oranges and Saffron.

III. The chief *Seeds* or fruits are Nutmets, Cloves, Carrawaies, Grains, Seeds of *Geranium Moschatum*, and the Nut Ben.

IV. The chief *Herbs* are *Geranium Moschatum*, *Basil*, sweet Majoram, Tyme, Angelica, Rosemary, Lavender, Hyssop, sweet Trefoyl, Mint and Bay-tree leaves.

V. The chief *Roots* are of *Calamus Aromaticus*, Ginger, China, *Caryophyllata*, Indian Spicknard and sweet Orrice or Iris.

VI. The chief *Woods* are of yellow Sanders, *Xylobalsamum*, *Lignum Aloes*, and *Rhodium*.

VII. The *Barks* and *Peels* are of Cinnamon, Mace, Oranges, Limons and Citrons.

VIII. The chief *Gums* are Frankincense, *Olibanum*, Labdanum, Styrax, liquid Styrax. *Balsamum Verum*, Ambergrice, *Styrax Calamita*, Benjamin, Amber, Camphire.

IX. The chief matters of Perfumes taken from *Animals*, are Musk, Zibet, Cow-dung and other turds.

IX. Of

X. Of *Minerals* there is one only, which yields a Perfume, and that is *Antimony.*

CHAP. XLIII.

Of the Oil of Ben.

I. THe little Nut which the Arabians call *Ben*, is the ſame which the Latins call *Nux Unguentaria*; and the Greeks *Balanos Myrepſta*; out of which is taken an Oil, of great uſe in the Art of Perfuming.

II. *To make the Oil of* Ben. Blanch the Nuts, and beat them very carefully in a mortar, and ſprinkle them with wine, put them into an earthen or Iron Pan, and heat them hot, then put them into a linnen cloth, and preſs them in an Almond preſs; this work repeat, till all the Oil is extracted, ſo have you Oil of *Ben* by expreſſion.

III. In like manner you may expreſs the Oil out of Citron ſeeds, incomparable for this purpoſe, to extract the ſcent out of Musk, Civit, Amber and the like, becauſe it will not quickly grow rank, yet Oil of the *Nut Ben* is much better.

IV. This *Oil* of *Ben* hath two properties; the one is, that having no ſcent or odour of it ſelf, it alters, changes or diminiſhes the ſcent of any Perfume put into it: the other is that it is of a long continuance, ſo that it ſcarcely ever changeth, corrupts or putrifies, as other Oils do.

V. To make a Perfume thereof, put the Musk, Amber, &c. in fine powder thereinto, which keep in a glaſs bottle very cloſe ſtopped, for a month or more, then uſe it.

VI. Or thus, Blanch your Nuts, and bruiſe them, (Almonds may do though not ſo good) and lay them between two rows of Flowers, ſuppoſe Roſes, *Jaſemin*, &c. or other Perfumes; when the Flowers have loſt their ſcent and fade, remove them, adding freſh ones; which repeat ſo long as the Flowers are in ſeaſon; then ſqueez out the oil, and it will be moſt odoriferous.

VII. Laſtly, by this laſt you may draw a ſweet ſcent out of thoſe Flowers, out of which you cannot diſtil any ſweet water.

CHAP. XLI.

Of ſweet Waters.

I. *The firſt ſweet Water.*

Take Cloves in powder two drachms, yellow Sanders, *Calamus Aromaticus* of each one ſcruple, *Aquæ Roſarum Damaſcenarum* fifteen pound, digeſt four days, then diſtil in an Alembick; to this new diſtilled water put in powder Cloves, Cinnamon, Benjamin, *Storax Calamita* of each one drachm, diſtil again in *Balneo*; laſtly put the water into a glaſs bottle with Muſk and Ambergriece of each ten granis, keep it cloſe ſtopt for uſe.

II. *The ſecond ſweet Water.*

Take Damask Roſes exungulated three pound, Flowers of Lavender and Spike of each four ounces, Clove-gilliflowers, and Flowers of *Jaſemin*, of each two pound, Orange-flowers one pound, Citron peels four drachms, Cloves two drachms, Cinnamon, *Storax Calamita*, Benjamin, Nutmegs, of each two ſcruples all in powder, *Aquæ Roſarum* ſix pound, digeſt ten days,

days, then diſtil in *Balneo*: to the diſtilled water add of Muſk and Ambergrieſe of each thirty grains.

III. *The third ſweet water.*

Take Roſes, Clove-gilliflowers of each one pound, Flowers of Roſemary, Lavender, *Jaſemin*, Majoram, Savory, Time, of each three ounces, dry Citron peels one ounce, Cinnamon, Benjamin, *Storax Calamita*, of each two drachms, Nutmegs, Mace, of each one drachm, bruiſe the Herbs and Spices well, digeſt in the Sun two days, then diſtil in *Balneo*: to the diſtilled water add Muſk in powder one ſcruple.

IV. *The fourth ſweet Water.*

Take Cloves, Cinnamon of each one drachm, Mace, Grains, Muſk, Ambergrieſe, Citron peels of each half a ſcruple, Benjamin, *Storax Calamita* of each one ſcruple, *Aquæ Roſarum* twelve pound, digeſt fifteen days, then diſtil in *Balneo*.

V. *The fifth ſweet Water.*

Take Roſemary-flower water, Orange-flower water of each five pound, Ambergrieſe one ſcruple, digeſt ten days, then diſtil in *Balneo*.

VI. *The ſixth ſweet Water.*

Take Roſes two pound, Macaleb half a drachm, Ambergrieſe ten grains, bruiſe what is to be bruiſed, digeſt in ſand three days, then diſtil in *Balneo*.

VII. *The ſeventh ſweet Water.*

Take green peels of Oranges and Citrons of each four drachms, Cloves half a drachm, flowers of Spike ſix ounces, *Aquæ Roſarum Damaſcenarum* ſix pound, digeſt ten days, then diſtil in *Balneo*.

VIII. *The eighth ſweet Water.*

Take of the water at the fifth Section ſix pound, Muſk ten grains, mix and digeſt them for uſe.

IX. *The ninth ſweet Water.*

Take *Aquæ Roſarum*, *Aquæ Florum de Jaſemin* of each four

four pound, Musk one ſcruple, digeſt ten days, then diſtil in ſand.

X. *The tenth ſweet Water.*

Take Damask-roſe, Musk-roſes, Orange-flowers of each four pound, Cloves two ounces, Nutmegs one ounce, diſtil in an Alembick, in the noſe of which hang Musk three ſcruples, Amber two ſcruples, Civet one ſcruple, tyed up in a rag dipt in bran, and the white of an egg mixed.

XI. *The eleventh ſweet Water, called* Aqua Nanſa *or* Naphe.

Take *Aqua Roſarum* four pound, Orange-flower water two pound, waters of ſweet Trefoyl, Lavender, Sweet Majoram of each eight ounces, Benjamin two ounces, ſtorax one ounce, Labdanum half an ounce, Mace, Cloves, Cinnamon, Sanders, Lignum Aloes of each one ounce, Spikenard one ounce; all being groſly beaten, digeſt a month, then in a glaſs retort diſtil in *Balneo.*

XII. *The twelfth ſweet water, called* Aqua Moſchata.

Take ſpirit of Wine two pound, Musk three ſcruples, Amber two ſcruples, Civet one ſcruple, digeſt in the Sun twenty days cloſe ſtopped in a glaſs veſſel; a drop of this water put into any other liquor, will very perfume it.

So may you extract the ſcent out of ſweet Flowers, with this difference, that they lie but a little while, becauſe their earthy ſubſtance will make the ſpirit ill-ſavoured.

CHAP.

CHAP. XLV.

Of Perfuming Oils.

I. *To make Perfuming Oils by infuſion.*

II. This is taught fully at the fifth Section of the three and fortieth Chapter aforegoing.

II. *To make Oleum Imperiale.*

Take Ambergrieſe four drachms, *Storax Calamita*, eight ounces, Roſe-water, *Oleum Roſatum* of each two pound, Oil of Cinnamon and Cloves of each half a drachm, put all into a glaſs, and digeſt in horſe dung twenty days: this done gently boil all for a quarter of an hour, which then let cool; with a ſpoon take off the Oil which ſwims a top, to which put of Musk and Zibet of each two drachms, digeſt all in a gentle heat for twenty days, and keep it for uſe. Where note the Amber and Storax at bottom will ſerve to make ſweet balls of, to lay among cloaths; or beads to carry in ones hands; or for a perfume to burn.

III. *To make Oil of Cinnamon.*

Digeſt Cinnamon groſly bruiſed in ſpirit of Wine, ſharpned with oil of Salt, in a glaſs veſſel, with a blind head cloſely luted, a gentle heat for ten days, then diſtil in an Alembick as we have more at large taught in our *Synopſis Medicinæ lib. 3. cap. 47. Sect. 1.* it is a wonderful Perfume, the moſt fragrant and pleaſant of all Oils, as well in taſt as ſmell: the uſe of it will certainly take away a ſtinking Breath.

IV. *To make Oil of Roſes, called* adeps Roſarum.

Take Damask Roſes, pickle them with Bay ſalt, and after three months, with a large quantity of water diſtil in aſhes with a gentle fire, ſo have you Oil, and

and Spirit or water, which keep for other diſtillations.

Weckerus hath it thus.

Roſarum folia in umbra aliquandiu aſſervata, in matula vitrea magna ponuntur, cujus ſit fundus latus, & ad dimidium vas impletur: indè affunditur ipſis Roſarum foliis tantum aquæ roſaceæ ſtillatitiæ, quantum ſatis fuerit, ut optimè madeant: appoſitóque pileo vitreo cæco, ſtipatisque optimè rimis cera gummata, quindecim diebus equino ſimo macerantur: ſic tamen, ut mutato, cùm frigeſcere cœperit, ſimo, calor æqualis ſervetur. Appoſito mox matulæ roſtrato pileo, igne moderato cinerum, aqua omnis elicitur: quæ rurſus in eadem matula, optimè priùs à fœcibus mundata, ablutáque ponitur, & calentis aquæ balneo lentiſſimo igne elicitur, dum tota in vas recipiens abeat. Nam in fundo matulæ remanebit oleum roſarum, colore rubrum, perſpicuum, & Moſchi odore ſuaviter fragrans.

This is the greateſt of all vegetable perfumes, and of an ineſtimable value.

V. *To make Oil of Calamus* Aromaticus.

It is made as oil of Cinnamon: it is a very great perfume, helps a ſtinking breath, vomiting, weak memory, &c.

VI. *To make Oil of Rhodium.*

It is made as oil of Cinnamon; is a very excellent perfume, good for the head, breath and the ſenſes.

VII. *To make Oil of Indian Spicknard.*

By infuſion it is made by the firſt Section; by diſtillation, as oil of Cinnamon. It is an eminent Perfume.

VIII. *To make Oil of Benjamin.*

Take Benjamin ſix ounces in powder, which diſſolve in oil of Tartar and *Aqua Roſarum* of each one pound, which diſtil with a cloſe pipe in an Alembick. So is made oil of *Storax* and *Ladanum.*

IX. *To make oil of Storax compound.*

Take oil of Ben, or ſweet Almonds one pound,

Storax

Storax groſly beaten four ounces, Benjamin, Cloves of each two ounces, digeſt (till the Gums are melted) over hot coals; then preſs out the oil diligently.

CHAP. XLVI.

Of Perfuming Eſſences.

I. *THe way to extract Eſſences is ſomewhat difficult, viz: by Diſtillation, Calcination, Digeſtion or Menſtruum.*

II. If by *Menſtruum*, uſe not a watry one for a watry eſſence; nor an oily one for an oily eſſence; becauſe being of like natures, they are not eaſily ſeparated; but on the contrary, chuſe an oily *Menſtruum* for a watry eſſence, and a watry *Menſtruum* for an oily eſſence.

III. If the eſſence of any metal be to be extracted by a *corroſive menſtruum*, after the work is done, ſeparate the ſalts from the waters, and uſe only thoſe ſalts which will be eaſily taken out again; *Vitriol* and *Alom* are very difficult to be ſeparated by reaſon of their earthy ſubſtance.

IV. *To extract the eſſence out of* Muſk, *Ambergrieſe Civet, and other Spices or Aromaticks.*

Mix the perfume with oil of Ben, which in a glaſs bottle ſet in the Sun or Sand for ten days, then ſtrain it from the dregs, and the eſſence will be imbibed in the oil. Then take ſpirit of Wine, and diſtilled fountain water, which mix with the ſaid oil, and digeſt for ſix days: then diſtil in ſand; ſo will the eſſence and water aſcend, (the oil remaining at bottom without any ſcent) that eſſence and water diſtil in *Balneo* in a glaſs veſſel,

with Civet one drachm) mix all together into an ointment which keep for uſe

CHAP. XLVIII.

Of Perfuming Powders.

I. *To make Powder of Oxe dung.*

Take red Ox dung in the month of *May* and dry it well, make it into an impalpable Powder by grinding: it is an excellent Perfume without any other addition; yet if you add to one pound of the former, Musk, and Ambergrieſe of each one drachm it will be beyond compariſon.

II. *To make Cyprian Powder.*

Gather Musk moſs of the Oak in *December*, *January* or *February*, waſh it very clean in Roſe water, then dry it, ſteep it in Roſe water for two days, then dry it again, which do oftentimes; then bring it into fine Powder and ſierce it; of which take one pound, Musk one ounce, Ambergrieſe half an ounce, Civet two drachms, yellow Sanders in powder two ounces, mix all well together in a marble mortar.

III. *Another way to make the ſame.*

Take of the aforeſaid powder of Oak moſs one pound, Benjamin, Storax of each two ounces in fine Powder; Musk, Ambergrieſe and Civet of each three drachms, mix them well in a mortar.

IV. *A Sweet Powder to lay among cloaths.*

Take Damask-roſe leaves dryed one pound, Musk half a drachm, Violet leaves three ounces, mix them and put them in a bag.

V. *Another for the ſame or to wear about one.*

Take

Take Roſe leaves dryed one pound, Cloves in powder half an ounce, Spicknard two drachms, Storax, Cinnamon of each three drachms, Musk half a drachm, mix them and put them into bags for uſe.

VI. *Powder of ſweet Orrice, the firſt way.*

Take Florentine Orrice root in powder one pound, Benjamin, Cloves of each four ounces in powder, mix them.

VII. *Powder of Florentine Orrice, the Second Way.*

Take of Orrice root ſix ounces, Roſe leaves in powder four ounces, Majoram, Cloves, Storax in powder of each one ounce, Benjamin, yellow Sanders of each half an ounce, Violets four ounces, Musk one drachm, Cyperus half a drachm, mix them: being groſly powdred, put them into bags to lay amongſt linnen: but being fine they will ſerve for other uſes, as we ſhall ſhew.

VIII. *Powder of Orrice roots, the third way, excellent for linnen, in bags.*

Take roots of Iris one pound, ſweet Majoram twelve ounces, flowers of Roſemary and Roman Camomil, leaves of Time, *Geranium Moſchatum*, Savory of each four ounces, Cyperus roots, Benjamin, yellow Sanders, *Lignum Rhodium*, Citron peel, *Storax*, *Labdanum*, Cloves, Cinnamon of each one ounce, Musk two drachms, Civet one drachm and a half, Ambergrieſe one drachm, powder and mix them for bags. This compoſition will retain its ſtrength near twenty years.

IX. *Powder of Orrice, the fourth Way.*

Take Orrice roots in powder one pound, *Calamus Aromaticus*, Cloves, dryed Roſe leaves, Coriander ſeed, *Geranium Moſchatum* of each three ounces, *Lignum Aloes*, Majoram, Orange peels of each one ounce, Storax one ounce and a half, *Labdanum* half an ounce, Lavender,

vender Spicknard of each four ounces, powder all and mix them, to which add Musk, Ambergrieſe of each two ſcruples.

X. *Pulvis Calami Aromatici compoſitus.*

Take *Calamus Aromaticus*, yellow Sanders of each one ounce, Majoram, *Geranium Moſchatum* of each one ounce, Roſe leaves, Violets, of each two drachms, Nutmegs, Cloves of each one drachm, Musk half a drachm, make all into powder, which put in bags for Linnen.

XI. *Another of the ſame.*

Take *Calamus Aromaticus*, Florentine Iris roots of each two ounces, Violet flowers dryed one ounce, round Cyperus roots two drachms, *adeps Roſarum* one drachm and a half, reduce all into a very fine powder: it is excellent to lay among Linnen, or to ſtrew in the hair.

XII. *An excellent perfuming Powder for the hair.*

Take Iris roots in fine powder one ounce and a half, *Benjamin*, *Storax*, Cloves, Musk of each two drachms; being all in fine powder, mix them for a Perfume for hair Powder. Take of this Perfume one drachm, Rice flower impalpable one pound, mix them for a powder for the hair. Note, ſome uſe white ſtarch, flower of French Beans and the like.

CHAP. XLIX.

Of Perfuming Balſams.

I. *Natural Balſam perfumed.*

Take *Balſamum verum* one ounce, Musk, Ambergrieſe, Civet of each two ſcruples, mix them, for a Perfume;

Perfume: it is the moſt fragrant and durable of all Perfumes.

II. *An odoriferous compound Balſam.*

Take of the aforeſaid Balſam perfumed one ounce, oils of *Rhodium* and Cinnamon of each two drachms, mix them: this is an incomparable Perfume, and better than the other for ſuch as are not affected ſo much with musk.

III. *Balſamum Moſchatum.*

Take oil of Musk one drachm, oil of Cinnamon half a ſcruple, Virgin wax one drachm and a half, melt the wax, and mix them according to Art.

IV. *Another very good.*

Take Cloves, Cinnamon, Lavender, Nutmegs of each two drachms, oils of Cloves and *Rhodium* of each half a drachm, Wax three drachms, Musk and Ambergrieſe of each ten grains, mix them into a Balſam.

V. *Another very excellent for thoſe that love not the ſcent of Musk and the like.*

Take oil of *Geranium Moſchatum* (made as *adeps Roſarum* by the fourth Section of the five and fortieth Chapter) *adeps Roſarum*, oil of Cinnamon of each one drachm, Virgin wax ſix drachms, melt the wax, and mix the oils for a Perfume.

CHAP. L.

Of Perfuming Tablets.

I. *To make red Muskardines or Tablets.*

Diſſolve gum *Tragacanth* in Roſe water, ſo that it may be as thick as Gelly: with make into paſte with the following compoſition. Take *Amylum* one pound,

fine Sugar half a pound, *Cochenele* two ounces, Musk three drachms, all being in fine powder, mix them, and make tablets with the aforeſaid Mucilage of Tragacanth, ſquare, long, round, or of what form you pleaſe, which dry in an Oven, out of which bread hath been lately drawn: but be ſure you dry them till they be as hard as horns.

II. *Another ſort of Red Tablets.*

Take of the aforeſaid compoſition one pound, Cloves, Cinnamon, Nutmegs, Ginger of each two ounces, Cochenele one ounce, all being in fine powder, make into tablets, with the aforeſaid Mucilage, and dry as aforeſaid.

III. *To make yellow Tablets.*

Take *Amylum* one pound, fine Sugar half a pound, yellow Sanders four ounces, Saffron two ounces, (or you may dip the *Amylum* in ſtrong tincture of Saffron, and then dry it again) Musk four drachms, all being in fine powder, make the maſs into tablets with the aforeſaid Mucilage, adding oil of Cinnamon in drops two drachms, dry them careſully in the ſhade.

IV. *Another ſort of yellow Tablets.*

Take *Amylum* dyed with tincture of Saffron 1 pound, Sugar half a pound, Saffron two ounces, Nutmegs, Cinnamon, Ginger of each one ounce, Carroways half an ounce, Musk three drachms, Ambergriece one drachm, all in fine powder make into tablets, as aforeſaid, adding oil of Cinnamon two drachms; which dry in the ſhade, till they be as hard as Horns.

V. *To make Muſcardines or Tablets of any other colour.*

You muſt make them after the ſame manner, only adding the colour you do intend; and in this caſe we think that it is better that the *Amylum* be dipt in the tincture, and dryed firſt before you uſe it. Where note, that

that theſe Tablets when uſed are to be held in the mouth, in which they will diſſolve, there by cheering the heart, reviving the ſenſes, comforting the ſpirits, ſtrengthning nature, reſtoring the body, and indeed nobly perfuming the breath. For them that do not love Musk, you may make them without, uſing inſtead thereof ſo much the more oil of Roſes or Cinnamon.

CHAP. LI.

Of making Pomanders for Bracelets.

I. *The firſt ſort.* Take Orrice powder, Cloves, Mace, Cinnamon of each half an ounce, yellow Sanders, Styrax, ſweet *Aſſa* of each two drachms, Ambergrieſe, Musk of each one drachm, Balſam of *Peru*, oil of *Rhodium* of each one ſcruple, Civet two drachms, all being in fine powder (except the Balſam and Oil) mix together, and make into paſte with mucilage aforeſaid, of which form Beads, drying them in the ſhade for uſe.

II. *The ſecond ſort.* Take *Storax Labdanum* one drachm and a half, Benjamin one drachm, Cloves, Mace, Spicknard, *Geranium Moſchatum* of each ten grains, Musk, Ambergrieſe of each ſix grains; with mucilage make a *Pomander* for Bracelets.

III. *The third ſort.* Take Damask Roſe leaves exungulated two ounces, beat them impalpable: Musk, Ambergrieſe of each two ſcruples, Civet one ſcruple, *Labdanum* one drachm, with mucilage of gum Tragacanth, in Roſe-water aforeſaid, make a *Pomander* for Bracelets.

IV. *The fourth ſort.* Take Storax, Benjamin of

each an ounce and a half, Musk two drachms, oil of Cinnamon one drachm, with Mucilage aforesaid make a paste of *Pomander*, very excellent.

CHAP. LII.

Of Perfuming Wash-balls.

I. *To make Barbers Wash-balls.*

Take purified Venetian Soap six ounces, Macaleb four ounces, *Ireos*, *Amylum* of each seven ounces, Cloves two ounces, *Labdanum*, Anniseeds of each one ounce, Nutmegs, Majoram, Cypress powder, *Geranium Moschatum*, Camphire of each half an ounce, *Storax liquida* half a drachm, Musk ten grains, all being in fine powder, with a little fine Sugar, beat all in a mortar, and make them up into Wash-balls.

II. *To do the same another way.*

Take of the said Soap two pound, juice of *Macaleb* two ounces, Cloves, Orrice of each three ounces, *Labdanum* two ounces, Storax one ounce, all being in fine powder, mix with the Soap, of which make balls, drying them in the shadow.

III. *To make Balls of white Soap.*

Take of white Soap five pound, *Iris* four ounces, *Amylum*, white Sanders of each three ounces, Storax one ounce, all in powder, steep in Musk water, of which make paste for Wash-balls.

IV. *Another sort very good.*

Take of white Soap four pound, Orrice six ounces, *Macaleb* three ounces, Cloves two ounces, all in powder mix with the Soap, with a little oil of Spike, Rhodium or the like, of which make Balls.

V. A-

V. *Another way to make them of Goats fat.*

Make a ſtrong *Lixivium* of Pot-aſhes, as that a new laid egg will ſwim thereupon, which boil with Citron peels: take of this Lye twenty pound, Goats fat two pound, boil it for an hour, then ſtrain it through a linnen cloth into broad platters of fair water, expoſing it to the Sun, mix it often every day, till it begins to grow hard, of which you may form balls, which you may perfume with Musk half a drachm, Civet one ſcruple, oil of Cinnamon ten grains.

VI. *To purifie Venetian Soap.*

Cut it ſmall, to which put ſome Roſe water, or other perfuming water, boil them a while, then ſtrain it and it will be ſweet and good, then take off the Soap which ſwims a top with a ſpoon, and lay it upon a tyle, and it will preſently be dry, being white, free from filth and unctuoſity.

VII. *Another way to do the ſame.*

Grate the Soap, and dry it in the Sun, or an Oven, powder and ſierce it, then moiſten it with ſome ſweet water or oil of Spike, which dry again (in the ſhadow) and keep it for uſe.

CHAP. LIII.

Of Perfuming Soaps.

I. *To make white musked Soap.*

Take white Soap purified as aforeſaid three pound, Milk of *Macaleb* one ounce, Musk, Civet of each ten grains, mix them and make all into thick Cakes or rouls.

II. *Another kind of ſweet Soap.*

Take of the oldeſt Venice Soap, which ſcrape and dry three days in the Sun (purifying it as aforeſaid) two pound, *Ireos*, *Amylum* of each ſix ounces, *Storax liquida* two ounces, mix them well whileſt hot; which put into pans to form Cakes.

III. *To make ſoft Soap of Naples.*

Take of *Lixivium* of Pot-aſhes (ſo ſtrong as to bear an egg) ſixteen pound, Deers Suet two pound, ſet them upon the fire to ſimper; put all into a glaſed veſſel with a large bottom, ſet it in the Sun for a while, ſtirring it five or ſix times a day with a ſtick, till it wax hard like paſte. Then take of this paſte, to which put Musked Roſe water; keep it eight days in the Sun, ſtirring it as aforeſaid, ſo long as it may be neither too hard nor too ſoft; then put it up in boxes or pots.

IV. *To make the ſame Soap musked.*

Put to the ſaid Soap, Roſe water two pound, fine musk in powder half a drachm, then mix the ſaid water as before.

V. *Another exquiſite Soap.*

Take of the aforeſaid *Lixivium* or oil of Tartar *per deliquium* twelve pound, oil Olive three pound, mix them, *Amylum* two pound, Roman Vitriol one ounce in powder, Glair of eggs two ounces, put all together, and ſtir continually for four hours time, then let it ſtand the ſpace of a day and it is done. You may perfume it as before; this makes the hair fair.

VI. *Another exceeding the former.*

Take Crown-ſoap, Vine-aſhes of each one pound, make it into Cakes with powder of Roch Alom and Tartar of each alike, which you may perfume at pleaſure.

VII. *To get the juice or milk of Macaleb.*

Take the ſweet and odoriferous grains of *Macaleb*, which beat in a mortar (with Roſe water, or ſome perfuming

perfuming water) till it becomes like pap, then preſs out the juice or milk; which uſe within two or three days leſt it ſpoil.

CHAP. LIV.

Of Burning Perfumes.

I. *To make perfumed lights.*

Take *Olibanum* two ounces, Camphire one ounce, beat them into powder, of which make, with wax, balls or rouls, which put into a glaſs lamp with Roſe water and lighted with a candle, will give a fair light, and a very good ſcent.

II. *Another for a Lamp.*

Take ſweet oil Olive one pound, Benjamin, Storax in powder one ounce, Muſk, Ambergrieſe of each one ſcruple, mix all with the oil, which put into a lamp to burn: and the oil will yield a fragrant odour.

III. *To make perfumed Candles.*

Take *Labdanum*, Myrrh, *Xyloaloes*, *Styrax calamita* of each one ounce and a half, Willow Charcoal one ounce, Ambergrieſe, Muſk of each ten grains, make them into paſte with mucilage of Gum *Tragacanth* in Roſe water, which make into rouls like Candles, and dry for uſe.

IV. *A perfume to ſmoak and burn.*

Take *Labdanum* two ounces, Storax one ounce, Benjamin, Cloves, Mace of each half an ounce, Muſk, Civet of each ten grains, all in fine powder, make up into cakes with mucilage of gum Tragacanth in Roſe water, which dry, and keep among your cloaths; which when occaſion requires you may burn in a chafing-diſh of coals.

ſing and ſmoothing them well; laſtly, waſh them in musked water, letting them lye therein for a day, then dry them with care. This done, ſteep *Musk*, *Amber*, *Bazil* of each one drachm in a quart of ſweet water, in which diſſolve gum *Tragacanth* three drachms, boil all gently together, and in the boiling add *Zibet* one ſcruple, with which beſmear the Gloves, rubbing and chafing it in, then drying them according to Art.

IV. *Or thus*, Firſt waſh the Gloves or Skins in white-wine, then dry them in the ſhade; then waſh them in ſweet water, mixed with oil of Cloves, and *Labdanum* of each alike: laſtly, take Musk, Civet, Ambergrieſe of each the quantity of ſix grains, oil of Musk half a drachm, mucilage of gum Tragacanth fifteen grains, mix them well together in a mortar, which chafe into the waſh'd Gloves before the fire.

V. *Cloths*, *Linnen or Woolen*, *Coffers*, *Trunks* and the like, are beſt perfumed (with little coſt) with the ſmoak of burning Perfumes.

CHAP. LVIII.

Of making various ſorts of Ink.

I. *To make good black writing Ink.*

Take ponderous galls three ounces in powder, White-wine, or in place thereof rain water, which is better, three pound, infuſe them in the Sun or in a gentle heat two days: then take Roman Vitriol well coloured and powdred, which put therein, and ſet all in the Sun for two days more; ſhake all together, to which add of good gum Arabick in little bits one ounce, with a litte white Sugar, which diſſolve over a gentle fire.

II. *To*

II. *To make red writing Ink.*

Take Raſpins of Brazil one ounce, white lead, Alom of each two drachms, grind and mingle them, infuſe them in Urine one pound, with gum Arabick eight ſcruples.

III. *Another way to make red Ink.*

Take Wine-vinegar two pound, Raſpings of Brazil two ounces, Alom half an ounce, infuſe all ten days; then gently boil, to which add gum Arabick five drachms, diſſolve the Gum, ſtrain, and keep it for uſe.

IV. *To make green Ink to write with.*

Make fine Verdigrieſe into paſte with ſtrong Vinegar, and infuſion of green galls, in which a little gum Arabick hath been diſſolved; let it dry, and when you would write with it, temper it with infuſion of green Galls aforeſaid.

V. *Another way to make green Ink to write with.*

Diſſolve Verdigrieſe in Vinegar, then ſtrain it, and grind it with a little honey and mucilage of gum Tragacanth, upon a porphyry ſtone.

VI. *To make blew Ink to write with.*

Grind Indico with honey mixed with glair of eggs or glew water, made of Iſinglaſs diſſolved in water, and ſtrained.

VII. *To make red writing Ink of Vermilion.*

Grind *Vermilion* well upon a porphyry ſtone, with common water; dry it and put it into a glaſs veſſel, to which put Urine, ſhake all together, let it ſettle, then pour off the Urine; and putting on more Urine, repeat this work eight or ten times, ſo will the *Vermilion* be well cleanſed; to which put glair of Eggs, to ſwim on it above a fingers breadth, ſtir them together, and ſetling abſtract the glair: then put on more glair of eggs, repeating the ſame work eight or ten times alſo,

to

to take away the ſcent of the Urine: laſtly, mix it with freſh glair, and keep it in a glaſs veſſel cloſe ſtop'd for uſe. When you uſe it, mix it with water or vinegar.

VIII. *To make Printers black.*

This is made by mingling Lamp black with liquid Varniſh, and boiling it a little, which you may make thick at pleaſure. You muſt make it moiſter in winter, than in Summer; and note that the thicker Ink makes the fairer letter.

If it be too thick, you muſt put in more Linſeed oil, or oil of Walnuts, ſo may you make it thicker or thinner at pleaſure.

IX. *To make red Printing Ink.*

Grind Vermilion very well with the aforeſaid liquid Varniſh or Linſeed oil.

X. *To make green Printing Ink.*

Grind Spaniſh green with the ſaid Varniſh or Linſeed oil as aforeſaid: And after the ſame manner, may you make Printers blew, by grinding Azure with the ſaid Linſeed oil.

CHAP. LIX.

Of making Sealing Wax;

I. *To make red Sealing Wax.*

Take white Bees wax one pound, Turpentine three ounces, Vermilion in powder well ground, oil Olive of each one ounce, melt the wax and Turpentine; let it cool a little, then add the reſt, beating them well together.

II. *To do the ſame otherwiſe.*

This is done by taking away the Vermilion, and adding inſtead thereof red Lead three ounces, to the former things.

III. *To*

III. *To make green Wax.*

Take Wax one pound, Turpentine three ounces, Verdigrieſe ground, Oil Olive of each one ounce, complete the work by the firſt Section.

IV. *To make black Wax.*

Take Bees Wax one pound, Turpentine three ounces, black earth, Oil Olive of each one ounce, mix and make Wax as aforeſaid.

V. *To make Wax perfumed.*

This is done by mixing with the Oil Olive aforeſaid, Musk, Ambergrieſe, or any other eminent Perfume, as oil of Cinnamon, *adeps Roſarum*, or the like one drachm, more or leſs, according as you intend to have its ſcent extended.

VI. After the ſame manner you may make Sealing wax of all colours, having what ſcent you pleaſe; by mixing the ſcent intended, with the Oil Olive, and putting the colour in, in place of the Vermilion.

CHAP. LX.

Of the various ways of making Artificial Pearls.

I. THe *firſt Way.* Diſſolve mother of Pearl in ſpirit of Vinegar, then precipitate it with oil of Sulphur *per Campanum* (not with *Oleum Tartari*, for that takes away the ſplendor) which adds a luſtre to it; dry the precipitate, and mix it with whites of eggs; of which maſs you may make Pearls, of what largeneſs you pleaſe, which before they be dry, bore through with a ſilver Wire, ſo will you have pearls ſcarcely to be diſcerned from thoſe which are truly natural.

II. *The ſecond way.* Take Chalk, put it into the fire,

fire, letting it lye till it breaks; grind it impalpable, and mix it with whites of eggs, of which form pearls, boring them as aforeſaid; dry them, then wet and cover them with leaf ſilver.

III. *The third way.* Take prepared Crabs eyes, ground into impalpable powder, and with glair make Pearls; which bore, as aforeſaid; dry them, and boil them in Cows milk; then in the ſhade (free from duſt) dry them well; they will pleaſe.

IV. *The fourth Way.* Take potters earth, and make them of what form you pleaſe; dry them in the Sun, or in the gentle heat of a furnace; then wet them with glair of eggs, lightly coloured with Bole armoniack, and cover them with leaves of ſilver, being firſt wet with water: when they are dry, poliſh them with a tooth, and they will be Oriental. Then take bits of Parchment, and waſh them in warm water, till the water grows ſomewhat thick, boil and ſtrain it, and uſe it warm: then faſten each pearl through its hole upon a fine piece of wire, and plunge them into the water of Parchment, taking them out again; then turn them round, that the glewy liquor may equally cover them: thus the ſilver whiteneſs will the better ſhine through, ſo that the pearls will ſeem to be truly natural, and being compared, will rather exceed.

V. *The fifth Way.* Calcine Muſcle and ſnail ſhells in a Crucible, till they are very white, even as ſnow; with glair make Pearls, which bore by the firſt Section; dry them in the Sun; dip them in red wine, dry them again, and they will be fair.

VI. *The ſixth Way.* Take *Sublimate* two ounces, *Tinglaſs* one ounce, mix them, and ſublime them together, and you will have a ſublimate not inferiour to the beſt orient Pearls in the world, of which with glair, you may form what you pleaſe.

VII. *The*

VII. *The ſeventh Way.* Take any of the aforeſaid particulars, and mix them (inſtead of glair) with ground Varniſh, (made of gum Anime, and the *Alcool* of wine) of which make pearls; theſe will in all reſpects be like the natural; for theſe will no more diſſolve in water, than the truly natural; which all thoſe that are made of glair of eggs are unavoidably ſubject to.

VIII. *The eighth Way.* After diſſolution, precipitation, edulcoration, ſiccation and formation, put the pearls into a loaf of bread, and bake it in the Oven with other bread, ſo long till the loaf is much burnt, then take them out, and waſh them, firſt in good juice of Limons, then in clear Spring water; and they will be as fair as the truly natural. Or after baking, give them to pidgeons to eat, keeping them cloſe up, and in the dung you will find the pearl exceeding fair: where note, you muſt give the pidgeons nothing to eat in three days time.

IX. *The ninth Way.* After diſſolution of ſmall oriental pearls in juice of Limons, make the form thereof with clarified honey, moiſtning your hand with *Aqua Mellis*; this done, perfect them as before.

X. *The tenth Way.* Take filtrated juice of Limons, powder of pearl of each ſix ounces, *Talk* one ounce, put them into a glaſs, and ſtop it cloſe, ſet it fifteen days in horſe-dung, and it will be a white paſte; of which form pearl, bore them, and dry them in the Sun; at laſt in paſte of barley meal (*viz.* a barley loaf) four fingers thick, ſtick the pearl, ſo that they may not touch, ſtop the holes, and cover them with paſte; ſet it into an Oven, and bake it with bread, and you will find them hard and clear.

XI. *The eleventh Way.* Having formed them of the matter intended, bored and dryed them, put them in-

to Quickſilver, ſet over a glowing heat, ſtirring them well about, that the Quickſilver may ſtick to them; then dip them into glair of eggs, upon a glowing heat, and they are done; or being dry, boil them in Linſeed oil, and waſh them in warm water.

XII. *The twelfth Way.* Take pearl three ounces, prepared Salt one ounce, filtrated juice of Limons, ſo much as will cover them four fingers breadth: let it ſtand ſo long till it be a paſte; the glaſs being very cloſe ſtopped, ſhake all together five or ſix times a day; and when it comes to a paſte put it into a glaſs with ſtrong ſpirit of Vinegar, lute another glaſs over it; digeſt it three weeks in a cool place under the earth, ſo long till all be diſſolved, then mix it with a little oil of eggs, or ſnail water, till it be like pearl in colours; then put this paſte into ſilver moulds, and cloſe them up for eight days; after which take them out, and bore them by the firſt Section, and put them again into the mould for eight days; this done, boil them in a ſilver porringer with milk; laſtly, dry them upon a plate, in a warm place, where neither wind nor duſt may come, and they will be much fairer than any oriental pearl.

XIII. *The thirteenth Way.* After the preparation of the matter in juice of Limons, or *Aqua fortis*, with clean hands make them into paſte, and waſh them in diſtilled water, which put into edulcorate calx of ſilver, and digeſt in Horſe-dung for a month, ſo will they be fair and very oriental.

XIV. *The fourteenth Way.* Diſſolve the matter in *Aqua fortis* (which let over-top it a fingers breadth) in a glaſs gourd, till all be incorporated into one body, which put into ſilver moulds, which have holes through them, and having ſtood one day, bore them through the holes, as they lie in the mould with a ſilver needle: being quite dry, take them out, put them into

into a glaſs cloſe covered in the Sun, till they be quite dry; then put them upon a ſilver wire; and let them lie covered in their own fat (that is, that fatty ſubſtance which ſwims on the top of the menſtruum in their diſſolution) ſo long till they are very fair, then being ſtrung, put them into a glaſs egg, and let them ſtand nine days in digeſtion, and they will be as fair as the natural.

XV. *The fifteenth Way.* Take Tobacco-pipe clay, of which form little beads (by the fourteenth Section) dry them in the Sun, and burn them in a potters furnace; then cover them with Bole armoniack, tempered with whites of eggs; being dry, dip them in water, lay on leaf ſilver, which dry again, and poliſh them with a tooth: then take clean ſhavings of parchment, cut ſmall, and waſhed well with warm water; boil them in a new pot, with a ſlow fire, till they become ſomewhat thick, ſtrain it, and being warm put in the pearl upon a needle or fine wire, that the hole may not be ſtopped, take them out, turn them round, that the water or glew may not ſettle in one place, dipping them ſo often (drying them every time) till they be thick enough, and they will appear full as fair as the truly natural.

CHAP. LXI.

Of the Conſummation or Perfection of the Art of Painting.

AS Invention gave way to the advancement of Art; ſo the advancement of the ſame made way for its Perfection.

The invention aroſe from the appearance of things natural, conceived in *Idea*'s, as we have abundantly