

BOOK the Fourth, of the Second Volume.

Of BITUMENS or Sulphureous MINERALS.

The P R E F A C E.

THE Word Bitumen, to speak properly, signifies a fat, sulphureous, inflammable Matter, which is found of different Colours and Consistence, either within the Earth, or upon it, or Swimming upon the Face of the Waters: Of these we have several Sorts, some hard, others soft, and some liquid, like Oil. The hard Bitumens that we sell, are the Yellow Amber, Black Amber, or Jet; Jews Pitch Natural and Artificial; Pit Coal, Cannal Coal, or Black Stone, and Sulphur: The soft Sorts are Naphtha, the Bitumen of Colao, of Syrnem and Copal; The Liquid are Naphtha of Italy, and the Petroleum, or Rock Oil; of all which hereafter in their Turns.

1. Of Yellow Amber.

Pomet. **Y**ellow Amber, to which the Ancients have given the Name of *Succinum*, or *Carabe*, is a Bitumen of different Colours, being either White or Yellow: This Bitumen is liquid when 'tis in its natural Place of Production, but as it comes from thence it hardens and becomes such as we see; and as it passes from its Recesses in the Earth in a State of Fluidity, swimming upon the circulating Waters, it is apt to carry with it what is in its Way, which is the Reason we find many extraneous Bodies in our Amber, which also nor hardening all at once, but by Degrees, a great ma-

ny Insects stick to it and there die. Most of the Yellow Amber we have is found upon the Banks of certain small Rivers, running into the *Baltick Sea*, in the *Ducal Drussia*: It is also found upon the Sands, which have been cast up by the Winds; and is a Commodity which brings no inconsiderable Profit to the King of Prussia, for he raises above 20000 Crowns per Annum from these Places where it is found, over and above the great Charge they are at in Securing and Preserving it from others; so that it necessarily follows, that this same Yellow Amber yields a yearly Rent of more than 100000 Livres.

What I say may perhaps seem strange to those that don't know the great Use there is

is of *Amber* in *China*, and amongst the *Savages*, as well as in *Europe*; but the greatest Consumption of it is in *Austria*, *Germany*, in *Poland*, and in the Neighbourhood of *Venice*; and the *Venetians* were the First that brought it into such Vogue and Fashion thereabout, there being few People in *Lombardy*, or all along the *Po*, but wear *Amber* Necklaces, believing they keep 'em from Quinzyes, and other ill Effects of the Neck and Throat, to which they are very subject, by Reason of the bad Waters they are forc'd to drink in those Parts: And History informs us, that the *Romans* made such Account of it, that *Nero* caus'd great Quantities of it to be imported; but no where is *Amber* more esteem'd and valu'd than in *Poland* and the lower *Hungary*, a pretty handsome Piece, without Fault or Flaw, being there as valuable, and prefer'd even to Gold; such Lovers and Admirers of this Commodity are they. As for *France*, 'tis by no Means so much in Esteem there, though 'twas not many Years ago that all People of Quality and Fashion wore Necklaces of it, but at present it's become so vulgar and common, none but Servants make Use of it. Beside the great Use of *Yellow Amber* for Trinckets, &c. 'tis of some Use too in Medicine, not only to powder, but to draw a Tincture, a Spirit, volatile Salt, and an Oil, and to make a Varnish with Spirit of Wine.

Amber ought to be clear and transparent, capable of attracting Straws, whence comes its Name of *Carabe*, which in the *Persian* Language signifies *draw Straw*. When it is design'd for any Piece of Workmanship, or to powder, it shou'd be white; but when it is to undergo the Fire, it matters not of what Colour it be, provided 'tis genuine *Amber*; for there are a great many that sell the *Copal* of *America* for it, of which I have spoken above, but it is easily distinguish'd from it, the *Copal* being in Pieces of the Bigness and Figure of Gum Arabick, and the true *Carabe* ordinarily in great Lumps, and also most commonly in a Sort of Film or Skin, which serves as a Kind of Matrix for it; and then again *Amber* burnt at the Candle sends forth an exceeding strong Smell; and moreover, as has been noted, will attract Straw, which *Copal* will not do. Some have assur'd me that *Yellow Amber* is counter-

feited with Turpentine and Cotton, or with Yelks of Eggs and Gum Arabick: But as this Sort of false *Amber*, wou'd be worth little or nothing, I cannot conceive how any one need fear its being disguis'd with those Druggs.

Amber is powder'd upon a Porphyry, and reduc'd into Troches, which are of some Use in Physick, particularly to restrain Spitting of Blood, and to stop Dysenteries and other Lasks. Dose from ten to thirty six Grains in any appropriate Vehicle. Also from Powder of *Amber*, with Spirit of Wine, is drawn a Yellow Tincture, endow'd with a great many good Qualities, especially in apoplectick and epileptick Fits, and paralytick Cases, taken from ten Drops to a Dram in any agreeable Liquor: Some dissolve pure fine Camphir in this Tincture to make what Monsieur *Soleysel* calls the *Flaming Balsam*, and recommends for Wounds, Bruises, or cold Humours in Horse or Man, which may be seen describ'd in his Book, p. 274.

Karabe, *Succinum*, *Electrum*, *Ambera Citrina*, or *Yellow Amber*, is a Lemery. hard Matter, like a Stone, yellow citron, or white, of a fine, shining, transparent Colour, that is brought from the *Ducal Prussia* in Pieces of different Shapes and Sizes: This *Amber* is thrown by the Waves of the Baltick Sea up the Rivers of *Prussia*, especially by certain Winds. They likewise find both the liquid and solid on the Banks of several little Rivers, and upon the Brooks that are about the same Sea; that which is liquid hardens in a little Time, and becomes solid as the other.

Opinions are divided upon the Nature and Origin of *Amber*; the Ancients believ'd that it was a Mixture of Gum and Rosin that flow'd from Poplars, Pines, or Firs, which being confus'dly carried by the Winds into the Baltick Sea, incorporated with the Salt, and was elaborated or work'd up, and then thrown by the Waves upon the Banks of the Rivers. This Notion is rejected by the modern Authors, who have all writ that *Succinum*, or *Amber*, is a *Bitumen* or Juice of the Earth, which the Sea has rais'd up, and the Waves thrown a Shore about the *Ducal Prussia* where it is form'd, and hardens after the Manner we see it in. I my self follow'd

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low'd this last Opinion in my Book of Chymistry: But as I have been convinc'd, since by several Circumstances, I have changed my Opinion, and found that the Thoughts of the Ancients, on this Subject, were preferable to those of the Moderns: For first of all, Travellers know that about the *Baltick Sea*, on the Coast of *Sweden*, there grows Abundance of *Poplars*, *Pines*, and *Firs*, from which there flows in Summer a great Quantity of Gum and Resin, which is partly blown into the Sea by the Winds.

In the next Place, the Substance, the Colour, and the Transparency of that resinous Gum, resembles much those of *Amber*; for we have *Gum Copal* brought us that flows from *Poplars*, in the *Antilles Isles*, and has no other Elaboration than what it receives from the Torrent of the Water in the Rivers, from whence they take it, as has been said in its proper Place; and it is so like *Karabè*, that those who know it not well may easily be deceiv'd, from whence it is call'd, *Falsè* or *Counterfeit Karabè*. *Amber*, indeed, is something harder, of a higher Colour, more transparent and resplendent than *Gum Copal*, but these Perfections come from the Salt that is mix'd in it, a long Fermentation and Working it meets with in the Sea, besides the Mixture of the Pine with the Resins of *Poplar*, &c. In the third Place the Principles that are drawn from the true *Karabè* by Chymistry, are likewise those that are taken from *Gum Copal*, or the resinous Gums.

Choose your *Amber* in fine, large, hard Pieces, clear and transparent, that will attract or draw to itself Straws, and several other little light Bodies, when the *Amber* is rub'd in your Hand, or otherwise, and apply'd near the same. The white *Karabè* is preferable to the yellow, but the Difference is not considerable: They use both Sorts to make Necklaces, Bracelets, and little Cabinets, with several other Nick-Nacks that are carry'd into *Persia*, *China*, *Turkey*, where the Natives esteem them as great Rarities. They likewise make *Amber Necklaces* in *Austria*, *Germany*, in *Venice*, and sometimes in *France*.

In Pieces of *Amber* there are sometimes found Spangles, Leaves of Trees, or little Insects; as Spiders, Ants, Flies, &c. This

Circumstance has given Occasion to Naturalists to enquire How these little Bodies become enclos'd in the *Amber*; and it appears to me that the Difficulty is easie to resolve, since from the Opinions given, touching the Nature of *Amber*, it has been thought necessary to admit that the Substance of it was sometime liquid or soft before it harden'd; that during that Time these small Bodies adhered to it, as to Glue, and were wrap'd up in it, or rather were cover'd and enclos'd therein by the Addition of fresh Matter of the same Kind; so that when the Whole was harden'd, these little Bodies remain'd wholly embalm'd, as we now see them.

The *Karabè* contains in it a great deal of Oil and volatile acid Salt; it stops the Flux of the Belly, Hemorrhages, Gonorrhea, and resists Poison: The Dose is from ten Grains to half a Dram; they likewise burn it over the Fire to receive the Fume of it, which checks the Violence of Rheum from the Head, and Catarrhs. *Karabè* is a *Persian* Name that signifies *draw Straw*; and they have given this Name to *Amber*, because it attracts Straws, especially when it has been a little rub'd in the Hand. The Reason of that Effect proceeds from this, That the subtil and insensible Particles of the Matter having been put into Motion with some Kind of Heat that follows the Friction, they emit on all Sides their Effluvia, and spatter it in the Air within their Circumference; but as they lose their Motion according to the Distance they are from their Center, they become so much weaker, and are on all Sides repell'd by the Air, and in their Return they stick by their Viscosity to a Straw, or any other light Body they meet with in their Way, and drag it along with them; the same Effect happens to several other Substances, which are rub'd after the same Manner as Wax, Suet, and divers Gums; this is call'd *Succinum*, from *Succus*, because it is suppos'd to be the Juice of the *Poplar*, or of the Earth.

Of the Spirit and Oil of Amber.

From *Amber* grossly powder'd, put into a Glass or Earthen Retort, may be drawn a reddish Spirit, and greenish fetid Oil.

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The Spirit of Amber is esteem'd an excellent aperitive or deobstruent, and very good against the Scurvy, taken in any Liquor, from ten to twenty-four Drops.

As for the Oil it is chiefly in Use to allay and drive down Vapours, being put upon Silk or Cotton, and rubbing the Wrists or Pulse, and the Nose therewith. If you'd have this Oil of a fine clear reddish Colour, you have nothing to do but to mix with it a little Earth or Sand, and to distil it again.

Those that wou'd have a volatile Salt, or Spirit, or Oil of White Amber, may perform all the three Operations very well, with a Glass Retort, and a Sand Heat: As for the volatile Salt, if you find it not good and fine enough, you need only put it into a small Vial, or Glass Bottle, and to sublime it upon a gentle Fire, taking Care to keep it well stop'd; for this is a ticklish Commodity that will evaporate and lose itself in the Air, and that which you'll find in the Retort, is of a fine shining Black, resembling the Bitumen of Judea, or Jews Pitch.

2. Of Black Amber, or Jet.

Pomet. **J**ET, which with good Reason, may be call'd *Succinum Nigrum*, or Black Amber, is also a Sort of Bitumen found in the Bowels of the Earth, but seldom near the Waters; it is a sulphureous Fossil, very hard, and of a glittering or shining Black, found in several Places of Europe, as well in Germany and Sweden, as in Ireland; as also in France, between St. Beaume and Toulon; and in Ireland it is so common, that as you go along you may see Veins of it running through the Stones and Rocks. Some Authors are of Opinion that Jet is the Yellow Amber divested of its Oil, drawn out by the subterranean Fires, and that from thence proceeds *Naptha* and *Petroleum*, which does not seem very repugnant to good Sense.

Jet is of a like Use with Yellow Amber for Ornaments and Decoration, but in Medicine it is only made use of for its Oil, which serves for the same Purposes as that of the other.

As to the Choice of it, 'tis sufficient to be of a shining Black as the Proverb bespeaks it.

Gagates, in French *Geest*, *Jays* or *Fayet*, and in English, *Jet*, is Lemery. a Bituminous Stone, that is hard, black and smooth, found in several Parts of Europe; as Germany, Sweden, Provence and Ireland, in the Stone Quarries among the Rocks; it yields a good deal of Oil, and a little volatile penetrating Salt.

Some People are of Opinion that Jet is an Amber whose volatile Parts have been separated by the subterranean Fires, and become what we call *Petroleum*: Chuse such as is near, hard, and of a fine shining Black; it dissolves, is emollient, expels Wind, and allays Vapours: The Dose from a Scruple to a Dram. The Name comes from *Gaga*, a River and City of *Lycia*, from whence Jet is sometimes brought.

3. Of Jews Pitch.

THE Jews Pitch, or *Asphaltum*, is a Bitumen found swimming upon the Waters of the Lake, where heretofore stood the Cities of *Sodom* and *Gomorra*, and the Name *Asphaltum* comes from the Dead Sea, or *Lacus Asphaltites*, which signifies the Lake of Trust, being so very strong, that every Thing almost swims that is thrown into it; and it is call'd *Mare Mortuum*, or the Dead Sea, because no Fish or other Beast can live in it, through the extreme Saltness and Bitterness, and noisome Smell of its Waters; but in Recompence there are great Quantities of this Bitumen found floating thereupon like Grease or Fat, of which the Coasters, who are *Arabs*, make very considerable Advantage; it being what they use to lay upon and besmear their Ships and Boats with, as the Northern Nations do with common Pitch: And one Thing is very remarkable, that when this Lake is very full of this Bitumen, there arises such a Stench in the Air, that the Inhabitants thereabout are necessitated to gather it and put it a Shore, and so noisome at that Time is the Smell that all Birds that fly over it fall down dead; and this is the Reason why the People in the neighbouring Places are so short liv'd.

The Bitumen of Judea, or *Asphaltum*, so much resembles the best Black Stockholm Pitch,

Pitch, that were it not for the strong Smell of *Pitch*, and that it is not so hard as the *Asphaltum*, no one could distinguish the one from the other.

The Use of this *Bitumen* is to make the fine shining Blacks of *China*. It also is of some small Use in Medicine, for that it enters the Composition of the *Venice Treacle*, for which Purpose it needs no other Preparation than to be true or genuine, that is to say, of a most beautiful, shining, polish'd Black, reflecting the Image of the Sun, and of no Manner of Smell; and to see that it be not adulterated, or mix'd with *Black Pitch*, which is what is call'd the *Artificial* or *Facitious Pissasphaltum*; it is no difficult Matter to discover this artificial *Bitumen*, being of a very base Black, and a strong Smell. 'Tis a Mistake to believe as some Authors do, particularly *Monfieur Furetiere*, that we have no *Bitumen* of *Judea* brought us now a Days; and that the Apothecaries, instead of it, sell a Composition which they make of *Pitch*, and the Oil of *Petre*, a Thing that don't stand to Reason, nor can I conceive 'Pothecries to be such Knaves and Fools, to do any such Thing, since the true *Bitumen* is reasonable enough in its Price; so that it wou'd have been better for these Scribblers, and all such as have undertaken to write of *Druggs*, without understanding them well, to have been silent; for they have made, and still do make horrid Blunders about *quid pro quo*, or in substituting succedaneous *Druggs* or Medicines, which is a Matter concerns the King and the Commonwealth.

Bitumen Judaicum, *Bitumen Lemery*. *Babylonicum*, *Asphaltus*, is a solid, brittle, black Matter, resembling *Black Pitch* that is sulphureous and inflammable, and in Burning sends forth a strong disagreeable Smell; It is found swimming upon the Surface of the Lake, or *Asphaltite Sea*, otherwise call'd the *Dead Sea*, where stood, some Time ago, the Cities of *Sodom* and *Gomorrha*. This *Bitumen* is cast up from Time to Time in the Nature of liquid *Pitch*, from the Earth that lies under this Sea, and being thrown upon the Water it swims like other fatty Bodies, and is condens'd by little and little thro' the Heat of the Sun, and the Salt that is in it.

The Inhabitants of the Country are con-

strain'd to take it from thence and carry it a Shore, not only because it brings them Profit, but also because the Lake being too much loaded with this *Bitumen*, yields a stinking and malignant Smell, which spoils the Air, affects their Health, and shortens their Days: The Birds that fly a-cross it fall down dead, and it is call'd the *Dead Sea*, because of the Stench, Bitterness, and excessive Saltiness of it; so that neither Fish or any other Creature can live upon it. The *Arabs* use this *Bitumen* of *Judea* to pitch their Ships as we do common *Pitch*, and there was a great deal of it employ'd in the Embalming of the Ancients.

Chuse such as is clean, of a fine shining Black, solid, and harder than *Pitch*, having no Smell but when it is held to the Fire; take Care it be not mix'd with *Pitch*, which may be known by the Smell: They use this to make your fine shining Blacks of *China*; it yields a good deal of Sulphur, partly exalted, with volatile Salt and a little Earth; it fortifies and resists Putrefaction, resolves, attenuates, and cleanses cicatrizes Wounds, and is us'd externally and internally.

It is suppos'd that the Word *Bitumen* comes from the Greek Word *πιττω*, which signifies a *Pine*, and which has been chang'd by Corruption, the π being alter'd into a β , from whence they pronounc'd it *Bitumen* instead of *Pitumen*: This Etymology is taken from the Opinion of the Ancients, that the *Bitumen* of *Judea* was a *Pitch* that flow'd from Pines and several other Trees about the Lake of *Sodom*: So were the *Jews* of that Opinion before; the Prophet *Esdra*s (speaking of *Sodom* and *Gomorrha*, says, that the Earth is founded upon *Pitch* and Heaps of Ashes.

4. Of Pit Coal.

Earth or *Pit Coal*, is a Sort of *Bitumen* chiefly us'd by Farriers *Pomets* and other Sorts of Smiths to heat their Iron; that of *England* is esteem'd the best, though there are some that say ours of *Auvergne* comes very little behind it; 'tis made a great Traffick, being a Commodity much us'd in *France*; the best is pretended to be most void of Sulphur, and consequently that which will keep Fire longest. Some will

will have it that this Sort of Coal is the Refult of *Petroleum* made in the Bowels of the Earth, which is probable enough, since out of it may be drawn an Oil altogether like the Oil of *Petre*.

It is call'd in Greek, *Lithan-Lemery*, *thrax*; in Latin, *Carbo Petre*, or *Carbo Fossilis*; and in English, *Coal*; and is distinguish'd into *Sea Coal* and *Pit Coal*, only upon the Account of that which is generally carried by Sea; all Coal being properly speaking *Pit Coal*, which is chiefly found in England, Scotland, Ireland, Germany, &c. and is an impure Sulphur, mix'd with many gross and earthy Parts, and a volatile Salt, being strong, friable, and black: In Distillation it yields an acid Spirit, reddish Oil, black Balsam, and volatile Salt, like Amber; which is but too well known to the Chymists of this Age, who adulterate most of the Preparations of their Shops, that are either chargeable or troublesome, and tedious in the Operation: The Virtues of this are in a lower Degree subservient to those of Amber, as well internally as externally apply'd.

5. Of Terra Ampelites, or Cannal Coal.

Pomet. *Terra Ampelites*, or *Cannal Coal*, is a dry Bitumen impregnated with Sulphur, that easily splits into Scales, and is reduc'd to Powder, found in the Entrails of the Earth in many Places of France: We have two Sorts of it, the one soft, the other hard, which comes from near *Alençon*, in the Province of *Maine*; the Propriety of the Quarry whence 'tis taken, belongs to a Curate of a Parish, who makes seven or eight hundred *Livers per Annum* of it; the Quarry is a Matter of forty or fifty Foot deep; and though this is a Merchandise of low Price, yet they make a good Trade of it; there hardly being any Artificers in Stone or Wood, but what make use of it more or less. That which is good must be lately taken from the Mine, for when 'tis stale and old it resolves into a Powder and becomes a Saltpetre; it ought to be light, neither too soft nor too hard; some have given it the Name of *Vine Earth*, because it kills or drives a-

way the Worms from the Leaves of Vines; also it is call'd *Pharmacitis*, because 'tis us'd in Medicine.

Ampelitis, *sive Pharmacitis*, the Black Stone, or Medicinal Earth, *Lemery*, is a very bituminous Stone, black as *Jet*, splitting into Scales, and is easily reduc'd to Powder; they get it from a Quarry near *Alençon* in France: There are two Sorts of it, one soft and the other hard; it affords Abundance of Sulphur and Salt: It is proper to kill Worms apply'd to the Belly, and to dye the Hair Black: Some use it as an Antidote to destroy all Vermine, apply'd to the Vine Roots.

6. Of Sulphur Vivum, or Native Sulphur.

Sulphur Vive is an Earth or Clay *Pomet.* easily inflammable, that in burning emits a bituminous Smell, brought us from *Cicily* and other Places. As to the Choice of Live Sulphur, so call'd, because it is sold and made use of just as it comes out of the Earth; let it be tender or soft, friable or easy to be broken, smooth, shining without as well as within, and of a Sort of Mouse Dun, or Grey, as free from Gravel and Dust as possible.

This Sort of Sulphur is very little in Use, unless it be for some particular Operations, and certain galenical Compositions, but pretty much us'd by Vintners, who mix it with Sugar, Anis, Cinnamon, Nutmeg, Cloves, &c. to sweeten and preserve their Vessels.

Some Apothecaries pound it with *Scammony*, which they call *Prepar'd Scammony*, or *Diagrydium*, and so make a better Market of it than their Neighbours, who take Pains to prepare it as it ought to be.

7. Of Mineral Sulphur.

Sulphur Mineral is a hard earthy Bitumen, of a yellow Colour, and bright enough, of a fetid sulphureous Smell, easie to be melted or burnt, and is more or less beautiful, as 'tis more or less mixt with Impurities it meets with in the Mine.

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This Mineral Sulphur comes from Mount Vesuvius; as to the Choice of it, though indeed 'tis made but very little Use of, let it be in handsome Lumps, of a golden Yellow, bright and shining, and as little as may be mix'd with Earth or other Filth.

Its Uses and Qualities are no other than like those of the common factitious Brimstone that is made of this, which we are going to speak of under the next Head.

Of Sulphur in Rolls, or Common Brimstone.

The common factitious Sulphur *Pomet.* or *Brimstone*, is made of yellow Mineral Sulphur melted, and, by the Assistance of right Train Oil and Moulds, cast into the Form in which we see it.

This Sulphur is more or less beautiful, and endow'd with good Qualities, according to the Degree of its Purification, and the Places where 'tis made; for that of *Holland* is much better, and more beautiful than that of *Venice*, or that of *Marseilles*, the three Places whence it comes, and where 'tis made: The Gentlemen of the *Royal Arsenal*, indeed, manufacture great Quantities, but make use of it all themselves.

In your Choice of this factitious Sulphur, or *Brimstone*, take such as comes from *Holland*, in large thick Rolls, of a golden Yellow, light, easie to break, and being held close, or grasp'd in the Hand, and apply'd to the Ear, crackles and makes a Noise, and at length breaks to Pieces, and being broken, appears as it were in Crystals, which are the true Marks of that of *Holland* and *Venice*; none of which were to be found in the *Marseilles Sulphur*, it being little better than a grey Sort of Earth. 'till of late, since we could have none from *Holland*, they have learnt the Art of well-working it there; and I think it has been our own Fault that we have suffer'd other Nations so long to run away with the Profit of Refining it as it ought to be: The Reason has been that no Merchants have undertaken to write of it, or enquire into the Manner of doing it; only a few Physicians, and some Apothecaries and others that have travell'd, but understood nothing of the Mystery of Trade, have set Pen to Paper concerning it, who acquit themselves but indifferently, when they tell

us that ordinary Sulphur in Rolls, or Common Brimstone, is made of Sulphur *Vive*; for that would be to turn Pewter into Lead, since the latter, tho' natural, is more valuable, that is, will sell dearer than the former, notwithstanding it be wrought; however, I would not be thought to discourage Authors, few Books being so ill written, but may contribute, in some Measure, to the Advancement of Knowledge; only in general it may be said, that the Subject one is going to treat of, ought to be understood before we begin to write.

There are several other artificial Sulphurs, as I have already taken Notice of, proceeding only from the different Preparations of different Countries; so the ordinary Sulphur of *Marseilles* is in small Rolls, the green Sulphur of the same Place, both in large and small Rolls, which Sort is esteem'd the best for Distillation, as shall be shewn hereafter.

There are a great many other natural Sulphurs, besides the two Sorts we ordinarily make use of, but they are not very common with us, because they come a great Way off, and we have 'em not in large Quantities.

The first and most desirable is that of *Quitto*, of a golden Colour, and an Amber Figure, found in great Abundance near the Gold Mines.

A second Sort is that of *Nicaragua*, which is in a yellowish grey Mass, altogether like that that was found, some Years since, in that Bank of Earth which was levell'd by *St. Martin's Gate*.

A third Sort is of *Switzerland*, resembling that of *Quitto*; and many more there are which I shall forbear to mention, there being no Demand for 'em.

The Use of Sulphur in Rolls, or Common Brimstone, is well known to all, and that it is one of the chief Ingredients of Gun-Powder; for which Reason, those that sell great Quantities of it to the *Arsenal*, for that Purpose, ought to discover it when 'tis faulty, that what is made of it may not fall short of Expectation. This Sulphur is us'd too in whitening Gawzes, Stockings, &c. for nothing blanches any Thing of Woollen like the Fume or Vapours of Sulphur.

It is also of some Use in Medicine, as well in the Body of many Prescripts, as to perform

form a great many Operations in Chymistry, as will be seen hereafter.

It is besides a Specifick in the Itch; but Care ought to be us'd in the Exhibition of it, for it now and then produces very ill Symptoms, nay even Death itself sometimes.

Sulphur, or *Brimstone*, is brought *Lemery*. to us from the *Caribee* Islands of the *West Indies*, and is found also in *Italy*, *Bohemia*, *Sicilia*, and *Melos*, being generated of the *Fat* and *Resin* of the *Earth*, filled with an acid and vitriolick Spirit: It is twofold, viz. *Natural* and *Artificial*, the *Roll Sulphur* is the latter; but if you would make right Oil of *Sulphur*, you must chuse the *Natural*, or *Sulphur Vivum*; but if that cannot be got, you must make use of the other, which yet you are to try, whether it easily inflames and burns constantly, if not 'tis not good, but is impure and adulterated with *Resin*, and such like Matters, whereby it becomes harder to kindle, and is easily extinguish'd, being *Caballine Sulphur*.

It is a noble Mineral even before Preparation, and is generally appropriated to the *Breast* and *Lungs*, and to cure all Diseases which disturb the same; it kills *Worms*, opens, cuts, resists *Putrefaction* and *Poison*, provokes *Sweat*, and is given in *Coughs*, *Colds*, *Phthicks*, *Wheezings*, *Shortness* of *Breath*, &c. Outwardly apply'd, it resolves all hard *Tumours*, cures corroding *Tetters*, *Scabs*, *Itch*, *Scurf*, *Morpew*, &c. dries up old *Sores* and *Ulcers*. Tho' this being finely ground, is sometimes us'd internally, yet the *Flowers* are more commonly us'd, as being a *Sulphur* open'd and purified from all *Filth*, whereby it is fitter for all internal as well as external Uses.

Of Flowers of Sulphur.

Flowers of Sulphur are prepar'd of *Pomet*. *Sulphur* calcin'd in *Pots* made for the Purpose, and then reduc'd into *Flowers* as we see: The best and most beautiful come from *Holland*; but of late, since they have been made at *Marseilles*, *Roan* and *Paris*, we have little thence. The true *Holland's Flowers of Sulphur* were wont to be brought us in *Cakes* that were light, soft, friable, and rather white than yellow; but through *Avarice* and the present Wars, there is no

such now; and the best that we have at present is from *Marseilles*, which tho' very good does not come near that I've mention'd of *Holland*, that us'd to be in an extraordinary fine impalpable Powder, of a bright golden Yellow, and of an agreeable Taste.

The third Sort is that of *Roan*, which usually is of a whitish Yellow, made up of *Sulphur* rais'd by a violent Fire, and *Meal* or *Wheat Flower*. or fine powder'd *Starch* added to it, which is all a Cheat; in like Manner is that which is generally hawk'd about, made of the *Dust* or *Dross* of *Holland Sulphur* beaten up, and then pass'd thro' a very fine Taffery or *Silk Searce*, but the Cheat is easily discover'd by the low Price this spurious Stuff is sold at.

Upon the Whole, *Holland's Flowers of Sulphur* are preferable to any other; next to them those of *Marseilles*, and these are the only two that ought to be given internally.

The true *Flowers of Sulphur* are a Natural Balsam for the *Lungs*, and endow'd with so many good Qualities, that 'twould be endless to pretend to recount 'em all.

Flowers of Sulphur are also made after another Manner, to wit, by adding to it fixt *Saltpetre*, or *Sal Polychrestum*, which is the Method we use to make it white; but there being little Demand for this Sort, it's seldom made, though it be a very good Medicine, and as agreeable to take as the above-mention'd.

To make *Flowers of Sulphur*: Take *Sulphur* grossly powder'd, *Lemery*. half a Pound; put it into a *Glass Body*, or *Cucurbit*; place it in a small open Fire, and cover it with another *Glass Body*, or earthen *Cucurbit*; turn the Bottom upwards, so as that the Neck of the Lower may enter into the Neck of the Upper; change the upper *Cucurbit* every half Hour, fitting another in its Place; adding likewise new or fresh *Sulphur*; the elevated *Flowers* sweep together with a *Hare's Foot*, and continue to do thus so long 'till you have what you desire. These *Flowers* are good against Diseases of the *Lungs*; Dose ten or twelve Grains in any fit Syrup, Pulp, or Electuary; outwardly you may mix them with *Hog's Lard*, for *Scurf*, *Tetters*, and the *Itch*; but be cautious of using it to *Infants*, especially anoint not any where upon the Trunk of the Body,

Body, and especially the Belly. If your Sulphur be sublim'd with *Sal Polychrest* you will have white Flowers.

Of Salt of Sulphur.

The Salt of Sulphur is made several Ways, but the best and easiest is according to Monsieur Charas's *Pharmacopœia*, p. 887, whether the Reader may have Recourse. This Salt is compos'd of Saltpetre refin'd, and Spirit of Sulphur, made in a Retort with a Sand Heat, into a white Mass, which has many good Qualities; or it may be made with the *Sal Polychrest*, or otherwise, as may be seen in Abundance of Chymical Processes which treat of it.

Salt of Sulphur is much in Use to temper and allay the Heat of Fevers: The Dose is not adjust'd, but 'tis sufficient to give it in any common Drink to an agreeable Acidity.

What Form one pleases may be given to this Salt; some will have it in a Mass, others in Crystals; some granulated, and others in Powder, or finally in Rolls; which last is a curious Method, and known but by few.

Of Magistery, or Milk of Sulphur.

The *Magistery*, or *Milk*, as 'tis call'd, of Sulphur, is made of the Flowers of Sulphur, and Salt of Tartar boil'd in Water; and then adding distill'd Vinegar to precipitate a Powder, which when dry'd will be white, and is esteem'd very good for the Lungs, and for Asthmatics.

If half a Pound of Flowers of Sulphur be mix'd with a Pound and an half of Salt of Tartar, or Pot-Ashes, and be boil'd in two Gallons of Water for six or seven Hours, the Sulphur will be all dissolv'd, and the Liquor become red: This filtred and mix'd by little and little with Spirit of Vinegar, or some other Acid, presently becomes white like Milk; let it stand to settle, and a white Powder will precipitate, which beingedulcorated by five or six Times washing in hot Water, and dry'd, is the *Lac Sulphuris*, which is better

than the Flowers for all the Diseases aforesaid, given from six Grains to fifteen: This is powerful against all Manner of Catarrhs and Fluxes of Rheum from the Head, that fall upon the Throat and Lungs; for it consumes and dries up all serous and watry Superfluities.

Of Spirit of Sulphur.

Spirit of Sulphur is a Liquor drawn from the green Sulphur, by the Assistance of Fire and certain Vessels, as Messieurs Charas, Lemery, &c. teach us; and as it is of different Colours, according as 'tis more or less divested of its Phlegm, so it has two different Names assign'd it: That which is just as it comes out of the Vessels is call'd *Spirit of Sulphur*, which when good ought to be as clear as Rock Water, and of an agreeable Acidity, and which put upon blue Paper will turn it red; but the best and surest Proof is to deal with honest Men for it.

The second Sort, to which improperly the Appellation of Oil of Sulphur has been given, is such as has been separated from its Phlegm or superfluous Humidity, and has a bright Yellow, or golden Colour, and is so very strong that it can't be endur'd upon the Tongue.

Some Hawkers counterfeit this Oil of Sulphur by a Mixture of Vinegar, and Spirit, or rather Phlegm, of Vitriol, or with Vinegar and Water, adding a few Drops of *Aqua fortis*, and sell it to Abundance of People, especially to Vintners, who use a great Quantity of it upon Occasion.

Great Vertues are attributed to the Spirit and Oil of Sulphur in Fevers and pulmonary Cases especially.

Not long since it has been discover'd, that Spirit, or rather the Oil of Sulphur, is the only Thing to give Lustre to the *Peridor*, as will be seen where we treat of precious Stones, and also to give Flowers that never fading or immortal Colour as we call it.

Of Balsam of Sulphur.

Balsam of Sulphur is made two Ways; First, With the green or express'd Oil of Anniseed, and the best Flowers of Sulphur melted

melted or dissolv'd together, which is call'd *Balsam* of Sulphur annisated, and has great Qualities given to it, as will be seen hereafter.

Monsieur *Charas* says in his Book, p. 470, that some are of Opinion this *Balsam* is in Quality but little behind the *Natural Balsam*, or *Balm* of *Gilead*, because it heats and dries moderately, and resists Corruption or Putrefaction; it therefore is a celebrated Medicine in pectoral Cases, being very beneficial in Coughs, Asthma's, Pleurisies, and Ulcers of the Lungs: It is good also against Weaknesses and Indigestions of the Stomach, restores the Appetite, expells Wind, eases all Sorts of Colicks: 'Tis said to be good also against the Plague, and all epidemical Diseases, venereal Affects, continual or intermitting Fevers, and the Epilepsie; it may be taken internally in any agreeable Liquor, from three to ten or twelve Drops; the Stomach or Navel may be annointed therewith in any Illness of the former, or in Colicks, &c.

The distill'd or chymical Oil of Anniseed might be made use of for this Composition, were it not that in the Operation it is apt to evaporate and fly off, do what you can, more than the green or express'd Oil.

The second Way or Method of making it is with Oil of Walnuts cold drawn, Flowers of Sulphur, Salt of Tartar, and White Wine mix'd together, which by Assistance of the Fire is made into a *Balsam* very good to digest, discuss, or resolve any crude Fluxion impacted in any Part of the Body, made use of by Way of Uction; it is also the Basis of the *Emp. Sulphuris*.

Some use Oil of Sweet Almonds, White Poppy-Seed and Turpentine instead of Oil of Walnuts in the Composition of this *Balsam*, in which every one may do as seems best to him.

Some again add to this *Balsam*, Myrrh, Aloes, Saffron, and the like.

Besides the Sulphurs afore-mention'd, we have a Sort of Earth or yellow Stone, which Mount *Etna* casts forth, call'd by us *Naples Yellow*, which Painters make use of: But this Sort of Earth is scarce enough amongst us. Note, The Marks of its Goodness are, that it be sandy, and of as high a Colour as may be. This Earth is nothing but a *Sulphur*

harden'd in the Bowels of the Earth, which makes it dry and brittle.

You may make a *Balsam* of Sulphur in a small Time, by taking to *Lemery*, one Part of Flowers of Sulphur four or five Times as much good Oil of Turpentine, Oil Olive, or the like, and boiling them in a Pipkin, so big, as it may be but half full, 'till the Flowers are perfectly dissolv'd, into a Blood-red *Balsam*; let the Fire be pretty quick, yet not too quick, and continually stir it all the While it is a making 'till it is cold, otherwise the Flowers will be apt to coagulate into a Mass, and so you will have no *Balsam*: It is good against Coughs, Colds, Asthma's, Consumptions, &c. outwardly apply'd, and is taken inwardly from four Drops to twenty.

8. Of Naphtha.

Naphtha is a Bitumen or Slime found in many Places of Europe, *Pomet.* and the Name *Maltha* has been given first of all to a Sort of Bitumen found near *Comagene* in Syria: And *Pliny* tells us that this Bitumen is so glutinous that it sticks to whatsoever it touches, from whence comes its Names of *Maltha*; and accordingly he relates, that at the Siege of *Samoza*, which *Lucullus* undertook, it was of great Advantage to those in the Town; for that as soon as it touch'd any of the Soldiers it set them on Fire in such Sort as could not be extinguish'd but by throwing Earth upon them, being of the Nature of other Bitumens, which the more you cast Water upon them the more they blaze. There is another Sort of Bitumen found near *Ragusa*, which has the Smell of, and serves for the same Purposes as common Pitch, and therefore has the Name of *Maltha*, or *Natural Pissasphaltum*, or *Earth-Pitch* bestow'd upon it: But these two Sorts being unknown to us, and we having none of 'em in France, I shall content myself to speak of that of *Auvergne* only.

The Bitumen then of *Auvergne* is a Sort of Pitch of a disagreeable Smell enough, found between *Clermont*, *Montferrat* and *Rion*, in a Place call'd *Pege-well*, where it is in such Abundance, that it makes its Way out of the Earth, and causes a great deal of

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Uneasiness to Passengers, who when they tread on it can hardly draw up their Feet 'tis so sticking, and who by Reason thereof are very often forc'd to leave their Shoes behind them. 'Tis this same famous Drugg the Hucksters dry, and then sell to Grocers and ignorant Apothecaries and others, instead of the true Bitumen of *Judea*, tho' it be easily distinguishable from it by its strong Smell, whereas the true *Judea Bitumen* is almost without any Smell at all; 'tis from its fetid Smell, some, as to *Afa fetida*, have given it the Name of *Stercus Diaboli*, or *Devil's Dung*. There are also many other Sorts of Bitumen that come from the Bowels of the Earth; but we having no Commerce in, as having none of 'em, I shall not trouble my self to speak any Thing about them.

9. Of Naphtha of Italy.

THE *Naphtha* of *Italy* is an Oil of different Colours, flowing from a Rock situate in the Valley of *Montfestin*, in the Dutchy of *Modena*; and this Oil has been known to us but a few Years since by the Means of one *Rogue Fourra*, a Native and an Inhabitant of the Village call'd *Prat*, near *Briançon*, in the *Upper Dauphine*, of whom I bought the different Sorts of *Naphtha* that I have by me, and had the following Account.

The *Italian*, or *Montfestin Naphtha*, comes from a Rock which is upon a Mountain, whether it is convey'd by Subterranean Veins, and it is gather'd into Oil of different Colours, by Means of certain Canals and Copper Cauldrons which separate it; or to speak more intelligibly, the Duke of *Sava* and *Darce*, and the Marquels of *Arpia* in *Modena*, to whom the aforelaid Rock belongs, have caus'd Trenches, and Copper Canals, or Pipes to be made, which are purposely plac'd to receive the Oil as it distills from the Rock, by Means of which it falls into the Cauldrons or Coppers, from whence it is taken or gather'd for Use. It is observable, that this Oil changes Colour according as it is nearer or farther off from the direct Light of the Sun; so that which is of the sunny Side is white, and clear as Water, and most esteem'd; that next to it clear and red like

Wine, the next yellow, afterwards green; and in short, that which is at the other opposite Side of the Rock, quite off from the Sun, is black.

White Naphtha, which we commonly call Oil of *Petre*, or *White Rock Oil*, because of its Whiteness, Clearness, and Beauty, is immiscible with any Thing in the World besides, being lighter than whatsoever can be put to it; and consequently it will be uppermost: as also by Reason of its strong piercing Smell, coming near that of Sulphur, which renders it extremely volatile, it is easy to catch Fire, which may serve as a Precaution to those that sell it, to be as careful of it as of Gun-Powder.

The great Virtues of this Oil is the Reason why I will not say any Thing of it here, but rather refer my Reader to what the afore-nam'd *Rogue Fourra* has printed concerning it. As for the red, yellow, or green *Naphtha*, they are so little in Use, that we don't see any of 'em at all: And moreover another Reason may be, that the *Italians* mix 'em with the black Oil before they send it to us, and this makes the Oil of *Petre*, which we have thence, instead of being black and thick as it comes out of the Rock, to be red, transparent, and yellowish, and moderately sulphureous in its Smell; and as this Oil is pretty dear some counterfeit it, as will be seen in the next Chapter.

Naphtha, Pissasphaltum Naturale, is a Kind of soft or liquid Bitumen, of different Colours, very inflammable, which is brought from several Parts; as the Place where ancient *Babylon* stood, and about *Ragusa*; likewise from a certain Lake or Marsh of *Samofata*, and divers other Parts; but we have no other *Naphtha* brought but what comes from *France* and *Italy*: The last of which is a Sort of *Petroleum*, or clear Oil, that is sometimes white, sometimes red, sometimes yellow, sometimes green, and sometimes black; it flows from a Rock situate on a Mountain near *Mount Festin*, in the Dutchy of *Modena*; the White is most valued. The *Bitumens*, call'd *Naphtha*, are almost all Sulphur or Oil mix'd with some acid and volatile Salt; they are incisive, penetrating, deterfive, digestive, vulnerary, and strengthening, and so are prevalent against Palsies, Weakness, and Relaxation.

laxation of the Nerves; outwardly apply'd, they relieve the Tooth-ach, and dissolved in a Turpentine or vinous Clyster, prevail against Dysentery and Diarrhea: *Petroleum* is by many us'd instead thereof.

10. Of the Black Oil of Petre, or Oil of Gabian.

Pomet. **T**HE *Petroleum*, or Black Oil of Gabian, is a liquid Bitumen that comes from the Bowels of the Earth, and by subterranean Channels is thrown upon the Waters of a small River near a Village call'd Gabian, in the Bishoprick of Bezier, in *Languedoc*. Formerly this Oil was so plentiful and common, that 'twas made but little Account of; for considerable Quantities might be gather'd of it daily: but now Mondays only are set apart for that Purpose; and the Place where it is, is enclos'd with a Wall, and guarded by a Man. And I have been told at Gabian, that the Bishop makes a great Penny of it, which notwithstanding is not of such Account as 'twas heretofore.

This Oil ought to be of a middle Consistence, of a strong stinking Smell, and of Colour black.

In the Choice of it, one must see to it that it be't Oil of Turpentine thicken'd and colour'd with Tar and black Pitch: The best Characteristick I can give whereby to know it, is to buy it of honest reputable Merchants, that won't do an ill Thing and sell one for another; and not to expect it at under Price.

The Black Oil of Petre of Italy, or of Gabian, is somewhat of Use in Physick, but chiefly employ'd by Farriers, and those that make artificial Fire-Works.

There are moreover other Sorts of Oil of Petre, or Bitumens, found in many Parts of the World, as those of Colao, of Sirnam and Copal; but since we have none of 'em, nor any Trade or Dealing in 'em, I'll not pretend to say any Thing concerning them.

Petroleum, sive Oleum Petreæ, or Lemery. Rock Oil, is a Kind of Naphtha, or bituminous Liquor that flows from the Clefts of several Rocks, Stones and Quarries, in many Parts of Italy, Sicily, and *Languedoc*: It is brought of several

Colours; as Black, Red, White and Yellow. The black *Petroleum*, usually brought us from a Village in *Languedoc*, call'd Gabian, and from thence Oil of Gabian, is of a very unpleasant Smell. All the Kinds of *Petroleum* are incisive, penetrating, resolute, attenuating, resist Poison, destroy Worms, expel Wind, strengthen the Nerves; some Drops may be taken inwardly and outwardly; the Joynts, Emunctories and Navel, may be rub'd with it.

It is hot and dry, and of thin Parts, and is of admirable Use against Aches and Pains, and all cold Distempers of the Muscles, Nerves and Joynts; it is prevalent against Gout, Palsies, Cramps, Convulsions, Apoplexy, Megrims, and other cold Diseases of the Head and Brain; anointed upon the Region of the Abdomen, Bladder, Reins, Spleen or Womb, it gives Ease to all Pains and other Disorders of those Parts, discusses Swellings, &c. It is said to cure ulcerated Kibes and Chilblains, to help Bruises, and heal old Sores; and is of singular Use against the Rheumatism, or running Gout. Some say that that which comes out of India is the best and pleasantest, and is thought to have all the Virtues of the *Naphtha* aforegoing.

11. Of China, or Indian Ink.

China Ink is a hard solid Paste, which, according to some Authors, *Pomet.* the Chinese make of a black bituminous Earth, which they powder, and with Gum Dragon form into a Paste, which they after lay upon little Sticks, and having mark'd it with some China Character, they dry and sell it as we have it. Others will maintain that it is made of a Black produc'd from the Smoak or Fume of Oil of Olives burnt; but as it is impossible I shou'd be able to determine of which 'tis compos'd, I will only remark in the Choice of it, that the true genuine Ink of China is to be prefer'd to that of Holland, and is distinguishable from it, in that it is in small square Cakes of the Thickness and Length of one's Finger, and of a very black jet Colour, whereas Holland's Ink is in flat Lumps, and of a sooty musty Black.

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China, or Indian Ink, serves for Geographical Charts: In short, 'tis very useful for all such as mark or take Sketches in Black, being a portable Ink.

12. Of Gun-Powder.

Pomet. **G**UN-Powder is a Composition of Saltpetre, Sulphur and Coal made with Willow, or any other white light Wood, which by Means of Vinegar, and a Sieve, or any other Instrument full of Holes; is made into Corns big or little, or what Size you please: But I will not enlarge upon this Occasion, not being thoroughly acquainted with the Manner of making it best; and by the Bye, I wou'd not advise any Merchant to deal in this Commodity, whose profess'd Business 'tis not, it being too hazardous.

Sal Pyrium, Sal Bombardicum, Lemery. and *Pulvis Pyrius and Bombardicus*, or *Gun-Powder*, was a Thing wholly unknown to the ancient *Greeks* and *Arabians*, and therefore they have no Name for it. It is made in many Parts of the World, but most plentifully in *France* and *England*, and is compos'd of *Saltpetre*, *Sulphur*, and *Wood-coal*.

You are to chuse good and pure *Nitre*, with fair and large Crystals or Shootings; if it be not good you must purifie it as we have before taught: This purified *Nitre*, put into a Kettle, which set upon a Furnace with a moderate Fire, which gradually encrease to such a Degree of Heat, 'till it begins to smok and evaporate, lose its Humidity, and grow very white; keep continually stirring it with a Wooden or Iron Ladle, for fear it should return to its pristin Form, whereby its Greasiness will be taken away. Then pour so much Water into the Kettle as will cover the *Nitre*; and when it is dissolv'd, and is brought to the Consistence of a thick Liquor, then with a Wooden Stick or Ladle, keep continually stirring it without any Intermision, 'till all its Humidity is again evaporated, and it be reduced to a moist dry, white Meal.

You ought also to chuse the purest and best Sulphur; that which is in very great large Lumps, clear, perfectly yellow, not very hard nor compact, but porous, nor too much

shining is the best. If when it is set on Fire, it freely burns all away, leaving little or no residant Matter, it is a Sign it is good: So also if you press it between two Iron Plates that are hot enough to make it run, if in running it appears yellow, and that which remains be of a reddish Colour, you may conclude it excellent and fit for your Purpose; but if it be impure and foul, *Powder-makers*, prepare it after this Manner. Melt your Sulphur in a large Iron Ladle or Pot, over a very gentle Fire of Coles well kindled, but not flaming, then scum off all that which riseth on the Top, and swims upon the Sulphur; presently after take it from the Fire, and strain it through a double Linnen Cloth, letting it pass at Leisure; so will the strained Sulphur be pure, (the gross filthy Matter remaining behind in the Cloth,) which powder finely.

You ought also to chuse Charcoal, large, clear, free from Knots, well burnt, and cleaving; but if you be where it's not to be had, you must make it after this Manner. Cut down your Wood when it is full of Sap, and is apt to peel, viz. in *May* or *June*, and chiefly *Hassle*, or *Ash*, or *Juniper*, &c. which cut into Lengths of two or three Foot long, of the Bigness of ordinary Billers, taking away the Rind and superfluous Branches; being very dry, make them into Bundles, and in a plain even Place, fit for that Purpose, set them upright one by another, and one upon another, cover them with Earth or Turf very close, leaving only some few Vent-Holes; then kindle the Fire, and when it is well lighted, and all in a red burning Heat, being reduced into burning Coals, stop up every Vent-Hole for the Fire, close, with moistened Earth, so that there be not the least breathing Place, the Fire being thus extinguished, the Coals will be pure and whole without any Ashes, and in twenty-four Hours after you may take them out for Use. But for a present and small Occasion do thus: Cut the Wood into small Pieces, dry them well, put them into a large earthen Pot, cover it all over the Top well with Clay, then make a good Fire round the Pot gentle as first, but so as it may be made red hot; covering it also all over with Fire, leaving it so for the Space of an Hour or more in that strongest Heat; let the Pot cool of itself, and then

then take out the Coals for Use, which reduce into a fine Powder.

Of these Ingredients the Country People in the *Ukrain* in Poland, and the *Cossacks* make it with their own Hands thus. They put their Proportions of Nitre, Sulphur and Charcoal, (being all in fine Powder) all together in an earthen Pot, upon which they put fair Water, then they boil upon the Fire till all is evaporated, and the Matter becomes thick like Paste, and taking it from the Fire they make it yet dryer in the Sun, or in a Stove, or the like, till it is fit to corn; then they granulate it by passing it through a Hair Sieve, making the Grains of what Bigness they please, and this serves their rural Occasions, as well as if it had been made by the most skilful Artist in the World.

But in order to the truly Knowing and Making of Gun-powder, it is fit that you should first know the Kinds thereof, and then the different Strength of each: The Kinds are threefold, 1. Canon Powder, 2. Musquet Powder, 3. Pistol Powder, and of each of these there are two several Kinds, viz. a stronger and a weaker, all which Differences arises only from the various and differing Proportions of the above enumerated three Ingredients. The exact Limitations of which we come now immediately to declare.

	Canon.	Musquet.	Pistol.	
Nitre.	10.0	10.0	10.0	Strong.
Sulphur.	2.5	1.8	1.2	
Coal.	2.5	2.0	1.5	
Nitre.	10.0	10.0	10.0	Weak.
Sulphur.	2.0	1.5	1.0	
Coal.	2.4	1.8	1.8	

The Preparations declared, I. Canon Powder, 1. The Stronger. To every 100lb. of Saltpetre, there is Sulphur 25lb. Charcoal 25lb. 2. The Weaker. To every 100lb. of Saltpetre, Sulphur 20lb. Charcoal 24lb. II. Musquet Powder. 1. Stronger. To Saltpetre 100lb. Sulphur 18lb. Charcoal 20lb. 2. The Weaker. To Saltpetre 100lb. Sulphur 15lb. Charcoal 18lb. III. Pistol Powder. 1. The Stronger. To Saltpetre 100lb. Sulphur 12lb. Coal 15lb. 2. The Weaker. To

Saltpetre 100lb. Sulphur 10lb. Charcoal 18lb. as in the Table annexed, which are the Numbers, and in the same Proportion, but in lesser Quantities or Decimals.

The Way of making it. All these Ingredients are to be finely powdered, and they are to be moistened with fair Water or Vinegar, or Spirit of Wine, or Water and Spirit of Wine mixt together, or Urine, which is usual; then let all be well beaten together for the Space of twenty four Hours at least, and then granulated after the following Manner.

You must prepare a Sieve with a Bottom of thick Parchment made full of round Holes, and the former beaten Mass must before hand be moistened with the following Liquor. R. Spirit of Wine 3xx. Spirit of Wine Vinegar, 3xij. Spirit of Nitre, 3iij. Spirit of Sal Armoniack, 3ij. Camphir, 3j. dissolved in Spirit of Wine, mix together for the Purpose aforesaid. Or in stead thereof, if all these Things cannot be had with this. R. Brandy 3xl. Camphir 3j. mix and dissolve; the Mass being made up into Balls as large as Eggs, which put into the Sieve, and with them a wooden Ball, which so move up and down about the Seve, that it may break the Balls of Powder, and make it pass through the little Holes into Corns.

But in making of vast Quantities for a natural Use, to do it all by the Hand would be a most tedious and slavish Work, and therefore Kings and the supream Rulers of Countries have provided Mills for that very Purpose, by Help of which they can do more in one Day, than a Man can in an hundred.

You may make Powder of various Colours, if you so please, but then you must leave out the Charcoal, and put in as much for it of another Thing of the Colour you intend, which may be as apt to kindle or take Fire as Charcoal is; but for real Service, whether for War or Hunting, &c. the black Powder is much to be prefer'd; yet for Satisfaction's sake, we will give you the Directions for making white Powder.

White Powder. Take Saltpetre, 10lb. Sulphur, 1lb. Saw-dust of Elder, or the like Wood, dried and powdered fine, 1lb. mix and make Powder by the former Directions. Or thus: R. Nitre 10lb. Sulphur, 1lb. dried and finely powdered, Saw-dust 1lb. mix and make Powder. Or Thus: R. Nitre 10lb. Sulphur, 1lb. Rotten Wood dried and powdered, 1lb. Salt of Tartar 3iij. mix and make Powder to be kept close from the Air.

This is also to be noted, That in making Pistol Powder, if you would have it stronger or more violent, you ought to stir it up several Times while it is in the Mortar, and moisten

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it with Water distill'd from Orange or Lemon Peels in an Alembick, and then beaten for twenty-four Hours, as aforesaid.

Moreover you ought to know, that Powder when it is corned, is of much greater Force and Power than when in Dust or Meal; and from hence it is concluded that the larger Grains are stronger than the smaller, and for that Reason Canon Powder is granulated larger than Musker, Musker than Pistol; and therefore being put into Ordnance, Muskets, or Pistols; it ought not to be forced or beaten so home, or hard into the Piece, as to bruise the Grains, lest it thereby loses much of its Strength.

To know the Goodness of Gun-Powder. It is tried three Ways, by Sight, by Touch, and by Fire. *First by Sight;* if it be too black, it is too moist, or has too much Charcoal in it; so also if rubb'd upon white Paper, it blacks it more than good Powder does. If it be of a Kind of Azure Colour, or a little obscure, something bordering upon red, it is a Sign of good Powder.

Secondly by Touching. If in crushing of it with your Fingers Ends the Grains easily break and turn to Dust, without feeling hard, it has too much Coal in it. If in pressing under your Fingers upon a smooth hard Board,

some Grains feel harder than the rest, or as it were dent your Finger's End, or very hardly yield to pressing, the Sulphur is not well mixt with the Nitre, and the Powder naught.

Thirdly by Burning. Lay little Heaps of Powder three Inches or more asunder upon white Paper, and Fire one of them; if it only fires and burns all away, and that suddenly, almost imperceptible, without firing the others, and makes a small thundering Noise, and a white clear Smoak rising in the Air, almost like a Circle, the Powder is very good. But if it leaves black Marks behind it, it has too much Coal in it, or is not well burnt. If it leaves a Greasiness behind it, the Sulphur or Nitre, are not well cleansed or ordered as they should be. And if two or three Corns of Powder be laid upon a Paper an Inch asunder one from another, and you put Fire to one of them, and they all fire at once, leaving no Sign behind but a white smoaky Colour in the Place, and the Paper not touch'd, the Powder is good; so also if fired in your Hand, and it burns it not; but if black Knots which burn downwards in the Place where Proof was made, remain after firing, it is not strong enough, but wants Nitre.

End of the Fourth BOOK of BITUMENS.

BOOK