

<title id="p012r_a4">Plaster</title>

<ab id="p012r_b4a">Mountain[248] plaster is greyer, and that from the region of Albi is whiter. It has to be cooked[249] over a closed fire, such as a reverberatory furnace or a brazier. The more freshly cooked[250], the better it is to work with. It should be finely crushed on marble. After preparing your hollow mold of sulfur[251] or another [material] and oiling it and surrounding it with a circle, soak your plaster[252] in water, not too thick, and rub it well with your finger, and if it makes bubbles, throw on more powder of the said plaster and crush it [253][254]with your finger until +</ab>

<ab id="p012r_b4b">+ it makes no more bubbles. Then once more throw and sprinkle plaster powder on top and leave to set well, then scrape the powder off.</ab>

<title id="p081r_a2">Earth for moulding</title>

<ab id="p081r_b2">Sheath maker's earth or the one potters use to blanch the pots to make the lead flow better on it and to prevent the lead from soaking into them is very good to cast the hollow parts of what you want in relief. It releases better than plaster or sulphur which become hard once they have grasped on [to the mould] because earth sticks. It must be hit very hard so that it does not break. If the piece you want to mould is very large you can mould different parts separately. If you reheat it, it must be over a closed fire. You can find this earth at Le Fousseret[442], and in another place called Ox[443].</ab>

<title id="p081r_a3">Plaster</title>

<ab id="p081r_b3">It must be very well cooked, you will come to learn when cooking it in an iron or metal casket. Mix it with an iron rod and if it sticks to the iron, it is not cooked enough, and if it doesn't then it is ready. The water with which you soak it has to be a little warm and the mould of the above mentioned earth or other, also should be a little hot. The plaster work does not last and the faces and delicate things break if you do not use glue.</ab>

<title id="p083r_a2">Sand for copper medals</title>

<ab id="p083r_b2">Recipe: [Take] hat felt burnt on a covered fire, iron dross[464], and burnt bone, all of which you should grind very finely, crush and spray with water and salt. Make a paste of it, mold it, and wipe it with hay fire. These three pulverized sands, having been very well refined on the porphyry slab, mold very well and cast well. Know that separately each of them is quite

good. Burnt felt molds well and is removed quite neatly.</ab>

<note id="p083r_c2">Plaster molds quite neatly but it swells. Bone does not have much body while iron dross does. Felt allows for an easy removal of the cast[465]

<title id="p106r_a2">Making gold run for casting</title>

<ab id="p106r_b2a">Because gold cools down very quickly, you have to give it a mixture when it is well melted that will keep the heat. Sublimate softens it nicely. But, since it vanishes into smoke, it won't aid you for very long. Therefore mix this mixture into it when you want to cast it: of sal ammoniac, the best verdigris that you can find, a bit of borax and some saltpeter. And this, held over the heat, will become neat. The saltpeter makes it clear and heats it. But the key thing in this mixture is the verdigris, which has to be good. This mixture softens your gold so much that it becomes as tractable as lead, even if it is good gold.</ab>

<ab id="p106r_b2b">For sand for molding flowers and leaves & other delicate things, mix in raw plaster, crushed brick and stone alum.</ab>

<ab id="p106r_b2c">To moisten sand, spirits are excellent because it makes sand fine and leaves in a vapor when you reheat your box frame.</ab>

<ab id="p106r_b2d">Dilute sal ammoniac is very good, is excellent for moistening sand, but for lots of water you only need a little bit of sal ammoniac.</ab>

<ab id="p106r_b2e">A raw lump[682] of metal[683], if you don't have crocum ferri[684], is good for gold.</ab>

<ab id="p106r_b2f">The snakes and the lizards you wish to mold should not be kept for a long time, because if they are alive, they will waste away, and if they are dead, they will decay.</ab>

<ab id="p106r_b2g">Plaster of Paris is as hard as stone and very good. When you want to choose some for your sand, take the rawest and the hardest that is possible for you & that does not make any powder. Transparent [plaster] and that which makes powder in giving way is that which is not good for this work. A sign of that which is near perfect is that it is hard & makes shining grains that look almost like sugar. Finally, to mix it into the sand to cast gold, it has to be put in the fire twice, & reheated twice.</ab>

<note id="p106r_c2">+ When gold is really pure, it is so dry that it can just barely endure a hammer. But this mixture softens it like lead.</note>

<ab id="p106v_b3b">?? as heavy as before, and it should be like a paste not very thick, it must not be as easy to stir as a liquid. This state shows you that it is cooked enough. It must boil in the middle, and all around you must have a thick mixture. If you reheat it too much your mixture would be short of body, because if it becomes red the mixture will lose its strength and it will spoil the sand. Let it cool before mixing it to any other sand. [...[688]]</ab>

<title id="p106v_a2">Tiles</title>

<note id="p106v_c2">those of houses that are outdoors, ones [that are] a bit sandy seem to hold better in fire</note>

<ab id="p106v_b2">Tiles with which one covers houses, the hardest and surest and recleaned of stones & large gravel, are taken to mix in with the sand for molding. But, rather, it is necessary to reheat them just until they have been quite red for one or two hours, and crush them and pass them finely through a sieve.</ab>

<ab id="p106v_b1d">Little turtles just out of the egg are really delightful to mold.</ab> ----- [Title: Plaster][686] <note id="p106v_c3e">If the plaster is mixed with some dust or is not the hard kind, [...] in the fire and make [...]</note>

<ab id="p106v_b3a">The hardest plaster, as was said, is the best, being taken thusly totally raw from stones of this kind. Crush it as finely as possible and pass it through the most fine sieve or sleeve that you can. Having been made fine in this way, put a good amount in a cauldron or frying pan over an open flame. & as it starts to heat up, stir it continuously. And heavy and lumpy though it is, it will become so light and so tractable that it will appear to you not to have any resistance to the said stirring, as though it were of water. Continue to keep stirring it continuously until it returns once again to being heavy and thick. And now this is the sign that it is cooked, but do not reheat it at all such that your stone alum brick be reheated & that clay circles form. Because this must be the last reheating, and when everything else is ready, because the less that the plaster remains reheated & the more suddenly it is put into the work, the better, because it takes rather better. It is not permitted to reheat it except when you want to mold. And to reheat it, put it, in fine, totally raw powder, in a cauldron on a clear flame & do not give it too much [heat] in one go nor too fierce. Stir continuously with a long stick, turning around the cauldron to avoid the vapor. And in the middle, in the form of a figure 8 at the beginning, you will find it heavy [and] clayey because it is full of moisture, [and] when it heats up, it will start to throw off [the moisture] in some bubbles on the edges of the cauldron. And finally it will become liquid & mealy and like bran and start boiling in the middle. Continue to stir continuously until you recognize that it has once again become heavy ??[687]</ab>

<ab id="p106v_b3b">Stone alum is that which binds well to sand.</ab>

<ab id="p106v_b3c">Crocum ferri is fit for gold. It is this which, mixed into sand, breaks it up again & keeps it hot.</ab> ----- <note

<note id="p106v_c3a">Plaster</note>

When you have it in stone form, choose the hardest pieces and those which do not easily break into small pieces with your nail, and clean it well of powder & filth rather than crushing them with it.</note>

<note id="p106v_c3b">Plaster alone does not sustain [...] but breaks up into lumps.</ab>

<ab id="p106v_b3c">Keep reheated plaster, as is said here, one or two months well compacted in a dry place, if it's not the rainy season but rather fresh out it is more excellent for exquisite work.</ab>

<note id="p106v_c3d">It must maintain its fire and turn red like lit charcoal.</note>

<ab id="p106v_b3b">?? as heavy as before, and it should be like a paste not very thick, it must not be as easy to stir as a liquid. This state shows you that it is cooked enough. It must boil in the middle, and all around you must have a thick mixture. If you reheat it too much your mixture would be short of body, because if it becomes red the mixture will lose its strength and it will spoil the sand. Let it cool before mixing it to any other sand. [...[688]]</ab>

<title id="p107r_a1">Catching lizards and snakes</title>

<ab id="p107r_b1a">Take a stick, pin a net with a slipknot to the top. Whistle, and move the net nearer to the head of the lizard, and pull when it put it's head inside the net. It is more difficult to take a lizard with your hands than a snake, because lizards bite without letting go, and bite as strong as pincers.

<ab id="p107r_b1b">You can take snakes with your hand, but cover your handle with a woollen cloth, because the teeth of the snake could go through a common cloth. You can recognize dangerous snakes by their blue eyes. They do not bite into water, as it is known by crayfish catchers.</ab>

<ab id="p107r_b2a">The sand mixture is made of two thirds of ground plaster, reheated as it is said before, and of one part of reddened tiles which are finely ground afterwards. Use also stone alum, half of the quantity of the tiles[689]. Use two full pots of plaster, one pot of tile and half a pot of stone alum. Do not use too

much stone alum because that binds the sand, and allow sand to withstand fire without cracking or breaking.[690] Without it [stone alum] sand would not withstand fire, you can use it for all kind of metal, but for gold add a bigger quantity of stone alum, add also crocum ferri, because they [these filings] attract gold.</ab>

<ab id="p107r_b2b">All the sands you will cast, must withstand fire very well, it must withstand high temperature without spoiling anything.</ab>

<ab id="p107r_b2c">It is difficult to grind stone alum, and it cannot be sieved, you must grind it on a marble slab. The white [stone alum] powder the apothecaries sell is good, it is easy to crush it into a mortar, use the pestle slowly, that way you will make it [the stone alum] very fine.</ab>

<ab id="p107r_b2d">Crocum ferri must be heated into a glassworker's furnace during four days.</ab>

<ab id="p107r_b2e">Molds for fine things, like wormwood or something similar, can only be used once, dip the molds into water before breaking them. Things twice reheated are dissolve easily into water.[691] If you don't do that your work will be hard to be stripped of the mold without being spoiled.</ab>

<ab id="p107r_b2f">Good stone alum[692] is white and as shiny as white silk, this stone alum is made of long pieces, as long as a finger, and is very fragile and woolly and fluffy. Stone alum made of stone is harder and not so good. The best quality can be found in France near Ronan. For our sand, stone alum must be crushed into a mortar, and must be ground on the marble again. Don't even think about sieving it because this matter is fat and woolly, it wouldn't pass through any sieve because of the very fine and soft filaments. These filaments give the sand a much greater binding effect than natural wool or even the filler the foundry owner uses for big works, because natural wool and filler burn and stone feather alum resists fire.</ab>

<ab id="p107r_b2g">When you cast surround the sand of your mold with very beaten greasy earth. Make a circle around your mold with this earth.</ab>

<ab id="p107r_b2h">[693][694]Archanum omnibus fere reconditum est in re fusoria,<lb/> v{idelicet} res exprimenda formis, sive herba sit sive animal<lb/> ut lucerta, inmergatur primum in vini spiritum<lb/> aprime rectificatum, deinde pulvere composito aspergatur<lb/> sive illinatur (si pulvis in formam pultis redactus sit, ut<lb/> assolet)</ab>

<ab id="p107r_b2i">When you want to mold something hollow, the core must be made of the same matter, if the snake or the animal is curved or folded you must

do your core in several pieces.</ab>

<ab id="p107r_b2j">Try [to see] if distilled vinegar is good for eating away, it will dissolve the animal inside the hollow mold.</ab>

<note id="p107r_c2">If you know that your plaster cannot endure fire without breaking, do not take the recipe of the mixture literally, sometimes you can add less stone alum than above. Because stone alum soften molds. Once reheated do not grind the stone alum again, leave it ground as the apothecaries did. It will not prevent the cast from being neat, and will give more binder to your cast. When the mold holds the color of the brick and is reddened then it will be harder.</note>

<ab id="p107r_b2k">To hold the cores, some [people] use wire made of the same metal as that to be cast because it boils down and is made similarly, but when it is melted or pliant the core varies. Other [people] find it serves them better to use sharpened iron wire about the borders because it holds more firmly, and having fine points it does not rise up any more than the point of a needle and one can apply gold or silver on this rather than putting it in works [where] one makes a hole in the work with a small chisel.</ab>

<ab id="p107r_b2l">Spirits prevent the sand from bubbling and do not make little holes on the borders of the mold if the thing to be molded is very damp, the holes and farts and bubbling does not make it in the place of the mold which is thick but at the borders which are more delicate.</ab>

<ab id="p107r_b2m">One casts ordinary silver of the sort goldsmiths coarsely work, which is made with mediocre alloys. And when one casts with solder, it runs even better.</ab>

<ab id="p107r_b2n">Spalt is a whitish stone which can be found in Germany, mainly in Augsburg from which can be made the most excellent sand that can be found for [casting] lead, tin, copper, silver and gold. And the more it is used, the better it is. It is clean for casting flat things in a frame. For rounded things, it is not as attractive [because it] does not hold in the fire as the aforementioned [things] composed of plaster.</ab>

<ab id="p107r_b2o">The snippings[695] of [a] large [piece of] greasy leather are good to cast in melted copper and brass because they clean it and take away from it all its filth. </ab>

<title id="p111v_a4"> Lizards </title>

<ab id="p111v_b4"> Hold the lizards by the two sides next to the ears with two

fingers, make it open the mouth, then take the low mandible with the help of [...], then take the upper one. If the lizard bites your nail, it won't pierce it. But if the lizard grips your nail and bites your flesh and does not let go, the best solution is to cut its head quickly. Lizards are much more beautiful during spring when they shed their skin. </ab>

<note id="p111v_c4"> Small lizards caught during the heat of summer, which are gray on the back and green under belly, are very good to cast with silver and gold or any metals, because the scales are harder than the lizards [...], and these scales are more visible. </note>

<title id="p111v_a5"> Making sand </title>

<ab id="p111v_b5"> Reheated as it is above said, take four crucibles full of plaster, two crucibles full of brick, and one crucible full of feather alum. Do not sieve your feather alum it wouldn't pass through the sieve. Blend the mixture with your hands, at the end you should not distinguish anymore the white color from the red color. If your plaster is not strong enough, do not add so much feather alum, because feather alum soften molds. When you want to dampen your sand, be sure that your sand is not warm, as warm as it is straight after being reheated. Otherwise your molds would be too soft and would break. </ab>

<note id="p111v_c5"> Reduce the quantity of plaster if it is not strong enough to withstand fire, and if it cracks [...] ground tiles and feather alum hold the mixture, you can add more feather alum and you'll have a better binder. </note>

<title id="p112r_a1">To wet the sand</title>

<ab id="p112r_b1">You should have: a large basin full of water to dip the molds into in order to open them, a tankard full of common water, a dish to wet the sand, a small wooden spoon to pick up the sand wetted in the dish.</ab>

<note id="p112r_c1">To make handles for your large oil brushes, if you do not have large enough feather pipes, take two of them, melt them and join them together.</note>

[image]

<title id="p112r_a3">Molding en noyau[738]. Mixing of sand</title>

<ab id="p112r_b3">Once you have reheated your sand, that is the plaster, the stone alum and the brick, and once you have finely filtered them through a cloth sieve, # mix them the following way: take four measures of plaster, two measures of bricks, and one measure of stone alum. Mix them all together with the hands,

so that one may not discern one [ingredient] from the other. Once your sand is ready, you need to kill the animal that you wish to mold in this way.</ab>

<note id="p112r_c3"># except for the stone alum which should be ground in a mortar.</note>

<title id="p112r_a4">Killing the animal to mold</title>

<ab id="p112r_b4a">You must have been careful not to hurt it while capturing it. If you have a stock [of animals] and you wish to keep them for a long time, place it in a glass bottle with bran or in a large barrel half full of damp fresh earth. Give them frogs to eat, live rather than dead, because should you keep them without feeding them, they would wither and become emaciated, and their skin would become saggy and wrinkled. Therefore, the sooner after its capture you mold it, the better it will come out. And kill it in the following manner: place it in a clean bottle or vessel so that [the animal] does not carry any dust; fill [the bottle] with enough good vinegar and urine so as to cover [the animal]. Shake [the bottle] and torment [the animal] inside there until it is dead which should take an hour or half an hour. But if you are in a hurry</ab>

<note id="p112r_c4a">To know if [the animal] is quite dead, take it out of the vinegar and take it by the tail. If it moves its tail, do not mold it because it still has feelings[739], and when pricking [its members], it would remove itself and harm the mold.</note>

<note id="p112r_c4b">Water snakes do not bite much.</note>

<ab id="p112r_b4b">to cast, force feed it [your animal] some good spirits or mix a bit of spirits with the vinegar. And soon it will be dead without any wounds that would deform it. As for large animals, for which it is necessary to have a lot of spirits, one uses vinegar and urine, but for small ones, spirits only are needed, and it will be done quicker.</ab>

<ab id="p112r_b4c">When your animal is dead, take it out and clean it very carefully, [relieving it] of its old skin if it sheds, of its parasites, and then apply it.</ab>

<note id="p112r_c4c">in a glass, and submerge, continuously holding the head of the animal. Or if it is not very big, put the whole thing in.</note>

<note id="p112r_c4d">Be advised that before it dies, you must open it eyes, by blocking its eyelids with a bit of wax or something else.</note>

<title id="p112v_a1">Affixing and arranging animals</title>

<ab id="p112v_b1a">Having gotten in some fat earth called clay, that should be grey, because that is the best one, or another that will bind well and will be well prepared and beaten, so that it is malleable without being damaging your hands or the work, make a lazagne,[740] or a pancake shape, of this clay equally flattened with a rolling pin, which pastry-makers use so that it is slightly thicker than a poulc. [741] And on this pancake, affix your animal, making it as life-like as possible and the way in which it is naturally shaped. And firstly, with a good needle, pierce it from underneath, in the middle of the throat, up to the top bone of the head. Then take the needle out and in the hole, put the point of an iron wire, of such a length that it suffices to maintain the head of the animal as high as it must be, and if the skin gets in when you put in the wire, take it out with the edge of your small pincer[742], and arrange the skin as it was before. Pierce the other end of the wire in the sheet of clay. In this way the head will be held high, which will make it more graceful and proud. Arrange afterwards, the rest of the body, and the legs, and the curling as you think will look best. And so that it is secure and does not move when you put in the sand, secure the legs with little points of iron wire, having already made the first hole with a very sharp needle. Do the same on the body parts that you deem necessary, making sure that the points going through the animal are fixed in the clay sheet, and not so far in front that they jut out beyond the body of the animal by a</ab>

<note id="p112v_c1a">Take a needle of fine steel, and which will be the sharpest you can find, so that with it, when you make your first hole in order to place the wire threads, it will pass through without effort, and take care not to rudely insert the wire or take skin with it. Then put a thicker wire in the thick bits [of the animal] and the thinner wire in the thinner bits. But take this secret advice and do not plant your pointed wire in one go through the animal and onto the plaster, but having planted it, take it out of the clay earth but not out of the animal, which is afterwards fastened there. One does this because by fastening the point the first time, it pushes in the skin of the serpent and by taking the point out, it replaces the skin in its original state.</note>

<note id="p112v_c1b">When you reuse the points you have already used, make sure to clean them well of rust, so that they do not take away some skin.</note>

<note id="p112v_c1c">The main arrangement of your casting is to keep its head very high and have it looking sideways. For this effect, pierce the head on a solid plank or table, making the wire pass through the bottom of the throat up to the top of the head ##</note>

<note id="p112v_c1d">## and make sure the needle is as long as you need according to how much you want to raise the head, and that both ends are sharp.

Having been arranged thusly, affix your serpent on the clay earth, and place the head first and then the rest.</note>

<ab id="p112v_b1b">a bit so that you can take it out if you need to. And be advised that these needle points must be of the thinnest kind of iron wire, with a length that is suitable to the animal; because the smaller your needle is, the smaller the leftover hole will be. However, you must have different sized ones because there are some needles that go on the body and in places that are thicker, like under the throat, and some [needles] must be longer and stronger than the ones used on legs and thin places, where the needles must be subtle and thin, almost like the biggest harpsichord strings. And it would be better if they were of iron wire, which is firmer than the one made of latten. And if piece of a tail, a piece of nail or a piece of leg to the body needs to be joined to the body, do not use the needle; it would damage these parts. But apply a bit of wax, as big as a grain of millet, between the body and the end of the tail. Then with a bit of iron wire, flattened and warm, touch the wax and join the two pieces by applying a bit of pressure. In this way, after your animal has been well-placed on the lute-shaped pancake [of clay earth], build around it a wall of the same clay in this way[743][744]. And join everything together. And then with a big knife, with which you have cut the clay, take away the extraneous [clay] surrounding the pancake. And place on a piece at the end of the mold to close it off, as you see in B.[745][746] Then, with a small curved instrument, mark on the inside of your mold the thickness you wish, which for a common serpent must be two inches thick; so that when you put in your wet sand, you will see when it is thick enough. When all of this is neatly set out, moisten well the shaped body of the animal everywhere, with good spirits, with a brush. For this is the best-kept secret: because everything that is touched by spirits will come out very neatly and without any small eyes or holes that we call bubbles[747], which usually come not at the back or in the thick sides of the mold, but on the edges. And as soon as you have thusly moistened everything with spirits, put in your wet sand without letting the spirits evaporate, which they do quickly. And soak it thusly.</ab>

<note id="p112v_c1e">If, once you have placed you animal on sheet of clay, you are distracted with other occupations, rub your animal with spirits and under the belly so that it does not stick or attach itself to the [clay] earth.</note>

<note id="p112v_c1f">If, when you pierce the belly of your animal, it releases water on the plaster, clean it well with cotton because the sand that was wet will become lumpy. If it is on top of the animal, clean it very carefully and very neatly and touch it and strongly wet it with spirits.</note>

[image A] [image B]

<title id="p113r_a1"> Wetting sand and molding the first cast</title>

<ab id="p113r_b1a">Have a porringer[748] of leaded earth of such a size that it can hold the wet sand which will be needed to fill your mold in one go, which is better than in two gos, because if you do not throw the second load of sand in very quickly, there is a risk that while you are preparing it, the first one will take and become solid,</ab>

<ab id="p113r_b1b">and this way, while annealing it, the two casts will break. Therefore, have several dishes of various sizes with a pouring beak in order to cast better. In these, pour some regular fountain water and mix into it as much as an egg #[749] can hold of water and of sal ammoniac, mixed as described if you want to cast iron or tin because one would need more for casting gold or silver. Having the water in your dish, add the sand and not the other way around[750] [by adding the water to the sand], and adjust it with such attentiveness that, while mixing it vigorously and wetting it quickly with a wooden spoon, it does not become thicker than mustard. And in such a way cast [i.e., pour] first the clearest part, as is always at the top, by shaking it a little higher in your mold. Once your animal is covered with the mixture blow on it very strongly to eliminate the small bubbles or small holes from your soaked sand. Then pour immediately the rest which had settled at the bottom and which is thicker than the upper part, fill your mold to the thickness mark you have made. [symbols[751]] And while casting do not forget to shake your mold, that way your soaked sand runs and get in through every parts. Also tip your mold up, in fact tip the head part up because this part is a bit higher than the body part, that way the contents of your mold will have the same thickness, and you'll spare sand. Your sand gets body within a quarter-hour. Then separate the mold from the clay, let it dry a little bit, you can mold properly straight after. Cut away the extra parts with a knife, and make it mandore[752] shaped. You can reuse the clay frame. Scrape away what's on the back of the mold, because this part is the softest, do not forget to make notches around it, that way the second cast would get through much better and would not move.</ab>

[image] <note id="p113r_c1a"></note>[753]

<note id="p113r_c1b"># that is to say one or two eggs, eggs are not the problem. If you cast in twice, just add sal ammoniac into the first cast.</note>

<note id="p113r_c1c">Make your mixture as thin as a potato stock, or as clear as starch water, the one women use to starch. It is not a problem if the mixture is very thin because sand settles in the bottom and water stays on top of it.</note>

<note id="p113r_c1d">[symbols] If you don't fill your mold with soaked sand at one go, do mix your second cast with the top part of the first cast, stir with a

spoon, or the stick you had took to soak your sand.</note>

<note id="p113r_c1e">You do not need to add sal ammoniac if you cast small molds which do not need to be reheated too long. However it is better to add some [sal ammoniac].</note>

<title id="p118r_a1">Snails</title>

<ab id="p118r_b1">Those which are found in the ocean and similarly those in which certain small crayfish dwell are very beautiful for grottoes, if they have been rid of the first layer[762] of their shell with aqua fortis, because they really look to be made of mother-of-pearl.</ab>

<title id="p118r_a2">For removing flaws and whiskers[763][764] from things molded in a core mold</title>

<ab id="p118r_b2">If your molds are made of good plaster which withstands fire, they will not crack, especially if they are squeezed well between two tables with presses or in a pot filled with ashes or sand, and, therefore, they will not develop flaws. If they they develop some [flaws], you can remove them with a burin called "chaple," which has a tip like a small chisel.</ab>

<title id="p120r_a1">Stamped medals made from wax</title>

<ab id="p120r_b1">You can mold[783] your relief with wax mixed with a bit of resin to make it harder and firmer, whatever relief that you wish, either an animal or a medal. And then, fashion a hollow [784]out of this relief in brass or copper. Or mold your [wax] in relief [785]and strike it in a sheet of tin. And fill [786][your final product] with lead, and heat it. Try [to use] blades of stone leaf [787]to make the hollow for lizards &[788]</ab>

<title id="p120r_a2">Sand for casting gold</title>

<ab id="p120r_b2">Take common sand made of alum, plaster and brick, according to the composition above-mentioned. Add to it some more feather alum. And add as well something a third part of crocum ferri. However whatever quantity is never harmful, because [crocum ferri] is the one that makes gold shiny and makes it come out of its cast easily. But it is best that your crocum has previously been left for three days and three nights in the furnace of glassworkers, in a flat box, where it is not very thick so that it will reheat better.</ab>

<note id="p120r_c2a">You can easily cast gold with the common sand of goldsmiths, but [make sure] that you add some substance that makes it runny.

Before the invention of crocum, one cast flowers in silver, but not in gold. This has only been known in Germany for forty years.</note>

<note id="p120r_c2b">Sublimate is often used by goldsmiths for gold. Some people add sulphur, but they are all wrong, because sulphur makes things sour, even if it heats [well.], And sublimate gets agitated,boils and bubbles. It is very good to clean gold because its exaltation draws [the bad stuff] out that disappears in the smoke. But to heat up gold, and to keep the heat, there is only the color of verdigris, salt of ammoniacum, saltpeter, and borax. This makes it runny and you will be able to throw in a branch from the Santoingel[789].[790]</note>

<title id="p120r_a3">Nightingale</title>

<ab id="p120r_b3a">It is necessary for the cage, made like those for larks found in barns[791] and lined with green fabric, to be made with something that slides out from underneath, so that you can refresh the dirt everyday, because the nightingale loves it, and mix in some ants. You can carry an ant-hill with its dirt in a barred full of earth, and keep them there and they will lay their eggs and in this way, you can always have access to them when you need them, should you enjoy feeding nightingales. When you caught it, it was fat and full. And to keep it in such good shape, on the first day, you must take it in you hand and open its beak and place in it, using a sharp twig, some mutton heart or other delicate flesh, chopped up not too finely, so that the belly does something[792], and make sure that it does not get smaller or thinner, until it has gotten used to it. And feed it in this way three or four times a day, and also give it something to drink. The next morning, you will give him in his cage some well-minced flesh mixed with the yolk of a hard-boiled egg, and

change this mixture two or three times a day, because it will not eat it if it is hard and not fresh. And if it goes half a day without eating, you must feed it as before[793] and do so until[794]</ab>

<ab id="p120r_b3b">eat by itself. And so that he likes it better, you can add to the meat and the egg some mealworm, because nightingales love them.</ab>

<title id="p121v_a1">Casting in silver</title>

<ab id="p121v_b1">You should place the animals as said and similarly compose the sand by taking four measures of plaster, two measures of annealed bricks, and one measure of annealed stone alum. Mix it

well, and once it is ready and you wish to mold, take three measures from the

sort of dish used by peasants to eat. Add pure annealed stone alum that has been ground in a mortar to this sand, as much as you will be able to grab with your four fingers and thumb or with a small jointe[802]. Then, mix well and dillute [this mixture] with a bit of sal armoniac and the rest of common water. And stir it with your palette[803] so that it all becomes like a thick sauce or light mustard. Once you have applied spirits with a brush on the animal, cast and swell, and hit the table for the mold to shake[804][805] and proceed similarly as the others. Do not forget to put crocum because it prevents mold from breaking and it is appropriate with every metal.</ab>

<note id="p121v_c1a">Alloyed silver, provided it is soft, is better for casting than pure silver.</note>

<note id="p121v_c1b">The stone alum should be quite pulverized and mixed.</note>

<note id="p121v_c1c">Sal armoniac is friend with[806] gold and silver.</note>

<note id="p121v_c1d">[Sal armoniac?[807]] which should be placed in the dish rather than in the sand, which should be placed in the water, instead of the water poured on the sand.

<note id="p121v_c1e">Brass is the enemy of [808]gold and the friend of[809] silver.</note>

<title id="p121v_a2">Silver [used] to cast</title>

<ab id="p121v_b2a">It is not pure but alloyed silver, and it does not become perfectly white on the fire because they [goldsmiths] whiten it after the melting to clean up the welding marks that occur when an animal needs to be attached to another or when it needs repairing. [The process] is similar with teston [810][811]silver and all alloyed silver as long as it is soft and good.</ab>

<ab id="p121v_b2b">Before starting to cast in silver, in order to coat all round and strengthen your molds, you should use earth that can withstand fire, such as this sandy[812][813] earth mixed with cloth waste which founders use to cast their canons, or any good lute that can withstand fire. They need to all be red and to be tied with iron wire.</ab>

<ab id="p121v_b2c">Rather than anneal the molds, have the mixture necessary so that the silver runs.</ab>

<ab id="p121v_b2d">If goldsmiths knew the material to make silver run in their work, they would buy it in quantity. Some buy it five sols for a denier.</ab>

<note id="p121v_c2a">I have used silver from the capital[814].</note>

<note id="p121v_c2b">Before luting and strengthening the molds for gold and silver with the said earth, the cast and the vents[815] must be made and the molds must have been annealed and made quite red to burn the animals, flowers and herbs that are inside. The ashes in the molds should be cleaned thoroughly. Once the molds are quite clean and ready, lute them and bind them with iron wire. Anneal them straight away until they are quite red.</note>

<title id="p125r_a1">Plaster</title>

<ab id="p125r_b1">When you mold something in order to cast with wax, first mold only plaster, you mold with plaster [that is] only reheated after [it] has been pulverized. Because, once [it] has been reheated on the stone slab, the outside[832] is burnt, and the inside remains nearly unburnt[833]. Transparent grey plaster is not strong, but the good one [plaster] becomes white once it has been soaked, and [it] sets well quickly. Nevertheless I have found the grey [plaster] to be quite firm and hard after it has set, but it takes longer [to work with it]. Know the nature of each. You will never mold very neatly if you do not soak until it is quite clear and liquid, your plaster or the core[834]'s sand. Soak it straight away after it has been reheated.</ab>

<note id="p125r_c1">However, if you mold with plaster that has been reheated once as said, coat the first mold well with oil. And when the second cast has set and you have prepared it, soak it in water for a long time. And if it does not strip[835], soak it in hot water, because cold water hardens it.</note>

<title id="p125r_a2">[Something] to know</title>

<ab id="p125r_b2">And hot water softens it [plaster] more than cold water [which] does not penetrate it [plaster] as [it does] mixed plaster because it [plaster] is stronger and mixed plaster is spongier. Medals are cast from this powdered, reheated plaster, [and the medals] will be waterproof as though they were varnished. In Germany, people hang these medals on houses. See to it that the water is very hot, and if the water is boiling, it will not endanger [it]. All molds [made] of plaster only or molds [made of] mixed plaster are stripped from it.</ab>

<title id="p125v_a3">Plaster to cast with wax</title>

<ab id="p125v_b3a"> When you want to cast in wax in a plaster mold, you must know this secret, that there is need that your mold be in hot water. The animal will never come out as clean as in metal, because wax grips. But to rough out an

animal as close to natural as possible in order to fix it afterwards, you have to remove all the scales, because the wax will permeate them & will not be able to be stripped off. In molding the animal, take off the scales for wax, but on the contrary [when not molding with wax] rub them against their grain so that they raise up, because then these animals [sc. those not molded in wax and prepared in this way] will show better. Do not wait to strip off your wax until it is cooled down at all. But while it is a bit hot, after you have molded the first casting of the animal, uncover it halfway so that it be stripped in so doing. And having as much in one mold as in the other, make very many large castings holding on to the animal in order to fortify them [...] stripping, & afterwards you'll cut it.</ab>

<ab id="p125v_b3b"> + Alabaster [...] which is plaster in any case, is very hard, but it shrinks quite a bit. It is good for making medals. But it must be very finely strained.</ab>

<title id="p126v_a2">Plaster</title>

<ab id="p126v_b2">You can mould with plaster things as big as you like. If you want to mould a big work or something made of wood, it wouldn't be well stripped unless you soak wood with very hot wax. Because wood sucks and becomes impregnated with the mixture made from plaster. That is why you must soak wood with very hot wax, your work will be well stripped of the cast.</ab>

<note id="p126v_c2">Plaster is not good if it shrinks.</note>

<title id="p127v_a1">Founder's earth</title>

<ab id="p127v_b1a">This is churned[859] earth mixed in with dung or hairs which withstands fire, of which you must always have a large stock hanging around for dawbing the molds that you use to cast in silver and that need reheating. Those where you burn flowers or animals do not need dawbing, unless they have been left to stand once they have been reheated, and once they have been cleaned of any bones and ash that might have remained inside. And having removed the clamps, you open the two halves to see if they have any cracks. Because there is some plaster that does not harden as much in the fire as another one would. Others create crusts on the things that remain to be burned inside. And all of these are imperfections that you must avoid, either by giving the animal a bath of spirits before pouring your soaked sand, or by putting in more or less brick [sand] or alum, or by reheating the brick to higher temperature, or by instead of mixing in brick, mixing in broken bits of crucibles and similar things that resist fire well. Having therefore reheated your mold to burn what is inside, leave it to cool. And if it is neat and unbroken put the clamps on again, and dawb with the aforementioned earth, that is called of the founders,

dust it with a bit of sifted ashes and leave it to strain. But beware not to dawb your if they are not cold. Those in which you cast silver, where nothing needs burning inside, only need, when the cast and the vents are made, to be dawbed and reheated once. Do not dawb the part of the mold in which you want to cast, but leave it uncovered like the openings of the vents.</ab>

<ab id="p127v_b1b">The molds[860] should crack at the first reheating, because [then] they will not crack at the second reheating anymore.</ab>

<ab id="p127v_b1c">The smallest molds reheat more quickly, therefore take the ones that have finished reheating first when you cast, because you can put several [in your furnace at the same time] to reheat.</ab>

<ab id="p127v_b1d">First light the coals in the forge, or in any other place that is close, and having placed your molds on a layer of good embers, not burning too much, in order to have a slow fire in the beginning, then add in little by little coals that are half lit to the forge.</ab>

<note id="p127v_c1a">Earth, of the kind used to braise or solder, which is sandy clay earth. Or else clay mixed with sand after having been dried and sieved, and then composed, is good to dawb your molds. Because this type of earth melts rather than cracks. And any earth that melts cannot be lacking in this.</note>

<note id="p127v_c1b">Use a wire to bind.</note>

<note id="p127v_c1c">Dawb very thickly your molds, and if they are small, you can reheat them immediately in a good fire, even those made out of crocum.</note>

<note id="p127v_c1d">If the earth has hair in it, and does not crack when heated, and does not separate from the mold, the molds will not crack either and will not run when cast. Reheat them at your leisure in a closed fire and do not expose them when warm to the air.</note>

<note id="p127v_c1e">Dawb rather thickly in two or three layers, [doing] similarly at the points of the joints, so that the silver does not run out of the mold.</note>

<note id="p127v_c1f">Reheat in a reverberatory furnace.</note>

<note id="p127v_c1g">To test if your earth is good, rather than putting some on your mold, dawb in that place of the wall of the forge that is around the opening and mouth of the bellows, then turn on the fire and if it tolerates this without cracking, then it is good.</note>

<title id="p139v_a1">Casting wax to mold an animal that one has not got</title>

<ab id="p139v_b1a">Take some white wax which is much more appropriate for this kind of work than anything else, because it is much firmer and does not leave as much filth, as much as you need to cast the animal that you propose, and no more. And [take] a half quantity of ground coal and neatly sieved through a cloth or coal sleeve, using it to give some color to your wax, that would otherwise be transparent and you will not be able to see your lines as clearly. Put your wax on the coal fire to melt. And when it is well-melted and well-liquified, take a full eared-porringer of melted wax, [and] as much sulphur as the amount of a large pulverized walnut. Melt all of over a slow fire and when it is melted, do not leave it on the fire because it will become too hot. But take it off and keep stirring it with a little stick and when it has finished bubbling and is as liquified as water, cast it into the wax that you will have previously removed from the fire. And mix and stir both of the them so that they join together. After stir in little by little while continuously mixing, the charcoal that has been repeatedly ground, and in this way it will be very well incorporated. This is how you will know that your wax has gone beyond its ideal heating point, it will release no more smoke, it will start to have lines appearing on the side and not in the middle, and those lines will be close to each other. If you cast too hot, you will not be able to separate your wax from your mold and it would stick to the cast. When it is at the right state, stir it with a little stick so that the pulverized charcoal is well mixed in and has not fallen to the bottom of the mixture. And in this way, throw it in your mold bit by bit and not in one go, because wax is not runny.</ab>

<note id="p139v_c1a">This black sulphured wax is for fashioning[915] round figures that do not come out of the mold. And they need to be burned in the moule au noyau[916] rather than be opened like the ones that have something jutting out or an intertwining of legs and arms. And this wax, thanks to the sulphur, will melt with little heat and leave without leaving any filth. If by some misfortune the crushed charcoal remains in ashes, when you open the mold and blow on it, it will come clean.</note>

<note id="p139v_c1b">To make wax serpents or other things to affix to candles, it is necessary to cast them with esbaucher[917] wax of all colors.</note>

<ab id="p139v_b1b"> not like other things. And for this one, you can cast two or three times until your mold is full. Now, concerning this mold of pulverized white plaster & reheated in the manner of the sand from the preceding recipes, you should have made it long ago because it is used many times. But, before using it, soak it for a good hour in cold water, & at a minimum, at least as long in hot water that at first is so hot that you can't hold your finger in it. And not that it absorbs no more, but that it appears very wet overall without water seeping into

it. In removing it closed from the hot water, cast your wax in such a state of heat as has been described. And neither the first nor the second casting will readily come out well, hardly, until the mold is soaked. Let it cool down before opening it so that the cast thing not break. You will know that the casting is good when the wax coming back out of the mold is thin and even. Remember to make several castings along the whole length of the mold so that in this way the wax runs better.</ab>

<image id="p139v_d1">[image]</image>

<ab id="p139v_b1c"> Make the first casting twice as large as other molds. And if, in the first casting, your work fills with bubbles and in so doing does not come out neatly, it's all the same, because you have to face the fact that the three or four first do not readily come out well. Firstly, you will know whether there are a few barbs that keep it from stripping well. And you will remove them if, on their own, they do not remove themselves in the two or three first castings. And the more that you cast, the more you will do it neatly. And your mold will serve you more than one hundred times if it is well governed. But it is good to soak it one night or one day before casting so that it be well soaked. The same must be done for fruits made from sugar. This wax is very soft & friendly & pliant, like copper. And if it is hard [this is] because of sulfur, which makes it melt more easily than than other [wax], so much that you can see evidence on a hot slate. And the sulfur that you put inside will be found the second time that you melt it, [as] cracks on the bottom. Having in this way passed through wax, it will not catch fire at all when put to a candle. And in this case, I believe that it will cast quite the medal [illegible]. One uses the same wax in place of varnish to [illegible].</ab>

<title id="p140v_a3">Casting of lead and tin in plaster</title>

<ab id="p140v_b3"> If you want to cast some flat medal or some animal that is not very heavy, and that must not be burnt inside the mold[920], you can rather cast in plaster & brique mixed as above; and not in plaster alone, because it will shrink too much feeling a vehement fire if it is not kept from it. But, with the brick, it holds well. In any case, take heed to dry out your mold at length & on a soft fire & with patience, because it has no need of reheating. But when your work is of flowers or other things whose molds need to be reheated & fired, mix the plaster with some stone alum & also with filings[921]. I have molded in plaster & brick very neatly & it has endured many castings.</ab>

<note id="p140v_c3a"> I tried the plaster & brick alone and molded en noyau with them as with the others. My mold was very clean, having lightly oiled my metal & rubbed it with spirits. I made my casting wide at the entrance, proceeding while making it thin just until the medal is quite slender. I changed the casting

which had taken a good hold of the medal. I dried out the mold on a soft fire & at the end, let it really heat up without its turning red. I let it cool to such a degree that I could hold my finger to it without burning myself. I made a line of 4 ? of tin, ix deniers of lead. Afterwards I put with 4 ? of tin, xii deniers of lead. It is very good & fine.</note>

<note id="p140v_c3b"> When there is nothing to burn inside your mold, it is not necessary to reheat for lead and tin. But for flowers and that which must be burned yes indeed.</note>

<note id="p140r_c1c"> When your animal is cast, cut away the broth & superfluous things with a hot pen knife. And if you want, plait and wrap it around some stick or candle, put it in some hot water to soften and hold it in turning it around.</note>

<note id="p139v_c1d"> Lower the protrusions of the castings so that they be even & that the wax has more silver so that it can run all in one go without turning through the windings of the snake.</note>

<title id="p141r_a1">Molding a crayfish</title>

<ab id="p141r_b1">The crayfish is one of the most fantastic things to mold. But it also constitutes an example of molding full of other great difficulties. The males can be distinguished by the eggs that the females carry, and by four little white legs that the males have at the end on the inside of the tail, after the eight principal legs. It is only good to do them a little bit dry so that the lumbs come out rougher & more beautiful, because everything that is part of the shell will not diminish. It is true that if you let it dry out too much, these little legs inside[922] will shrink & become thinner & will have less body. Also, if they are too dry, the flesh will separate from the scales. Take heed therefore to keep to the mean in your own work. They have some hair between the claws & at the end of the tail, and because all hair is troublesome to mold because it gets covered in sand & will not strip,

<ab id="p141r_b1"> Crayfishes are moulded with difficulty, but it is a good practice to learn how to mould much more difficult things. You can distinguish male from female thanks to the spawns that females hold. Also males have 4 little white legs at the end of their body, inside the tail and following the 8 mains legs. It is good to let it dry because the scale turns firmer and becomes more beautiful. The shell won't shorten. It is true that if you let it dry too much the 4 little legs would turn thinner, and more fragile, and loose body. Also if your crayfish is too dry the flesh would separate from the scales. So, be sure not to dry it very much. Crayfishes have hairs between the legs, and at the end of the tail. Hairs are moulded with difficulty because they tangle with the sand and

cannot be stripped. You can burn crayfishes with a cauterium (or a hot flat iron), because it cannot be seen. But you must oil the other hairy animals or birds with olive and wheat oil which dry immediately and which lay hairs. That way you have the shape of your animal, and also the hairs, make some kind of waves which will be easily reworked. If your crayfish has some delicate (parts this word is missing) which would be stripped with difficulty without being broken, it is much better to pour your first cast on the belly side and on the spawns, then uncover the back side only which is harder, and easier to handle, and the belly side and spawns remain in the mould. It is much better to burn the parts inside the mould than to open your mould before casting the second time. Thus these burnt parts cannot impede the second casting anymore. The second casting hardens on the first one. After being reheated the second cast will be easily separated from the first one. This is a special secrecy for this kind of mould. </ab>

<ab id="p141r_b2"> Start to cast the tail very thinnely Do not forget to rub your thing with brandy before moulding Mould stag beetles, crayfishes, and crabs in the same way If your crayfishes haven't any spawn, do mould the back side up and the belly side down You can mould hollow the body, but not the legs It is much easier to mould hollow the body of a crayfish than to mould a full body, if you don't want to mould hollow mould a turtle When you open your mould you see that the crayfish looks like white bones and not powder, if not open the mould mercury couldn't work. Apply oil colors very thinly </ab>

<ab id="p141v_b1"> Let your crayfish dry a little in the sun, by itself. If it has spawns, they will shrink while drying, and be all the more beautiful for it. Make you paste out of yellow potter's earth, just like for the other representations[923]. Lay your crayfish on it, the back side down, and the other parts which are more tricky to mold -- legs, belly, eggs - side up. Drive in the back side in the clay paste up to the legs, which is about the half part [of the crayfish's body]. Fix the body with a pointy iron thread in the middle and, if you feel you need it, you can also drive another one at the edge of the tail. And in order that the big legs be lower than the head, which is lower because it is linked from below, add a little clay [under the head]. Then add a bit of clay under the jacket in order to raise it. Hide the feelers under the clay and under the crusher claws, then arrange it as you like. Stretch out the walking legs to the joints, and for the first cast, bend the second part of the walking legs. Fix the joints of the legs with wax and a warm wire so they will not move. If you want to mould something fancier, fix the end of one walking legs on the body or on a crusher claw , using the same wax. If the female has spawns, bent half the tail over the spawns, and keep the shape by fixing the tail with a wire. Be sure that you will be able to clean this part. Finally rub your crayfish with spirits, and cast your sand. Once the sand is hardened, uncover the back side, the head, the eyes, and the small legs close to the crusher claws, and the

walking legs all along. One must uncover these parts as much as possible. Then bend and cover the spawns again. The other animals When you arrange the legs, be sure that they do not get over the belly, and that they are well set against the belly otherwise [...] </ab>

<ab id="p141v_b2"> Fix what may raise -- [i.e.] the two padded edges on each side of the mouth-- with melted wax under them.</ab>

<ab id="p141v_b3"> uncover as much parts as possible, but be sure the channel[924] you make are well stripped.</ab>

<ab id="p141v_b4"> Incline your mould to the thickest side of the animal.</ab>

<ab id="p141v_b5"> To paint the crayfish, one paints the middle of the back with vermilion, mixed with a bit of lacquer. The sides, the belly, and below the legs with a mixture made of vermilion, cerussite, and a bit of yellow ochre. As with all things, always keep the real one in front of you in order to copy it [as realistically as possible].</ab>

<ab id="p141v_b6"> Lay the feelers on the crusher claws, or solder this part with a wire made of bleached brass. </ab>

<ab id="p141r_b3"> are not so uncovered. But since crayfish are troublesome to burn & clean, you have to uncover them as much as you can, even the little legs just until the tips, because they are troublesome & if, in order to not alter them, you have to take them out, you could break something of the mold. Having uncovered it with the point of a knife, like an engraving stick or another fitting thing, clean off the sand at the joints & elsewhere with your little brush really very scrupulously. And if something is loosed from the crayfish, attach it with wax, as is discussed. And also attach the horns this way. And also do[925] the casting the length of the extremes of the little legs with wax. And refill the holes that have been made with the needles of iron wire with it. And everything being quite clean & having uncovered more than half of it, oil your mold after having soaked the back side in water, & do not forget to oil all the fine parts that are between the legs and the little beaks; then rub the crayfish with spirits. And do your second casting after having made the first mold even, so that the cramp-irons join better. Your mold must be larger on the side with the impression than on the back. Do not open your mold after the second casting, so that it not become clayed & reheated & that which is inside not be burned. Do not forget to mix crocum throughout your sand when you mold the crayfish, because you must really reheat it & the crocum withstands this marvelously. To mold a crab & to mold a crayfish are exactly the same. When you have uncovered your crayfish on one side do not delay at all before doing the second casting, because crayfish dry out. It is not enough to uncover the crayfish such that you see the whole half [sc.

the half you uncover], but take heed that your mold, even when you are uncovering, be good and stripped, because if the crayfish gets well burnt, you will not be able to open your mold without breaking it.</ab>

<note id="p141r_c1p">Restore it with a pen knife, little chisels, or engraving sticks.</note>

<note id="p141r_c1q"> As you see here, but a wax casting all around & at the end of the tail, where you will do the principal casting, two or three more.</note>

<image id="p141r_d2">[Image]</image>

<note id="p141r_c1r"> Make the casting with candle wax [shaped] in a thread like a large packthread, the whole length from the end of the claws to the extremity of the tail. If there is also some claw end or other part that is extended past the rank of the others or is raised up higher or turned up all alone, make[926] a wax casting for it from its end just barely not joined to the body or to one of the large claws or to some other place where lots of metal will be wedged in[927].</note>

<note id="p141r_c1s"> Having uncovered it, attach & secure the two little bearded horns of the crayfish, and anything else that is not secured, with wax.</note>

<title id="p148v_a1">Molding turtles</title>

<ab id="p148v_b1">Join the parts of your mold and fix very carefully clamps on all joints, which are on the top, the bottom and the sides of the mold; do not forget to notch the joints as you did with the other moulds. Once you have fixed all the clamps, remove the sides ones, not the others. Thus your mold, made of several pieces, will open as if it was only made of two parts. If you want to mould hollow, pierce a hole big enough to thread the end of your little finger in the middle of your mold's belly. Widen the outside of the hole, like clervois[951], in order to cast the core. You could avoid all these difficulties if you didn't mold hollow; you could then mold your turtle in two pieces, more quickly, and burn it inside of the mold like other animals. But a turtle is wheighty, and would be heavy if not molded hollow. This is why it is considered better to mold it that way. It takes 3 days to make the proper [hollow] mould. To mold hollow and fantastic [forms], you need very strong plaster which can withstand fire without bursting. But if you can't get this kind of plaster, add to it a little more stone alum, and also add crocum, which fortifies it [the plaster] and makes the flaws -- if there are any -- so fine that they can be easily removed. Do not forget to tighten your mould with a press in order to avoid flaws that happen when your mold is not tight

enough, or when it bursts. To repair it, if the lines are not apparent enough retrace with a burin, then soften the lines with a ciselet[952]. You can remove the flaws with a chaple[953], a kind of burin. For the grumelures[954] and scales, they can be made with a gadget[955] or a small carving tool which isn't hammered, and hitting with a small file.</ab>

<note id="p148v_c1">Make this hole before joining the mould.</note>

<title id="p159v_a1"> Cleaning files</title>

<ab id="p159v_b1">Sometimes they[1000] get fat from[1001] the fat of lead, which is naturally fat, or also filings corrode them. And you will be able to clean them with hot charcoal or a wire brush made from brass.</ab>

<image id="p159v_a2">[image]<image[792]/>

<title id="p159v_a2">Carnation</title>

<ab id="p159v_b2">Mold a carnation like a rose, marigold, and all other flowers as discussed, that is to say cast the flowers in one mold, and the leaves in two parts in order to solder them onto the flower, this is the better way. But you could mold the flower and the leaves together in one single closed mold. I tried one which came out well from the mold. But the sand must be very thin, and you must blow very strongly.</ab>

<title id="p159v_a3">Molds</title>

<ab id="p159v_b3">Try to make one side as thick as the other, that way the two parts will be equally reheated. You can open this kind of mold, in order to clean it, when you mold some animals, like crayfish, which burn. When your mold is reheated, do not wait too long before casting again, because it gets damp and loses its strength.</ab>

<title id="p159v_a4">Unmixed plaster</title>

<ab id="p159v_b4a">If you reheat plaster as a stone it would crumble into water, but if you grind it before reheating it, it will not crumble into water, on the contrary it will harden in water, if it is good plaster like the one from Paris or from Spain which is as hard as a stone, and which is found through poor and dry earths, and which looks like white salt. German people use this plaster to make statues for their fountains, even if the statues are varnished they will not be damaged with water. On the contrary this plaster harden with water. When this sand is unmixed it sets much sooner. Oil very lightly your shapes of metal or of other materials otherwise you will not be able to strip plaster from the mold. And dip your mold

into hot water in order to open it, if it does not open in hot water, it could open into boiling water.</ab>

<title id="p159v_b4b">It is sometimes necessary to boil your mold into hot water, as you did with wax when you were afraid it could not be well-stripped.

This plaster is well stripped because cold water draws out oil to plaster which absorb oil.</ab>

<title id="p165r_a4">Plaster for molding</title>

<ab id="p165r_b4a">When it is long to set and dry, it means that it is too fat and moist, which is what makes it shrink away from the fire and crack. [This is] where burrs come from. The one that comes from lean earth is better. You must not store your moulds made of fat plaster for a long time, because they resemble fat earth, which when drying, cracks. The best is to reheat them[1034] soon after they have been made and cast. Moulds made of good plaster can be stored a long time.</ab>

<note id="p165r_c1">It is necessary to oil well, because it is more difficult to separate the two halves of these [kind of] moulds than when it is [made of] mixed [plaster].</note>