Diseases of potters

In all cities there are workers who fall seriously ill as a result of metal poisoning. Amongst these are potters. In which city, in which town, is the most ancient of arts, that of pottery, not practiced? These workers have to use heated, calcined lead to glaze their pots and have to grind the lead in marble mortars, which they do by hanging a wooden pole with a stone at the other end from the ceiling and then making it turn round. Before they place the pottery in the kiln, they paint it with brushes dabbed in lead solutions. This means, therefore, that they take in this metal, which has been dissolved and mixed in the water, through their mouths, noses, and their whole bodies. After a very short while the toxic effects soon become apparent: first of all they suffer from palsied hands, abdominal colic, fatigue, cachexia, and they lose their teeth. It is therefore extremely rare that one can see a potter who does not have a lead-coloured, cadaverous looking face. In *Acta Medica et Philosophica Hafnien­sia*, one can read about the potter who after an autopsy was shown to have his right lung adhering to his ribs, the former being almost desiccated and consumptive. The state of his lung was attributed to the profession the poor man had carried out before his death. Once he fell ill, he himself sensed that his illness had been caused by his job and he had stopped, but not in time.

_Poterie_ records the case of a potter who became paralysed on the right side, with a distortion of the spine and a stiffening of the neck, which he himself cured with a tea of sassafras wood and bay berries. _Poterie_ also describes the case of another potter who died of apoplexy.

Potters who use lead are frequently afflicted by such illnesses. What is surprising is that lead (which chemists so skilfully trans-
form into an endless quantity of remedies for internal and external illnesses, so much so that it is commonly known as the best remedy of all) harbours such corrupt seeds that it frees when it is dissolved in water and ground to dust. The potters who have to use it in this form suffer from all its effects. But I was no longer surprised when I learned from Boyle that mercury is fixed and solidified almost the very instant it comes into contact with lead fumes. As Thruston so poetically says in *Diatribe de respirationis usu*, Saturn behaves with Mercury in the very same way that Vulcan behaves with Mars, “it chains and fetters it”. It is therefore not at all surprising that once it has been ground with a mortar, despite being cold by nature, lead flares up against those who are manipulating it and afflicts the potters terribly, resulting in a torpor of their circulation and spirits and tormenting their hands.

Chemists themselves bear witness to the remarkable toxic nature of lead and, as they know to their cost, this has also been observed by those who remove lead impurities from gold and silver.

The authors of *Collect. chymicae Leydens* write that lead acts with such violence “that, if someone should inhale the lead vapours during metal refining, they might be suffocated, while those who do not take all necessary precautions lose their teeth”.

To carry out my work, that is, to identify the causes of workers’ diseases as best possible, I have frequently had to visit workshops. At this point I would like to summarize the various observations I have made in potters’ workshops regarding the glazing of earthenware, a technique that goes back to ancient times, as can be seen from archaeological finds, and one that is of great use. If we did not know how to glaze terracotta vases, we would be forced to use the more costly receptacles of tin and copper for cooking and kitchenware. I found it both surprising and interesting to study the process in which these clay artefacts are baked first in the furnace, coated with calcined lead mixed with powdered flint dissolved in water, and then put back in the furnace - the strength of the heat gives them that glazed crust that makes them so practical for their various uses. However, first and foremost, it is the chemists who need glazed vessels for their alchemical processes. I do realize, however, that it is not possible to go into this matter in great detail without straying from my current objective which is not the study of the actual working processes, rather the diseases they cause. Since the
object in question is potters, I would like to avoid having Horace's words used against me - “at first a large vase is formed; why then, as the wheel revolves, does it become a little pitcher?” I shall therefore save my interest for a more suitable occasion when I can write a book, which I already have in mind, on the mechanical methods adopted in professions.

The remedies these workers are offered hardly ever lead to their total recovery. Furthermore, it is not until they have serious afflictions to their hands and feet and their bowels have become hard, that they turn to a doctor; and to this we must add one further ill, that of extreme poverty. In these cases it is necessary to resort to the medicine of the poor, in other words, to prescribe remedies that alleviate their suffering at least, and advise them primarily to quit their craft. For such illnesses I have occasionally prescribed repeated mercurial purgatives, in particular those with sweet mercury, soothing their hands and feet by rubbing them with petroleum, and achieving good results. Inexpensive iron-based medicines are to be recommended for lengthier therapies against the hardening of the bowels. Iron filings dissolved in wine together with cinnamon is preferable to the other chemically-prepared iron remedies and indeed, they are also more effective and less expensive, considering the great hardship in which these workers find themselves.

Not all potters and ceramists are afflicted by these illnesses since the tasks carried out in the workshop vary: some workers knead the clay with their hands and feet, while others sit at the potter's wheel and shape the vases. One must therefore bear in mind this variety of tasks when one hears the word “potter”, to avoid resorting to medicines that are used to treat metal inflicted diseases. However, all these workers have certain characteristics in common – a pale complexion, cachexia, and being sickly – since they handle moist clay and live in damp surroundings. In particular, those who work at the wheel and shape the vases suffer from vertigo if they are weak-sighted, as well as sciatica owing to their constant feet movements to keep the wheel in continuous motion. One at least must provide these workers remedies that alleviate such afflictions, even if these do not guarantee total recovery.
Chapter VI

Diseases of tinsmiths

Called white lead by Pliny and Jupiter by chemists, which they place between the Moon and Saturn, tin is used in homes to adorn tables. It is also used by metal founders to make weapons, church bells, and other objects. Using tin, chemists have learned how to prepare remedies for various illnesses, for example, tin butter, crystals, tin-based counter-poison, and other compounds. As do all metals, tin harms not only those working in the mines where it is quarried, but also those in places where it is smelted and refined; in cities workers who smelt and remake old plates, polishing them with their tools, are seriously afflicted. Tinsmiths suffer the same symptoms as porters who smelt and grind lead. Indeed, tin is made up of mercury and extremely acrid sulphur, so that when workers are smelting it, they can not avoid inhaling those noxious fumes.

In *Collegium Consult*, Ettmüller tells the intriguing story of a tinsmith who first had a persistent cough, then difficulty breathing, at night in particular, so much so that he would spring out of bed and open the window, breathe in deeply and, just like a sleepwalker, wander around the house until dawn was breaking. It was only then that his symptoms were alleviated. A doctor of great experience, Ettmüller attributes the cause of such serious symptoms to the mercurial fumes that the metal releases. He says there is a considerable amount of volatile antimony in tin which, when mixed with saltpetre, acquires an explosive capacity. He includes this kind of asthma in the category of convulsive disorders, since it is the nervous plexus that causes the spasms that prevent pulmonary dilatation.

These workers are often to be seen in the city. If they seek medical help, they have to be treated with the same remedies given to other metal workers. First of all, their lungs need attention, since
this is the chief seat of their illness and the extent of their respiratory difficulties needs to be assessed. These workers need to be treated in the same fashion as those suffering from miners' asthma, avoiding any substances that desiccate by their nature. Butter, milk, emulsions of almond and of melon seeds, barley infusions, and the like are all to be recommended.

The aforementioned tin-based remedies may also be administered, in particular the *Antihecticum Poterii*, which would appear to be made up of antimony and tin, since, as has already been said, the illnesses caused by metals can be remedied with metal-based preparations.
Diseases of glass-workers and mirror-makers

I believe that glass-workers are more prudent than any other kind of worker. After having worked for six months (that is, during the winter and spring), glass-makers rest, and when they turn 40, they give up their trade and wisely spend the rest of their lives living quietly on what they have managed to save or otherwise turn to other trades. Indeed, such a dangerous profession cannot be borne for long and can only be carried out by young, robust men. I believe that the mass of molten glass that ripples in the furnace is harmless and causes no perceptible damage to the workers. This is also because no glass-maker has ever complained and there is never any bad smell in glass factories. This is not the moment for a detailed analysis of the nature of the substances used to make glass, or of the technique used to blow glass. I believe it suffices to know that any injuries these workers incur come only from the violence of the fire or the toxicity of the minerals used to colour the glass. Even in the deepest winter, glass-workers are always half-naked, standing in front of the boiling furnaces blowing glass, staring into the fire at the very point at which the glass becomes molten. It is inevitable that they fall seriously ill under such conditions.

Their eyes bear the direct brunt of the fire and they are often seriously inflamed; they gradually become weaker because their natural watery humours are dried up and consumed by the excessive heat. For the very same reason, glass-makers are tormented by an unquenchable thirst and frequently drink excesses of wine rather than water. Indeed, many people believe water to be more harmful than wine, because many people have died suddenly after drinking cold water when overheated.

Glass-makers are also subject to pulmonary illnesses, as they only
wear a vest and their chests are always exposed to the air; then, once they finish work, they go from the boiling hot workshop to colder places. No matter how strong and vigorous, the body cannot withstand such excessive and sudden changes in temperature for long, and therefore they fall ill with pleurisy, asthma, and chronic cough.

But those who make coloured glass for necklaces and other objects for women from the lower class and glass for other uses are afflicted by much more serious illnesses. Calcined borax and antimony with a certain amount of gold must be used to colour the glass; this is pounded together and mixed with the glass to obtain a paste. No matter how well they cover their faces or turn their heads away, glass-makers cannot help but inhale the noxious fumes. It is therefore often the case that they fall lifeless to the floor from suffocation or, over time, they suffer from ulcers in the mouth, the oesophagus, or trachea before developing pulmonary ulcerations which make them consumptive, as has clearly been shown from post-mortem examination.

I have always found it surprising that glass takes on such noxious characteristics after borax and antimony have been mixed with it. Nevertheless, I am sure this is true, although I have never been able to observe as much in person. There is a glass factory in this city, but they do not colour glass there. However, Doctor Giuseppe de Grandi, one of my pupils at the University of Modena and now a renowned doctor and anatomist in Venice (where the famous glass factories are situated on the island of Murano), sent me a letter on the subject. What I am trying to say is that very often even the most skilled doctors are deceived when it comes to the mixture of substances, and even more so when these are exposed to fire which, although Van Helmont calls it the corruptor and death of all things, it is still the creator and father of many more. As Pliny so astutely wrote with more understanding than a chemist: “Different substances may be derived from the same material depending on how long they are exposed to fire”.

In Venice in particular, as is also the case with gilders, mirror-makers are affected by the noxious effects of mercury, which is coated on large sheets of glass to give a clearer reflection on the other side. It is very likely that the ancients were unaware of this technique; in his work *Naturalis Historia*, Pliny makes no mention of it in the passage wherein he describes the various ways of making mirrors.
Those who make mirrors are poisoned by the mercury, thus becoming not only palsied and asthmatic, but also afflicted by the other previously mentioned illnesses. In Venice, on the island of Murano where large mirrors are made, these workers glower at the reflection of their suffering in the very mirrors they have made with their own hands and curse the profession they have had to follow. A letter sent from Venice to the Royal Society in England (it is included in the *Transactions* of the Royal Philosophical Society), states that workers who coat the back of the mirrors with silver frequently suffer from apoplexy.

I have nothing new to add as regards medical remedies. These workers can be treated in the same manner as all the others who work with metals and furnaces.
Diseases of painters

Painters are also afflicted by a great many illnesses: palsy of the limbs, cachexia, blackened teeth, pallor of the face, upper abdominal pain, and loss of the sense of smell. It is very seldom the case that the very people who paint the portraits of others, making them more handsome and florid than they actually are, are themselves of a healthy and florid complexion. Both here and in other cities, all the painters I have met have had sickly complexions. If one reads the lives of painters, one will observe that they do not live particularly long, the more famous ones in particular. Raphael of Urbino, for example, a renowned painter, died in the very flower of his youth; his premature death was lamented in an elegant poem by Baldassarre Castiglione. One of the causes for the premature death of painters might be their sedentary life and melancholic nature that leads them to isolate themselves from others and to busy their minds with fanciful ideas.

But it is probable that the cause for painters' illnesses is another: the coloured substances they handle and inhale continually, red-lead, cinnabar, white-lead, varnish, nut-oil and linseed oil needed to mix the colours, and countless other mineral substances. Evidence for this is the fact that there is a strong smell in their workshops, like a latrine, that comes from the varnish and oils, and goes straight to one's head, and might even be the cause of their loss of smell. Furthermore, while they are working, painters tend to wear

* The absence of a chapter numbered eight, between the seventh and ninth, is an anomaly that was carried forward from the first edition in Modena in 1700, in all the editions of *De Morbis Artificum Diatriba* and in most vernacular translations.
dirty garments splashed with paint, so these unpleasant fumes enter the blood stream via the respiratory passages, attacking the soul and disturbing the equilibrium of the bodily functions, and thus causing the above-mentioned diseases. It is a well-known fact that cinnabar contains mercury; white-lead, lead; verdigris, copper; ultramarine, silver; and that painters prefer to use colours of mineral origin, since they last longer than their vegetable counterparts. Since most pigments are derived from minerals, painters are afflicted by the same illnesses as metal workers, albeit less severely.

Fernel describes the highly unusual case of a painter from Angers who was first afflicted by palsied fingers, then convulsions that gradually spread from the arms to the feet, until he was overcome with strong pains both in the stomach and the upper abdomen bilaterally under the ribs. Enemas, soaked woollen compresses, baths and all other kinds of remedies brought him no relief whatsoever. During a colic attack, the only way to help him was for three or four men to push down on his stomach with all their weight, because this compression of the abdomen alleviated the pain. Finally, after suffering terribly for three years, he expired, wasting away. Fernel adds that animated discussions broke out amongst the most renowned doctors both before and after the autopsy regarding the true cause of such an illness. In actual fact, these discussions then became more heated when nothing abnormal could be observed in the painter’s bowels. When I read this case I could not help but admire Fernel’s candour which, as Celsus himself states, is a sign of a great man: “We were all off the mark and, as the saying goes, completely on the wrong track”. Nevertheless, he does add that the painter not only had the habit of cleaning his brushes with his fingers, but also was imprudent enough to suck them. In all likelihood the cinnabar entered the other organs, brain, and the whole nervous system via his fingers and, via the mouth “reached the stomach and intestine and, with its noxious properties, was the cause of such suffering”.

His cachectic condition and pallor, as well as the melancholy that is a characteristic of painters, are therefore all to be attributed to the toxicity of their pigments.

Antonio Allegri, known as Correggio after his place of birth, was so melancholic and distracted that he could recognize neither his own greatness nor that of his paintings, to such an extent that he
would return the fees given him in the belief that it was wrong to be
paid in gold for the very works that are now considered priceless.

When painters, therefore, suffer from the above-mentioned or
other common maladies, they should be treated with particular at-
tention. In addition to the traditional remedies, they should also be
given those that are most suitable for illnesses caused by mineral
substances. But I have already described these and I do not wish to
repeat myself and bore the reader.
Diseases that afflict those working with sulphur

Of all the minerals that make life easier, sulphur is the most important, but it also causes serious illnesses in those who roast, melt or use it in other modes of production. In this chapter we shall study the illnesses of those who work with sulphur. Those who use burning or liquefied sulphur suffer from cough, dyspnoea, hoarseness, and eye inflammation.

Analysis has shown that sulphur is made up of two substances, one fatty and inflammable, the other acidic and able to extinguish fire. When sulphur is melted over fire, and even more so when it is burning, this acidic substance volatizes into fumes that cause the above-mentioned illnesses, in particular precipitating cough and eye irritation. The soft and delicate structure of the lungs and eyes is severely damaged by this corrosive acid.

In his list of merchants and workers in Rome who, with their excessive noise stopped him from sleeping both night and day so that he was forced to flee to the countryside, Martial includes not only coppersmiths, minters, bakers, and Jews, but also those who sold sulphur-coated splinters, who stood out from the other workers because of their sore eyes: "The sore-eyed lad who sells sulphur candles".

Women are also familiar with the characteristics of sulphur fumes and this is why they use it to bleach garments by holding them over the fumes of burning sulphur. They also use it to bleach red roses and make them as white as milk: "Sulphur fumes decolourise roses by just grazing them" says the poet. According to Van Helmont in his treatise De asthmate et tussi, in Germany they fumigate casks with sulphur to stop Rhine wine from becoming musty.

The acid in sulphur is, in particular, an enemy to the bronchi and trachea and induces adverse effects.

There is a well-known story about a woman who hid her lover
under the bed and threw a sheet that had been bleached with sulphur over him, trying to hide the object of her guilt from her husband when he returned home. By doing so she betrayed herself, since the lover could not stop coughing and sneezing as a result of the smell of sulphur. The case of a baker also springs to mind who saw the sulphur balls that are used to light a fire in the stove and, in fear the house would burn down, had the courage to tread on them to put them out, but nearly killed himself as a result. For days he was afflicted with a wracking cough and had great difficulty breathing; this was almost certainly because the pulmonary vesicular structures had constricted because of the strong acidic fumes. He then appeared to be getting better by drinking sweet almond oil and following a milk diet, but he died within just a year.

In *De vitis expirationis laesae*, Ettmüller observed that the vapours of saltpetre and sulphur cause persistent coughing and laboured breathing. He does not object to sulphur being commonly known as the balsam of the lungs, but only once its abundant acid content has been removed, as both Juncken in *Chymia experimetalis* and the aforementioned Ettmüller in his book *Mineralogia* explain. The latter says that sulphur is rightly called the balsam of the lungs but only once “its dense healing component” has been separated from that corrosive acid. Juncken explains how this separation takes place in the aforementioned passage; sublimating sulphur with corals and staghorn, which absorb the acid.

I do not understand why, in our region at least, numerous doctors prescribe sulphur spirits for pulmonary illnesses. Perhaps it is only because they have read that in illnesses of this kind, sulphur is the main remedy; as if acidic component of sulphur were the same thing as sulphur and that part of it can have the same properties as the whole. Because of their extreme superficiality, these doctors are therefore making a serious mistake. The same mistake is made when certain doctors administer sulphur spirits in some kind of solution as a specific internal remedy for their patients with scabies, in the belief that sulphur is an extremely effective remedy and the main component for topical ointments used against scabies. Workers who use sulphur must therefore protect themselves as much as possible from inhaling sulphur fumes and they must take marsh mallow syrup, melon seed emulsion, barely brews, sweet almond oil and follow a milk diet to alleviate their cough.
Daily experience has also shown us that blacksmiths suffer from sore eyes which are, in my opinion, not so much owing to the violent heat of the fire that the blacksmiths have to stare at continuously, but rather to the sulphurous fumes from the red-hot iron. These fumes attack and irritate the eyes, causing secretion from the glands and eye inflammation. Demosthenes' father is said to have been a blacksmith who made swords and Juvenal describes him with swollen eyes when he says the following about Demosthenes: "His father had swollen eyes because of the soot from the red-hot iron; he removed his son from the charcoal, tongs, and anvil that make swords and from grimy Vulcan and sent him to study the art of rhetoric".

The expression "yellow Vulcan" (to my knowledge, an attribute no other poet has ever used to describe fire; others called it sparkling, flashing or red), made me think that the author might be referring to the colour of the molten metals that comes from the sulphur they contain and which is reflected in the blacksmiths' faces; this was something I myself also observed when a weapon was being cast. However, in the aforementioned line, the first syllable of the Latin luteo is shortened, so it cannot mean yellow, but rather something muddy.

Since iron contains a considerable quantity of sulphur, it comes as no surprise that once it has become red-hot, it emits small sulphur particles (as does charcoal). These attack the eyes like sharp thorns, causing severe irritation and ophthalmia. I have had numerous blacksmiths complain of such illnesses and when they come asking for a remedy, I recommend a woman's breast-milk, barley water, and similar soothing applications and bleeding if the inflammation is severe. Other remedies are cow whey, emulsions of mel-
on seeds, and a cooling diet (i.e., one that cools the blood), which is to be particularly recommended for those who work near fires. Beet is also advisable, since it frees the intestine, as it is generally known that blacksmiths tend to suffer from constipation. This is why Martial calls “beet the food of blacksmiths”. Should the eye troubles persist, one can also use the same water in which the red-hot iron is cooled. However, blacksmiths should also be advised to turn their eyes away from the red-hot and incandescent iron whenever they can.
Diseases that afflict those working with gypsum and lime

Workers who use gypsum and lime, burning this in furnaces and selling it in shops, are afflicted by illnesses that are just as serious. Gypsum is universally acknowledged as a poison. If drunk, it causes death by suffocation. Pliny describes how Proculeius, a relative of Augustus, was wracked by unbearable stomach pains and killed himself by swallowing gypsum. I have frequently observed that workers who burn, prepare, grind, sift, or sell gypsum have great difficulty breathing, suffer from constipation, and have a hard, distended upper abdomen; their faces are pale, as if dusted with gypsum. This is especially the case for those who grind dehydrated gypsum in a donkey mill, sift it, and those who use gypsum to make various objects, in particular statues and portraits to adorn churches, the halls of princes, and even libraries, consistent with traditions dating back to antiquity.

"In the first place, they are unlearned persons, though you may find their houses crammed with plaster casts of Chrysippus", says Juvenal, mocking the vulgar rich who adorn their libraries with the statues of philosophers so that they appear more knowledgeable.

No matter how carefully these workers cover their faces with cloth, the tiny gypsum particles still manage to pass via the mouth and nose mingling with the lymph to form tufaceous concretions, obstructing respiration by encrusting the pulmonary breathing passages.

However, at this point I would like to digress somewhat and look a little more closely at the nature of gypsum. Indeed, I believe that its nature and characteristics have not yet been studied by those who have written about minerals. Dioscorides says gypsum has a pliable and astringent capacity, which Galen has also con-
firmed in his various works. According to Pliny it is similar to lime. More recent writers, such as Cisalpino in his book De metallicis, attribute it with an obstructive, suffocating faculty; Amato Lusitano notes that it is extremely drying and that "most of the workers who prepare gypsum die because their heads are weakened by the excessive desiccation gypsum transmits and thus are no longer able to assimilate or retain the humours which then descend to the lower parts, causing phthisis". With this particular observation, this Jewish author describes the noxious characteristics of gypsum.

Unless "I am deceived by my own presumption", I believe that gypsum has another quality that has not yet been observed: an expansive and elastic strength that is nothing like that of lime, in fact it is quite the contrary. In Modena, a city abounding in porticoes, I have frequently had occasion to observe builders demolishing old precarious columns, resting the buildings on thick beams before replacing them with new columns of either marble or stone. These workers make the new columns with lime and stone but, just two ells from the top, where the column must be cemented to the building above supported on the beams, they use gypsum and not lime. While observing this technique (one which is common in this city since it is one of the oldest this side of the Po), I asked the builders why they did not use lime to finish the job as well, but rather used gypsum, almost as if they wanted to put a seal on their fatigue, as it were. The bricklayers replied that a wall built with slaked lime settles, while one that is built with gypsum expands upwards; they added that it is truly amazing that just five or six days after the column has been built, they can remove the beams that supported the entire weight on both sides with almost no effort whatsoever. If the bricklayers were to complete their work with lime, it would require considerable effort to remove the supports, and would endanger the building due to the violent shaking that would result.

Gypsum is therefore very similar to lime since they are both coagulants; when dissolved in water they are both able to unite and cement, but gypsum also has a great elasticity that allows it to elevate considerable masses. It not only produces an upward thrust, but also one downwards and to the side, and exerts this even more where it encounters the least resistance. It has been observed that if a wall of bricks and gypsum is constructed on a beam and then joined to another old wall above it, no matter how strong
it is, the beam will sag. This sagging is not caused by the excessive weight which, on the contrary, is frequently minimal, but rather by the pressure of the gypsum. Lime is also resistant to damp and never deteriorates with age, so that walls nearest the ground and in the very foundations themselves are as resistant as iron. Gypsum, however, if close to the ground will rot and crumble, while when placed higher up, for example in chimneys, no matter how much it is rained upon, is just as resistant as lime.

Returning to our main theme, it is not at all surprising that gypsum particles, which enter the respiratory system via the trachea and mix with the serous fluid exuded by glands, cause such terrible effects: they occlude the ducts with their expansive strength, thus impeding the air from being inhaled or exhaled. The ancients recommended various remedies for the treatment of diseases caused by gypsum (although once manifest, it is not easy to cure them). In the second book of De antidotis, Galen recommends a lye solution made of vine shoot ash; Guainieri suggests the same remedy, but prescribes only a third of the weight of ash; while Sennert recommends mouse droppings.

I prescribed such workers fresh oil of sweet almonds and melon seed emulsions with a certain amount of success. Nevertheless, if these workers continue their trade, they die of asthma and cachexia. I would have liked to perform an autopsy on some of these (and other) workers, but no amount of pleading or money is able to convince people to allow the study of the bodies of those who have died of an uncommon illness. On the contrary, if the request is justified by the claim it is for the good of the general public, when someone dies, some then criticize the doctor for wanting to satisfy his curiosity in regards to the cause of a fatal illness after the fact.

Lime is not as noxious as gypsum to the workers. When lime is removed from the kiln, it develops great heat and burns. This is why Paolo Zacchia was so surprised that some cities allow the construction of lime kilns, since the vapours they emit are so harmful to the chest. Lime is unrivalled in its ability to smoulder long after it has been burning. If water is added to lime that has been stored in a dry place for a year, it smokes and is still able to make the water boil. However, with time, when it has turned to powder and is old, it loses that characteristic almost completely. This is when it is less harmful, although it still preserves its corrosive powers.
Lime attacks the throat and eyes, making the voice hoarse. But this can be easily treated with cold drinks and melon seed and other cold seed emulsions. Lime makes the bricklayers' hands rough and at times can even cause sores, although it can be used as a cure for those suffering from scabies. Lime is therefore rightly included amongst antipruritic remedies as its alkaline properties neutralize the acidity that abounds in scaly skin conditions. It is for this reason that in his work, *Pharmaceutica rationalis*, Willis recommends a lime tea for diabetes, reasoning that this tea would appear to stimulate the flow of urine, owing to its heating and attenuating properties; nevertheless, since it reduces and eliminates the acid salts that actually cause the flow, it also helps alleviate excessive urine flow. For the same reason, Richard Morton strongly recommends lime tea for pulmonary consumption.

Some believe that quicklime contains two kinds of salts that remain inert after calcination but which, when dissolved in water, react with one another and produce the boiling commonly observed. However, in his work *Meditationes de aeris influxu*, Johann Bohn questions this theory since, as has been observed, other fixed and purer alkalis produce the same heat in the presence of water without need of any acid. Saint Augustine was surprised by the fact that lime boils in water while remaining inert in oil. It is therefore to be believed that there is a considerable amount of alkaline salt in quicklime, since remedies that are prepared using lime are commonly and successfully used to cure purulent ulcers that are excessively acidic.

For the treatment of workers who use lime one can therefore recommend a tepid extraction of boiled of mallow, violets, fresh butter, or milk itself, the latter being the most suitable remedy to alleviate a parched and irritated throat.

The workers I have been discussing so far, once again from first-hand experience, are subject to illnesses caused by the toxicity of the metals and minerals I shall now give a brief description of the most suitable methods of treatment. The main principle of the doctor looking after these workers is to cure them as quickly as possible with the most suitable and effective remedies since their persistent request is the following – to be either cured or killed. When treating the diseases of these workers, one must therefore choose a cure that is both rapid and conclusive, because otherwise
the starvation resulting from the illness and the concern for their families' needs will worry them to death. At this point I believe it is appropriate to quote one of Plato's valuable maxims, which will, I think, please the reader. In the Republic Plato says: "When a carpenter is ill, he asks the physician for a rough and ready cure; an emetic or a purgative, cautery or the knife, - these are his remedies. And if someone prescribes for him a course of dietetics, and tells him that he must swathe and swaddle his head and all that sort of thing, he replies at once that he has no time to be ill, and that he sees no good in a life which is spent in nursing his disease to the neglect of his customary employment; and therefore bidding goodbye to this sort of physician, he resumes his ordinary habits and either gets well and lives and does his business, or, if his constitution falls, he dies and has no more trouble". Thus notes Plato.

I have observed in practice that this is exactly what happens. If the worker's health is not quickly restored, he returns to his workshop while he is still ill and neglects the doctor's lengthy cures. Unlike workers, the same is not true of the wealthy, who have much more time to be ill (and at times pretend to be so just to flaunt their wealth, such as the man Martial made fun of) and they pay doctors a pittance to stay at their bedsides. "Is the practice of virtue obligatory to the rich man", Plato continues a little further on, "or can he live without it?"

But there is one category of doctors who prescribe lengthy cures for short illnesses as well, which could also be cured if left alone. First of all they prescribe sedatives, then stimulants, syrups, purgatives, repeated blood-letting and a multitude of other tedious remedies, all in accordance with the principle: not a day must go by without a new prescription. Horace's lines are most fitting for these doctors: "He will fasten on to anyone he manages to catch, and cure him to death - just like a leech that will not drop off your skin until it is gorged with blood".

Going back to our main theme, if we want to shorten the treatment of those who work with metals and minerals, as I have already said, more effective remedies should be sought in the mineral kingdom itself. Next, vegetable substances are effective, including soothing agents or antidotes such as treacle, a mithridatic antidote and other commonly used counter-poisons. Purgatives and emetics also need to be administered in more generous dosages, even twice
as much as usual, to fight the tenacity and violence of the metal poisoning. The following who have written about poisons should be consulted: Guainieri, Cardano, Arduino, Baccio, Parè, Sennert, Prevost, Etmüller and others, authors who suggest a broad range of remedies for each kind of poison. A soothing, milk-based diet is also to be recommended. Blood-letting should be prescribed with great caution in this kind of illness. Unless there is serious inflammation, bleeding has rarely proved useful. Furthermore, the measures mentioned earlier should also be adopted to ensure, as far as possible, that the noxious particles do not enter via the respiratory tract.