Skilled builders are afflicted by the same diseases as those who work with lime. Indeed, when they slake quicklime with water to build walls or to plaster them, the substance in question is still lime, and they cannot help inhaling the tiny particles that develop and irritate the mouth, throat, and lungs, thus resulting in such serious disorders in the body.

The noxious qualities of lime are well-known as it is the first in the class of alkaline substances, and those who choose to live in freshly plastered houses have also experienced them first-hand, after being afflicted by serious illnesses. The case-study of Hermocrates described by Hippocrates is well-known: "Hermocrates, who lived by the New Wall, was gripped by a violent fever". Following in Galen's footsteps, in his comment on this case-study, Valles says that it is foolish to believe that Hippocrates added the detail of the "new wall" deliberately in reference to the cause of Hermocrates' illness. In the Pisan lessons, however, Epiphanius Ferdinandi and Mercurial state that Hippocrates wrote those words deliberately, since there is nothing more dangerous than living in a newly-built house made of lime and that many have experienced this in person and died, either being suffocated or struck by fever, deafness, and numbness, as happened to Hermocrates, who died on the twenty-seventh day. Verulamius describes how Emperor Jovinianus died after staying in a room that had been freshly plastered. I myself experienced this and ran a great risk when I had my small study plastered and

* This chapter was in the editio princeps, straight after Chapter Twenty-four (Diseases of stonemasons); for reasons that are uncertain it was not included in the 1713 edition of De Morbis Artificum Diatriba.
thought it safe to return after six months, because the walls were old and just one coat of lime had been plastered. I was afflicted by a high fever that I had great difficulty in shaking off and after troubled by a persistent slight fever for a long while. I have frequently had the chance to observe that one can smell lime in new buildings for several years, especially when the windows have been closed throughout the night. Many are deceived by this because the smell is not noticed during the day when the windows and doors are open, and they are therefore not afraid of sleeping there at night.

Pliny quotes an edict that rightly forbade the Romans from living in newly-built buildings. "Ancient laws on houses forbade the buyer from using the house unless it was three years old". Pliny himself added that this was so the buildings would not be spoilt by cracks. In actual fact, it takes much longer before houses built with lime can be inhabited without any danger, which is not the case if gypsum is used, as it dries straight away and does not give off any bad smell.

As is the case with those who remove lime from furnaces, skilled builders move and sell the substance and therefore know all too well just how noxious it is. As mentioned previously, Wedel observed the development of stone in the lung of a furnace-man's servant, formed by the lime particles taken in via the mouth. While recalling the fate of a very strong man, Amato Lusitano writes that those who prepare or work with lime usually die of phthisis. A great deal of information regarding the effects of lime is to be found in the writings of both ancients and modern writers, so I do not believe it necessary for us to dwell on this subject at length. Chemists believe lime contains many alkaline substances and a little acid, and they describe many external remedies that can be prepared with it. Amazed by the characteristics of lime, Pliny says: "It is surprising that there are substances that are set alight with water once they have been burnt". Nobody has dealt with this subject in as much detail as Tackenius. He considers lime to be one of the most important alkaline substances, but he also believes it contains a certain amount of acid. This it why it effervesces when water is added, since the alkaline part reacts with the acid. Lime contains a fiery component, especially when it is fresh and has not yet absorbed the humidity in the air. Since it belongs to the fire family and contains combustible particles, it is not surprising that it emits imperceptible and invisible vapours and causes such harm to workers.
I do not know how skilled builders can avoid such dangers, other than covering their mouths and noses with small wrappings to ensure they do not inhale the dust, in particular when they are handling lime and pouring water onto it. They should also drink cold water, as this will alleviate the extreme parchedness and burning they feel in their throats. From experience, I have observed that sweet almond oil is more beneficial than any other medicine, since it assuages and alleviates almost any acid and, in addition, stops the effervescence of lime. In fact, lime boils when in contact with any liquid apart from oil and, even when wet, it does not become hot. When these workers fall ill with one of the above mentioned or another illness, if the physician is to be able to prescribe effective remedies and therefore help the patient, he should know which illnesses are caused by these workers' trade and which organ is usually the most affected. As we have already pointed out, perhaps excessively, this precaution is of the utmost importance when looking after workers. Indeed, according to Hippocrates, "If part of the body aches before the illness becomes manifest, that is where the ill lies". In actual fact, during an illness, stasis of the humours occurs much more readily in the weakest part of the body.
BERN. RAMAZZINI

In Patav. Archi-Lycæo Prof. Publ.

DE
MORBIS
ARTIFICUM
DIATRIBA.

ACCEDUNT
LUCÆ ANTONII PORTII
In Hippocratis librum
DE VETERI MEDICINA
PARAPHRASIS;
Nec non ejusdem
DISSERTATIO LOGICA.
EDITIO SECUNDA.

ULTRAJECTI,
Apud GUILIELMUM van de WATER,
Academiæ Typographum. 1703.

6. Frontispiece of the second edition of De Morbis. Utrecht 1703
To the amiable reader

De MORTIS ARTIFICIUM

The Treatise of the Diseases of Workers: supplement
DE MORBIS ARTIFICUM
BERNARDINII RAMAZZINI
IN PATAVINO GYMNASIO
PRACTICÆ MEDICINÆ PROFESSORIS PRIMARII
DIATRIBA
MUTINÆOLIMEDITA
Nunc accedit supplementum ejusdem argumenti,
AC DISSERTATIO
DE SACRARUM VIRGINVM
VALETUDINE TUENDA.
PATAVII', M. DCCC. XIII.
Per Jo: Baptifiam Conzattum.
SUPER. PERM. AC PRIVIL.

7. Frontispiece of the first Padua edition (with the supplement) of De Morbis, Padua 1713
To the amiable reader

If you find pleasure in having this addition to my book on the diseases of workers that was printed in Modena long ago, dear reader, it is thanks to my printer in Padua. He knew that my book was sought after, and at times even received letters to that effect from young scholars and other learned men who had been unable to obtain it either from me or elsewhere, as all the copies had already gone out. He therefore asked me repeatedly to add a supplement to the published book on the same topic. Indeed, he believed that were I to add something additional else, to attract further purchasers as it were, it would enhance the book considerably when reprinted. I promised to meet his request if my public duties gave me the chance and, more importantly, if the ailments I am increasingly fighting against in my poor state of health allowed me to do so. However, since I can no longer set foot in his bookshop without being reminded of my promise, I have finally decided to satisfy his wish and to keep my word. Thus, during the summer holidays, I put aside a whole series of other commitments to search for new classes of workers and visited their workshops. I have thus written this treatise on the diseases of workers, with the addition of a short Dissertation on Preserving the Health of Nuns (Dissertationem de Viginium Vestallium Valetudine). It might have been more to the point to discuss their illnesses, but that would have required more time and consideration and I shall therefore do that at later time, if I have the chance. Meanwhile, dear reader, enjoy the fruits of my labours and take care.
BERNHARDI RAMAZZINI,
Med. Doct. und Professoris Publ.
zu Padua,
Untersuchung
Von denen
Krankheiten
der Künstler und Handwercker,
Worinnen
die Krankheiten, vonmit fast alle Künstler und Handwercker gemeiniglich befallen werden, genau beschrieben, wie durch die Kunst oder Handwerk solche zugezogen werden, und wie man solche hernachmals auß beste und leichteste curiren kann.

LEIPZIG,
bev Moris George Weidmann.
Anno 1718.

8. Frontispiece of the first German edition of De Morbis, Leipzig 1718
Diseases of printers

It is a well-known fact that the ancients knew nothing of printing and the task of copying texts was carried out by copy-clerks and those that took dictation. Printing was invented in the fourteenth century and it is questionable as to whether it brought more harm than good to the world. There is no doubt that as soon as it was discovered it was put to general use, and as a result, thousands of people were deprived of the possibility of earning their living and feeding their families. It also brought misfortune to monks who spent their time copying manuscripts, earning a little money once they had finished their religious duties. Printing has not yet been introduced in the Ottoman Empire; in fact, in his letters from Parma, Cornelius Magnus, the famous Oriental traveller, writes that when the question was discussed in the Imperial council of Constantinople as to whether it should be introduced, rumours were spread throughout the city and nearly resulted in a popular uprising. There is much to be said regarding both the advantages and disadvantages of printing. In his book Ragguagli di Parnaso, Trajan Boccalini describes how the inventor of printing entered Parnassus with great pomp, expecting to be welcomed into the company of learned men, but he was banished in disgrace for having corrupted one of the arts. However, let us put this dispute aside and continue with our purpose – let us deal with the illnesses that afflict printers because of their profession.

These workers can be divided into two categories. The first are almost always seated and have the task of choosing the metal characters from their little compartments and putting the words together, or they disassemble the words and put the characters back into the compartments. The second category of workers are always on their
feet and work at the press. The latter, with both hands, use a particular tool made of leather filled with hairs to cover the set-up type with ink, while another worker uses his right hand to move the upper part of the press and press hard on it. Thus, in just one step everything that was hidden in the typeface is printed on the paper. This operation is repeated until the work is complete, that is, until they have printed the number of copies required. It would certainly be an ingenious invention, if it only supplied learned men with books and not the fishmongers who use the paper to wrap their mackerel.

The first category of workers leads a sedentary life and therefore suffers from all the diseases that accompany a sedentary lifestyle. The other category, however, works on their feet and uses a considerable amount of energy, since this kind of work exerts nearly the whole body. These workers suffer from great exhaustion and, when they reach a certain age, they find they have to give up their profession. Another danger for those who work sitting down is that they use their hands, but keep their eyes on the blackened typeface. Their eyesight gradually becomes weaker and weaker and, if their eyesight was not perfect to start with, it soon becomes worse and worse until they are afflicted by dim-sightedness with suffusion and other ocular ailments. I know two brothers who were printers with naturally large, protruding eyes; they had to give up their trade, otherwise they would have become totally blind. I remember I once sat at my printer’s for around four hours, correcting a work of mine, and once I left the print-shop, my eyes were flickering and I could see before my eyes the whole night long the images of the tiny typeface I had stared at for so long. Staring at those dark characters intensely for such a long time, whether when putting them together or taking them apart, ruins the tone of the membrane and the eye fibre, the pupil in particular. It therefore comes as no surprise that printers are afflicted by eye ailments. Printers themselves have told me that after a whole day’s work, once they have left their workshop, they can still see those very same letters before their eyes for hours, at night too, until they are cancelled out by something else.

In addition to these eye diseases, there are other ills: persistent fevers, pleurisy, pneumonia, and other chest diseases, since printers are forced to stay in closed, hot rooms the whole day through to produce and dry the sheets and when they then go out into the
cold, the pores of their skin become constricted and perspiration is abruptly stopped. This leads to the ailments mentioned above. Those who work at the press fall ill more because of the great exertion of the arms and body which causes them to sweat profusely; by the time they leave the print-shop, they are well on their way to encountering the illnesses mentioned above.

I do not know how medicine can help these workers or which measures to suggest, other than recommending they work in moderation, take the odd hour off work, and make sure they are well wrapped up in cloaks when they return home from the print-shop in winter. Printers who sit at benches composing text should use eyeglasses so that the eye tone is weakened less. They should also turn their gaze elsewhere and rub their eyes gently with their hands to awaken the torpid spirits. They should also rinse them with euphrasy water, violet-water, and the like. When they are afflicted by serious illnesses they should be treated with the usual remedies. However, if the cure is to be effective, the physician should know his patient's profession.
Diseases of scribes and copy-clerks

In the past, prior to the invention of the press, there were a great many more scribes and copy-clerks than today. Nevertheless, there are still people in every town and city who, through writing alone, support themselves and their families. Rosin states explicitly that scribes and copy-clerks were usually slaves or freemen. By "copy-clerk", I am not referring to those who draw up codicils and testaments, who we now call notaries, but those who can write quickly using abbreviations called "notes" and are therefore called "notarios". According to Pliny the Younger, every time his father travelled, he would "Have a copy-clerk with a book and tablet at his side, who wore gloves in winter so the cold weather would not hinder him in his work". Today these scribes are either employed by magistrates to keep the accounts in law courts or work in the workshops of merchants or at the courts of princes. We shall now look at their illnesses, which have three main causes. The first, continuous sitting, second, the incessant movement of the hand in the same direction and third, the mental attention they have to pay to make sure their errors to not defile a book or cause loss to their employers when they add, subtract or do other arithmetic calculations. It is well-known which illnesses constant sitting causes – obstruction of the viscera, such as the liver and spleen, indigestion of the stomach, numbness in the legs, inhibited blood return and an unhealthy constitution. In short, these workers are deprived of the benefits that are usually derived from moderate activity. Indeed, even if they so wished, they have no time for exercise, because they are paid in a manner that necessitates writing all day long. Furthermore, the required tracing of a pen over paper results in constant tension in the muscles and tendons, considerably tiring
the hand and entire arm. As a result, the right hand gradually becomes weaker and weaker. I was acquainted with a man, still alive, who used to be a copy-clerk. He spent his entire life writing and earned a considerable amount of money. He began complaining of extreme fatigue in his whole arm and could find no remedy. In the end, his right arm was completely paralyzed. He therefore tried to get used to writing with his left hand but, after a while, this was afflicted by the same ill. However, the greatest burden for these workers is the intense and assiduous mental concentration required of them. Indeed, in this work the entire brain, nerves, and fibres must be kept under the utmost tension, then subsequently loss of tone. Thus ensue: headaches, head colds, hoarseness and fluxions to the eyes, because they are constantly fixed on papers. So called accountants and book-keepers, and “calculi magistros”, that is, those who work in merchants’ workshops, are similarly afflicted. The private secretaries of princes belong in the same category, and it is true that he who can keep the favour of a prince deserves the greatest praise. Indeed, when writing letters, secretaries are frequently subjected to a form of mental torture because not only do they have to pay attention to a multitude of letters, but also because they have difficulty understanding what the prince has in mind, frequently because such princes deliberately do not wish to be understood. As a result, those working in this profession often curse both their trade and the court.

What remedies can medicine offer those who fall seriously ill as a result of writing unrelentingly? First of all, to combat the effects caused by a sedentary life, moderate physical exercise is to be recommended, for example on holy days after attending church; frequent massage will also help. As Celsus says, massage might also have the opposite effect: “By brisk massage, you harden the body, massage gently and you make it soft; if too much it reduces, if moderate, it bulks up”, a precept borrowed from Hippocrates. If there are signs that the viscera are being obstructed, the body should occasionally be purged with a laxative, while stronger purgatives should be administered in spring and autumn. As far as the weakening of the right arm and hand are concerned, massage is also useful, but should be gentle and sweet almond oil should be used with the addition of a little aqua vitae to add tone to the part in question. In winter they must make sure their hands do not grow
numb because of the cold, wearing good, thick gloves. To ensure the heads of these workers are not afflicted by the illnesses they are often subject to, all cephalic remedies are to be recommended, in particular those containing volatile salts such as the spirit of sal ammoniac which dispels torpor with its odour alone. Particular purgatives should be given for the head – Johann Crato's pills are to be recommended and should be taken more than once. Others include medicines that can be chewed and errhines to make them sneeze, thus liberating the cerebral glands of serous humours. Amongst those medicines to be chewed, the moderate use of tobacco has proved effective. Finally, the intestine should be kept as free and clean as possible with soft foods; should this not prove sufficient, enemas should be prescribed since, according to Hippocrates, "Torpor of the bowels causes disturbance of everything else, disorders of the vessels and exhaustion of the brain".
Diseases of spice dealers who sugar the seeds of various plants

Various kinds of seeds are covered with sugar as delicacies or for other purposes. For example, this is done with the seeds of almonds, pistachio, pine, fennel, coriander, santonica, and also fresh fruit. This is certainly much to the delight of those who are to enjoy them, but less so for those who have to prepare them. In fact, these workers are subject to serious illnesses. These workers attach a large brass mixing pan to the ceiling with a brazier filled with coal placed below at a suitable distance. The seeds or fruit are then placed in the pan and liquid sugar is added drop by drop from a spout placed at a suitable height above it. In Venice, where this work is done on a large scale, two workers are needed, whereas in other cities only one suffices. They then keep the pan rotating so that the seeds in it are evenly covered with a white crust. During this stage the workers have no choice but to keep their faces over the pan and therefore inhale the hot air and vapours it emits. After working under these conditions for one day, the workers suffer from serious headaches, eye pain, and severe breathlessness.

There are three things that harm these workers seriously – the burning coals, the heated pan and, finally, the sugar itself. Carbon is a product of fire, the black offspring of an extremely luminous parent whose nature is better admired than understood. "What is carbon made up of?" Saint Augustine asked in De Civitate Dei, "Is it not amazing that on the one hand it is so fragile and breaks at the slightest touch, crumbling under the slightest pressure, but on the other hand, it is so strong that no amount of damp changes it, nor does it change over time, so that when boundary marks of fields are set, they usually lay coals under them as evidence in the case of future litigation?" Even more surprising, however, is its pernicious-
ness. Unless it has a free outlet of escape, it can kill a man acting quickly. What accounts for this is inconclusive, given that red-hot coals do not act thus, even in closed rooms. There are many examples of coal’s power to suffocate. Van Helmont, in his work *Jus duumviratus*, describes how he was poisoned by its smoke. The author writes that it was in the middle of winter and he was in a closed room, writing. He inhaled the fumes of a coal brazier they had brought him and he was so ill, he had difficulty getting out of the study and then fell to the ground as if dead. Van Helmont attributes the cause to what he calls “wood gas” that is latent in charcoal and activated by the inflammable sulphur concentrated in it. Now the pan containing the seeds has the same defect as copper, since brass is an alloy of copper and mineral calamine. Thus, when white-hot, it gives off an acridity that the workers inhale. In addition, there is also the noxious effect of liquefied sugar that gives off corrosive vapours when poured on to the seeds. These vapours are even more acrid because the sugar used for preserving is refined with lime-water to make it white. Indeed, if these sweets were not as white as snow, the guests who have finished their meal and eaten their fill would find it easier to resist them. All these factors together lead to serious ailments of the brains, the eyes, and the chests of these workers: their heads ache badly; their eyes are pricked by the fire’s fumes as if by thorns, so much so that they become red and at times even inflamed; and their respiratory apparatus is damaged by inhaling air saturated with acrid fumes. These workers need to take certain precautions. First of all, as far as possible they should make sure they work outdoors, so that the vapours are more readily diffused. They should also take short breaks and enjoy some fresh air and, at the same time, wash their face with water and rinse the back of their mouths with diluted vinegar. To counteract the severely harmful effects of coal, I would like to describe a remedy used in winter by nearly all workers who have to use burning coals in their workshops. They place a piece of iron amongst the coals to bind its virulent component. Perhaps it can be said that coal’s malignant exhalations act upon the iron or that the iron itself absorbs them.
Diseases of male and female weavers

Just how useful and necessary the art of weaving is can be seen by the fact that there is not one man who does not use woven fabrics to cover his nakedness. As nature granted birds feathers and other animals fur, we cannot complain that only man was left naked. For man has both the intelligence and hands to weave different kinds of garments, not only to cover himself, but also to adorn and beautify himself. Weaving was once mainly the task of women, so much so that women of higher social status did not disdain this kind of task. Throughout her husband’s absence, Penelope eluded her suitors by weaving and then unweaving her web. In Virgil we can read that at the funeral of Pallante who had died on the battlefield, Aeneas wore two mantles embroidered with gold, “A costly gift which Dido had made, varying the web with threads of gold”.

Today this is now the task of the lower classes, both male and female, and if noble women have learned to embroider, it is about as much as one can expect. In his learned work *De re vestiaria*, Ottavio Ferrari state there used to be two different methods of weaving – a more ancient one, in which women would stand and weave upwards, reaching high up, while in the other they would sit and weave downwards. According to the author, the latter was invented by the Egyptians, who would thrust the thread of the woof downwards or pull it towards their chests. Today women weave sitting down, but the way in which they do so it looks to be that they are actually standing. There is no doubt that this work is extremely tiring because it uses the whole body: both hands, the arms, feet, and back and nearly all at the same time. During the winter, when they do not have to work the fields, country women weave hempen or linen cloth in the stables, especially young girls before they marry,
since the only dowry they bring with them is knowing how to weave. Indeed, it is a disgrace if a country woman does not know how to weave. The toil involved in this work is the origin of the ills it causes, especially in women who, if pregnant, miscarry very easily and in consequence are afflicted by other ills later on. Women who do no other but this kind of work must be strong and robust, otherwise they will become weak as a result of the excessive toil and, as they grow older, will find they have to stop altogether. Nevertheless, apart from the money they earn from weaving, they also benefit from another advantage—regular menstruation. It is extremely rare that they suffer from irregular menstrual flow; on the contrary, if they work weaving harder than they should during their menstrual period, they menstruate too profusely. Thus, when young women sometimes complain to me that their menstrual flow is poor or irregular, I advise them to turn to female weavers and other women for advice rather than doctors. If women return straight to their weaving after a meal because they are so anxious to earn more money, they harm their stomach and digestion because the energetic movements needed to pull the loom comb towards the chest upsets the digestion and the undigested chyle then enters the lacteals and fills the blood mass with undigested matter. The same happens in men, mainly those employed in the weaving of woollen cloth. Unless they are robust and muscular, they are overcome with great fatigue, especially in their arms, back, and feet. Owing to the great breadth of the fabric, when weaving woollen cloth two men work together at the same time. The one on the right sends the shuttle with the thread to the other man who, with his left hand, sends it back. Together they then both pull the comb towards their chests, which requires a considerable amount of force. Weavers of woollen cloth are afflicted by another ill that does not usually afflict weavers of flax, hemp, or silk. This is due to the nature of the material, because the wool is imbued with oils and therefore gives off a foul smell. The weavers themselves, therefore, also smell and at times have bad breath as well. Their eyes become blood-shot, as happens to anyone who works with oily wool.

Moderation is the only means of prevention for both men and women against the illnesses caused by such taxing work. I find the popular saying "nothing in excess" particularly appropriate. Gentle massage of the arms, thighs, and legs with sweet almond oil will
alleviate the fatigue. Weavers of woollen cloth should pay particular attention to their personal hygiene and wear clean clothes on holy-days at least, after washing their hands, arms, and legs with aromatic wine.

In the workshops where woollen cloth is woven, there are also workers who shear the woven cloth with heavy shears all day long. This is extremely tiring, for the arms and hands in particular, and these workers should also be kept in mind and treated with the same remedies as weavers.