to Ettmüller, or obstructs the lateral ducts of the pancreas, as is the belief of De la Boe, and which exercises this febrile effect once it moves to the veins and joins the parts that are richer in spirits in the blood. No matter how weakened or contaminated the blood mass is, it still preserves an oily and sulphurous content that is able to nourish the vital flamelet. The heart of the fever was therefore situated outside the blood vessels, as is the case in all periodic fevers. Furthermore, it is also difficult to distinguish between intermittent and what are actually continuous fevers, and Hippocrates called such fevers “fire”, as can be seen in the various descriptions in his books Of the Epidemics. The learned Descartes said it is impossible to understand what the cause of the cyclic recurrence might be, if it is not a certain kind of substance that has to mature before it mixes with the blood mass which, once carried to veins in the heart, is able to create such disorder and outbreaks of fever that it will only subside when the hostile substance itself is expelled in the form of sweat all over the body, or via the urinary tracts.

XXIX. The learned Ettmüller says it is unusual to see epidemic tertian fevers caused by polluted air and that in actual fact, fevers that are caused by some kind of evil germ lurking in the air rarely follow any set rules. It is also very uncommon for them to be of the intermittent kind. Nevertheless, this year it was evident how such fevers raged throughout these regions, both in the countryside and town (although since they lasted so long, they developed more continuously and slowly). In his treatise on fevers, the learned Willis describes a similar epidemic that raged in England in 1658, more in the countryside and villages than in towns and cities. A true expert, he believed the origin and primary cause of his febrile epidemic did not lie in the polluted air, but in the previous season which had been unusually torrid for that area. In 1652 in Copenhagen the illustrious Bartholin also observed an epidemic of intermittent tertian fever and he also attributed it to the scorching, dry summer that was unusual for that climate. We, however, may explain our rural epidemic with the unusually extremely wet and cold season together with air that was polluted by such abundant mud. If this epidemic had been caused by the unseasonable weather throughout the year, which was just as cold and stormy in the whole of Italy, it is unclear why this epidemic was to be seen only in the lower lying areas and places with stagnant water, and
not in much vaster areas of the country. Moreover, the inhabitants in other regions that were further away from such conditions (for example the whole stretch above Via Emilia towards the hills), do not remember ever having experienced other occasions when they were immune to fevers.

XXX. Why there was such a change from extremely dry seasons, which lasted for several years, to such abundant rainfall is a mystery to me, and to discover the truth we would need an oracle from Delos. Certainly not one astrologer, who believed he can foresee future events by the configuration of illusory astral configurations, foresaw such flooding and, once it had taken place, had any explanation for its occurrence. The stars certainly have an effect here on earth (and it would be extremely obtuse to claim otherwise), but how this influence actually works is a mystery. Ptolemy rightly claimed that the effects of the stars are uncertain and varied since it is unknown how they influence the earth. One therefore needs to observe the great changes of time, that is, the equinox and the solstice. At those times “we give no medicine, we burn and cut nothing”, as Hippocrates advised more than once. For the same reasons, we must pay attention to the rising of Canis major and Arcturus and the eclipse of the Pleiades. Indeed, to use his very words, “Illnesses reach their critical point in these days in particular: some resulted in death while others were transformed into other forms”. Any attempt to explain why such great changes take place at these times in both the celestial and terrestrial worlds would be nothing other than divining. Our situation, with the abundant rainfalls that led to this outbreak of diseases, was therefore the exact opposite of what happened in Egypt when the flooding of the Nile was eagerly awaited to dispel the plague. Alpino, however, seems to attribute the fact that the air became healthier after the Nile flooded to the northerly summer winds which, when the Sun is in the sign of Cancer, when the southern area is full of smoke, began to blow and repelled the campsini winds, the bearer of plague. No matter why the Nile, the goblet of Egypt, brings good health, there is no doubt that any illnesses that are on the rampage begin to disappear during the floods that sweep them away. What Gelsus said in his Proemio was certainly true — “The kinds of medicine differ depending on where they are; in Rome one kind is needed while in Egypt another is necessary and yet another in Gaul”. Over one hundred
years have gone by since the areas to the north and south of the River Po were last flooded, which was then followed by a great increase in the cost of food, and wheat was turned into darnel. Paolo Grassi of Correggio was convinced of this in his booklet on darnel, and in which this transformation – from wheat to darnel – is the subject of considerable doubt. The rains began at the beginning of May and then continued without stopping throughout the entire summer. One can therefore observe that at certain intervals the same patterns are repeated in the seasons, whether we attribute it to the power of the stars we are unaware of, or the vengeance of God, who once punished the whole world with His universal flood, and now wants to punish particular regions with particular floods.

XXXI. I mentioned earlier that the blight caused considerable damage during this unhealthy season. To make sure I do not appear to be making unwarranted, authoritarian-like claims, I would like to stop one moment and look more closely at the nature of blight. The ancients wrote a considerable amount about blight, but each did so according to his own philosophical views. In religious texts such as the Book of Amos, blight is also mentioned, for example when God used it as a tool to impart his anger and take away all harvests and crops from his people to lead them back to the right path. Others have written about this plague more recently, for example, Ruvellio, Levinio Lemnio, Ludovico Vives, and Lange, but they have just reformulated what the ancients had already written. It is now recognized that the vegetal kingdom is afflicted by specific illnesses of the most various kinds, which have been described by countless serious authors such as Varrone, Pliny, Columella and others. However, the ancients were so afraid of blight, described by Theophrastus as “an illness common to all crops and harvests”, that they created a god they called Rubigo to repel this plague, (Varrone’s De Re Rustica is testimony of this), hence the Rubigalia, celebrations established by Numa Pompilius during the eleventh year of his reign (see Pliny), celebrated on 25 April. As described by Columella, during these celebrations a young puppy was sacrificed: “so that this malignant blight no longer burns the green glass and is placated by the blood and intestines of a young puppy”.

They sacrificed a puppy in the belief that this devastation was brought to the earth by the god of blight, by means of the malignant influence of the Canis constellation. Thus, this sacrifice was
made out of blind superstition, but one that reflected the name; as Ovid said so outspokenly: “Instead of the astral Canis, this dog is placed on the altar, and the only reason for this is its name”.

XXXII. To ensure that everything flourished, these rites in honour of Rubigo and Flora were established and usually celebrated at the end of April for the simple reason that that was when the fear of blight afflicted the crops and harvests was greatest; in other words, when Canis was declining, and then waned on 28 April according to Pliny. The ancients paid close attention to the decline of Canis whereas we barely notice it rising. All too often it is believed that the height of summer commences at the same time everywhere, as I have often had the chance to hear learned and famous professors say, when in actual fact, it depends on the diverse latitudes of the various regions, and therefore changes according to when the stars rise and fall. Galen himself already knew this when he wrote that the equinox and solstice take place at the same time everywhere, but the rise and fall of the stars is the same only in those places that live under the same vertex.

XXXIII. The Greeks called this plague Erysible, the Latins blight, from rodere according to Varrone, or because it turned the crops a reddish colour. Pliny also called it uredo or carboncolare because it burnt the crops, as was the case this year, when all the crops and plants carboncolavano as Pliny would say. It was possible to observe the harmful effects of blight in detail. However, it is not easy to say what the nature and character of this plague is. It would be easy to claim to know the nature of fire or the lye-like and alkaline power of acrid and volatile salt, but there are countless things that stop me from agreeing with this line of thought. The ancients believed that blight originated from contaminated dew, either during tranquil nights or with the full moon or in the interlunar period, which is when the Moon reflects a colder light on us (while during the full moon in summer it is much further away from our vertex; during the inter-lunar period it sends all the light it receives back to the Sun). A great number of the moderns accepted this opinion, including Joan Lluis Vives, in his learned notes on Saint Augustine’s book *The City of God* in which he wrote that “blight is putrefied dew that rots and destroys the tender crops”. The fact that blight is formed by dew during tranquil nights (since dew only falls when the sky is clear) and when the Moon is hidden, would appear to be true. At
the beginning of June, around the inter-lunar period, one can see the first signs of blight on the crops and plant leaves. These look as if they have been afflicted by a dot-like disease, as they are covered in tiny blackish spots, which is sufficient evidence that these spots are made by the dew drops that were on them for hours.

XXXIV. Dew, which Alcmane called the daughter of the Moon and the air, according to Isidoros also because of its rarity, because it is lighter than rain, contains a great amount of saline volatile liquid and it is this that makes it clean and helps unblock the intestine. This is taught by all chemists who recommend it as a special purgation to extract dyes from all plants. It is also said that one can extract a spirit from dew that is able to dissolve metals, which was used by Cnoffel when he prepared coral dye by throwing burning coral on spirits of dew. Those who touch dew with their hands or walk barefoot in the dew-covered fields and meadows have experienced just how strong this salt is – their hands and feet become rough because of the saline, nitrous particles that corrode the skin. According to Plutarch it also has the power to make people lose weight and, as a result, more robust women use it as a remedy for their obesity. Van Helmont says that in his analyses and study of fire he discovered that dew contains an equal amount of salts and sugars, which help in a variety of illnesses. Our illustrious, learned Giuseppe Lanzoni, a doctor in Ferrara, wrote a great deal about the properties of dew and I am greatly indebted to him for having written to me to tell me what he himself has observed this season.

XXXV. These are the natural properties of morning dew, especially in May but only when the season is healthy and the ground is not too damp and marshy. However, if the dew has been contaminated by bad constitutions of the weather and noxious air or malignant exhalations from the ground, it turns into blight, an ill that has no equal and which, as Pliny says, “cannot be compared with either hail or storms, which never led to such an increase in the cost of food”. I therefore believe that blight originates from dew, when countless nitrous, acidic corpuscles are emitted from the ground and spread throughout the air and then unite with the saline particles in which dew is so naturally rich. These then ferment together in the vast recipient of the air and ascend imperceptibly to form a liquid that descends in the form of dew. Once this falls on the plants, it stains them with different colours, as has been the case.
in this region over the past two years; two years ago all plants and crops were covered in red spots, while this year they were black. It is therefore much more likely that blight is prevalently acidic and corrosive, more similar to Stygian waters and the spirits of sulphur and vitriol than an alkali of acrid, caustic salt since it is impossible to imagine something that can cause such burning and acidity in such a mild season as this.

XXXVI. I believe that the Hebrew Bible does not contradict my opinion in any way since the prophet Amos mentions blight with the following words: “I struck you and most of your crops and vineyards with the scorching wind and blight, your olive trees and fig trees were devoured by the locusts” and when the southerly wind blows with its heat, it scorches no less than the “bitter cold of the northerly wind”.

XXXVII. While this epidemic was raging, I regret not having carried out any experiments to discover more about its nature, but at the time I had not yet had the idea to write about this rural epidemic and the plague of blight. However, I was unable to resist carrying out various experiments to see if my explanation actually corresponded to the truth. I sprayed the leaves of plants, flowers and crops with various liquids, both alkaline and lixivial to see what colour they would turn. I also sprayed the young leaves of broad beans (which are usually sown around the end of October in this region) with spirit of vitriol, and very shortly after yellow spots appeared exactly where the liquid had been. I then wanted to do more experiments on broad beans, both because blight afflicts this kind of legume much more and because, according to Theophrastus, “of all legumes, broad beans suffer from blight the most”. I then covered the broad bean leaves with an alkaline, ruinous liquid and strong lye but did not see spots of any kind of colour. I did the same with other plants and various vegetables such as lettuce and cabbage leaves, but acid spirits of vitriol or sulphur produced neither yellow nor black spots. It is therefore safe to say the nature of blight lies in its acidic and not alkaline nature. The massacre of animals coincides with my opinion because in addition to the harmful qualities of the air, which also affects the animals, their blood became more acidic because of the blight-covered meadows; once they could no longer move, sudden death wiped out entire herds of sheep and they broke out in pustules which, according to the
moderns, are caused by the stagnation of blood while it circulates. The growths that appeared on the sheep's heads, necks and legs were certainly pustules, as they were identical to those in children, regarding not only their colour and liquid but also their size and how they resolved since a dark crust remained once they had been suppurated. In the same manner, other animals were wiped out by these infected meadows. For example, the bees were no longer drinking nectar from the flower chalices but acid drops, and they either died or moved their colonies elsewhere. It is also not surprising that this year the cicadas were quieter than usual as it was cooler this summer so they were not induced to sing. But not only did they not enjoy the dew as their food (if it is true that they eat dew), most of them died. The learned Mercurial himself wrote that the cicadas' silence is a foreboding of bad weather when he observed in 1577 around Padua, “Not one cicada is singing, or hardly any at all”, and a short while later a serious epidemic broke out. I myself do not believe it is a fable that cicadas drink dew. A farmer once told me that they do not sleep on plants at night, but on the ground where dew gathers more easily; when the sun rises, they then fly up to the trees. On an estate called Roboretum near the Gabello River, I once asked why there were so many cicadas that it seemed as if they had their own emporium there. I was told that this was because the ground was very sandy and it was therefore easier there than in clayey ground for them to make the tiny holes where they lay their eggs which would then hatch the following summer.

XXXVIII. This all seems to be clear confirmation of the fact that the nature of blight is such that it causes extreme harm to both animals and plants. The reason why walnuts alone are not affected by blight is uncertain, but it might either be because that fruit has a double shell or because the shell contains a considerable amount of volatile salt that has different characteristics to acidic salts. Galen extols the juice of the green skin of the *juglans* walnut as a remedy he discovered to be very effective in curing inflammation of the throat. He believed that this juice was so effective because it acts as an astringent, while at the same time it is made up of fine parts. He deduced that it was because of the fineness of its parts that it acted as a tincture that was almost inerasable and stained the hands of anyone who touched it, while he thought its effectiveness as an astringent was what gave it its ability to cure inflammation. It was
believed, almost as if it were a law, that at the onset of inflammation repellents and astringents should be administered to make it more difficult for the humours in circulation to be affected because of the ensuing dilatation, a measure that is still adopted by many professors today. However, this is not the right place to discuss whether this is correct or not. The moderns also recognize the ability of this juice to cure inflammation, while they rebut its power as an astringent and actually believe it to be a dissolvent. One such person is Leonardo di Capua, who believes the skin of green walnuts is rich in volatile salt and is therefore able to dissolve blood clots and correct its acidity without obstructing the blood flow by constricting it only partially and aiding the reflux of the blood by opening the passage to the heart via the veins. In the same way that one must indulge the ancients, as they knew nothing of the circulation of the blood and their explanations of natural effects were therefore inadequate, one must also congratulate our generation, and to use Pliny's own words, "that in ancient times observation was no less ingenious than reason is today". I recently learned from the renowned Nathan Lacy, an English doctor and illustrious anatomist, that in England they prepare a brew using green walnut skin that has proved extremely effective in curing syphilis, which all the moderns believe to be dominated by acid. Since walnut skin abounds in volatile salt, it is not surprising it counteracts blight and the enclosed nuts escape unharmed. These are therefore the characteristics and nature of blight.

XXXIX. We shall now look at the causes of the symptoms and other observations. It has been observed that during the evening hours, these fevers usually worsened together with the nightly prostration of the patients' strength so that they seemed to be at death's door. However, in the morning, when the sun rose their strength was restored and once they got up, they even had the strength to walk. Hippocrates said: "In the same way the disease worsens in the evenings, the illnesses and seasons affect each other reciprocally in relation to one another". This intensification in the evenings is therefore sufficient evidence of the nature of the disease described above and its causes. I believe that this diminishing of strength at night and its return in the morning is to be explained by both the position of the sun as it moves further away at night and returns in the morning, and the prevalence of acid dyscrasy. Indeed, when
the sun sets, it takes all the volatile spirits in the air with it, and the vital spirits in the blood are blocked by a coagulating acid that leads to this torpor of the spirits. This is then dispelled with the return of the sun's rays in the morning, just as the winter cold interrupts the flow of running water at night, only to return it with the sun when it rises the next day. Pliny wrote that in the universe, “There is nothing more useful than salt and the sun”. Celsus also said that those who are afflicted by dropsy should be exposed to the sun and should be rubbed with hands that are damp with water containing salt, sulphur and a little oil. It is therefore not surprising that in our case, the tepid warmth of the sun seems to have melted the ice of the mucus so the blood was once again able to resume its usual path in our vessels and the sleepy faculties are once again able to function properly.

XL. Amongst other things of note, we also observed the overwhelming tenacity of these fevers. This was such that not only did all medical skills prove to be of no avail (blood-letting, purgatives and cordials all had no effect), but they actually seemed to make the fevers worse. I believe this was due to the poor quality of the air, which was nourishing the disease. Therefore, even if suitable remedies were administered, the disease never receded but on the contrary became worse and it would certainly have been better not to intercede in many cases. Hence Hippocrates’ famous saying, which I quoted at the beginning of this dissertation: “The nature of man is not superior to that of the Universe”. If doctors were to pay much closer attention to Hippocrates’ words, they would not exhaust their patients with so much medicine, in particular during epidemics, the cure of which only becomes known once the graveyards are full.

XLI. Blood-letting was certainly not the healthiest remedy for this kind of fever and I know nobody who said it made their fever abate. On the contrary, if blood-letting was done repeatedly, the patient’s strength was weakened even further and such prolonged fever led to death or cachexia. As blood-letting was so ineffective in these fevers, it follows that, deprived of its volatile salts and particles rich in spirits owing to the poor quality of the air and poor diet, the blood mass was weakened even further after blood-letting, hence the predominance of acid and reduction of bile, which prolonged the fever even more. It is common belief amongst the moderns that
blood-letting in itself is not a suitable remedy for intermittent fevers since it does not reduce the fever that is seated outside the vessels through which the blood flows. They believe it should be done only occasionally, depending on the extent of the symptoms and dangers that the body is exposed to, especially as it is afflicted by plethora and excessive effervescence, that is, inflammation and bursting of the vessels. Such was the case described by Baillou of a noble man suffering from tertian fever, whose veins burst in the fourth paroxysm because his blood was not let. He then suffered such an excess of blood that he died that very day. However, in our rural epidemic the effervescence of the blood was not so great as to pose a similar danger. On the contrary, it was much slower owing to the prevalence of acid and less bile, which joined the pancreatic juice and lymph and effervesced less. It is for this reason that blood-letting was less ineffective than in the past seasons of previous years, which were extremely dry and torrid, leading to an excess of bile so the blood effervesced easily, thus making blood-letting more effective and protecting against excessive effervescence and rarefaction of the blood. Furthermore, in this season – one that was so unlike previous ones – by repeatedly resorting to venesection, the professors, who were so used to doing so in the presence of fever with no other objective than reducing the fever, often condemned their patients to death. I would not like to be included in the list of those who fear blood, and neither would I like to be considered amongst those who shed blood. There are cases when blood should be let generously, and others in which very little or none should be let, even if the kind of illness is the same. Hippocrates took so much blood from Stimargo’s servant that he fainted, although he was afflicted by a disease accompanied by chills. Vallés wrote about this and added the following explanation: “This should be done on this occasion and at the beginning of the occasion”. The cause of the illness is certainly the one that gives us the most important indications. “Similarities can induce good doctors to make mistakes as well; whereas the opposite unveils the cause”, Hippocrates himself warns. In fact, once the cause has been identified, it is not easy to be led astray and ignore the appropriate cure.

XLII. Let us go back to Baillou. A famous Parisian practitioner once asked why blood-letting sometimes makes fevers miraculously disappear, while at others it makes them worse. He replied with
just few words but ones that are worth heeding. He says, "Fevers – some are venous while others are gastric, that is, some follow an inflammation of a venous kind rather than the vice of the humours in the praecorida; those that are of venous kind cease immediately with blood-letting while those of another kind are not so easily cured by blood-letting; on the contrary, they require a purgative". This was the nature of the intermittent tertian fevers this season. They were more gastric than venous and this was why blood-letting made them worse and more tenacious while purgatives and vomit-inducing medicaments were more effective, thanks to the use of emetics, which frequently succeeded in eliminating the fever. I would like to end this part with a noteworthy observation by Baillou, against those who take every opportunity they can to let blood, just so they are doing something. He says, "If they are induced to cut a vein, and they hesitate while doing so; if small drops of blood come from the nose, they then triumphantly declare that that is the suitable occasion for blood-letting; if it is a profuse haemorrhage, they cut with less fear and say that nature is burdened by such abundance; if less blood than usual is flowing, they claim this lack needs to be compensated by opening a vein". 

XLIII. Also of interest is the question why during this season a simple tertian fever frequently developed into a double one, the very same day blood-letting was carried out. In the past this was also observed by Amato Lusitano and Pietro Castelli, but as far as I know, nobody else has ever mentioned this phenomenon. Amato describes the case of a twenty-five year old man with tertian fever. On the day he was without fever, he was bled and by the evening the fever had become double. He explained this phenomenon with the following words: "A simple fever does not become double as a result of blood-letting because there is no doubt that if blood had not been let, the illness would have evolved into a continuous tertian fever". Even today, most doctors are quick to use this as an excuse every time their patient takes a turn for the worse after recommending an inappropriate remedy. Indeed, they claim he would have been even iller if they had not used such a remedy. We should therefore look for a better explanation that is more suitable to our times. I believe that in that case (and also in this season), blood-letting is more to blame than the fever, as the latter tends to develop into a continuous tertian fever. Amato says that a young man fell
ill in the middle of autumn, and that the first blood obtained from bleeding was dark while the second was red and not at all watery. It is therefore normal that the young man had lost the components of the blood that were the most volatile and richest in spirits as a result of the prior summer heat and that the blood mass during the autumn had then degenerated into acid dyscrasy, just like wines, which tend to become acidic after having suffered the summer heat (like the dark blood in the first vessel: which is why the second time the blood was redder because it was arterial). Therefore, once the patient had been bled and his blood impoverished even more, it was not surprising that the acid component prevailed and had free rein so that the simple tertian fever became a double one. The young man was restored to good health after being administered a good purgative, which was because the fever was probably of the gastric rather than venous kind. However, during this season I believe that the blood mass did not become acidic as a result of the disappearance of spirits following the excessive heat. I think rather that, because of the unseasonably cold temperatures that year and a poor diet, the bile and parts of the blood that were richest in spirits were overwhelmed and the acid fermentation of the stomach and pancreatic juice were more vigorous, and even more so after venesection, hence the transformation from a simple fever to a double tertian one.

XLIV. In these cases, blood-letting as an inappropriate remedy and nothing else is to blame, as Pietro Castelli himself also observed in his invaluable pamphlet "On the abuse of phlebotomy". Someone is sure to disagree that the tendency of these fevers is to double as this happens as a matter of course at the beginning of the summer when all simple tertian fevers double. To this I reply that during the entire spring there was hardly one case of double tertian fever, either in the country or in this city, apart from those resulting from blood-letting. I therefore do not see how blood-letting can be absolved from this accusation.

XLV. For the very same reason, administering water was no less harmful than blood-letting. Indeed, in a cold, damp climate, when the bile was overwhelmed and acidity prevailed, what possible advantage might have been expected from drinking water in these fevers? The only possible outcome would have been that with such an enfeebled, tense stomach, harmful juices would have accumu-