

La piccolezza dei corpicelli: The concept of Epidemic and Contagious disease according to Estêvão Rodrigues de Castro

La piccolezza dei corpicelli: O conceito de doença epidêmica e contagiosa segundo Estêvão Rodrigues de Castro

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Abstract: In the early seventeenth century, the Portuguese physician Estêvão Rodrigues de Castro (1559-1638) proposed an innovative understanding of epidemic and contagious diseases based upon a brand new philosophy of nature. His conception of those morbid manifestations was strictly connected with his theory of the composition of things. In the book *De meteoris microcosmi* (1621), Estêvão Rodrigues launched the principles on which he established his entire medical theory and practice, demonstrating that, in the early-modern period, philosophy was a propaedeutic discipline to medical thought. His theory consists by and large of a synthesis of pneumatic and atomist philosophies. Those principles were expanded in the books *Compendio* (1630) and *Il curioso* (1631), written and published at the same time of the outbreak of a plague in northern Italy, in 1630-33, with the purpose of defining what should be conceived as a universal disease (i.e. epidemic). His theory was considered an alternative to the one suggested, few decades earlier, by Girolamo Fracastoro in his *De contagione* (1546). Although influenced by many elements of Lucretian philosophy, Fracastoro's proposal explained the mechanism of contagion through the use of an Empedoclean notion of sympathy.

Keywords: medical thought, theories of diseases, early-modern medicine.

Resumo: No século XVII, o médico português Estêvão Rodrigues de Castro (1559-1638) formulou uma inovadora interpretação acerca da natureza e da causa das doenças epidêmicas e contagiosas baseando-se numa nova filosofia da natureza. O modo como concebia essas manifestações morbosas estava estreitamente conectado com o modo como ele concebia a natureza da matéria. Em 1621, no livro *De meteoris microcosmi*, Castro formulou uma nova teoria da matéria que alteraria todos os pressupostos usados na medicina clássica, ilustrando como, na época moderna, o conhecimento filosófico era um saber propedêutico ao saber médico. Sua teoria consistiu num amálgama de noções pneumáticas e atomistas. Em 1630 e 1631, nos livros *Compendio* e *Il curioso*, publicados durante o surto pestilencial que atingiu Florença entre os anos 1630-1633, Castro nos mostra como, pela alteração de sua filosofia da matéria, ele altera a sua concepção de doença epidêmica e contagiosa propondo uma nova teoria dos males universais. Sua nova teoria aparece então como uma alternativa àquela proposta por Girolamo Fracastoro em 1546 na sua obra *De contagione* e em voga nas cidades europeias. Apesar de se basear no pensamento atomista, a teoria fracastoriana ainda se fixava extensamente em noções empedocleanas acerca da matéria, matriz essa também empregada na filosofia de base aristotélica.

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Palavras-chave: pensamento médico, teorias das doenças, medicina na época moderna.

In August 1630, the city of Florence was experiencing a huge outbreak of the plague, an outbreak that mobilized all the forces of the Grand dukes, notably the Health Magistracy of Florence (*Magistato Sanitario di Firenze*), in order to prepare the city for an eminent catastrophe. Around the same time, many physicians and intellectuals of the Grand Duchy were proposing new interpretations on the causes and dissemination of epidemic and contagious diseases, something that defined and redefined the knowledge on the origin and nature of the plague. These interpretations were used by the State, through the health magistracies, as alternatives to deal with the matter.

Among those men, the Portuguese Estêvão Rodrigues de Castro, a long time resident of the Grand-Duchy of Tuscany, interpreted the plague in a very particular way. His interpretation was exposed in two books and had astonished the physicians and the citizens of the Grand-Duchy of Tuscany by its originality.

The first book, the *Compendio d'avvertimenti per preservazione e curazione della peste*, dedicated to the prince Don Lorenzo di Medici, was published in 1630 in Florence by the famous printer Giovanni Battista Landini. It was a small manual or treatise compiling a good deal of information on how to preserve health and cure the disease (Figure 1).



Figure 1. Frontispiece of the *Compendio* (1630).

The other one was *Il curioso nel quale in dialogo si discorre del male di peste*, published in 1631, and dedicated to Pisa's archbishop Giuliano Medici. This book was organized as a dialogue divided in three parts, concerning the knowledge and the measures to be used in the epidemical event (Figure 2).

Based on those two books, we will analyze the interpretation of the epidemic and contagious diseases as suggested by Portuguese Estêvão Rodrigues de Castro. We aim at observing how the adoption of different principles in the sphere of philosophy would influence the principles of medical theory and what consequences this action could have in the sphere of medical practice.

In addition, we shall present a short biographical sketch of Castro's life, which would not only emphasise additional issues and questions to those already existent in the theoretical study, but would also make the outcome of our analysis more historical.

From Lisbon to Pisa: Notes on the life of Estêvão Rodrigues de Castro

Estêvão Rodrigues de Castro was born in Lisbon on 19th November 1559, son of the new Christians



Figure 2. Frontispiece of the dialogue *Il curioso* (1631).

Francisco Rodrigues de Castro and Isabel Álvares. At the age of 22, he started his studies at Coimbra College of Arts (Colégio das Artes de Coimbra)², where he learnt, other than grammar, rhetoric, poetry and languages, and the fundamentals of Aristotelian philosophy (notably Aristotelian physics). This concerned reading many of the stagirite treatises, such as *Metaphysics*, *Physics*, *On the heavens*, *Meteorology*, *On the Soul* and *Parva Naturalia*. Besides, he also learned principles of mathematics based on the study of the *De sphaera* of Joannes de Sacrobosco. During this period his teacher was the Jesuit Luis de Cerqueira, who would later become bishop of Japan.

It goes without saying that Estêvão Rodrigues de Castro's philosophical formation was wholly based on peripatetic thought. Castro was deeply familiar with the fundamentals of Aristotelian philosophy and understood philosophy and philosophers through the encyclopaedic eyes of the Stagirite. He also knew deeply well the strengths, as well as the weaknesses, of the Aristotelian philosophical system.

From 1585 to 1588, Estêvão Rodrigues de Castro studied medicine with the most eminent Portuguese doctors, such as Tomas Rodrigues da Veiga, the important Portuguese commentator of Galen, and Baltazar d'Azeredo, the Arabist and professor of Avicenna. In his medical formation he converges the knowledge of Hippocrates, Galen and Avicenna.

In 1598, he witnessed the outbreak of a huge plague in Lisbon, known as *Peste pequena* [small plague].³ During this period, he also served as a consultant. One of his attributions was to discuss whether or not the disease was indeed a plague and whether or not its first signs were clear enough to identify it as such. This was very important at that time and many doctors were persecuted because they misinterpreted the nature of the disease.

A decade later, Estêvão Rodrigues de Castro moved, along with his wife, two sons and two daughters,

to the Grand-Duchy of Tuscany. There, the physician, then aged 50, was elected by the Grand-Duke Cosimo II, archiater⁴ and professor of theoretical medicine in Pisa University. During those years in Florence (1609-1617), and since 1617 in Pisa, Castro published a long list of scientific and poetic works. Among them, the book *De meteoris microcosmi* (1621) is particularly important because it redefined Castro's notion of disease on the whole on the basis of a new philosophy of nature. His other books dealt with specific medical issues and poetry.⁵

The Portuguese philosopher apparently brought to Tuscany not only his philosophical and medical knowledge, but also his experience acquired when amongst other Portuguese physicians. Based upon such theoretical and practical knowledge, he established a totally new medicine and philosophy, which could not have survived in his homeland, where the strong influence of scholasticism was still dominant.⁶

When, in 1630-1633, Tuscany experienced the outbreak of an impressive plague, Estêvão Rodrigues de Castro was - as we have already pointed out - among the physicians who practiced in the city of Florence.⁷ During those years, not only did he become one of the medical counsellors of the Magistracy of Health of Florence, but he also wrote and published the two afore mentioned books on the plague. Those books were most likely read by the nobles and priests involved in the organization of the Florentine city⁸, which is why the analysis of those two books is relevant in the study of the medical procedures used during that Florentine plague.

In the *Compendio* and in the *Il curioso*, Estêvão Rodrigues de Castro offered an interpretation of epidemic and contagious disease that seemed to be unique in the context of the medical culture of the Grand Ducal state of Tuscany at that time. This interpretation, unparalleled in the Florentine cultural panorama⁹, had its followers around the Italian peninsula¹⁰.

² The College of Arts became a Jesuit institution around 1555, when King John III of Portugal, in a letter to the rector of the institution, handed over the institution to the Society of Jesus (Brandão, 1948; Gomes, 1992).

³ About the *small plague* of Lisbon see Meirelles (1866) and Serrão (1992, p. 62-64).

⁴ The personal and private physicians of the aristocracy and eminent people like popes.

⁵ For an almost complete list of Castro's books, see Manuppella (1967) and Leite (2012).

⁶ Although open to speculation, it could be argued that if his philosophy and practical knowledge could not survive in Portugal under circumstances such as the Inquisition or scholasticism, we have strong reasons to believe that they were generated there.

⁷ The list of practitioners presented in Cipolla's book (1985, p. 325) shows us the presence of Castro, and his son Antonio de Castro, as well as his Italian disciple Valerio Nervi, among the physicians of the city.

⁸ In the book of Francesco Rondinelli, in which the author describes the plague and the actors who fought against it, we see the importance of Castro's books about the plague to the planning of the medical strategies to prevent the spread of the disease, like the use of certain medicines to close the pores of the skin in order to avoid the entrance of poisonous corpuscles (Rondinelli, 1634).

⁹ Except in the philosophical domain, as was the case of the *alileians*, the medical atomism in Florence in the first half of seventeenth-century had in Estêvão Rodrigues de Castro its sole representative. Actually, since Pietro Redondi's *Galileo Eretico*, which proposed that the possible source of Galileo's atomism was the philosophy of Estêvão Rodrigues de Castro, the debate about the arrival of atomism in Tuscany is still open. Michele Camerota argues that Galileo's atomism was generated by some disputes which took place in Florentine soil and that Castro's philosophy only affirmed his adoption. For a better understanding of Florentine atomism around the *galileians* see Redondi (1984) and Camerota (2008). For a better understanding of Castro's philosophical and medical ideas see Leite (2012).

¹⁰ We know of two important medical doctors who embrace the atomist philosophy. The first and more important is the Venitian physician Prosper Alpini (1553-1617). Alpini "applied" the atomism to medicine according to the ancient school of the Methodists, against who Galen always opposed his thoughts. The other was the Neapolitan physician Marco Aurelio Severino (1580-1656). Severino "applied" atomism to the analysis of compared anatomy (Cf. Alpini, 1611; Severino, 1645). Recent works on medical atomism: Trabucco (2000) and Borrelli (2000).

This it is which we breathe in: The Epidemic theory of Estevão Rodrigues de Castro

In the dialogue *Il curioso nel quale si discorre del male di peste* (1631)¹¹, Castro expounds, in this way, his notion of plague. It reads as follows:

Are you aware that the plague touches everyone? Both young and old, male and female, those who drink wine and those who drink water, those who eat bread made of wheat and those who eat it made of sorghum and those who work as those who are idle (Castro, 1630, p. 8).

This is why, during the Florentine plague of 1630-1633, the Barnabite priest Filiberto Marchini defined the plague as a synonym of Pandemic.¹² But when Marchini analysed those different kinds of epidemic he affirmed that “all plague is an epidemic but not all epidemic is a plague” (Marchini, 1633, p. 3). Accordingly, he distinguished the plague from the other sort of epidemic that he classified as *simple epidemic*.

Estevão Rodrigues de Castro, on the other hand, connected the definition of the epidemic disease with its etiology. The plague, according to him, was called so not only for the fact that it was common to everyone or universal, but also for the fact that its cause was the air. The air was the only thing that was common to everyone. A disease caused by the air should be, then, common to everyone.¹³ Nevertheless, he also accepted the fact that there were other kinds of “plagues” or epidemics that depended on or had their origin in other causes.

Therefore, if there were epidemics that were common to certain persons or beings, the only real universal disease, or the epidemic that attacked every kind of person, was the one which was caused by the air. For that reason, he concludes that, “the plague is called so because it reaches every kind of person, we may observe that if it reaches everyone it is because it is caused by the infection of the air” (Castro, 1630, p. 10).

By connecting the definition of the plague with its etiology, Castro redefined the concept of plague and epidemic. This allowed him to support a certain “Hippocrates”, or a certain interpretation of pathological mechanisms that was already existent in ancient times.

Castro developed his understanding based upon the connection between epidemics and airborne diseases, inspired by the adoption of the pathological theory of the Pseudo-Hippocratic treatise *On winds*. In this book, every disease is understood to be caused by the air, and was thus the principle supposed to explain every pathological phenomena, notably the epidemic diseases. Indeed, nine years before, in the book *De meteoris microcosmi* (1621), Castro had clearly presented his ideas along the lines of the Pseudo-Hippocratic *On winds*. He adapted this ancient theory to the early modern cultural context in which he was immersed and added his entire atomistic arsenal to it, renewing the classical interpretation on epidemic diseases and their diffusion.

By maintaining the definition of the disease based on its cause, he put the air in the centre of the debate. In other words, by doing so, Castro openly endorsed, in his epidemic treatises, the theory contained in the book *On winds*.

This is why, even when referring to other kinds of epidemic diseases in his *Compendio*, Castro connects the cause of those diseases with the air. According to him, every epidemic disease had its “seeds of contagion” scattered in the wind. The wind ended up being a major source for the explanation of diseases in Castro’s thought. He says that,

And if Galen argues that some common diseases may be born of the common food, on the other hand he confesses that it happens very rarely. Furthermore, if a disease is generated from the common food, the vapours of cadavers or the dirt, it will never be contagious if the air does not receive first in itself the seeds of contagion. This is why in very a prudent manner Hippocrates liberated many cities from the pestilence through the purification of the air. Ordering that as the only remedy fire should be set to the city and that some garlands and smelly unguents should be thrown in the fire (Castro, 1631, p. 8-9).

¹¹ The book *Il curioso nel quale si discorre del mal di peste* (1631) was organized in three dialogues. Each of those dialogues was composed by two interlocutors, one who represented a *curious* or a character who proposed precise questions to be answered, and the sage, who had the precise answers to those precise questions. In the first dialogue, about the causes of the plague, the curious was named *Dionisius* and the sage *Marcellus*.

¹² “Dicimus pestem morbum esse, qui apud graecos Pandemus, sive Pandemius, appellatur, sic dictus à dictione Pan, quae totum significat, & Demos, idest populus, nempe quia totum populum eadem inficit malignitate: atque ob hanc etiam radicem dicitur Pancaenus, idest omnibus communis; Caenos enim graece quid commune significat, idest morbum universalem: Sed rectius latino nomine retento, pestis dicitur à pascendo, quia veluti efferratus rabie draco urbes, terras, populumque omnem devastans, humanis carnibus, vita, & sanguine depascatur, ut hoc fatali anno M. DC. XXXI. Dum haec scribimus, nec non praecedenti anno 1630. experientia comprobatum vidimus” (Marchini, 1633, p. 3).

¹³ Castro’s argument is based on this quotation of Hippocrates: “Diseases arise, in some cases from regimen, in other cases from the air by the inspiration of which we live. The distinction between the two should be made in the following way. Whenever many men are attacked by one disease at the same time, the cause should be assigned to that which is most common, and which we all use most. This it is which we breathe in since the disease attacks all in turn, both younger and older, men as much as women, those who drink wine as much as teetotalers, those who eat barley cake as much as those who live on bread, those who take much exercise as well as those who take little” (Hippocrates, 1959, p. 25-27).

This extract does not only demonstrate the Hippocratic source of Castro's thought, but, in addition, brought an important notion into Castro's medicine. The presence of the *seeds of contagion* in his theory of epidemic and contagion shows us a narrow relationship with the Fracastorian theory¹⁴ of the seeds of the disease (*seme di contagio*¹⁵). The air was the main principle of motion and diffusion in the Portuguese physician's *seeds of contagion* theory; it was the existence of seeds of contagion in the air that made a disease epidemic and, as we will see afterwards, contagious.

Nevertheless, the connection between Castro's interpretation and the importance he gave to ancient sources, notably the referred Hippocratic treatise, made him criticise the novelty of Fracastoro's theory of contagion. He opposed to the idea that the notion of *contagion* was first "discovered" by the Veronese, because the principles of that concept were already present in the sources he used.¹⁶

The understanding of the air or the wind as a principle of movement of other bodies, especially those which suffered putrefaction, paved the way for Castro's interpretation of the nature of the air as a complex body, as a "substance". This interpretation is opposed to the current Aristotelian interpretation of the air as one of the four primary "elements". He developed this proposition in his dialogue, as follows:

*We have to align Aristotle's philosophy with his own thoughts. Because in the **Metereologica** he says that everything except the fire putrefies and, on the other hand, in the **Problemata** he examines the causes why the air putrefies. Nevertheless, if one carefully considers the answer that he gives to the problem, one would see that there is no contradiction. He argues that the air does not putrefy due to the fire it contains. The reason is that all those elements that we are familiar with are*

not true simple elements, but impure and mixed bodies. Therefore, they can get infected by a "non-legitimate-putrefaction" since the air, especially, is a receptacle of vapours and exhalations sent upwards by the earth and the water (Castro, 1630, p. 12).

Being, then, the air a mix and not a simple element, it can be 'putrefied'. A 'non-legitimate-putrefaction' (*Putredine non vera*)¹⁷ though, says Castro, for it is not an alteration of the body of air, but only a presence of putrid matter inside its 'body'. The air, in every type of epidemic disease, is a receptacle of 'putrid matter' that comes from the putrefaction of vapours or gases emitted by the earth and water. This theory was based on the Aristotelian theory of meteors according to which every atmospheric phenomenon was originated from exhalation or vapours that came from the interior of the Earth.

Thus, from Castro's point of view the air brings in itself the principles that generate, and diffuse, the epidemic disease through the human body. The air is the key to understand the way he understood the epidemic diseases. Castro referred to the air also as the cause of contagious disease. According to him, the air was the bearer of the *seeds of contagion*. Those seeds come from corrupted bodies.¹⁸ He states that,

All the common illnesses (as I said) are called Epidemic, they have the presence of the air as their supporter [...] that is why I conjecture that the cause that makes them become an epidemic, also makes them become contagious (Castro, 1630, p. 18).

But how can an airborne disease be, at the same time, epidemic and contagious? According to the Portuguese doctor, every epidemic disease was also a contagious disease. What is then a contagious disease? The first thing that Castro exposes on this matter is a study of the tradi-

¹⁴ The tradition that influenced the notion of *Seminaria contagionum* in the thought of Girolamo Fracastoro was present in many writings. Some historians proposed that the notion came from an ancient medical concept already present in Galen, others suggested that it came from a Lucretian tradition, and some that it came from a neoplatonic and ficinian tradition. For the *Semina rerum* as a concept already present in ancient traditions, see Nutton (1983). For the thesis of lucretian tradition, see Beretta (2003). And finally, for the thesis of neoplatonic tradition, see Hirai (2006).

¹⁵ In another extract, Castro refers to those seeds as 'occult seeds of contagion': "Dell'aria infetta si difendono meglio I ricchi emendandola con diversi profumi, contenendosi in casa, e separandosi dalla pratica, massime di persone sospette, & oltre di ciò hanno discorso per conoscere che uno che ha praticato con persone infette, se bene non ha segno di male, può havere in se il *seme occulto del contagio*, al che la plebe non si persuade, credendo solamente à quello che con gli occhi vede, e non si curando di persuadersi con discorso" (Castro, 1630, p. 9).

¹⁶ "Anzi direi che non ha cognizione d'Hippocrate, colui che dice che Hippocrate non ha avuto cognizione della peste, si che direi con Galeno, che nessun libro particolare di peste scrisse Hippocrate, pero che esser la peste uno dei mali epidemici, per tutti i libri dell'epidemie ha dimostrato" (Castro, 1630, p. 11). This controversy, very embedded in Castro's work about how the ancients (in that case Hippocrates) already knew the plague, could be seen as an attempt of Castro sustaining the importance of the Hippocratic book *De flatibus* inside the medical knowledge. We shall remind the readers that some doctors, notably Spanish Francisco Valles (1524-1592) and Italian Girolamo Cardano (1478-1553), did not recognize the authenticity of the treatise *On winds* inside the Hippocratic corpus.

¹⁷ "Di tre modi si può dire la putredine non vera, uno quando si fa grande alterazione nelle prime qualitàdi caldo, freddo, humido e secco; altro per abbruciamento, che questo putredine ancora chiamar si suole; altro per mescolanza di qualche cattiva sostanza; e lasciando i primi dua modi, questo terzo è quello che fa l'aria putrida, e dannosa, pero che tirandosi dentro del corpo per l'inspirazione, porta seco di quella cattiva sostanza con che è mescolato, per ciò dice Hippocrate che tale è lo spirito, quale è l'aria che si respire" (Castro, 1630, p. 12-13).

¹⁸ Castro notes that, "Da gl'elementi incorrutibili si fa un corpo misto corrutibile. E finalmente ne i corpi celesti se uno influisce humidità, l'altro calore, forza è che segua putredine; questo sia detto con la poca notizia che io ho della Astrologia, potrà ben il Curioso trovar intorno all'influssi celesti, che son causa della peste, nel ricco thesoro di Marsilio Ficino, abbondante materia da saziar il desiderio suo" (Castro, 1630, p. 12).

tion of the term from the ancients, demonstrating not only his knowledge on the topic, but also the possible sources he used to develop the idea of contagion. He says that,

*Marcello. It seems to me that Galen knew about the contagion when he says that the contact with the sick is dangerous. But he considered it so negligently that he does not differ the contagion of the plague from that of the scabies and from that of Lippitudo [inflammation of the eyes]. The plague contagion is so powerful that it works in the distance and that is not the case in other forms of the contagion. The scabies contagion only works through contact. The plague is spread through tissues and other vehicles. Aristotle speaks of it twice in his *Problemata*, but superficially, and Lucretius speaks about it very briefly (Castro, 1630, p. 20).*

The referred extract is clearly connected to Castro's attempt to undermine the 'novelty' of Fracastoro's notion of contagion and to sustain the originality of his Hippocratic source. Despite all this effort, the Portuguese's theory is essentially connected and influenced by the ideas of the Veronese physician. The study of the word *Contagion* in Castro's narrative shows us that influence.

As Fracastoro in his *De contagione*, Castro enumerated the three types or forms of contagion while analysing the contagion of different diseases. Those three forms are the contagion by touch or contact, the contagion through a *fomes* or a vehicle of dissemination and the contagion at a distance.

The use of the same classification proposed by Fracastoro to analyze the different types of mechanisms of contagion clearly demonstrates the influence that the works of the Veronese physician had on the thought of the Portuguese physician – which reveals the importance of Fracastoro's theory on Castro's understanding of contagion. This being the case, a brief outlook on Veronese's theory of contagion is necessary in order to allow us to examine the similarities and the discrepancies between the two theories. Furthermore, it allows us to see the advancements and singularities of the theory proposed by Castro.

Forme spiritual: the contagion according to Girolamo Fracastoro

In 1546, Girolamo Fracastoro published *De contagione*, a book on the nature of contagion, preceded by *De sympathia et antipathia rerum*. The fact that these two works were published together was not accidental. The Neoplatonic notion of sympathy, as pointed out by Concetta Pennuto, played an important role in Fracastoro's understanding of the mechanisms of contagion¹⁹.

As mentioned previously, Fracastoro explained three ways of diffusion of contagion: through *contact*, through vehicles or *fomes*, and at a distance. The mechanism of contact is explained using the example of putrid fruits put in contact with the human body, thus introducing the concept of *seminaria*. According to him, the principle and the *seminaria* of putrefaction were minimal particles, hot and humid, of some fruits or other bodies²⁰.

In the second modality of contagion, through the *fomes* or the vehicle of contagion, the explanation provided by Fracastoro was very similar to the first modality. But in the case of the vehicles, we have a vector of diffusion of the disease. The seeds attach themselves to certain things, such as beds, tissues and wood because, according to Fracastoro, they are hot and humid. And it is the humidity that 'glues' the seeds to other things.

The third modality of contagion, according to Fracastoro, is the most complex of the three. It is an *effluvia* or a flow of new *seminaria*²¹ born to the ones that have first putrefied that are transported by the wind through long distances. Nevertheless, the singular way Fracastoro interpreted this *effluvia* must be taken into account.

According to Fracastoro, as Concetta Pennuto has brilliantly observed, the theory of *effluvia*, which derivated from an atomistic tradition, was entirely based on an Empedoclean interpretation of *effluvia* of spiritual forms (*species*)²². It is not the seeds or the particles that flow through the air, but the *species* or *simulacra* of the first putrefied seeds that are subject to movement. To Fracastoro, those *species* were so strong that they even had the power to generate material substance, as light (a *species*) can generate heat.

¹⁹ Concetta Pennuto observes a narrow relationship between the notion of sympathy of Fracastoro and neoplatonic and hermetic notions of harmony (Pennuto, 2006).

²⁰ "In fructibus igitur quae contagio accidit, per haec principia fieri putandum est, at vero et in aliis quaeque omnibus quae putrescentia sese tangunt, si analoga sint, idem evenire et per idem principium existimare par est: principium autem sunt particulae illae insensibiles quae evaporant, calidae quidem, et acres, sed humidae commistione, quae deinceps *seminaria* contagionum dicantur" (Fracastoro, 1546, p. 10).

²¹ Is it rather *species* or *simulacra seminariarum*, according to Fracastoro's theory.

²² "Empedocle quindi compare nel *De sympathia* di Fracastoro: parlando dell'attrazione e moto dei simili verso i simili, Fracastoro spiega che, se ogni azione avviene per contatto, bisogna che qualcosa sia emesso da un corpo all'altro affinché possano congiungersi. Una teoria degli efflussi, *effluxiones corporum*, contestata, se interpretata come emanazione di atomi quale troviamo nel pensiero di Democrito, Epicuro e Lucrezio. Ma da non negare in assoluto, se interpretata come emanazione di forme spirituali: la forza simpatetica agisce attraverso l'effluvio di un grado o parte sottile e superficiale che si stacca dalle forme materiali dei corpi. Nel luogo in cui Fracastoro tesse le sue critiche alla teoria degli efflussi di atomi, da sostituire con effluvi di specie, troviamo, per un complesso ramificarsi della tradizione del testo, il nome di Empedocle al posto di quello di Democrito in alcune edizioni. Possiamo immaginare che la correzione sia da ricondurre alla citazione delle dottrine atomistiche: nella editio princeps del 1546 il nome di Empedocle è nel testo, ma corretto negli Errata ita corrigenda con quello di Democrito" (Pennuto, 2006, p. 62).

According to the Veronese physician, the seeds of contagion are born of putrefaction, as the example of the fruit, and those seeds can be transported by vehicles, *fomes*, or can even be scattered by the dispersion of the *species* of those seeds that flow through the air carrying the principle of the disease. Those *species* are identified as light, smell, flavour and sound.²³ This is why, when referring to the third modality of contagion, Fracastoro compared one dimension of it, that of vision²⁴, with the glance of the Catoblepas²⁵, the mythic animal from the source of the Nile that could kill any human being only by his glance. This metaphor is related with the contagion through *Lippitudo* already mentioned by Castro²⁶.

This notion explains why, during the outburst of the Plague in Florence in the years of 1630-1631, one of the doctors of the city, Alessandro Righi, who was very influenced by the theories of Fracastoro, argued that the contagious disease could be transmitted – other than by transpiration and inspiration – by all the five senses: touch, sight (through the explanation of *Lippitundine* and *Puerorum Fascinatione*), taste (present in food and drink), smell (from the bad smell of cadavers and putrid bodies) and hearing²⁷. Besides these forms of contagion, for Righi as for Fracastoro, the imagination also had an important role to play in the theories of contagion. Quoting Aristotle, Righi (1633, p. 61) recognized that the *phantasia* (imagination), the senses and the mind could alter the body. Imagination and thought were supposed to have in themselves the virtue of things.²⁸

Related to that, was the practice of the magistrates of Florence fighting against the bad smell of the city, as they thought – again using Fracastoro's theory – that the disease could be spread through the smell. We can mention the case of the inspection of the wells of the city ordered by the Grand dukes and carried on by Filippo Lasagnini. His

inspection was entirely based on an analysis of the *bad smell* of the wells and of the houses of the poor.²⁹ We should also keep in mind that, based on this concept, a profession was born in the Grand Duchy, the *Votapozzi*, whose function was to empty the wells that were affected with bad smell.³⁰

La piccolezza dei corpicelli – the contagion according to Estevão Rodrigues de Castro

We have argued so far that Castro proposed that the nature of the Plague, or the epidemic diseases, was within the air. He also argued that the *seeds of contagion* were a product of putrefaction of the vapours and exhalations of the earth and the water through the influence of certain planets. He also maintained, in the same manner as Fracastoro, that those seeds could be spread through contact, vehicle or at a distance. But, how could those *seminaria* be attached to other vectors of contagion? How could they enter into the human body? And how did the contagion at a distance work in Castro's perspective?

Fracastoro sustained an Empedoclean doctrine of contagion and the notion that bodies that suffer putrefaction were constituted by four basic elements (air, fire, earth and water). This is why his concept of seeds has two qualities, hot and humid. According to Fracastoro, it is the humidity or the viscosity of the putrid *species* or *simulacra* of corpuscles that explains the adherence of the seeds to things: walls, clothes and other *fomes*.

To Estevão Rodrigues de Castro, the case is different. His seeds were not made of the four Empedoclean elements, but of one unique element, the atom or *spiritus*, as he so fiercely argued in his book *De meteoris microcosmi*.³¹ Therefore, his seeds, even derivated from atoms, present

²³ "Porro substantiam per se nihil aliud facere, nisi locales motus sursum, deorsum, rarefactionem, & condensationem, & circularem. Hi enim a forma rerum fiunt. Reliqua vero actiones a qualitatibus proveniunt. Qualitatum vero aliae materiales dicuntur, calidum, frigidum, humidum, siccum, lux, odor, sapor, & sonus, aliae spirituales vocantur, quae species sunt, & simulacra materialium sive sint cum ijs univoce, sive non, ut lucis lumen, saporis vero & odoris, & soni species nomen non habent, nisi saporimen & odorimen, & sonimen velimus effingere, sicut a luce lumen" (Fracastoro, 1546, p. 31).

²⁴ It is important to stress that the Latin word *species*, *-ei* is also defined as *view*. Defined as *appearance* it is strongly related to the organ of the view (as Aristotle refers to the eye). Besides, the word is also defined as *image*.

²⁵ "Quare alius impetus, alia vis esse videtur harum contagionum, et venenis aut Catablephae animali assimilari, non autem reliquarum contagionum modum & natura sequi" (Fracastoro, 1546, p. 31).

²⁶ It is important to observe that Castro mentions the contagion through *Lippitudo* (p. 11) as a different kind of epidemic disease, distinct from what he called plague. This theory, therefore, became marginal inside Castro's interpretation. He did not undermine Fracastoro's assertions, but he did not accept these assertions to be linked with the phenomena of the plague.

²⁷ "Contagium contrahitur, vel per inspirationem, vel per transpirationem, ut notum est, contrahitur quoque per omnes quinque sensus; ut per tactum, sicuti dictum fuit; ut per visum, sicut in lippitudine, & puerorum fascinatione; ut per gustum, sicut in cibo, & potu; ut per odoratum, sicut in faetore cadaverum, & putridorum corporum; ut per auditum, ut multi aethores asserunt, licet apud nonnullos sit hoc admodum difficile" (Righi, 1633, p. 61).

²⁸ "Contagium etiam contrahi potest, & facilissimè ab forti imaginatione, quia imaginatione, cum sit facultas corporea, & educta de potentia materiae, maxillè alterat, & mutat corpus; & hinc est, quod fortis imaginatio est omnium animi passionum pessima, cum morbus adducat, & proprium corpus immutat, ita ut ex anima contagiat in corpore mutatio temperamenti; hoc autem fit, quia fortis imaginatio habet in se virtutem illarum rerum, quas imaginatur; & ideo dixit Arist. "Alterant corpus phantasiae, sensus, & meditationes, nam phantasiae, & meditatio habent in se rerum virtutem." Avicenna. etiam dixit, "Forma, quae est in anima, est principium eius, quod sit in materia, sicut forma sanitatis, quae est in mente medici, est principium sanitatis, quae fit in aegroto" (Righi, 1633, p. 61).

²⁹ The visit of Filippo Lasagnini, 3 January 1621 (Cipolla, 1985, p. 35).

³⁰ The *votapozzi* (Cipolla, 1985, p. 68).

³¹ "Spiritus generationis principia in semine contenta, quae corpuscula, sive atoma, hoc est insectilia dicuntur, veterum fuit inventum: siquidem inter philosophos Democritus, Leucippus, Mnesitheus, Epicurus, omnia ex insectionibus, quae ατομοί vocabant constare dicebant, inter medicos Asclepiades Bithynius, & Heraclides Ponticus principia rerum ἀνχρημοίον γοκοίον idest incompacta corpuscular dixerunt, ut testatur autor libri de Historia philosophica, qui potius Plutarchus, quam Galenus esse perhibetur, quorum sententia a multis, sed precipue Aristotele, & Galeno varijs suorum operum locis refutatur" (Castro, 1621, p. 25).

qualities, although not those proposed by Fracastoro. His seeds, as the fumes, were dry. He says that,

Dionisio. Do you agree with Fracastoro's opinion on the viscosity of the seeds of contagion being the basis of its attachment to other things? Marcello. I do not want to contradict him, but I know that the smoke is largely dry and does not present any kind of viscosity. And nevertheless it adheres to walls and other things. Dionisio. If the capacity of adherence of the seeds does not come from the viscosity, where does it come from? Marcello. It comes from the fact that the corpuscles that compose this contagious smoke are so small that they go through the porosities. When the substances are not very porous, like the metals, this smoke does not stick. And if we want to attribute humidity to something, it is more likely to exist in the things that the smoke adheres to (Castro, 1630, p. 20–21).

From his perspective, the principle that makes the seeds stick themselves to things is not its humidity, or viscosity, but the small size of the atoms, *la piccolezza dei corpicelli*, that compose the seeds, allowing them to go through the pores of other bodies.

By formulating this idea, Castro readdressed the ancient theory of atoms and void present in the philosophy of Lucretius. According to this philosopher, the world, elements and bodies were composed of matter (atoms or corpuscles) and void (pores). When referring to the adherence of the seeds through the pores by the movement of very small atoms that compose the putrid smoke, Castro was clearly revisiting an atomist philosophy to explain the plague contagion.

Castro quotation raises a second question. If the 'adherence' of the seeds was due to the fact that their components could enter a body through its pores, the seeds of contagion entered the human body through the pores of the skin.

As for the question of the contagion through a distance, the solution is a synthesis of all that has been mentioned here: the answer to the contagion at a distance is in the wind. The putrid seeds, flowing in the wind, were thrown far away, allowing the seeds to penetrate the pores of other bodies.

Estevão Rodrigues de Castro does not accept the theory of spiritual *effluvia*. He proposes an interpretation

entirely based on the movement of atoms and bodies propelled by the wind. By doing so, he reconstructed the atomist theory of *effluvia* on the basis of a pneumatic theory of the movement. He observed the whole phenomena of epidemic disease on the basis of a materialist and mechanic theory of movement.

His theoretical views made him understand the disease as a *substance* and not as a *quality*. Castro's concept of *effluvia* is the flow of indivisible parts of matter with a specific property, while those of Fracastoro's are nothing more than a flow of *species*, or accidents of the putrid matter. It shows how distant Castro was from the more dominant medical theories based on the Empedoclean solution, very much adopted by the Aristotelian philosophy³².

The comprehension of the air as a cause and the adoption of the theory from the treatise *On winds* is so important to Castro because, without it, how could he explain the movement of material bodies through the air? The air and the theory of *De flatibus* allowed him to make an extended use of pneumatic and atomistic theories in the sphere of medical thought.

Furthermore, this interpretation by the Portuguese physician was at the base of certain measures taken by the Magistracy, such as the public fires, also recommended by the Galenists, and the use of certain substances, as lavender, in order to reduce the size of porosities and prevent the entrance of the *seeds* in the bodies of the healthy.

Estêvão Rodrigues de Castro, whose entire formation took place in Portugal, was an atomist physician, such as Prosper Alpini and Marco Aurelio Severino. Although the historiography of the Iberian Peninsula suggests that during the Inquisition new philosophical thinking could not flourish, this was certainly not true in Castro's case, once he developed his ideas and medical practice in Portugal, before going to Italy. His alternative philosophy and medicine made him a *cultural outsider* of great importance inside the Florentine culture and medical institutions, strongly marked by the presence of Fracastorian theory. He was a medical alternative inside the Grand Duchy of Tuscany.

These debates highlight the importance of the Portuguese culture to other nations and also suggest that alternative theories within the Portuguese cultural panorama did not only come from outside. Contradicting the argument based on the notion of *Estrangeirado* in José Sebastião da Silva Dias' thought³³, Estêvão Rodrigues de

³² This also shows how Castro's thoughts have been misunderstood, contradicting the following statement by Beretta (2008, p. 187, n. 25) "Come Nardi anche de Castro era un sostenitore dell'aristotelismo e la sua parziale concessione all'atomismo qualitativo di Lucrezio è da inquadrare nel sincretismo scientifico". Castro has never been an Aristotelian and his deeply materialistic philosophy, as well as his substantial interpretation of the epidemic disease, shows us how he strongly believed in atomistic philosophy. This is better proved in Leite (2012).

³³ The Portuguese historian José Sebastião da Silva Dias sustained that, during the period of the Counter-Reformation in Portugal, the only way of renovation in the Portuguese culture was the action of the *Estrangeirados*. Those were the Portuguese intellectuals who were able to leave the country and come back bringing new ideas from the rest of Europe. The foreigners or *Estrangeiros* that went to Portugal bringing new cultural alternatives were also considered in the referred category (see Dias, 1952).

Castro shows us that, despite the hegemony of scholastics in Portugal, different philosophical alternatives were brought forth from within the country.

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Submetido: 15/12/2013

Aceito: 11/03/2014

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