

EARTH'S SOUL AND SPONTANEOUS GENERATION:  
FORTUNIO LICETI'S CRITICISM OF FICINO'S  
IDEAS ON THE ORIGIN OF LIFE

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If it is important to evaluate the impact of the thought of Marsilio Ficino (1433–1499) on the Scientific Revolution, the detailed analysis of the application of his metaphysical ideas to natural questions in the sixteenth and seventeenth centuries becomes a matter of considerable interest. In spite of some recent studies devoted to Ficino's cosmology, his views on matter theory and the life sciences remain largely unexplored by historians. One of the most crucial problems of these domains is without doubt the origin of life. In this regard, the question of spontaneous generation or 'abiogenesis', that is, the birth of living beings from lifeless matter, illustrates the cause of matter's activity or its animation.<sup>1</sup> Ficino actually used this phenomenon as crucial evidence for his thesis of the world's universal animation. I shall thus focus the present study on his theory of spontaneous generation. For this purpose, the criticism formulated by a Paduan professor of philosophy, Fortunio Liceti (1577–1657), seems to serve as the best guide.<sup>2</sup>

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<sup>1</sup> See especially Edmund O. von Lippmann, *Urzeugung und Lebenskraft: Zur Geschichte dieser Probleme von den ältesten Zeiten an bis zu den Anfängen des 20. Jahrhunderts* (Berlin: Springer, 1933); Jean Rostand, *La genèse de la vie: histoire des idées sur la génération spontanée* (Paris: Hachette, 1943); Everett Mendelsohn, 'Philosophical Biology vs Experimental Biology: Spontaneous Generation in the Seventeenth Century', in *Actes du XII<sup>e</sup> congrès international d'histoire des sciences (Paris, 1968)* (Paris: Blanchard, 1971), I–B, pp. 201–26; John Farley, *The Spontaneous Generation Controversy from Descartes to Oparin* (Baltimore, MD: Johns Hopkins University Press, 1974); Remke Kruk, 'A Frothy Bubble: Spontaneous Generation in the Medieval Islamic Tradition', *Journal of Semitic Studies*, 35 (1990): 265–82; Maaïke Van Der Lugt, *Le ver, le démon et la vierge: les théories médiévales de la génération extraordinaire* (Paris: Les Belles Lettres, 2004).

<sup>2</sup> On Liceti, see *Dizionario biografico degli italiani* (Rome: Istituto della Enciclopedia Italiana, 2005), vol. 65, pp. 69–73; Jean-Pierre Nicéron, *Mémoires pour servir à la*

For, in his work entitled *De spontaneo viventium ortu*, published in Vicenza near Padua in 1618, he surveyed not only a wide range of ideas related to spontaneous generation but also devoted a long examination to Ficino's theory.<sup>3</sup> Although Liceti is today little known to historians, his discussion enjoyed success in its day, and a diffusion beyond the Alps in the seventeenth century, through the writing of the Lutheran medical professor of Wittenberg, Daniel Sennert (1572–1637).<sup>4</sup> In Italy too, as I have shown elsewhere, Liceti's theory was literally absorbed into that of the famous Jesuit father, Athanasius Kircher (1602–1680), who provoked lively debates on the issue all over Europe.<sup>5</sup>

It should be noted that, from antiquity, spontaneous generation was often linked to the idea of universal animation. Aristotle, in his *Generation of Animals*, III.11, explained the phenomenon by *pneuma*, which resides in the earth's humidity and carries 'soul-heat' (*thermotēs psychikē*) everywhere in the world, so that all things are in a sense full of soul.<sup>6</sup> The theory of Themistius, who connected the World-Soul to spontaneous generation more explicitly, was very widely diffused thanks to a quotation made by Averroes in his *Long Commentary*

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*vie des hommes illustres dans la République des Lettres*, 43 vols. (Paris, 1727–1745), vol. 27, pp. 373–92; Vasilij Zoubov, 'Une théorie aristotélicienne de la lumière du XVII<sup>e</sup> siècle', *Isis*, 24 (1935–6): 343–60; Giuseppe Ongaro, 'La generazione e il "moto" del sangue nel pensiero di F. Liceti', *Castalia: rivista di storia della medicina*, 20 (1964): 75–94; idem, 'L'opera medica di Fortunio Liceti (nota preliminari)', in *Atti del XX<sup>o</sup> congresso nazionale di storia della medicina* (Rome: Società italiana di storia della medicina, 1965), pp. 235–44.

<sup>3</sup> Fortunio Liceti, *De spontaneo viventium ortu* (Vicenza, 1618), I.99, p. 98.

<sup>4</sup> Daniel Sennert, *De spontaneo viventium ortu*, in *Hypomnemata physica* (Frankfurt, 1636). Cf. Hiro Hirai, 'Atomes vivants, origine de l'âme et génération spontanée chez Daniel Sennert', *Bruniana & Campanelliana*, 13 (2007): 477–95.

<sup>5</sup> Cf. Hiro Hirai, 'Interprétation chymique de la création et origine corpusculaire de la vie chez Athanasius Kircher', *Annals of Science*, 64 (2007): 217–34; idem, 'Athanasius Kircher's Chymical Interpretation of the Creation and Spontaneous Generation', in *Chymists and Chymistry: Studies in the History of Alchemy and Early Modern Chemistry*, edited by Lawrence M. Principe (Sagamore Beach, MA: Science History Publications, 2007), pp. 77–87.

<sup>6</sup> Aristotle, *Generation of Animals*, III.11, 762a, 18–21. Cf. Friedrich Solmsen, 'The Vital Heat, the Inborn Pneuma and the Aether', *Journal of Hellenistic Studies*, 77 (1957): 119–23, esp. 122; Gad Freudenthal, *Aristotle's Theory of Material Substance: Heat and Pneuma, Form and Soul* (Oxford: Clarendon, 1995), pp. 123, 127. On the World-Soul, see among others Joseph Moreau, *L'âme du monde de Platon aux Stoïciens* (Paris: Les Belles Lettres, 1939); David E. Hahm, *The Origins of Stoic Cosmology* (Columbus, OH: Ohio University Press, 1977); Tullio Gregory, *Anima mundi: la filosofia di Guglielmo di Conches e la scuola di Chartres* (Florence: Sansoni, 1955).

on Aristotle's *Metaphysics*, XII.<sup>7</sup> The Commentator's discussion rapidly became a commonplace for medieval Scholastics.<sup>8</sup> In the late fifteenth century, Ficino, considerably developing the doctrine of the World-Soul and its application to spontaneous generation, introduced a new 'Platonic' perspective on the question.<sup>9</sup> In this essay, I shall analyze Liceti's Aristotelian critique of Ficino's theory written in the early seventeenth century, on the threshold of the Scientific Revolution.

*Liceti's De spontaneo viventium ortu (1618)*

Liceti's work, *On the Spontaneous Generation of Living Beings*, is divided into four books, the first of which is devoted to a survey of the diverse opinions of ancient, medieval and early modern authors on spontaneous generation. This first book is a genuine encyclopaedia of ideas related to the question before him. The structure of the book, divided into 151 chapters, follows the Aristotelian theory of four causes, based respectively on finality, form, matter and agent. Liceti begins his discussion with final cause (chapters 1–34), first by studying the ideas of neoterics like Girolamo Cardano (1501–1576), Marcantonio Zimara (1475/6–c.1537) and Andreas Cesalpino (1524/5–1603). It is followed by the examination of the views of Avicenna and Albert the Great on the spontaneous generation of man. Next, Liceti turns to formal cause (35–55) and material cause (56–67). Finally, he tackles efficient cause (68–151), whose discussion, more important than the others, stretches out to the end of the first book. As for the efficient cause itself, Liceti first examines the ideas of those who do not admit any efficient cause

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<sup>7</sup> Themistius, *Paraphrase of Aristotle's Metaphysics*, XII.3 = Samuel Landauer, *Themistii in Aristotelis metaphysicorum librum XII paraphrasis* (Berlin, 1903), p. 9 = Rémi Brague, *Thémistius: Paraphrase de la Métaphysique d'Aristote (Livre Lambda)* (Paris: Vrin, 1999), p. 64. On this treatise, see Shlomo Pinès, 'Some Distinctive Metaphysical Conceptions in Themistius' Commentary on Book Lambda and their Place in the History of Philosophy', in *Aristoteles: Werk und Wirkung*, edited by Jürgen Wiesner, 2 vols. (Berlin: de Gruyter, 1985–7), vol. 2, pp. 177–204; Brague, *Thémistius*, pp. 9–39.

<sup>8</sup> Averroes, *Long Commentary on Aristotle's Metaphysics* (hereafter *LCM*), XII.18 (on Aristotle, *Metaphysics*, XII.2, 1070a 27–30) = Maurice Bouyges, *Averroès: Tafsir mâ ba'd at-tabî'at* (Beirut: Imprimerie catholique, 1938–48), pp. 1490–1505 = Aubert Martin, *Averroès: Grand commentaire de la Métaphysique d'Aristote, livre lambda* (Paris: Les Belles Lettres, 1984), pp. 127–40.

<sup>9</sup> Cf. Hiro Hirai, 'La fortune du concept de semence de Marsile Ficin au XVI<sup>e</sup> siècle', *Accademia: revue de la société Marsile Ficin*, 4 (2002): 109–32.

(68–70) and that of Duns Scotus, according to whom God himself is the efficient cause (71–83). He also takes up those who favor the theory of ‘agent intellect’, advanced by Themistius and Avicenna but vigorously refuted by Averroes. This is followed by a discussion of the doctrines of the World-Soul and the Ideas (96–101). Next, Liceti turns to astral causality in Averroes, Albert, Thomas Aquinas and Jean Fernel (102–118),<sup>10</sup> and those, such as Cardano, who emphasize the agency of natural or celestial heat (121–132). Finally, Liceti tackles at length the views of Ficino (133–145). The theories of a Platonic tendency, then, are discussed principally in two sections: 1) the examination of the doctrines of the World-Soul and Ideas and 2) that properly devoted to Ficinian theory. In order to understand Liceti’s argument, I shall first examine his discussions on the World-Soul and the Ideas, and then analyze his criticism of Ficino.

### *‘Junior Platonists’ and the World-Soul*

After having covered the views of Arabic and Latin Aristotelians, Liceti takes up those of Platonists. He divides them into three groups according to their choice of the efficient cause for spontaneous generation: 1) those who favor the World-Soul (*anima mundi*); 2) those who advance the Ideas (*ideae*); 3) and Ficino who takes a third way. If Liceti devotes a long examination to the latter, he draws his inspiration for the first two groups from the writings of two Paduans, Niccolò Leonico Tomeo (1456–1531) and Cristoforo Marcello (d. 1527). Since these two men are influenced by Ficino’s work on the subject, it can be said that all three of these sections represent Ficinian lines of thought.

Liceti first gives the views of Philoponus, Virgil and Macrobius. For him, since these men think that the souls of all living beings are generated by the World-Soul, the efficient cause of spontaneous generation will also be attributed to this universal soul of the world. He affirms that

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<sup>10</sup> See Gad Freudenthal, ‘The Medieval Astrologization of Aristotle’s Biology: Averroes on the Role of the Celestial Bodies in the Generation of Animate Beings’, *Arabic Sciences and Philosophy*, 12 (2002): 111–37; for Fernel (1497–1558), see Hiro Hirai, *Le concept de semence dans les théories de la matière à la Renaissance: de Marsile Ficin à Pierre Gassendi* (Turnhout: Brepols, 2005), pp. 83–103; idem, ‘Ficin, Fernel et Fracastor autour du concept de semence: aspects platoniciens de *seminaria*’, in *Girolamo Fracastoro fra medicina, filosofia e scienze della natura*, edited by Alessandro Pastore and Enrico Peruzzi (Florence: Olschki, 2006), pp. 197–212.

such an opinion is common to 'junior Platonists' (*Platonici juniores*). He does not forget to add that, for Leonico Tomeo, this opinion agrees with the teachings of the Academics, Stoics and Peripatetics.<sup>11</sup> Liceti quotes a passage from Philoponus's commentary on Aristotle's *On the Soul*, II.4, which explains that the species of plants and animals are sent from a 'universal artificer'. Identifying this artificer with the World-Soul, Liceti points out that the argument of Philoponus is not supported by proofs.<sup>12</sup> To this, he adds the famous verses of Virgil's *Aeneid*, VI (724–731):

Principio caelum, terras, camposque liquentis,  
 Lucentemque globum lunae, Titaniaque astra  
 Spiritus intus alit, totamque infusa per artus  
 Mens agitat molem et magno se corpore miscet.  
 Inde hominum pecudumque genus, vitaeque volantum  
 Et quae marmoreo fert monstra sub aequore pontus.  
 Igneus est ollis vigor et caelestis origo  
 Seminibus [...].<sup>13</sup>

According to Liceti, the poet sings here in the same spirit as Philoponus by locating the origin of the particular souls of living beings,

<sup>11</sup> *De spontaneo*, I.96, p. 99. Cf. Leonico Tomeo, *Alverotus sive de tribus animorum vehiculis*, in *Dialogi* (Venice, 1524). I have used the edition of Simon de Colines (Paris, 1530), here p. 29. On Leonico Tomeo, see Daniela De Bellis, 'Niccolò Leonico Tomeo interprete di Aristotele naturalista', *Physis*, 17 (1975): 71–93; eadem, 'Autokineton e entelechia: Niccolò Leonico Tomeo, l'anima nei dialoghi intitolati al Bembo', *Annali dell'Istituto di filosofia (Università di Firenze)*, 1 (1979): 47–68; eadem, 'La vita e l'ambiente di Niccolò Leonico Tomeo', *Quaderni per la storia dell'università di Padova*, 13 (1980): 37–75; eadem, 'I veicoli dell'anima nell'analisi di Niccolò Leonico Tomeo', *Annali dell'Istituto di filosofia (Università di Firenze)*, 3 (1981): 1–21; Deno John Geanakoplos, *Constantinople and the West: Essays on the Late Byzantine and Italian Renaissances and the Byzantine and Roman Churches* (Madison, WI: Wisconsin University Press, 1989), pp. 114–29; Stefano Perfetti, *Aristotle's Zoology and its Renaissance Commentators (1521–1601)* (Louvain: Louvain University Press, 2000), pp. 65–83.

<sup>12</sup> *De spontaneo*, I.98, p. 100. Cf. Philoponus, *Commentary on Aristotle's On the Soul*, II.4 (on Aristotle, *On the Soul*, II.4, 415a, 26) = Michael Hayduck, *Ioannis Philoponi in Aristotelis de anima libros commentaria* (Berlin, 1897), p. 268 = William Charlton, *Philoponus: On Aristotle On the Soul*, II.1–6 (London: Duckworth, 2005), p. 72.

<sup>13</sup> 'First, know that heaven and earth and the watery plains, the moon's bright sphere and Titan's star, a spirit within sustains; in all the limbs mind moves the mass and mingles with the mighty frame. Thence spring the races of man and beast, the life of winged creatures, and the monsters that Ocean bears beneath his marble surface. Fiery is the vigour and divine the sources of those seeds of life [...].' Virgil, *Aeneid*, VI, 724–731, in *Virgil. Eclogues, Georgics. Aeneid I–VI*, translated by H. Rushton Fairclough, revised by G. P. Goold (Cambridge, MA and London: Harvard University Press, 1999), pp. 582–83.

which are spontaneously generated, in the universal soul of the world. But he considers Virgil's argument to be weak, for even if the World-Soul is held as the mind (*mens*) that vivifies the universe, it is not the particular and immediate cause but the common and remote cause from which these beings receive their souls. According to Liceti, Macrobius puts forward a similar idea in his commentary on Cicero's *Dream of Scipio* when he says that the World-Soul gives life to all living beings.<sup>14</sup>

On the basis of Aristotle's definition that the soul is the first actuality of an organic body having life potentially, Liceti thinks that life is given to man by the human soul and to other beings by their proper souls.<sup>15</sup> From this point of view, even if it is placed under the power of the World-Soul, the body of a living being which has not yet received its own soul cannot have life in actuality. Life will be given to the body only by its own soul and not by that of the world. Even if the World-Soul gives life to these beings, it does it only as the common and remote cause. For Liceti, life comes to such beings from the soul, insofar as the latter is their form and not their agent. It is not the World-Soul but the parent's soul that is the immediate and particular cause of the generation of congeneric offspring.<sup>16</sup>

Then, following Averroes, Liceti reports that Aristotle himself seems to accept the idea of the World-Soul. For one might think that, speaking of this soul, the Philosopher attributed a single principle to all beings, on which all being and life depend, manifestly for some or obscurely for others; he taught that 'heaven' (by which he understood corporeal and living beings) and 'nature' (all kinds of generation, including spontaneous generation) depend on it.<sup>17</sup> But Liceti knew

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<sup>14</sup> Macrobius, *Commentary on the Dream of Scipio*, I.14.14. On Macrobius's Platonism, see Stephen Gersh, *Middle Platonism and Neoplatonism: The Latin Tradition*, Publications in medieval studies, 23/1–2, 2 vols. (Notre Dame, IN: Notre Dame University Press, 1986), vol. 2, pp. 493–595.

<sup>15</sup> Aristotle, *On the Soul*, II.1, 412a 27–8.

<sup>16</sup> *De spontaneo*, I.98, pp. 100–101. On the phrase 'human is generated by human', see Aristotle, *Metaphysics*, VII.7, 1032a 25; VII.8, 1033b 32; VII.9, 1034b 2; IX.8, 1049b 25–6; XII.3, 1070a 8 and 28; XII.4, 1070b 31 and 34; XIV.5, 1092a 16; David M. Balme, 'Human is Generated by Human', in *The Human Embryo: Aristotle and the Arabic and European Traditions*, edited by Gordon R. Dunstan (Exeter: Exeter University Press, 1990), pp. 20–31.

<sup>17</sup> Cf. Averroes, *Long Commentary on Aristotle's On the Heavens*, I.100 (on Aristotle, *On the Heavens*, I.9, 279a 28–29), *LCM*, XII.3 (on Aristotle, *Metaphysics*, XII.7, 1072b 14) = Bouyges, 1611–2 = Martin, 233.

that this Platonized interpretation came rather from Themistius as it is found in his paraphrase of Aristotle's *On the Soul*, I.4:

But others say that this was the very opinion of Themistius, by adducing his very famous passage where we read: 'Thus [there is] that single and universal soul of the world, which furnishes to bodies the soul, whether you prefer to call it soul or life, and which is nothing other than a certain vital and generative force, infused into the whole of nature. This [point] is most clearly shown by those living beings, which are spontaneously born from putrefied matter, those born from such a mixture of excrement and filth, or arising from such origin, breathe, live and are moved like mice in Egypt and worms, gnats and very many things alike under our sky'. The most illustrious men hold this opinion about the efficient and immediate cause of the spontaneous generation of living beings.<sup>18</sup>

Liceti recalls that the World-Soul, considered as intellect totally separated from matter, is the one upon which all living beings depend as their common and remote cause. For him, what Themistius presented is not his own view but that of those with whom he was disputing. For Themistius denied elsewhere that the single soul gives life to all beings as the sun gives its light to everything, and attributed the origin of only certain living beings, which are spontaneously born, to the intellect separated from matter, as Avicenna would later do with his famous theory of the 'Giver of forms'.<sup>19</sup> Thus, Themistius's authority is not essential to Liceti's argument.

<sup>18</sup> *De spontaneo*, I.96, p. 99: 'Sed hanc ipsissimam fuisse Themistii sententiam alii profitentur, celeberrimo ejus allato loco, ubi legimus: *Animam itaque illam mundi unicam, atque universalem, quae corporibus praebet sive animam dicere, sive vitam malis, quae nihil aliud est, quam vis quaedam vitalis, generabilisque per omnem naturam injecta, clarissime asserunt ea animalia, quae ortu spontali de materia putri proveniunt, ea ex tali excrementorum et sordium mistione, aut tali orta spirant, viviscunt, moventur, ut in Aegypto mures, et in nostro caelo vermes, et locustae, et quae hujus generis plurima.* Haec de causa effectrice proxima spontanei viventium ortus habent viri clarissimi.' Cf. Themistius, *Paraphrase of Aristotle's On the Soul*, I.4 (on Aristotle, *On the Soul*, I.4, 408a 24–8) = Richard Heinze, *Themistii in libros Aristotelis de anima paraphrasis* (Berlin, 1899), p. 26 = Robert Todd, *Themistius: On Aristotle On the Soul* (London: Duckworth, 1996), pp. 42–43.

<sup>19</sup> On the 'Giver of forms' (*wāhib al-suwar*), see Amélie-Marie Goichon, *La distinction de l'essence et de l'existence d'après Ibn Sînâ* (Paris: Desclée de Brouwer, 1937), pp. 301–3, 473; eadem, *Lexique de la langue philosophique d'Ibn Sînâ* (Paris: Desclée de Brouwer, 1938), pp. 440–41; Helen T. Goldstein, 'Dator formarum: Ibn Rushd, Levi ben Gerson, and Moses ben Joshua of Narbonne', in *Islamic Thought and Culture*, edited by Ismail Raji al-Faruqi (Washington, DC: International Institute of Islamic Thought, 1982), pp. 107–21; Herbert A. Davidson, *Alfarabi, Avicenna, and Averroes, on Intellect: Their Cosmologies, Theories of the Active Intellect, and Theories of Human Intellect* (Oxford: Oxford University Press, 1992); Hiro Hirai, 'Semence, vertu

Against all these opinions that apply the World-Soul to spontaneous generation, Liceti affirms that this soul is not the immediate agent that gives life to living beings. The most crucial point concerning the World-Soul is the fact that this soul is, for him, nothing but almighty God. The World-Soul, identified with God the Creator, must be the common and remote cause of all events in the world but not the immediate cause of the generation of beings rising from putrefied matter.<sup>20</sup> Liceti adds that human soul, although it is the agent of all human functions, is not their particular cause. For the immediate cause of reasoning is the intellectual faculty of this soul, that of vision is its visual faculty and that of nutrition its nutritive faculty. Spontaneous generation is merely one of the multiple actions that occur in the world. Its particular cause cannot be identified with the universal soul of the world. For Liceti, just as the human soul, the form of the whole substance of man, is not the soul of worms that happen to be born within a human body, so the World-Soul, the form of the universe, is not the soul of living beings generated in the world. Thus, he concludes that spontaneous generation requires another immediate agent, lying hidden in the matter from which these living beings are born. It is not the World-Soul, situated outside of matter, that gives them their own souls.<sup>21</sup>

### *'Major Platonists' and the Ideas*

Next Liceti examines the view of the second group, called 'major Platonists' (*Platonici majores*), to whom the immediate agents of spontaneous generation are Ideas. For him, these men hold that beings which are spontaneously born are directly produced by the particular Ideas that procreate their proper souls. These Ideas exist with those of other beings in the Divine mind without any contact with matter. According to Liceti, the fundamental reason why they advance this

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formatrice et intellect agent chez Nicolò Leoniceno entre la tradition arabo-latine et la renaissance des commentateurs grecs', *Early Science and Medicine*, 12 (2007): 134–65, § 5.

<sup>20</sup> This almost heretical identification of the World-Soul with God is remarkable. Justus Lipsius (1547–1606) regarded the World-Soul as the 'mind' (*mens*) of God, although he also called 'God' the World-Soul. See Hiro Hirai, 'L'âme du monde chez Juste Lipse entre théologie cosmique romaine et *prisca theologia* renaissante', *Revue des sciences philosophiques et théologiques*, 93 (2009): 251–73.

<sup>21</sup> *De spontaneo*, I.97, p. 100.

theory is the fact that these beings do not have any other agent through whom they might obtain their souls. Among the moderns who support this doctrine, he mentions Cristoforo Marcello as 'the most brilliant of Paduan scholars'.<sup>22</sup> Then he presents what seems to him the most pertinent among the arguments the latter set forth in his treatise *De anima* (Venice, 1508). According to Marcello, since the form of sublunary beings, subject to generation and corruption, passes from non-existence to existence, it should exist before the birth of a composite (form-matter). Thus, there should be a cause by which the form or soul of living beings is procreated. But, since agent and product cannot be identical, another agent is needed. By this agent, the form is entirely produced either from nothing formal preexisting in the matter, or from something formal. The second option is impossible, otherwise one would fall into the error of Anaxagoras to whom 'all is in all', or would mistakenly attribute the role of agent to matter, which is nothing but a passive principle.<sup>23</sup> It is thus necessary that the entire form is produced by this agent. Moreover, the form should be produced as an entity totally distinct from the matter. It should also be admitted that nothing produces an entity superior to itself by acting beyond its own capacity and that a material being is inferior to an immaterial entity. But Marcello finds no immaterial agent having an essence similar to the souls of beings which are born spontaneously, except the Ideas of these souls. That is why, Marcello concludes, the Platonists think that the souls of living beings which are spontaneously born, are produced by the Ideas as the particular and immediate agents of their generation.<sup>24</sup>

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<sup>22</sup> *De spontaneo*, I.99, p. 101. On Marcello, see the learned introduction of Stéphane Toussaint to the reprint of Cristoforo Marcello, *Universalis de anima traditionis opus* (Venice, 1508; repr. Paris: Phœnix, 2003), pp. i-vii. Cf. also Nicéron, *Mémoires*, vol. 35, pp. 1-7.

<sup>23</sup> On the famous phrase 'all is in all', see for example Thomas Leinkauf, *Mundus combinatus: Studien zur Struktur der barocken Universalwissenschaft am Beispiel Athanasius Kirchers SJ (1602-1680)* (Berlin: Akademie Verlag, 1993), pp. 83-91. In the medical tradition, see Hippocrates, *Places in Man*, 1 in Hippocrates, *Oeuvres Complètes*, edited by Émile Littré (Paris: 1839-61), vol. 6, p. 279; Galen, *De usu partium*, VI.16 in *Galenii opera omnia*, edited by Carl G. Kühn (Leipzig, 1821-33), vol. 3, p. 491. For the phrase 'all things are/were together', see Aristotle, *Physics*, III.4, 203a 22-33; *Metaphysics*, IV.4, 1007b 26; IV.5, 1009a 27; X.6, 1056b 28; XII.2, 1069b 23; XII.6, 1071b 27. But the most important is without doubt the discussion of Averroes, *LCM*, XII.11 and XII.30 = Bouyges, 1450-51, 1571-72 = Martin, 87-88, 199.

<sup>24</sup> *De spontaneo*, I.99, p. 101. Cf. Marcello, *Universalis de anima*, II.146-47, 118 verso-121 verso.

Faced with this argument, Liceti complains that although Aristotle has condemned the use of Ideas in natural philosophy, the Platonists continue to apply them to the explanation of spontaneous generation. For him, since spontaneous generation is a physical action whose principle lies only in nature, it must be realized in a physical way, that is, by direct contact through movement or by a natural quality. But the Idea does not act physically because it resides in the intellect, separated from matter and from any corporeity. Separated from matter, it cannot be the physical cause of natural generation. Thus the souls of living beings which are spontaneously born cannot be procreated by the Ideas. Liceti adds that since the forms of natural beings (with the exception of the human intellect) cannot exist without matter, they are material and perishable. They differ from the Ideas that are totally immaterial. If the Platonists admit that similar things are generated by their similars, the souls of living beings generated spontaneously must be produced by material and perishable forms of the same kind.<sup>25</sup>

Next, Liceti wonders whether Idea is accident or substance. If it is accident, it cannot procreate the soul that is substance because the accident, inferior to the substance, cannot produce anything superior to itself. If it is substance, Liceti proposes three options: matter, form, or a composite of them. If Idea is matter, it cannot be the efficient cause of the souls of living beings because matter is merely a passive principle. If Idea is a composite, it cannot procreate the souls that are simple substances because the simple is superior to the composite, even for the Platonists. Finally, if Idea is form, it can either be within a subject or without. If it is not in a subject, it is intelligence.<sup>26</sup> But Liceti finds that Marcello himself criticized Avicenna, by saying that separated intelligences cannot be the immediate agents of the generation of living beings. He adds that Idea, which is neither nature nor physical form, cannot be taken into consideration in natural philosophy, which merely concerns enmattered forms, leaving the separated forms to mathematicians and metaphysicians. Then, even if the Idea is the form residing in an incorporeal subject, since the Platonists place it in the separated intellect or the Divine mind, it must be at the same

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<sup>25</sup> *De spontaneo*, I.100, p. 102.

<sup>26</sup> On 'intelligence' (*intelligentia*) in the Scholastic tradition, see, for example, Jean Jolivet, 'Intellect et intelligence: note sur la tradition arabo-latine des 12<sup>e</sup> et 13<sup>e</sup> siècles', in *Philosophie médiévale arabe et latine*, edited by Jean Jolivet (Paris: Vrin, 1995), pp. 169–89.

time simple for all beings born in the sublunary world and multiple for the diversity of their species. If it is simple, all become similar contrary to the variety of the species. But the Platonists do not posit a uniform Idea for all. If it is multiple, Ideas differ from each other. It is thus necessary to deny the simplicity of the Divine mind or to think that Ideas are accidents because substantial forms cannot simultaneously occupy the same place. But Liceti recalls that the Divine mind is not established under any accident and that accidents cannot produce souls. That is why the Platonists are forced to admit that Ideas differ from each other by their functions while they are identified by their essence with the intellect where they reside.<sup>27</sup>

After having thus refuted Marcello's view, Liceti affirms that living beings that are born spontaneously are procreated by a congeneric material agent residing in matter. Even if form passes from non-existence to existence as Marcello says, Liceti does not accept that it can be procreated. For it is neither all form nor all matter but only the composite of them that is produced, according to Aristotle. Even if the form is established before the composite, Liceti again denies that the form of living beings is established from nothing. For him, the form, lying hidden in well-disposed matter before the generation of these beings, can become 'life-giving form' (*forma vivifica*) and be established as their soul. Thus, in Liceti, nothing is born totally spontaneously and 'spontaneous generation' does not really signify abiogenesis. So, even if the form is established by an agent as Marcello thinks, its totality is not produced by this agent as if nothing formal preexisted in matter. Remarkably enough, Liceti affirms that the rudiment of a future form resides there in a state of privation.<sup>28</sup> This rudiment is the 'generic nature' (*natura generica*) that any form shares with its preceding form. Indeed Liceti places in matter the form in potentiality, through this formal rudiment. But this does not mean assigning

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<sup>27</sup> *De spontaneo*, I.100, p. 102. Cf. Agrippa, *De occulta philosophia* (Cologne, 1533), I.11 = *Cornelius Agrippa: De occulta philosophia libri tres*, edited by Vittoria Perrone Compagni (Leiden: Brill, 1992), p. 107: 'Ponunt [Platonici] secundo in ipso intelligibili, hoc est in anima mundi, per formas proprie atque insuper absolutis formis invicem differentes, ita ut ideae in Deo quidem omnes una forma sint, in anima mundi vero multae [...].'

<sup>28</sup> As we shall see below, this interpretation, which introduces a kind of corpuscularism into the Aristotelian notion of 'privation', is worth studying further. On Liceti's real theory of spontaneous generation, see Hirai, 'Interprétation chymique'; idem, 'Atomes vivants'; Carlo Castellani, 'Le problème de la *generatio spontanea* dans l'œuvre de Fortunio Liceti', *Revue de synthèse*, 89 (1968): 323–40.

the role of the agent to matter by attributing to it a 'formal' factor, for this rudiment is only the generic nature that receives the specific difference of a future form. According to Liceti, this form is not totally separated from matter because it resides in matter and depends on it. That is why a future form cannot be produced by an Idea totally separated from matter.<sup>29</sup> For material and perishable forms cannot be physically produced by Ideas that are not similar to them, but only by material forms of the same kind. Liceti thus concludes that Idea is not the immediate cause of spontaneous generation.<sup>30</sup>

### *Ficino and the Earth's Soul*

After having examined these two types of Platonic solution, Liceti turns to those who hold celestial influence to be the efficient cause of spontaneous generation. Then he takes up Ficino's theory of the 'earth's soul' (*anima terrae*), as developed fully in the fourth book of the *Platonic Theology on the Immortality of Souls* (Florence, 1482).<sup>31</sup> Liceti introduces Ficino's doctrine of the World-Soul and its cosmological application as follows:

But Ficino, the great renovator of Platonic philosophy among the Italians in the time of our grandfathers, refined this idea much more clearly, judging that all living beings which are born spontaneously receive their souls directly from nowhere but the soul of earth and water, and expressly of that element in which spontaneous generation happens abundantly. In this he disagrees with the majority of other Platonists since he establishes that these souls of the elements, the agents of the spontaneous generation of these living beings, differ from each other as well as from the World-Soul, whatever junior [Platonists] might contrive from the agreement of all Platonists on this proposition. But let us now listen to Ficino who agrees with Seneca [...].<sup>32</sup>

<sup>29</sup> *De spontaneo*, I.101, pp. 103–4.

<sup>30</sup> *De spontaneo*, I.101, p. 104.

<sup>31</sup> In this essay I have used the translations of Michael J. B. Allen and James Hankins, *Marsilio Ficino. Platonic Theology*, 6 vols. (Cambridge, MA: Harvard University Press, 2001–6), hereafter referred to as '*Platonic Theology*', and of Raymond Marcel, *Marsile Ficin: Théologie platonicienne*, 3 vols. (Paris: Les Belles Lettres, 1964–70), hereafter referred to as 'Marcel'.

<sup>32</sup> *De spontaneo*, I.133, pp. 131–32: 'Sed hanc opinionem multo evidentius excoluit magnus ille Ficinus Platonicae philosophicae apud Italos auorum nostrorum aetate restaurator, qui viventia cuncta sponte nascentia non aliunde animam immediate sortiri decrevit, quam ab anima terrae, et aquae, ac omnino ejus elementi, in quo spontaneam

After this, Liceti quotes a long passage from Ficino and examines its contents point by point in the following eleven chapters.<sup>33</sup> The Ficinian theory can be summarized as follows: the souls of living beings that are born spontaneously are given to matter by the soul of the earth or by that of the water through Ideas implanted in these souls, which are rational but different from the World-Soul. Before formulating his detailed criticism, Liceti takes up the more general problems posed by Ficinian theory. First, although for Ficino each element has its own soul only when it remains undivided, he thinks that the parts of elements, which are in mixed bodies, can be animated. Liceti indeed finds many living beings spontaneously born in the depths of mixed bodies, in the human belly, in the body of plants or cheese. But the matter from which these living beings are born is not touched by the watery or earthly sphere. Thus, for Liceti, the immediate agent of their generation is not the soul of those elements. He also remarks that the general and remote cause generates nothing without an immediate and particular cause, even for Ficino, because the remote cause is undetermined for particular effects. Moreover, Ficino considers that the earth has only one soul despite the great diversity of living beings born from it. Thus, for Liceti, even if the earth's soul really exists as the Florentine teaches, it cannot be considered as the immediate particular cause of the generation of these beings.<sup>34</sup>

Next, Liceti remarks that, in Ficino, the soul of the earth differs in species from that of water or air. For him, if immediate agents are of different species, they cannot produce the same effects. Similarly, when many species of living beings are born from one element, the soul of this element cannot be considered as their immediate agent. In Liceti's eyes, the very idea that the elements have their own souls is absolutely false. If the elements are animated, since any mixed body is superior to them, it is necessary that all mixed bodies are at least

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viventium generationem celebrari contingit; in hoc a plerisque aliis Platonice dissentiens, quod hujusmodi elementorum animas spontaneae viventium generationis effectrices tum inter se, tum quoque a mundi anima diffidere constituit; quicquid juniores de consensu omnium Platoniorum in proposito comminiscantur. Sed jam Ficinum Senecae consentientem audiamus [...].'

<sup>33</sup> Ficino, *Platonic Theology*, IV.1, vol. 1, pp. 248–58, 260, 262–66, 294–96 (= Marcel, vol. 1, pp. 144–49, 149–50, 152, 164–65). For an analysis of this passage, see Hiro Hirai, 'Concepts of Seeds and Nature in the Work of Marsilio Ficino', in *Marsilio Ficino: His Theology, His Philosophy, His Legacy*, edited by Michael J. B. Allen and Valery Rees (Leiden: Brill, 2002), pp. 257–84, esp. pp. 267–69.

<sup>34</sup> *De spontaneo*, I.134, pp. 134–35.

superior to the lowest element, the earth. In this case, no inanimate being would exist in nature. Liceti finds this conclusion absurd since Ficino himself admitted that plants torn out of the earth cannot continue to live or have their souls.<sup>35</sup>

Even in Ficino, remarks Liceti, the soul is threefold (vegetative, sensitive and rational). For him as for other Aristotelians, in an organic body, the vegetative soul is the principle of nutrition, growth and generation, the sensitive soul that of sense and movement, and the rational soul that of reasoning.<sup>36</sup> If the earth's soul is vegetative, how can it procreate souls superior to itself in spontaneous generation? If it is vegetative, according to Liceti, innate heat and radical moisture are indispensable even for the earth because they unite the soul to its body.<sup>37</sup> But there is no such heat and moisture in the substance of the earth because heat and moisture are contrary to its cold and dry nature. Next, if the earth's soul is sensitive, it must also display the three functions of the vegetative soul. As the earth does not have them, the soul resides in it in vain, contrary to Aristotle's statement that 'nature does nothing in vain'.<sup>38</sup> Then, in the case of the rational soul, Liceti supposes three possibilities: that it is inferior, equal or superior to the human soul. For him, if the earth's soul is inferior to the human soul, it must at least be sensitive or vegetative. But, as we have already said, the earth has no function proper to the sensitive or vegetative soul. Moreover, since the elements are not organic but simple bodies, a rational soul inferior to the human soul cannot reside in them as the first actuality of an organic body in the manner of Aristotle's definition. Then, if the earth's rational soul is equal to the human soul, the earth is equal to man. But the earth can neither walk nor laugh like

<sup>35</sup> *De spontaneo*, I.134, p. 135.

<sup>36</sup> For this doctrine, see, for example, Dennis Des Chene, *Life's Form: Late Aristotelian Conceptions of the Soul* (Ithaca, NY: Cornell University Press, 2000).

<sup>37</sup> On innate heat and radical moisture, see Everett Mendelsohn, *Heat and Life: The Development of the Theory of Animal Heat* (Cambridge, MA: Harvard University Press, 1964); Thomas S. Hall, 'Life, Death and the Radical Moisture: A Study of Thematic Pattern in Medieval Medical Theory', *Clio Medica*, 6 (1971): 3–23; Peter H. Niebyl, 'Old Age, Fever, and the Lamp Metaphor', *Journal of the History of Medicine*, 26 (1971): 351–68; Michael McVaugh, 'The *humidum radicale* in Thirteenth-Century Medicine', *Traditio*, 30 (1974): 259–83.

<sup>38</sup> For the phrase 'nature does nothing in vain', see James G. Lennox, *Aristotle's Philosophy of Biology: Studies in the Origins of Life Science*, Cambridge Studies in Philosophy and Biology (Cambridge: Cambridge University Press, 2001), pp. 205–23; idem, 'Material and Formal Natures in Aristotle's *De Partibus Animalium*', in *Aristotle's Philosophy*, pp. 182–204.

him. Finally, if the earth's rational soul is superior to the human soul, the earth is superior to man. This is simply inadmissible.<sup>39</sup>

After this general criticism, Liceti examines the details of Ficino's arguments in the form of a running commentary. I shall analyze here the most important points of his criticism. The Florentine metaphysician begins his discussion with an explanation of the universal animation of the world and especially of the earth. He says:

Generation is the principle of nourishment and growth. For nowhere can anything be nourished or grow without the generation of particular parts. But where nutrition follows generation and growth there we know for certain that life and soul are present. But we see the earth generating large numbers of trees and living creatures from their own seeds, and nourishing them and making them grow. Stones grow too like its teeth, and plants like hairs as long as they are attached by the roots; but as soon as they are pulled up or torn out of the earth, they stop growing. Who would say that the womb of this mother lacks life, when of her own accord she brings forth and nourishes so many offspring, when she sustains herself, and when her back produces teeth and hairs?<sup>40</sup>

Liceti denies that 'the earth generates living beings by her own seeds, nourishes them and makes them grow as if stones were her teeth and plants her hairs.'<sup>41</sup> For him, the seeds that propagate these living beings do not come from the earth but from plants and animals of similar kind. Thus the generation of these beings should not be attributed to the earth containing the seeds but to the seeds themselves. These seeds are not produced in the earth by nature, but are produced by living beings that dwell within it. Otherwise, the earth's uniform nature would give to each being its own proper seed, which is impossible. If the earth were full of seeds proper to her own nature, they would be of only one kind and procreate the uniform nature of the earth. But the

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<sup>39</sup> *De spontaneo*, I.134, p. 135.

<sup>40</sup> Ficino, *Platonic Theology*, IV.1, vol. 1, 249, with slight alteration (= Marcel, vol. 1, p. 144). Cf. Plotinus, *Enneads*, IV.4.27; Proclus, *Commentary on Plato's Timaeus*, IV.4 (Diehl, III, 135); Ficino, *De vita*, III.11 = *Marsilio Ficino: Three Books on Life*, edited and translated by Carol V. Kaske and John R. Clark (Binghamton, NY: Medieval and Renaissance Texts and Studies, 1989), p. 289; Sylvain Matton, 'Marsile Ficin et l'alchimie, sa position, son influence', in *Alchimie et philosophie à la Renaissance*, edited by Jean-Claude Margolin and Sylvain Matton (Paris: Vrin, 1993), pp. 123–92, esp. 140–1; Dilwyn Knox, 'Ficino, Copernicus and Bruno on the Motion of the Earth', *Bruniana & Campanelliana*, 5 (1999): 333–66, esp. pp. 362–63.

<sup>41</sup> *De spontaneo*, I.135, p. 137.

beings that are born spontaneously are multiple. Thus Liceti concludes that they are not generated from seeds produced by the earth's soul.<sup>42</sup>

Liceti also denies that 'the earth nourishes and makes plants and animals grow as her offspring'. For each animal is nourished and grows thanks to its own soul, and by taking food from the earth. Moreover, stones, which increase by the juxtaposition of new material, do not grow in the manner of living beings.<sup>43</sup> Liceti laughs at Ficino, suggesting that he would do better to say, like Ovid, that stones are the bones of the earth, rather than her teeth. He judges as false the theory of Ficino who, in his view, spoke only in a poetical and metaphorical way. If 'plants pulled up out of the earth do not grow any more', this is because they lack food coming from the earth. Liceti concludes that the plants live by their own soul and not by that of the earth.<sup>44</sup>

Since Ficino thinks that celestial influence plays only an accidental role in the universal animation of the world, he calls for the intervention of a substantial and living agent. He says:

Platonists, however, will deny that celestial influences, as particular accidents far removed from their own living substances, can generate a living substance here on earth. For accident cannot generate substance, unless it is subject to the substance as an instrument; and I mean to the substance closest to it. For apart from the craftsman an instrument is not moved to craft the form of an artifact. Thus an influence descending from celestial life will not generate a vital form if it is far removed from that life itself [...]. A convincing argument that this generative life, however, must be present in the elements is that a substance is needed as agent to generate substance, and the perfect presence of the agent itself is needed for [such] a perfect action. But when one corporeal substance approaches another in order to act on it in some way, what is substantial in the agent remains outside [the patient]; what penetrates within is entirely accidental. But penetrating substance [not accident] is needed in order for substance to be made, and perfectly made from it. Such substance is incorporeal and living.<sup>45</sup>

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<sup>42</sup> Ibid.

<sup>43</sup> For Renaissance mineralogical debates on *juxtapositio* and *intussusceptio*, see Hiro Hirai, 'Les *Paradoxes* d'Etienne de Clave et le concept de semence dans sa minéralogie', *Corpus: revue de philosophie*, 39 (2001): 45–71; idem, *Le concept de semence*, pp. 148, 154, 340, 403, 475. See also Hiro Hirai and Hideyuki Yoshimoto, 'Anatomizing the Sceptical Chymist: Robert Boyle and the Secret of his Early Sources on the Growth of Metals', *Early Science and Medicine*, 10 (2005): 453–77.

<sup>44</sup> *De spontaneo*, I.135, p. 138. Cf. Ovid, *Metamorphoses*, I.393–4.

<sup>45</sup> *Platonic Theology*, IV.1, vol. 1, p. 251 (= Marcel, vol. 1, p. 145).

Although Liceti, like Ficino, does not admit the mutual penetration of bodies, he thinks that the parts of the agent's substance, converted into very rarefied vapor, can penetrate the body of the patient through insensible passages. Thus he denies that 'the agent always remains outside the patient'. For him, the idea that 'what penetrates within is entirely accidental' is also false because the accidents, inseparable from the body, cannot transmigrate from one body to another. Liceti then denies that a 'penetrating substance is needed in order to make substance'. Although a substantial, perfect and immediate agent is required to produce perfect substance, this agent need not be penetrating. For if only its action penetrates the matter and procreates the substantial form in it, that is enough. Liceti concludes that the agent's essential form, without penetrating the matter, can procreate another form similar to it in the matter. Finally, he rejects the idea that 'penetrating substance is incorporeal and living' because the generative substance that penetrates the matter is often corporeal and inanimate, such as a coagulant, which penetrates milk and produces cheese.<sup>46</sup>

Ficino also demands the intervention of particular causes in the generation of living beings from putrefied matter as follows:

Natural causes, moreover, because they act by way of their own nature, are borne towards a definite effect only because of the definite rational principle of their own nature, otherwise they would no more tend towards one effect than another. Consequently, to the extent they are fitted to doing a work, they do it; and vice versa. Therefore plants and living things which appear to come to birth in the earth only as a result of putrefaction must arise from their own causes no less than things born from propagation.<sup>47</sup>

Liceti first refuses to accept that 'natural causes are borne towards a definite effect only because of the definite rational principle of their own nature.' For 'heaven', found in all sublunary things, can be deemed to generate this or that being from putrefied matter, not by a rational principle but by the dispositions of matter and by the immediate agent that regulates the power of the stars.<sup>48</sup> Admitting that 'living beings which appear to come to birth in the earth' need their own particular causes, Liceti denies that these beings are born from the earth's soul. For, even if this soul exists in nature, it will be general and remote

<sup>46</sup> *De spontaneo*, I.136, pp. 138–39.

<sup>47</sup> *Platonic Theology*, IV.1, vol. 1, pp. 251–53 (= Marcel, vol. 1, p. 145).

<sup>48</sup> *De spontaneo*, I.137, p. 139.

for all. Thus particular causes are required. This is really what Ficino meant too by emphasizing the necessity of an intermediate and earthly yet general agent, which is the earth's soul. He says:

Undoubtedly the proper causes of terrestrial lives are in terrestrial life. For even were you to attribute the causes to celestial souls, the general celestial impulses will nevertheless have to be confined within particular earthly souls by way of the universal soul of the earth, in order for you to proceed from what is celestial and general to its opposite, what is earthly and particular, by way of an appropriate intermediary, what is earthly and yet general.<sup>49</sup>

But although Liceti admits that 'the particular efficient causes of living beings cannot be placed in the celestial souls', he denies that they reside in the earth's soul. For the immediate corporeal agents of these living beings can lie hidden in the inanimate body of the earth. Liceti, in other words, rejects the intervention of an 'earthly and general intermediary', which is placed between the celestial general agent and the earthly particular agent. For him, like Aristotle who, in *Physics*, II.2, admits only the intervention of man and the sun for the generation of man, heaven and the earthly particular agent procreate these living beings without any intermediary.<sup>50</sup>

In order to locate these particular causes in the earth's soul and to connect them with the theory of Ideas, Ficino introduces an analogy between art and nature:

The proper causes, therefore, will be in the soul of the earth, which will produce a vine by means of the natural idea or rational principle of the vine, and produce flies through the rational principle of flies. It will make them such, I should add, in matter that has first been made specifically ready by the soul itself, when in order to prepare the matter it contracted the terrestrial impulses in specific ways. Hence, if human art is nothing but an imitation of nature, and this art fashions its products by means of their definite rational principles, nature must work in the same way, but with an art which is much more enduring and full of wisdom in that it works with greater effectiveness and makes more beautiful things. But if art, which produces works that are not alive and introduces forms that are neither primary nor whole, has living rational principles, there is all the more reason to suppose that rational principles

<sup>49</sup> *Platonic Theology*, IV.1, vol. 1, p. 253 (= Marcel, vol. 1, pp. 145–46).

<sup>50</sup> *De spontaneo*, I.137, p. 139. Cf. Aristotle, *Physics*, II.2, 194b 14: 'Man is begotten by man and by the sun as well'.

are present in nature, which does generate living things and produce forms that are primary and whole.<sup>51</sup>

In response to this, Liceti first rejects the idea that human art is a kind of imitation of nature because, although some arts imitate nature, others perfect her imperfect products. Thus, he denies that nature works in the same way as art, which fashions its products by means of definite rational principles. For Liceti, art is similar to nature in that they both act for the sake of a definite end and use instruments to attain this end. But art is unlike nature since art works only through Ideas implanted in it. An artisan, endowed with cognitive faculty, has Ideas and arranges instruments in order to realize those Ideas. By contrast, brute and ignorant nature does not possess any Ideas of products but has a similitude with the products. Just as a man, without any Idea of future man, reproduces another man only by similitude of nature, it is this similitude between agent and product that replaces the Ideas for art.<sup>52</sup> Thus, it is not exact, Liceti concludes, to believe that nature executes her works according to Ideas implanted in her and that the earth's soul procreates a vine by means of the Idea of the vine.

Next, Liceti does not accept that 'nature, which produces primary and whole forms in order to generate living beings, has living rational principles for her works'. For him, nature produces these forms through her internal essence and not through extrinsic Ideas proper to art. Moreover, for Liceti, it is not wrong to say that 'Ideas in the mind of an artisan are living' since the artisan is living and so is his mind. But Ideas in his mind are not really living. Even if it is possible to believe that animals are produced by living nature, one should not consider that beings born spontaneously in the earth are made by the earth's soul because, for Liceti, in the earth lie hidden, as in a receptacle, some entities possessing soul, which stimulate their generation.<sup>53</sup>

<sup>51</sup> *Platonic Theology*, IV.1, vol. 1, p. 253 (= Marcel, vol. 1, p. 146).

<sup>52</sup> *De spontaneo*, I.138, p. 140. Cf. Hirai, 'Semence, vertu formatrice et intellect agent', §4. On the Aristotelian analogy of art and nature, Simplicius's discussion is insightful. See his *Commentary on Aristotle's Physics*, II.3 (on Aristotle, *Physics*, II.3, 194b, 26) = Hermann Diels, *Simplicii in Aristotelis physicorum libros quatuor priores commentaria* (Berlin, 1882), pp. 310–14 = Barrie Fleet, *Simplicius: On Aristotle's Physics 2* (Ithaca, NY: Cornell University Press, 1997), pp. 67–71. On Simplicius in the Renaissance, see Bruno Nardi, *Saggi sull' aristotelismo padovano dal secolo XIV al XVI* (Florence: Sansoni, 1958), pp. 365–442; Charles Lohr, 'Renaissance Latin Translations of the Greek Commentaries on Aristotle', in *Humanism and Early Modern Philosophy*, edited by Jill Kraye and M. W. F. Stone (London: Routledge, 2000), pp. 24–40.

<sup>53</sup> *De spontaneo*, I.138, p. 140.

It is precisely in this context that Ficino speaks of the generation of plants and living beings without corporeal seeds. For him, definite and particular seeds are nevertheless required for the birth of definite beings. This is why he introduces the concept of spiritual seeds. He says:

Yet certain definite things have to come from certain definite seeds, and what passes from potency into act has to be brought into this act by a cause that already contains such an act within itself, or one that is equivalent or more eminent. Nor should one suppose it enough if the universal and remote cause were merely more eminent, otherwise certain of the most imperfect causes here with us would be able to produce certain superlatively perfect effects, [those] in the power of the celestials. All these points signify that present everywhere through earth and water in an artful and vital nature are the spiritual and life-giving seeds of everything. These seeds can generate of themselves wherever bodily seeds are missing; they can re-warm seeds that have been left behind by animals; and from one withered grape pip, whose nature is single and lowly, they can bring forth the vine with all its variety, order, and value to man, namely, with their varied, rational and splendid powers. The same vital nature draws out from the depth of matter, where corporeal substances do not penetrate, the substantial form of the elements.<sup>54</sup>

Although Liceti thinks, like Ficino, that an actual agent is necessary for beings to pass from potentiality into actuality, he cannot accept the idea of the earth's soul. For him, the earth, totally inanimate and lower than the other elements, has an essence inferior to all living beings. Thus it has no actuality equal or superior to the soul of these beings. What Liceti finds absurd is the fact that Ficino called accidental and imperfect causes placed in the earth's rational soul 'Ideas'. Liceti admits that 'the spiritual and life-giving seeds of everything are present through earth and water' and that 'these seeds generate of themselves wherever bodily seeds are missing'. But he refuses to think that they are in 'a vital nature', which is the soul of an element. According to him, these seeds reside in the excretions and corpses of living beings from which spontaneous generation takes place.<sup>55</sup> It should be noted here that Liceti does not understand these spiritual seeds in the sense Ficino gave to the term 'spiritual'. For Liceti, as I have shown elsewhere, they

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<sup>54</sup> *Platonic Theology*, IV.1, vol. 1, p. 257 (= Marcel, vol. 1, pp. 147–48). Cf. Hirai, 'Concepts of Seeds and Nature', pp. 268–69.

<sup>55</sup> *De spontaneo*, I.139, p. 141.

are made of material corpuscles although extremely subtle, like *spiritus*, and endowed with the rudiment of a future form.<sup>56</sup>

In order to subordinate Aristotelian physics to Platonic metaphysics, Ficino affirms that the vital nature, which encloses these spiritual seeds, uses elemental qualities. And he calls this nature 'mother substance' as follows:

Moreover, it [vital nature] takes the elemental qualities, which of themselves can only burn or freeze or whatever, and adds to them the precious varieties of colors and shapes and the vigor of life [...]. And wherever accidental qualities alone appear to contribute something to generation, yet are incapable of doing so themselves without a substance in accord with the effect, it is that living nature that plays the role of the mother substance.<sup>57</sup>

Liceti denies that these accidental qualities, even if they are governed by the soul of the elements, produce colors and figures. For these qualities are given to inanimate mixed bodies by the substantial form of these bodies and to living beings by their own souls that use these qualities as their instruments. Taking fire produced by the friction of cold stones as example, Liceti affirms that the form of fire is produced not by the soul of the element through the Idea of fire but from the potential fire lying hidden in the body of stones. Otherwise, how could the earth enclose the Idea of fire when it is contrary to the nature of fire? Liceti also wonders how the earth's soul, lower than the fire's soul, can draw a form superior to itself from the matter. For Liceti, the accidental qualities of elements cannot realize generation without the help of a substantial essence. He concludes that the soul of any

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<sup>56</sup> Hirai, 'Interprétation chymique'. Cf. Giuseppe Ongaro, 'Atomismo e aristotelismo nel pensiero medico-biologico di Fortunio Liceti', in *Scienza e cultura: informazione dell'università di Padova* (Padua: Edizioni universitarie patavine, 1983), pp. 129–40. On the Aristotelian corpuscularism of the Renaissance, see especially Christoph Lüthy, 'An Aristotelian Watchdog as Avant-Garde Physicist: Julius Caesar Scaliger', *Monist*, 84 (2001): 542–61; William R. Newman, 'Experimental Corpuscular Theory in Aristotelian Alchemy: From Geber to Sennert', in *Late Medieval and Early Modern Corpuscular Matter Theories*, edited by Christoph Lüthy et al. (Leiden: Brill, 2001), pp. 291–329; idem, 'Corpuscular Alchemy and the Tradition of Aristotle's *Meteorology*, with Special Reference to Daniel Sennert', *International Studies in the Philosophy of Science*, 15 (2001): 145–53; idem, *Atoms and Alchemy: Chymistry and the Experimental Origins of the Scientific Revolution* (Chicago, IL: Chicago University Press, 2006).

<sup>57</sup> *Platonic Theology*, IV.1, vol. 1, pp. 257–59 (= Marcel, vol. 1, p. 148).

element cannot play the role of generative substance but that other generative agents lie hidden in the matter.<sup>58</sup>

After his explanation of the spiritual seeds, Ficino advances the existence of universal life in the world. He introduces first the view of the Stoics, who identify this life with God himself, and then that of the Platonists, who place it between the particular lives of terrestrial beings and the original life in God. He says:

Strato and Chrysippus will acknowledge that such a life permeates the world, but they go on to claim that it is the highest God. Platonists will deny this, because above this life which belongs to another and exists in another there has to be the life that exists of and in itself. But the life of any one of the world's spheres is no less close to its sphere than man's rational soul to his body. So the life of a sphere, whether of some part of it or of the whole, is neither that primary life nor is it God. For God on high is highest unity. According to the Platonists, it is perhaps possible for some sort of plurality to issue directly from that unity, but certainly not such a great diversity and discord of mutually destructive qualities.<sup>59</sup>

Liceti agrees with the Platonists, who testify that the supreme excellence resides in the world, and with the Stoics, who believe that this excellence is given by the universal soul, identified with the supreme God. But, for him, whatever the opinion of Ficino in this regard, the fact that the world has its soul does not imply that each element obtains its own soul. For, the relationship between the elements of the world and its parts is the same as that between the humors of an animal and its members. Ficino himself, adds Liceti, said that the elements of the macrocosm have the same relationship as those of the microcosm. However, the humors are inanimate even though they are contained in a living animal. This is why it is not necessary for one element to have its own soul even if a universal soul resides in the world. If each element as part of the animate world had its own soul, the same soul would reside in all the elements and the whole universe. But the earth's soul is not identical with that of the water or that of

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<sup>58</sup> *De spontaneo*, I.140, p. 142.

<sup>59</sup> *Platonic Theology*, IV.1, vol. 1, p. 259 (= Marcel, vol. 1, pp. 148–49). Cf. Cicero, *De natura deorum*, I.14, 39. Although Strato is not a Stoic, Ficino uses this figure on the basis of Cicero's explanation which introduces, right after Strato, the idea of Zeno, the head of the ancient Stoics.

the world according to Ficino. So Liceti concludes that the elements are not animated.<sup>60</sup>

One of the most essential points of Ficino's theory is the fact that the earth's soul is rational. He highlights this rationality by the superior beauty of the earth's products over that of human works. He says:

The soul of the earth must be rational since certain of earth's animals do not lack reason, and since especially the works of the earth are more beautiful than men's works. If the soul of this lowest sphere has not been robbed of reason, the souls of the higher spheres are also not without reason. In earth and water the different parts are distinguished such that some of the earthly bodies are less pure, others are very pure. The former have irrational souls, the latter rational.<sup>61</sup>

Liceti cannot accept that the earth enjoys a rational soul. For him, a receptacle does not need to be of the same nature as that of bodies placed in it. It is evident that man, who lives on the earth, is placed at the top of the chain of being, far from the earth's nature.<sup>62</sup> Moreover, Liceti must absolutely deny that 'the works of the earth are more beautiful than men's works'. For man procreates man as a great miracle of nature while nothing is more ignoble in the universe than the earth. Liceti also refuses to think that the pure parts of an element have rational souls while its impure parts have irrational ones. For the most impure part of the earth is full of living beings while the purest part is its centre where there is no living being. Thus it would be contradictory if this centre, hostile to life, were animated by a rational soul.<sup>63</sup>

Just before the end of his discourse, Ficino inserts a demonological discussion, taking his inspiration from Orpheus, and confirms the superiority of watery daemons over men.<sup>64</sup> Liceti accepts the existence of these daemons but denies their superiority. For him, they are living beings inferior to men despite the similitude of their body. Remarking on the fact that some of them are dumb, he affirms that their soul is not superior to that of beasts. He reinforces his argument by taking testimonies on monsters from the works of such authors as Theodore of

<sup>60</sup> *De spontaneo*, I.142, p. 143.

<sup>61</sup> *Platonic Theology*, IV.1, vol. 1, p. 267 (= Marcel, vol. 1, p. 152).

<sup>62</sup> On the chain of being, see Arthur O. Lovejoy, *The Great Chain of Being* (Cambridge, MA: Harvard University Press, 1936); *Reforging the Great Chain of Being*, edited by Simo Knuuttila, Synthese historical library, 20 (Dordrecht: Reidel, 1981).

<sup>63</sup> *De spontaneo*, I.143, p. 144.

<sup>64</sup> *Platonic Theology*, IV.1, vol. 1, pp. 293–95 (= Marcel, vol., 1, pp. 164–65).

Gaza (1400–1476), George of Trebizond (1395–1472/3) and Cardano. It should be noted that Liceti was an iconic figure in the tradition of Renaissance teratology.<sup>65</sup> Moreover, for him, vaporous beings, seen in the air or the water and considered by the Platonists as corporeal daemons, are merely images, received by melancholic people, or incorporeal daemons. He thinks that these daemons are not physical beings, subjects of natural philosophy, but intelligences to be treated purely in the sphere of theology. Thus he directs us to the Jesuit Martin Del Rio (1558–1608), whose *Disquisitiones magicae* (1595) contains many testimonies and Catholic theories on daemons.<sup>66</sup> Ficino also follows Orpheus in assigning to the soul of each element a double cognitive and generative power. But Liceti considers this a purely poetical invention. Ficino concludes by repeating that there are three degrees of rational souls:

We conclude then that there are three levels of rational souls: in first place is the single World-Soul; in second, the twelve souls of the twelve spheres; and in third, the many souls which are contained in the individual spheres. All that pertains to the souls of the spheres and is here set forth from the point of view of the Platonists will be confirmed only when a council of Christian theologians, after careful examination, agrees upon them.<sup>67</sup>

Liceti remarks that Ficino was not fully satisfied with his theory. This is why, he says, the Florentine metaphysician prudently submitted it to the judgment of theologians, although he insisted again that the earth's soul is neither vegetative nor sensitive but rational.

#### *Cicero's De natura deorum as Ficino's source?*

Through the criticism formulated by Liceti, we have seen thus far the major lines of Ficino's ideas on spontaneous generation. According to Ficino, the generation of living beings that do not reproduce through

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<sup>65</sup> *De spontaneo*, I.143, p. 144. See especially François Houssay, *De la nature, des causes, des différences de monstres d'après Fortunio Liceti* (Paris: Hippocrate, 1937); Jean Céard, *La nature et les prodiges: l'insolite au XVI<sup>e</sup> siècle* (Genève: Droz, 1977), pp. 442–47, 451–56; Lorraine Daston and Katharine Park, *Wonders and the Order of Nature, 1150–1750* (New York: Zone Books, 1988), *passim*.

<sup>66</sup> On Del Rio, see P. G. Maxwell-Stuart, *Martin Del Rio: Investigations into Magic* (Manchester: Manchester University Press, 2001).

<sup>67</sup> *Platonic Theology*, IV.1, vol. 1, pp. 295–97 (= Marcel, vol. 1, p. 165).

corporeal seeds is realized through incorporeal and spiritual seeds conceived by the rational soul of the earth or of water. This soul is an inferior species of the World-Soul, and we have seen how Ficino develops this theme in the fourth book of his *Platonic Theology*. We have also observed what points were inadmissible for Liceti, a typical Aristotelian of the end of the Renaissance. He refutes this Ficinian theme at length, because it seems to be gaining ground, particularly as it was not foreign to Aristotle's theory of the *Generation of Animals*, III.11, 762a, 18–21.<sup>68</sup> Considering that the idea of the earth's soul enjoyed a remarkable fortune in the cosmology of contemporaries of Liceti like Giordano Bruno (ca. 1548–1600), William Gilbert (1540–1603) and Johannes Kepler (1571–1630), it is striking that its true history still awaits serious study. Such a study would help us to understand the real impact of Ficino's thought on natural philosophy at the threshold of the Scientific Revolution.<sup>69</sup>

For his idea of the earth's soul, Ficino was without doubt inspired mainly by the discussions of Plotinus in the *Enneads*, IV.4, 22; 26–7 and VI.7, 11, and possibly by those of Proclus in his *Commentary on Plato's Timaeus*.<sup>70</sup> However, are there other possible sources of

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<sup>68</sup> On the passage and the World-Soul in Cardano, see Hirai, *Le concept de semence*, p. 143. For a debate on the passage, see David M. Balme, 'Development of Biology in Aristotle and Theophrastus: Theory of Spontaneous Generation', *Phronesis*, 7 (1962): 91–104, esp. pp. 98–100; James G. Lennox, 'Teleology, Chance, and Aristotle's Theory of Spontaneous Generation', *Journal of the History of Philosophy*, 20 (1982): 219–38; Allen Gotthelf, 'Teleology and Spontaneous Generation in Aristotle: A Discussion', *Apeiron*, 22 (1989): 181–93.

<sup>69</sup> On the earth's soul in Bruno, see among others Paul-Henri Michel, *La cosmologie de Giordano Bruno* (Paris: Hermann, 1962), pp. 275–96. On Gilbert, see John Henry, 'Animism and Empiricism: Copernican Physics and the Origins of William Gilbert's Experimental Method', *Journal of the History of Ideas*, 62 (2001): 99–119, esp. 116–17. In Kepler, see Frances A. Yates, *Giordano Bruno and the Hermetic Tradition* (London: Routledge, 1964), pp. 440–44; Gérard Simon, *Kepler, astronome astrologue* (Paris: Gallimard, 1979), pp. 186–91; J. V. Field, *Kepler's Geometrical Cosmology* (Chicago, IL: Chicago University Press, 1988), pp. 130–31; Fernand Hallyn, 'A Poem on the Copernican System: Cornelius Gemma and his Cosmocritical Art', in *Cornelius Gemma: Cosmology, Medicine and Natural Philosophy in Renaissance Louvain*, edited by Hiro Hirai (Rome: Serra, 2008).

<sup>70</sup> On Plotinus's ideas, see Arthur H. Armstrong, *The Architecture of the Intelligible Universe in the Philosophy of Plotinus* (Amsterdam: Hakkert, 1967), p. 77; Pierre Hadot, *Plotin: Traité 38* (Paris: Cerf, 1987), pp. 242–46. See also Proclus, *Commentary on Plato's Timaeus*, IV.4 (Diehl, III, 133–44 = Festugière, IV, 170–84). Proclus's manuscript Ficino used does not seem to contain this part. Cf. Michael J. B. Allen, 'Marsilio Ficino's Interpretation of Plato's Timaeus and its Myth of the Demiurge', in *Supplementum Festivum: Studies in Honor of Paul Oskar Kristeller*, edited by James

inspiration for the main thread of the fourth book of the *Platonic Theology*? If Liceti does not speak of Plotinus or Proclus, it is because he finds a similar idea in Seneca's *Natural Questions*, VI.16. Here, on the theme of earthquakes, the Roman moralist develops a theory implying that the earth possesses a soul or *spiritus vitalis*, which is life-giving and nourishes all. This *spiritus* is sent from the earth to plants on her surface to give them life.<sup>71</sup> Liceti formulates his criticism of this theory exactly as he does for that of Ficino, by considering the earth not as an agent but as a receptacle containing this *spiritus vitalis*. He rejects Seneca's idea that the earth nourishes terrestrial living beings like a mother, feeding children at her breast.<sup>72</sup>

Liceti also finds a similar idea in Cicero. For, in his treatise *De natura deorum*, II.33, the Roman orator explains that the earth, animated by nature and pregnant with seeds, gives birth to plants from her bosom, nourishes them and makes them grow. The earth also nourishes the air, the ether and everything above by her own breath.<sup>73</sup> Liceti allows this as a metaphor but denies that the earth really becomes pregnant to generate living beings.<sup>74</sup> For him, the seeds of things that Cicero places in the earth are very different from the nature of the earth. They should be considered as materials proper to the procreation of plants and the earth as merely their receptacle. These remarks are interesting because, if we turn to the second book of Cicero's *De natura deorum*, we can observe ideas significantly close to those we have traced and also a similar cosmological dimension. It is true that Cicero speaks in the manner of the Stoics about universal nature, the *spiritus* diffused in the world and its divine heat which animates the universe. But he ranks Plato above the Stoics and attempts to reconcile them with the Academy. And if this life-giving heat, though material, is replaced by the incorporeal soul, the differences are not insurmountable.<sup>75</sup> Cicero also explains the double power of each element with mythological

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Hankins et al. (Binghamton: Center for Medieval and Early Renaissance Studies, 1987), pp. 399–439, esp. p. 422.

<sup>71</sup> Seneca, *Natural Questions*, VI.16, 1–3.

<sup>72</sup> *De spontaneo*, I.135, pp. 136–37.

<sup>73</sup> Cicero, *De natura deorum*, II.33, 83. On Cicero's Platonic tendency, see Gersh, *Middle Platonism*, vol. 1, pp. 53–154.

<sup>74</sup> *De spontaneo*, I.135, p. 137.

<sup>75</sup> For example, Fernel did not find it difficult to reconcile the ideas of Ficino with those of Cicero on the *spiritus mundi*. Cf. Hiro Hirai, 'Alter Galenus: Jean Fernel et son interprétation platonico-chrétienne de Galien', *Early Science and Medicine*, 10 (2005): 1–35, esp. pp. 23–24.

names, as does Ficino, as well as speaking of the 'Great cosmic year'.<sup>76</sup> He speaks too of the organization of the world by the skillful art of universal nature through invisible seeds, and echoes of these themes reappear in Ficino. Further points of contact between *Platonic Theology*, IV and *De natura deorum* can also be traced. Although Raymond Marcel has already detected some Ciceronian borrowings in the *Platonic Theology*, specialists have so far scarcely examined the impact of this treatise on the thought of the Florentine metaphysician.<sup>77</sup> This point is worth emphasizing to close the present study.

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<sup>76</sup> Cicero, *De natura deorum*, II.20, 51–52; Ficino, *Platonic Theology*, IV.2, vol. 1, pp. 303–5 (= Marcel, vol. 1, p. 169). On the 'Great cosmic year', see Godefroid de Callatay, *Annus Platonicus: A Study of World Cycles in Greek, Latin and Arabic Sources* (Louvain-la-Neuve: Peeters, 1996).

<sup>77</sup> See, however, the recent study of Valery Rees, 'Ciceronian Echoes in Marsilio Ficino', in *Cicero Refused to Die*, edited by Nancy van Deusen (Leiden: Brill, forthcoming).