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Chapter 2

What Is Life?

A Comparative Study of Ralph Cudworth and Nehemiah Grew

Raphaële Andrault

[p. 29]

1. Introduction

At the end of the 17th and the beginning of the 18th centuries, vital phenomena were the focus of a violent polemic against Cartesian mechanism. Philosophers and naturalists who were engaged in this polemic proposed different conceptions of what specifies a living being. Whereas “life” was reduced to the effects of matter and motion by mechanist philosophers, it was assimilated to a special entity or power by their detractors, who wanted to defend the specificity of living phenomena vis-à-vis inanimate things and artificial machines. Thus, the idea of life played an important role in the refutation of both Cartesian dualism and materialism, supposedly encouraged by mechanistic theories. This historical framework is well known and has been comprehensively studied. However, the meaning of the notion of life used in this context has not been duly examined. In this chapter, I look into this question by comparing the physico-theologies of Ralph Cudworth and Nehemiah Grew.

In 1703, the publication by Jean Le Clerc of several chapters of Ralph Cudworth’s *True Intellectual System of the Universe* (1678) and Nehemiah Grew’s *Cosmologia Sacra* (1701) provoked a virulent reaction among the Republic of Letters, involving notably Pierre Bayle and G. W. Leibniz. For Bayle, Cudworth’s notion of a “plastic nature” and Grew’s idea of a “vital principle” were similar and should be regarded as modern versions of the Aristotelian concept of “substantial forms.” Following Bayle’s point of departure, this chapter examines the nature of “life” and “vital phenomena” used in Cudworth and Grew against the materialistic tendency of mechanist theories. In the first place, I see how the idea of life is used as a refutation of Cartesian dualism, that is, as a refutation of [p. 30] the division between *res extensa* and *res cogitans*. Then I focus on the difference between Cudworth’s and Grew’s conceptions of “life” and “vegetative souls” of the scholastics. Last, I show how the double apologetic ambition (against dualism and against hylozoism) is an obstacle for drawing a clear line between living and nonliving beings. My aim is to challenge the usual assimilation between what the authors of that time considered as “a body endowed with Life” and what is called today a living body.

2. Against Cartesian Dualism: Life as an Unconscious Autonomy

Cudworth’s *True Intellectual System* and Grew’s *Cosmologia Sacra* present two obvious common points: the apologetic ambition, which consists in demonstrating God’s

excellency, and the polemical background, that is, the refutation of atheism understood as the natural tendency of modern philosophical systems since Descartes, such as Hobbes's and Spinoza's. But in this double common approach, the two works proceed very differently. The *True Intellectual System of the Universe*, which is best known, is a learned but selective history of philosophy. Cudworth examines different philosophical systems, such as atomism and stoicism, in order to build a new "intellectual system" true to Christianity. It is in this context that a long digression about the hylozoism takes place at the end of the third chapter of the first book. It aims to show that what is reprehensible in hylozoism is not the assumption of a plastic nature, or a life distinct from the animal, but rather the way this plastic nature is conceived; we can admit it without danger for the religion if, and only if, it is regarded as incorporeal and, as such, an agent of God in the world. Cudworth demonstrates that a plastic nature, or a "plastic life of nature," or again a "vital energy", is an adequate tool both to account for corporeal phenomena and to apprehend rightly the way God is the cause of those phenomena.¹ As for Grew, his demonstration of the "truth and excellency of the Bible" is based [p. 31] on detailed descriptions of corporeal phenomena, according to a progression from simple to complex, and from inanimate to animate. The second book is about the "vital world" and examines successively the "Life," "Sense," "Mind (Phancy)," and "Intellectual Mind."

Nehemiah Grew (1641–1712) was a doctor by profession, receiving his degree from the University of Leiden in 1671. He is principally known for his work on the anatomy of plants, which he presented before the Royal Society. He became thereafter the secretary of the Society—from 1677 on. In his *Anatomy of Plants* (1682), Grew explained the vegetation of plants in a mechanical way, by microstructures and motions, without any reference to an incorporeal principle. Twenty years later, in his *Cosmologia Sacra or a Discourse of the Universe. As it is the Creature and Kingdom of God. Chiefly written to demonstrate the Truth and Excellency of the Bible*, the arguments are completely different. In this book, Grew used his knowledge of anatomy to demonstrate the existence of "incorporeal principles,"² required to account for vital phenomena such as vegetation, sensation, and intellection. In other words, Cudworth's book is a vast philological undertaking, whereas Grew's book is first based on physiological knowledge and "goes into the detail of phenomena," according to Leibniz's statement.³ In light of these differences, how can we explain the fact that Bayle, and then Le Clerc and Leibniz, have regarded the two books as one indistinct whole? Was Bayle fair with the two authors when

¹ There are obvious analogies between Henry More's *Immortality of the Soul* (1659; 1662), where More presents the idea of a "spirit of nature" understood as a sphere of life and activity, and Cudworth's *True Intellectual System*, where the idea of a plastic nature of life is developed. But here, we are specifically interested in the reasons for the reception of Cudworth at the beginning of the 18th century, that is to say, long after the first publication of the *True Intellectual System*. This reception by Bayle and Leibniz is focused on the question of vital phenomena, though it was just one part among others in Cudworth's monumental book. See Alan Gabbey, "Henry More and the Limits of Mechanism," in S. Hutton (ed.), *Henry More (1614–1687), Tercentenary Studies* (Dordrecht, DE: Kluwer, 1990), 19–35; and François Duchesneau, "L'idée néo-platonicienne du vivant chez More et Cudworth," in *Les modèles du vivant, de Descartes à Leibniz* (Paris: Vrin, 1998), 149–181.

² For a more detailed presentation, see Raphaële Andrault, "Entre anatomie et théologie: l'organisme chez G. W. Leibniz et Nehemiah Grew," in *Natur und Subjekt. IX. Internationaler Leibniz-Kongress*, eds. Herbert Breger, Jürgen Herbst, Sven Erdner (Hannover, DE: Hartmann, 2011), I, 18–26.

³ To Burnett, 1703: "J'ai le *Wisdom of God* de Mr Ray, et la *Cosmotheorie* de Mr. Grew. Ce sont de bons livres, car ils entrent dans le détail de la nature et ne se contentent point des raisons générales, dont je ne fais pas trop de cas, quand elles ne sont point écrites d'une manière démonstrative" (*Die philosophischen Schriften von G.W. Leibniz*, ed. C. I. Gerhardt [Hildesheim, DE, and New-York: Georg Olms Verlag, 1978], III: GP III, 291).

he dealt with the “plastic nature” of Cudworth and the “principle of Life” of Grew as two names for the same thing and two different expressions of the same kind of thesis?

In the first place, it is true that there is a common gesture in both authors’ refutation of Cartesian dualism, which consists in demonstrating the existence of an intermediate nature, between the thinking soul and the corporeal matter: a principle of life devoid of consciousness, or, according to Cudworth’s innovative expression, devoid of “synesthesia,” but endowed with a real power of action—a regular, efficient, and relevant action, which implies that the principle acts partly autonomously toward an end, without being forced by the blind and fortuitous interactions of the particles of matter. To show that [p. 32] there are a lot of incorporeal principles of life, and not only human souls, is a way to show that God is everywhere in the world. This polemical upshot is particularly clear in Cudworth:

The Occasion of which Miscarriage [of Descartes] hath been already intimated, namely from the acknowledging only *Two Heads* of Being, *Extended* and *Cogitative*, and making *the Essence of Cogitation* to consist in *Express Consciousness*; from whence it follows, that there could be no *Plastick Nature*, and therefore either all things must be done by *Fortuitous Mechanism*, or else God himself be brought Immediately upon the stage, for the solving of all *Phaenomena*. Which Latter Absurdity, our Philosopher being over careful to avoid, cast himself upon the Former, the banishing of all *Final* and *Mental Causality* quite out of the World.⁴

With this purpose, the refutation of Cartesian’s dualism, Cudworth and Grew’s demonstrations use the particular phenomena in nature that “transcend the powers of mechanism,”⁵ as motion of respiration in the animals, to show that there is an intermediate principle first between divine action and natural things, and second between human mind and inert matter. According to Cudworth, plastic nature, which forms plants and animals, is said to be devoid of animal imagination and self-perception:

There is . . . another *Imperfection* to be observed in the *Plastick Nature*, that as it doth not comprehend the Reason of its own Action, so neither is it *Clearly* and *Expressly Conscious* of what it doth.⁶

As examples, Cudworth invokes respiration and the pulsations of the heart. The aim of Cudworth’s digression about plastic nature is indeed to show that there is “some Lower

⁴ *The True Intellectual System of the Universe: the first part, wherein all the reason and philosophy of atheism is confuted and its impossibility demonstrated* (London: Printed for Richard Royston, 1678), book I, ch. III: TIS, I, III, 38, 175. About Cudworth’s conception of the action of God, see Justin Smith, “The Leibnizian Organism between Cudworth’s Plastic Natures and Locke’s Thinking Matter,” in François Duchesneau and Jérémie Griad (eds.), *Leibniz selon les Nouveaux Essais sur l’entendement humain* (Montreal: Bellarmin-Vrin, 2006), 129–140.

⁵ See Cudworth, TIS, I, III, 37, §3, 148: “Now to assert . . . that all the effects of nature come to pass by *Materiel* and *Mechanical Necessity*, or the mere *Fortuitous Motion* of *Matter*, without any Guidance or Direction, is a thing no less Irrational than it is Impious and Atheistical. Not only because it is utterly Unconceivable and Impossible, that such Infinite Regularity and Artificialness, as is every where throughout the whole World, should constantly result out of the *Fortuitous Motion* of *Matter*; but also because there are many such particular *Phaenomena* in nature, as do plainly transcend the *Powers of Mechanism*, of which therefore no sufficient mechanical reasons can be devised, as the *Motion of Respiration* in Animals.”

⁶ TIS, I, III, 37, §15, 158–159.

Life from the Animal”⁷—an animal life, which is apparently by [p. 33] definition endowed with consciousness. In Grew, we find also the proofs of the unconscious nature of life:

[I]t is the same Vegetable Life, whereby these Operations are performed in Animals, as well as in Plants. And which are still going on, while we are asleep, and all our Senses locked up. And is also the reason, that while we are awake, we feel none of all those Motions, which are continually made, in the disposal of the Corporeal principles subservient herein. . . . [The motion of the Guts is a] Motion, whereof we have no perception, as depending on the Vegetable Life in an Animal. As also doth, the Peristaltick Motion of the Arteries.⁸

Thus, “life must occupy an intermediate position between mechanism and mind—an operative principle, without, nevertheless, any perceptive role,”⁹ as emphasized by G. Gigliani. And indeed, it is within the polemical context of the refutation of Cartesian dualism in the late 17th century that life and vitality have become scientific and philosophical objects in themselves. In contrast, “life” is nearly absent from medical treatises of that time. In medical books such as Nicolas Tulp’s *Observationes medicae* (1658) or Kerckring’s *Spicilegium anatomicum* (1670),¹⁰ the notion of “life” is only used when diseases call into question the continuity of the existence of a patient in case of great pain or anorexia. In other words, life, which means the continuity of an individual existence indicated by the retention of cardiac motions and respiration, usually appears only when the line between the two states “life” and “death” does not seem obvious anymore for the physician. For the anatomists, life itself is rarely conceived as an object of scientific examination or explanation, but only as a vulgar notion reducible to some more fundamental causes. Life is the *explanandum*, not the *explanans*: an effect, and not a cause or a principle. For instance, in Steno’s *Elementorum Myologiae Specimen* (1667), the signs of “life” and “death” are only exterior manifestations of inner motions like those of the motor fiber. The proper matter of the anatomist in this case is the motion of the fibers, that is to say, the cause of the motions of the heart and respiration, but not the signs of life and death, whose boundaries are determined by common sense. The adjectives [p. 34] “vital” or “active” are completely absent from this book.¹¹ Beyond Steno, at that time, life is usually defined by the anatomists, according to Descartes’s view, as the effect of the circulation of the blood,¹² of the agitation of spirituous liquors,¹³ or of the perpetual motion of particles.¹⁴

⁷ TIS, I, III, 37, §26, 172.

⁸ Nehemiah Grew, *Cosmologia Sacra or a Discourse of the Universe. As it is the Creature and Kingdom of God. Chiefly written to demonstrate the Truth and Excellency of the Bible, in five books* (London: Printed for W. Rogers, S. Smith, and B. Walford, 1701), book two, ch. 1: CS, II, I, 36.

⁹ G. Gigliani, “Automata compared. Boyle, Leibniz, and the debate on the notion of life and mind,” *British Journal for the History of Philosophy*, vol. 3 n° 2 (1995): 249–278, 274.

¹⁰ *Observationes medicae* (Amstelodami: apud Ludovicum Elzevirium, 1652), liber 1, cap. XIX, 42; and *Spicilegium Anatomicum* (Amstelodami, 1679), Obs. 80, 156: “inde exsugebat per anni totius spatium, sustentavit vitam, si languor ille, & illam paulatim, consumens macies, qua tandem extincta est, non potius mors diuturna, quam vita dicenda est.”

¹¹ Contrary to Mirko Grmek’s statement, for whom Steno’s motor fiber is an “active fiber” in *La première révolution biologique: Réflexions sur la physiologie et la médecine du XVII^e siècle* (Paris: Payot, 1990), 172. See Steno, “Elementorum Myologiae Specimen,” in *Opera philosophica*, ed. Vihelm Maar (Copenhagen: V. Tryde, 1910), II, 105: “Adde, quod de fibra motrice agatur, de parte, quae membra agit, quae aere inspirat, quae sanguinem movet, paucis, unde vitae mortisque signa dependent.”

¹² See “L’Homme,” in *Œuvres de Descartes*, eds. C. Adam, T. Tannery, B. Bochot, and P. Costabel (Paris: Vrin-CNRS, 1964–74), XI, 202: “[il ne faut concevoir] en cette machine [l’homme] aucune autre âme

3. Against Materialism: Life versus Bodies

If life is a third causal agent in the world, between human soul and inert matter, we could believe, as Bayle does, that Cudworth's "plastic nature" or Grew's "vital principle" are only some modern versions of Aristotelian "substantial forms":

Mr. Cudworth and Mr. Grew, very great philosophers . . . , did not find that it was worthy of them to strengthen and to clarify the Cartesian hypothesis, which is in the end the most capable of supporting the spirituality of God: they found more glory in strengthening the uncertain and almost appalling sect of Peripatitians, I mean in updating and repackaging the doctrine of substantial forms, the one by putting forth the system of the plastic faculty, the other by supposing a vital world that is distinct from the material world.¹⁵

[p. 35] According to Bayle, what is dangerous in this undertaking is to ascribe to bodies a kind of motor force and autonomy, which would imply a compatibility between the two and, as a consequence, an autonomy of matter vis-à-vis God.¹⁶

The comparison of "substantial forms" with vital principles could be true if vital principles were inherent to matter or, at least, animated matter from the inside. Even though Cudworth evokes an "inward principle" for apologetic reason, he has to insist on the absolute heterogeneity between life, which is something mental, and corporeal bodies.

végétative, ni sensitive, ni aucun autre principe de mouvement et de vie, que son sang et ses esprits, agités par la chaleur du feu qui brûle continuellement dans son cœur, et qui n'est point d'autre nature que tous les feux qui sont dans les corps inanimés."

¹³ William Croone, "On the reason of the movement of the muscles," trans. Paul Maquet, intro. Margaret Naylor, *Transactions of the American Philosophical Society*, vol. 90 (2000), with the facsimile of the original edition in Latin (ed. by F. Hayes, London, 1664), §12, 70: "Spirituosis hujusce generis liquoribus, singula in Animantis corpore partes vehementer turgent . . . Omnes autem ubicunque sunt, caloris nativi ac circulationis beneficio, in constanti motu ac agitatione existant: & haec ipsa Agitatio, id ipsum est quod Vitam appellamus."

¹⁴ Marcello Malpighi, "De Gallis" (1679), in *Opera omnia* (London: Robert Scott, 1686), II, 17: "Animalium vita, cum perpetuo effluvio manutenatur; talem corporis compagem exigit, qua jam recepta largo dispendio reddet; alienaque denuo, & quotidie admittat: ita ut vitae chorea continuato introitu & egressu perennet."

¹⁵ "Continuation des Pensées diverses écrites à un Docteur de Sorbonne, à l'occasion de la Comète qui parut au mois de Décembre 1680, ou Réponse à plusieurs difficultés que Mr. *** a proposées à l'Auteur," in *Pensées diverses* (Rotterdam, 1705), 90. "M. Cudworth et M. Grew très grands Philosophes (. . .) n'ont pas trouvé qu'ils fût digne d'eux de fortifier et d'éclaircir l'hypothèse Cartesienne, qui est dans le fond la plus capable de soutenir la spiritualité de Dieu: ils ont trouvé plus de gloire à fortifier la secte chancelante et presque atterrée des Péripatéticiens, je veux dire à mettre dans un plus beau jour et sous une nouvelle face, la doctrine des formes substantielles, l'un en illustrant le système de la faculté plastique, l'autre en supposant un monde vital distinct du monde matériel."

¹⁶ Ibid. "La forme plastique de M. Cudworth, et le principe vital de M. Grew sont cependant dans le même cas, et ainsi ils ôtent à cette objection contre les athées toute sa force. Car si Dieu a pu donner une semblable vertu plastique, c'est une marque qu'il ne répugne point à la nature des choses qu'il y ait de tels agents, ils peuvent donc exister d'eux-mêmes, conclura-t-on. Vous comprendrez ceci par une comparaison. Si la matière peut recevoir de Dieu la force motrice, il y a une compatibilité naturelle entre la matière et la force motrice. On peut donc supposer également et que la matière existe par elle-même, et que la vertu motrice lui est propre essentiellement. Ceux qui supposent comme la plupart des Cartesiens que la matière est incapable d'être investie de la force de se mouvoir, et que Dieu seul peut produire le mouvement sont beaucoup plus en état de démonter les athées."

In both cases, there is no rehabilitation of the scholastic couple form/matter, considering the very sharp opposition between, on the one hand, incorporeal principles, which are necessarily exterior to matter because they have a divine origin, and, on the other hand, the properties of matter, which are dependent, passive, and, for Cudworth only, erratic and resistant to the order introduced by the laws of nature. Indeed, Grew's explicit starting point is the fact that God has life, and God is incorporeal. Thus, for Grew, life has to be incorporeal. And if there is something as Life in nature, it is a proof of the divine creation of nature—living things are the marks of the creator in the creation. In the introductory lines of *Cosmologia sacra*'s second book, which is devoted to "Life," we read:

The Universe consisteth of the Corporeal and the Vital World: the Latter of which, is next to be considered. And first, I shall prove, That there is a Vital Substance in Nature, distinct from a Body. . . . God, who as he is the Cause of all other Beings, is the most Substantial Being: is Himself a Substance Vital and Incorporeal.¹⁷

[p. 36] As regards Cudworth, we find the same kind of assimilation between life and incorporeity:

But though the Plastick Nature be the Lowest of all Lives, nevertheless, since it is a *Life*, it must needs be *Incorporeal*; all Life being such.¹⁸

Certainly, Grew's refutation of materialism is different from Cudworth's. Most notably, Grew admits a Cartesian conception of body¹⁹: Bodies are defined by mechanical properties as figures, structures, and sizes. So, by hypothesis, if corporeal modifications could produce vital phenomena, there would be three options, all of which Grew refutes: (1) It could be by the "subtlety" of the particles. But size cannot change the nature of bodies: "Body, being subtilized, can loose nothing of its Corporeity."²⁰ (2) It could be by their organization, either by their figures (but a square is not more vital than a triangle because every square contains two triangles at least); by the combination of the parts (but a watch is not more "vital" when its parts do not "lie in a confused heap"); or by their motions (but a paper kite is not more vital when it is moved by the wind). (3) Life could be caused by a special property of the body, but this supposition is perceived by Grew as absurd. According to this demonstration, no mechanism accounts for the manifest difference between animate and inanimate. So, we have to admit an incorporeal principle of Life.

In Cudworth, the refutation of materialism proceeds differently. Cudworth's matter, contrary to Grew's matter, is not really or faithfully Cartesian. First, matter is for him "dead" and passive. Second, matter is submitted only to fortuitous motions. As a consequence, matter is *resistant* to any regularity or any ordering by the laws of nature. To account for the regularity of phenomena, we have to then conceive an "immediate agent" of God, like a plastic nature, by which "the things of nature are administered":

¹⁷ CS, II, I, 31.

¹⁸ TIS, I, III, 37, §20, 163.

¹⁹ As emphasized by Brian Garrett, "what makes Grew interesting is his simultaneous commitment to atomistic and mechanistic explanation regarding matter, along with the somewhat pansychist view that all material bodies, but certainly vegetative bodies, are associated with a vital principle" ("Vitalism and Teleology in the Natural Philosophy of Nehemiah Grew," *British Journal for the History of Science*, 36 (2003), 63–81, 3).

²⁰ CS II, I, 32.

Wherefore, the *Divine Law and Command*, by which the things of Nature are administered, must be conceived to be the Real Appointment of some *Energetic, Effectual, and Operative Cause* for the Production of every Effect.²¹

[p. 37] Nevertheless, despite these differences, both authors maintain a dualistic system, opposing mental and corporeal, to avoid promoting materialism.²² From this point of view, Le Clerc is right to criticize Bayle's statement:

Mr. Cudworth and Mr. Grew do not say that God placed a motive force in matter, which exists there as an accident or as a property in its subject. They strongly attack this thought when they maintain that matter is incapable of life, and they say that the *plastic and vital natures* are immaterial substances. Thus what [Bayle] says here does not concern them, and I have no need to respond.²³

To summarize, the refutation of materialism, whether it be mechanist or hylozoist materialism, implies in each case two features of "life": (1) Life is associated with a mental and final activity, and defined in contrast to "dead" matter; and (2) life does not necessarily imply a conscious and intelligent activity, in contrast with Cartesian soul. Life is defined negatively in two ways:

– In a *generic* sense, life is just opposed to body as an equivalent to "mental." It is even possible to ascribe some natural properties of the soul to life itself, as in this passage from Cudworth: "if the Souls of Men and Animals be at any time without *Consciousness* and *Self-perception*, then it must needs be granted, that Clear and Express *Consciousness* is not Essential to Life."²⁴ Insofar as Cudworth and Grew want to refute materialism, they have to give to life a broad meaning, a generic sense, according to which everything that is not corporeal, God included, is vital: They cannot admit that God has only a vegetative Life, devoid of sense and understanding.

– In a *specific* sense, life is just the lowest degree of what is incorporeal. In this last sense, life is equivalent to "vegetation" or to the vegetative Life, because it is devoid of sense, consciousness, and understanding. Generally speaking, life means the motions of vegetation, that is to say growth, reproduction, circulation and, in one word, all inner regular, continuous, [p. 38] and unconscious motions that seem to make the difference between living beings and inert things. According to Grew, "the lowest Species of Life, whereof we can have any conception, is such a sort of Life, as is without Sense."²⁵

²¹ TIS, I, III, 37, §2, 147.

²² See John Henry, "The Matter of Souls: Medical Theory and Theology in Seventeenth-Century England," in R. French and A. Wear (eds.), *The Medical Revolution of the Seventeenth Century* (Cambridge, UK: Cambridge University Press, 1989), 87–113, 88; and Yves-Charles Zarka, "L'être et l'action selon Ralph Cudworth," *Philosophie* (1997), n° 53, 57–69, 60.

²³ *Bibliothèque choisie* (Amsterdam: Schelte, 1705), V, 300–301. "Mrs Cudworth et Grew ne disent point que Dieu ait mis dans la Matière une force motrice, qui y existe comme un accident, ou comme une propriété dans son sujet. Ils attaquent fortement cette pensée, lorsqu'ils soutiennent que la Matière est incapable de Vie, et ils disent que les *Natures plastiques et vitales*, sont des substances immatérielles. Ainsi ce [que Bayle] dit ici ne les regarde pas, et je n'ai que faire d'y répondre."

²⁴ TIS, I, III, 37, §17, 160.

²⁵ CS, II, 1, 35.

It seems that when Cudworth uses the specific meaning of life, life as vegetation, he employs the words “a Plastick Nature,” “the Plastick Nature,” or “the Plastick Life of Nature,” whereas he uses the term “life” when he means the generic sense of life, life as something mental. It is quite consistent with the following citations. First, he clarifies: “the *Vegetative Soul* [of the Platonists and Peripateticks] is no other than a *Plastick Nature*”; and speaks about the “*Vegetative or Plastick Power* of the Soul.”²⁶ And then:

We conceive, that the first Heads of Being ought rather to be expressed thus; *Resisting* or *Antitypous Extension*, and *Life* (i.e. *Internal Energy* and *Self-Activity*), and then again, that *Life* or *Internal Self-Activity* is to be subdivided into such as either acts with express Consciousness and *Synaesthesia*, or such as is without it; the Latter of which is this *Plastick Life* of Nature: So that there may be an Action distinct from Local Motion, or a Vital Energy, which is not accompanied with that Fancy, or Consciousness.²⁷

Or:

[T]his *Plastick Nature* is so far from being the *First* and *Highest Life*, that it is indeed the Last and Lowest of all *Lives*, it being really the same thing with the *Vegetative*, which is Inferiour to the *Sensitive*.²⁸

Insofar as life means sometimes the lowest degree of the triad of vegetation, sense, and thought, we could find a similarity with the scholastic triad of “vegetative, sensitive and rational souls.” This similarity is even emphasized by Cudworth when he compares his plastic nature with the vegetative soul. However, it is only an apparent similarity. In Aristotle, every living being is endowed with a vegetative soul. It is not the case for Cudworth: Although some nonliving beings (the universe, the terrestrial globe, a mineral) have a plastic nature, some living bodies, like plants, do not:

[p. 39] Though it be no reasonable to think, that every Plant, Herb, and Pile of Grass, hath a Particular Plastic Life, or Vegetative Soul of its own, distinct from the Mechanism of the Body, nor that the whole Earth is an Animal endued with a Conscious Soul; yet there may possibly be, for ought we know, one Plastick Nature or Life belonging to the whole Terrestrial globe, by which all Plants and Vegetables, continuous with it, may be differently formed, according to their different Seeds, as also Minerals and other Bodies framed, and whatsoever else is above the Power of Fortuitous Mechanism effected.²⁹

For Cudworth, it is more reasonable to admit one unique plastic nature for the whole earth than to give to every living being its own plastic nature. This means that plastic nature is not necessarily an individual principle, but may be an unconscious substance that infuses into the different parts of corporeal nature. In this respect, it does not seem true that Cudworth gives to each individual a plastic nature or a substantial form conceived as an

²⁶ TIS, I, III, 37, §6, 153; and §12, 157.

²⁷ TIS, I, III, 37, §16, 159.

²⁸ TIS, I, III, 37, §19, 162–163.

²⁹ TIS, I, III, 37, §25, 171.

immaterial active force.³⁰ Leibniz, for example, was well aware of this difference between Cudworth's system and his own, which gives to each (living) individual its own principle of life or soul: In 1689, when annotating *The True System*, he remarks that contrary to Cudworth's assumption, every plant deserves its own soul.³¹ According to Cudworth's quotation, the vegetation of plants (their growth for instance) may be explained in ascribing a plastic nature to the terrestrial globe, which could communicate its formative power to the plants through their roots. But in this case, how are we to explain the fact that some plants keep growing once picked and put into water? For Leibniz it is far more reasonable to ascribe to each plant its own life. Life is a property of individuals, and not a diffused power that can be communicated by contact or contiguity. Later on, in his *Considérations sur les principes de vie et les natures plastiques* (1705), Leibniz assimilates "life" to the soul, or something analogous: "Life" is not only the property that requires the individuation of things, or an individual as its bearer, but also a principle that [p. 40] individualizes things, that is, which makes a thing *one* individual substance. In one word, for Cudworth, a plastic nature can be a transmissible power that can be shared, whereas for Leibniz, it should be an individual property—a principle peculiar to truly indivisible individuals.

4. The Properties of Life

As we have seen, the apologetic ambition of praising God's creation and proving the truth of Christianity is common to Cudworth and Grew. This explains why for both, "life" has two dimensions: a generic one, life as something mental, to refute the materialism, and a specific one, life as vegetation, to prove God's presence everywhere throughout nature. Nevertheless, the two authors do not ascribe to "life" the same properties and powers. To better understand some of the differences between the two authors, we have to examine what life, or plastic nature, means exactly for each of them, and of what life is capable. We cannot find any positive and exhaustive definition of life in those two books, particularly in Grew, but there are still some descriptions, equivalences, and features associated with the notion.

For Cudworth, life has essentially four features and functions: (1) A plastic nature is something that can directly give motions and directions to bodies. It is described as an internal energy, and even a self-activity. We may indeed identify life as a "motor force" in this sense. Quoting Plotin (Enneads, 3, 2, 16): "[E]very Life is Energy, even the worst of Lives, and therefore that of Nature."³² This cause or energy produces among other things the motion of respiration in the animals. (2) As a plastic nature, the second property of life is the formation of bodies and their growth. Cudworth speaks about something superior to mechanism, which "restores Flesh that was lost, consolidates dissolved Continuities, incorporates the newly-received Nourishment, and joyns it Continuously with the

³⁰ See Pauline Phemister: "[According to Cudworth, the] individual living being has two aspects: the immaterial active force and the matter or body upon which this active force « acts » and with which it forms a living being. . . ." The position is also remarkably close to Leibniz's own Aristotelian understanding of corporeal substance as a combination of soul or substantial form and organic body. ("All the time and everywhere everything's the same as here: The Principle of Uniformity in the Correspondence between Leibniz and Lady Masham," in Paul Lodge (ed.), *Leibniz and his Correspondents* (Cambridge, UK: Cambridge University Press, 2004), 193–213, 195).

³¹ See G. W. Leibniz, *Sämtliche Schriften und Briefe* (Berlin, Akademie-Verlag, 1923– [?]), VI, vol. 4, B2, 1950: "Et postera dicit etiamsi cuilibet plantae non necesse sit assignare talem vitam plasticam, sufficere ut sit in globo terrae cui plantae cohaerent [+ sed plantae eam habent et avulsae et in vasis positae+]."

³² TIS, I, III, 37, §16, 159.

preexistent parts of Flesh and Bone.” But he also esteems that the same plastic nature builds the frame of “mineral and other bodies.”³³ This is the precise meaning of “plastic,” that is, *formative power*. (3) A general plastic nature of the whole universe is responsible for the *unity of the world*, that is to say, for the “uniform Order and Harmony.”³⁴ (4) It is life also that explains the functioning of our soul, for instance in our *reasoning*: “the Rational Life [p. 41] that is in us ought to be accounted a much Higher and more Noble Perfection than that *Plastick Life of Nature*.”³⁵ Or also: “There is also another more Interior kind of *Plastick Power* in the Soul (if we may so call it), whereby it is Formative of its own Cogitations, which it self is not always Conscious of.”³⁶

As a consequence, life, or at least the different sorts of life in nature, can be responsible for a large range of actions: Life is capable of every action that seems beyond the powers of matter and motions. And this diversity of actions implies a variety of bearers of Life. The plastic nature can be either a faculty of a soul, whether animal or human, or directly a soul itself. This is a question that is left undetermined. Cudworth writes, for instance: “[Life lower than the Animal] is either a Lower Faculty of some Conscious Soul, or else an Inferior kind of *Life* or *Soul* by itself; but essentially depending upon a Higher Intellect.”³⁷ But, as we have seen, there should be also a general plastic nature for the whole universe in order to explain the harmony of the whole:

Besides this Plastick Nature, which is in Animals, forming their several Bodies Artificially, as so many Microcosms, or *Little Worlds*, there must be also a general Plastick Nature in the *Macrocosm*, the whole Corporeal Universe that which makes all things thus to conspire every where and agree together into One Harmony.³⁸

In this last sense, life cannot be assimilated to the soul without risking encouraging the view according to which the world is a unique living animal.

As for Grew, he defines “life” as a “sphere of activity” dependent upon a vital substance. As the same time, he maintains the Cartesian thesis according to which the quantity of motion is always the same in the universe. This means that vital principles cannot move bodies immediately, but can only give directions, and directions suitable to the corporeal organization of bodies:

Yet neither by this Life, nor the Subject of it, do I mean, a Principle of Motion. The Universal Stock of Motion, as that of Matter, being neither increased, nor diminished, but only transfer’d. But I mean, a certain Power to determine the manner of its being transfer’d; or of returning an Impression upon Bodies, suitable unto that which it receives.³⁹

We can deduce from this that “life” is the cause of motions that are specifically “vital” only because they are not immediate, automatic, or mechanical reactions [p. 42] to

³³ TIS, I, III, 37, §22, 167.

³⁴ TIS, I, III, 37, §20, 164: “The same is to be said likewise concerning the Plastick Nature of the whole Universe, in which . . . *all things are ordered together conspiringly into one*. It must be one and the same thing, which formeth the whole, or else it could never have fallen into such an Uniform Order and Harmony. Now that which is One and the Same, acting upon several distant parts of Matter, cannot be Corporeal.”

³⁵ TIS, I, III, 37, §19, 162.

³⁶ TIS, I, III, §17, 161.

³⁷ TIS, I, III, 37, §26, 172.

³⁸ TIS, I, III, 37, 167.

³⁹ CS, II, I, 35.

stimulations: Vital actions, that is actions caused by a vital principle, are reactions that do not seem to be the mere effect of a mechanical impact insofar as they are appropriate or “suitable” to the circumstances. This vital action can be the reasoning of our soul or the motions of the animals. In contrary to Cudworth, Grew stays relatively close to Descartes’s legacy. For Grew, life cannot be a spring of motion. So Bayle and Leibniz were quite wrong in their critique of Grew, as he never clearly defended an interaction between incorporeal principles and bodies.

5. What Is Alive and What Is Not? Some Difficulties

Commentators often wonder about the definition of life, that is, about the *comprehension* of the concept, but they neglect the question of its *extension*. Of what kind of things can “life” be predicated? It is often assumed that those things are the very things we consider these days as “living beings.” Nevertheless, there is no exact equivalence between, on the one hand, phenomena that belong to living beings, or at least to what we today call living beings, and, on the other hand, phenomena that allow Cudworth and Grew to illustrate the properties of life.

As we have seen, for Cudworth and Grew, vital phenomena are first and foremost the vegetation in plants, as well as the several sorts of animal and human unconscious activities. But, and it is something that has not been often underlined, life, vital substances, or plastic nature have also a “sphere of activity” in the so-called inanimate world. What is “animated by life” is broader, strictly speaking, than the group of all living beings. For Cudworth, there is something similar between a mineral and a plant, and this is why we need a principle like a plastic nature endowed with life to explain their formations. Cudworth needs also to invoke a plastic nature of the whole universe to explain its unity and harmony. This implies that there is a life everywhere, as the “fortuitous power of mechanism” is unable to account for the phenomena, including in the inert parts of the world, insofar as they exhibit some continuity, regularity, and complexity. The extension of the group of things that are completely inert and dead is rather fuzzy. The lack of systematicity is emphasized by the adjective “particularly” [*surtout*] in Le Clerc’s following statement: “Mr. Cudworth believes that bodies, particularly those which are organized, are not formed by mere matter moved according to the laws of motion.”⁴⁰ Then, for Cudworth, some bodies, which are [p. 43] for us not organized or living, are formed by a plastic nature or the plastic life of nature, contrary to Leibniz’s thesis that only organized bodies are endowed with principles of life (regarded as perceiving and desiring souls): “principles of life belong only to organic bodies” (“*les principes de vie n’appartiennent qu’aux corps organiques*”).⁴¹

In Grew’s *Cosmologia sacra*, life is required to explain the cohesion of bodies. Strikingly enough, the first illustrations that Grew gives of the “power of life” are colors, odors, magnetic inclination, and gravitation. Life as a “sphere of activity” is that “also, wherewith every Corporeal Principle may be probably Endow’d: or, to speak properly, may be Animated.” Thus it seems that, in these two books, there is no clear-cut line between what is generally regarded as something inanimate and what is generally regarded as living. And, indeed, if Life, vital substances, or plastic nature have to testify for the presence of God throughout nature, it might be problematic to limit divine expression to

⁴⁰ Le Clerc, *Bibliothèque choisie*, V, 1705, 292: “Mr Cudworth croit que les Corps, *surtout* ceux qui sont organisés, ne sont pas formés par la pure Matière agitée selon les lois du mouvement, comme Descartes l’a cru.”

⁴¹ GP VI, 539.

plants, animals, and human beings—especially if the aim is to demonstrate the unity and harmony of the universe.

As a matter of fact, the apologetic ambition of the two authors explains (1) why the line between living and nonliving is so hard to draw, and (2) why there seems to be a discrepancy between what “life” is supposed to explain and the properties attributed to it, that is to say, between vital phenomena as an *explanandum* and “life” as an *explanans*. The apologetic ambition requires a demonstration of the immateriality of life. In this respect, two aspects of life are emphasized: the regularity of bodies and the whole nature, whose formation supposes *intellection* and *consciousness*, and the faculties of animals such as *sensation*. These two aspects, intelligence and sensation, clearly exceed the properties of matter. And yet “life” cannot be identified only with intellection and sensation. If it were the case, there would be no proof that life or vital energy is spread throughout nature whose unity is manifest. So, there would be no proof that, first, life goes past the realm of animals and human souls and, second, that God is not immediately the creator of every living being. In this last case, the danger would be to support the Cartesians instead of refuting them. Thus, mental features of life are needed to refute materialism, but non-mental features of life are the best proof of the omnipresence of vital principles that are God’s agents. By “non-mental features,” we mean vegetative actions, as respiration or growth, that are too poor or limited to be direct productions of God himself but too complex to be only the result of a material mechanism.

The association of those mental and non-mental features raises some difficulties. In the first place, according to the generic meaning of life, sense and thought are sometimes depicted as potentialities of life in order to refute materialism. [p. 44] But according to the specific meaning, life does not necessarily imply sense and thought. This may cause a problem in the comprehension of the notion. Let’s attend to what Grew writes:

Were Life, an immediate Adjunct of Body, as Motion is; then as all sorts of Bodies are capable of all sorts of Motion; so they would be capable of all sorts of Life; even of Intellection itself. That is, every Atom, as an Atom, would be capable of being Intellectual. To avoid which Absurdity, we must allow the being of a Substantial Principle, distinct from Body, as, the proper and immediate subject of Life.⁴²

It is difficult to understand why life as a property of matter could induce confusion among vegetative, sensitive, and rational faculties, whereas a substantial principle called “vital” would enable us to understand the real distinction among these three kinds of life.

In the second place, according to Grew, “the difference between Vegetable and Sensible Life, seemeth to be this; that in the former, the Impression arising from the Motion, is entirely reflected, and lost in an Instant. In the latter, it is immersed and rein’d.”⁴³ So, vegetable life acts as a reflex. But in this case, in what sense exactly does this reflex differ from a mere mechanical reaction? The idea of an immaterial source of life, required to conceive why a living being does not react merely mechanically to the motions he receives, is clearer for the superior sorts of life (i.e., sense and thought) than for the vegetable life. In this last case, it is hard to grasp the specific skills attributed to life versus bodies.

In the third place, it is difficult to understand in what sense vital principles or the plastic nature of life may account for phenomena that are explained neither by God’s

⁴² CS, II, I, 34.

⁴³ CS, II, II, 37.

immediate action, nor by the actions of a soul endowed with intellection like the human soul. The *explanans* does not seem to meet the *explanandum*. Indeed, in Cudworth, it is said that life or plastic nature can be devoid of intellection and knowledge. But at the same time, it is because matter is devoid of intellection that a plastic nature or a life is needed in nature. More precisely, a plastic nature is able to build a body, whereas matter does not: “For is it not altogether as Absurd and Ridiculous, for Men to undertake to give an accompt of the Formation and Organization of the Bodies of Animals, by mere Fortuitous Mechanism, without any *Final or Intending Causality*.”⁴⁴ And yet, a plastic nature is devoid of understanding, which seems required to build a body, or even to direct its motions: It operates “Fatally and Sympathetically, [p. 45] according to *Laws and Commands*, prescribed to it by a Perfect Intellect, and imprest upon it.”⁴⁵ How would an immaterial vital principle devoid of intellection be more able to build an organized body than matter itself directed by God’s laws?

This fits one of the main criticisms of Bayle and Leibniz. For Bayle: “Nothing is more awkward for the atheists than to find themselves reduced to attributing the formation of animals to a cause that does not have an idea of what it is doing, and that regularly executes a plan without knowing the laws that it is executing.”⁴⁶ Generally speaking, “a being that neither conceives what it is doing, nor the plan that it is to carry out, nor the goal toward which it is to tend, could not do anything in a regular fashion”⁴⁷: Regularity of the phenomena requires intellection and conscious finality as its cause. As for Leibniz, according to his *Éclaircissement sur les principes de vie et les natures plastiques*, Cudworth’s plastic nature does not satisfy the principle of economy:

As for these immaterial plastic substances, I do not well see how they suffice here, nor in what respect they have the advantage over mechanism. It seems that they would need a completely divine intelligence in order to form the organs of animals with the knowledge of an architect: but if they do not have this architectonic knowledge, and if it is necessary that God intervene here and direct things in particular, then what good are these intelligences?⁴⁸

This difficulty is intrinsic to Cudworth’s system. As energy, self-activity, or sphere of activity, vital substances or plastic nature seem to be autonomous. It is what distinguishes bodies from life or from things endowed with life. But at the same time, in order not to support atheism, this autonomy has to be conceived as something still dependant upon a divine activity. This is partly why it is so [p. 46] important for Cudworth and Grew to emphasize the fact that some lower sorts of life are deprived of understanding and self-perception. As Cudworth writes:

⁴⁴ TIS, I, III, 37, §3, 149.

⁴⁵ TIS, I, III, 37, §26, 172.

⁴⁶ *Continuation*, 90–91. “Rien n’est plus embarrassant pour les athées que de se trouver réduits à donner la formation des animaux à une cause qui n’ait point l’idée de ce qu’elle fait, et qui exécute régulièrement un plan sans savoir les lois qu’elle exécute.”

⁴⁷ *Histoire des ouvrages des Savans*, August 1704, 384. “Un être qui ne conçoit point ce qu’il fait, ni le plan qu’il doit remplir, ni le but où il doit tendre, ne saurait rien faire de regulier.”

⁴⁸ GP VI, 554. See Catherine Wilson, *Leibniz’s Metaphysics* (Princeton, NJ: Princeton University Press, 1989), 160 *sq.* “Quant à ces substances immatérielles plastiques, je ne vois pas bien ni comment elles y suffisent, ni en quoi elles aient de l’avantage sur le Mécanisme. Il semble qu’il leur faudrait une intelligence toute divine pour former les organes des animaux avec la connaissance d’un architecte: mais si elles n’ont point cette connaissance architectonique, et s’il faut que Dieu y supplée et les dirige particulièrement, à quoi bon ces intelligences . . . ?”

[There is a] certain Lower Life from the Animal, which acts *Regularly* and *Artificially* . . . , though it self do not know the Reason of what it does, nor is Master of that Wisdom according to which it acts, but only a Servant to it, and Drudging Executioner of the same.⁴⁹

6. Conclusion

Contrary to Bayle's assumption, neither Grew nor Cudworth admit any autonomy of matter or something similar to the "substantial forms" of the Aristotelian tradition. It is precisely because they both want to refute materialist theses, presumably involved by this conception, that they promote two different conceptions of the notion of life, a generic one (life as something mental) and a specific one (life as vegetation), whose agreement is sometimes difficult to grasp. Indeed, despite the huge differences between the two authors, they both defend this double conception of life for apologetic reasons. On the one hand, the *mental* features of life understood as its higher capacities, sensation and intellection, are the best proof of the incorporeal nature of life, and this way, the best proof of the divine causation testified by vital phenomena. On the other hand, the *vegetative* sense of life, regarded as the lowest common denominator of the group of things or properties that are called 'vital,' is the best way to demonstrate both the presence of God everywhere throughout the whole universe and the unity of the creation. It is notably the adoption of these two ideas of life that paradoxically does not allow for a clear distinction between animate and inanimate bodies.

This ambiguity demonstrates the fecundity of the notion of life as a polemical tool. Nevertheless, in these conditions it is necessary to take into account the different dimensions of life: If it is a notion that can be determined by the phenomena described in the life sciences of that time, it keeps a strong theological dimension, which can partly modify its meaning.

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⁴⁹ TIS, I, III, 37, §26, 172.