

What is an “Organism”? On the Occurrence of a New Term and Its Conceptual Transformations 1680-1850

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ABSTRACT – The essay reconstructs the occurrence of the term “organism” and the transformations of its concept from around 1680 to the middle of the nineteenth century. The different sections refer to individual authors who used the word “organism” and situate its usage in specific historical contexts. After earlier uses of the word in medieval sources, the Latin word “organismus” appeared in 1684 in Stahl’s medico-physiological writings. Around 1700, it can be found in French (*organisme*), English (*organism*), Italian (*organismo*) and later also in German (*Organismus*). During the eighteenth century, the word “organism” generally referred to a specific principle or form of order, often in opposition to the order of “mechanism,” that could be applied to plants, animals or the entire world. At the end of the eighteenth century, the term became a generic name for individual living entities with inside-outside-interfaces and an inner “organization” of parts. From around 1830, the word “organism” replaced the expressions “organic” or “organized body” as a recurrent technical term in the emerging biological disciplines.

KEYWORDS – Organism, mechanism, organization, individual, agent, organic, body, microcosm, macrocosm, process, milieu

The different sections of the essay reconstruct the occurrence of the term “organism” and the transformations of its concept from around 1680 to the middle of the nineteenth century.¹ They refer to individual authors who used the word “organism” and situate its usage in specific historical contexts.² The first section briefly discusses two medieval sources to indicate the first occurrences of the word in European history. The next three sections retrace the first formative phase of the concept within the debates about specific and categorical differences

¹ This essay is a substantially revised version of “From the Organism of a Body to the Body of an Organism: occurrence and meaning of the word “organism” from the seventeenth to nineteenth centuries” (Cheung 2006). If not otherwise indicated, translations are from the author of this essay.

² Cf. Robin 1880; Balan 1979; Schmidt 1986; Breidbach 1999a. Kucharczik wrote his doctoral thesis on the usage of the word “organism” in the linguistics of the nineteenth century (Kucharczik 1998).

between the form of order of machines and that of living bodies. The second section focuses on the writings of John Evelyn and Nehemiah Grew. Around 1700, both referred to the word as a principle or form of order. The third section explores the writings of Leibniz and Louis Bourguet, who also referred, though in different ways, to a form of order when they used the word organism. In the fourth section, the order of “organism” and the order of “mechanism” are discussed in the work of Georg Ernst Stahl. The fifth, sixth, and seventh sections highlight the shift of meaning of the word organism that took place at the end of the eighteenth century within German idealism, micro-macrocosm models of *Naturphilosophien*, physiological anthropologies, medicine, and *Lebenserhaltungslehren* or dietetics. The final section begins around 1830 and focuses on various growing scientific fields, such as physiology and theories of the milieu, in which the word organism became a recurrent technical term and replaced the compounds “organic body,” “living body,” “living being,” “living individual,” or “organized body.” These compounds had prevailed since the sixteenth century in medical texts, natural history, and anatomy (Wolf 1971).

The eight sections thus correspond to four phases: (1) the first occurrences of the word (section one), (2) the first concept formations within organism-mechanism-debates (sections two to four), (3) the shift from a form of order to a generic name of individuals (sections five to seven), and (4) the establishment of a recurrent technical term (section 8). The first phase only points to the first occurrences. Their relation to the later conceptual developments still remains an open question. The second phase reacts to a multilayered discourse about the adequacy of Cartesian mechanic models of organic order in the second half of the seventeenth century. Key themes of this discourse represent agent models (for example of the Cambridge Platonists), instincts, and the relation between medical experience, philosophy, and natural history (cf. Rosenfield 1940; De Ceglia 2000; Chang 2002; Reill 2005; Cheung 2008). The third phase is closely related to new alliances between theories of subjectivity and individuation and chemical and physiological models of dynamic inside-outside-interfaces (Wiesing 1995; Regenspurger & Zantwijk 2005). In the third phase (1790-1840), the conceptual field of organism with its inside-outside-interfaces begins to differ from the field of “organization” that referred rather to the inner order, and sometimes also to the static order, of organic bodies. However, from the last third of the eighteenth century, the dissemination of the word organism took various paths that eventually generated new meanings (for example in Auguste Comte’s sociology) or referred to older conceptual layers of its occurrence.

Two Medieval Sources

Before the second half of the seventeenth century, only two texts are known which use the word organism. The neoclassical Greek noun ὀργανισμός (or διοργανισμός) and the verb διοργανίζω appear in the manuscript collection Marcianus Graecus (end of the tenth or eleventh century).³ The text is undated and has no title. The unknown author discusses different alchemical techniques of distillation or “sublimation” and refers to Zosimos, an important alchemist who lived at the end of the third or the beginning of the fourth century⁴ in the Egyptian town Panopolis. The verb διοργανίζω can be translated as “to operate a reaction, to distil, to rectify.” The word ὀργανισμός is composed of the classical Greek word *organon* (tool, instrument) and the ending (i)smos which indicates an abstract noun. In the text, the term ὀργανισμός represents an apparatus in which liquids are distilled:

Πῶς οὖν, ὧ ἀγαθοὶ, Ζώσιμος φησιν ὅτι οὐδαμοῦ ἔστηκεν ὁ νοῦς τῶν γραφῶν, εἰ μὴ ἐν τῷ ὀργανισμῷ τῷ ἀνασπῶντι τὸν χαλόν· καὶ ὅτι τὸ πέρας τῆς τέχνης ὧδε οὐκ ἦν, ἀλλ’ ἐν τῷ διοργανισμῷ καὶ τῇ τούτου πήξει.⁵

How can, ô philosophers, Zosimos say that the sense of the writings has been misunderstood, except that we can extract the copper in the apparatus (organism)? And how can he say that the proper end of these practices is not [the extraction], but the fixation [of the copper] in the apparatus?

Gerhoh of Reichersberg (1093-1169), provost of the same city and canon of Augsburg, is the author of the second medieval text, written between 1126 and 1132. The text has the title *De edificio Dei*. The word organism occurs only once and in the plural. In the text, Gerhoh discusses the problem of the unity of the Roman church. He uses the word organism for a (disharmonic) polyphony of human voices metaphorically to criticize the reformation of the church, notably the worldly status of clerics.

Fuit enim ante aliquot annos ecclesia illa talibus clericis exposita, qui non canerent quasi ex uno ore, sed quasi ex ore diverso ac multum dissono; tum propter vocis inconcinnos organismos, theatralibus quibusdam modulibus variatos; tum propter mores incompositos et magna discrepantia contra invicem divisos.⁶

³ Cf. Balan 1975, 326 and footnote 127. For a verification and discussion of the source, see Mertens 1995, Introduction, XXII-XXIX and LIII-LIV; Letrouit 1995, 11-93, 37 and 92.

⁴ The exact period of his life is unknown; see Mertens 1995, Introduction, XV.

⁵ Marcianus Graecus 299, M, f. 116v; in Berthelot 1967, vol. 2, 252. A French translation can be found in Berthelot 1967, vol. 3, 242. I am grateful to Robert Halleux and Diether R. Reinsch for their help with the translation.

⁶ Gerhoh of Reichersberg, *De edificio Dei* (1126-1132), in Dümmler 1891-97, vol. 1 (1897), 172-

Some years ago, the church [in Rome] fell into the hands of those clerics, who sang, so to speak, not with one mouth, but with many and differently sounding mouths because of the disharmonic polyphonies (*organismos*) of voices, varied through melodies that are used in the theatre, and of the practices that are confused and divided into great differences.

The noun *organismus* seems to be a nonce-word. Gerhoh did not use it in other writings. Blatt and Lefèvre quote the same passage without any other indication.⁷ The noun is related to the Latin verb *organizare* which already appears in the *Vetus Latina* (second to fourth centuries). It means “to play an instrument” or “to sing in more than one voice.” (cf. Stotz 1996-2004, vol. 1 [2002], 485). The verb has no equivalent in classical Greek. Until the seventeenth century, no other occurrence of the word *organism* is known.

John Evelyn, Nehemiah Grew and the Organism of a Body

From around 1600, the material unity of living bodies and the soul-body-interface have been characterized through the organization and the mutual correspondence of parts. In *Two Treatises* (1644), Kenelm Digby discussed the correspondence and subordination of the compound of parts in organic bodies. He called the compound an engine that has a specific “design” in which all parts are in harmony and sustain mutually the performance of the whole.⁸ After Digby, Descartes referred in *Les*

173. Cf. *Patrologia Latina*, vol. 194, col. 1258C. I have to thank Wolfgang Maaz and Marie-Luise Weber for their valuable hints and suggestions about the translation of the text, which has not been translated before. Weber also checked the spelling of the word “*organismos*” in the original manuscript in Munich and confirmed that the electronic resources of the new *Mittellateinisches Wörterbuch* (Bayerische Akademie der Wissenschaften) – which currently cover the period from 600 to 1280 within the borders of contemporary Germany – contain no other reference of the word.

⁷ Blatt and Lefèvre 1983, 776. No other reference for the word “*organismus*” in Latin dictionaries is known (cf. Kucharczik 1998, 23).

⁸ Cf. Digby 1644, 205: “As there may be observed in some bodies digged out of mines, in which one may see lumps of metall, oore, stone, and glass, and such different substances But there are other bodies in which this manifest and notable difference of partes, carrieth with it such a subordination of one of them unto an other, as we can not doubt but that nature made such engines (if so I may call them) by designe; and intended that this variety should be in one thing; whose unity and being what it is, should depend of the harmony of the severall differing partes; and should be destroyed by their seperation. As we see in living creatures, whose particular partes and members being once severed there is no longer a living creature to be among them . . . the subordination of these partes to one another is so great, and the correspondence between them so strict, (the one not being able to subsist without the other, from whom he deriveth what is needefull for him; and againe being so usefull unto that other and having its action and motion so fitting and necessary for it, as without it that other can not be;) as plainly convinceth that that the compound of all these severall partes must needs be one individual thing.”

passions de l'âme (1649) to an “assemblage” (*assemblage*) of organs in human bodies, in which each part is “disposed” in such a way that it sustains the activity of all the others.⁹

The order of organization as a material, lifeless “disposition” of interacting organic parts (especially organs), that represents a necessary condition for the regulating operations of its animating soul or a “plastic force,” was a frequent topos among Cambridge Platonists as Henry More and Ralph Cudworth (cf. Cheung 2008, 41-70). The argument and the terminology (*organizatio*, *dispositio*, *corpus organizatum*) can already be found in Francisco Suárez’s *De Anima*.¹⁰

In many etymological dictionaries and histories of science, John Evelyn’s *Sylva*, first published in 1664, is given as the first usage of the word organism in English.¹¹ However, the word only occurs in a later edition of Evelyn’s book. The full title of Evelyn’s book was *Sylva, Or a Discourse of Forest-Trees, and the Propagation of Timber in His Majesty’s Dominions*. It was published in February 1664 after the Commissioners of the Royal Navy initiated inquiries into the management of woodlands (cf. Bédoyère 1995, 173-180). In January 1660 Evelyn had already presented a paper on the anatomy of trees to the Royal Society and lectured on forest trees in October 1662. This latter lecture was printed as the first part of the book of 1664 (Weld 1848, vol. 1, 101 and 137, footnote 15). After *Sylva*, the book contains two other texts, the *Pomona, or an Appendix concerning Fruit-Trees, in relation to Cider, the Making and several ways of Ordering it* and *Kalendarium Hortense*. The word organism does not appear in *Sylva* nor *Pomona* nor in *Kalendarium hortense*. Only in the enlarged fourth edition of 1706,¹² where *Sylva* is changed to *Silva*, did Evelyn use the word organism (in the plural) in the fourth book of *Silva*.

⁹ Cf. Adam and Tannery 1996, vol. 11, 351: “... [le corps humain] est un, & en quelque façon indivisible, à raison de la disposition de ses organes, qui se rapportent tellement tous l’un à l’autre, que lors que quelcun d’eux est osté, cela rend tout le corps defectueux ...”

¹⁰ The text was probably written between 1571-1574 and posthumously published in 1621. Cf. Suárez 1856-1878, vol. 3, 475b and vol. 25, 182a. For the use of the terms among medieval authors, especially within the context of late Aristotelian concepts of individualization, see Des Chene 2000, 94-102; and Cheung 2008, 124-132.

¹¹ See for example Barnhart 1988, 735; Simpson and Weiner 1989, vol. 10, 922; Dardi 1992, 545, footnote 129; Echelard-Dumas 1976, 160, footnote 1. Kucharczik (1998, 22-23) refers also to Evelyn’s *Sylva* for the first usage of the word “organism” in the 17th century. The *Oxford English Dictionary* (1989) quotes a later edition of Evelyn’s *Sylva*, but refers to the edition of 1664 for the first usage of the word. In the thirteenth edition of the *Dictionnaire de médecine* (1873, 1084), Émile Littré and Charles Robin refer to Charles Bonnet for the first usage of the word “organisme” in the eighteenth century. Bonnet never employed the word. The reference still occurs in the twenty-first edition (1905-1908, 1174).

¹² The fourth edition was divided into two parts. The first part contains “Silva,” and the second four other texts: “Terra,” “Pomona,” “Acetaria” and “Kalendarium hortense.”

In a word, so astonishing and wonderful is the *Organisms*, Parts and Functions of *Plants* and *Trees*, that some have, as we said, attributed *Animal* Life to them, and that they were living creatures; for so did Anaxagoras, Empedocles, and even Plato himself. (Evelyn 1706, 353)

In the 1776 edition, edited and enlarged by Alexander Hunter after Evelyn's death, the same passage reads as following:

In a word, so astonishing and wonderful is the organism, parts and functions of plants and trees, that some have, as we said, attributed animal life to them, and conceived that they were living creatures; for so did Anaxagoras, Empedocles, and even Plato himself. (Evelyn 1776, 648)

In both editions, the passage is in chapter XXXV, entitled *An Historical Account of the Sacred.esse, and Use of standing Groves,&c*, included in the fourth book of the first part. The chapter had already been added to the second edition of 1670, but without the section including the word Organism in the fourth edition of 1706. The third edition of 1679 was a reprint of the 1670 edition. The *Historical Account* of 1706 appears later on in various reprints and revised editions.

The word Organism occurs only once in Evelyn's text. It points to a specific form of order "which brings forth the lofty fir-tree, and the spreading oak ... without the least luxation, confusion or disorder of parts" (Evelyn 1706, 261). For Evelyn, the development of trees relies on the perfect order of an "automat" that grows out of grains or minute atoms which contain not only "the fœtus exquisitely formed," but also "a second tree, ... and so on" (Evelyn 1776, 262-264).¹³ Evelyn refers to theories of the preformation of organic order which were first formulated among microscopists as Marcello Malpighi, Jan Swammerdam, and William Croone.¹⁴

Five years before Evelyn, Nehemiah Grew had already used the capitalized word Organism to indicate a form of order in his last book, the *Cosmologia Sacra* (1701).¹⁵ Like Evelyn, Grew was supported by the Royal Society; he had published the main results of his studies in botany

¹³ Cf. Evelyn 1706, 262-263: "Contemplate we again, what it is which begins the motion, and kindles the flame of these *automata*, causing them first to radiate in the earth, and then to display their top in the air ..."

¹⁴ In 1671 Croone, a member of the Royal Society, produced a manuscript paper claiming that preformed embryonic structures can be detected in the unincubated embryo of a chick. In *De la Recherche de la Vérité* (1674), Nicolas Malebranche combined the concept of infinite divisibility of matter and preformation with a theory of insensible grains of trees that are encapsulated in each other.

¹⁵ For the contemporary religious and intellectual context of Grew's *Cosmologia Sacra*, and a brief summary of its content, see LeFanu 1990, 53-55, 143-146.

and plant morphology in 1673 and 1687.¹⁶ In the *Cosmologia Sacra*, the word Organism is frequently used in the second book, in which Grew wanted to show that there is, besides the “Corporeal world,” “a Vital world” of a self-moving power that regulates movements in different ways.¹⁷ However, the “Organism” appears to be just a kind of order of the “Corporeal world.” It represents the “Organizing of a Body.”

. . . the Corporeity of all Bodies, being the same; and Subtily, of all degrees, and in all Bodies, being Essentially the same thing: could any Body, by Subtily, become Vital; then any degree of Subtily, would produce some degree of Life . . . Which is all Subtile Nonsense. Neither can Body be Vital, as it is Organized. For to the Organizing of a Body, these Three Things are required, and no more; viz. Bulk, Figure, and Mixture: Or, that the Parts of the Organ, be fitly Cized, Shaped, and set together.¹⁸

The “Organizing of a Body” appears ten sections later as the “Organism of a body”:

Wherefore, the Organism of a Body, although it hath nothing to do, in the production of Life, as hath been shewed: Yet is necessary, that every Body should have its Organism, agreeable to the Species of Life, in the Vital Principle, wherewith it is endowed. So as hereby to be fitted to receive from, and transfer unto Life, all manner of proper Motions and Impressions.¹⁹

The Organism thus characterizes a specific corporal order that is necessary for the co-operation and mediation between a vital principal and the regularity of a body, in which the vital principle directs and determines

¹⁶Grew 1673 and 1965. The seven chapters of *The Anatomy of Plants* are divided according to the “Method of Nature her self, in her continued series of Vegetation; proceeding from the Seed sown, to the formation of the Root, Trunk, Branch, Leaf, Flower, Fruit, and last of all, of the Seed also to be sown again; all which, we shall, in the same order, particularly speak of” (Grew 1965, 1). For a discussion of Grew’s methodology in *The Anatomy of Plants*, see Anker 2004.

¹⁷Grew 1701, 4-5 and 13-14 (Book I). Garrett highlights the fact that Grew’s late vitalism had been influenced by Henry More, Ralph Cudworth and John Ray. Garrett 2003, 72.

¹⁸Grew 1701, 32-33 (Book II, chap. 1, § 12). Cf. Grew 1965, Dedication to King Charles II: “That by all these Means, the Ascent of the Sap, the Distribution of Aer, the Confection of several sorts of liquors, as Lympha’s Milk, Oyls, Balsames; with other parts of Vegetation, are all contrived and brought about in a Mechanical way.”

¹⁹Grew 1701, 34 (Book II, chap. 1, § 22). He uses the word “Organism” for the first time in chapter four (*Of Compounded Bodies*, § 4) of the first book (Grew 1701, 18). For other references, see Grew, 1701, 42 (Book II, chap. 2, § 11): the “advantageous Organism of the Eye” of birds for a “Quicker Sight”) and 46 (Book II, chap. 3, § 38): “But the Organism of every part of the Brain, particularly, of the Chambers of the Optics, Nerves, in which, if any where in the Brain, the Phantastick Images of Visible Things are made; is altogether different from that of the Eye.”). Grew 1701, 18 (Book I, chap. 4, § 7)) calls the “Organism” also the “natural Structure” of the organic Body. Furthermore, Grew mentions once the “Organism of Mind” (Grew 1701, 78 [Book II, chap. 7, § 51]) as a disposition of faculties for mental activities.

motions. Grew always refers to the “Organism of a Body” and not, as later in the nineteenth century, the body of an organism. Furthermore, this organism is, as a natural structure or pattern of various fibers, lifeless. However, to be organized is not the only property of an “Organ of Nature” in a living body. The organism of an organ never brings “Life” into it.

The Variety of the Mixture, will not suffice to produce Life . . . Unless the Parts of a Watch, set, as they ought to be, together; may be said to be more Vital, than when they lye in confused Heap . . . And although we add the Auditory Nerves to the Ear, the Brain to the Nerves, and the Spirits to the Brain; yet is it still, but adding Body to Body, Art to Subtility, and Engine or Art to Art: Which, howsoever Curious, and Many; can never bring Life out of themselves, nor make one another to be Vital. (Grew 1701, 22 [Book II, chap. 1, § 15])

Grew’s notion of organism came close to Leibniz’s idea of a preexisting organization of organic parts. However, Leibniz developed a metaphysical system of monadic substances. For him, the active force and the body are substantially united in a single, individual monad, although they do not influence each other. For Grew, the active force and the body represent two distinct ontological regimes of the created world, although one regime (the active force) can influence the other through the organism of a body.

Leibniz, Louis Bourguet and the *mécanisme organique*

Leibniz used the words *organisme* (only in singular and in French), *organismus* (in Latin) and *organisation* (in French) to characterize the divine mechanism of organic bodies. The word *organisme* appeared during his middle period, shortly after the publication of the *Discours de métaphysique* (1686), in a letter to Antoine Arnauld of 9 September or 9 October 1687.²⁰ This is currently the earliest known well-documented reference to the word organism in his writings.²¹ Another reference to a text of 1686 in the Academy edition is dated *post quem*.²²

²⁰ According to Fichant, the word *monade* occurs first in Leibniz’s writings in a letter of 1695 to Fardella. Cf. Fichant 2003, 17. See also Rutherford 1995, 166.

²¹ Some historians give a fragment of 1676 as the first use of the word “organismus” in Leibniz’s writings. This fragment was published by Louis Couturat in Couturat 1988, 11-16. Until now, the text has been dated *post quem* to 1708. The date 1676 applies to the preceding fragment.

²² Leibniz 1923 ff., sec. 6, vol. 4, part B, 1615: “Le rapport general et exacte de toutes choses entre elles, prouve que toutes les parties de la matiere sont pleines d’organisme. Car chaque partie de la matiere devant exprimer les autres et parmy les autres y ayant beaucoup d’organiques, il est manifest qu’il faut qu’il y ait de l’organique dans ce qui represente l’organique.” Nunziante gives this passage as

Leibniz's letter to Arnauld has two versions. The first version reads as follows.

Finally, the works of God are infinitely greater, more beautiful, more numerous and better arranged than is commonly thought, and the machine or the organisme, that is to say the order, is essential for them until the smallest details. (Finster 1997, 308)²³

In the second version, Leibniz replaces *organisme* with the word *organisation*.

And above all, the works of God are infinitely greater, more beautiful, more numerous and better arranged than is commonly thought, and the machine or the organization, that is to say the order, is essential for them until the smallest details. (Finster 1997, 344)²⁴

Leibniz referred only once to the word *organisme* in his letters to Arnauld. He normally used various compounds such as organic body, living body and organized body in the plural and the singular.

After 1700, Leibniz more frequently used the French word *organisme* and sometimes also the Latin word *organismus*, as for example in the preface to the *Théodicée* (1710), the *Considérations sur les principes de la vie et sur les natures plastiques* (1705) and in his correspondence with Lady Masham (1703-1716),²⁵ Des Bosses (1706-1716) and Georg Ernst Stahl (1708-1710).²⁶

In Leibniz's writings, the word *organisation* and the word *organisme* shared a common field of meaning. The *organisme des animaux* also rep-

the first use of the word *organisme* in Leibniz's writings (Nunziante 2002, 121-122, footnote 25). See also Fichant 2003, 13, footnote 27.

²³ "Enfin que les œuvres de Dieu sont infiniment plus grandes, plus belles, plus nombreuses, et mieux ordonnées qu'on ne croit communément et que la machine ou l'organisme c'est à dire l'ordre leur est comme essentiel jusque dans les moindres parties." This version was probably written earlier than the second version. Cf. Finster 1997, 411 (notes).

²⁴ "Et surtout que les ouvrages de Dieu sont infiniment plus grandes, plus belles, plus nombreuses, et mieux ordonnés qu'on ne croit communément et que la machine ou l'organisation c'est à dire l'ordre, leur est comme essentiel jusque dans les moindres parties."

²⁵ Lady Masham wrote in English but used the French word *Organisme* in capitalization. Cf. Gerhardt 1978, vol. 3, 350 and 358.

²⁶ See for example Leibniz, in Gerhardt 1978, vol. 3, 356, 361; vol. 6, 41, 44, 544; vol. 7, 418; and in Couturat 1988, 16. In the *Nouveaux Essais*, Leibniz only used compounds such as *corps organique* or *vivant organique*. It seems that Leibniz did not use the word *organisme* in his correspondence with Louis Bourguet, but the correspondence has not yet been completely edited. Leibniz also referred to the first or second edition of *Sylva* in a comment on the *Monita Sapientiae Christinae* of Hostius (Cologne 1630): "Uti pro hortulanis Almanach Evelini, et Almanach oeconomicae in Colero." (Leibniz 1923 sqq., sec. 6, vol. 2, 150) The text is dated post quem Oct.-Nov. (?) 1671.

resented for him the *organisation des animaux*.²⁷ The *organisme* and the *organisation* (or *organisation vitale*)²⁸ are principles of order that belong to the divine mechanism of nature.²⁹ They are essential to matter because they result from compossible sets of primary possibilities that have been chosen by God according to the criterion of unity in diversity within the best of all possible worlds.³⁰ The organism is thus not a product of time nor a generic name for individual living bodies. The parts of the world are full of an organism (*pleines d'organisme*) (Leibniz 1923 sqq., sec. 6, vol. 4, part B, 1615), and not of organisms, and the organism is not an individual living organism, but an organism of living bodies or things (*organismus viventium*).³¹

Within the discourse of natural history, Louis Bourguet referred to Leibniz's notion of organic order as an *organic mechanism* (*mécansime organique*) of interrelated inner forms (*moules*) in plants and animals.³² Combined with certain active *corpuscles*, these forms act like small, self-active machines, although their systemic interaction is not, as in Giovanni Alfonso Borelli's *De motu animalium* (1680-1), just mechanical. Bourguet discussed the *organisation* of these bodies in his *Lettres philosophiques sur la formation des sels et des cristaux* (1729). The development of germs of plants and animals depended for him on a specific primitive regulating constitution or "divine Predelineation" (*Prédelinération divine*) which he analyzed in the third and fourth letters of the *Lettres philosophiques*. Bourguet used the word *organisme* to describe the systematic constitution (*constitution systématique*) or composition (*composition*) of the world, in which the particular systems (*systèmes*

²⁷ Cf. Leibniz, Préface, *Théodicée* (organisation); in Gerhardt 1978, vol. 6, 42; and Letter to Clarke on August 18, 1716 (organisme); in Gerhardt 1978, vol. 7, 418.

²⁸ Leibniz, *Nouveaux Essais* II, 27, § 6; in Leibniz 1923, vol. 5, 215.

²⁹ Leibniz, in Couturat 1988, 16: "Natura enim cum a sapientissimo artifice fabricata sit, ubique in interioribus organica est. Et nihil aliud organismus viventium est quam divinius mechanismus in infinitum subtilitate procedens."

³⁰ Leibniz, Letter to Arnauld on 9 September or 9 October 1687 (organisation), in Gerhardt 1978, vol. 2, 126. However, in a letter to Lady Masham, 30 June 1704 (in Gerhardt 1978, vol. 3, 356), Leibniz once refers to the "organisme" a "natural machine": "... l'organisme est essentielle à la matière, mais à la matière arrangée par une souveraine sagesse. Et c'est pour cela aussi que je définis l'Organisme, ou la Machine naturelle, que c'est une machine dont chaque partie est machine, et par conséquent que la subtilité va à l'infini"

³¹ Leibniz, in Couturat 1988, 16. However, in a letter to Lady Masham, 30 June 1704 (in Gerhardt 1978, vol. 3, 356), Leibniz once refers to the "organisme" as a "natural machine": "... l'organisme est essentielle à la matière, mais à la matière arrangée par une souveraine sagesse. Et c'est pour cela aussi que je définis l'Organisme, ou la Machine naturelle, que c'est une machine dont chaque partie est machine, et par conséquent que la subtilité va à l'infini"

³² Bourguet was in contact with Leibniz and Johann Christian Wolff. The Fonds Louis Bourguet of the Bibliothèque publique et universitaire in Neuchâtel also contains a *Dissertation sur les monades* and a *Défense de la philosophie de Leibniz contre M. de Crousaz*.

particuliers) of plants and animals co-exist.³³ *Corpuscles*, which possess a vital activity, enter into their inner forms.³⁴

The word *organisme* occurs only once in the text. When Bourguet focused on concrete individuals, he always referred (as did Grew) to organized or organic bodies.³⁵ In the *Dictionnaire général de la langue française du commencement du XVIIe siècle jusqu'à nos jours* (1889-1901), Bourguet's *Lettres philosophiques* are cited as the first use of the word in the French context.³⁶ Jean Le Clerc (1657-1735), who translated parts of Grew's *Cosmologia sacra* into French in the first two volumes of his *Bibliothèque choisie* (1703), used for the English term organism the expressions organization and disposition.³⁷

In a letter from the philosopher and natural historian Antonio Schinella Conti to Antonio Vallisnieri in January 1726, Conti referred to Bourguet's *Lettres philosophiques* and his notion of an *organismo del mondo*.³⁸ In an earlier article in the journal *La Gallerica di Minerva* of 1708, organism appeared as a specific form of order or an *organismo meccanico* that corresponded to the expressions of the soul of living bodies (*corpi viventi*).³⁹

³³ Cf. Bourguet 1729, part 2, 8. For the notion of the *échelle des êtres* in Bourguet's writings, see Lovejoy 1936; Barsanti 1992; Diekmann 1992.

³⁴ Bourguet 1729, 66: "J'ai remarqué tantôt que tout étoit organique dans la Nature: Le Règne Minéral autant que le Végétal & l'Animal, quoique dans un ordre fort différent de celui que les Philosophes & les Chimistes ont imaginé. Cet organisme consiste en des Corpuscules d'une petitesse presqu'infinie, dont les figures son géométriques, mais des plus simples . . . Ces corpuscules doués chacun d'une activité vitale convenable à sa figure, entrent dans la composition de tous les Amas qu'il y a dans le Monde matériel."

³⁵ Bourguet was one of the first French naturalists often to use the word organized body (*corps organisé*) instead of organic body. For the influence of Bourguet's terminology on the French natural history, see Schiller 1975, 93.

³⁶ *Dictionnaire général de la langue française du commencement du XVIIe siècle jusqu'à nos jours* . . . , 1924, vol. 2, 1640. The page reference of Bourguet's *Lettres philosophiques* in the article is not correct. Instead of page 66, the author of the article indicates page 6.

³⁷ Cf. Le Clerc 1703-1718, vol. 1 (1703), 361 (*organization d'un corps* instead of "Organism of a Body") and 377 (*disposition de l'Oeil* instead of "Organism of the Eye").

³⁸ Letter of Antonio Conti to Antonio Vallisnieri of January 2, 1726; in Badaloni 1972, 402: " . . . non ho accusato la ricevuta della lettera unita alla dissertazione della dama senese. Fattala trascrivere, io gliel'invierò insieme con la lettera del sig. Borghet. Il suo sistema dell'organismo del mondo contiene una bella idea, ma temo che l'ignoranza in cui siamo de'veri fenomeni e delle vere regole della natura non dia troppo del gusto del nostro secolo." There are 180 letters from Antonio Vallisnieri to Bourguet (from 1710 to 1729) in the Fonds Louis Bourguet of the Bibliothèque publique et universitaire in Neuchâtel.

³⁹ *La Galleria di Minerva* 1696-1717, vol. 6 (1708), 215: "Nel organismo meccanico ò seconda lucubratione, dal principio tratta de spiriti degli animali, loco materia, generatione, virtù, e modo d'operare, secondo le loro figure, tutto sempre corrispondente a primi principii, poi passa all'Anima immortale . . ." The author of the article resumes Santanello's *Lubricationes physico-mechanicae* (1705) (see footnote 53 of this essay for more details on *Lubricationes*). For more references on the occurrence of the word *organismo* in the second half of the 18th century, see A. Dardi 1992; *Nuovo Cortelazzo* 1999.

Later on, Linnaeus used the Latin word *organismus* in his essay *Oeconomia naturæ* (1750) to distinguish the preservation (*conservatio*) of inorganic stones from the putrefaction and the development of *corpora organica*.

Stones possess no life and organism, they are hard, and they are not affected by putrefaction or accretion. They thus last for the longest time among all other bodies.⁴⁰

Linnaeus used the word organism in the singular. He referred not to individual organisms, but to a principle of order that is specific for organic bodies.⁴¹ As in William Harvey's theory of blood circulation, Linnaeus claimed that organic bodies are not just material aggregates such as stones, but bodies capable of a spontaneous propulsion of liquids.

The Order of Organism and the Order of Mechanism: Georg Ernst Stahl and The Two Orders of the Living

Georg Ernst Stahl, who between 1679 and 1683 studied medicine, anatomy, and botany at the University of Jena,⁴² frequently used the Latin word *organismus* in some of his texts.⁴³ It had already appeared in Stahl's doctoral thesis *De Intestinis, eorumque Morbis ac Symptomatis, eognoscendis & curandis* of 1684.⁴⁴ In this thesis, Stahl distinguished between animated bodies that have a regulating soul, the *Dirigens microcosmicum*, and aggregates of a more or less confused order (Stahl 1684, A2 [1]). He referred in general to two different classes of animated bodies,

⁴⁰ Linné, *Oeconomia naturæ*, diss. [1749], resp. J.C. Biberg 1750, § 4: "Quemamodum vita & organismo destituuntur lapides, & duriores sunt, nec putredini aut accrescentiæ obnoxii, sic etiam prae ceteris omnibus diutissime perdurant."

⁴¹ In the German translation of 1777 (*Des Ritter Carl von Linné auserlesene Abhandlungen aus der Naturgeschichte, Physick und Arzneywissenschaft*, Leipzig, 1777, vol. 2, 36), *organismus* is translated with "organs."

⁴² One of his teachers was the iatrochemist Georg Wolfgang Wedel. See Gottlieb 1943, 452-462; Geyer-Kordes 2000, 16.

⁴³ Cf. Stahl, *De mechanismi et organismi diversitate* (1706), in Stahl 1708, 6, 13, 16, 17, 18, 52. See also Stahl 1696.

⁴⁴ The doctoral thesis is dated January 1684. The president of the jury was Rudolf Wilhelm Krauß (or Crause). Cf. Stahl 1684, B2 [54 pages, without page numbers] [9], title of sec. I, part 2: "PHYSIOLOGICUM. De officio, & sine organico Intestinorum, seu Organismi eorum Formali." See Stahl 1684, E3 [35], sec. II, part 2 ("organismus formalis"), and F1 [38], sec. II, part 2, art. 2 ("organismus materialis" as "texture" [*textura*] and "organismus formalis"). Later editions are from 1704 and 1711.

the human bodies and the animal bodies.⁴⁵ Stahl also distinguished between the material and the formal conception of organs. This distinction is analogous to the difference between concrete bodies (*corpora certa*) and organic bodies or instruments (*corpora Organica, seu Instrumenta*) (Stahl 1684, A2 [2]). The material conception of concrete bodies is mechanical and the formal conception of organic bodies is operational or instrumental (Stahl 1684, B3 [11]). The latter explains the usage of parts and the purposefulness of the order of the whole body. Stahl called this order a formal organism (*organismus formalis*). The corporeal order of organic bodies represents for him a material organism (*organismus materialis*) or texture (*textura*) (Stahl 1684, B2-C1 [9-16]).⁴⁶

In *De motu tonico vitali* (1692) and in *De mechanismi et organismi diversitate* (1706), Stahl often used the word *Organismus* (in the singular and with capitals) in opposition to a categorically different principle of order, the *Mechanismus*. As a general principle of order of organic or living bodies, the *Organismus* does not represent a generic name for the *corpora viva*.⁴⁷ However, the principle is proper to living bodies.

It would be very strange to call the right disposition of the parts of the body, such as curves, filaments, tendons, joints, beams, handles, small wheels, wells, pumps, canals, cataracts, flaps, sieves, and who knows what, a vital principle. And it would also be strange to use only [the mechanism] of ... pneumatic or hydraulic machines to produce living bodies. This would result in an eternal confusion between mechanism and organism.⁴⁸

Stahl's notion of organismic order, in which the soul influences or informs the organic body, was criticized by Leibniz, for whom the soul and the body could only express themselves in a pre-stabilized harmony as if they influenced each other. Unlike Stahl, Leibniz frequently used the word *organisation* and the compound *corps organisé* in the singular and the plural.⁴⁹

⁴⁵ In his French translation of Stahl's work, Blondin often used the word organism for various other Latin terms (for example "corpus organicus"). Cf. Blondin 1859-1863, vol. 3, 11-12.

⁴⁶ For the notion of life and organism in Stahl's writings, see Duchesneau 1976; Geyer-Kordesch 2000, 159-179; De Ceglia 2000, 33-40; Cheung 2007.

⁴⁷ Stahl 1684, A2 (1-3). In Ideler's German translation of *De mechanismi et organismi diversitate*, published in 1831, the word "organism" occurs in plural (*Organismen*) although Stahl refers only to the singular. Cf. Ideler 1831, vol. 1, 12, 19.

⁴⁸ Stahl 1708, 29 (§ 22): "Quin à veritate alienissimum esset, principium *vitale* vocare: justam dispositionem partium corporis, tamquam elateriorum, filamentorum, funiculorum, catenularum, trabium, vectium, rotularum, cisternarum, antliarum, canalium, cataractarum, valvularum, cribrorum, und wer weiß noch mehr; aut ex machiniis, pneumaticis, hydraulicis ... strictam applicationem ad corpus vivum formare. Sic enim confusio Mechanismi & Organismi, in perpetuum succedet." Cf. Stahl, *De mechanismi et organismi diversitate*, (1706), in: Stahl 1708, 17.

⁴⁹ Leibniz, in Gerhardt 1978, vol. 2, 126; vol. 5, 214 and vol. 6, 42. Duchesneau, Hartmann and

Stahl's concept was also rejected by Christian Wolff, whose ontology dominated teaching at German universities in the first half of the eighteenth century. Wolff drew a sharp line between the ontology and the mechanical physiology of organic bodies.⁵⁰ He avoided the word *organism* and used only compounds such as *organic* or *living body*.⁵¹ It is thus unsurprising that the author of the entry *Organismus* in the twenty-fifth volume of Zedler's dictionary (1740), whose main editor, Carl Günter Ludovici, supported the Wolffian school,⁵² referred to the mechanical order of the *Organismus* as an *Organicum Mechanismum*.⁵³

Basler cites this article as the first occurrence of the word *Organismus* in German.⁵⁴ In *Philosophische Betrachtung des menschlichen Körpers überhaupt* (1750), Johann August Unzer defined the order of *Organismus* as a dynamic whole in which the movements of the composed machine correspond to the perception of the soul in animals and humans.⁵⁵ However, between Georges Buffon's *Histoire naturelle générale et particulière* (1749-1789), Charles Bonnet's *Considérations sur les corps organisés* (1762) and Georges Cuvier's *Leçons d'anatomie comparée* (1800-1805), the compounds *corps organique*, *corps organisé*, or *corps vivant* were, in

Carvallo have discussed the differences between Leibniz's and Stahl's theories of organic order. Cf. Duchesneau 1995; Hartmann 2000; Carvallo 2004. Among Stahl's pupils, see for example Georg David Coschwitz 1725 for the opposition between "Organismus" and "Mechanismus."

⁵⁰ For Wolff's ontology and physiology, see Cheung 2004b.

⁵¹ Cf. Wolff 1981, 334-377; 349 (§ 3, "belebten Körpers") and 355 (§ 5, "lebendiger Körper").

⁵² Ludovici, the main editor of the volumes 19-68, wrote a long article on Wolff's philosophy in the dictionary and published also a book with title "Ausführlicher Entwurf einer vollständigen Historie der Wolffischen Philosophie" in three volumes (1737-1738).

⁵³ *Grosses vollständiges Universal-Lexicon aller Wissenschaften und Künste* 1732-1754, vol. 10, c. 1866: "ORGANISMUS, ist nichts anders, als die Einrichtung der Theile eines organischen Körpers. Er ist wenig oder gar nicht von dem Mechanismo unterschieden, vielweniger kan er, wie von einigen geschieht, dem Mechanismo entgegen gesetzt werden. Will man unter beyden einen Unterscheid machen, so kan solcher in nicht anders bestehen, als daß der Mechanismus die Einrichtung der Theile aller und jeder Körper; der Organismus aber die Theile nur organischer Körper andeute ... Ja man könnte den Mechanismum eintheilen in Organicum Mechanismum und Non-Organicum Mechanismum, welches also zwey Arten des Mechanismi generalis wären." Adelung's *Grammatisch-Kritisches Wörterbuch* of 1777, however, only carried a short article about the word *Organ*, but no entry for the word *organism*. In *Lubricationes physico-mechanicae* (1705), Ferdinando Santanello already referred to an *Organismus mechanicus*. Cf. Santanello 1705, 71. It is also in this text that the word *Organismus* occurred in the plural. Cf. Santanello 1705, 81: "Concludendum igitur censeo, quem spiritus in istis partibus recipiunt, inter cæteros omnes alios organismos recipere in qualibet alia parte corporis possent, considerari ritè deberi, cùm ex hoc organismo, non solum operationes puræ naturales, & materiales tanguntur, sed etiam seminaturales, sive animales materiales; ..."

⁵⁴ *Deutsches Fremdwörterbuch* 1913-1988, vol. 2, 267.

⁵⁵ Cf. Unzer 1750, 158: "Die thierische Natur, oder der Organismus überhaupt ist der Inbegriff aller harmonischen Bewegungsvermögen und Kräfte eines thierischen Körpers. ... Ein thierischer Körper ist eine natürliche zusammengesetzte Maschine, die mit einer Seele in der genauesten Gemeinschaft steht." Unzer frequently used the word *Organismus* in the first section of the fourth part (Unzer 1750, 158-170).

general, used solely to refer to individual living bodies.⁵⁶ Only during the final decades of the eighteenth century did the reception of French *histoire naturelle* and the reaction to Kant's transcendental philosophy initiate new discourses on the natural order of organized bodies in the German context.⁵⁷ These discourses resulted in a new terminology.⁵⁸

Individual Organisms: the Organismic Turn in German Idealism

Around 1800, the word organism can be found in the singular and the plural in Kant's later philosophy. Kant used the word not only for a principle of cosmological order, the "total nexus" of mutual relations between all beings, but also for subjects.⁵⁹ Subjects exist as a part of the general organism of nature, but represent also an individual Organism.⁶⁰ This double occurrence of the word Organism both for a principle of order and also as a generic name of individuals is characteristic for a shift in German idealism after Fichte's seminal lectures on the "I" as an absolute subject.⁶¹ German philosophers tried to find a model in nature that corresponded to the idea of an absolute unconditioned (*unbedingt*) unity of the "I" and its capacity of experiencing the world. In the *Erster Entwurf eines Systems der Naturphilosophie*, a sketch for lectures of 1799, Schelling referred to

⁵⁶ Magdeleine de Saint-Agy employs the word "organisme" in the last volume (1845) of the *Histoire des sciences naturelles*. Cf. Cuvier and Saint-Agy 1969 (1841-1845), vol. 5 (1845), 313-435. Only the second and a part of the third volume relied on Cuvier's lectures on the history of science at the Collège de France. Cf. Cuvier and Saint-Agy 1969 (1841-1845), vol. 5 (1845), 434. Diderot and Jean Charles de Grimaud refer to the "organisme" as a principle of order that is different from the "mécanisme." Cf. Diderot, *Encyclopédie*, vol. 6 (1756, "Fibre," 670) and 11 (1765, "Nutrition," 260); and Grimaud 1787, 16: "La différence essentielle qu'il y a entre le simple mécanisme & l'organisme, c'est que dans l'organisme l'appareil instrumental est appliqué par un *principe* à des fins prévues & déterminées."

⁵⁷ In the French context, it is Pierre Maine de Biran who first quite frequently used the word *organisme* for individual entities, for example in *Nouvelles considérations sur les rapports du physique et du moral de l'homme*. The text has been first published by Victor Cousin in 1834.

⁵⁸ For the influence of Stahl's theory on such German naturalists and philosophers as Johann Christian Reill and Schelling, see Gottlieb 1943, 488-502. Stahl's critique of mechanistic models of organic order played also an important role in the debates at the medical school of Montpellier.

⁵⁹ For a discussion of the notion of organismic order in Kant's posthumous writings, see Debru 1980; Löw 1980, 272; Düsing 1986, 164 sqq.; Outram 1986; Mathieu 1989, 226 and 235-238.

⁶⁰ Kant 1902ff., vol. 21, 187 and vol. 22, 78. Kant normally used compounds such as "organische Körper" (cf. *Critique of Judgment*, §§ 65, 73, 75, 80, 81, 82), "organisierte Körper" (cf. *Critique of Judgment*, § 8), "organisierte Produkte" (cf. *Critique of Judgment*, §§ 65, 67, 75), "organisierte Geschöpfe" (cf. *Critique of Judgment*, § 64), "organisierte Naturdinge" (cf. *Critique of Judgment*, § 82) and "organische Naturwesen" (cf. *Critique of Judgment*, § 78).

⁶¹ Fichte, "Grundlage der gesammten Wissenschaftslehre als Handschrift für seine Zuhörer" [1794], in Fichte 1971, vol. 1, 83-328.

the mediating process between the “I” and the world (or the “Non-I”) as an “assimilation” of the “Non-I” into the “I.”

To save the unchangeable identity of your I, you must by necessity elevate the Non-I, of which plurality is the original form, to identity and assimilate it, so to speak, to the I.⁶²

The word assimilation had already been used in medieval *species*-theories of perception and in physiologies that refer to the Greek term “*homoioōsis*” (ὁμοίωσις). Around 1750, it became a well-established expression among natural historians such as Buffon and Bonnet.⁶³ They used it to explain the process of appropriation of outer particles into the inner order of organic bodies.

Bonnet’s model of preformed germs described a process through which an organized unity differentiates and develops into multiple but interrelated structures that have a systematic relationship with the surrounding world (cf. Cheung 2004c). Schelling called the product of such a continuous self-differentiating process an *individuellen Organismus*.⁶⁴ In his *Naturphilosophie*, Schelling also focused on the general organism of nature (*allgemeiner Organismus der Natur*) and the recurrence in the microcosm of the individual organism.⁶⁵ As in Kant’s posthumous writings and Bonnet’s theory of organized bodies, the individual organism represented for Schelling a particular system within the systemic and organic macrocosm of nature: such a conception, informed by neoplatonic and alchemic thoughts, had already played an important role in the writings of Paracelsus, Boehme, More, Cudworth, and in the mystic visions of the Freemasons.⁶⁶ Thus by the end of the eighteenth century, many German philosophers, writers and naturalists,

⁶² Schelling, *Erster Entwurf eines Systems der Naturphilosophie* (1799), in Schelling 1856-1861, sec. I, vol. 1, 193-194. For the notion of process in Schelling’s natural philosophy, see Breidbach 1999b, 147-160.

⁶³ For the use of the Greek term, see Aristotle’s *species*-theory in *De Anima*, 429a, 17-18, and Galen’s model of organic assimilation in *De usu partium*, Book I, chap. 8 and 11. English physiologists and anatomists also used the term. Cf. Grew 1687, 3 (§ 6); Evelyn 1706, 263. For the French context, see Rheinberger 1986.

⁶⁴ Schelling, *Erster Entwurf eines Systems der Naturphilosophie* (1799), in Schelling 1856-1861, sec. I, vol. 3, 19.

⁶⁵ Schelling, *System der gesamten Philosophie* (1804), in Schelling 1856-1861, sec. I, vol. 6, 301. See also Schelling, *Von der Weltseele. Eine Hypothese der Höhern Physik zur Erklärung des allgemeinen Organismus* (1798), in Schelling 1856-1861, vol. 3.

⁶⁶ Cf. Böhme 1988, 55-64 and 192-198. Stahl referred to the microcosm-macrocosm relation at the beginning of his doctoral thesis of 1684 (Stahl 1684, A2 [1]). For the influence of Paracelsus and van Helmont on Stahl’s notion of living bodies, see Pagel 1915, 301; Gottlieb 1943, 32. Grew also had contacts with iatrochemists. From 1663 to 1671, he studied medicine and natural philosophy at the University of Leiden, where one of his teachers was the Paracelsian chemist Franciscus de le Boë. See Hunter 1989, 275; LeFanu 1990, 2-3.

such as Herder, Hamann, Goethe, Schiller, Hegel, Novalis, Oken, Alexander von Humboldt,⁶⁷ Carus, and Ritter, all discussed the microcosm-macrocosm relationship.⁶⁸ They all used the word *Organismus* in this context.⁶⁹

De toto in entibus: The Micro-Macrocosm Problem in Naturphilosophien and Physiological Anthropologies⁷⁰

In his *Lehrbuch der Naturphilosophie* (1808-11), Lorenz Oken defined organisms as entities in which the whole is represented in its parts and the part transforms into the whole. Oken called these parts cells or vesicles (Bläschen; Oken 1805). The *Organismus* is a self-differentiating system of “cells.”

An individual, entire and moved body that is closed in itself and stimulated through itself, is called *Organism* ...⁷¹

⁶⁷ Alexander von Humboldt used the word organism in *Ideen zu einer Physiognomik der Gewächse* (A. von Humboldt 1807, 18), a lecture that was given in 1805 in Berlin. The word does not occur in Agustin-Pyrame de Candolle's writings.

⁶⁸ In *Ideen zur Philosophie der Geschichte der Menschheit*, Herder used the expression *Organismus der Natur* to explain the *uniformity (Gleichförmigkeit)* of the inner order of living bodies and the outer order of nature: “... der gleichförmige Organismus der Natur von Innen und Außen, wenn man ihn recht bestimmt, bleibt in allen Bildungen des Lebendigen unverkennbar”, (Herder 1877-1913, vol. 13, 116). See also Hegel, *Jenaer kritische Schriften* (1801), in Hegel 1999, vol. 1, 407; and *Phänomenologie des Geistes* (1807), in Hegel 1999, vol. 1, 155. Ludwig Börne (1808) compared the human “organism” with the “organism” of a state: “Man kann sich daher den menschlichen sowie jeden andern Organismus als einen Staat vorstellen, worin zwar sämtliche verschiedene Glieder einer gemeinschaftlichen Lebensregel unterworfen sind, wo aber jedes für sich wieder seine eigentümlichen Gesetze hat, die es befolgt . . .” (Börne 1964-1968, vol. 1, 74). The word *Organismus* appears further in many other German texts of this period, for example in the writings of Friedrich Matthison (1795), Christoph Wilhelm Hufeland (1797) and Adolph Eschenmayer (1799). For exact references, see *Deutsches Wörterbuch* 1854-1971, vol. 7, c. 1339-1340; and *Deutsches Fremdwörterbuch* 1913-1988, vol. 2, 267.

⁶⁹ After Johann Georg Hamann and Johann Wilhelm Ritter had referred to the notion of “living language” (*lebende Sprache*), Wilhelm von Humboldt frequently used the expression *Organismus der Sprache*. See Hamann, “Beilage zum 37sten Stück der Königsbergischen gelehrten und politischen Zeitung” [1772]. In: *Sämtliche Werke* 1949-1957, vol. 3, 22; Ritter 1984, 270-277; and von Humboldt 1994, 16-17. For the expression “Organism”, which occurred besides *Organismus*, see Hahnemann 1829, 22, 23, 26, 29, 118, 122.

⁷⁰ Friedrich Hildebrandt refers to the expression “physiological anthropology” in his *Lehrbuch der Physiologie* (1799). Cf. Hildebrandt 1799, 1-2 (§§ 1-2).

⁷¹ Oken 1809-1811, vol. 2 (1810), sec. 817, 10: “Ein individualer, totaler, in sich geschlossener, durch sich selbst erregter und bewegter Körper, heisst *Organismus* . . .” Cf. Oken 1809-1811, sec. 831, 12: “Ein Organismus ist ein Individuum.” Oken already used the word *Organismus* in 1802 (*Grundriss der Naturphilosophie der Theorie der Sinne, mit der darauf gegründeten Classification der Thiere*) and 1805 (*Abriss des Systems der Biologie. Zum Behufe seiner Vorlesungen*).

In Oken's cosmology, individual organisms were also parts of the all-embracing "organism" of nature, itself characterized as a continuous alchemical process of the analysis and synthesis of elements (earth, water and air) according to specific principles of interaction (magnetism, chemical law and galvanism; Oken 1809-1811, 5-9). As in other Romantic concepts of nature,⁷² Oken held that each organism individually repeated the order of the living world. The recapitulation of the whole in the parts is most explicit in the embryonic development of higher organisms. They transform from one lower organizational form into another until they reach their grade of perfection.

Like Oken, Goethe also focused on processes of individualization through the repetition and metamorphosis of parts (leaves or vertebrates) that potentially represent the *Organismus* as an integrating whole.⁷³ However, Goethe rarely used the word organism.⁷⁴ In his essay *Grundzüge der allgemeinen Naturbetrachtung* (1832), Carl Gustav Carus combined Goethe's notion of metamorphosis with the order of micro-macrocosm.

Each living being, in so far as it is out of itself a means for the various effects that it has to operate, that is to say in so far as it forms tools or organs, is called *organism*. – Nature, in so far as she restlessly evokes new phenomena of its inner life, is the organism per se (macrocosm). Each natural being, that forms itself, is called partial-organism (finite-individual organism, microcosm), in so far as it can only exist within the general organism of Nature, and its development is only possible through the influence of the general life of Nature.⁷⁵

In his *Lehrbuch der Physiologie des Menschen* (1809), Friedrich Ludwig Augustin, professor of pharmacology at the Collegio medico-chirurg-

⁷² For further references, see Gusdorf 1993, 143-170.

⁷³ Goethe criticizes Oken for his ontological claims and romantic mysticism. Cf. Schmitt 2001.

⁷⁴ Goethe, "Zur Morphologie", vol. 1 (1817), in Goethe 1988, vol. 13, 56 and 58. The passages are part of an introduction that is dated in Jena 1807 ("Die Absicht eingeleitet"). Goethe's *Die Metamorphose der Pflanzen* was published in 1790.

⁷⁵ Carus, "Grundzüge der allgemeinen Naturbetrachtung (Einleitung zu den noch ungedrucktem Werke über die Ur-Theile des Schalen- und Knochengerüsts von D. C. G. Carus)," in Goethe 1817-1823, vol. 2, 84-95, 87: "Jedes lebendige Wesen, inwiefern es aus sich selbst Mittel seiner verschiedenen auszuübenden Wirkungen, d.i. Werkzeuge, Organe, erschafft, heißt *Organismus*. – Die Natur, inwiefern sie rastlos neue Erscheinungen ihres inneren Lebens hervorruft, ist der Organismus schlechthin (Makrokosmos). Jedes einzelne sich aus sich selbst entwickelnde Naturwesen, inwiefern es nur im allgemeinen Organismus der Natur bestehen kann, ... heißt Theil-Organismus (endlich-individueller Organismus, Mikrokosmos), und seine Entfaltung ist nur unter Einwirkung des allgemeinen Naturlebens möglich." Carus later systematically employed the word organism in *Psyche. Zur Entwicklungsgeschichte der Seele* (1846).

gico in Berlin, defined the organism as a micro-macrocosmic monadic unity.⁷⁶ Like Augustin, Gottfried Reinhold Treviranus, Carl Friedrich Burdach and Johann Michael Leupoldt all explained the organism as a dynamic individual system that repeats in itself, as a part of the general organism, the organic order of nature.⁷⁷

The State of Life of “Organisms” in Medicine and *Lebenserhaltungslehren*

At the end of the eighteenth century, the micro-macrocosm problem transformed into a field of knowledge that focused on medicine and dietetics or doctrines on how to sustain and extend life (*Lebenserhaltungs- or Lebensverlängerungslehren, Heilkunden*). Christoph Wilhelm Hufeland’s influential *Makrobiotik oder die Kunst das menschliche Leben zu verlängern*, first published in 1796, was characteristic for a discourse that combines physiological models with a Galenic tradition of modifying influences of outer agents or circumstances – the so-called *sex res non naturales*: light and air, food and beverage, exercise and rest, sleeping and wakening, secretion and excretion, and affections of the soul. On the basis of these models and circumstances, doctrines of dietetics referred to rules that change or maintain certain states of life (*Lebenszustände*) between health, illness and death.⁷⁸

The term *Organismus* rarely occurred in Hufeland’s *Makrobiotik*.⁷⁹ He used it more frequently in *Ideen über Pathogenie und Einfluss der Lebenskraft auf Entstehung und Form der Krankheiten* (1795) and in *System der practischen Heilkunde. Ein Handbuch für academische Vorlesungen und für den practischen Gebrauch* (1800-1805) (Hufeland 1795, 71, 104, 127, 145, 147, 151, 175, 207, 237; 1800-1805, vol. 1, Vorrede, xi-xiii, 15-16, 19, 23, 28, 30, 46). Hufeland criticized John

⁷⁶ Augustin 1809, vol. 1, 65-66 (§ 19): “Jeder Organismus ... hat das Eigenthümliche, dass in ihm die vollkommenste Einigung der Vielheit in Einheit statt findet, d. i. dass das Besondere dem Ganzen vollkommen gleich ist, so dass das Ganze in dem Besonderen lebt, aber auch wieder ein Einzelnes und in seiner Art vom Ganzen verschieden, dass jedes Glied im Organismus in der Totalität und in der Einheit lebt, jedes Organ als ein Ganzes für sich gebildet ist, sein eigenes Leben hat, ... Jedes organische Wesen ist selbst eine Welt in sich. Alles Gesagte gilt von dem Organismus der Welt eben sowohl als von jedem einzelnen organischen Ganzen auf ihr ...”

⁷⁷ Treviranus 1802-1822, vol. 1, 37, 68; Burdach 1810, 67-72; Leupoldt 1834, vol. 1, 56-57.

⁷⁸ For the German context of *Lebenserhaltungskunden*, see Schönfeld 1988; Pfeifer 2000; Nowitzki 2005.

⁷⁹ Cf. Hufeland 1860, 41: “Die nächsten Wirkungen der Lebenskraft sind, nicht bloß Eindrücke als Reize zu percipiren und darauf zurück zu wirken, sondern auch die Bestandtheile, die dem Körper zugeführt werden, in die organische Natur umzuwandeln (d. h. sie nach organischen Gesetzen zu verbinden) und ihnen auch die Form und Structur zu geben, die der Zweck des Organismus erfordert (d. h. die plastische Kraft, Reproductionskraft, Bildungstrieb).”

Brown's doctrine of excitability as a theory according to which organic bodies passively receive outer stimuli and react to them.⁸⁰ For Hufeland, excitable living beings (*erregbare lebende Wesen*) possess active life forces that regulate organic processes, but that are also themselves modified through inner and outer mechanical and chemical operations.⁸¹ In his physiology and medicine, Hufeland thus combined stimuli-reaction-schemes with the life-force discourse and the Hippocratic notion of a self-healing *vis mediatrix naturae* to outline the conditions of existence and the various states of life of a new agent.⁸²

Hufeland clearly distinguished between organization (*Organization*) and organism (*Organismus*). The organic "organization," as a certain mechanical and chemical order of parts or fluids (especially of the blood), represents the material condition of life. It can gradually convert into disorganization (*Desorganization*).⁸³ However, the regulative, dynamic properties of the life forces of living beings, that are, as potentials, already activated in the egg, cannot be reduced to their organization.⁸⁴ Both sets of properties constitute the organism as an individual and self-sustaining entity that exists and acts as long as it is alive – although the dead body of an organism still shows for a certain time some degrees of organization. Each organization thus results from the regulating laws of the organism (*Gesetze des Organismus*), and yet each organism can only live because it is organized.

. . . I think that organization is nothing else than the fixation and the formation of components according to the laws of organism"⁸⁵

⁸⁰ Hufeland 1860, 9-10. For Brown's doctrine of excitability, see Brown 1795; Tsouyopoulos 1988.

⁸¹ Cf. Hufeland 1795, 9-10.

⁸² Hufeland referred, for example, to Johann Friedrich Blumenbach's formative drive (*Bildungstrieb*). Cf. Hufeland 1795, 65-66. For the life-force discourse, see Lenoir 1982.

⁸³ Cf. Hufeland, *Von dem Rechte des Arztes über Leben und Tod* (1823; Hufeland 1834, 244-294: 248 and 293).

⁸⁴ Cf. Hufeland 1795, 53. In *Bemerkungen über Galls Gehirnorganenlehre* (1805), Hufeland also contrasted the organization of human bodies, that determines actions through material structures, with the self-activity and spontaneity of their non-material soul or spirit (*Geist*). Cf. Hufeland 1805, 141-144.

⁸⁵ Hufeland 1775, vol. 1, 71: "Aber unter Organisation kann ich mir nichts anders denken, als eine nach den Gesetzen des Organismus bewirkte Bindung und Formation der Bestandtheile, und auch flüssige Körper können eine solche Organisation haben." Cf. Hufeland 1800-1805, vol. 1, 51: "Organisation (eine bestimmte chemische Mischung, Textur und Form der Materie)"; Hufeland 1800-1805, vol. 1, 59-60: "Wir müssen dabey weiter zurückgehen, auf den wesentlichen Begriff des Lebens. Die Lebensoperation ist ein zusammengesetzter Prozess. Materielle Stoffe von aller Art werden dabey in ein ganz neues eigentümliches Verhältniss gesetzt, so dass sie da ganz eigne, in der unbelebten Natur nicht anzutreffende, Verbindungen eingehen, ganz neue, somit nirgends zu findende Produkte bilden, und Kräfte äussern, die in der unbelebten Natur ganz unbekannt sind, und die wir daher Lebenskräfte nennen. Die Ursache aber, wodurch diese Stoffe diesen eigentümlichen Charakter

While Hufeland normally used the term *organism* only in the singular,⁸⁶ Georg August Berlele's *Versuch einer Lebenserhaltungskunde* (1803) marked a threshold of the occurrence of the word in the singular and the plural within the fields of anthropology and dietetics.⁸⁷ In the first part of *Versuch*, in which Berlele defined certain basic notions of organic order, he systematically replaced the various expressions for living beings, such as *organized body*, *organic body*, *living body*, *living being*, through the word *organism* (*Organismus*; cf. Berlele 1803, 1-10). He referred to different types of organisms in the *scala naturae* – especially the human organism (*menschlicher Organismus*) – and distinguished between different states of healthy organisms (*gesunde Organismen*) and ill organisms (*kranke Organismen*; cf. Berlele 1803, 4-5 and 9). Berlele's dietetical rules of the healthy organism (*diätetische Regeln des gesunden Organismus*) are based on a dialectic between the spontaneous self-act-

erhalten, sind eben diese lebendigen Kräfte. Es erhellt hieraus, dass das Wesen der Lebensoperation ein beständiger Zirkel, eine beständige Wechselwirkung ist, wo unaufhörlich durch die Materie die Kraft, und durch die Kraft die Materie bestimmt wird." ; Hufeland 1800-1805, vol. 1, 71 ("Kenntniss des materiellen Zustandes des Organismus"); Hufeland 1800-1805, vol. 1, 220 ("die Selbsterhaltung des Organismus"). In a similar way, Joachim Dietrich Brandis distinguished between *Organismus* and *Organisation* in *Pathologie oder Lehre von den Affekten des lebendigen Organismus* (1808). Cf. Brandis 1808, 4: "Diese Tendenz zur organischen Zweckmäßigkeit oder Lebenskraft kann nicht als einem einzelnen Theile der Organisation eigen gedacht werden; sie ist keine materielle Zumischung von ponderablen Stoffen zu andern nach den im begrenzten Raume statthabenden Gesetzen der Affinität, sondern sie ist eine dem ganzen lebendigen Organismo eigene Kraft ..." William Cullen, who normally used the words *living animal* and *living system*, also referred to the term *organization*, as an expression for the order of solid parts. Cf. Cullen 1785, 10, 11, 62 and 17: "The properties of the solid parts are also varied by the state of their organization. This every where depends upon an arrangement of fibres, the state of cellular texture, or upon a texture of vessels; and therefore, to explain the different states of organization, it will be enough to mention the causes of the differences which occur in these fundamental parts."

⁸⁶ One of the first occurrences of the plural *Organismen* is in Hufeland's essay *Die Welt des Lebens* (1815). Cf. Hufeland 1834, 59. After 1820, Hufeland referred more often to the plural, especially in *Atmosphärische Krankheiten und atmosphärische Ansteckung* (1824), in which he focussed on inside-outside relations of living beings and on maladies that are caused by the atmosphere. Cf. Hufeland 1834, 296: "Unter Krankheit der Atmosphäre verstehe ich nicht die gewöhnlichen in die Sinne fallenden Veränderungen der Atmosphäre, welche als äussere Ursachen, so wie jedes äusserer Agens, Krankheit erregend auf die Organismen wirken können, sondern eine gewisse fehlerhafte Beschaffenheit des Innern der Atmosphäre selbst, welche, oft ohne alle sinnlich bemerkbaren Veränderungen derselben, eine so bestimmte Form und Qualität, ja ein so productives inneres Leben, hat, dass sie dasselbe in eben dieser bestimmten Form, Qualität, selbst Localität, den menschlichen, thierischen, ja selbst vegetabilischen Organismen mittheilen, das heisst, dieselben mit einer bestimmten Krankheit anstecken kann."

⁸⁷ For Berlele's definition of dietetics, see Berlele 1803, 1: "Eine Zusammenfassung aller jener Regeln, welche den gesetzmäßigen Gebrauch und Nichtgebrauch aller auf und in den menschlichen Organismus einwirkenden Außendinge zu dem Endzwecke bestimmen, daß durch deren Befolgung das Leben, und die Gesundheit des Menschen unter allen Verhältnissen erhalten, und auf das weiteste natürliche Ziel hinausgedehnt werde, heißt gewöhnlich *Diätetik* (Hygiein), und wird vielleicht bestimmt mit dem Worte *Lebenserhaltungskunde* ausgedrückt."

ing organism (*selbstthätiger Organismus*), which modifies and restricts the influence of outer agents, and the effect of outer forces on the activity of the organism (cf. Bertele 1803, 3).

Naturphilosophien, anthropologies, medicine, and dietetics thus formed a dense cluster of the occurrence of the term organism, in the German context. In this cluster, physiological models, that rely on chemical operations between the inside and outside of organic borders, played a crucial role and are tightly related to concepts of milieu-organism-interfaces.

The Individual “Organism” as a Recurrent Technical Term

In the 1790s, the comparative anatomist Carl Friedrich Kielmeyer outlined a *Naturlehre des Organismus* and focused on the material individuality (*materielle Individualität*) of the organism as a specific form of existence (*Dasein*) and organization (*Organisation*).⁸⁸ Like Bertele and Oken, Kielmeyer used the term organism as a generic name for individual entities in the singular and in the plural. According to Kielmeyer, the naturalist who studies the physiology of organic bodies has to search for the

... differences, that the organism – examined in its variability –, and especially its very materiality, reveals of itself at different times, that is, changes that the organism undergoes, suffers or carries out during its existence, and which constitute its life.⁸⁹

While Kielmeyer and Oken still discussed macrocosmic problems of order, Samuel Christian Lucae (1787-1821) referred in his *Entwurf eines Systems der medicinischen Anthropologie* (1816) only to the phenomena of life (*Lebenserscheinungen*) and the order of individual organisms. He defined organisms in the Kantian sense as organized and organizing bodies with interactive parts that support the existence of the whole.⁹⁰

⁸⁸ Kielmeyer 1938, 20 and 52-57. Kielmeyer (1938, 111) also sketched a “allgemeine Naturlehre des Lebens und des Organismus.” For a detailed comparison between Schelling’s and Kielmeyer’s “Naturlehre,” see Bach 2001.

⁸⁹ Kielmeyer 1938, 21: “Verschiedenheiten, die der Organismus – in der Veränderlichkeit betrachtet – und vorzüglich das Materiale an ihm in verschiedenen Zeiten von sich selbst zeigt, d. i. Veränderungen, die der Organismus erfährt, erleidet oder vornimmt während seines Daseins, und die sein Leben ausmachen.” This passage, written between 1790 and 1793, was part of Kielmeyer’s plan to write a book on the anatomy and zoology of animals. See also Kielmeyer 1938, 63-64 (“Über die Verhältnisse der organischen Kräfte untereinander in der Reihe der verschiedenen Organisationen, die Gesetze und Folgen dieser Verhältnisse,” 1793).

⁹⁰ Cf. Lucae 1816, 1: “Den Inbegriff einer gewissen Anzahl zusammengesetzter, mit einan-

During the French reception of the German discourse on organic order, anthropologies and *Naturphilosophien* between 1810 and 1830, the word *organisme* became a more and more frequently used term among French authors.⁹¹ In Georges Cabanis's *Rapports du physique et du moral de l'homme* (1802), the term *organisme* still did not occur.⁹² Rather, it is Théophile Bordeu's "doctrine of organism," as Anthelme Richerand called it in his introduction to Bordeu's *Recherches anatomiques sur la position des glandes et leur action* (1818), and the school of Montpellier (that is closely related to debates about Stahl) that represented the context in which the term organism first systematically occurred in France.⁹³ Bordeu employed the word *organisme* only in the singular in his later essays (for example in *Recherches sur l'histoire de la médecine* (1764), *Recherches sur les maladies chroniques* (1775) and *Analyse médicinale de sang* (1775) and in the *Recherches anatomiques*.⁹⁴ In an abstract sense, Bordeu referred to the *organisme* as a dynamic order of functions that "results from the various actions of the parts" and their sensibility.⁹⁵ He used the term organism also for a kind of physical function-structure-unit with organizing faculties. Such units are the seminal organism (*organisme séminal*) and the hemorrhoidal organism (*organisme hémorrhoidal*) (cf. Virey 1823, 959, 961, 986). In the plural, however, he normally called organic bodies living beings (*vivants*).⁹⁶

der verknüpfter, gegenseitig auf einander wirkender, und durch ihr gemeinsames Wirken einander thätig und wirksam erhaltender Apparate, welche gerade durch ihre gegenseitige harmonische Zusammenstimmung einem allgemeinen großen Zweck, nämlich der Erhaltung des Ganzen, entgegenstreben, bezeichnet die Naturkunde durch die Benennung *Organismus*." For his notion of phenomena of life, see Lucae 1816, 26 (§10).

⁹¹ For a detailed analysis of this period and the importance of the French reception of the German context of *Naturphilosophien*, see Balan 1979, 11-24.

⁹² Cabanis normally referred to the expression *corps organisé*.

⁹³ Cf. Richerand in Bordeu 1818, vol. 1, *Notice sur la vie et les ouvrages de Bordeu*, i.

⁹⁴ The word *organisme* does not occur in Bordeu's *Recherches anatomiques sur la position des glandes et leur action* (1752). It occurs only sixteen times in the second volume of Bordeu's *Oeuvres*. Cf. Bordeu 1818, vol. 2, 669, 670 (3x), 804, 829, 832, 951, 958, 959, 961, 973, 986, 987, 1014, 1024.

⁹⁵ Bordeu 1818, vol. 2, 669: "Telle est la matière et l'étendue des spéculations des médecins philosophes les plus modernes, eu égard aux principes de la Vie et à l'organisme de ses fonctions, si on peut s'exprimer ainsi." See also Bordeu 1818, vol. 2, 670 (*système de l'organisme*) and 829 (*organisme résultant des diverses actions des parties*). In a political and social perspective, Bordeu's concept of multiple "lives" (*vies*) that constitute organic order through interaction is opposed to Virey's concept of a regulating *foyer* of vital forces. Cf. Virey 1823, 52: "Les molécules d'un corps vivant ne possèdent donc pas leur vie en propre, mais elles l'ont cédée au tout, et n'obéissent plus aux attractions, aux lois de la matière brute. Elles y sont tellement entrelacées, mixtionnées, rattachées au foyer vital qui les gouverne, que toute leur force est abandonnée à ce centre. Il en résulte unité d'action et de vouloir, comme dans un gouvernement monarchique absolu toutes les volontés se trouvent réunies dans la personne qui tient les rênes de l'état, et chaque sujet ne reçoit son emploi et ses attributions que du gouvernement, chacun selon son rang et sa subordination."

⁹⁶ Bordeu also uses the terms *corps vivant*, *être vivant* and *corps organisé*. In the second volume of

About the same time as Bordeu's *Recherches anatomiques*, the term organism also frequently occurred in various texts of the emerging field of physiological pathology. Like Richerand in his *Nouveaux éléments de physiologie* (1817), François-Joseph-Victor Broussais distinguished in the *Traité de physiologie appliquée à la pathologie* (1822) between the organized animal matter of an organism – that results from the interactions between the anatomical disposition of parts, a living chemistry (*chimie vivante*) and a set of vital forces –, the *Moi* or the rational soul as an agent that connects ideas through reflexive operations, and the order of inorganic, dead bodies, for which explanatory patterns of chemistry and physics are sufficient.⁹⁷ After Richerand and Broussais, Julien-Joseph Virey's *De la puissance vitale* (1823) marked the beginning of a systematic and frequent usage of the word *organisme* in the French context. However, like Richerand and Broussais, he employed the term only in the singular to define the characteristic order of a specific bodily structure-function complex. When he referred to concrete bodies, he used expressions like living body (*corps vivant*) or animated being (*être animés*) (but not “organized body”). Like Broussais, Virey outlined a threefold order in which the circular movement and the concurrence of a multitude of combined molecules, that is centered upon a *foyer* of vital forces, closely interact to constitute the organism. It is only through this particular interaction and a regulating vital centre that bodies live and that living bodies can be categorically distinguished from non-living bodies.⁹⁸ Virey emphasized, however, that the organism just represents a

his *Nouveaux éléments de la science de l'homme* (1806), Paul-Joseph Barthez refers to both the organisation and the organism as a dynamic order of functions. Cf. Barthez 1806, vol. 2, 186 (*ces fonctions sont opérées par l'organisation*) and 217 (*organisme de leurs fonctions*). While the word *organisme* does not occur in the first volume of *Nouveaux éléments* (1778), it occurs two times in the second volume (1806, 198 and 217) (Only the first volume of the *Nouveaux Eléments* has been published in the first edition [1778]).

⁹⁷ Cf. Broussais 1822, 253-254: “Avant de récapituler ce que j'ai dit des fonctions intellectuelles, des affections, des passions et de leurs effets sur l'organisme, je dois faire ici une déclaration formelle. Je ne prétends point donner dans cet ouvrage un traité d'idéologie. J'indique la source de nos facultés intellectuelles; mais je ne les suis pas dans leurs développemens par rapport aux idées sur lesquelles elles s'exercent. Je signale les élémens de nos passions; mais je m'abstiens d'en décrire toutes les nuances sous le rapport intellectuel. Je n'examine que leurs effets sur l'organisme, afin d'y découvrir les causes et les remèdes de nos maladies ...” See also Broussais 1822, 31, 59, 197, 222, 257 and 260. For Richerand's use of the term *organisme*, see Richerand 1817, Bd. 1, 37, 97, 132, 133; Richerand 1817, Bd. 2, 172, 197 and 547.

⁹⁸ Virey 1823, 52: “... dans le corps organisé, chaque molécule est étroitement associée au tout et y exerce au emploi quelconque; elle fait partie intégrante du système et le soutien de sa force; sans lui elle rentrerait dans la nullité ou l'isolement, comme la molécule minérale. C'est donc le *concours central et uniforme d'une multitude de molécules combinées en une étroite communauté, par le moyen de ce mouvement circulaire, qui constitue l'organisme*. Une partie démembrée d'un corps vivant meurt et se décompose pour l'ordinaire, tandis qu'un fragment de roche subsiste quoique séparée. Les molécules

material disposition for the mediation of the processes that are operated by a “regulating being that fabricates the animal machine” (*être directeur fabricant la machine animale*; Virey 1823, 208).⁹⁹

While the term organization referred for Bordeu, Richerand, Broussais, and Virey to a static and anatomical order, they defined the organism as a dynamic, processual order of functions within the limits of a certain individual body and its structural dispositions.¹⁰⁰ Instead of the expression “organized body,” they normally employed the terms living bodies (*corps vivants*) or living beings (*être vivant* or just *vivant*).

From around 1830, the individual organism as a living, individualized entity became a recurrent term in various research fields. This transformation varied according to stylistic development and changes in those national languages which displaced Latin in academic and literary discourses from around 1750 onward (cf. Kucharczik 1998, 22). Kielmeyer’s French colleague Cuvier, working at the Muséum in Paris, did not use the word organism in his major writings on anatomy. He probably avoided the metaphysical connotations that the word had acquired in its German context.¹⁰¹ Lamarck, who also worked in the Muséum, normally used the compound *corps organisé*. In the *Système analytique des connaissances positives de l’homme* (1820), he used the expression *organisme distinct* to describe an ensemble of organs that is clearly visible to the naked eye, such as the digestive apparatus in the human body.¹⁰² He distinguished it from an *organisme indistinct* as an ensemble of organs

d’un corps vivant ne possèdent donc pas leur vie en propre, mais elles l’ont cédée au tout, et n’obéissent plus aux attractions, aux lois de la matière brute. Elles y sont tellement entrelacées, mixtionnées, rattachées au foyer vital qui les gouverne, que toute leur force est abandonnée à ce centre.”

⁹⁹ Cf. Virey 1823, Introduction, X: “On peut supposer, en effet, un organisme parfaitement en état d’agir, mais sans qu’il jouisse de la vie, comme on voit des automates, une montre en repos; il faut donc une force propre, distincte du corps, car ce qui meut diffère nécessairement de ce qui est mu;” and 212: “Autre chose est donc l’organisme, et autre la force excitatrice qui la met en mouvement. Il n’y a donc point de parité, de comparaison entre une montre mue par un ressort et un animal jouissant de la vie. Il faut prouver que les lois de la mécanique, de l’hydraulique, de la statique, de la dynamique, enfin, de la physique et de la chimie, sont bien insuffisantes pour expliquer la vie, et qu’il existe en nous un principe particulier, une force propre qui a reçu le nom d’*âme* parce qu’elle nous anime.” In *De la puissance vitale* (1823, 208), Virey referred to the possibility that the regulating being of the organism is either Cudworth’s *plastic nature*, Wolf’s *vis essentialis*, Blumenbach’s *nisus formativus* or Aristotle’s and Stahl’s “informing soul” (*âme informante*). For Virey’s relation to the German context of *Naturphilosophie*, see Rey 1988.

¹⁰⁰ In the twelfth edition of the *Dictionnaire de médecine* (1865), Émile Littré and Charles Robin add the following passage to the lemma *organisme* (*Dictionnaire de médecine* 1865, 1056): “Le mot *organisme* s’est introduit dans la science vers 1820, et désignait d’abord l’organisation en action, le côté fonctionnel de l’économie, l’ensemble de ses actes ou des lois qui les régissent.”

¹⁰¹ Cuvier also did not use the word biology.

¹⁰² In 1858, Rudolf Virchow still used the expression *Organismus eines Knochens*; see Virchow 1858, 27 (second lecture).

that is difficult to perceive, such as the nervous system.¹⁰³ Both “organisms” constitute “organized bodies.”¹⁰⁴

Ducrotay de Blainville, Johannes Müller, Richard Owen, Karl Ernst von Baer, Auguste Comte, and Claude Bernard all frequently used the word organism for an individual entity (in the singular and the plural) in physiology, embryology, and milieu theories.¹⁰⁵ In 1840, Justus Liebig also systematically employed the word in agrochemistry (Liebig 1840). Thus in the first three lectures of his *Cours de physiologie générale et comparée* (1829) at the Faculté des Sciences in Paris, Blainville used the plural *organismes* throughout the whole text. He focused on a branch of the new science *biologie*. He called this branch *zoobiologie*. Zoobiologists should analyze the phenomena of life “in their relations to the [inner] organization or to outer circumstances.”¹⁰⁶ The combination of inner and outer conditions characterizes the mode of life of individual organisms.

The zoobiology includes the study of various inner actions of organisms (*actions intérieures des organismes*) that result from the influence of the outer world; it refers to both the actions of organs, considered for themselves, and the liaison of the actions of all organs and their mutual reaction that constitutes the life of animals.¹⁰⁷

¹⁰³ Lamarck 1988, 163-166. An earlier reference to be found in *Recherches sur l'organisation des corps vivants* (1802) on the very helpful web page <http://www.crhst.cnrs.fr/i-corpus/lamarck>, is based on a misspelling (“organisme vitale” instead of “orgasme vitale”). Cf. Lamarck 1986, 57.

¹⁰⁴ Lamarck 1988, 163-166. In a similar way, Schiller distinguished in his second medical dissertation (1780) between three organisms (*Organismus der Seelenwirkungen*, *Organismus der Ernährung* and *Organismus der Zeugung*): “Diese drei Organismi in den genauesten Lokal- und Realzusammenhang gebracht, bilden den menschlichen Körper.” Cf. Schiller, “Versuch über den Zusammenhang der thierischen Natur des Menschen mit seiner Geistigen,” in *Schillers Werke. Nationalausgabe* 1943 sqq., vol. 20 (1962), part 1, 41-43.

¹⁰⁵ In Milne-Edwards’s *Histoire naturelle des Crustacés* (1834-1840), the word organism occurred only one time (vol. 1 [1834], 197). In the *Éléments de zoologie*, it appeared in the last section of the last, third volume of the second edition (1843). Like the last chapter of the *Histoire naturelle des Crustacés*, this section focuses on the geographic distribution of animals and their relation to specific environments or milieu. Cf. Milne-Edwards 1841-1843, vol. 3 (1843), 338 (§ 1373). The word “organisme” frequently occurs in the *Introduction à la zoologie générale* (1851) in singular and in plural. Cf. Milne-Edwards 1851, 8: “... il faut encore remonter jusqu’aux premiers temps de la vie de tous ces animaux pour assister au développement des organismes et en saisir les métamorphoses”; and Milne-Edwards 1851, 14: “Cette tendance de la nature à diversifier ses produits en les perfectionnant inégalement se manifeste dans la formation de chaque organisme individuel aussi bien que dans la création des espèces zoologiques.”

¹⁰⁶ Blainville 1829, vol. 1, 18-19 (first lecture). A second edition in three volumes was published in 1833.

¹⁰⁷ Blainville 1829, 3-4 (first lecture): “La Zoobiologie, qui embrasse l’étude des divers actions intérieures des organismes, par suite de l’influence exercée sur eux par le monde extérieur, tant les actes de chaque organe, considérés isolément, que la liaison des actes de tous les organes, et leur réaction mutuelle, ce qui constitue la vie des animaux.” For the plural *organismes*, see also Blainville 1829, vol. 1, 118, 143, 237, 239, 264, 329, 332.

Johannes Müller, the German physiologist and anatomist who in 1833 became professor at the Friedrich-Wilhelm University in Berlin, frequently used the word *Organismus*, together with the expression *organischer Körper*, for individual living bodies in his *Handbuch der Physiologie des Menschen* (1833).¹⁰⁸ In the second section of the prolegomena, with the title *Vom Organismus und vom Leben*, Müller defined the germ as an unstructured (*formloses*) potential whole that develops into a Kantian whole-part unit. Müller called this unit an *Organismus*.

Organic bodies differ from inorganic bodies not only through their specific composition of elements, but also through the activity that operates in the organic matter. This activity is productive according to the laws of a rational plan and its ends. It arranges parts for a whole, and this is exactly what is particular for an organism.¹⁰⁹

Similarly, in the fifth of the extant Hunterian lectures on comparative anatomy and physiology at the Royal College of Surgeons in London, delivered on 11 May 1837, Richard Owen used the word organism to characterize, as did Müller, a whole-part unit that grows out of a germ entity through an organizing energy and vital stimuli (Owen 1992, 225 and 230, [fifth lecture]). Owen knew Müller's *Handbuch* and often paraphrased or directly translated from it (cf. P. Sloan, in Owen 1992, 15-39, 233-236.). In the 1830s Karl Ernst von Baer, professor of natural history, comparative anatomy and physiology in Königsberg and St. Petersburg (1822-1852), focused on the developmental history of individual animals. He criticized the idea of the recapitulation of forms of lower animals or plants in the grades of development of higher organic bodies (Baer 1828-1837, vol. 1 [1828], 221-222). Baer rarely employed the word *Organismus* in the first volume of *Über [die] Entwicklungsgeschichte der Thiere*, published in 1827 (Baer 1828, 200, 208), but he frequently used it in the second volume, published in 1837 (Baer 1828, vol. 2: 3, 4, 8).

Auguste Comte, who attended Blainville's lectures from 1829-1832 (Comte 1830-1842, vol. 3 [1838], 40th lesson, 269, note 1), outlined the concept of a new science of living bodies in the third volume of the *Cours de philosophie positive* (1838; Comte 1830-1842, 269). Comte referred also to the expression *science biologique* (cf. Comte 1830-1842,

¹⁰⁸ Müller 1838-1840, vol. 1 (1838), Prolegomena.

¹⁰⁹ Müller 1838-1840, vol. 1 (1838), 19-20: "Die organischen Körper unterscheiden sich nicht bloss von den unorganischen durch die Art ihrer Zusammensetzung aus Elementen, sondern die beständige Thätigkeit, welche in der lebenden organischen Materie wirkt, schafft auch in den Gesetzen eines vernünftigen Plans mit Zweckmäßigkeit, indem die Theile zum Zwecke eines Ganzen angeordnet werden, und diess ist gerade, was den Organismus auszeichnet ..." Müller refers in the same passage to Kant's definition of organic unity.

277, 284). He used the expressions *organisme*, *organisme vivant* or *organisme unique* (instead of the compounds living body or organized being) when he discussed the life-constituting relation between organic bodies and the outer milieu (Comte 1830-1842, 289, 290, 291, 292, 302, 303, 304, 308, 310). Claude Bernard, successor of François Magendie in the chair of physiology at the Collège de France in 1855¹¹⁰ and a student of Milne-Edwards, frequently employed the word *organisme* in *Leçons de physiologie expérimentale appliquée à la médecine* (1855-1856), *Leçons sur la physiologie et la pathologie du système nerveux* (1858), *Leçons sur les propriétés physiologiques et les altérations pathologiques des liquides d'organisme* (1859) and *Introduction à l'étude de la médecine expérimentale* (1865).¹¹¹ Like Comte, Bernard focused on “the conditions of the organism and those of the ambient milieu” (*les conditions de l'organisme et celles du milieu ambiant*; Bernard 1865, 106). However, Bernard was mainly interested in regulating processes of the inner milieu and its resistance to changes in the outer environment.

After Blainville, Comte, and Bernard, French dictionaries systematically replaced expressions such as organic body or organic organization by the word organism. The first appearance of the word organism in a French dictionary can be found in the *Dictionnaire de Trévoux* of 1771. The author of the article defined the *organisme* as the “quality to be organized” and quoted Bourguet’s *Lettres philosophiques*.¹¹² However, in many French dictionaries on natural history in the first half of the nineteenth century, the word *organisme* did not occur.¹¹³ If the word is listed, the author normally referred to its abstract meaning as a principle of order and as a synonym for the word *organisation*.¹¹⁴ The word finally

¹¹⁰ Bernard already represented Magendie at the Collège from 1848.

¹¹¹ Vgl. Bernard 1855-56, vol. 1, 20, 29-30, 47-48, 51, 78; Bernard 1858, Bd. 1, 1, 5, 55, 61, 138, 165, 205; Bernard 1859, 15, 19; Bernard 1865, 7, 17, 34, 102, 105-7. The word *organisme* also frequently occurred in Charles Robin’s and François Verdeil’s *Traité de chimie anatomique et physiologique normale et pathologique* (1853). In *On the Origin of Species*, published shortly after Bernard’s *Leçons* in 1859, Darwin employed the word organism in the first four chapters, in which he focused on the importance of the relation of organism to organism, and, more frequently, in the chapters on the geological record and the geographical distribution of species. He normally used the expressions “organic being” and “individual.” See Darwin 1964, 9 (chap. 1), 50 (chap. 2), 60 and 65 (chap. 3), 103-104 (chap. 4), and chap. 9-12. The term does not occur in chapters 5-8.

¹¹² *Dictionnaire de Trévoux*, 1771, vol. 6, 389: “Organisme. S. m. Qui appartient à l’organisation des corps, la qualité d’être organisé. Tout est organique dans la nature, le règne minéral, autant que le végétal & l’animal, quoique dans un ordre différent de ce que les Philosophes & les Chimistes ont imaginé. Cet organisme consiste d’abord en des corpuscules d’une petitesse infinie, dont les figures sont géométriques, mais des plus simples. BOURGUET, Lettr. Phil.”

¹¹³ *Dictionnaire des sciences naturelles ... 1804-1830*, vol. 36 (1825); and *Dictionnaire universel d’histoire naturelle 1841-1849*, vol. 9 (1847).

¹¹⁴ *Dictionnaire pittoresque d’Histoire naturelle et des phénomènes de la Nature*, 1833-1839, vol. 6, 408: “Organisme: le mot, pour la plupart des physiologistes modernes, est un synonyme d’organisa-

appeared in 1855 in the tenth edition of Littré's and Robin's *Dictionnaire de Médecine*¹¹⁵ and in 1878 in the seventh edition of the *Dictionnaire de l'Académie française* as an "ensemble of organs that execute the functions of life."¹¹⁶

Conclusion

After its occurrence in two medieval sources, the usage of the word organism in the seventeenth century is well-documented for Stahl (1684) in Latin and for Leibniz (1687) in French. Around 1700, the word occurred in English (Grew 1701, Evelyn 1706), Italian (Minerva di Gallica 1708, Vallisneri 1729) and later also in German (Zedler 1740). Before Leibniz and Stahl, Suárez referred around 1600 to the organized body of humans in which all parts are disposed for the expression of the proper activity of a (immaterial) soul which possesses regulating faculties. In a similar way, Digby, Descartes, More, Cudworth and Grew discussed the organized unity, the disposition and the mutual interaction of organs in human bodies. The notion of organic organization thus merged with the notion of "organism" in the second half of the seventeenth century, although they could have different meanings within the debates about the mechanical and non-mechanical order of things. This is especially the case in Stahl's writings.

Stahl frequently used the word organism to refer to a general regulating principle of order in animated bodies which is different from a mechanism in which parts only interact through their material properties. Stahl rarely used the expressions organization or organized body. While Leibniz interchangeably referred to the terms organism, divine mechanism, and divine organization to explain organic phenomena through the metaphysical order of individual monads, Stahl avoided any confusion between these terms in his medical theory. For Stahl, only "organisms" live, and the categorical distinction between life and death can only be understood if the difference between the orders of organism and mechanism is clear.

tion; il sert plus spécialement à désigner l'ensemble des lois qui régissent les êtres organisés, animaux ou végétaux." The article is attributed to Paul Gentil.

¹¹⁵Littré and Robin distinguished between "simple or composed organisms" (as humans, oak trees, horses, eggs or seeds), that can exist as individual entities, and "organized bodies" that represent "anatomical parts" (for example muscle fibers or cells) of organisms. See *Dictionnaire de médecine ...* 1855, 893a.

¹¹⁶*Dictionnaire de l'Académie française* 1878, vol. 2, 316.

Throughout the eighteenth and during the early decades of the nineteenth centuries, French natural historians as well as anatomists and physiologists normally referred to compounds such as organic body or organized body. Until the last third of the eighteenth century, the word organism was seldom used. The Wolffian school of the first half of the eighteenth century only distinguished between the ontology of being and the physiology of organic bodies as mechanic aggregates. In the final decades of the eighteenth century, the dialectics between the microcosm of living entities and the macrocosm of nature together with the transformation of theories of the unconditioned self into models of processual self-differentiation became characteristic of the occurrence of the word organism as a generic name for individual entities in the German philosophical context (Kant, Herder, Schelling, Hegel). At the turn of the eighteenth century and in the first decades of the nineteenth century, the expression individual organism also appeared, in the singular and the plural, in *Naturphilosophien* (Oken, Goethe, Carus), physiological anthropologies (Treviranus, Augustin, Burdach, Leupold), comparative anatomies (Kielmeyer) and medicine or *Lebenserhaltungslehren* (Hufeland, Bertele). *Naturphilosophien*, anthropologies and *Lebenserhaltungslehren* were of course closely related to the micro-macrocosm problem and to the notion of organism as a particular organic system within the general organic order of nature.

Between 1810 and 1830, the organism more frequently occurred in the French context of natural history, medicine, and physiological pathology, first, as a dynamic form of organic order, especially of “functions” and different (normal or anormal) “states” (Bordeu in his *Œuvres*, Richerand, Broussais, Virey) in contrast to the static order of solid parts, and, second, as an entity that exists through the exchange processes between its inner organization (the order of the *corps organisé*) and its outer environment. Concepts of individuated inside-outside relations, which already emerged in *Naturphilosophien* and German idealism, thus established a new agent model. Within this context, the notion of organism (as an expression for an individual entity) began to differ from the notion of (inner) organization and replaced the term organized body. Finally, from around 1830 the word organism became a recurrent techno-scientific term within various research fields such as anatomy, physiology, embryology and milieu theories. Organisms were there defined as whole-part units (Müller, Owen) and natural entities determined by outer and inner milieux (Blainville, Comte, Bernard). The problem of the *organism* of bodies thus transformed into the scientific research about the body of *organisms*.

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