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Jacob Lorhard's Ontology:
a 17th Century Hypertext on the Reality and Temporality of the World of Intelligibles

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Abstract. Jacob Lorhard published his ontology in 1606. In this work the term *ontologia* 'ontology' was used for the first time ever. In this paper, it is argued that Lorhard's ontology provides a useful key to the understanding of the early 17th-century world view in Protestant Europe. Among other things, Lorhard's ontology reflects how the relations between scientific investigation and religious belief were seen. It is also argued that several of the conceptual choices which Lorhard made in order to establish his ontology may still be relevant for modern makers of ontological systems. In particular, Lorhard's considerations on the notions of reality and time deserve modern reflections. Also his assumption of the educational value of diagrammatical ontology deserves a modern discussion. Along with this paper an online hypertext version of Lorhard's ontology has been presented in order to create a useful tool for historical research in early 17th-century thought and in order to illustrate the problems, which characterized the early attempt at establishing a diagrammatical approach to ontology.

Note: References with just a page number (e.g. [p.17]) refer to the English translation of Lorhard's *Ontology* [7]

1. Introduction

The term *ontologia* ('ontology') was coined by Jacob Lorhard (1561--1609), who used this new term for the first time in his volume of eight books *Ogdoas Scholastica* (1606), in which he demonstrated how ontology could be presented in a diagrammatical manner (see [8] and [7, 9]). Lorhard's way of presenting his ontology makes it natural, from a modern perspective, to read it as a hypertext. This makes it straightforward to implement Lorhard's ontology as a modern hypertext (see [7]).

Lorhard's ontology is relevant for contemporary historians as a semi-formal key to a 17th-century world-view. The creation of such world-views was typical within academic circles of early 17th century Protestantism, so Lorhard's work provides us with a snapshot of the framework within which scientifc study was carried out in the 17th century. Moreover, we argue that several of Lorhard's considerations regarding the organization of his ontological system also warrant consideration by modern makers of ontological systems. The two considerations that we focus on in most detail are the concepts of reality and time. The first concept, in particular, is of central importance, both in Lorhard's ontology and in modern ontologies.

We begin in section 2 with some historical and conceptual background to Lorhard's ontology, providing a cultural and philosophical setting against which his views on time and reality should be evaluated. In section 3 we discuss Lorhard's concept of reality as it is manifested both in beings and attributes, using the reality of moral qualities and of structures or orders in the world as specific examples. In section 4 we consider Lorhard's treatment of the temporal aspects of beings. In section 5 we comment on Lorhard's presentation of his ontology. We show that an implementation of the system provides a useful tool for research in the history of science and philosophy. It turns out that Lorhard's ontology can be represented as a hypertext dealing with aspects of reality and time which are essential for the understanding of the world. We make some concluding remarks in section 6.

2. Some Comments on the Historical Setting

In order to understand Lorhard's approach to ontology, and the effect that this had on his approach to doing science, we must understand the philosophical and social milieu within which he worked. Lorhard's *Ogdoas Scholastica* was designed as a grammar school text-book. As such, it was meant to introduce essential parts of the scientific and religious aspects of the world to the students. Lorhard was influenced by the tradition from Peter Ramus (1515--72), who wanted to transform dialectical reasoning into a single method of pedagogical logic partly by using diagrammatical tools (see [9]). Lorhard sees diagrammatical ontology in this context, believing that the students will benefit from a deeper understanding of the ontological truths. This view on education became very influential in Europe. This is evident, for instance, in the writings of the Danish professor Jens Kraft (1720--1756) who, in organizing a school for young people expected to become national leaders, insisted on making ontology an essential part of the curriculum. Kraft clearly believed that a deeper understanding of the ontological truths would help the students not only in obtaining a better understanding of the world but also in becoming better people ethically speaking (see [8]).

Book 8 of Lorhard's Ogdoas is devoted to metaphysics or, in the new word that he introduces, ontology. At the end of the 16th century, the predominant view of metaphysics was that found in Suárez's *Disputationes metaphysicae* (which was published in Mainz in 1605 [4]). On Suárez's view, the primary subject matter of metaphysics is being: "the concept of the real being which is the subject of metaphysics..." [p.614]. Suárez's text "fixed the method of instruction in metaphysics for centuries, not only in Catholic schools, but also in Protestant academies and

universities" [p.615] and "by the end of the [16th] century, Fonseca, Pereira, and Suárez were standard references in the newly founded Protestant universities" [p.621]. His view was, however, rejected by Clemens Timpler of Heidelberg, whose *Metaphysicae systema methodium* was published in Steinfurt in 1604 and in Hanau in 1606 [6]. (That Timpler knew of Suárez's views is clear from the fact that he references him in bk. 1, cap. 1, q. 7.) Timpler "proposed that the subject-matter of metaphysics is not being, but rather the intelligible, παν νοητον" [p.635]. He says that *metaphysica est ars contemplatiua, quae tractact de omni intelligibili, quatenus ab homine naturali rationis lumine sine ullo materiae conceptu est intelligibile* (metaphysics is a contemplative art which treats of every intelligible, to the extent that it is intelligible by men through the natural light of reason without any concept of matter) [bk. 1, cap. 1].

Timpler's work was enormously influential on Lorhard's ontology. Timpler's *Metaphysicae* is written in a more traditional style than Lorhard's textbook: it is divided in to five books, of which each chapter presents an aspect or a part of his metaphysical views, followed by a number of questions and answers dealing with the philosophical issues arising from the distinctions offered at the beginning of each chapter. (For example, q. 5 of bk. 1, cap. 1 is 'what is the proper and adequate subject matter of Metaphysics?' to which the answer, naturally, is *omne intelligibile* 'every intelligible thing'.) The divisions and distinctions in Timpler's work can be found almost universally without change in Lorhard's ontology, with the exception that Lorhard's text omits all the philosophical commentary (for a comparative taxonomy, see [3]). What is interesting is that in many places where Timpler raises questions about his classification and characterization, Lorhard adopts his distinctions without indicating that they might be questionable.

Following Timpler, Lorhard defined ontology as "the knowledge of the intelligible by which it is intelligible" [p.1]. His ontology is hence a description of the world of intelligibles, i.e., the items, concepts, or objects which are understandable or conceivable from a human perspective. The emphasis on the intelligibility of the world is essential in Timpler's and Lorhard's ontology. When Lorhard followed Timpler's lead and adopted this new proposal about the subject matter of metaphysics, or ontology, he agreed with the idea that we in formulating ontology are concentrating on the knowledge by means of which we can conceive or understand the world. In this way ontology is seen as a description of the very foundation of scientific activity as such.

Lorhard holds that the human rationality must function on basis of what he and Timpler both call 'the natural light of reason' [p.1]. Ontology captures this fundamental understanding of the basic features of the world. Based on this knowledge everything else – to the extent that it is intelligible at all – becomes conceivable. This approach presupposes that there is in fact only one true ontology – the one that reflects to the world as it truly is. The belief was in fact very important for the rise of modern science in the early 17th century. According to J. Needham [5], the confidence that an order or code of nature can in fact be read and understood by human beings was one of the important cornerstones for the rise of modern science in Europe. This strong belief was absent in Eastern civilizations in the early 17th century.

Lorhard, again following Timpler, divides the world of intelligibles into two parts: the universals and the particulars. The set of universals can be further divided into two

parts: the set of basic objects, and the set of attributes [p.1]. As mentioned in [9] it should be noted that Lorhard's ontology does not begin with a distinction between physical and abstract, as many modern ontologies do. As we shall see, however, there is a similar distinction integrated in his ontology based on his notion of reality, which he uses several times in the ontology. As a result, a number of important concepts in Lorhard's ontology are mentioned more than once.

The notion of reality is essential when it comes to ontology. The distinction of what is real (*realis*) as opposed what is not real is used no less than 16 times in chapter 8 of *Ogdoas Scholastica*. However, in his book Lorhard uses the term in a rather complex manner, which is apparent from the fact that it contrasted with three different concepts in the text: rational (*rationalis*), imaginary (*imaginaria*), and verbal (*verbalis*). In the following section, we discuss Lorhard's use of the term 'real' as it is introduced in various parts of the text. As we shall see, the term 'real' mainly refers to 'mind-independent' or 'belonging to the external world'.

3. The Reality of Beings and Attributes

According to Lorhard, the essence of a being (*ens*) is that "by which a being is what it is" [p.2]. Some beings are real in the sense that they exist independently of human cognition, whereas other beings depend on human cognition, i.e., they are beings of reason or rationality. The essence of a being of the first kind relates to the external world, whereas the essence of a being of the second kind belongs to the internal (or mental) world of human cognition. According to Lorhard, there is an important duality between the beings themselves and our rational discussion of these being. It appears that he insisted on the necessity of this duality, in the sense that each time we discuss the beings in the world wanting classify them we also have to reflect on the concepts we are using in doing so. Such reflections at the meta-level turn out to form an essential part of Lorhard's work.

3.1 The Reality of Simple Attributes

Lorhard identifies two simple and 'most common' attributes of intelligibles or beings: existence and duration [p.4]. This means that for every intelligible it is correct at least to say that it exists in the world, and in some cases we may be able to say more about the duration of its existence. However, with respect to both existence and time, we make use of the real/imaginary distinction (*realis/imaginaria*). An existent intelligible might be something real in the sense that it exists independently of all human minds (although it is conceivable by the human rationality) or it might be imaginary (i.e., something imagined by the human mind). Also the duration of an intelligible might depend on a single human mind, in which case it is "imaginary", or it might be real, i.e., independent of the human mind as it is a consequence of the properties of the external world. However, even if a duration is real in this sense, it may still have to be determined or measured in relation to human decisions regarding temporal units [p.5].

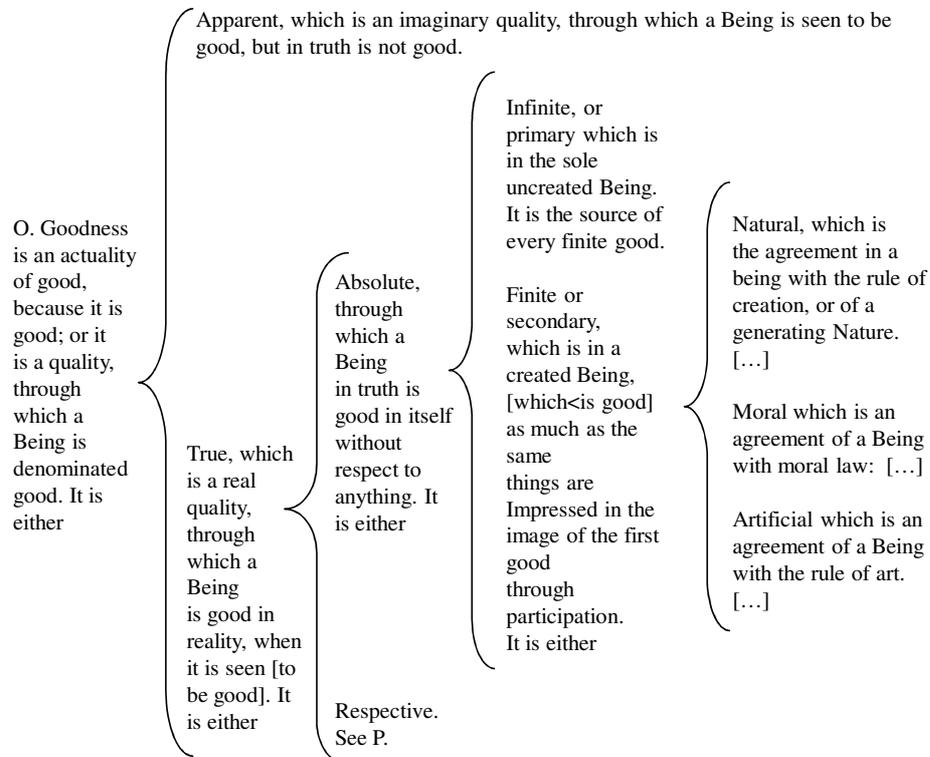### 3.2 The Reality of Beings and Complex Attributes

Real beings, beings which exist "in fact through [their] own essence[s], and further [are] suited to exist apart from cogitation of the mind" [p.3], are distributed across five different classes, each of which are further divided by a positive and a negative characteristic, such as "complex" and "uncomplex", "immaterial" and "material", and so on. This same type of positive/negative division is seen in his classification of conjunctive (non-simple) attributes. He divides conjunctive attributes into eight classes of opposing pairs: Every conjunctive attribute is either a principle/a principiate; a cause/of cause; a subject/an adjunct; a signifier/signified; a whole/a part; the same/diverse; ordered/disordered; prior/posterior [p.17]. In each of these 16 subclasses, Lorhard makes a distinction between real (i.e., mind-independent) attributes and non-real or imaginary attributes which depend on the rationality of the human mind.

We give two specific examples of the reality of complex attributes. As noted above, every conjunctive attribute is either a 'signifier' or a 'signified' [p.17]. If the attribute is in fact a sign, then it is either a natural or an arbitrary sign. If the former, then the reason for the sign relation is something in order of nature [p.28]; if the latter, then the reason is a human decision [p.30]. According to Lorhard, an arbitrary sign is called real if it is manifest in society, e.g., through some institution. Alternatively, an arbitrary sign may just be verbal, i.e., an idea of an individual human being expressed in speech or in writing [p.31].

Another particularly interesting example of the reality of attributes comes up in his discussion of the reality of moral qualities. It seems to have been essential for him to make his students aware of the nature of ethics. This is evident from the fact that not only did he deal in his ontology with the nature of morality, he also has a separate book devoted wholly to ethics in his collection of eight schoolbooks.

In the book on ontology, Lorhard claims that in some cases moral qualities are just apparent (he calls these apparent qualities 'imaginary'). In other cases, however, a being or an intelligible is in fact "good in reality" [p.15]. Here, however, he does not use his standard opposition of *imaginaria* with *realis* but instead contrasts *apparens* with *verus* 'true'. In this way, Lorhard claims that goodness is in fact true in itself, if it is a real (i.e. mind-independent) quality. He treats 'malice' (the contrastive of 'goodness') in a similar way. Malice is in some cases true and in other cases it is merely apparent. If malice is true, then it is truly bad in itself and without respect to anything else. [p.16]

It is worth noting that according to Lorhard there is in fact something which is good in itself and also something which is bad in itself. This means that he accepted the idea of an absolute ethics, which is not a construction of human rationality, but which on the other hand can be understood or realized by humans. The claim is that goodness in the finite world in fact comes from the infinite or eternal good, and the goodness not only occurs in the relations between human beings, but that goodness also may be integrated in the physical world as an important aspect of it.
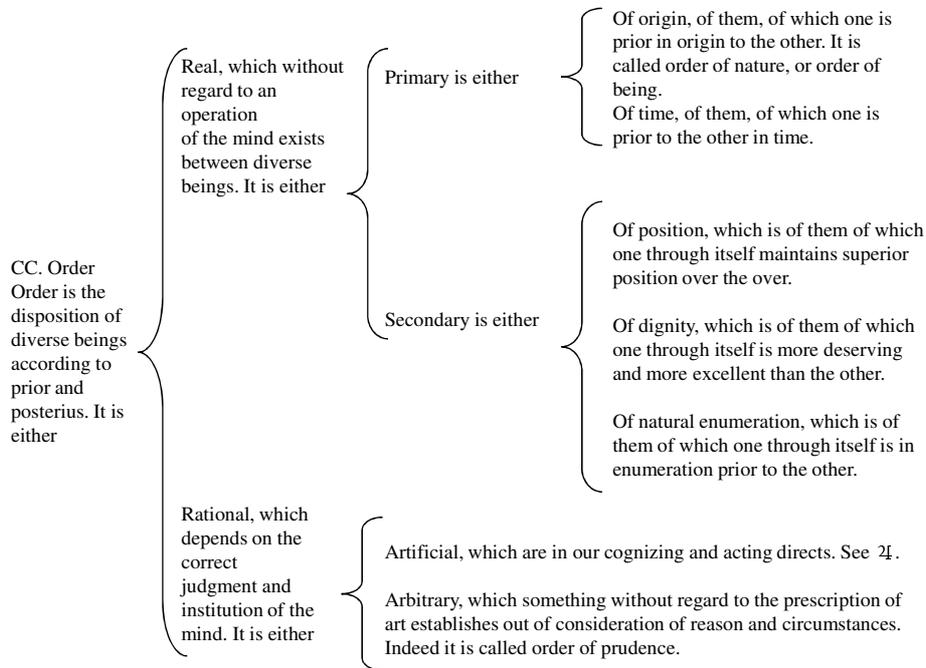
5

O. Goodness is an actuality of good, because it is good; or it is a quality, through which a Being is denominated good. It is either

- Apparent, which is an imaginary quality, through which a Being is seen to be good, but in truth is not good.
- True, which is a real quality, through which a Being is good in reality, when it is seen [to be good]. It is either
  - Absolute, through which a Being in truth is good in itself without respect to anything. It is either
    - Infinite, or primary which is in the sole uncreated Being. It is the source of every finite good.
    - Finite or secondary, which is in a created Being, [which<is good] as much as the same things are Impressed in the image of the first good through participation. It is either
      - Natural, which is the agreement in a being with the rule of creation, or of a generating Nature. […]
      - Moral which is an agreement of a Being with moral law: […]
      - Artificial which is an agreement of a Being with the rule of art. […]
  - Respective. See P.

Excerpt from p. 15

3.3 The Reality of Structures in the World

Dealing with the more complex attributes of intelligibles, Lorhard used the notion of reality in relation to determinations like 'identity' [p.35]. He points out that there are two different kinds of identity. In some cases the idea of something being identical with something else is just a rational construction, but in other cases a claim of identity between two beings is based on external, mind-independent properties of the beings in question. In these cases the identity is there objectively speaking, and Lorhard refers to it as a 'third thing'.

Similarly, the order of beings in the world may according to Lorhard be real or rational (i.e. just a product of human rationality) [p.39]. If it is real it does not depend on human cognition, but is there independently of human observation and cognition. A purely rational order, on the other hand, is mind-dependent, i.e., it is there as a result of human reason. Lorhard's ontology contains rather elaborate description of the various kinds of order of beings.

CC. Order
Order is the disposition of diverse beings according to prior and posterius. It is either

- **Real, which without regard to an operation of the mind exists between diverse beings. It is either**
  - **Primary is either**
    - Of origin, of them, of which one is prior in origin to the other. It is called order of nature, or order of being.
    - Of time, of them, of which one is prior to the other in time.
  - **Secondary is either**
    - Of position, which is of them of which one through itself maintains superior position over the over.
    - Of dignity, which is of them of which one through itself is more deserving and more excellent than the other.
    - Of natural enumeration, which is of them of which one through itself is in enumeration prior to the other.
- **Rational, which depends on the correct judgment and institution of the mind. It is either**
  - Artificial, which are in our cognizing and acting directs. See ♃.
  - Arbitrary, which something without regard to the prescription of art establishes out of consideration of reason and circumstances. Indeed it is called order of prudence.

Extract from p. 39

Lorhard believed in an essential 'order of nature' related to the origin or creation of the world. This order is structural. It is, however, important to emphasize that the order should not be understood as something static or inescapable. As we shall see, the order should be understood in the perspective of time.

This basic belief in an ordered or structured world was very important for the rise of modern science in the same period. It is, however, just as important with respect to the scientific project that the order of the world can in fact be studied, investigated, and learned by the human mind. This is probably why Lorhard emphasized the importance of the duality between on the one hand the real or external order of the beings in the world and on the other hand the rational order of beings as it can be captured by the human mind. Indeed, he says we obtain a theoretical, rational order of beings, i.e., a theoretical order corresponding to order of the external world, through our "cognition of things" [p.40].

3.4 The Reality of Privation

One of the most philosophically interesting distinctions that occur in Lorhard's ontology is that between being nothing and being negative. In his very first division of intelligibles, he says that an intelligible is either "*Nothing*: This is simply not something" or "*Something*: Whatever is simply not nothing" [p.1]. The remaining 57

pages of Lorhard's book on ontology are devoted to the intelligibles which are something; of the intelligibles which are nothing, nothing further is said. This distinction between being nothing and being something is copied directly from Timpler [bk.1, cap. 2]. Timpler says that an intelligible is anything which is able to be perceived and comprehended in the intellect, and that an intelligible is either something or nothing. In contrast to Lorhard, before continuing Timpler raises a number of questions whose answering seems to be required and which Lorhard doesn't mention at all. The first is "whether 'nothing' can be an intelligible" [q.1]. Timpler gives a positive answer to this question, but it is interesting that he feels the need to argue for it (and indeed gives a number of different arguments), whereas Lorhard simply takes it for granted that 'nothing' is something intelligible. Timpler also asks "whether 'something' and 'nothing' are equivalent to 'being' and 'non being'" [q.3]. He gives a negative answer to this question ("'being' is not always contradictorily opposed to 'non being'" whereas the answer to q.2 is that between 'something' and 'nothing' no middle ground can be attributed), and as an example he says that "privation is called 'non being', and nevertheless is still not nothing".

It is in the discussion of privation that Lorhard diverges from Timpler's metaphysical presentation. Both divide intelligibles which are something into those which are positive and those which are negative. Lorhard describes "something negative" as a privation "which is a negative habit in a being, of which then it is either able or required to be in" [p.58] In contrast, Timpler's discussion of privation is separate from his comments on intelligibles which are something negative. He classifies privation as an accident, namely, something which can be positively attributed to a being. While privation is a removal of something from a being, it can still be affirmed that the removal is present in the being. When Lorhard says that a privation is something negative, he is taking a symmetric view: We do not affirm that a privation is present in a being, but instead we deny that some habit or other is present in a being. For both Timpler and Lorhard, privations, like other types of intelligibles, are divided into those which are mind-independent and those which are mind-dependent. It is interesting here that the choice of words that both Lorhard and Timpler use is not the usual pair of *realis/rationalis* or *realis/imaginaria* but *verus/ficta* 'true/fictional' (though Lorhard does add that fictional privation is also called rational or imaginary, because it "is attributed solely through a fashioning on the mind" [p.58]). The only other time that Lorhard uses 'true' to describe the mind-independent intelligibles instead of 'real' is when he discusses goodness and malice, which we discussed above. There is thus a clear connection between the reality of something negative/privation and the reality of the moral qualities, a status which is not shared with any of the other intelligibles.

4. The Temporal Aspects of Beings

Lorhard's conceptual framework is basically Aristotelian. Following this tradition Lorhard believes that understanding causality is essential for understanding the world. This point was formulated by Aristotle himself in the following manner:

Knowledge is the object of our inquiry, and men do not think they know a thing till they have grasped the 'why' of (which is to grasp its primary cause). [1]

In order to establish a theoretical framework corresponding to the structure of the world including its temporal relation he classifies effects based on the four Aristotelian causes [p.23]. An effect will always be one of the following:

Caused by reason of efficiency
Caused by reason of matter
Caused by reason of form
Caused by reason of finality

For some reason Lorhard has chosen to list these four causes in a different order from the one used by Aristotle himself in Physics Book II, Part 3 [1]. In fact, the four causes are listed in the same order later in Lorhard's ontology when de discusses causes of real identity [p.35]. In his book on logic in the *Ogdoas*, Lorhard has also used the Aristotelian order of the four causes. In his logic it is even indicated that the four causes should be conceived as two pairs: efficient and material causes on the one hand, and formal and final causes on the other hand.
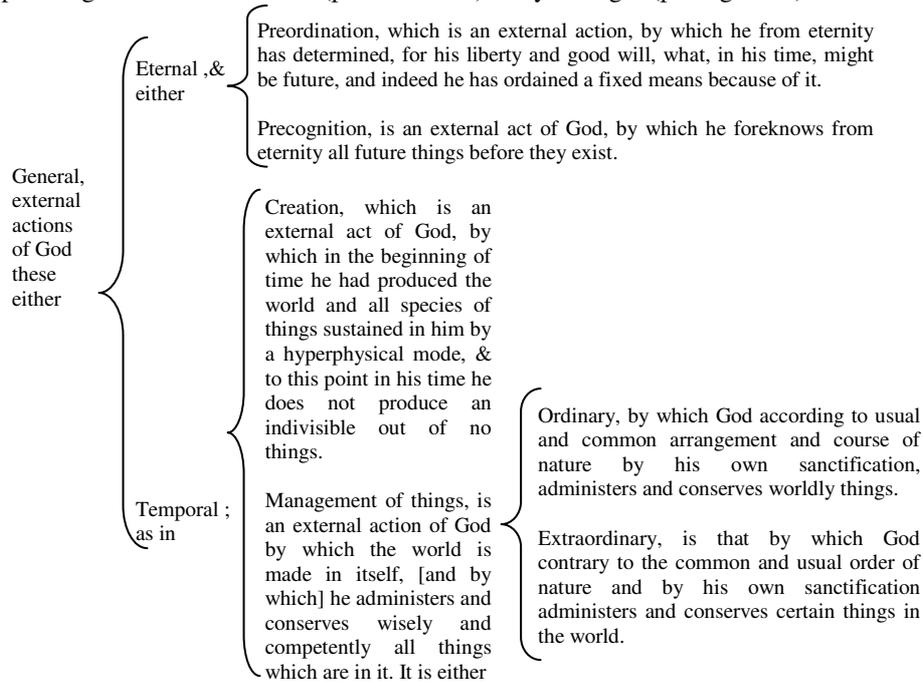
From a modern perspective the most controversial part of Lorhard's treatment of causality is probably his reference to final causes. A final cause (*telos*) implies an assumption of a purpose. However, according to Lorhard 'purpose' does not have to refer to human intent. Teleological causes may also be found in nature. There can be little doubt that this approach to purpose (*telos*) in nature should be interpreted in light of the religious assumptions incoporated in Lorhard's ontology.

The temporal aspects of Lorhard's ontology can be found not only in his emphasis on the importance of causality, they are also evident from the fact that the essence of a being introduced in terms of positive characteristics is, according to Lorhard [p.2], an actuality or performance (*actus*). If a being is real, the actuality or performance constituting its essence will reflect features in the external world taking place independently of human cognition. If the being is not real, the actuality or performance in question will depend on human cognition. In both cases the reference to '*actus*' must involve some kind of process. This clearly means that there is an aspect of temporality involved in the essence of beings.

It should be noted that according to Lorhard the world as such can also be seen as a result of a number of divine actions, some of which are eternal and some of which are temporal. This is due to Lorhard's religious approach to ontology according which the world as a whole from the very beginning has been under divine supervision and according to which worldly things have been permanently under divine management. The view is that there is "common and usual order of nature" [p.44], which represents God's management (or actions) most of the time. This order of nature will naturally be the object for scientific investigation. Sometimes, however, God's actions are extraordinarily different (i.e., miraculous).

Lorhard divides God's eternal actions into preordination (i.e., the determination of the general plan for the temporal world) and precognition (i.e., the act by which God knows anything that is going to happen in the future whether it is necessary or

contingent) [p.44]. These actions are carried out from a standpoint outside the temporal world. The idea seems to be that there is a non-temporal dimension of existence logically prior to time from which God can relate to the temporal world. From this non-temporal (or eternal) dimension God can either act in eternity by planning the course of events (preordination) or by seeing it (precognition).

General, external actions of God these either

- **Eternal ,& either**
  - Preordination, which is an external action, by which he from eternity has determined, for his liberty and good will, what, in his time, might be future, and indeed he has ordained a fixed means because of it.
  - Precognition, is an external act of God, by which he foreknows from eternity all future things before they exist.

- **Temporal ; as in**
  - Creation, which is an external act of God, by which in the beginning of time he had produced the world and all species of things sustained in him by a hyperphysical mode, & to this point in his time he does not produce an indivisible out of no things.
  - Management of things, is an external action of God by which the world is made in itself, [and by which] he administers and conserves wisely and competently all things which are in it. It is either
    - Ordinary, by which God according to usual and common arrangement and course of nature by his own sanctification, administers and conserves worldly things.
    - Extraordinary, is that by which God contrary to the common and usual order of nature and by his own sanctification administers and conserves certain things in the world.

Excerpt from p. 44

The distinction between eternal and temporal is essential in Lorhard's ontology. This distinction may also be referred to as 'uncreated/created' or 'infinite/finite'. Together with 'real/rational', the 'eternal/temporal'-distinction is the most fundamental concept in Lorhard's ontology. In short: it may be held that key concepts in Lorhard's approach to the world of intelligibles are real (as opposed to rational) and temporal (as opposed to eternal).

5. Lorhard's Ontology as a Hypertext on Reality and Temporality of the World

It turns out that Lorhard's ontology can be represented as a hypertext on important aspects of reality and time which are essential for the understanding of the world. As mentioned in the introduction, it is easy to see how Lorhard's textbook can be represented as a modern hypertext because it relies so heavily on cross references. A large number of the pages (especially in the beginning of the text) list sections of the

ontology that will be dealt with later. By choosing a graphical style of representation, Lorhard was able to not just present the concepts of his system, but also the structure that connects the concepts. This gives the obvious advantage that a single glance at a page reveals for instance how many subdivisions a given concept has. But the graphical representation also comes at a cost, namely that some of the strands of relations introduced in the early parts must 'wait' for many pages before being charted out. In this respect, it is remarkable that Lorhard throughout the ontology maintains such a close correspondence with Timpler's work, as shown by Lamanna [3]. It would not have been surprising if the diagrammatical style resulted in a different ordering of the material, but this is not the case. This observation adds to the important question of how the diagrams should in fact be read. An analysis of this question may pave the road for designing systems equipped to deal with such complex representations.

5.1   The Didactic Nature of the Representation

As mentioned above, the *Ogdoas* is intended to function as a textbook, and it seems reasonable to assume that it was used as lecture notes by Lorhard and his students. As such, it would be incorrect to view the text exclusively as a hierarchy of concepts or types. Rather, the diagrams take on form as didactic aids suited to address the questions at hand. In support of this view is should be noted that not only the ontology, but all the eight books are written in this style.

   It is still an open question how much of the actual layout of the ontology was due to printer's constraints, and how much influence Lorhard had on the questions of layout. For example, the entire section on "Goodness" has been forced onto one page, whereas "Malice", which is structurally simpler, is divided up into multiple lettered sections over more than one page. In the absence of the original manuscript, we cannot say for certain whether such formatting differences have any underlying signification.

5.2   The Nature of Repetitions

An important feature in Lorhard's work is, as we have demonstrated, the use of repetitions. In [9] we mention the extensive use meta comments (or notes) within the ontology, which from a modern point of view cannot be seen as part of the actual hierarchy. Even more pertinent is the repeated divisions into dichotomies such as: created / uncreated (which occur 10 times), generic / specific (9 times), complex / uncomplex (6 times); and as pointed out above, the crucial distinctions of the real, which occurs no less than 15 times, contrasted with rational (7 times), imaginary (6 times), verbal (once), and 'of reason' (once). Quite obviously these terms function not as types in a hierarchy, but closer to the modern notion of metaproperties often discussed in contemporary research, see for example [2]. The use of repeated distinctions adds to the number of steps one has to go through in order to grasp a given concept. In our opinion, the repetitions also add to the difficulty of mentally navigating the ontology. But this solution does address another fundamental problem

in ontology engineering, namely the critical problem of the top distinctions. It turns out that the entire structure is affected by these repetitions, and it seems therefore at least reasonable to suggest that the top distinctions de facto chosen by Lorhard (the subject / predicate structure distributed over the universal and the particular) should be seen as balanced by other important top distinctions. Thus, if the entire structure is rearranged according to whether elements are dependent on human cognition or not, the entire ontology could be 'turned upside down', whereby the subject / predicate distinction would be needed as metaproperties. Large portions of the ontology could be treated in the same way if Lorhard's use of created / uncreated was employed as a top distinction, etc.

5.3 Hypertext Arrangements

A contemporary version of Lorhard's text could be a simple hypertext as suggested in [7]. This implementation remains true to the original and preserves the structure in a very direct manner. Possible non-invasive additions could include more navigational aids such as a bi-directional link structure to help maintain the awareness of the big picture. It would also be desirable to have the actual book pages shown alongside the translation. See the sample page here below.

More advanced solutions could take on the challenge of dynamically rearranging the ontology according to the metaproperties discussed above. Such a system should be able to lift specific distinctions from the structure and rearrange the hierarchy based on all these occurrences. The central idea is to designate a given division as the privileged distinction by means of which the remaining ontology is organized. Important criteria for selecting the privileged distinction is how often it is used, and to what effect, e.g., how big a portion of the original structure is affected by the distinction. Any such selection (except the actual top distinction) would carve up the ontology in two parts: One part consisting of concepts directly affected by the selection, and one part consisting of concepts outside the scope of the current selection. The former of these would consist of fragments to be rearranged and if possible, also merged. The second part should also be listed thereby making the scope of the selection visible. The result would be a dynamic arrangement of original structure that takes the faceted style of representation seriously.

6. Conclusion

We have seen that Lorhard, following Timpler, defined ontology as the fundamental study of the intelligible world. In this way ontology is presented as the very foundation of scientific activity– including the important relations between scientific and religious concepts. We have also pointed out that Lorhard does not use the distinction between 'abstract' and 'concrete' which has become very common in modern ontology as an upper-level distinction. Instead, Lorhard makes an important distinction between what is mind-dependent (what Lorhard calls 'rational') and with is not mind-dependent (what Lorhard calls 'real'). In addition he distinguishes between time, where natural intelligibles exist, and eternity, by which the relations between the scientific and religious matters are understood. In short: The key

distinctions in Lorhard's ontology and his approach to the world of intelligibles are rational/real and temporal/eternal.

Lorhard's ontology is a schoolbook using a diagrammatical approach in the tradition after Peter of Ramus. Lorhard accepted the view that ontology was essential as the foundation of science and knowledge in general. In this way ontology in not only about being, but it is about the broader world of intelligibility. Lorhard's work may be seen as a typical representation of the philosophical ideas behind the rise of modern science. And in addition, Lorhard's ontology serves as an example of inspiration to contemporary faceted knowledge representation.
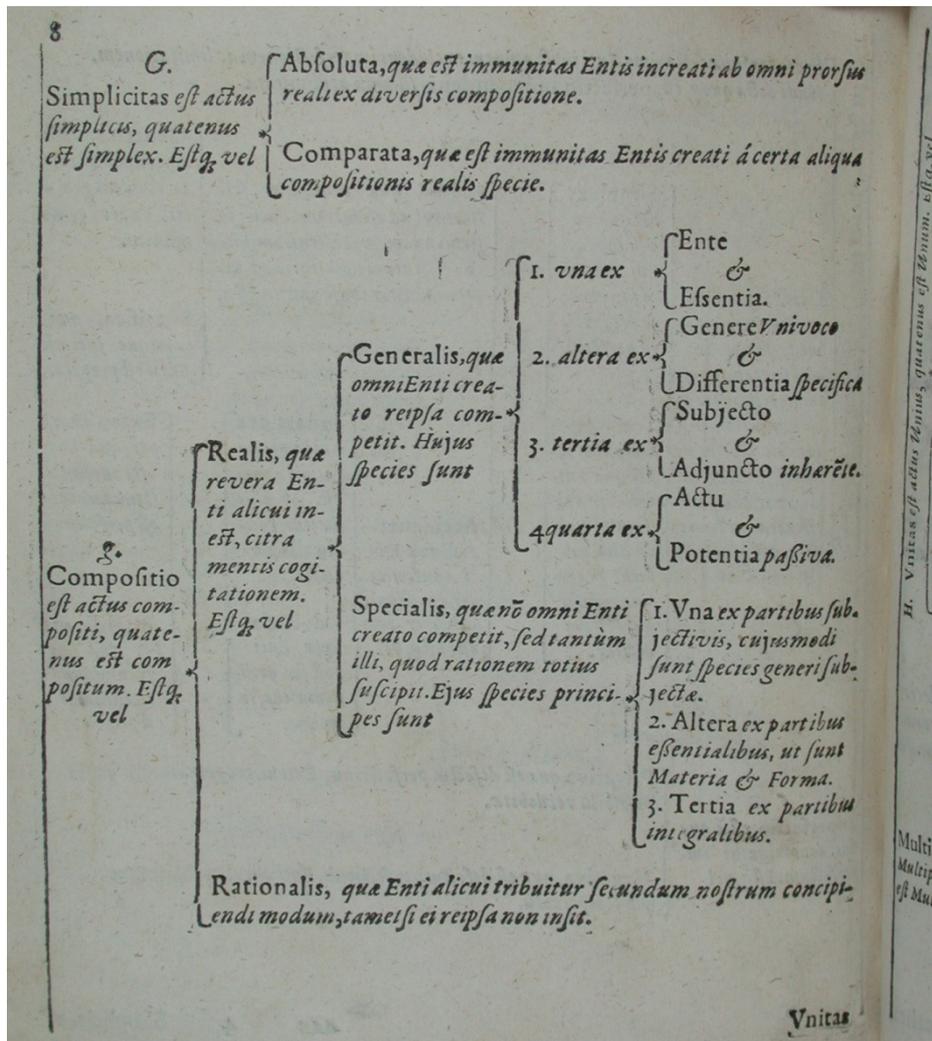
Page 8 containing one of the *realis* iterations.
(Vadianische Sammlung, St. Gallen, Switzerland)

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