PHILOSOPHICA n.º 1/2
Vol. 30, Lisboa, 2022
DOI: 10.5840/philosophica20229297
pp. 49–69

Before Kant: Universals in German Enlightenment[1]

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Abstract: The paper deals with the problems of universals in German Enlightenment before Kant. The first part reconstructs the sources of the problem of universals, focusing in particular on Leibniz and Locke. The second part examines the early eclectic positions of Brucker, Baumgarten, Hollmann and Crusius. In the fourth part the essay investigates the relation between universals and the various combinatorial projects like those of Ploucquet and Lambert.

Keywords: Universals, Concepts, abstraction, German Enlightenment, Combinatorics

1. Sources of the Problem of Universals

In the German Enlightenment, the question of universals deals essentially with two highly interconnected problems: the logical problem of their formation, and the ontological problem of their existence. What are universals? Are they constitutive elements of reality or simply explanatory concepts for reality as such? How are they generated? How are they known? These were the main questions of the time.[2]

In general, the problem of the formation of universals in German philosophy was strictly related to that of abstraction. In the *Schulphilosophie*, abstraction was the framework within which the concept of *ens* as the subject of ontology was formulated. Suffice it to say that the term "ontology" only occurs in Goclenius's *Lexicon philosophicum* in the entry "abstractio" (Goclenius 1613, 13–14).[3] In

[1] Abbreviations: CL = Couturat, Louis, ed. 1903. *Opuscules et fragments inédits de Leibniz*. Paris: Félix Alcan; GP = Gerhardt, ed., Carl I. 1875–1890. *Die philosophischen Schriften von Gottfried Wilhelm Leibniz*. Berlin: Weidmann; OP = Erdmann, ed., J. E. 1840. *Leibnitii Opera philosophica quae extant Latina, Gallica, Germanica Omnia*. Eichler: Berlin; KGS = Kant, Immanuel. 1900–. *Kants gesammelte Schriften*. Berlin: Georg Reimer.

[2] For an overview on the problems of universals in early modern philosophy see Di Bella-Schmaltz (2017).

[3] "*Philosophum necesse est esse ἀφιρετικὸν abstractivum and τὰ καθόλω etruere abstrahendo ab circumstantiis loci and temporis*. [. . .] *universales naturae seu τὰ καθόλω (universalia) abstrahuntur*

this sense, the problem of universals was not only the logical-epistemological question of their formation from particulars—the Aristotelian problem of induction (Goclenius, for instance, mentions Jacopo Zabarella's theory of induction)—it was also ontological. That is, its purpose was to determine pure universals which could be predicated of all things as constitutive of the things in themselves, e.g., the transcendental concept of *ens*. This is the reason why the ontology of the German *Schulmetaphysik* dealt with the *ens in abstractissima ratione*. This concept of *ens* was nonetheless no more than a kind of abstract universal, and thus incapable of providing the basis for a truly descriptive theory of reality, as *Aufklärung* philosophers were seeking. In fact, the concept of *ens* designates all and nothing at the same time: it is too abstract to have any palpable reality, so much so that it fell into the concept of "possible". These philosophers found the analysis of the Aristotelian-scholastic tradition wholly inadequate and turned their attention instead to the works of Gottfried Wilhelm Leibniz and John Locke. Hence if the *Schulphilosophie* introduced the question of universals into the German Enlightenment, it was only with the dissemination of Leibniz's philosophy and British empiricism that it assumed any great significance and became a matter for philosophical debate.

Leibniz was particularly appreciated for his attempt to establish a general science—an *ars characteristica universalis*—which could explain the whole of reality by means of universal primary concepts. These universals, however, were not only explanatory concepts. Indeed, the problem of the *inventarium* of simple terms of logic had metaphysical implications as well: in essence, universals determined the ontological structure of reality.

Leibniz devoted most of his life to the study of the *ars combinatoria*, starting with his *Dissertatio de arte combinatoria*, in which he founded a new art of thought, that is, a logic of invention and discovery which could exhaustively describe the entire reality. The Leibnizian *ars combinatoria* was heralded as an "instrument for discovering the most intimate and secret features of the world [. . .] a magical key to disclose the mystery of the ideal and the real" (Barone 1999, 48). According to Leibniz, all previous attempts to find an *ars characteristica universalis* through the appropriate arrangement of notions and things had been unrealistic. For only by establishing the characteristics of all of its notions, could mankind have a new tool to increase the power of the mind (OP, I, 164).

Leibniz conceived the *ars characteristica combinatoria* as a tool for the improvement of knowledge. This tool—he writes in *De organo sive arte magna cogitandi*—corresponds to the alphabet of human thought and is "the catalogue of those concepts that are conceivable from themselves and, from the combination of which, all other ideas are possible" (CL, 430). By "concepts conceivable from

ad suis particularibus. [. . .] *abstractio est actio intellectus, quo sperat ad phantasmatibus seu visis universale and ipsum denudat omni materiali conditione.* [. . .] *Abstractio est separatio universalium ab omni conditione materiae. Seu est ablatio omnium accidentium ab singluaribus, ideoque ipsius singularitatis. Seu est separatio unius ab aliis, and acceptio unius non acceptis aliis. Seu Abstractio est consideratio alicuius absque eo, in quo est. Seu est, cum quid concipimus mente abiunctum ab omnibus conditionibus restringentibus. Seu consideratio alicuius in naturae suae puritate*".

themselves" Leibniz means those primitive concepts that do not rely on any other concept for their conception, in other words, those concepts which are conceivable *a priori*. It is the task of analysis to fully resolve all compound ideas into these primitive concepts and, where this is not possible, to use nominal definitions, reducing compounds to simple, if not primitive, concepts (Cf. CL, 431).

Leibniz's objective was to achieve a complete analysis of "human thought in a kind of alphabet of primitive concepts" (OP, I, 82), thus establishing a table of predicates to which, by means of calculations, the *ars combinatoria* could be applied. In fact, "all human reasoning happens according to particular signs or characters" and "all human thought can be completely resolved into a few thoughts, which are considered as primitive, [. . .] and from these it is possible to make the character of derivative concepts" (GP, VII, 204–205). This then leads to the idea of a universal science which allows for the complete description of the universe, beginning with the primitive concepts. If there is, as Leibniz states in *De scientia universali seu calculo philosophico*, "an exact language [. . .] by means of which concepts can be reduced to a certain kind of alphabet of human thoughts," then "all the inferences which rationally issue from such concepts could be discovered by means of calculation" (GP, VII, 198–199). As a result, "in the case of differences of opinion, no discussion between two philosophers will be necessary any longer, just as there is none between two calculators. It will be enough for them to take pen in hand, set themselves to the abacus and (if it so pleases, at the invitation of a friend) say to one another: *calculemus*!" (GP, VII, 200).

Leibniz's project was grounded on the following assumptions: 1) the possibility of resolving all concepts into a definite number of simple concepts, not further resolvable; 2) the possibility of an *ars characteristica* in which the fundamental concepts have a symbolic character; 3) the possibility of determining by means of calculations, similar to those of mathematics, the relations between the various kind of characters (Mori 1996, 482–483).

From Leibniz's perspective, the universal primitive concepts of the *ars characteristica combinatoria* were not only heuristic instruments equipped to explain reality in all its complexity. They were products of the analytical power of the mind—which has the capacity to resolve concrete particulars into general abstract concepts—but they were also the constituent blocks of reality itself. As such, primitive concepts are not knowable through the demonstrative science of logic, but only through intuition, which pertains only to God. For Leibniz, therefore, universals are the result of an act of abstraction by the mind, which nonetheless conforms to some objective constraint. Furthermore, even if the mind does not grasp any similarity between things, conceptualization can be always performed by some other mind, or by God Himself and, in the final analysis, an act of God is anything but arbitrary, having an ontological correlation in things.

Universals at work determine the ideal structure of reality; they are knowable as an abstraction of the mind, but they are also at the same time concrete elements of reality, which can be grasped immediately only by a divine intuition. Leibniz's general science is therefore not only to be considered as a structure and object of

the human mind, but it rests on the assumption that it mirrors, if only partially, the ontological structure of reality (Barone 1999, 69). In Leibniz the logical aspect and the metaphysical aspect are strictly related because "there is a rigorous parallelism between the doctrine of the monad as a spiritual microcosm that produces from its essence all its contents and representations, and the logical thesis that the subject contains in itself its own predicates" (Barone 1999, 71). This kind of parallelism confers on universals both an ideal and a real existence: they are both, as we will see, *in abstracto* in relation to the mind, and *in concreto* in relation to nature.

A completely different standpoint was upheld by the other important source of the doctrine of universals entertained by the German Enlightenment, namely the logic of British empiricism. This school combined a broad Aristotelian perspective with a nominalistic theory of universals, typical of the medieval logic still widespread in the logical textbooks of Oxford and Cambridge (Cf. Sgarbi 2013). There are three general claims of British empiricism concerning the problem of universals: 1) universals exist only in the mind, and not in nature; 2) names refer only to concepts and not to real existing things; 3) universals refer to particular concepts of the mind, that is, they are concepts of concepts.

Hobbes was one of the first to defend this thesis, according to which the universal "is never the name of anything existent in nature, nor an idea or phantasm formed in the mind, but always the name of some word or name" (Hobbes 1839, II.9). So that when a "man" is said to be universal, it is not to be understood that any man was or can be universal, but only that "man" is a universal name common to many things: there does not exist in nature a universal "man" as such, even if there is a concept in the mind corresponding to a "possible" thing existing in nature to which the universal name "man" can be attached by means of the concept itself. Universals are nothing more than a product of the imagination, which is the reason why concepts bring to mind sometimes one thing, sometimes another. If universals refer to mental concepts, then, according to Hobbes, these in turn can refer either to a concrete thing or to its cause, that is, something produced by the mind. In the first case, we deal with concrete concepts, e.g., a body, and, in the second, with abstract concepts, e.g., corporeity. For "concrete," he means the name of anything existing in nature. Abstract concepts always denote the cause or essence of concrete concepts and never the things themselves, so they are concepts of concepts, like the universals. But abstract concepts are not always universals, because the concrete concept "Lentulus" has as its abstract concept "Lentulity," which is not a universal (Hobbes 1839, III.3). However, every universal is an abstract concept and in this way it is possible to resolve the problem of universals by reducing them to abstract concepts and looking at whether they refer to particular things or not—a strategy adopted, as we shall see, by the philosophers of the German Enlightenment. In this way, universals are never constituent blocks of reality, but rather a heuristic instrument for explaining it.

Hobbes's standpoint was further developed by John Locke, whose views were widespread in Germany throughout the eighteenth century. Locke clearly maintains that everything which exists is particular, and that therefore general concepts and

universals are not concerned with the real existence of things, but rather "are the inventions and creatures of the understanding, made by it for its own use, and concern only signs, whether words or ideas" (Locke 1975, III.3.3). Universals are the products of the power of the mind, which can "abstract its ideas and so they become essences, general essences, whereby the sorts of things are distinguished" (Locke 1975, III.8.1). Locke agrees with Hobbes that universals are the result of abstraction, however for him not all universals are abstract concepts. Indeed, all simple ideas have abstract as well as concrete concepts: "the one whereof is (to speak the language of grammarians) the substantive, the other an adjective; as whiteness, white, sweetness, sweet" (Locke 1975, III.8.2).

Besides this distinction, Locke mentions a particular kind of basic and original ideas, like to abstract concepts applicable to everything, such as extension, solidity, mobility, perceptivity, motivity, existence, duration and number. These are primitive ideas of the mind to which all others can be reduced, and also the universal constituent blocks of knowledge characterizing the act of cognition. They pertain only to the power of the mind in its activity to provide a possible description of the world corresponding to reality, but they do not pertain to reality itself.

2. Early Debates on the Problem of Universals

In opposition to the Leibnizian standpoint, Locke reduces all investigation of universals to the possibility of the mind knowing and experiencing the world with a particular heuristic and explanatory strategy, leaving aside the ontological aspects. However, from the conjunction of the logical-ontological Leibnizian standpoint with the epistemological Lockean perspective there emerged in Germany new eclectic philosophical positions between 1730 and 1760, with philosophers such as Alexander Gottlieb Baumgarten, Christian August Crusius, Gottfried Ploucquet, and Johann Heinrich Lambert, to name only the most important (Rumore 2020).

Besides Locke and Leibniz's views of the universals, the German Enlightenment debate was determined by Johann Jakob Brucker's reconstruction of the problem in his *Historia philosophica doctrinae de ideis* (1723). Brucker offers a brief but comprehensive overview of the different positions on the problem of universals going from scholastic philosophy up to British Empiricism. Brucker shows a particular preference for nominalistic philosophers, especially for Locke, whose doctrines are carefully examined in the third section of his work, devoted to the problem of universals in modern philosophers. He emphasizes the logical-epistemological reduction of universals from being the constituent essence of substances to the final result of the first operation of the mind (apprehension). Brucker describes the shift from an ontological realistic standpoint, which is found also in Leibniz, to a heuristic logical nominalistic perspective on the universals. In fact, according to Brucker, following the Lockean paradigm, the universal must not be confused with its cause: the latter is something that really exists, while the former is what pertains only to the mind (Brucker 1723, 238–239). A particular man—say, Socrates or Plato—is the cause behind the generation of the universal. This position leads to the

problem that in this way what the mind really knows—its object—is just a concept, or composition of concepts, rather than the substance or ontological structure of the world that causes them. What is really and most knowable for the mind is only the universal as an abstract concept, while the mind is wholly ignorant of that to which the concept refers, even if the substance in itself is the first object of knowledge.

In Brucker it is evident that the problem of universals consists in the dialectic between abstract and concrete concepts, and this would set a pattern for subsequent philosophers. Indeed, the whole story of the problem of universals in the early German Enlightenment is epitomized by the opposition between the *universale in abstracto* and *universale in concreto*. In general, the expression "in abstracto" denotes a universal which has been abstracted by the mind from reality and which has no relation to it: it exists only in the mind and not in nature. "In concreto," in contrast, characterizes a universal which has a particular relation to reality in being its constituent feature: even if it exists in the mind, it can be found in nature in all the various particular things.

The problem of German Enlightenment philosophy was to reconcile somehow the *universale in abstracto* with the *universale in concreto* in order to find a perfect correspondence between the logical and the ontological aspects of reality and, by means of universals, to determine the structure of reality more precisely.

This opposition between *universale in abstracto* and *universale in concreto* had a long history, traceable back to the Middle Ages in authors such as John Duns Scotus and Gerard Odonis, and revived by Francisco Suárez, who disseminated it in the *Schulmetaphysik* of the seventeenth century.

It was from the *Schulmetaphysik* that Baumgarten reclaimed the opposition between *universale in abstracto* and *universale in concreto* in his *Metaphysica*. Baumgarten deals with the problem of universals in the context of the disjunctive transcendentals of the *singulare et universale*. In § 149 he writes:

> *Ens universale spectatum in suo inferiori, et singulare spectatum qua alia etiam sua praedicata, praeter certum universale spectatur in concreto et tunc concretum dicitur. Ens universale, quod attenditur quidem, non tamen in inferiori suo, et singulare, in quo tamen certum tantum eius superius attenditur spectatur in abstracto, et tunc abstractum dicitur. Universale in concreto est universale physicum, (in multis, in re), universale in abstracto est universale logicum (post multa, post rem).* (Baumgarten 1779, 43)

The universal is always conceived in relation to the singular, which is contained in it in the sense that a singular is always described by means of its respective universal. There are two kinds of universal: the *universale in concreto* and the *universale in abstracto*. *Universale in concreto* is also defined as *universale physicum*, which means that the universal really exists in nature and can pertain to many things, even if it "is" singular in the things. In fact, *universale in concreto* realizes itself in the singular, and like the Aristotelian form inheres in matter. The *universale in concreto* does not exist independently of the thing in which it exists. However, it is possible to conceive of it independently of the thing, and in this case the universal is

universale in abstracto, which can be grasped only after the consideration of many things and which has objective reality only as a product of the mind. Of the two, therefore, what really exists in nature is only the *universale in concreto*, which refers to a particular thing in reality, even if it expresses a universal nature. *Universale in concreto* and *universale in abstracto* differ thus in the sole respect that they are either something that pertains to reality or merely to the mind.

In § 150 he specifies that:

> *Universale in solis individuis in concreto repraesentabile, seu, quod sola individua sub se continet, est species, quod etiam in universalibus in concreto repraesentabile est, seu, quod universalia etiam sub se continet, est genus, et horum infimum quod in nullo genere est, seu quod nullum genus sub se continet, summum in quo nullum genus seu quod sub nullo genere continetur, subalterna denique vocantur, quae non sunt summa*. (Baumgarten 1779, 43–44)

Baumgarten provides a better explanation from an epistemological perspective in the *Acroasis logica*, in the section entitled *Noetica seu de conceptibus*, which clearly shows a Lockean heritage. According to Baumgarten, the object of a concept can be either an "ens singulare seu individuum" or "universale, hoc est, pluribus commune" (Baumgarten 1753, 17). He labels the "conceptus singularis seu indvidui" as an "idea", while the "conceptus communis, seu eiusdem in pluribus", i.e., the universal, is a "notio" (Baumgarten 1753, 17–18). All the concepts are either ideas (singular) or notions (universal). Notions, however, always follow ideas, because the latter deal with singular things while the former with a number of things considered together. In § 62 he writes that "notio, quae singulis sub aliquo conceptu contentis convenit strictius, respectu illus seu obiective dicitur universalis" (Baumgarten 1753, 20). This kind of universal is what the mind strives for: "conceptus obiective universales extensionem et rationalitem cognitionis promouent. Ergo utiles sunt" (Baumgarten 1753, 21). If the objective universal is what cognition is looking for, but it follows singular ideas, it cannot exist independently of singular things, even if universals are not singular. The problem is therefore the relation between the singular and the universal. According to Baumgarten, everything that actually exists is singular and individual, and so what the mind actually knows is always an idea and never a notion: we know Socrates, Plato and Aristotle, and never the universal "human being". Since particulars are known by sensation, an idea comes from sensation and is "conceptus per sensum", which is called intuition (Baumgarten 1753, 21). However, a notion, i.e., universal, is not a "conceptus per sensationem", but formed "abstrahendo ab inferiorum differentia, ergo per abstractionem (*Absonderung*)" (Baumgarten 1753, 21). For instance, we know of the idea of a "human being" from Socrates, Plato and Aristotle, but we know it as a notion denoting "rational animal" only by abstraction and specification. "Conceptus per abstractionem" is called "abstractus". All universals are notions, notions are abstract concepts, ergo universals are abstract concepts. Concepts like "Lentulity", which are abstract but not universal, are not considered by Baumgarten because they are useless for

knowledge and convey nothing more than the singular idea. Baumgarten therefore equates universals with abstract concepts, and singular ideas with concrete concepts. The abstraction from sensation to universals is also a process of clarification and illumination (*Aufklärung*), possible only through a process of analysis or resolution (*anatomia*) by which the concepts become clearer and more distinct. When a concept cannot be resolved it is called "conceptus irresolubilis" or "simplex" (Baumgarten 1753, 22). These irresolvable concepts are for Baumgarten the building blocks of knowledge, by means of which all reality can be explained. However, they do not pertain to reality itself, because no ideas correspond to them and they pertain only to the explanatory power of the mind.

Baumgarten has therefore a twofold perspective on universals. On the one hand, concerning the *universale in concreto* he is a realist, in the sense that he regards universals being *in re*. On the other hand—the *universale in concreto* being for Baumgarten a singular concept from an epistemological point of view—he is a nominalist, holding that universals are simply abstract concepts existing only in the mind. He is attempting to reconcile the realist and ontological perspective of Leibniz with the nominalistic and epistemological standpoint of Locke. However, equating abstract concepts with universals, he solves the problem of universals in a nominalistic way.

Baumgarten's view of the origin and formation of universals met fertile soil in the German Enlightenment, as Samuel Christian Hollmann's *Philosophia rationalis* clearly testifies. According to Hollmann, all that exist are singular and individual things (*res singulares and individua*); these differ from other things not in a physical but in a logical sense, according to their determinations. The mental object of a singular thing is an idea, as in Baumgarten. When the mind abstracts from the various determinations, and finds determinations in common with other things, it grasps a universal. The singular thing, i.e., the idea, is always logically subordinate to the universal, though no universal can be formed without particular ideas. From the epistemological standpoint, ideas are prior to universals, which would be mere names without reference to things. Furthermore, universals are obscure by nature, and the more abstract they are, the more obscure they seem. Universals that are less abstract and therefore less general are more accessible, and they permit cognition of particulars. Hollmann takes a very specific position on the scholastic problem of universals:

> *Neque minus vero ex iisdem fundamentis dijudicari partim quaestio poterit, quae tantis animorum motibus inter* scholasticos *olim fuit agitata, ut schismatis, satis notabilis, sectarumque, ipsis causa fuerit: num* universalia, *nempe, aliquid* realis, *an* nuda *potius solum sint* nomina? Prout universalia *enim sunt, extra mentem nostram nullibi existunt, adeoque nec eatenus aliquid realis quin* nuda *potius* nomina *tantum, sunt; prout* fundamentum *vero suum* in singularibus *illis habent, a quibus mentis abstractione sunt formata,* realis *utique aliquid eatenus dici recte possunt, quatenus singularia illa* vere realiterque existere *concipiuntur, neque nuda hactenus appellari nomina possunt.* (Hollmann 1767, 133)

Hollmann's position on universals is therefore better characterized as conceptualist than nominalist. He explicitly agrees with Aristotle's view that universals have no existence outside of the mind but achieve their reality only in relation to concrete things. Being a product of a specific mind, universals are always arbitrary concepts: they can differ from individual to individual according to the activity of abstraction undertaken by each mind. Ideas, on the other hand, are not arbitrary but necessary, because they come directly from reality (Hollmann 1767, 136). Indeed, the relationship between abstract concepts and ideas or concrete concepts is ontologically oriented in favor of ideas, which alone have a real existence in nature; conversely, however, this relationship is logically resolved in favor of universals, which involve the activity of "pure understanding", namely a type of understanding that has to do only with pure abstract forms and not with concrete knowledge (Hollmann 1767, 131–132).

Christian August Crusius went further than Baumgarten in his exploration of the relation between *universale in concreto* and *universale in abstracto*, making this distinction one of the central claims of his *Weg zur Gewissheit*. The distinction rests on the proper operation of the judgment, which is abstraction (Crusius 1747, 169). Abstraction always begins with individual things. From here, the mind discards the peculiarities of each, looking for a common nature and forming the universal in this way. This kind of abstraction is called by Crusius *abstractio latitudinis*, or specifically logical abstraction, which is one of various kinds of abstraction, alongside *abstractio externa*, *abstractio metaphysica*, *abstractio mathematica*, and *abstractio physica* (Crusius 1747, 170). In each kind of abstraction there is a concept which is abstract as a result, and a concept which is abstracted. In Hobbes' terms, the latter is called *concretum*, or the object of the abstraction, while the former with respect to the *concretum* is called *abstractum* (Crusius 1747, 171). Furthermore, in relation to the content of the abstraction, concepts can be either concrete and irresolvable concepts, or abstract and resolvable. In the former case, a concrete or irresolvable concept is a general concept, which can be considered in two ways: firstly, as a union of manifold parts or properties, as with the concept of society; secondly, as an example of something according to which it becomes possible to know many things—even if not in a clear way—as with the universal of beauty arising through looking at Giotto's paintings as a canon for the evaluation of all beautiful things (Crusius 1747, 216–217). In this sense, a concrete concept is not the object of abstraction, but rather a general concept which can be given in reality as a way of making senses of its manifold components. A concrete concept is therefore a real universal which manifests itself in reality and denotes a singular entity, which, however, collects together manifold elements that cluster beneath it.

A concrete concept is an irresolvable concept, either because it has not yet been resolved, or because it is completely irresolvable by the human understanding (*notio indissolubiliter concreta*) (Crusius 1747, 217). In contrast, a distinct grasp of a concept is possible only in the case of a resolvable abstract universal. Distinct cognition of abstract universals is the property of mathematical knowledge, while

cognition of concrete universals pertains to physical, philosophical, and ethical forms of knowledge.

Johann Joachim Darjes applies the distinction between *universale in concreto* and *universale in abstracto* to the *ars characteristica combinatoria*. A universal is "qui ab aliis etiam *communis* dicitur, est qui rem universalem significat" (Darjes 1742, 243–244), while a singular concept is "qui ideam rei singularis seu individui exhibet" (Darjes 1742, 244). Also for Darjes, therefore, an idea represents a singular thing, while a concept properly represents only a universal. He adds that, unlike a concrete concept, an abstract concept is one which the mind represents as not being inherent in the object when it is thinking (Darjes 1742, 244). In conclusion, "terminus priorem exprimens ideam dicitur *abstractus*, qui vero posteriorem exhibet ideam, *concreti* accepit nomen" (Darjes 1742, 244). There are as many concrete concepts as there are singular objects. However, the mind lacks the power to retain in its memory all individual objects, and therefore it uses abstract concepts as signs through which it can properly express the various ideas. The combination of all these abstract concepts as signs is a heuristic instrument equipped to explain reality, and this is the task of the *ars characteristica combinatoria*. Universal abstract concepts thus have no essential reality, which pertains only to concrete concepts, and so Darjes settles for a nominalistic view .

3. Universals and Combinatorics

The problem of universals became more complex with Gottfried Ploucquet's combinatorial logic. In his *Methodus calculandi in logici inventa*, Ploucquet defined calculation as "methodus secundum regulas constantes incognita et cognitis determinandi" (Bök 1766, 31), i.e., as a real method of discovery. Despite this definition, however, Ploucquet is convinced that "pro diversitate objectorum diversae nascuntur methodi", and therefore that "calculi variant in infinitum, aut tantum quantum ipsa rerum genera variam" (Bök 1766, 31). The infinity of calculations is evident from the many different ways of dealing with geometrical quantities forces, degrees, either logical or physical objects, or those combining geometry with dynamics. The lack of overlap between the various methods of calculation is shown by the fact that "variationes in arithmeticis plane non respondent variationibus in geometricis" (Bök 1766, 31). It is therefore clear that Ploucquet undermines the possibility of a general science of the kind envisaged in the Leibnizian *ars characteristica*:

> *E quibus luce meridiana clarius apparet, quod methodi comparandi res cum rebus non possint tradi mediante calculo quodam universali, adeoque characteristica universalis ad somnia excellentium ingeniorum pertineat. Si enim summa tantum disciplinarum capit sub calculum quendam revocanda essent, non nisi pars Ontologiae traderetur, generalissmas varietates complexa, ubi calculi usus plane nullus deprehendetur.* [. . .] *Deinde omni calculus natura et ordine logico posterior est intellectione materiae, ad quam calculus applicatur. Si igitur ingeretur calculus universalis, supponeretur cognitio rerum, quae autem a nemine mortalium supponi*

> *potest. A calculo inventor non facit initium, sed a consideratione rerum. Si igitur possibilis esset is calculus (id quod autem ex rationibus supra datis non concedo) inventor calculi profundissima rerum omnium cognitione instructus esse deberet.* (Bök 1766, 36)

Ploucquet's final conclusions are that: 1) not everything can be taught by means of a universal calculation; 2) if a universal calculation if there were such a thing, it would characterize the first principles of ontology, in which there is no use of calculation; 3) if a universal calculation were possible, it would be necessary to know everything; 4) the calculation always comes after the knowledge of the things, therefore it would be necessary to consider the thing starting with its material aspect; 5) the universal calculation could pertain only to an immortal being.

The impracticality of a general *ars characteristica combinatoria universalis* is due, according to Ploucquet, to the impossibility of completely reducing concrete concepts to universal abstract concepts. In fact, if there are as many calculations as there are things—namely concrete concepts—then the mind must consider all these concrete concepts in the calculation, a task which is impossible for its limited powers to realize. The *ars characteristica combinatoria* is based on abstract concepts which cannot provide an exhaustive explanation of reality.

Ploucquet develops his theory of universals in a short essay entitled *Von dem Ursprung der allgemeinen und abgezogenen Begriffe* (Bök 1766, 257–259).[4] Universals are the outcomes of the abstraction of common properties inherent in many objects, even if strictly speaking they do not exist in nature because any operation of the mind is always singular and, for this reason, also the object of the operation must be singular. This is because otherwise there would necessarily be another operation that makes the singulars into universals, but also in this case the first operation would be based on singular concept, and so on *ad infinitum.* In this case, the universal is a "singular" but indeterminate and general concept. Since the universal is an indeterminate concept, it cannot be a specific object of the operation of the mind that denotes something in reality. Therefore, according to Ploucquet, it is possible to deal properly only with the *universale in concreto*, not with the *universale in abstracto*: the former has an epistemological-psychological validity, while the latter has a merely logical validity that does not describe the whole of reality in exhaustive way.

Ploucquet's investigation is strictly psychological. He rejects the possibility of universals in a strict sense, because every operation of the mind is a single act, which cannot be called universal. In addition, every object, which is conceived *in abstracto* and not *in concreto*, becomes a non-object. Nonetheless the mind demands universals because in its analysis of reality it focuses its attention on the impression of similarity and almost completely neglects the diversity among things. Thus the mind repeats the concept of a given particular until it assumes a universal validity for manifold concepts. Therefore, a universal is nothing other than frequent repetition of the same "singular" concept of which the mind has had

[4] Appendix 1 provides the first English translation of the whole essay.

prior experience. Furthermore, besides the actual diversity of particular objects, also the psychological processes of the individual mind deny the validity of universals. In fact, for instance, if the mind could see clearly what happens in all other minds about a certain concept of a number, it would know that the modifications of the affections in one mind differ from those of another mind when they are actually representing that number. Francesco Barone is right in stating that "we are dealing with an assessment of the universals which very closely recalls the investigation of the British empiricists, and which shows in the thought of Ploucquet a ferment of mixed topics, within a general framework characterized by formal dogmatic rationalism" (Barone 1999, 90). Ploucquet argues that rules and definitions and other logical elements have only a heuristic value, and they have no ontological consistency. Science proceeds by using formal universality in its arguments, and this is the only reason for accepting the use of universals. In conclusion, "Ploucquet accepts universals with regard to their *Bedeutung*, but rejects them as regards their *Sinn*, because they are psychologically individual images with a representative function" (Barone 1999, 90). In Ploucquet, therefore, universals are merely names by which it is possible to describe and explain reality, but they are not its constituent elements, as was the case for Leibniz.

Ploucquet's position was opposed by logicians such as Thomas Abbt, and appreciated, even if criticized, by philosophers such as Johann Heinrich Lambert. Lambert was the first to reconcile Leibniz's combinatorics with Lockean psychology on the topic of the universals. In particular, his criticism of Ploucquet is evident in his correspondence with Georg Jonathan Holland. Lambert maintains that Ploucquet's method "creates neither a language nor an art of signs, but only an abbreviation" (Bernoulli 1781, I, 96). In sum, Ploucquet's approach was useless for describing reality, but served a function in communicating in an easy and concise way what is discovered and demonstrated. Lambert's divergence from Ploucquet is evident also in the ontological implications of his architectonic system. According to Lambert, reality could be described through logical elements in a rigorous and scientific way, and these logical elements are the constituent blocks of reality itself. In this respect Lambert supports—in *De universaliori calculi idea disquisitio*—a similar thesis to Leibniz's proposal in reducing all quantities to a kind of quality: "quodsi ergo inveniatur methodus, rerum qualitates, vel veritates, vel ideas, ea ratione tractandi, qua in Algebra tractari videmus quantitates, utique vel ipsa tractationis similitudo *calculi qualitatum, veritatum vel idearum*" (Lambert 1765, 442). The construction of this "real" *ars characteristica combinatoria*—which is not merely logical—in such a way that it characterizes the ontological constitution of reality requires the discovery of primitive concepts and their relations. The correctness of the description depends on the resolution of the primitive concepts and on their composition by means of the relationships between them (Lambert 1765, 444, 446). Similarly, in the posthumously published *Versuch einer Zeichenkunst der Vernunftlehre* Lambert focuses his analysis on the problem of concepts as qualities and on their relations, but with a particular interest in the characteristic mark. A characteristic mark is what represents a thing as being distinct from others. The concept is what is composed

of characteristic marks and it is the representation of something in thought (Cf. Lambert 1782, 15). A concept is primitive or irresolvable when it is constituted by a small number of essential characteristic marks, which are not further resolvable (Cf. Lambert 1782, 16). Given these premises, the combination is not of concepts, but of the characteristic marks of concepts. Among these characteristic marks, a very specific role is played by relation, which is the mark through which a concept is known or determined by other concepts (Lambert 1782, 17).

The problem of fundamental concepts and of their relations can be traced back to Lambert's essay *Criterium Veritatis*, which was likely written around 1761. Here, every truth is based on fundamental concepts (*Grundbegriffen*) and on derivative or doctrinal concepts (*Lehrbegriffen*). Fundamental concepts are those which are represented immediately as possible and correct. They are grasped by internal sensation (*sensus internus*) (Cf. Lambert 1782, 55), and have an immediate characteristic mark of truth, on which is based the truth of derivative concepts. The correctness of principles is grounded on concepts, both fundamental and derivative. The correctness of theorems, meanwhile, is grounded on concepts and principles. They are based on the principle of non-contradiction and demonstrated by means of syllogism. Syllogism is the expression of the mediated characteristic mark of truth (Lambert 1782, 56).

The real problem is therefore how the mind knows the truth of fundamental concepts, and what these are. Lambert's doctrine of fundamental concepts shows a substantial shift away from Leibniz's *ars characteristica combinatoria* towards a methodological rigorization of Locke's philosophy, which structured all knowledge on the basic and primitive ideas that come from sensation and reflection (Cf. Barone 1999, 115). In fact, the constituent elements of Lambert's *ars characteristica combinatoria* are not essences or numbers as in Leibniz (Cf. Barone 1999, 117), but come from the primitive content of experience, which is immediately accepted as absolutely true and valid.

In the *Neues Organon* Lambert explains how the mind achieves these fundamental primitive concepts. He is clear in stating that to understand a thing means having a representation of it in the form of a concept (Cf. Lambert 1764, 5–6). A thing is easily distinguishable from other things if they have nothing in common or,—what amounts to the same thing—if it is entirely different from the others. However, in a comparison between two or more things, a shared or similar characteristic mark is more recognizable than divergences. In this way the mind tends to represent to itself a shared characteristic mark more readily than an individual characteristic mark proper to a particular thing. The operation of the mind which enables this consideration is called abstraction. If the mind abstracts shared characteristic marks from individual ones, it forms an abstract universal (Cf. Lambert 1764, 418). In the realm of experience, the abstract universals—which are common to many things, i.e., they form the fundamental concepts—are existence, unity, solidity, extension, duration, and succession.

These are the universals that describe the whole of reality: on the one hand, they are grasped from experience as *universales in concreto*, and on the other—being the

subject of logic—they are *universales in abstracto*. Lambert explains that they really inhere in things *in concreto*—not as such, but as a property or characteristic of a thing. Solidity does not exist by itself in nature—in fact it is an abstract universal—but it always exists as a solid thing, that is, as property of a body. These universals, therefore, have no independent reality apart from real existing things, even if their existence for Lambert is indubitable. Their reality is purely mental insofar as they are the universals through which the mind has the particular concept of a thing, and so can achieve scientific knowledge of it. However, according to Lambert "the conceptual elements, of which is constituted the a priori truth or our knowledge, reflect the actual structure of the world" (Barone 1999, 115). This is an original and undisputed position, which leads Lambert to the construction of an architectonic science in which universals feature as the constituent blocks of reality.

This project is carried to fruition by Lambert in his *Anlage zur Architektonik*, which, directly recalling Baumgarten's doctrines, set out to analyze all the primitive and simple universals that describe and structure reality. Lambert realizes a complete analysis of these fundamental concepts but does not achieve the desired *ars characteristica combinatoria*; instead, he explains—in a somewhat rhapsodic way—fundamental concepts such as consciousness, existence, unity, duration, succession, will, extension, movement, and force: Lambert's sorcerer's stone remained a dream. In particular, on the problem of universals Lambert demonstrates his ontological and realistic standpoint. He writes that the so-called universal beings (*entia universalia*) do not exist—and cannot exist—as abstract concepts, and they cannot be considered as metaphysical entities. But since they can exist *in concreto*—that is, with particular determinations which pertain to individual things (*individuis*), and therefore to the power of the mind, and through which the mind can really think of them without determinations—they are metaphysical entities (Lambert 1771, 290–291). Lambert presupposes a parallelism between the real ontological world constituted by concrete universals and the logical world constituted by abstract universals. This particular conception is supported also in his posthumous fragment entitled *Von der Abstraction des Allgemeinen aus dem Besondern*, which is explicitly devoted to the problem of the universals (Lambert 1782, I, 479–483).[5] Lambert tries to mitigate Locke's conceptualism by assuming the ontological nature of the concepts, as Leibniz did; but he goes far beyond Leibniz in referring to experience in all its universality.

In the same years, Johann Georg Heinrich Feder summarizes Locke's perspective, stressing his conceptualism and not paying attention to any possible ontological implication. § 21 of his *Logik und Metaphysik* deals with the origin of universals:

> There has always been much quarrelling among philosophers about the origin of concepts, particularly about universal ones. It is certain, however, that there are neither sufficient grounds for maintaining that they arise from somewhere other than sensations, nor for maintaining that they are innate concepts in general. On the contrary, everything, which one learns from experience, seems to coincide with the contrary opinion. Let us just consider:

[5] Appendix 2 provides the first English translation of the whole essay.

1) that with the privation of one sense man is deprived at the same time of all those concepts that refer to the sensations of that sense. What concepts could exist if all senses were lacking?

2) universals, of whose origin from sensible knowledge one may doubt, are also linked to words or other signs. We learn the latter, however, not only in relation to their own matter but also through the senses, by seeing or hearing them: yet these signs, too, do not have in themselves a force of meaning: only through direct or indirect connection with sensations can they be rendered significant and comprehensible.

3) are not inner or outer sensations those simple, or at least for us insoluble, notions to which the most subtle metaphysics in the end leads in the development of our concepts?

4) the constitution of a universal, or ideal, depends on whether a man has had many or few, these or those, sensations of a certain type of things. (Feder 1775, 53–54)

Using Locke's arguments, Feder argues implicitly against Lambert's ontological and metaphysical account of universals. Finally, he states that all universals have their origin in sensation. First of all, Feder notes, when sensation is lacking, so is the universal which refers to it. Without sensation, the universal does not exist. However, Feder adds, it is plausible to doubt that the origin of the universal is sensation. In fact, words and signs also seem not to come from sensation, and the kind of knowledge that we achieve with universals is not the same as sensory experiences such as hearing and seeing. However, without any reference to sensation universals are completely incomprehensible and unintelligible. Furthermore, Feder explains, universal irresolvable concepts are not the simple and primitive things that some metaphysicians claim. Finally, it is by means of the various sensations that the mind has a particular mode of understanding things, which can be considered its universal or ideal. Thus all universals have their origin, according to Feder, in sensation, and sensation gives meaning to the universals, which, otherwise, would be insignificant.

4. Conclusion

To conclude therefore, in the German Enlightenment there were three main perspectives on universals. The first is such as Lambert's: a particular conception of universals that can be defined in a broad sense as "realistic" and that conceives universals as being the ultimate constituent elements of reality. However, these authors left open the question of the connection between ontological and logical-epistemological aspects of the universals. In fact, universals such as "extension" and "solidity"—if they are considered for themselves—are only abstract concepts of the mind, and they exist in reality only in the singular, in which case they are called universals *in concreto*. Universals *in concreto* are in truth merely individual, while universals *in abstracto* are purely fictions of the mind with the function of

explaining reality. Universals in concreto and universals in abstracto must exist in parallel states, otherwise there would be no correspondence between the ontological and the logical levels. Such a correspondence consists simply in the presupposition that universals are the constituent elements of reality. Universals are, therefore, at one and the same time concrete and existing in reference to something else outside of the mind in so far as they constitute reality. Yet they are only abstract and purely fictions of the mind when they lack this reference to individuals. Nonetheless, in so far as they inhere in individuals, they are only properties and not self-subsisting realities. This position can be called realist for the simple reason that it conceives of universals as being constituent parts of reality—but not because it believes that universals exist independently of the mind.

There is another position: one which denies that universals can constitute reality and which maintains that universals are only heuristic strategies for explaining the world, or rather the picture that the mind makes of the world. Universals arise from the demands and limits of the mind in providing reasons with respect to the manifold nature of experience. In this case, we have two different factions—one more nominalist and the other more conceptualist—both grounded in a different reading of Locke. The nominalist perspective—like that of Ploucquet—posits that universals do not exist, but are only singulars with the function of representing more things: all that exists, or can exist, is particular. The conceptualist position—advanced, for instance, by Baumgarten and Crusius—maintains that in themselves universals exist only in the mind and have no substantial or external reality beyond it. For the conceptualists, in opposition to the realists, universals do not simply reflect the essence of a thing but are also constructions of the mind. Contrary to the nominalists, however, they admit the existence of universals in the mind: the universal is mental content, which exists *post rem*, yet can also exist *in re* as a universal *in concreto*, that is, as an individual. Also for this conceptual position, universals are only equipped to explain reality, and are not a constitutive element of it.

Nominalist and conceptualist criticisms of the ontological implications of placing universals as the constituent blocks of reality influenced Kant from his early writings onwards, especially in his rejection of combinatorial logic in the *Untersuchung über die Deutlichkeit der Grundsätze der natürlichen Theologie und der Moral* and in the *Methodenlehre* of the *Kritik der reinen Vernunft* (Cf. *KGS*, II, 291; *KGS*, III, A 713/B 741). However, Kant did not dismiss what he learnt from the philosophers of the German Enlightenment, and he used the distinction between *universale in abstracto* and *universale in concreto* in his *Kritik der Urteilskraft* to characterize the different attitudes of the *bestimmende Urteilskraft* and *reflektierende Urteilskraft* towards universals (Cf. *KGS*, IX, 131–132). This terminology was taken up by Hegel, who elaborated a logic of the concrete universals in his *Wissenschaft der Logik*—but that is another fascinating story.

Appendix 1—Gottfried Ploucquet's *Von dem Ursprung der allgemeinen und abgezogenen Begriffe*

On the Origin of the Universal and Abstract Concepts

In every concept two things have to be considered, namely the operation of the intellect and the object that the intellect conceives. Every true operation, or actus, is necessarily a single operation and cannot be called universal. The object is also nothing indeterminate because the indeterminate, in being precisely indeterminate, would be a non-object. Consequently there is no universal for the more perspicacious intellect. How does it then come to be that we construct our whole reason and all sciences on universals? In my opinion, the matter is as follows: If a single object is presented to the intellect several times, then the same concept is also repeated. Should several things be presented to us in succession at the same time, with the result that we distinguish them only as a number, we similarly repeat exactly the same concept so frequently that the things seem to be multiplied. If various objects appear, whose distinct parts or determinations can only be distinguished by us as a number, we repeat in precisely this way our concepts or images according to the nature of the objects. If we then think on another occasion of this repetition, which can happen an infinite number of times, we may well content ourselves with a similar image or concept. A universal is, therefore, nothing but a rapid repetition of precisely the same concept that we had according to a certain determination. It may by chance happen that this indispensable operation of our intellect depends on its own finite nature, and that man has to seek the strength of his reason in a certain weakness. Infinite intellect has an intuitive and complete recognition of all things and truths, which it clearly sees immediately. Hence teachers are right when they do not apply reason, *discursivam cognitionem*, to infinite intellect. Anyone who considers the so-called universal to be something positive, so that a universal should necessarily be and remain to all rational beings precisely the same as far as both the operation of the intellect and the object are concerned, then finds it difficult to free himself from this erroneous concept. I confess that I feel very reluctant to abandon this prejudice although I am obliged to. It is also known that various intellectuals in Britain, France and throughout the world reject the concepts of common understanding as non-existent concepts. Despite this, all the rules of explanations, classifications, conclusions and other logical things maintain their value and are absolutely indispensable. These general concepts seem indeed to be something necessary, hence the same, for all thinking beings. If I think, for example, of the three hours that are required to complete a certain task, it does not matter if these three hours are spent by day or by night, on Monday or on Tuesday, in France or in Germany. The abstract concept of 'hour' is identical for any hour, as is the concept of 'three'. If one thinks, however, exactly of what happens in us when we really think the sentence "three hours are required", then we find that in the real thought that we have the number 3 is presented to us by means of a real sign, which in itself cannot be indeterminate, and that the concept of 'one hour' has at its root a certain thought of a precise length of time. Thus, if several cases of

thinking of '3' or 'hour' present themselves to us all together or imperceptibly fast, we combine all these very similar or barely indistinguishable images and signs and turn them into a valid general concept. Man can do nothing else, and neither does it harm sciences if many similar, subsequent sensations and thoughts are considered as having a formal universality. Yet since it is impossible for either a modification of the intellect or the object conceived to be indeterminate, there is no constant universality of concepts. If we were able to understand clearly what happens, for example, with the concept of a certain number in all thinking individuals, we would recognise that the modification in A would be different from the modification in B since both A and B themselves really imagine this precise number. Even if this is the case, I shall deal with abstractions according to the old custom.

Appendix 2—Johann Heinrich Lambert's *Von der Abstraction des Allgemeinen aus dem Besondern*

On the Abstraction of the Universal from the Particular

Abstracting generally requires the perspicacity to notice everything in the particular case and sufficiently clear concepts of the same, besides the universals and terms needed to express the abstracted. The difficult question is to what extent the abstracted is universal. One can find, for example, in subject A two or more concepts, B, C, D, etc., at the same time, so the question is how far they remain together when abstracted and whether, without being aware of it, one does not also abstract further concepts, H, I, J etc., along with the former, and whether the latter do not pertain to it, and so on. This analysis must necessarily be carried out when abstracting. Reasons for abstracting: If one finds a useful, noteworthy, attractive, etc., aspect in something, it remains to be seen in what this aspect consists, what it is in this thing that makes it possible and whether it does not occur in other things as well. If these questions are raised, one may abstract usefully. It is clear that any noteworthy case provides a reason. Should this reason be found, one can find a useful abstract concept which can be applied to several cases. In this way, I determined the essential usefulness of the meridian in geometry, and from this I abstracted the concept that it exists in parallelism, which I then applied to distant objects. From this I abstracted the present considerations, because this case is, in fact, an example of a useful, logical rule. An individual or a particular case always has a reason for abstracting whenever this abstraction is useful, noteworthy, convenient, facilitating, profound, advantageous, unexpected, appropriate, important, delicate, paradoxical, applicable, attractive, all-inclusive, fecund, etc. Wherever something similar to this occurs in particular cases, one can attempt to abstract and see if it is not more universal. There are similar reasons for applying general principles and parts of a theory of a similar type to new kinds. In abstracting, either one is left with a single piece or one abstracts as much as one can. In both cases, one must seek to exploit it fully, that is, not omit anything of the universal that is abstracted, otherwise one would easily feel the lack of many properties, frequently the essential ones. One example is Thümmig's concept of immortality abstracted from the parable of the rich man and Lazarus. The

universal is complete in the individual, and hence one has to see how far it extends, and abstract no more and no less. The former is found by examining what can be omitted, the latter by means of the complete list of all parts and concepts that the object offers. One has to see that all the concepts of a different type are abstracted. Thümmig abstracted, for example, only the concept of immortality; in the parable, however, there is more (for example the destinations of the soul after death, the ways of the Lord, etc.). One has to see by abstracting from all perspectives and considering the thing in all its aspects, etc. One has to see by abstracting continuously, because one can find in this way genres and types in their own order. One has to see by combining the various abstracted, namely considering the thing in all its aspects. In abstracting, there are two different cases. The first is: the object from which one has to abstract is given. Here, one has to consider how one should abstract, what one wishes to abstract and for what reason. The second is: the *abstractum* is given in general, and objects are sought from which it can be abstracted. The abstract may be, for instance, a higher genre and one seeks to abstract from the lower ones; it may be a genre, and one seeks to discover how it is placed within types; it may be a general concept of method or expedient, etc., and one seeks to find more specific ones. The first of these tasks is a direct one, the second the contrary. The task keeps to a central path between abstracting and applying universal principles to particular cases. It is at the same time an indirect means of subdividing, and connects the highest genres to individuals through the middle ones. One therefore has thereby the highest genre, and one seeks subtle individuals not as the main intention but in order to abstract from them the lower genres. The task may also be considered a very broad predicate for which one finds the lowest subjects in order to discover from them the higher and middle predicates. This task is advantageous because abstracting is easier than combining. In abstracting there are two intentions. Either one is content with the abstracted concept, in so far that it is simply a concept (this is always the case as long as it is correct), or one stops at the object and extends the concept to the whole class or genre to which the thing belongs: the latter is more difficult and complicated because in so doing it still remains to be decided whether the abstracted concept lets itself be extended that far or whether it remains more specific. This must be demonstrated either by means of a complete induction, or from the concept of the genre of the thing that has already been demonstrated. One can, for example, draw a figure on paper that has in itself a noteworthy property, etc. but one cannot extend this property without proof to every figure of the same name. A right-angle triangle would imply the Pythagorean theorem, but the latter would be extended without reason to every other triangle. Something similar has been noticed in a glass when a diverse glass divides coloured rays differently, etc.; hereby one cannot be too cautious if one has to draw conclusions for all examples from merely a few of them: the universality and the extension of an attempt is something important. This is helped a great deal when one analyses the reason why the abstracted lies within the thing, since one has to abstract it along with its grounds and in all its extension. If one considers the *abstractum* to be a predicate, in order to enquire into the nature of the subjects to which it belongs, then this is a contrary

task if one wants to render the thing more general. One frequently supposes for this reason that something is more universal because one cannot yet see a reason in the object wherein it has been found why it should only belong to that specific one. In supposing, this is sufficient and justifiable if the observed thing deserves to be examined. In geometry, arithmetic and algebra, if these are applied to the other parts of mathematical science, such cases very often occur, since either an unexpected symptom is revealed in the figure sketched or something attractive is shown in the formula that is extracted, which both can be made more universal. Precisely this also happens with attempts at casual causes.

Bibliography

BARONE, Francesco. 1999. *Logica formale e logica trascendentale. Da Leibniz a Kant*. Milano: Unicopli.

BAUMGARTEN, Alexander G. 1753. *Acroasis logica.* Halle: Hemmerde.

BAUMGARTEN, Alexander G. 1779. *Metaphysica*. Halle: Hemmerde.

BERNOULLI, Jakob, ed. 1781. *Heinrich Lamberts deutscher gelehrter Briefwechsel*. Berlin: Bernoulli.

BÖK, August F. 1766. *Sammlung der Schriften, welche den logichen Calcul Herrn Prof. Ploucquets betreffen mit neuen Zusätzen*. Frankfurt-Jena.

BRUCKER, Johann J. 1723. *Historia philosophica doctrinae de ideis*. Augsburg: Mertz.

CRUSIUS, Christian A. 1747. *Weg zur Gewissheit*. Leipzig: Gledtisch.

DARJES, Joachim G. 1742. *Introductio in Artem Inveniendi, seu Logicam theoretico-practicam, qua Analytica atque Dialectica in usum et jussu auditorum suorum methodo iis commoda proponuntur.* Jena: Buch.

DI BELLA, Stefano, and Tad M. SCHMALTZ. 2017. *The Problem of Universals in Early Modern Philosophy*. Oxford: Oxford University Press.

FEDER, Johann G.H. 1775. *Logik und Metaphysik*. Göttingen: Dietrich.

GOCLENIUS, Rudolph. 1613. *Lexicon philosophicum*. Frankfurt: Becker.

HOBBES, Thomas. 1839. *Opera philosophica quae latine scripsit*. London: Bohn.

HOLLMANN, Samuel C. 1767. *Philosophia rationalis quae logica vulgo dicitur*. Göttingen: Vandenhoek.

LAMBERT, Johann H. 1764. *Neues Organon*. Leipzig: Wendler.

LAMBERT, Johann H. 1765. "De universaliori calculi idea, disquisitio." *Nova acta eruditorum*, 6, 441–473.

LAMBERT, Johann H. 1771. *Anlage zur Architektonik*. Riga: Kanter.

LAMBERT, Johann H. 1782. *Logische und philosophische Abhandlungen*. Berlin: Bernoulli.

LOCKE, John. 1975. *An Essay Concerning Human Understanding*. Oxford: Clarendon Press.

MORI, Massimo. 1996. "Calcolo combinatorio e ricerca dei principi." In *Storia della filosofia*. Edited by Paolo Rossi and Carlo A. Viano. Roma-Bari: Laterza, 482–496.

RUMORE, Paola. 2020. "Locke in Halle: A chapter of the 18th-century German reception of John Locke." *Studi lockiani*, 1, 163–194.

SGARBI, Marco. 2014. *The Aristotelian Tradition and the Rise of British Empiricism*. Dordrecht: Springer.