LEIBNIZ'S PROJECT FOR *CHARACTERISTICA UNIVERSALIS* IN RELATION TO THE EARLY ANALYTIC PHILOSOPHY

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Summary

Leibniz changed the definition of his concept of *characteristica universalis* during different periods of his development—as will be discussed further in § 1. He introduced it as a "philosophical characteristic" in 1675, elaborated it further as *characteristica universalis* in 1679, and worked on it until at least 1690. In § 2 we shall see that in the last 140 years or so, different philosophers have advanced projects similar to that of Leibniz, sometimes without referring to him directly. These very projects shed some light on what Leibniz's idea of *characteristica universalis* could be. Be this as it may, the fact is that today, more than 300 years after its introduction, that concept has yet to be used on the scale that its author dreamed of. This fact sets out the second objective that we are going to pursue in this paper: we shall tentatively set out (in §§ 3 and 4) how this concept can be interpreted in more practical terms. To this purpose, we shall make use of some points in the philosophical practices of Moore, Russell and Wittgenstein.

1. LEIBNIZ'S IDEA OF *CHARACTERISTICA UNIVERSALIS*

1.1 Philosophical characteristic/*characteristica universalis*

The first variant of Leibniz's project for a new language was set out in a letter from Marin Mersenne to Descartes. In fact, Mersenne's idea was that of *pasigraphy*, a general language that helps one to understand all languages. In his reply to Mersenne of 11 November 1629, Descartes found this project rather interesting; however, he suggested a much wider variant of it: a project for *ideography* that mirrors human thoughts. This *ideography* would be connected with a *mathesis universalis* that could conceive of anything thinkable as a calculation. "The greatest advantage of such a language would be the assistance it would give to men's judgment, representing matters so clearly that it would be almost impossible to go wrong."[1]

Descartes, however, repudiated this project as utopian. Such a language could be realized only if we could guarantee a certain order in reality. Above all, "all the thoughts which can come into [the] human mind must be arranged in an order like the natural order of the numbers". Secondly, "the order of nature would have to change so that the world turned into a terrestrial paradise". Descartes' conclusion was that this "is too much to suggest outside fairyland".

In Leibniz's archives, an excerpt of Descartes letter is preserved, together with Leibniz's commentary on it,[2] which shows that he knew these deliberations of Descartes very well. Leibniz, however, was more optimistic than Descartes. He was convinced that every science and discipline, and even every concept and thing, can have its own character. Moreover, Leibniz believed that elements of ideography, albeit in quite rudimentary form, already exist, and that the program for general ideography is not

[1] All citations in this and in the next paragraph are from Descartes (1977), pp. 12–13. AT I 81–2.

[2] Cf. A VI, 4. 1028–30; C, 27–8.

utopian. Thus "the model of a machine expresses the machine itself, the projective delineation on a plane expresses a solid, speech expresses thoughts and truths, characters express numbers, and an algebraic equation expresses a circle or some other figure".[3] Another example of ideography is the language of logic with its forms.[4]

Leibniz further claimed that *characteristica universalis* must orient itself around the example of mathematics. In particular, he acknowledged the unique position of numbers as precise characters that enable exact, algorithmic thinking. Other academic disciplines, and also parts of public discourse, would benefit from establishing such languages in the future. This would make their subjects clear and distinct.

Be this as it may, the universal characteristic is more general, and also more important, than mathematics. In fact, mathematics—algebra and arithmetic—"are but shadows"[5] of it, despite the fact that they are its best existing examples.[6]

1.2 "Let us calculate!"—two types of analysis

Leibniz hoped that his program would help to solve any problem via calculation. In this way also, the dispute between the schools would become superfluous: "our characteristic will reduce the whole [the

[3] Leibniz (1678), p. 207. (A VI, 4. 1370; GP VII, 263)

[4] Cf. § 5.1.

[5] Leibniz (1678/9), p. 6. (A VI, 4. 264; GP VII, 185)

[6] It is important to stress that this was the first program for a single formal science since Aristotle introduced logic as a second formal discipline parallel to mathematics. (Cf. Milkov (1997), i, pp. 50–1.) Similar programs were fully developed only at the turn of the twentieth century by Frege and Russell.

disputing arguments] to numerical terms, so that *even reasons can be weighed*, just as if we had a special kind of balance."[7]

Perhaps the most interesting point in Leibniz's project (we shall return to it in §§ 4 f.) was his insistence that this art would be especially valuable for realms in which scientific procedures cannot be applied directly, those in which we advance by *conjecturing* and by estimating the degrees. Such examinations are especially relevant in medicine, military arts, and politics, where we *deliberate* on which way to follow.

In this connection, it is to be noted that Leibniz discriminated between two types of analysis. The most common type of analysis (the Cartesian one) advances by leaps (*per saltum*) and is explored in algebra. It consists of "division of difficulty in several parts".[8] "The other [type of analysis] is special and far more elegant but less known; [Leibniz] call[ed] it 'reductive' analysis."[9] Reductive analysis[10] is especially appropriate when we must resolve problems in practice by conjecturing. Occasionally, in *Ars inveniendi* in particular, Leibniz expressed the difference between the two kinds of analysis, discriminating between analysis and combinatorics: "Analysis is a study which dissects the object with greatest possible exactness. … Combinatorics [, in contrast,] consists in that in order to explain an object, we add other objects."[11] The creative scientists, Galileo, for example, made use of combinatorics; the mathematician Descartes preferred analysis. It is to be underlined that, at least in his philosophy, Leibniz was above all interested in combinatorics, or in reductive analysis, not in analysis by leaps.

[7] Leibniz (1678/9), p. 9 (A VI, 4. 269; GP VII, 189), italics mine.

[8] A VI, 3. 671; GP VII, 83.

[9] Leibniz (1679), p. 233. (A VI, 4. 544; GP VII, 297)

[10] Something similar was called by Kant "regressive analysis". Cf. Peckhaus (2001), (2002).

[11] A VI, 3. 429; C, 167.

1.3 The turn in Leibniz's conception of *characteristica universalis*

Around 1679 Leibniz started to speak of his *characteristica universalis* as of "a certain new language that some people call Adamic Language, and Jacob Böhme calls 'nature language' ".[12] He also connected it with the language of Cabbala and with the *characteristica* of the "magicians".[13] Further Leibniz argued that "if we have an exact *language* (called also *Adamic* language), or, at least, a *really philosophical script* in which the concepts can be abridged to something like an *alphabet of human understanding*, then all that reason deduces from data could be found *by a kind of calculation*."[14]

In another formulation, Leibniz's idea was "that one can devise a certain alphabet of human thoughts and that, through the combination of the letters of this alphabet and through the analysis of words produced from them, all things can both be discovered and judged".[15] This would be both a succinct and a more generalized analysis of human thoughts.

How can we explain this turn in Leibniz's project for *characteristica universalis*? Our guess is that this new formulation of the idea of a universal characteristic was nothing more than Leibniz taking sides in the dispute of the second half of the seventeenth century between the Teutonic philosophy, on the one hand, and the "mechanic philosophers", or the "excessively materialistic philosophers", on the other hand. Leading figures of the latter were Baco, Descartes, Galileo, Hobbes, Hyugens and Jungius who, "having revived Archimedes's use of mathematics in physics ... thought that everything in corporeal nature should be explained mechanically".[16]

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[12] Leibniz (1678/9), p. 5. (A VI, 4. 264; GP VII, 184)

[13] Apparently, this turn was occasioned by Leibniz's encounter in 1679 in Herford with Francis Mercury van Helmont, a leading Christian Cabbalist. Cf. Coudert (1995), p. 36.

[14] A VI, 4. 911; GP VII, 199.

[15] Leibniz (1678/9), pp. 6–7. (A VI, 4. 265; GP VII, 185)

[16] Leibniz, "Antibarbarus physicus", GP VII, 343.

From historical–philosophical perspective, Leibniz has rightly noted that the method of the new philosophers was directed, above all, against the old scholastic method of gaining knowledge through inference. Following Newton, Locke presented Baco's method systematically, thus developing it further. For him, perception, which is limited to immediately-existing reality, is the most important and fundamental source of knowledge. To oppose this tendency, Leibniz revived Aristotle's "substantial forms".

In order to bring more light on the context of Leibniz's project for Adamic Language, it is important to note that a century before Leibniz started it, the method of "mechanical philosophers" was already opposed by his fellow Saxonian Jacob Böhme. In Hegel's judgment, "for Jacob Böhme the contents of doing philosophy is intrinsically German, for what characterizes and specifies him, is the ... Protestant Principle, which puts the mental world into its home [*Gemüt*] (into its concept) and contemplates, knows, and feels in it own self-consciousness all that which usually is outside".[17] In short, this Principle led Böhme to begin to consider reality as a concept, to embrace the belief that every subject investigated has its idiosyncratic laws of developing. Clearly, this idea was not far removed from Leibniz's dream for Adamic Language can present every real thing and every concept—which explains why we are not going to make it a detailed analysis here.

2. ORTHODOX INTERPRETATIONS OF *CHARACTERISTICA UNIVERSALIS*

In this section, we shall review some interpretations of Leibniz's programme for *characteristica universalis* made in the last 140 years. Despite the fact that they shed some light on what Leibniz's idea

[17] Hegel (1836), pp. 301 f.

of *characteristica universalis* could be, it is a matter of fact that today, more than 300 years after its introduction, that concept is still not used on the scale that its author dreamed of.

2.1 The program for perfect language

Frege was one of the first to reconsider Leibniz's project for *characteristica universalis*, understood as consisting of idiosyncratic characters.[18] In this connection, he criticized Boole's logic for its refusal to speak of the content of logical formulae.[19] In "Boole's Logical Calculus and the Conceptual Notation" (1881) Frege emphasised that while Boole's project aimed to develop a technique or skill that would help solve logical problems automatically (the logical laws were transformed by Boole into algorithms), Leibniz was interested in the content of a logical formula, i.e. in the being. In "On the Aim of the Conceptual Notation" (1882) Frege was even more explicit:

> My aim was different from Boole's. I did not wish to present an abstract logic in formulas, but to express a content through written symbols in a more precise and perspicuous way than is possible with words. In fact, I wished to produce, not a mere *calculus ratiocinator*, but a *lingua characteristica* in the Leibnizian sense.[20]

Similarly to Leibniz's program for *characteristica universalis*, Frege's program for conceptual notation was a program for ideography: a means for the graphical representation of ideas, or concepts. More specifically, Frege's idea was that the conceptual notation should serve for "perspicuous representation of the forms of thought".[21] The perspicuity of the symbolism is to be achieved through ap-

[18] Frege's knowledge of Leibniz has as a source mainly Trendelenburg (1867).

[19] Similar criticism was also advanced by Husserl. Cf. Husserl (1979).

[20] Frege (1882/3), pp. 90–1.

[21] Frege (1881), p. 89.

propriate spatial relations of the symbols. This is exactly what Frege was aiming for when he invented his eccentric symbolism.[22]

The idea of perfect symbolism was also prominent in Wittgenstein's *Tractatus*. In 6.122, Wittgenstein reached the conclusion that in such a symbolism, "we can in fact recognize the formal properties of propositions by mere inspection of propositions themselves". This belief, in fact, followed—via Frege—Leibniz's idea of *characteristica universalis*, which claimed: "a complex chain of proof is to be fixed in one single formula, so that one could grasp the proof in a single glance."[23]

This genealogic connection throws some light on further similarities between Leibniz's and Wittgenstein's programs: (i) Leibniz's "*ars characteristica* is the art to build, and order, symbols, in such a way that these are in same relations as the thoughts which they represent".[24] In the same way, Wittgenstein claimed that "in 'aRb' 'R' is not a symbol, but that 'R' is between one name and another symbolizes".[25] (ii) Similarly to Leibniz, Wittgenstein accepted that besides letters and numbers, characters can be also figures, pictures or models. (iii) In typical Leibnizian manner, Wittgenstein asserted that when we construct graphically correct symbols, all the problems of logic are *eo ipso* resolved. In this sense, "we cannot make mistakes in logic" (5.473). (iv) Finally, also in Leibnizian spirit,[26] Wittgenstein embraced the principle *simplex sigilum veri* (5.4541).

[22] Cf. Milkov (1999), p. 43.

[23] Peckhaus (1997), p. 31.

[24] Ibid., p. 32.

[25] Wittgenstein (1979), p. 109.

[26] Cf. A VI, 4. 959; GP VII, 179.

2.2 Ontological characteristic:[27] Wittgenstein's *Tractatus*

We have already mentioned (in § 2.1) Descartes' claim that if natural order is not guaranteed, the project for *characteristica universalis* will be a no-starter.[28] As though in an effort to make Leibniz's project viable, Wittgenstein met precisely this requirement. In *Tractatus*, he asserted that the world consists of facts that, in turn, consist of objects. Wittgenstein further claimed that his objects are "formal concepts" (4.1272). This is a hint that Tractarian ontology was logico-ontology: it was the flip side of Wittgenstein's new, "perfect" symbolism. It is precisely this point in *Tractatus* that secured a complete congruence between symbolism and the world that Descartes had thought impossible.

In more concrete terms, Wittgenstein's Tractarian ontology accepted that the objects are primitives, or indefinables. We can *see* the world—any aspect of it—as combinations of these building blocks. For example, when we see a blue spot in a particular visual field, we can analyse it to a blue extension of a certain size and a certain shape—that is, to a certain combination of objects, interwoven in a certain way.[29]

Apparently, this ontology is in perfect harmony with the conceptual notation based on primitive symbols, the combination of which all other symbols result: a conceptual notation close to the one Leibniz dreamed of. The problem is that today we do not know did Wittgenstein really defended it, or did he simply advance it tongue in cheek.[30]

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[27] The term is of Barry Smith; however, Smith uses it in different sense—as characteristic which is a mirror of reality. Cf. Smith (1992), p. 49.

[28] Many authors of today are also conscious that "how a finally acceptable directly depicting language will look, will clearly depend on what the world is like." Ibid., p. 58.

[29] See on this interpretation Milkov (2001).

[30] Cf. Diamond (1991), Conant (2002).

2.3 Directly depicting language

Leibniz's program for *characteristica universalis* was also employed in Otto Neurath's idea for an artificial language he called *isotype*. The problem with isotype was that it was a rather naïve language, mainly designed for practical (political) purposes: to make it possible for "all men [to] participate in a common culture and [to make] the canyon between educated and uneducated people … disappear".[31] This point explains why isotype has no quantifiers and no logical connectives.

Recently, a program for a directly-depicting language was launched by Barry Smith. His hope was that it "will enable us to represent the most general structures of reality".[32] Smith's language would not use sentences or propositions, but maps, diagrams and pictures. He further claimed that

> in a properly constructed characteristic language ... the structures of diagrams will as far as possible be dictated by the structures in reality they are designed to represent. [This kind of language] is concerned with the depiction of what actually exists, ... not merely with what is general but also with what is particular.[33]

Such an ambitious program can be only realised within strict parameters. For example, in it there is no place for general proper names:

> Our diagrams will in fact almost all of them incorporate proper names in the ordinary sense as constituent parts. It is from these that they will inherit their primary relation (be anchored) to reality.[34]

Unfortunately, the latter point of Barry Smith's project for *characteristica universalis* contradicts that of Leibniz. Indeed, authentic Leibnizian "characters are proper names of concepts, or of that what presents general concepts";[35] they are not proper names of individuals.

[31] Neurath (1973), p. 225.

[32] Smith (1992), p. 48.

[33] Ibid., p. 51.

[34] Ibid., p. 52.

It is important to note that, similarly to Neurath, Smith developed his project for practical ends: in his case, for the ontological underpinning of programs of artificial intelligence.[36] To this purpose, "directly depicting language seeks high representational adequacy, even at the expense of low expressive adequacy".[37] This point clearly sets out the disadvantages of Smith's variant of *characteristica universalis*: namely, that it can treat neither time and change, nor such factors as propositional attitudes, probabilistic machinery and vagueness.

3. PARALLEL PROJECTS

Philosophers of today, more than three centuries after Leibniz raised his program for *characteristica universalis*, unanimously feel that it "appears as a more or less unattainable goal".[38] At the same time, as we have seen in § 3, philosophers have repeatedly tried to revive the program;[39] in point of fact, this paper has the same objective. For this purposes, however, we are going to make it a rather free interpretation. In this we are encouraged by the afore-mentioned (in § 2) fact that Leibniz himself advanced alternative, even competing, conceptions of *characteristica universalis.*

The main point in Leibniz's concept of *characteristica universalis* is the claim that it would be especially helpful in regions where conjectures prevail—above all in "propositions of civil or natural

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[35] Arndt (1967), p. 75.

[36] Smith's final objective was to develop an "ontological language". Cf. Degen *et al*., (2001).

[37] Smith (1992), p. 53.

[38] Rutherford (1995), p. 227.

[39] Among the philosophers who tried to do that, but whose efforts we would not discuss here, were Franz Brentano and Edmund Husserl.

history, in the art of investigating natural bodies and thinking persons, and, especially, in public life, in medicine, in jurisprudence, in military art and in state governing".[40]

Our interpretation of Leibniz's project starts with this question: what can help in such cases best? Apparently, the most convincing answer is: the clever or judicious intuitions that we further verify in reality. But how could an encyclopaedia of universal characters help develop a judicious intuition? The hypothesis we defend here is that this job can be best accomplished by a *compendium of forms*.[41] In what follows, we shall support this claim with examples from the philosophical writings of Moore and Russell.

3.1 Moore and Russell

Similarly to Leibniz, Moore insisted that mistakes in ethics have the same roots as mistakes in mathematics: "Certain it is that in all those cases where we found a difference of opinion, we found also that the question had not been clearly understood. … It is as with a sum in mathematics."[42] It suffices to rightly pose the question in order to calculate the correct answer without much ado.[43] The only difference between ethics and mathematics, in this respect, is that ethics is much more complex and so, the calculation required is much more complicated.

In fact, the idea that if all conceptual confusions are eliminated we would see the truth and agree on it—we will reach the point at which we can calculate—is central to early analytic philosophy.[44] Russell,

[40] A VI, 4. 913; GP VII, 201.

[41] Cf. Milkov (2004), § 1.3.

[42] Moore (1903), p. 145.

[43] In the *Tractatus* (6.5), Wittgenstein brought up this point so: "If a question can be framed at all, it is also *possible* to answer it."

[44] Cf. Milkov (1997), i, p. 196.

for example, developed it in the claim that the rigorous (analytic) philosophy is examining the subject under consideration with the help of the models, or forms, it establishes.[45] Only when such logical models are elaborated—they can be also collected in a special "dictionary", or encyclopaedia, as Leibniz had in view[46]—can we examine the subject under consideration without vagueness or misunderstanding. Explicitly, Russell advanced this program in two forms: (i) in *The Problems of Philosophy*, where he claimed that training in rigorous philosophy can also be helpful for discussing matters of *public interest*;[47] (ii) and in *Our Knowledge of the External World*, where he insisted that such fruitful hypotheses, which can be most helpful in investigating different problems of *academic interest*, are advanced by the new symbolic logic.[48] In other places Russell insisted that forms can be suggested not just by logic but also by rigorous philosophy in general. In particular, he spoke about epistemic, propositional, factual forms, as well as forms of objects.[49]

3.2 A digression on Plato

Long before Moore and Russell, Plato introduced peirastic dialectic as the discipline most helpful in gaining wisdom. First of all, it tests, or examines, the interlocutor's beliefs and arguments. Apparently, it is not a theory but a skill.[50] That is why its knowledge cannot be put into words, whereas knowledge of the other sciences can be. The skill of the peirastic dialectician simply supports the ability to better

[45] Cf. Milkov (2004), § 1.3, where we defined both phenomenology and analytic philosophy as theory of forms.

[46] Cf. A VI, 3. 430; C, 169.

[47] Cf. Russell (1912a). In some later writings, Russell even defined philosophy as "The art of rational conjecturing". Cf. Russell (1974).

[48] Cf. Russell (1914), p. 68; Russell (1918), p. 85. Cf. also Milkov (2004), § 2.2.

[49] Cf. Milkov (2003), pp. 71–75.

[50] Cf. with: "Philosophy is not a body of doctrine but an activity." Wittgenstein (1922), 4.112.

assess the arguments and facts under consideration. The dialectician is wiser than other academics, scientists and intellectuals in general exactly in this sense (*Rep*., 534e). She examines a number of alternative solutions of the problem under analysis, and decides which one is the most appropriate.

This examination, or conjecturing (cf. Leibniz's balancing), is a kind of calculation of well-established facts and arguments.[51] It is also a procedure similar to Leibniz's reductive analysis, or combinatorics (cf. § 1.2).

In his early dialogues, Plato elaborated manuals (we interpret them as the first pieces of Leibniz's *Encyclopaedia*) for Art of Discourse. In fact, they were nothing but *verbatim* reports of selected eristic matches, especially popular in Athens of the time. This practice was based on the belief that "tried argument-sequences can be learned by heart and studied for their strength and weakness, and the successful ones can, *en bloc*, become parts of the common repertoire of all who may ever debate the same thesis."[52] In a sense, they were similar to today's chess training. Chess players are typically drilled by memorizing patterns of different combinations, which can later be used in related situations. In the same way, Plato believed that memorizing different forms of dialectical argumentation is an irreplaceable instrument for philosophical training.

Unfortunately, in his later years, namely in *Republic*, Plato started to conceive of dialectics as a search for special truths, or "super axioms". Eventually, in and after *Philebus*, he replaced this discipline with his famous theory of forms. He also adopted the view that forms pertain to a special realm that is truer and more exact than reality.

[51] In ordinary usage, too, conjecturing is conceived as a kind of "calculation without numbers".

[52] Ryle (1966), p. 198.

4. NEW INTERPRETATION OF LEIBNIZ'S PROJECT

Having summarized the philosophical practices of Moore, Russell and Plato, we will now interpret Leibniz's project for *characteristica universalis* as resulting in a compendia or an encyclopaedia of selected forms. Typical examples of such forms are: (i) some philosophical discoveries, for example, Hermann Lotze's discovery of values and their connection to logic, Franz Brentano's (re)discovery of intentionality,[53] J. L. Austin's (re)discovery of speech- acts,[54] or the forms Russell described in *Mysticism and Logic*;[55] (ii) some philosophical arguments. Typical examples include the argument from illusion, the problem of other minds, the private language argument, the problem of the rule-following. Etc. "[These] are not so much questions, as tokens of profound uneasiness of mind."[56] Discussions of such puzzles teach us to rightly calculate different options in problematic situations. The forms in such cases are simply different moves by discussing such puzzles.

Apparently, the use of encyclopaedia or compendia of such forms is intrinsically informal; it is a science-cum-practice activity—the science is the collection of forms, and the practice is their application, or verification. This explains why it is best applied in such disciplines as medicine, jurisprudence and military arts. Contrary to the conception of Plato's forms, however, the forms of our *characteristica universalis* have no existential import. They are simply models of reasoning that help to find the best solution for every specific situation which we can encounter either in practice or in theory.[57]

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[53] In fact, it was introduced in Plato, *Parm.* 132b.

[54] Apparently, it was discovered by Adolf Reinach. Cf. Smith (1990)

[55] We spoke about them at the end of § 3.1. Incidentally, in 1912–16 Wittgenstein was even more concentrated on philosophical–logical discoveries than Russell. Cf. Milkov (2007).

[56] Waismann (1956), p. 449.

[57] In this sense we used Wittgenstein's theory (model) of subject as divided into empirical, metaphysical and willing, for solving the problem of the meaning of life. Cf. Milkov (2005a).

We are adamant that this project is not utopian: parts of it already exist in practice.[58] For example: (i) a judge considers every new case as consulting the "forms" of the justice codices; (ii) a medical doctor diagnoses his patients consulting the a dictionary of medical diseases and conditions. Etc.

4.1. Arguments in defence of this interpretation

This interpretation of Leibniz's project of *characteristica universalis* is supported, first of all, by the fact that his program for universal conceptual notation was initially realized as a contextual (in the sense of Frege–Dummett) "calculus of truths", not of individuals.[59] Indeed, Leibniz's initial idea of a universal characteristic, first articulated in his 1666 dissertation *Art of Combinations*, was that "just as there are predicaments [categories] or classes of simple notions, so ought there be a new genus of predicaments in which propositions themselves or complex terms might also be set out in a natural order."[60]

Secondly, Leibniz insisted that *characteristica universalis* must help to reach "proofs beyond quantities". Helpful to this purpose are the forms of the logicians, but also what he had called the "metaphysical forms", or the metaphysical proofs of the degree and intensity of forms.[61]

Thirdly, Leibniz often expressed rather catholic views as of what *characteristica universalis* can achieve. In difficult cases it would simply help to choose the most reasonable alternative. Of course, nobody can guarantee that it will be the winning position; it is just more probable that it will be.[62]

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[58] On this point we are paraphrasing Leibniz. Cf. n. 6.

[59] Leibniz defined *characteristica universalis* as program for calculating individuals much later. Cf. § 2.3.

[60] Leibniz (1678/9), p. 6. (A VI, 4. 265; GP VII, 185)

[61] Cf. A VI, 4. 910; GP VII, 199.

[62] Cf. A VI, 4. 913–14; GP VII, 201.

Finally, this interpretation also explains how philosophical education functions. When studying the classics of philosophy, we usually learn different models of reasoning, or what Leibniz called different "metaphysical forms". We often master these models, without realizing which ones they are exactly and who their originator was (in the same way in which we use different techniques of, say, skiing, without exactly knowing who brought them to us and when). Similarly, using the corpus of a well-selected *characteristica universalis*, or a proper thesaurus of philosophical discoveries, arguments and paradoxes of the past, we achieve the skills of correct thinking that form the basis of a good philosophical education.

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