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The perfecting, or near-perfecting, of philosophy

G. W. Leibniz; *Leibniz: Dissertation on Combinatorial Art*; Translated with introduction and commentary by Massimo Mugnai, Han van Ruler, and Martin Wilson; Oxford, Oxford University Press, 2020; 307 pp.; Hard-back; \$65.00.

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This volume presents a complete English translation of Gottfried Wilhelm Leibniz's *Dissertation on Combinatorial Art* (*Dissertatio de arte combinatoria*), first published in 1666 when the philosopher was just twenty years old. The *Dissertation* focuses on formal techniques for solving problems concerned with the variations of elemental parts of larger wholes. Leibniz in fact conceived this project as one of *metaphysics*, or what he defines in the *Dissertation* as the general science of Being and its affections. Since he takes it that any being can be conceived as a whole composed of elements, Leibniz intends for his art of combinations to comprehend and allow us to treat all possible types of variation that can be exhibited by beings. In this way, the *Dissertation* provides a window into one of Leibniz's earliest intellectual programs and is vital for understanding the development of Leibniz's philosophy as a whole.

The volume itself is the second in a series of critical editions of Leibniz's works being published by Oxford University Press. For the *Dissertation*, Martin Wilson played the role of primary translator and was aided by Han van Ruler and Massimo Mugnai. The volume features a facing Latin version of the text based on its original published version of 1666, as well as an a footnote commentary written primarily by van Ruler and an introduction by Mugnai, an eminent scholar of Leibniz's logic. The first volume in the series, released in March 2020, presents Leibniz's *Discourse on Metaphysics* of 1686, a text constituting his first mature metaphysical

synthesis (Leibniz 2020). In contrast with the *Discourse*, the *Dissertation* as a whole has not previously been translated into English (partial translations may be found in Leibniz 1966 and Leibniz 1976), and in general, readers have paid less attention to the writings of Leibniz's early period. However, one cannot fully appreciate Leibniz's mature philosophy without understanding how it developed on the basis of his youthful projects. This translation is thus a major event for Leibniz studies and will hopefully stimulate new research on the early Leibniz.

In the *Dissertation*, Leibniz addresses a collection of twelve problems concerned with determining different types of variations of what he calls *complexions*. In addition to solving these problems, in some instances Leibniz includes theorems and practical applications. Leibniz defines a complexion as "a Union of a lesser Whole within a greater Whole" [77]. To the notion of a complexion is added that of *exponent*, the number of parts belonging to a complexion. If the exponent is two, Leibniz describes a complexion as a "com²nation;" an exponent of three is a "com³nation," etc. Thus, for with a whole with four parts, ABCD, the "com²nations" of four, are AB, AC, AD, BC, BD, and CD. As an example, the first problem asks: "given a number and exponent, to find the complexions," and Leibniz gives the following solution (which, he admits presupposes having already found the complexions of preceding numbers):

'Let the number of complexions of the preceding exponent with the preceding number be added to the number of complexions of the given exponent with the preceding number; the result will be the required number of complexions.' For example, let the given number be 4, and the given exponent 3. Let the 3 com²nations of the preceding number 3 be added to the 1 com³nation of the preceding number (3 + 1 f. 4). The result 4 is the required number. 81–83

To this solution, Leibniz appends two tables displaying the progression of complexions as well as eight theorems, including: "3. if the Exponent is one less than the number, the number of Complexions and the Number itself are the same" [87].

Mugnai's introduction analyzes a number of the problems that Leibniz treats in the text and provides useful context for the *Dissertation*. Mugnai shows that Leibniz was interested in attempts to reform logical thinking including Lull's combinatorics, and new approaches learning developed by thinkers like Alsted and Bisterfeld. Importantly, Mugnai also explains how Leibniz's approach in the *Dissertation* connects with his ambitious projects in the 1670s concerning the growth of knowledge. These projects include the universal characteristic, an encyclopedia, and the 'general science,' a type of meta-science concerned with ordering all forms of knowledge. Additionally, Mugnai argues that the *Dissertation* contains the seeds of core elements of Leibniz's mature philosophy, including a form of atomism:

When Leibniz wrote the DAC, he was clearly under the strong influence of an atomistic point of view. Of classical atomism, however, he seems to consider with diffidence the implicit materialistic ontology and to accept the very general claim that everything (material and spiritual) is generated through a combination of certain minimal parts. Thus, whereas the first elements of the material world are very small 'atom-like' parts, the first elements of the 'mental world' are the simple concepts from the combination of which every complex concept and every true proposition originates. (53–54).

We find echoes of such atomism, for instance, in the mature Leibniz's famous monads, the mind-like substances characterized in *Monadology* ¶3 as "the true atoms of nature and, in brief, the elements of things" [Leibniz 1989, 213].

Despite such continuity, however, Mugnai stresses that Leibniz's approach in the *Dissertation* differs from his later understanding of mereological problems. Indeed, in the *Dissertation*, Leibniz treats as a whole any group of parts collected by an act of the mind:

In a union, indeed, the Things between which there is this relation are called *parts*, and taken together with the union, a *Whole*. This occurs as often as we suppose a plurality of things at the same time to be *One*. *One*, instead, means something that we think of in a single intellectual act, that is, at the same time. 69–71

This approach enables an application of the art of combinations to a vast array of topics—the number of syllogistic moods [103–33], the construction of geometrical figures [135–39], the

nature of the highest good [201–11], the determination of genealogical descent [211–23], and the seating of guests at a dinner party [227–29], to name just a few. However, as a metaphysics, it is committed to identifying and individuating beings through arbitrary mental judgments. In contrast, Leibniz’s later metaphysics moves beyond this understanding of metaphysical unity to center on individual living substances—*per se* unities endowed with force and activity—and the way that physical reality results from their relationships of domination and subordination (see, e.g. Leibniz 1989 206–13). Leibniz therefore comes to favor a more restrictive notion of what it means to be ‘a being,’ and consequently develops a more sophisticated account of part-whole relations.

In addition to Leibniz scholars, the *Dissertation* should find an audience in students of the histories of mathematics and logic. However, it is unlikely that most readers will want to read the text in its entirety. In addition to its technical nature, the *Dissertation* often treats particular variations in meticulous detail, as, for instance, when Leibniz spends fifteen pages determining “the number of *Moods of Categorical Syllogism*” [103–33]. As always in reading Leibniz, however, one must bear in mind the way that each detail reflects a larger and much grander whole. Thus, at the end of this most interminable discussion—one which Leibniz clearly anticipated would try the reader’s patience—we find a striking statement of purpose where Leibniz both justifies his prolix treatment of syllogisms and asserts the philosophical significance of his art of combinations:

I shall at long last leave the [syllogistic] Moods, for even though I hope I have brought something, however little, to such commonplace matters, in naturally tedious things even novelty becomes tedious. But no-one will say that I have deviated from my purpose who sees that all these things have been derived from the heart of my system of Variations, which alone leads the mind that yields to it almost through all infinity, and embraces at once the harmony of the world, the inner workings of things, and the series of forms. The incredible benefit of this to the perfecting, or near-perfecting, of philosophy will in the end be appreciated at its proper worth. 133

Leibniz's own philosophy would undergo a number of makeovers in the decades following the *Dissertation*, and it is unclear if it ever attained a final or 'perfect' form (although 1714's *Monadology* might be a candidate). Nevertheless, Leibniz's *Dissertation on Combinatorial Art* constitutes a noteworthy seventeenth-century model of the relationship between combinatorial thinking and what Leibniz considered the "the harmony of the world, the inner workings of things, and the series of forms" [133].

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