Free University of Berlin / Charles University in Prague
Text and Event in Early Modern Europe (TEEME)
An Erasmus Mundus Joint Doctorate

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How to discover things with words? John Wilkins: from *inventio* to invention

Synopsis of PhD Thesis

Scientific language deserves to be named among scientific instruments, and perhaps even as the most consistently used one. In early-modern England, the making of knowledge was viewed as a fundamentally linguistic process. The seventeenth-century British natural philosophy started with Bacon's critique of language abuse. Language can make raw scientific data, such as sounds, visuals, and holistically presented scenes, visible for intellectual apprehension, and thus lay out the primary textures for understanding. In the mid-seventeenth century, British *virtuosi* appreciated the "artificial advantages" of adding the "artificial organs to the natural". Towards the late-seventeenth century, many British authors, including John Wilkins, demanded that the language of enquiry should be improved alongside other scientific instruments.

My dissertation explores early-modern ways of turning language into the key instrument of discovery within the early performance of science. This thesis represents an extended case study focused on the legacy of John Wilkins (1614–1672), an educator, a theologian, an experimentalist, and a linguist, who was fascinated with promoting innovative methods for the apprehension of scientific experience through the instrumental use of language. Wilkins's versatile approach to language practices provides abundant and demonstrative material for investigating the role of language in integrating the contexts of discovery and justification in early scientific practices. He played a catalytic role in several movements that proved formative for British scientific life, facilitating the most fruitful upsurges of scientific inventiveness, and bringing together the best minds of his time for tackling specific problems.

Wilkins's main contribution to the epistemological reformation of the seventeenth century consisted in promoting a range of groundbreaking methods for scientific discoveries. He also has a taste for avant-garde quests himself; apart from his scheme of artificial philosophical language, he authored a number of pioneering surveys, including the first comprehensive Copernican *apologia* in England, the first ever English-language discourse on cryptology, and one of the first English-language publications on mechanics. At the same time, he was also active as one of the founders of the movement of natural theology, and the masterminds behind the reformation of scientific language within the Royal Society of London.

In the broad spectrum of John Wilkins's pursuits, my dissertation highlights his three main areas of intellectual interest, i.e. his scientific narratives, natural theology, and linguistics, and considers them against the background of dialectical rhetoric as an instrumental technique of early scientific discourse. From this perspective, Wilkins's innovative but seemingly disparate undertakings appear as a more coherent exercise in the art of making knowledge through persuasive communication. My thesis explores how Wilkins's argumentative method and style departs from baroque rhetorical flair in *The Discovery of a World in the Moone* (1638), proceeds by employing the capacity of rhetoric to impart scientific experience in *Mathematical Magick* (1648), copes with the challenges of the social and empirical quests of science in *Discourse on the Beauty of Providence* (1649) and *Of the Principles and Duties of Natural Religion* (which appeared posthumously in 1675), and arrives at elaborating the instruments for the codification and formalization of knowledge in *An Essay towards a Real Character, and a Philosophical Language* (1668). Wilkins's humanist scholarship taught him to appreciate the heuristic potential of dialectical rhetoric in the practices of making knowledge, criticizing at the same time the misapplication of figural language within the framework of the Royal Society. Wilkins's methods benefited from the visualization of experience within the procedures of both rhetorical *inventio* and technical invention. Dialectical and rhetorical *inventio* was a strategy of rational persuasion that sought to discover new relations between phenomena, which served as the basis for new theorizing and eventually resulted in making technical inventions.

My study consists of six chapters, each investigating how Wilkins's discursive techniques manifested themselves in relation to specific themes. In each of them, I attempt to track the course of his argument from the initial figures of *inventio* to the specific inventions made by him within the topic. My first chapter elaborates on the dissertation's methodology and the notion of performative knowing, deriving it from the ideas of the analytic philosophy of the twentieth century. The concept of performative knowing is intended to delineate the point of balance between dialectical logic and the representation of experiential data, which Wilkins displayed and promoted throughout his multifaceted career. My second chapter describes Wilkins's early cosmological narratives and traces how his argument started with the Galilean hypothesis of the similarity between the earth and the moon, and arrived at designing the means of space travel. The third chapter focuses on the context of Wilkins's work while an Oxford college warden, considering how his activities within the "invisible college" may have influenced the reformation of scientific language within the Royal Society of London, and how the performative capacities of rhetorical and poetic strategies were used for the development of new methodologies in natural studies. The fourth chapter considers Wilkins's second scientific narrative where a performative representation of the art of mechanics formed a modeling example for the new scientific knowing to be implemented in the research program of the Royal Society. In the fifth chapter, I examine Wilkins's treatment of the notion of providence and the doctrine of natural theology, which were intended to repair the gap between the government of turbulent individual affairs and the universal harmony of divine nature. The last chapter of my thesis focuses on the rhetorical and dialectical roots of Wilkins's artificial philosophical language project, identifying its features as a complex database and an instrument for enhancing the scientific performativity of the human mind. The notion of performativity helps me to link Wilkins's dialectical efforts with their remote technological outcome. I aim to show how Wilkins's astronomical and engineering narratives, his ideas about natural theology and artificial project, all elaborated on the means of breaking through the linear structures of natural language into the artificial, diagrammatic, and multi-dimensional space of performative representation.

To analyze the early history of performing science, I will use the concept of "performative knowing" derived from early analytic philosophy and speech act theory, including the ideas of Bertrand Russell, Gilbert Ryle, John Austin, and John Searle. The employment of various concepts of analytic philosophy and philosophy of mind has long been a part of early-modern studies. Due to the complex material-discursive character of early scientific practices, which involved a wide range of hands-on operations and persuasive strategies, I propose to consider discovery and justification within early-modern science in the context of scientific performance. The language of performing scientific events represents the main instrument of science, and the chief methodological skill in making science can be formulated as the knowing how to employ language for performing scientific discourse, which my study will term as "performative knowing". The concept of performative knowing emphasizes the significance of the apprehension of scientific experience through combining the dialectical-rhetorical and the experimental practices of knowledge-making. The main research question that my thesis explores is how the early-modern techniques of dialectical rhetoric were employed as heuristic tools within the argumentative style?

My dissertation is greatly indebted to a number of expert accounts on the role of performativity and persuasion in early-modern scientific discourse. Concerning current research on John Wilkins's legacy, his best-known linguistic writings were analyzed in a number of authoritative reviews and publications on the development of artificial language movement and early-modern scientific narratives. Within this framework, my project attempts to coalesce the argumentative lines concerning rhetorical *inventio* and scientific invention, and seeks to focus on the functions of specific rhetorical figures as symbolic forms or "image vehicles" in Wilkins's writings. Drawing on existing research, my dissertation aims to accentuate the role of locutionary tools in the early-modern practices of making knowledge. In my thesis, I will explore how John Wilkins displayed and elaborated on the various aspects of performative knowing across several contexts within the diverse field of seventeenth-century British natural philosophy.

My argument pinpoints "performative knowing" as a form of competence in early-modern knowledge-making, which was characterized by relational apprehension and conceptualization of experience, to open up new hypothetical perspectives. In the early-modern argumentative style, the contingent character of this knowing, which is not a body of information but rather a skill to be acquired in practice, activated the heuristic functions of dialectical and rhetorical devices.

Wilkins's language project can be thus described as grounded on the experience of species derived from a construal of their relations adopted in contemporary natural philosophy. Wilkins's project was to promote scientific knowing via practicing the operations of species in the mind. The knowing of species provided the "principle of meaning" for the interpretation of descriptions. Ramist dialectical patterns allowed for the schematization and formalization of this knowing, and the hundreds of pages of tables, which Wilkins never believed were completed, were to preserve the copiousness and enable the extension of philosophical description. Wilkins's project was intended to reveal the ingenious "figures of abundance" for a certain scope of experience, as well as balancing the structural clarity of *inventio* with the fullness of *copia*.

Wilkins's hypothetical *inventio* helped him promote specific inventions and explore the material properties and relations of "things themselves". Wilkins employed this knowing-how as a "spiritual optic" for displaying phenomena at a closer intellectual distance and "making things to speak", which became one of the primary goals not only for him but also for the Royal Society of London. Although the Royal Society claimed to break with rhetoric, dialectical procedures were considered necessary for directing experimental inquiries. Wilkins's collaborators repudiated outdated "fancies & fables" but welcomed the vivid "language of the hand" which for them attained the role of the language of ingenuity. The task of "bringing things to speak" made the experimental philosophy join with poetry, as both aimed to arrive at a new vision of nature. The elements of poetical and rhetorical discourse provided techniques for the reconstructing scientific objects as material entities within experimental action. These "speaking instruments of science" made new properties of nature visible for analysis, which enabled the generation of new theories.

In early-modern scientific writing, various figures of speech corresponded to the use of specific visual figures in illustrations. The use of imagery in texts, such as tables with curly brackets and spherical projections, often indicated the presence of particular rhetorical techniques. In both speech and vision, the argumentative significance of figures consisted in allowing for a recombination of data into a more coherent and concise structural pattern. Verbal and visual figurative forms were used as performative aids within the procedures of both rhetorical *inventio* and technical invention.

The techniques of figurative thinking, developed within the aesthetics of rhetorical and poetic composition, were employed by Wilkins and the Royal Society as symbolic forms for designing the paradigmatic structures of new scientific knowledge. Partly due to the specific conditions of discourse after the English Civil War, Wilkins tended to find epistemic solutions outside the realm of scholarly artifice and within the practices of artistry. When the knowing is primarily viewed as a practice, a different set of epistemic values begins to prevail. As opposed to the rigidity of representation that repudiates the sensuousness of epistemic expression, the clearness of performance does not marginalize the sensuous. In this context, "speaking plainly" means adequacy in the delivery of the performative intention of the experimenter. Poesy can "speak plainly" by imagining with ingenuity, even though it does not employ "plain language". The concept of performative knowing assists in defining the early-modern mode of scientific constructive imagination which operated through dialectical and rhetorical forms, bearing similarities with poetic imagination but allowing for a material implementation of the procedures of invention.

Wilkins's writings contributed to the liberalization of scientific language and practices by associating the ingenuity of dialectical *inventio* and engineering invention. He was among the chief ideologists of the language reformation within the Royal Society, which, like the religious Reformation, aimed to purify the language to turn it into a more pointed instrument of invention and communication. The Royal Society's efforts were part of a broader movement shifting from *inventio* as the main framework for producing knowledge within a providential probabilistic paradigm, to approaching the certainty of knowing by the means of mathematical demonstration.

The early-modern interest to "situational knowing" of the arts challenged the concepts of absolute knowledge and divine dispensations. Wilkins applied topical dialectical techniques to bridge the human knowing of the arts with absolute divine knowledge. In mid-seventeenth-century, the British crisis of absolute power was resolved through a redistribution of responsibilities. Wilkins attempted to resolve the crisis of the idea of providence by renegotiating divine and human duties, so that humans could dispose of the domain of particular providence for experimental but legitimate interaction with divine nature. Wilkins first chose the imagery of mechanical contrivance as a symbolic form for overcoming the epistemic perplexity due to "infinite mischief" within the civil society. Later, he readjusted this position, since the elucidating potential of mechanism as a symbolic figure was on the wane, and explored the mode of perception of a "sensitive agent". This interest motivated his effort to create his language scheme which was intended as an instrument for enhancing the performative knowing of the sensitive agent in discerning ingenious argumentative patterns among the potentially infinite scientific and social experience. The distinction between general providence as the realm of abstract natural laws and particular providence as the realm of narrative human laws was to become one of the driving forces behind the division between the two cultures of the sciences and the humanities.

In spite of recent consideration of rhetorical techniques in the literary genres related to natural history, the instrumental and heuristic role of specific rhetorical and dialectical devices in the structuring of experience has received insufficient attention. My study contributes to the understanding of how the concrete figures of dialectical rhetoric were employed as patterns for constructive imagination and processing experience in early-modern argumentative style. Considering this question through the lens of John Wilkins's writings enables a focus on a comprehensive range of scientific themes and activities. The concept of performative knowing provides a framework for understanding how experience was apprehended through the figural structures of scientific imagination and the intelligent enactment of experimental practices. Dialectical and rhetorical techniques may attract more interest from scholars not only as means of persuasion but also as patterns for processing scientific experience.