Ruđer Bošković and the structure of the experience of scientific discovery (tentative title)

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Abstract

Ruđer Josip Bošković (1711-1787) was a Jesuit priest and a scientist from the former Republic of Dubrovnik. He published many works in such fields as mathematics, physics, astronomy, geodesy and even archeology. He is also known as being the first natural philosopher to have formulated a unified theory of all the forces responsible for the phenomena of the observable universe. Bošković's theory of forces is based on the notion of field, thus anticipating Faraday and Maxwell. He proposed an atomic model similar to that of Niels Bohr, that is, a model that accounts for the concept of discrete and stable orbits. His theory of forces also predicted the existence of what came to be known in physics as particle confinement. To some extent, Bošković appears to have been able to identify many of the realities that constitute the conceptual framework of modern physics and chemistry. The question that may be asked at this point is: what enabled Bošković to have this anticipatory insight into the nature of reality?

One possible approach for answering that question is to look into the presuppositions underlying Bošković's theory. One would see, for example, that the basic elements of reality are not “objects” like atoms, but rather relations. In the first case, the search for the “building blocks” of the phenomenological world seems to have encountered a snag with the formulation of the quantum model of reality. The notion of relation, on the other hand, as a relativistic principle, may be more useful as a means of reconciling the contradictions of nature.

A second approach that could be used to explain Bošković's anticipatory power may consist in examining whether the process by which he arrived at his intuitions does contain a mechanism of intrinsic validation. Modern science exclusively relies on external means of validation, for instance, experimentation, observation and measurement. However, if this was really the case, the practice of science would be highly rational, cold and emotionless. Scientists would simply compare results and agree on what is right and what is false. But we know that this is not the case, that many scientists have to passionately defend their ideas against colleagues who are no less passionate in trying to discredit them. If we have a tendency to attribute these glitches in what should be in theory a very smooth process to the personality of the scientists, is it inversely possible to assume that what sets these scientists apart in the course of the history of ideas is precisely what allows them to accurately predict the evolution of that history? Thus, the anticipatory power of a scientist like Bošković would not only be based on conscious choices that present themselves in the development of scientific knowledge, but also on an experience that establishes a specific relationship between a subjective knower and the objective knowledge he or she believes to be true. It is this specific relationship that would be at the basis of the mechanism of intrinsic validation of knowledge.