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Innovation for Innovators

NULLIUS IN VERBA: THE BIRTH OF INNOVATION

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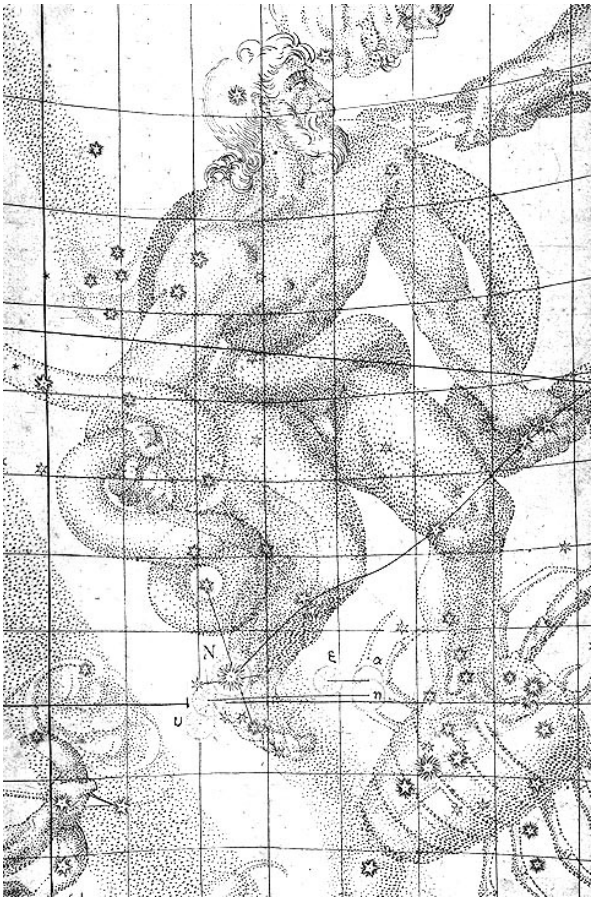
On the night of October 9, 1604, Italian citizens recorded their astonishment that the universe had changed for the first time in centuries. As they looked to the night sky, they found a new star had appeared. They knew nothing about the process for the creation of stars; rather, they believed that the heavens were fix and immutable. The same stars in the same arrangements made up the map of the heavens for their entire lives and going back for generations. What did it mean to man and society if the heavens could change their composition?



Johannes Kepler was especially intrigued by this new object. He studied this new star in detail, writing an entire book on his observations, *De Stella Nova in Pede Serpentarii (On the New Star in Ophiuchus's Foot*). His book contained an original drawing of the position of the stars with the shadow of Ophiuchus framing the constellation. The new star appears in the heel of the constellation, labeled 'N'. As a result of this work, SN1604 is now also known as Kepler's Supernova.

The supernova and Kepler's methodical observations of it planted the seeds for a new approach to scientific discovery. The appearance of a new star opened people's eyes to new possibilities: If there is more in the heavens than has been known in the past, then perhaps there is more on earth as well. If even the heavens are subject to change, questioning the accepted knowledge received from the ancients might be permissible, beneficial, and even essential. SN1604 did not change the physical earth, but it did begin to change the mental framework of earth's inhabitants.

This natural philosophy took some time to coalesce. Its first expression might be seen in the formation of a small group of natural philosophers in the area around London, England in the late seventeenth century. On November 28, 1660, this "Committee of 12" met to hear a lecture by Christopher Wren and afterward formally declared themselves "a Colledge for the Promoting of Physico-Mathematicall Experimentall Learning." Two years later, they were officially recognized by the Crown with a Royal

Charter and the loose title "The Royal Society of London for Improving Natural Knowledge"—and the motto "Nullius in verba," Latin for "Take nobody's word for it" (Royal Society 2012).

Christopher Wren and the Committee of 12 laid the groundwork for the acceptance of inquiry, innovation, invention, and change in the natural and mechanical worlds. They made it acceptable to question what is and extended their thinking to the question of what might be. For Wren and his compatriots, knowledge and wisdom were not—as they had been believed to be—derived exclusively from the "wisdom of the ancients." They offered a new structure for pursuing knowledge, a new understanding of innovation as a positive force.

However, the boundaries of scientific inquiry were not yet defined. Astrology and astronomy were one practice, and alchemy was just beginning to grow into chemistry. Scientists explored fortune telling and divination alongside mathematics and physics. Gradually, through the development of an objective method of inquiry and the accumulation of results from repeated, well-structured experiments, the parameters of science and a disciplined method of inquiry emerged.

As natural philosophers uncovered how the physical world worked, they provided essential knowledge for manipulating that world to meet practical needs. The birth of real science led to the birth of real engineering. This mother-daughter pair equipped thousands of intelligent and inquisitive minds to invent, discover, and innovate their way out of the Dark Ages, creating a scientific Renaissance that would eventually give us the Industrial Revolution. The work of the Committee of 12 and their generations of successors opened people's minds to the possibilities of inquiry, enabling them to question accepted knowledge and test their own theories about how the world might work and how it might be changed for the better. Nullius in verba.

Aristotelian tradition maintained that air was a basic element. This was accepted as fact from 350 BC until the late eighteenth century, when Joseph Priestley discovered oxygen and several additional gases in the mixture formerly classified simply as "air." Nullius in verba.

Newtonian physics sufficiently described the behavior of the natural universe for over 200 years. But Albert Einstein changed all of this with his proposition of the general theory of relativity in 1916, changing our understanding of the entire universe for a second time. Today we see yet another transformation from our growing understanding of quantum physics. Nullius in verba.

Everyone knew that computers were specialized tools for large corporate and scientific jobs. Only dedicated scientists were interested in or capable of using them. The whole world agreed with DEC Founder Ken Olson's famous 1977 declaration, "There is no reason for any individual to have a computer in his home." But Steve Jobs, Steve Wozniak, Bill Gates, and Paul Allen created a personal computer appliance, which the entire world eagerly brought into their homes and allowed to reshape their lives. Nullius in verba.

"Nullius in verba" is one of the most essential ingredients for innovation and one of the most difficult to support and maintain in a large organization. For an individual working alone, it may be the only path to creating something notable. But for an established organization, the idea threatens the foundation that

has made the organization successful and that serves as the structuring force among its people and departments. At some point in the evolution of countries, religions, and businesses, the value of maintaining what has been achieved in the past seems to surpass the potential value even of a true breakthrough.

In the four centuries since Kepler, scientists have struggled with these two competing forces—the need to respect and apply existing knowledge and the need to question everything, even the wisdom of centuries. Isaac Newton believed that he was not discovering or inventing calculus, but was rather reintroducing lost knowledge that had been known in ancient times (Dolnick 2011). As Thomas Kuhn posited in his influential book, *The Structure of Scientific Revolutions* (1996), new ideas do not supplant established ideas, until new scientists supplant their forbears. Established leaders give weight to the trove of accepted knowledge through their positions of authority. Innovative businesses can wait for "the Kuhn Force" to change the hierarchy of leadership or they can take intentional steps to free new thinkers from the constraints of past successes.

Can we practice “Nullius in verba” today as it was originally intended nearly four centuries ago? Do we still have a naiveté that will allow us to venture into new territory or to return to old questions with new eyes? Can we seriously ask, "What if?" What if a core belief is not true? Where might a "ridiculous" experiment really go? What if we take the risk to explore truly new territory?

References

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