

## GREAT PERSONALITIES OF SCIENCE: GOTTFRIED WILHELM LEIBNIZ

**Naghiu Mihai-Octavian**

*Technical University of Cluj-Napoca, Romania*

**Abstract.** Although a well-known personality of science, Gottfried Wilhelm Leibniz often doesn't take the credit he truly deserves for his major contributions to science and the history of thinking. The present paper represents an attempt to honor the memory of this great German scientist that contributed significantly to the evolution of science on so many areas. His complete dedication and perseverance for study from an early age is a legitimate source of inspiration for us today and tomorrow. So let's remember his main contributions and cherish his memory.

Leibniz was born on the first of July 1646 at Leipzig. His father, a teacher of moral philosophy at the University of Leipzig, played an important role in young Gottfried's early orientation towards study (but unfortunately died when Gottfried was only six). Furthermore, considering his childhood, Leibniz was born into a Lutheran family. This impacted significantly on his later thinking. As a result, Leibniz's scientific approach has always suffered from this metaphysical necessity of having a theistic view about the world. Even in the later years he remains with the conviction that the metaphysical system of the monads is made possible (only and necessarily) by the supreme monad (God). But in general, science in that time wasn't completely prepared yet to remove any sort of theistic argument. For instance even Sir Isaac Newton's view on the world requires that first spark from God – the deistic approach.

Although Leibniz was educated in the Nicolai School, he was largely self-taught in the library of his father. (Britannica.com) This provided an excellent opportunity for him to deepen his studies and expand his consciousness. In 1661, he entered the University of Leipzig as a law student. This step is highly important in his career because there he came into contact with the works of men who had revolutionized science and philosophy. We are talking about geniuses such as: Galileo, Francis Bacon, Thomas Hobbes, and René Descartes. Some say that a young Leibniz began to dream about encountering a golden mean that would link the works of the great man listed above, with his childhood idol Aristotle (who was losing favor with Leibniz's contemporaries).

As a fan of Aristotle, Leibniz slipped into nominalism (the theory that universals have no reality but are mere names), the recoil of rejecting Plato's thesis of universals. As a great humanist and champion of the German luminism, Leibniz has emphasized the existential value of the individual, rather than focusing on the universals. From this perspective will arise in later years the metaphysical theory of the "monads".

Although a well-known personality of science, Gottfried Wilhelm Leibniz often doesn't take the credit he truly deserves for his major contributions to science and the history of thinking. Tackling the infinitesimals issue with its two major sub-branches: differential calculus (concerning rates of change and slopes of

curves) and integral calculus (concerning accumulation of quantities and the areas under and between curves), Leibniz was the first to publish his results on the development of calculus. Thus, the differential calculus and the integral calculus related to each other by the fundamental theorem of calculus, are first clarified in “*Nova Methodus pro Maximis et Minimis*” by Gottfried Wilhelm Leibniz. In spite of Sir Isaac Newton’s initial success in claiming that he was first and that Leibniz somehow managed to steal his ideas from some unpublished notes, justice was served in Leibniz’s case and specialists have proven that he made this major breakthrough independent from Newton’s notes.

As a keen advocate for “objective idealism”, Leibniz is one of the founders of German Enlightenment. His philosophical system considers the “monads” as principle of existence (or *arkhe*). The monads are immaterial and indivisible “substances”, independent from each other, that possess active force. Monads “don’t have windows to allow something in or out” (Monadologia, part. 7), thus monads go beyond the cause-effect logic paradigm. According to Leibniz, matter represents the exterior manifestation of the monads. Each monad reflects the entire universe and the concordance of the monads activity is ensured by the special feature of the supreme monad - “*predetermined harmony*”. Based on this, Leibniz states that our world is “the best from all possible worlds”.

In spite of being ridiculed by Voltaire, Leibniz’s idea that our world is the best possible one may hold some ground. (Voltaire, 2002) For Voltaire rejected this idea based on ethics (by using a religious argument), while Leibniz deduced that we live in the best possible world because it is the world that encompasses mathematics. The beautiful and unshaken truths of mathematics (starting from its axioms) make our world the best possible one.

Although some might include Leibniz to the list of thinkers that belong to the so-called idealist rationalism (alongside with Descartes and Spinoza), one cannot ignore the fact that Leibniz’s rationalism is combined with elements of empiricism. In this respect, factual truths obtained by induction laid the foundation for his famous “Reason enough law”, which represents a key contribution to the field of logics. Also, Leibniz started a logic based on “symbols”, thus anticipating the rise of mathematical logic. (Cottingham, 1998)

In physics, Leibniz proposed the introduction of an interesting notion called “living force” ( $mv^2$ ) as a measure of mechanical movement, different from the amount of movement ( $mv$ ). In doing so, Leibniz managed to propose a notion precursory to the modern notion of “energy”. Furthermore, in Leibniz’s view there is an indissoluble nexus between matter and movement, which enables nature to evolve as a (time-space) continuum. (Dicționar de filosofie, 1978)

Towards the end of his life, in a dispute with Sir Isaac Newton, Leibniz claimed that the notion of “absolute space” (meaning a space that is independent from space objects) contradicts the “Reason enough law”. And so he proposed a different conception according to which space is an order of coexistence, thus

being inseparable from the space objects. Sadly, Leibniz's idea has not taken root in his time, so the XIII century was dominated by Newton's view. (Flew Antony, 1996)

As a conclusion one can only admire and never forget the achievements, energy and inspiration power of a men like Leibniz. With great contributions to domains such as physics, mathematics, logics, metaphysics, Gottfried Wilhelm Leibniz is rightfully considered one of the greatest rationalist philosophers.

## REFERENCES

1. \*\*\*<https://www.britannica.com/biography/Gottfried-Wilhelm-Leibniz>
2. Cottingham John, Rationalistii, Ed. Humanitas, București, 1998;
3. Voltaire, Dicționar filosofic, Ed. Polirom, București, 2002;
4. Flew Antony, Dicționar de filosofie si logică, Ed. Humanitas, București, 1996;
5. Dicționar de filosofie, Ed. Politică, București, 1978.