

# Free article review about the role of the automata in the history of technology

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## Article Review

The meaning role of the automata in the history of technology was described in the article written by Silvio A. Bedini, an American historian, specializing in early scientific instruments. The article was published in 1964 in "Technology and Culture" journal and it narrates the history and development of automata from the very beginning, starting from the easiest mechanisms. Author describes causes that gave a rise to the development of mechanics as a man's desire to fly through the air like a bird, swim in water like a fish, and finally subdue the nature.

Referring to the works of ancient scholars, author tells us that the first automata was based on elementary laws of physics and were built as irrigation systems and fountains. One of the works, which aroused the great interest among Renaissance scholars, was the Pneumatics, that was translated and published by Giovanni Battista Aleotti for the first time in 1589, and in which the translator added to the original text some ideas of his own. And the bilingual volume in French and Italian called *Le Diverse e Artificiose Macchine* (Diverse and Ingenious Machines) by Captain Agostino Ramelli is noticed as one of the greatest works that grew out of literature of that kind. It became popular not in Italy and France only, as well as in Spain and Germany. No less important was the work called *Les Raisons des Forces Mouvantes avec Diverses Machines tant Utiles que Plaisantes*, which was published in Frankfurt in 1615 by Salomon de Caus (1576-1626), a French engineer who was working on Palatine Elector. In this work, he applied the knowledge of hydraulics for the solution of various problems like creating grotesque grottoes and fountains, which later became prototypes for actual

constructions.

The most progressive hydraulic system of Greek ancients was made in the fifteenth and sixteenth centuries for the refined gardens of the royal mansions and palaces of Renaissance Europe. The next great step in the development of hydraulic and pneumatic machines was made in Italy. A fine display of fountains and waterfalls preserved to this day at the Villa d'Este at Tivoli.

One of the most famous and elegant waterworks of the seventeenth century was the installation of hydromechanical devices, constructed at the chateau at in 1646, based on designs from de Caus. The major novelty, the mechanical theatre was added to the installation in 1725 by Lorenz Rosenegge, craftsman from Nuremberg, and it still extant at Heilbrunn. The theatre features 256 figures, 119 of which are driven by a single water turbine with a horizontal axis, which operates a series of reduction gears. The final gear carries a cylinder on which several cams regulate the movements of the figures driven by copper wires. The wheelwork is made of wooden wheels and iron teeth. Also there are powerful hydraulic organ, created to provide background music to cover the noise of the mechanism. The automata and waterworks of the Renaissance reached the highest peak of evolution in the gardens of the royal chateau of Saint-Germain-en-Laye. King Henry IV enlarged the chateau in the late sixteenth century and it became the principal royal residence. Another impressive example of mechanisms of sixteenth century was a hydraulic singing bird, first described by Heron and illustrated in *Les Raisons des Forces Mouvantes* in Paris, 1615. Not every source can be trusted. The most interesting examples of

exaggerated complexity and success of automata was the mechanical lion of Leonardo da Vinci and the two automata of Johannes Muller, called Regiomontanus, one of which was said to have been an iron fly and another - the eagle which was claimed to have escorted the Emperor Maximilian to the city gates of Nuremberg.

As we can see, the main goal of the article was to convey to the reader the idea, that the automata is an ancient ancestor of modern mechanics.

Without the ideas and works of ancient scholars, the science would never become so, as we know it.