

ANNUAL TESLA DAY DINNER 2011
After Dinner Address
Vladimir Jelenković
Director, Nikola Tesla Museum, Belgrade
Perth • 9 July 2011

Nikola Tesla and his Wonderful World of Electricity

Nikola Tesla gave the mankind a great number of significant inventions, which presented ingenious solutions, universality of application and expansion of numerous borders in science and technology, and changed the world around us. The long list of his inventions testifies of a great, imaginative mind that accomplished groundbreaking achievements with equal bravado in many very different fields – from electro- and radio-technology to machine engineering, medicine, aviation and many other fields of science and technology.

The interest for Nikola Tesla is continually growing. At the scale of millennia of human existence it is almost impossible to find any other person whose life and work invoke such a broad spectrum of interest from various researchers – from science historians, electrical engineering and machine engineers, computer scientists, telecommunication, aviation and military experts, to doctors, psychologists, ecologists and philosophers. At the same time, the acknowledgments bestowed upon him by major scientific institutions and individuals stand as unequivocal testimony of a man who accomplished some fundamental milestones on the road towards modern, contemporary scientific and technological civilization.

Indispensable Constituent of the New Age of Technology

Starting with the end of the 19th century, the inventions of Nikola Tesla (1856-1943), a Serbian-American scientist, were the keystones for numerous breakthroughs in science and technology that our modern lifestyle would not exist without.

Nikola Tesla created **science** with his empirical research, and the results of his scientific research and his patents represent **technology** – his solutions applied as a foundation for second industrial revolution. Tesla was a man graced with inspiration, incredibly broad scientific knowledge, enormous energy, courage, patience and persistence. Still, his visionary spirit is probably the most important quality keeping his achievements still so up to date. His visions and creativity paved the way for our lifestyle of today, so fundamentally underpinned by distribution of electrical power to great distances and the wireless world of communication. The little remote-controlled ship he demonstrated in the Madison Square Garden in New York in 1898 is a pioneering step on a long road towards the contemporary civilization, towards the wireless world and the realization of the endless human desire to communicate and send and receive comprehensive remote messages and signals.

Volumes of books, scientific papers and articles have been written about Tesla's inventions to date. Researchers from a broad range of fields and professions have attempted to divulge the secrets of his peculiar character, exceptional intuition, and outstandingly imaginative mind, as well as his unusual way of life, often

distinguished by relinquishment of earthly pleasures and material benefits for the purpose of total dedication to the holiest researching goal he posed before himself – conquering the forces of nature for the benefit of the whole mankind. He probably gave the best and simplest explanation for the unselfishness and nobility of his goals himself in the lecture The Art of Telautomatics before the Commercial Club, Chicago, on May 13, 1899: „Our work, to be the best, must be like that of the planter – for the future! And full of self-denial and nobility of purpose. Its reward, when it finally comes, is all the sweeter, because it was long deferred. Selfish instincts and desires hamper every better development in Nature“.

Prestigious Honors and Recognitions

In his life, Nikola Tesla received a large number of noteworthy honors. There were periods in his life when numerous notable scientific institutions and professional associations raced to bestow their honors upon him and acknowledge his groundbreaking scientific achievements. The collection of the Nikola Tesla Museum contains 56 such recognitions, including diplomas accompanying decorations and medals, honorary doctorate certificates, as well as honors from academies of science, professional associations and various organizations.

The Serbian Royal Academy, one of institutions of probably great significance for Tesla himself, recognized the greatness of his accomplishments very early, and instituted him as a corresponding member on February 22, 1894. His visit to Belgrade less than two years earlier, on June 2, 1892, was probably very inspiring to that end. He was received with greatest honors, and met King Alexander I Obrenović, Serbian ministers, representatives of Belgrade Municipality, professors at the Great School and educational institutions, representatives of various companies and associations and inspired great respect and admiration as a young and celebrated scientist of Serbian origin who was greatly advancing the standing of his home country and Serbian people. His visit to the Serbian capital was influential for Serbia to become one of the first countries in Europe to begin with the electrification of the country with the construction of a hydro-power plant based on Tesla's polyphase system, in Užice, in 1900, just four years after the first hydro-power plant in the world, on Niagara Falls.

During his life, Tesla was decorated six times. He received three prestigious medals in the field of electrical engineering, the Eliot Cresson Gold Medal from the Franklin Institute, the John Scott Gold Medal from the City of Philadelphia, and the Thomas Edison Gold Medal from the American Institute of Electrical Engineers.

At the Edison Medal award ceremony to Nikola Tesla, on May 18, 1917, Bernard Arthur Behrend (1875 – 1932), Tesla's friend and one the first electrical engineers to recognize the full potential of his polyphase system of alternating currents and the induction motor, as well as the fellow of the American Institute of Electrical Engineers and the Tomas Edison Medal Committee, held one of the most poignant speeches dedicated to Tesla's ingenious work:

“The due appreciation or even enumeration of the results of Mr. Tesla's invention is neither practicable nor desirable at this moment. There is a time for all things. Suffice it to say that, were we to seize and to eliminate from our industrial world the results of Mr. Tesla's work, the wheels of industry would cease to turn, our electric

cars and trains would stop, our towns would be dark, our mills would be dead and idle. Yes, so far reaching is this work that it has become the warp and woof of industry... His name marks an epoch in the advance of electrical science. From that work has sprung a revolution in the electrical art”.

In the Temple of Science Greatness

The greatest recognition that can be received in the world of science is a unit in the International System of Measures (the SI System) named after exceptional scientists who changed the course of development of our civilization. The decision of the 11th General Conference of Weights and Measures, held in Paris from October 11 to 20, 1960, adopted the resolution naming the unit for magnetic induction - tesla (T). Tesla then entered the international Temple of Science and joined the greats such as Newton, Faraday, Volta, Watt, Henry, Hertz, or Amper.

The naming of the unit was not the last honor bestowed upon Nikola Tesla. Based on immeasurable importance of his contribution to contemporary civilization and the recommendation of the International Advisory Committee, on October 16, 2003 the General Director of UNESCO Koichiro Matsuura adopted the decision on including the archive materials from Tesla’s legacy into the international registry of the UNESCO's Memory of the World Programme. The registry of documentation materials has been instituted in 1992 with the goal of preserving and promoting cultural heritage of universal importance. The inclusion of Nikola Tesla Archives in the UNESCO registry is a reflection of his exceptional value and the necessity of preservation of a legacy of significance for the benefit of the whole mankind.

On the occasion of the 150th anniversary of birth of the ingenious scientist, in October 2006, the renowned Institute of Electrical and Electronics Engineers, IEEE, presented the Nikola Tesla Museum in Belgrade with its newly established Special Citation in Electrical Engineering and Computing, recognizing the pioneering work and enormous contribution of Nikola Tesla in many fields of electrical engineering.

The Wizard of Electricity

Numerous scientists, artists and other authors are striving to find words to best describe this in many ways exceptional and remarkable personality. *The Man Out of Time, Prodigal Genius, The Man Who Lit the World, The Inventor of Dreams, The Man who Invented the 20th Century*, are just some of numerous metaphors his admirers have used to express their admiration for this proud and modest man, and ordering him amongst the most eminent people of the world.

Tesla himself, at the beginning of his well-known auto-biography “My Inventions” defined his fundamental creative axiom, principle and the fundamental meaning of his inventions: “The progressive development of man is vitally dependent on invention. It is the most important product of his creative brain. Its ultimate purpose is the complete mastery of mind over the material world, the harnessing of the forces of nature to human needs. This is the difficult task of the inventor who is often misunderstood and unrewarded. But he finds ample compensation in the pleasing exercises of his powers and in the knowledge of being one of that exceptionally privileged class without whom the race would have long ago perished in the bitter struggle against pitiless elements.”

In addition to his engineering and inventive imagination, Tesla was a true master of performances. It would probably require a team of artists, designers and engineers today to design such a simple and at the same time ingenious project as Tesla realized for the World Fair in Chicago in 1893, on the occasion of 400 years of Columbus's discovery of the Americas. Namely, Tesla had the idea to replicate the famous riddle of the Egg of Columbus, posed by the legendary seafarer and explorer to his adversaries. As the story goes, Christopher Columbus was dining with many Spanish nobles when he asked the adversaries of his naval expedition to place an egg to stand on its end. They tried in vain, and then Columbus took the egg, tapped it gently on the table to break the shell and the egg stood on its end. This is probably a myth illustrating that something needs to be discovered in order to become obvious and possible, but the fact remains that Columbus did obtain the audience with Queen Isabella of Spain and won her support for his expedition to discover the New World.

Tesla, on his part, obtained a promise from his potential investors to receive funding for his future projects if he places an egg to stand on its end without breaking it. For the purpose, in 1893 Albert Schmid, then Superintendent of the Westinghouse Electric and Mfg. Co. constructed based on Tesla's design a powerful rotating field ring with an egg made of copper, and larger than that of an ostrich, for Tesla's personal collection at the Chicago World's Fair. The so-called 'Tesla's Egg of Columbus', as newspapers reported, "was one of the most attractive novelties ever publicly shown and drew enormous crowds every day". On the other hand, Tesla successfully introduced to a broad lay audience the operating principles of an extremely abstract scientific concept – the rotating magnetic field, which firmly secured his prominent place in the history of electricity.

The photographs from Tesla's laboratory in Colorado Springs, taken in 1899, are another example of Tesla's ability to impress with unfamiliar and fascinating displays. The photograph of Nikola Tesla sitting under a flow of lightning and sparks surging from the 'Tesla Coil', as it is known today – are still mesmerizing the world.

His unbound curiosity, enormous creativity, and ease of solution for complex engineering problems are all on display in his patented idea for a fountain he wanted to build with the well-known New York artist Louis Tiffany. Regrettably, he never realized his vision of "the fascinating spectacle of a large mass of fluid in motion and the display of seemingly great power... the realization of beautiful and striking views through illumination and the disposition of voluminous cascades."

Tesla as Artistic Inspiration

It is obvious that Tesla strived to create fascinating and dramatic spectacles himself. Despite the fact that numerous artists asked him to sit for a portrait, Tesla almost always refused. The only one who managed to convince Tesla to sit for a portrait was the painter Princess Elisabeth Vilma Lwoff-Parlaghy in 1916 – all other oil portraits and sculptures of Nikola Tesla are based on photographs.

As the illumination of her atelier was not satisfactory, Tesla ventured to create an arrangement of light sources and blue glass filters simulating the desired north exposure. The portrait she painted under this light in oil on canvas became known as 'The Blue Portrait of Nikola Tesla'. It was first printed in January 1919 in the Electrical

Experimenter magazine as an illustration for Tesla's autobiographical feuilleton 'My Inventions', and on July 20th, 1931, on the occasion of Tesla's 75th birthday, it was on the cover of Time magazine. After its sale at an auction in 1924, the fate of the portrait remained unknown until 2006, when it was identified in the Nordsee Museum in Husum, Germany, as a part of the legacy of artwork that Ludwig Nissen, a well-known diamond trader from New York, left to his home city.

On only one occasion did Tesla express a wish for an artist to create his portrait – in a telegram he sent to his friend, the famous Yugoslavian sculptor Ivan Meštrović, in 1939. However, due to adverse circumstances, Meštrović came about to create Tesla's bust only in 1952. A cast of the bust is preserved at the Nikola Tesla Museum in Belgrade.

Edwin Howard Armstrong, distinguished professor at Columbia University, electrical engineer and inventor of FM radio, said on one occasion: "The world, I think, will wait a long time for Nikola Tesla's equal in achievement and imagination." The proof of his words is the fact that a large number of artists – painters, sculptors, composers, and film, TV and theater authors are still finding ample inspiration in his life and accomplishments.

This simple and yet unique genius created his most significant inventions at the end of the 19th century, their application marked the 20th century, and his visionary solutions and the pioneering steps he made more than a century ago in remote control, radio technology, high-frequency currents and wireless technologies are seeing their full implementation only today. Consequently, Tesla's groundbreaking work spans three centuries and two millennia and ranks him amongst rare, true and authentic renaissance personalities who, regardless of new ideas and scientific breakthroughs that the future may bring, shall be remembered as the ones whose humane visions and universally beneficial achievements changed the world around us.

Let me finish with Behrend's paraphrase of Alexander Pope's lines on Newton:

*Nature and Nature's laws lay hid in night;
God said, 'Let Tesla be,' and all was light."*