

Nikola Tesla

NIHIL IN SACCULO
QUOD NON FUERIT
IN CAPITE

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Teslin čudesni svet

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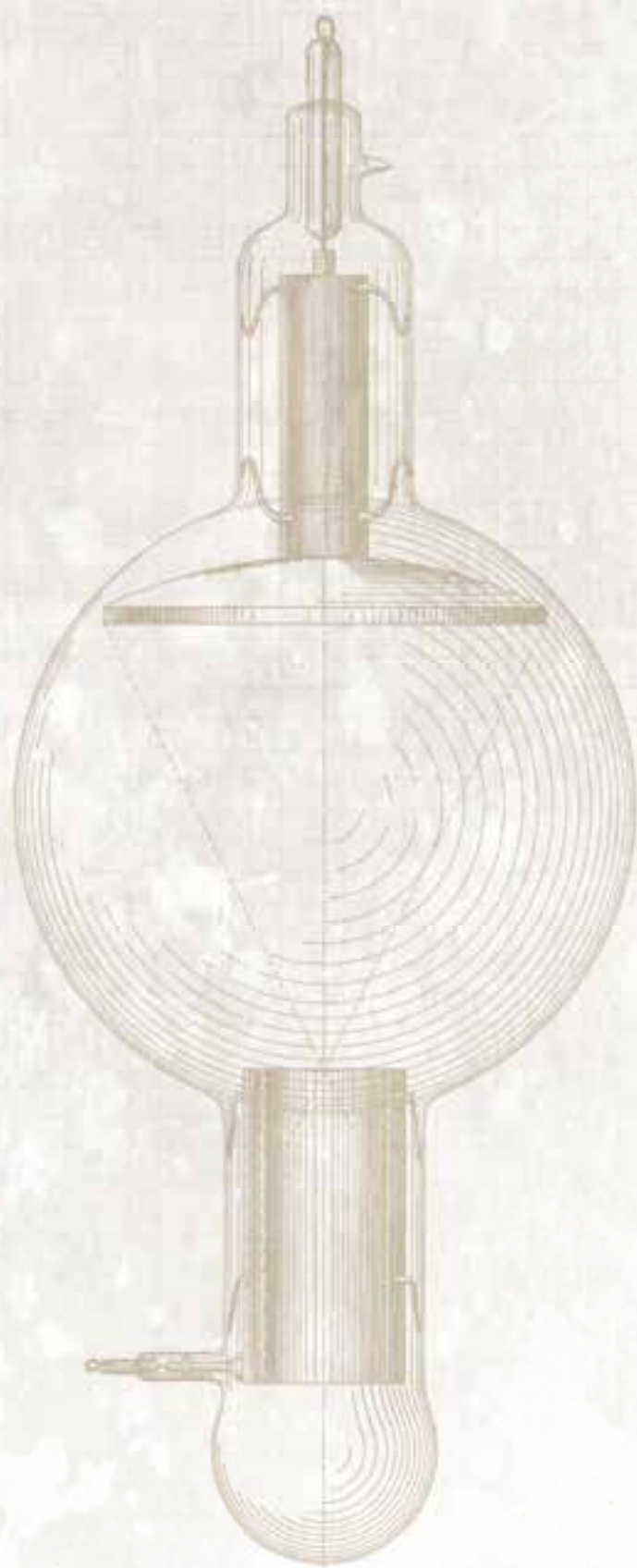
WIRELESS

*The Life, Work and
Doctrine of Nikola Tesla*

Translated by Steve Agnew

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Belgrade, 2016.



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In place of a foreword

This book is the fruit of decades of research which began in 1981 and is still going on. The most important part of it was completed in the course of my professional work in the Nikola Tesla Museum, between 1981 and 2001. The review of Tesla's life and work is highly documentary in nature; however, throughout the writing I have attempted to breathe life and emotion into the manuscript. This was not difficult, because the study of Tesla's life could not leave anyone indifferent.

I believe that, within this book, every reader will find something for himself. For me, as author, three things were of greatest interest:

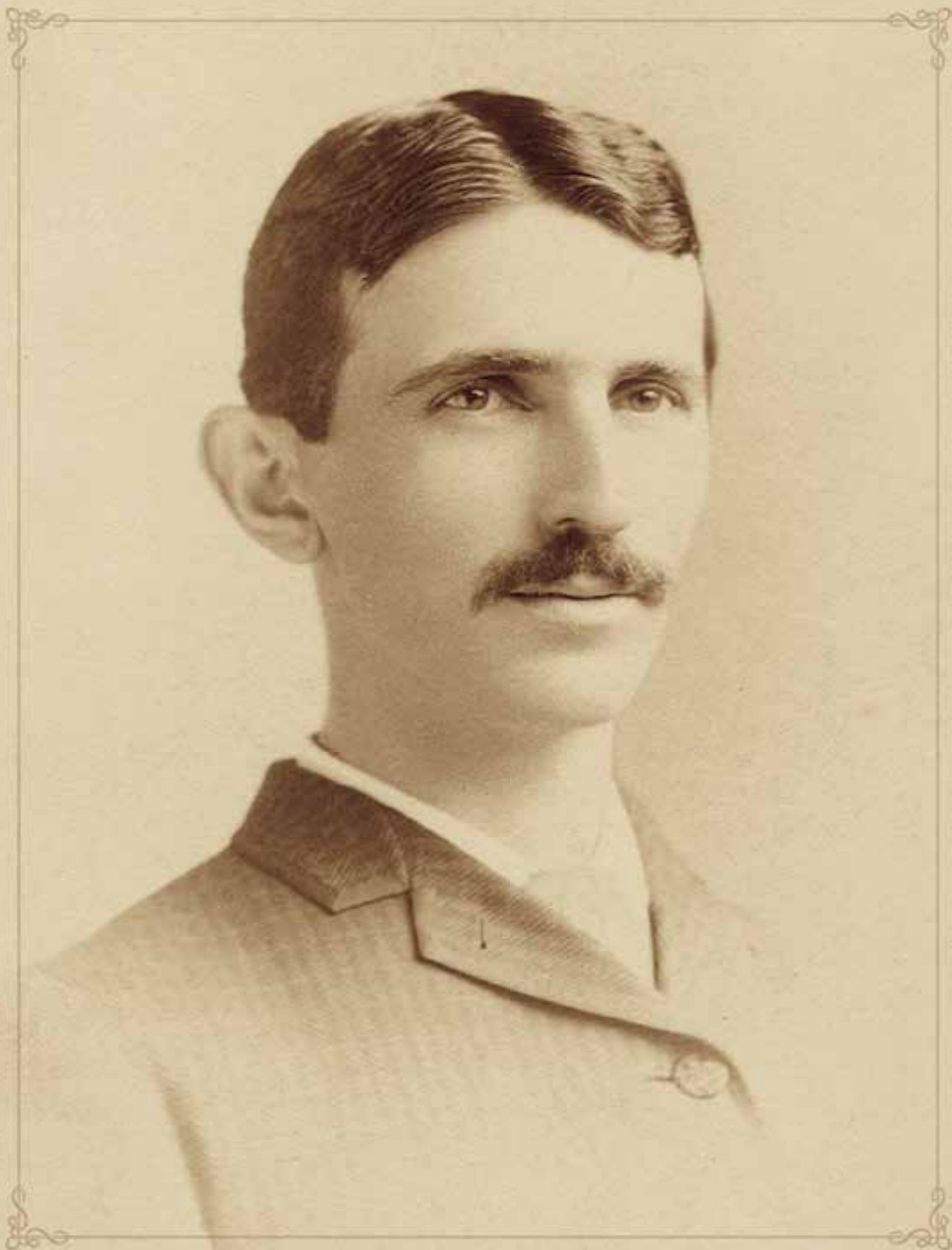
The first was a complete reconstruction of Tesla's life. I have had exceptional good fortune and an advantage over other local and international authors in that for years I have collected material at the source and, piece by piece,

assembled a mosaic to solve the enigma known as Tesla. The result of this long analytical work and research is now before the reader.

The second thing was to find Tesla's internal "credo", as a basis for explaining and understanding his psychological portrait. To answer this, it was of special importance to reconstruct not only the history of Tesla's life but also the story of his origins.

The third, and for me the most important, thing was to reconstruct Tesla's key thinking on the future of civilization. The solution of the first two tasks determined the character of the third. From Tesla's vast heritage certain theses naturally stand out which I believe present his particular legacy for the future and which are set out in the section entitled "The Tesla Doctrine".

BRANIMIR JOVANOVIĆ



PART ONE

Life

From time to time, in rare intervals, the Great Spirit of Invention descends to Earth, to tell a secret which is to advance humanity. He selects the best fitted, the most deserving, and whispers the secret in his ear. Like a flash of light the precious knowledge comes. As he grasps the hidden meaning the fortunate sees a magic change: Before his enraptured eyes there is a new world, he barely recognizes a semblance of the old. It is not a passing illusion, a mere play of his vivid imagination, or phantom of mist that will dissolve. The marvels he sees, distant though they appear in time, are to be. He knows it, there is not a shadow of a doubt in his mind, in every fiber of his body he feels: It is a Great Idea!

Nikola Tesla in
"Notes on Cabanellas' Patent
No. 164,995", c. 1904





New York, 1904

As he opened the folder of patent documents that lay before him, Tesla recalled his times in Paris in 1883 and 1889. He had been asked for a professional opinion on the patent “System of single-pole electrical machines with switching”, issued to the late French inventor Cabanellas. Tesla’s lawyers were preparing to lodge a complaint against a company manufacturing alternating-current motors, which claimed to be doing so under Cabanellas’ patent which had preceded Tesla’s basic patents in this field. All previous cases over the precedence of this discovery had been resoundingly resolved in Tesla’s favor. Schallenberger, Ferraris and others who had claimed otherwise were humiliated in the court.

Now Tesla wondered – why Cabanellas? None of his very well-informed attorneys had mentioned him as a possible competitor. In 1883 he had spoken to friends in Paris about his findings. The idea was already in the air. When he returned to Paris in 1889 with the patents he had obtained and a convincing contract for their application, his discovery was highly regarded in professional circles. He recalled how many names had been mentioned in connection with the problem, from Arago to Marcel Deprez. But he had never heard a single word about Cabanellas.

Tesla looked again at the English translation of the patent, and then at the French original as well. His gaze fell on the title “Un système de machines électriques unipolaires”:

“In the art “unipolar” are preeminently “direct” current machines. It would be singular, indeed, to find that a system of unipolar, direct machines with commutation was intended to be a system of multipolar, alternating current machines without commutation.”¹

He closed the folder. The man had never had the slightest idea about his discovery. The Great Spirit had never spoken to him.

All the same, he was sorry that Cabanellas would not receive any reward for his work.

“Cabanellas,” he thought, “is not trying to deprive me of the fruits of my labor; Cabanellas is not attempting to cause me damage in my work; Cabanellas is not spreading untruths about me in articles to destroy my name and reputation.”²

The Cabanellas case provoked him to think about what was disturbing him most at that moment. He was in the middle of a bitter fight to make his dream come true – the dream of a World Center for the wireless transmission of signals and power. His main financier at the time, John Pierpont Morgan, had withdrawn from the work and was not answering his letters. His masterpiece, the antenna of the World Center on Long Island,

stood unfinished, but the debts were mounting with frightening speed.

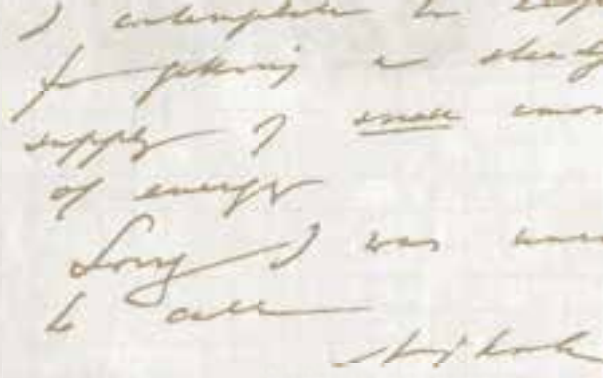
Over the past ten years he had invested superhuman effort into solving the mystery of propagating electric waves across the globe, he had developed apparatus for the transmission and reception of energy to the most remote areas, he had overcome all the technical obstacles. And now, with the goal in sight, he had been thwarted. He could only look on helplessly as those who had built their success on the foundations he had given now occupied the sensational headlines of newspaper articles. And as Thomson, Martin and others spread untruths about his impracticality and incapability.

The concentration of thought and effort he had invested over those months had led him almost to the limit of endurance. He realized that he was at the very breaking point. He had an intense feeling of something he could not describe. At night, alone in his room in the Waldorf Hotel, this feeling grew to the point of being intolerable. His greatest relief came from thoughts of his mother, who had died not long before. He had always been able to conjure her image in innumerable situations, as clearly as if she were alive, but now he saw his mother only in an episode of grief that he had almost forgotten.

“It was the dead of night, the rain was falling in torrents as though the sky had opened. I felt

in every fiber that something terrible might happen, and my fear was even stronger because of the remoteness of our house. Our closest neighbors were the church and the graveyard, at the foot of a chain of hills patrolled by wolves. The ancient clock had just struck midnight when my mother came into the room and whispered almost inaudibly: ‘Come to kiss Danilo.’ My only brother, a boy of eighteen with an enormous intellect, had died. I pressed my lips to his, cold as ice, thinking only that the worst possible thing had happened. Mother settled me again in bed, covered me and, tears streaming down, said to me, hesitatingly: ‘God gave me one at midnight, and at midnight took the other.’”³

This painful scene released a flood of images from his earliest childhood. He saw his sisters, his father, a multitude of relatives, places, people, strange or quite unremarkable figures and details. More and more he felt the need to withdraw in the face of many problems, the clamor of daily events, the creditors who were increasingly persistent and loud in seeking what was theirs. He would close the door of his office and leave instructions not to be disturbed and give himself over to the flood of images. He was able to see events from the distant past with unusual clarity and in the full light which had amazed and brought him peace and relief.



The Clan

*Let God's right hand keep you!
But may you never forget
"the forest in which you are a leaf".*

Aleksandar Leko Budisavljević –
The sacred testament of the Budisavljević clan.

Nikola Tesla's name arose from the joining of two respected families in Lika. Tesla's grandmother Sofija Budisavljević, daughter of Toma Jošanički, the archpriest of Jošan, married the priest Nikola Mandić. Their eldest daughter, Georgina "Đuka", married the archpriest Milutin Tesla and bore him three daughters and two sons. One of them was Nikola Tesla. There were few families in Lika who preserved memories of the past, and still fewer who kept written accounts. They were struggling for bare survival in the face of fierce Turkish force and under Austrian protection in name only. This, along with misery, hunger, poverty, constant war and uncertainty, took its toll. "In the procession of cruel times, all the attention of the men was fixed on the blade of the *khanjar*, all activity devoted to bloody combat."⁴

Few people could read at that time, and there were even fewer who dealt in any systematic way with the past, collecting and preserving

documents or writing records. Many valuable accounts of Tesla's ancestors have been lost forever.

Milutin

Tesla's father Milutin was born in the village of Raduč in February, 1819. His father Nikola was married to Ana Kalinić and, besides Milutin, had two daughters and another son, Josif "Josa" who, as well as his military achievements, was known in the family as an excellent mathematician.

John O'Neill was a contemporary of Tesla and wrote the first important biography of the great inventor. According to him, Nikola Tesla was descended on his father's side from a family which had moved from the old Serbia in the late seventeenth or early eighteenth century. They had earlier been named Draganić. John O'Neill must have heard this from Tesla himself, because the same information is also mentioned



Milutin Tesla

by Sava Kosanović, the son of Tesla's sister Marica. When the modern amateur historian Nikola Todorov Draganić learnt of this detail, it piqued his interest and he collected documents and accounts on the origin of the Draganić family. He established that they had come from a place called Vilusi, near Trebinje in Herzegovina. Because of conflicts with the Turks, they became rebel outlaws and dispersed. It is recorded that this family, like the Teslas, had broad, protruding front teeth, the congenital deformity known as buck teeth. The colloquial description of such people was as having "tesla teeth", from the local term *tesla* which means an adze. This is the probable origin of the family name. One more piece of information supports this theory of the name's origin: The Draganić and Tesla families have the same patron saint – Saint George.



Milutin's notebook from his theology studies

Milutin Tesla first completed German schooling in Gospić, then later enrolled in a military school or "matematika" as it was known in Lika. He abandoned this, saying that the discipline and effort of military service did not agree with his delicate constitution and natural inclination to solitude, daydreaming and the life of the mind. It seems that Nikola inherited all his father's character traits. Milutin enrolled in a seminary in Plaški and graduated in 1845. At that time the theological school operated in the house of the late renowned bishop, Lukijan Mušicki. Immediately after graduating, Milutin married Đuka Mandić. He was soon ordained as a deacon and then as a priest of higher rank, a presbyter, and posted to serve in Štikada. From there he was moved to Senj and eventually to Smiljan, where he became parish priest of Gospić in 1863. When a position became available for religious instruction in the Gospić middle school, he became its first teacher of religion. He died in Gospić in 1879.

According to contemporary descriptions, Milutin was tall and lean. A surviving photograph shows his face as pale and long, with prominent cheekbones, a thin beard, and an absorbed gaze. Little is known of his spiritual education. The surviving notebook from Milutin's pastoral theology course may serve for further study of his theological education.



Icon of St. George – collection of the Nikola Tesla Museum



Milutin's brother Josif



Milutin Tesla's charter from the Austrian Emperor

In addition to Serbian and Old Church Slavonic, he also spoke and wrote both German and Italian. His library was renowned for the works of Schiller and Goethe, as well as those of the Serbian language reformers Vuk Stefanović Karadžić and Dositej Obradović. Archpriest Tesla was a zealous cleric. During his service in Senj, he was already known for his sermons and some of the locals compared him to Abraham a Sancta Clara, the celebrated court preacher from Vienna. Nikola's schoolmate Mališa recalled as a young adult listening to the elderly Milutin's sermons in Gospić. He was enchanted by the beautiful use of the local language and the perfect phrasing, and would ask him, "Father, give me today's sermon to send to the Serbian newspapers,". The reply was always the same: "Never mind that. When I die, if my Nikola is not able to do that, speak to my old lady and choose whatever you want."⁵ For one of his sermons, written at the behest of Bishop Teofan, Milutin was decorated.

At the time of Milutin's service in Gospić, relations between Serbs and Croats had not yet been poisoned, so the people of Gospić would sometimes see Archpriest Tesla, in a new suit with the imperial decoration on his chest, visiting a service of his Roman Catholic colleague.

Milutin also distinguished himself as a lover of justice. He could not tolerate lying, and published articles in Croatian newspapers defending the Serbian cause in Lika. They were signed "Rodoljub Pravičić". He was strongly influenced by the struggle of his wife's cousin, General Bude Budisavljević, to open Serbian schools in Lika, so he continued to fight for General Bude's ideals. He wrote mainly about folk life and the need to enlighten the people.

The portrait of Archpriest Tesla is filled out by the description of his son Nikola who emphasizes his father's worldly side.

"He was a very erudite man, a veritable natural philosopher, poet and writer... He had a prodigious memory and frequently recited at length from works in several languages. He often remarked playfully that if some of the classics were lost he could restore them. He had the odd habit of talking to himself and would often carry on an animated conversation and indulge in heated argument, changing the tone of his voice. A casual listener might have sworn that several people were in the room."⁶

In his part of the world, Milutin was known as a witty man. He also had a gift for poetry. Part of his ode to Kornelije Stanković has been



Tesla's uncle, Paja Mandić

preserved. Also attributed to him is a wonderful description of a meteorite fall near Smiljan, which was published in "Srpski dnevnik" (The Serbian Journal) on St. Peter's Day, 1855, a year before the birth of his son Nikola.

"Yesterday was very hot and the air heavy; in the afternoon it rained in the Velebit area but in the early evening the sky again cleared and the air was cool, the heavens smiled and the stars were shining as always. Suddenly from the east there came a blaze, as if three hundred torches flared up at once; it streamed towards the west, the stars gave way and, as it were, all nature stood still. But the apparition across the celestial sphere seemed so close, as though it could be reached with a slingshot. It could be heard like a distant waterfall and, pouring sparks, it left a trail of purple stripes behind. And when it was quenched behind the first hill, there was a dawning, as though some great tower had collapsed and the echo reverberated on the

south side of Velebit for a long time. Then the darkness fell quickly and a myriad of heavenly flares remained from the face of this little divine phenomenon."⁷

Duka

Tesla's mother Georgina "Đuka" was the eldest of eight children of Nikola Mandić and Sofija Budisavljević. She was born in 1822, inheriting many varied talents from both her father and her mother. Her celebrated son Nikola took every opportunity to point out that it was from his mother, an illiterate woman born in a remote village at the foot of Mt Velebit, that he inherited his talent as a first-rate inventor. It is from Nikola Tesla that we learn that his grandfather Nikola and his great-grandfather invented various household devices and tools, which his mother also continued to do. Nikola Mandić was forbidden by the bishop to practice a trade but, despite this, he maintained a workshop where he worked at forging, masonry, carving and stamping, all in an artistic fashion. Invention was a habit in the family of Tesla's mother. Nikola Tesla took this family practice and pastime to an exalted level.

Like most other women of her time, Đuka was never photographed and little information about her life remains. She was valued in Gospić as an extraordinary woman, particularly skilled with textiles and handicrafts. She also had an extraordinary memory. She only needed to hear someone recite something once to immediately memorize it. She knew by heart, for instance, "Gorski vijenac" (The Mountain Wreath), the nineteenth-century dramatic epic by Petar II Petrović-Njegoš, the prince-bishop of Montenegro.

The most valuable information we have about Đuka comes from her son Nikola: "My

mother descended from one of the oldest families in the country and a line of inventors. Both her father and grandfather originated numerous implements for household, agricultural and other uses. She was a truly great woman, of rare skill, courage and fortitude, who had braved the storms of life and passed through many a trying experience... My mother was an inventor of the first order and would, I believe, have achieved great things had she not been so remote from modern life and its multi-fold opportunities. She invented and constructed all kinds of tools and devices and wove the finest designs from thread which she had spun herself... She worked indefatigably, from break of day till late at night, and most of the wearing apparel and furnishings of the home was the product of her hands. When she was past 60 years old, her fingers were still nimble enough to tie three knots in an eyelash... My mother was a woman of genius and particularly excelling in the powers of intuition.”⁸

Memory, intuition, dexterity, a gift for invention – these were the talents possessed by Đuka. Among the examples which support the stories about her is the testimony of her son Nikola. He describes one of his mother’s accomplishments as inventing and making a loom by herself, without ever having seen one in her life. He also tells us that she discovered a way to spin different threads of yarn not only from wool but also from various plants. Mojo Medić, Tesla’s school friend, testifies that he and other boys often asked Nikola to take them to his mother who would show them a miracle of skill – tying a knot in an eyelash with two fingers.

She was diligent, brave and devoted. The warrior blood of the Budisavljević clan ran in her veins. Nor did she fear death: it was recorded that on one occasion when all the members of a family had died of an infectious disease, she bathed and dressed them and assisted in their burial.



Mandić’s book of liturgical rituals

This was a mother who knew human nature well. At crucial moments, with patience and love, she ensured that her son Nikola stayed on the right path in life.

On her father’s side, Đuka came from the well-known clerical family Mandić, from Tomingaj, near Gračac. They were prominent in cultural life and were especially noted for binding church books. Milan Radeka, priest and amateur historian, recorded and collected facts about many liturgical books which the Mandić family had bound and inscribed. The Krupa Monastery has a psaltery bearing the inscription: “Repaired by Toma Mandić, 1783”. The native village of the Mandić family was named Tomingaj (the Serbian name means Toma’s Wood), after Toma Mandić, the father of Nikola Mandić and great-grandfather of Nikola Tesla. The Mandić family were





Bag from Lika – presumed to be the work of Tesla's mother Đuka

known as highly skilled tradesmen with an excellently equipped smithy and carpentry workshop. Tesla's grandfather, Nikola Mandić, was said to be able to carve and overlay a complete draft wagon. Some surviving books have such beautiful binding decorations that it is difficult to believe that they came from a rural workshop. One Mandić-bound *trebnik* – a liturgical book with the prayers needed for all everyday occasions – is today in the Nikola Tesla Museum in Belgrade.

The greatest trove of valuable detail about the ancestors of Nikola Tesla is preserved through oral history in the family of Đuka's mother, Sofija Budisavljević. And little wonder: the Budisavljević family were among the most respected Serbian families and clans in Lika. In the eighteenth and nineteenth centuries, two members of the family were ennobled by the Austrian Empire for military service, so their relatives were known as the kin of the "nobility". The family also produced many priests. Five priests from the Budisavljević clan served continuously in the parish of Jošan-Pećani in Lika, in the village of Jošan, for 120 years, from 1775 to 1895. The Budisavljevići were respected, educated and even, for that time, wealthy, with enough awareness and free time to deal with their own lineage.

Aleksandar Leko Budisavljević, Tesla's uncle and the son of the Austrian general Bude Budisavljević, wrote "The Budisavljević Clan in Gornja Krajina" in 1890 and published it in Novi Sad. This manuscript is in many respects a precious and unique testimony. Budisavljević provides historical data on the settlement of his clan in Krajina, sets out the traditions they preserved, explains the way of thinking, gives a value system, shows family feelings and ancestral characteristics. Nothing similar has been preserved in the Tesla and Mandić families. But through the history of the Budisavljevići, the similar fates of many Lika families, including the Tesla and Mandić families, can be discerned.

The sources for his book were the family tradition, the Budisavljević genealogy up to 1825, Leko's personal notes, discussions with Budisavljevići still living, and songs about the clan preserved by the family.

"Our legends are more than legends," wrote Leko, "In their simplicity, naturalness and clarity they have a value which is completely historical, drawing on the temporal space in historical eras, which are in any case deeply engraved in our homeland memory. Besides that, our legends are still so firmly framed by the living names of countries, landscapes and places that they could not belong to any other age or land because, through and through, they have adapted to all the natural historical and geographical circumstances of the times and lands."⁹

Tesla's ancestors on the world stage

In about 1459, three Budisavljević ancestors, the brothers Budiša, Juriša and Pilip, set off with their families from the village of Pećani, near Prizren towards Montenegro or, to be more precise, towards Zeta and Duklja, then ruled by the Crnojević family. They most likely travelled, says Leko, by the shortest and safest route, sheltered from the east and south by high mountains, through the valley of the River Drim and the King Milutin bridge, across the "green mountains" to Đakovica and the Visoki Dečani monastery, along the Dečani Bistrica river to Lake Plav, then down the River Lim and through the land of the Vasojević tribe to upper Tara. They stopped somewhere in the Morača river basin and there founded their first settlement. Their migration had not been impelled by the search for a better and richer region, but by severe distress. They were escaping from the