

Nikola Tesla

by George Colpitts

Things from the Dark Side and the Imagination of Nikola Tesla

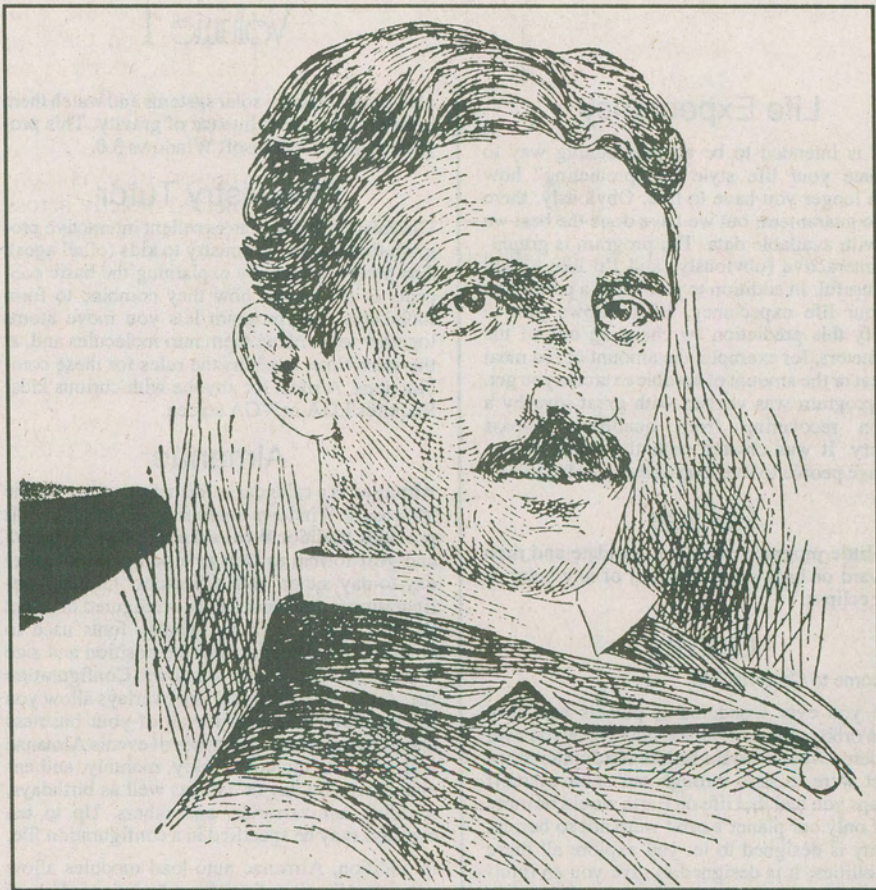
There was a dark side to electrical invention in the late 19th century. While converting electricity into everyday applications, the inventor himself became imbued by his medium, working in laboratory shadows, using fingers black with soot, and reeking of burnt ozone, acid — and brimstone.

Early in its development, electrical experimentation was closely associated with the occult. By the 1890s, both newspaper reporters looking for good copy, and scientists seeking names for themselves reported the industry's progress as if it was clandestinely tinkering with hell.

Moreover, the world of electricity was charged with occult terminology. Scientists were called "wizards" or compared with Greek gods, or pictured as grabbers of forbidden power. Their medium was equally mystical. Electromagnetic energy supposedly travelled in "ether", a mysterious fluid invisible and omnipresent. Electricity seemed to flow from an invisible world and carry inestimable power. It was the stuff of lightning bolts, and possibly divine retribution.

It was probably for this reason, rather than technological snarles, that direct current was consistently chosen over alternating currents almost to the end of the 19th century. Alternating currents were deadly (the fluid chosen for electric chairs), a lot more complex to work with, and more importantly, represented a complete abandon to a still mysterious and little-known force.

Although Westinghouse is often cited as Edison's rival who promoted



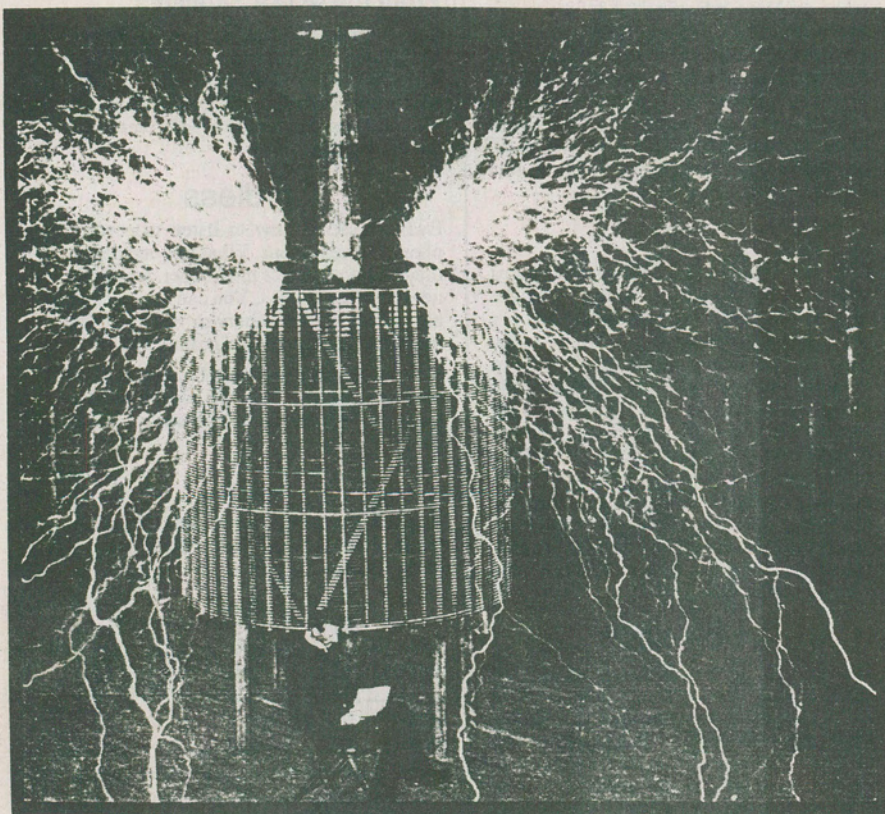
An 1894 New York Times Drawing of Tesla

AC, in many respects it was one of Edison's previous employees, Nikola Tesla, who eventually cut off direct current's application in everyday life and ushered in the era of high power AC electrical use.

When Tesla arrived to the U.S. in 1884, he found North American industry completely entrenched in

Edison's direct current systems. The engineer, however, was carrying in his luggage one of the great electrical breakthroughs: a prototype of his now-famous AC inductive motor which when powered, whirred silently with a rotating magnetic field.

It must be remembered that Edison's world was a relatively small one, a fea-



A Tesla Coil—What Else?!

ture that gave it an illusion of manageability to the user. Direct current was burnt up quickly into useless heat; every half mile, for instance, about 30 volts were lost before reaching customers. The Edison topography, then by necessity became reassuringly small to the user. Power stations were situated every five or six blocks and in many cases their turbines could be heard churning the power which illuminated a user's interior lights. The Edison world, although fraught with inefficiency, nevertheless still made some sense to users who easily charted the system in mental maps, and could remove themselves, at will, and relatively easily, from the electrical world.

To Tesla, who worked under Edison designing arc lights, the topography seemed ridiculous and he quickly introduced AC applications which startled the electrical community both by their power and innovation. By the end of his life, the Yugoslavian dreamed up the polyphase alternating current generator, and the basic principles of the radio, radar, electronic tube, X ray, fluorescent light, and electron microscope. Moreover, such developments as

the Tesla Coil allowed for the transportation of AC over large distances, a feat out of the question for DC power stations.

In essence, Tesla threw away Edison's small mental terrain and replaced it with a complex world of long-distance, high power transmissions, connected with awesome electronics.

Throughout the late 19th Century until his death in World War II, Nikola Tesla, self-made eccentric and electrical prophet, whose mind seemed to possess dark, almost forbidden abilities, led society to leap in faith into the world of alternating currents, and plunge deep into the cult of electricity.

There can be no mistake that Tesla carefully constructed an eccentric image which intrigued colleagues, millionaire benefactors and the newspaper-reading public.

He arrived with four cents in his pocket from Yugoslavia, and he lived most of his life relatively penniless, even after a lifetime which produced some 900 patents. The *New York Times* reported Tesla's 1916 trial for tax evasion and the surprising disclosure

that he lived mostly on credit, had "scores" of unpaid bills and when asked if he had any valuable assets such as jewellery, he replied: "No, Sir; I abhor jewellery."

Tesla, while not collecting personal wealth, lived most of his life holed up in lavish hotel rooms at the Waldorf or Ritz Carlton, amassing unpaid bills. He tramped around most of the day in "morning clothes," fed the pigeons at the nearby St. Patrick's Cathedral and taped the doors of his room to stop germs from seeping underneath.

His birthdays were appropriately celebrated in public light: New York city reporters invited to his hotel room were given belts of scotch and descriptions of his last year's work, usually just as jolting as the booze. He had announced on his 78th birthday, for instance, his discovery of a death ray which could kill millions of people in a single pass. By the end of his life, his theories became progressively more ambitious to the point that they made good news copy, but little else. And it was no surprise that after his death during World War II, the FBI confiscated his files for fear they contained material the Nazis could use to take over the world.

Tesla seemed to have been both scientist and carnival conjurer. During the 1890s Hollywood actors, political dignitaries and famous writers visited his lab in lower Manhattan — usually in the dark of night — where they witnessed scientific "demonstrations" which have never been fully explained. One of Tesla's favourite tricks was to hold a ball of glowing electricity in his hand; another, to throw bolts of lightning across the room or cast light on particular objects from apparently no source. All of the experiments smack now as a bit of slight-of-hand mesmerism, or tapped from the cane of a Las Vegas magician. At the time, though, such demonstrations ran his reputation wild. A 1894 *Times* article described one reporter's experience:

"In some lamps Mr. Tesla had placed substances that phosphoresced, under the stimulation of the currents reaching them across many feet of space..."

As his friend and biographer, John O'Neill, science editor of the *New York Herald Tribune* said, the tricks "suggested this magician's chamber was

connected directly with the seething vaults of hell."

But while Tesla seemed to flow his life into an eccentric mold, there was no explaining away the awesome Tesla mind, attributed directly to the electrical revolution in the first decades of the century.

Mathematically adept and able to memorize effortlessly, Tesla was able to quickly seize electrical theory and channel his full energy into design. As a student at engineering college in Yugoslavia, he often lay on his bed assembling inventions mentally.

Before he began full-time inventing, Tesla admitted in autobiography that he spilled his mental abilities into occult-like uses, the most unsettling being what he refers to as thought travel: "...so I began to travel — of course, in my mind," he writes. "Every night (and sometimes during the day), when alone, I would start on my journeys — see new places, cities and countries — live there, meet people and make friendships and acquaintances."

Later, he said, his mind's capacity for such visualization helped him design electrical systems. Without blueprints or diagrams, Tesla built the first alternating current motor with a rotating magnetic field, *in his mind*. Moreover, he said that he had tested the motor, running it for a few weeks to see if there was any faults, *in his mind*.

In a series of autobiographical features in *Electrical Experimenter* in 1919 he wrote: "I started by first picturing in my mind a direct-current machine, running it and following the changing flow of the currents in the armature. Then I would imagine an alternator and investigate the processes taking place in a similar manner. Next I would visualize systems comprising motors and generators and operate them

in various ways. The images I saw were to me perfectly real and tangible."

The design of the induction motor kicked the stool out from under the electrical community. But its design, although brilliantly innovative, reflected also the Tesla mindset, and cast shadows of the work which would extend throughout his life. Tesla had struck out at theory before practice,

that never quite arrived at the point of practical utility."

One such useless experiment was performed in 1912, when Tesla announced he was collaborating with a school teacher in the U.S. to make "mentally deficient" students smarter. The experiment involved installing Tesla coils in the walls so that "invisible electrical currents will run, by means of

which ... the brains of the children will receive artificial stimulation." Tesla said he was prompted to perform the experiment after he observed that one of his assistants, who was "exceedingly stupid", had appeared much smarter after working around Tesla's snapping, high-voltage coils.

But whether Tesla was working on educational stimulants, or communicating to Mars (he and Marconi had a running argument over the subject, Marconi wanting to transmit mathematical codes; Tesla wanting to transmit pictures) or patenting in 1915 a new park water fountain which used less water, Tesla maintained the public's confidence. He received funding from mil-

lionaires such as J.P. Morgan, John Jacob Astor, and John Hays Hammond who ardently believed he would, someday, culminate his work with a new world order, maintained by electricity.

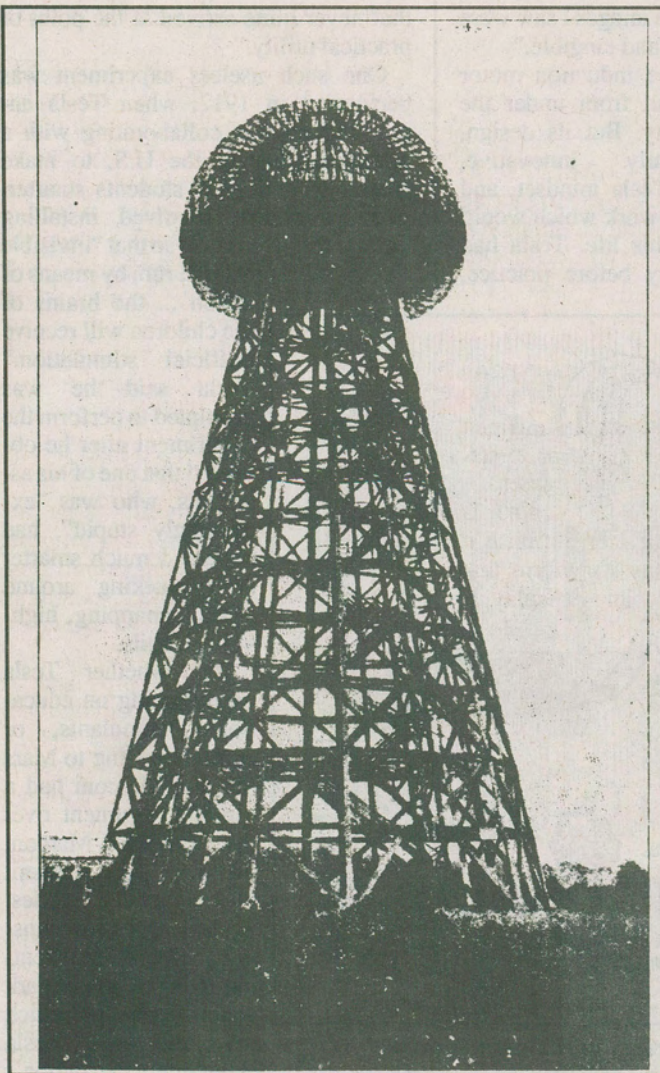
One of Tesla's legacies was a long list of innovations, often never fully developed in his lifetime, but which are now becoming valuable to the scientific community. In 1887, for instance, he filed patents to use the loss of magnetism in iron when it is heated to temperatures above 750 degrees centigrade, a process being reinvestigated for energy conservation. In 1891, he patented a medium frequency generator which much later had broad application in broadcasting stations. That year he also tackled problems of electrical insulation and created an electrical condenser, composed of plates and im-



An 1895 New York Times illustration of Tesla demonstrating coil and light innovations.

something Edison hadn't really done. Edison was busy hammering square pegs into round holes a lot of the time, a methodology which irritated Tesla considerably.

Moreover, the induction motor did away with the cumbersome brushes and commutators which made up DC motors. Tesla *hated* clumsy physical contact between energy sources and their applications. The quiet running, low-maintenance induction motor had an armature driven, it seemed to contemporary observers, magically. Tesla devoted his life to other grandiose applications of wireless, and hence, magical, power transmission, which eventually stirred The *New York Times* editor to complain that Tesla produced "revolutionary inventions



Not Built To Be But A Landmark

Like the rest of Tesla's mystery, the purpose of this mushroom tower with its 185 feet of structure and its copper-covered dome, is unknown. But Tesla still dreams, and it may yet come to life.
(from Literary Digest Article, 1916)

mersed in insulating oil, a design used to the present.

The most conservative histories of Tesla cite the Tesla Coil as being his great contribution to long-distance power transmission and what eventually allowed for the tapping of Niagara Falls power. But Tesla envisioned a more ambitious use for his coils, the most interesting being a way to create world-wide wireless power transmission.

After building larger and larger coils within his lab and finally deciding he would have to move out-of-doors after

4,000,000 volt potentials were arcing into the room's walls, floors and ceilings, Tesla commenced work on the famed tower built in Colorado Springs. There, in the mountainous geography, the tower was Babel-like in ambition and a monument to Tesla's determination. The tower bristling with coils and receptors was 80 feet above the ground and created, according to Tesla, something around 135,000,000 volt potentials. He claimed that he lit 200 incandescent bulbs 26 miles away with "wireless" power.

Tesla also built a tower on Long Island, abandoned soon after construction but of similar dimension, crowned with an ominous copper dome. Town residents living nearby believed the scientist was going to connect

the tower to an elaborate system of super conductors around the globe, or simply communicate to Mars. It made good press, but Tesla never actually used the machinery.

Behind the project remained Tesla's goal to eventually charge the earth with tremendous voltages and make it "oscillate," making it possible, anywhere on the globe, to tap into power wirelessly. And even though he met with failure all his life in this plan, he never stopped planning for the day when he would create wireless unmanned drones which would patrol the continent's coastlines,

and would target and destroy enemy ships and airplanes before they left their bases. "Wars of the future will not be waged with explosives but with electrical means," he said after describing his theories.

Mostly, however, Tesla planned for peace. He saw the grand electrical schemes allowing for wireless telephony around the world, illuminating the sky at night when needed, watering deserts and correcting bad weather systems. To people who scoffed at such ambitions, he repeated that he didn't care if the world thought he was insane.

In a *Newsweek* article written just before his death in January 1943, Tesla was described as spending most of his hours alone in his room at the Hotel New Yorker, most likely the hotel's most eccentric guest at that time. Still a bachelor, and having devoted his entire life to electrical theory, he looked more like a comic than a genius. He wore long underwear, golf stockings and high-laced boots. When maids came in he slipped on a bathrobe. Most often they found him sitting on the edge of his bed, contemplating his pet pigeons which pecked at seed in their cage. Or they found him "moodily" thinking.

His alchemy, whether applied to practical electronics, or to futurist fantasies, it seems, never came to an end.

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