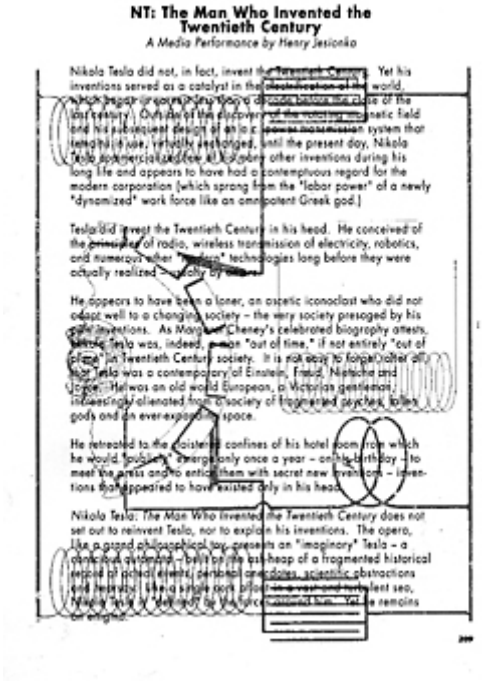
NT: The Man Who Invented the Twentieth Century
A Media Performance by Henry Jesionka


NT: The Man Who Invented the Twentieth Century
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Nikola Tesla did not, in fact, invent the Twentieth Century. Yet his inventions served as a catalyst in the electrification of the world, which began in earnest less than a decade before the close of the last century. Outside of the discovery of the rotating magnetic field and his subsequent design of on a.c. power transmission system that remains in use, virtually unchanged, until the present day, Nikola Tesla commercialized few of his many other inventions during his long life and appears to have had a contemptuous regard for the modern corporation (which sprang from the "labor power" of a newly "dynamized" work force like an omnipotent Greek god.)

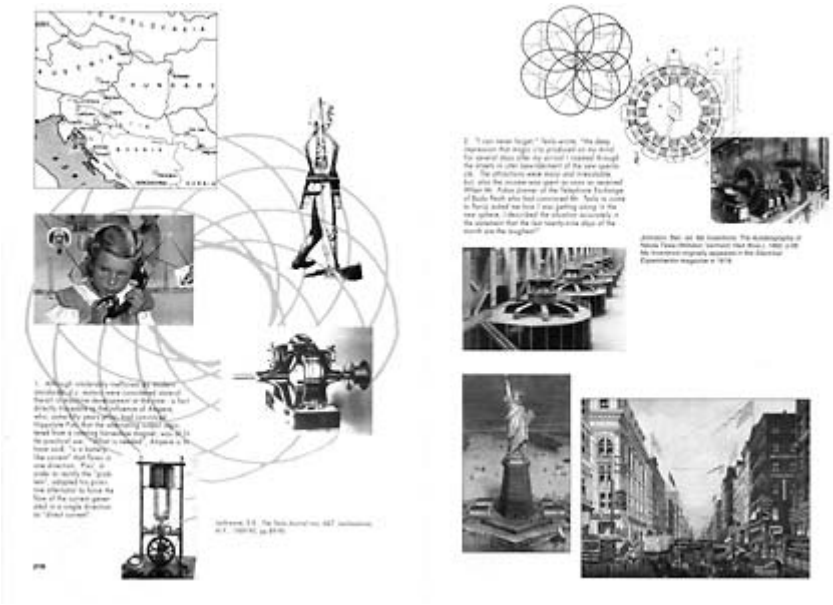
Tesla did invent the Twentieth Century in his head. He conceived of the principles of radio, wireless transmission of electricity, robotics, and numerous other "modern" technologies long before they were actually realized — usually by others.

He appears to have been a loner, an ascetic iconoclast who did not adapt well to a changing society — the very society presaged by his own inventions. As Margaret Cheney's celebrated biography attests, Nikola Tesla was, indeed, a man "out of time," if not entirely "out of place" in Twentieth Century society. It is not easy to forget, after all, that Tesla was a contemporary of Einstein, Freud, Nietsche and Joyce. He was an old world European, a Victorian gentleman, increasingly alienated from a society of fragmented psyches, fallen gods and an ever-expanding space.

He retreated to the cloistered confines of his hotel room from which he would "publicly" emerge only once a year — on his birthday — to meet the press and to entice them with secret new inventions — inventions that appeared to have existed only in his head.

Nikola Tesla: The Man Who Invented the Twentieth Century does not set out to reinvent Tesla, nor to explain his inventions. The opera, like a grand philosophical toy, presents an

"imaginary" Tesla — a conscious automata -built on the ash-heap of a fragmented historical record of actual events, personal anecdotes, scientific abstractions and hearsay. Like a single cork afloat in a vast and turbulent sea, Nikola Tesla is "defined" by the forces around him. Yet he remains an enigma.



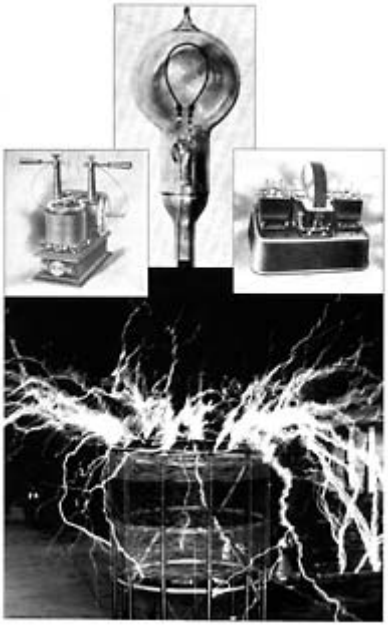
1. Although intolerably inefficient by modern standards, d.c. motors were considered state-of-the-art in machine development at the time — a fact directly traceable to the influence of Ampere, who, some fifty years prior, had convinced Hippolyte Pixii that the alternating output registered from a rotating horseshoe magnet, was of little practical use. "What is needed", Ampere is to have said, "is a battery-like current" that flows in one direction. Pixii, in order to rectify the "problem", adopted his primitive alternator to force the flow of the current generated in a single direction as "direct current".

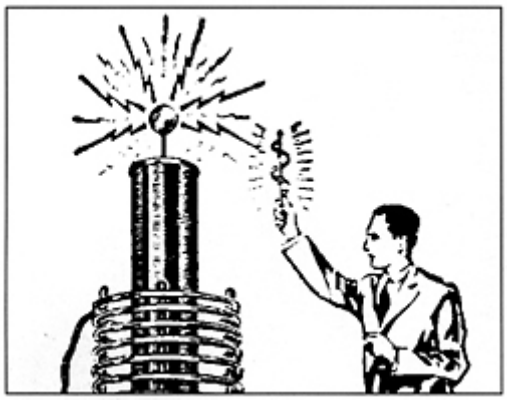
Laithwaite, E.R. The Tesla Journal nos, 6 & 7, Lackawanna, N.Y., 1989-90, pp. 89-90

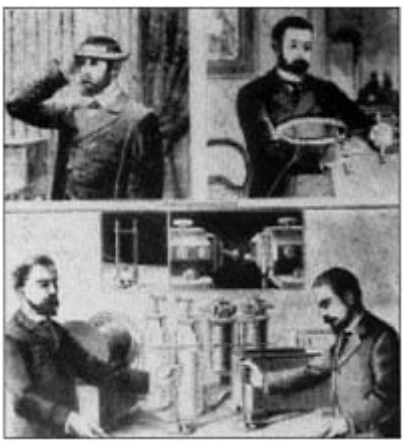
2. "I can never forget," Tesla wrote, "the deep impression that magic city produced on my mind. For several days after my arrival I roomed through the streets in utter bewilderment of the new spectacle. The attractions were many and irresistable, but, alas the income was spent as soon as received. When Mr. Pukas (owner of the Telephone Exchange of Buda Pesth who had convinced Mr. Tesla to come to Paris) asked me how I was getting along in the new sphere, I described the situation accurately in the statement that the last twenty-nine days of the month are the toughest!"

Johnston, Ben, ed. My Inventions: The Autobiography of Nikola Tesla (Williston Vermont: Hart Bros.), 1982, p.66

My Inventions originally appeared in the Electrical Experimentor magazine in 1919.







3. Clerk, Ronald W., Edison: The Man who Invited the Future, (NY: GP Putnam's Sons), 1977, pp. 157-158

4. "There could be little doubt about the economic advantages of alternating current and Edison eventually realized that the battle fought on economic grounds would be lost. In the last decades of the nineteenth century electricity was looked upon by the general public much as nuclear power is considered today, while it could be of immense benefit to mankind, it was also a killer and one about which layman still knew very little. It was thus easy to fuddle the

public mind and to claim that the dangers of high voltages — which though real could be guarded against -were those of alternating current itself. In the words of Harold Passer's study of The Electric Manufacturers, the Edison company now "decided to compete outside the area traditionally identified with commercial rivalry … As the foundation stone of his extra-market competition with alternating current the Edison company chose public safety."

Every accident that could rightly be attributed to alternating current was publicized by the direct current party. Claims and counterclaims which owed little to science and much to dramatic copyrighting were published almost daily. Among the highlights of the Edison campaign was "A Warning," bound in red and recounting in great detail the alleged dangers of alternating current.

In "Dangers of Electrical Lighting," an article in the North American Review, Edison lambasted the idea of using alternating current for any purpose:

The electrical lighting company with which I am connected purchased some time ago the patents for a complete system and my protest against this action can be found upon its minute book. Up to the present I have succeeded in inducing them not to offer this system to the public, nor will they do so with my consent.

Westinghouse replied in support of alternating current. However, the baffle was also being waged outside the magazines. There was a good deal of political lobbying, the Edison interests supporting a proposed law to limit electrical circuits to 800 volts, thereby preventing the effective use of an alternating current but leaving their own circuits untouched. In the summer of 1888 Westinghouse thought of legal action. On July 11th he wrote:

It is a matter of very serious consideration as to whether or not we could proceed against the directors of the Edison Company, Johnson and others, for conspiracy under the laws of New York: for their recklessness, and you might say, criminal course in some way be brought to an end.

Strong emotions were aroused and Edison, a naturally affable man, asked to visit Westinghouse by Villard, a mutual friend, replied uncharacteristically:

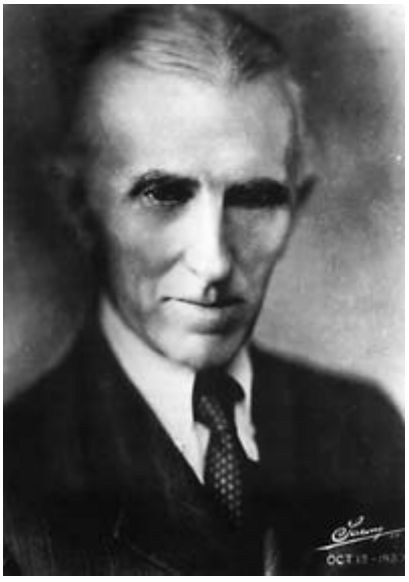
I'm very well aware of his resources and plant, and his methods of doing business lately are such that the man has gone crazy over sudden accession of wealth or something unknown to me, and is flying a kite that will land him in mud sooner or later.

Edison, op. cit. pp. 159-160

5. Although Tesla appealed to his old friend George Westinghouse for help, it was not forthcoming:

…"Like Edison, George Westinghouse possessed many advantages in the contest for industrial supremacy; vast personal wealth, an expert engineering staff, and patents on hundreds of processes and devices, of which the most valuable was the alternating -current system for transmitting electricity. But Westinghouse's company expanded too quickly, its sales rising nearly thirty-fold in its first four years of existence. In the depression of the 1890's George Westinghouse was forced to seek a loan of a half-million dollars. The Mellons of Pittsburgh offered to lend him the money, demanding in exchange the right to name the company's manager. Westinghouse stalked out of the Mellon bank and headed for the office

of New York financier August Belmont, where he received the funds he needed. But in the 1908 recession "Westinghouse was caught again," as journalist Harvey O'Conner wrote in his Depression-era exposé of the house of Mellon. "The bankers took over his enterprises and gave the old man a nominal position from which he resigned in disgust, and the immense Westinghouse business marched on without George Westinghouse."



Nikola Tesla and Jose Schillinger
The Music of NT: The Man who Invented the Twentieth Century
Bruno Degozio
Toronto, Canada

The music of NT. The Man who Invented the Twentieth Century was composed using modernized versions of algorithmic techniques developed by a little-remembered early twentieth century Russian-American music theorist, Joseph Schillinger, and is related in a particular and peculiar way to Tesla's most important ideas. Fundamental to these techniques are a geometrical world view dating back to Pythagoras and the use of phase relationships as creators of energy (physical in the case of Tesla's generators, aesthetic in the case of Schillinger's interference patterns). His techniques have been brought up to date by their amalgamation with recursive and chaotic processes ("fractals") in the music of NT, notably in the overture and the "phase music" used to herald the approaching storm.

In some cases, as in the Fantasy on The Electric Motor, the overall rhythmic structure is controlled by the phase relationships employed in Tesla's original polyphase motor, and developed according to Schillinger's ideas of phase and pattern. In other pieces the connection is more elusive, as in the sequence entitled The Power of Resonance — Number is the Basis of the Universe. Tesla's position in the long line of geometrical idealists beginning with Pythagoras is demonstrated through the use of the same harmonic relationships described by Pythagoras (and consistently employed as one of the underpinnings of Western theories of music for the last 2600 years). This heritage of geometrical idealism is brought up to date through the use of compositional techniques derived from chaos theory and fractal geometry.

Tesla's obsession with automata and robots is finding its modern fulfillment in these intelligent, computer-based processes. Unknown to most people, however, is the fact that many of these processes were anticipated by Joseph Schillinger, one of the strangest and most interesting musical figures the twentieth century has produced.

Schillinger and Tesla were remarkably similar in many ways: both were obsessively concerned with a cataloguing and rationalization of human experience, culminating in an almost pathological reduction to mechanisms of behavior; both were immensely influential and acquired (or attempted to promote) a Promethean view of themselves while alive (Tesla's promise of free power and information through the magnifying transmitter as his gift to mankind, Schillinger's "scientification" of music as the salvation of art); both saw technology as a positive creative force working for the good of mankind and eagerly anticipated its future development; both were enthusiastic immigrants to America (Tesla from Yugoslavia, Schillinger from Russia) and embraced the life of the New World wholeheartedly; both were individual to the point of eccentricity in their personal habits; both suffered a bizarre (in view of their previous influence) and almost total eclipse after death. They died within a few years of one another, both in New York City where they had spent the greatest part of their creative lives.

PHASE AND THE PRINCIPLE OF INTERFERENCE

Like Tesla's most important and influential ideas, the basis of Schillinger's System is geometrical, especially resting on the concept of phase relationships ("resultants of interference" in his terminology) of simple periodic motions. He found ways to project these resultants into the obvious areas of rhythm and structural proportion and also into the much less obvious ones of pitch structures (scales and chords), counterpoint, harmonic progression, orchestration and even into the emotional and semantic aspects of music composition. In the final years of his life he extended the system into non-musical domains to produce images and designs based on the same principles.

Schillinger's System of Musical Composition was a unique, perhaps misguided, attempt to discover the atomic structure of music, the smallest indivisible element, the simple ground from which all complexity emerges. In this respect it has interesting parallels to other currents of thought in the mathematical and physical sciences of the time, such as the quantum theory of atomic structure, Einstein's attempt to unite all physical laws into a 'Unified Field Theory', Betrand Russells's and Alfred Whitehead's bid to relate the whole of mathematical thought to a handful of elementary postulates in the Principia Mathematica. It also bears a strikingly similarity to Tesla's reduction of human activity to mechanistic laws that were obeyed unwittingly by human beings "as surely as molecules obey the gas laws." Although he may have failed to convincingly relate all aspects of musical thought and perception to a handful of fundamental principles, Joseph Schillinger nevertheless provided, and continues to provide a fresh outlook and an invigorating force to a potentially moribund musical culture. Like Tesla, his influence on the course of events in this century has been deep and universal but strangely unacknowledged.