

Nikola Tesla Visits the 21st Century – Part 3

While experimenting with scalar waves late one night in NuTesla's lab a stranger appeared, seemingly from nowhere.

“Good evening, sir. Let me introduce myself. My name is Dr. Nikola Tesla.”

And so began the most interesting night of my life. After discussing advances in technology since the 1940s and explaining harmonic resonance to me, he turned and asked, “Might I bother you to reheat this cup of tea? It's grown cold as we've visited.”

As I took his cup and turned to set it in the microwave oven Tesla stopped me and said, “Actually, let's heat it in a pan and I'll demonstrate these principles. The time is growing late and there is still much to teach to ensure this message isn't lost again. The world has come a long ways and it's time to lift everyone to a higher level of awareness, a higher level of consciousness; you might even say a higher level of vibration.”

I poured his tea into a metal saucepan and placed it on a hot plate. When I reached to turn on the electric heating element, Tesla stopped me and said, “Before heating the tea, allow me to show you a little standing wave magic.”

I stepped back and stared wide-eyed as Tesla grabbed the handle of the saucepan and poured a small amount back into his cup. He placed the saucepan on the bench and waited until the surface of the tea was smooth and no movement could be seen. Tesla took hold of his cup with a small amount of tea in it and ever so carefully let a single drop pour from the cup into the center of the saucepan, causing a small wave, a ripple, to form and expand until it evenly struck the sides of the saucepan. I was busy marveling about how he could so precisely dispense a single drop from a cup into the very center of the pan that I almost did not hear him continue his discourse.

“Resonance so often is demonstrated with dissimilar objects being used to transfer energy from one item to the other. The classic example of a small cork suspended on a string being used to strike a similarly suspended metal bar may be visually stimulating given the immense disproportions between the masses of the two items, but it completely disregards harmonic resonance in similar or identical objects, as with the wave created when a drop of tea encountered the surface of the same substance in the pan. And yet, from a proportionate perspective, the difference in mass between the single drop of tea and the saucepan of tea can easily be as great as that of the metal rod and the small cork.”

I was still wondering how he could let a single drop out of the tea cup fall exactly into the center of the saucepan when he continued, “Regardless of the volume of liquid in the pan a single drop will have the same result each time. Now, watch as two drops are dispensed into the pan one after the other.”

Carefully Tesla poured first one drop into the saucepan, causing a wave to again expand outward to the edge of the pan. This time I noticed the reflected wave as it struck the sides of the pan and was returned back to its point of origin where it collided with itself and began expanding outward again, except this time he let a second drop into the center which added to the reflected wave expanding outward again. This second wave was slightly larger than the first due to the added energy of the second drop.

Tesla continued, “I could continue to dispense successive drops of tea into the center of the saucepan each time adding to the wave expanding outward and reflecting back to the center. The edge of the saucepan has created a feedback loop, an oscillatory function, as resonance is only effective when such feedback exists. And the timing of the successive drops must be precise to always add to the accumulating wave.

I interrupted, “But these are transverse waves, correct? They’re not standing waves, because their crests and troughs transverse above and below the surface of the tea as they move across its surface.”

“Precisely so,” Tesla said as he shook the pan to disturb the surface and waited as the tea settled and the surface was smooth again. “Let’s have one more demonstration.”

His shaking action of the pan and the subsequent rapid settling of the tea to a smooth surface caused me to reflect on Chaos Theory, but before I could comment he dispensed a single drop of tea into the center of the pan once more. This time, when the expanding wave struck the inside of the pan, he dispensed another drop creating another wave expanding outward while the first wave was reflecting back inward. And then I saw it, the two waves collided, crest to crest, and became one wave frozen in place. After what seemed like too long of a moment the wave collapsed, dissipating into the surface of the tea in the pan. Tesla must have seen this look on my face from our earlier discussion that evening and he knew my mind was spinning with possibilities as his lips turned up into a small smile. Before I could ask him to show me again he turned the hotplate on and began heating his standing wave tea.

Then he wiped that sly smile from his face and began, “When the two waves collided in phase with each other, crest to crest or trough to trough, or wherever they may be in their relative plane of action, as long as they are in phase and traveling towards each other, they created a single standing wave, or longitudinal wave as some call them. But what happened to the energy of that collision, since energy is conserved it must go somewhere?”

Before I could reply, Tesla continued, “Standing waves can be seen in many forms. When a string is held taut and then plucked it creates a visual and audible standing wave. When energy is transmitted from a radio to an antenna there is a standing wave created by reflected energy from the antenna back towards the transmitter. If you hold a florescent tube near the antenna and its cable you can see the standing wave as the tube lights and extinguishes while moving along the cable as it intersects the standing wave.

“When you tune a radio receiver to hear a single station, standing waves can be used to demodulate signals like voice or music. A modern radio receiver is not like the original ‘spark-gap’ wireless telegraphs and crystal radios. One method used involves a local oscillator in the receiver tuned to the transmitter’s frequency. When the transverse wave from the local oscillator collides with the transverse wave from the transmitter it creates standing wave collisions resulting in energy being released which can be amplified as the demodulated sounds heard over the loud speaker.

“*Anytime* two identical transverse waves collide in phase with each other, the collision creates a scalar component perpendicular to the plane of the collision. This scalar

component is a standing wave, which is why they are referred to as scalar waves. This is central to understanding wireless transmissions of any form, even electricity.”

My head was swimming at this point and Tesla could see I was a bit overwhelmed trying to follow his reasoning, so he broke it down for me in simpler terms. “In order for a string to produce a standing wave it must be secured at both ends and then plucked. In order to create a standing wave in the saucepan of tea there had to be an edge for the tea to strike and cause a feedback loop so the second drop could create an opposing wave in the same phase. In the radio receiver the local oscillator is mixed with the received signal and the collisions create standing waves. Standing waves are all around us, occurring *anytime* two identical transverse waves collide in phase with each other.”

“Is this how noise cancellation works?” I asked.

Tesla frowned and replied, “No, cancellation of two waves occurs when colliding waves are exactly out of phase with each other, crest to trough rather than crest to crest.”

To which I replied, “Now I’m confused. It seems standing waves are simply some artifact created from the collision of two transverse waves, but the standing wave itself doesn’t seem to serve any purpose. It’s not the standing wave that gets transmitted through the antenna, and the vibrating string is disturbing air, creating transverse sound waves I can hear. What am I missing?”

Tesla responded, “*Anytime* two identical transverse waves collide in phase it creates a standing wave. *Conversely*, anytime two identical standing waves collide a transverse wave is created, much like the Maxwell-Faraday laws that any change in the magnetic environment of a coil of wire will cause a voltage to be induced in the coil, and conversely any voltage change in a coil produces a magnetic field. If it were not for losses from entropy and resistance, you could convert a magnetic field to voltage and convert voltage back to a magnetic field endlessly. And the same is true for transverse and standing waves.”

“Okay, so we can convert transverse waves to standing waves and then back to transverse waves.” I replied. “But I am still missing something.”

Tesla thought for a moment before continuing. “Let’s be clear, the intensity of a transverse wave decreases proportionately to the inverse of the square of the distance from its source. A standing wave, on the other hand, maintains its intensity and integrity over the entire distance it travels until striking something, which can then affect or convert it depending upon what it encounters.

“Radio waves emitted from the antenna are transverse waves constantly expanding and thus decreasing in density as they travel outward. Standing waves travel in only one plane and may be disc shaped or collinear, depending upon how they were created.”

I asked Tesla, “How can a standing wave be emitted? In your examples the standing waves were created by a feedback, in a closed system. The string had to be secured at both ends. The tea had to strike the edge of the pan to reflect back to the center, and the transmitter had to be connected to an antenna to also reflect its signal which collided with itself to create a standing wave. It seems standing waves only exist between two fixed points.”

His tea was reheated and he poured the steaming liquid into his teacup looking about wistfully for his whiskey and silently remembered there was none as he said, “Recall when this tea was in the saucepan and the two waves collided in phase with each other? For a moment it appeared the two waves combined and were frozen. Perhaps not so obvious were the other secondary waves following the initial wave of the greatest amplitude. These secondary waves also had collisions and for a moment there were rings of waves seemingly frozen on the surface of the tea.”

He was correct, I recalled the smaller secondary and tertiary waves and so forth behind and, oh, yes, they were also in front because of the feedback oscillations.

I nodded and he proceeded, “Then it seemed they all just disappeared into somewhat random ripples and the surface was composed of dips and hills rather than crests and troughs of waves. The first question is, and this is pivotal to tonight’s visit, what happens if the standing waves are maintained? As steady as my hand and eye may be, I could not maintain an exact timing to continue the demonstration in tea, but I needed you to see, to visualize, this effect. Oscillations of very high frequency and high potential can be used to create identical and opposing transverse waves and by tuning the circuit properly persistent standing waves occur.”

Again, Tesla gave me a moment to absorb his words. Then I asked, “Okay, and what can those standing waves do besides make great arcs of electricity that leap across the room and create visually dazzling displays?”

Tesla smiled and responded patiently, “It was essential to create those types of visual displays to pique the interest and creativity of the few true intellectuals in the world. Unfortunately, I learned too late that it also attracted the attention of powerful and undesirable people as well. The part you are ‘missing’ is why I am here now, so you figured out the next part of the solution and now we need to finish what I started and what you have built upon.”

Tesla saw a perplexing look was on my face and addressed my look with a question, “What would have occurred if two drops of tea fell into the pan at the same time a short distance apart?”

I thought for a moment and answered tentatively, “They create a standing wave as they collide?”

Tesla replied, “Yes. However, since the two ripples would have collided tangentially the resulting standing wave would have been less noticeable and harmonics of the two waves would have appeared. It is much easier to create standing waves in a closed environment. As I said earlier, *anytime* two identical transverse waves collide in phase with each other a standing wave is created. However, because the intensity of a transverse wave decreases as it travels, random collisions rarely produce standing waves. The two waves would have to be the same frequency, same phase, similar amplitude and traveling in the same plane directly towards each other to create a standing wave.”

To which I asked, “So, how did you create your standing waves, and why would you do so?”

Tesla began explaining, “I’ll explain the ‘why’ part of your question first. Do you know how much energy is wasted transmitting electrical power over wires? Too much is the

short answer, and the longer answer has to do with the cost of building and maintaining the infrastructure to do so. The even longer answer is that sending it over wires allows unscrupulous business men to meter it and to control it and everyone who needs it. So the 'why would you do so' answer is because it's the right way to distribute power."

Tesla's passion about wireless transmission of power was perfectly clear in his demeanor and diction as he continued. "How you create this standing wave is only part of the answer to wireless transmission of electricity, but I'll start here. Standing waves can be omnidirectional in one plane, like a giant disc extending outward in all directions in a flat plane. The tower I started constructing was designed for this purpose, and a network of towers would have connected everyone to the most efficient power grid imaginable."

I could picture the Wardencllyffe tower J.P. Morgan initially funded Tesla to build and remember Morgan pulling his funding when he learned the power could not be metered so Morgan could not control the usage.

Tesla continued, "Each tower had a generator to produce enormous amounts of energy, this energy was to be converted into a coplanar standing wave that would travel until it encountered a receiving tower at the intersection of another coplanar standing wave from a different generating tower. When the standing waves collided at the receiving tower a transverse wave would result, creating usable electrical power."

To which I said, "Right; standing waves, unlike transverse waves, cannot be used to power electrical appliances or motors, correct?"

"That's correct, at least not yet. When that scoundrel Edison tricked me into redesigning his power plant and distribution system I also developed AC motors for factories and locomotives using the most immediate solutions at hand. All generated AC power is transverse, so AC motors had to be transverse powered. I anticipated a future with standing wave powered motors, but until that time industry had to keep working.

"So the Wardencllyffe tower concept was designed to create a grid of generators to emit standing waves and then receiving towers to convert standing waves into usable transverse wave power."

I interrupted, "No wonder people are still trying to figure out how this was to work, they missed the whole conversion process."

"That's right, and resonance precedes that understanding. What amazes me is that engineers should understand all these principles and yet they are only being applied in the infancy of their development. It's as though in the last 70 years engineering overlooked some of the greatest discoveries during my life."

I could hear the remorse in Tesla's voice and trying to get back to answering the 'how' part I asked, "You favored flat coils, ones that were wound in a single plane with an ever increasing diameter, why?"

Tesla's intensity returned to his voice as he answered, "Efficiencies, of course. Imagine two flat coils wound in opposing directions around separate ferrite cores, one above the other, with the two cores in line with each other almost touching, end to end. The coils are wound like the grooves in the vinyl platter of a long-playing record. The two opposing coils are connected to each other so that when a pulse of current is sent through

the coils, owing to their opposing windings, they each generate an opposing magnetic field that collides with the other. When the coils are spaced correctly the two opposing fields will create a standing wave parallel to the windings and perpendicular to the ferrite cores. The standing wave is emitted in 360 degrees along the single plane of the tuned collision.

“If no other towers existed that standing wave would travel around the entire world to other side where it would collide with itself. The pulses are timed to match the resonant frequency of the earth’s atmosphere, which was determined to be 7.83 times a second for a trip around the earth and back to the point of origin.”

“Schumann’s resonance?” I asked.

“Why, yes,” Tesla responded, almost surprised I knew that, and then asked, “And what do you think happens on the opposite side of the world where the standing wave collides into itself?”

“It creates a transverse wave?” I answered timidly.

“Sort of,” was Tesla’s immediate reply before continuing, “Lightning, is the more correct answer.”

“Wait a minute,” I responded, “Is this how you were creating lightning in Colorado Springs?”

“Of course, how else could it be done?” Tesla asked rhetorically.

“But creating lightning was only an artifact of my research as the purpose was to send and receive the energy safely and efficiently. The receiving towers were of a similar, though somewhat different, design and were able to capture the intersecting standing waves and convert them into usable electricity.”

“And if you wanted to create a standing wave ‘beam’ instead of a disc, is that possible, too?” I asked.

To which Tesla replied, “Yes, yes, but that is a different process and for another time.”

“Can’t you tell me at least a little about how it’s done?” I pleaded.

“Okay, just a little. But I must preface it with a clarification. The standing waves proposed in my wireless power grid were harmless to organic matter that may have crossed their plane. Metallic items would experience slight heating if they were exposed for extended periods of time, but posed no threat to anyone or anything. I think though you are referring to the energy cannon I proposed to the US government, correct?”

“Yes,” I replied.

“If you will recall, in April of 1897 I spoke at the New York Academy of Sciences regarding my discoveries with phosphorescent lighting and the subsequent ability to produce images on photographic plates similar to Roentgen’s X-Rays. I laid out for the academy my discoveries and demonstrated much safer X-Ray vacuum tubes and methods.”

“Yes,” I said, “Roentgen’s gaseous discharge utilized electron avalanche, whereas your cold cathode tubes used a process of decelerating electrons to produce X-Rays, and your work became the basis of high energy particle accelerators that continues to this day.”

Tesla smiled at my understanding of this and proceeded, “Yes, the bremsstrahlung process describes how a photon is emitted when an electron decelerates and falls into a lower orbit around its nucleus, or in the case of the X-Rays, when a stream of electrons impacts an object, such as the aluminum cap at the end of a Lenard tube, and a particle is emitted. After observing the hurtful actions of X-Rays, and when my phosphorescent lamps were found to affect photographic plates I realized there were principles at work no one fully understood and put my efforts on hold until I could discover the true source, or sources, of the X-Rays with the various tubes available in order to ensure any form of phosphorescent actions could not cause harm.”

“But I digress, and the point is this, anytime two identical transverse collide in phase a standing wave is created. This is true even of photonic particle waves and X-rays.”

“So, you’re telling me your improved Lenard Tube for X-Rays with the dual cathodes emitting electrons at each other and then directed them at a 90 degree angle was creating some type of scalar or standing wave?”

To which Tesla simply smiled and closed with, “That’s enough about collinear standing waves, except to say that I offered to design and build an energy cannon for our government, but their engineers simply could not grasp the idea. They were so steeped in classical physics and mathematics as to be seemingly unable to comprehend these basic principles. They thought they had a better idea and went about creating something needing so much energy to power it that it was a complete disaster. Again, they simply could not grasp the significance of harmonic resonance and subsequently the value of standing waves.”

Tesla was reminiscing again and looking down. After a few moments he looked up and said, “Oh, that there was more time, but alas, let’s push on.”

A dull throb was building in the back of my skull as thoughts swirled around inside my head and I began to feel a bit nauseous. Tesla could see my discomfort and did something so unlike him that I was startled. He placed his hand on my shoulder and moved closely and speaking softly, “Look over my shoulder, behind me. Tell me what you see.”

Tesla never shook hands, he shunned human contact and now his hand on my shoulder was sending powerful pulses through me, as though the man were made of pure energy in some corporeal form. I did as he asked, and looked over his shoulder. It was as though I was looking through a tunnel with walls of electricity and at the far end was a laboratory, Tesla’s laboratory, the one in Colorado Springs. I don’t know why I knew that, I just did and he saw the look of realization on my face.

Tesla removed his hand from my shoulder and the tunnel collapsed with the view of the Colorado lab. Tesla sat back and spoke clearly and slowly to ensure I understood each word, “*Anytime* two transverse waves collide and create a standing wave, secondary waves are also involved. The waves emanating from each point of origin collide with the opposing waves and while it appears they are standing still as you saw in the saucepan, the energy of those waves is still moving. When you look at a string vibrating after being

plucked you ‘see’ the standing waves in the string and you also ‘hear’ the sound of the string vibrating at its resonant frequency. In the saucepan, you ‘saw’ the standing waves created by the collision, but there was nothing you could ‘hear’ and yet there was still energy moving. If we ignore the visually interesting aspects of the demonstration, whether the standing wave tea or the arcs of electricity in the air, and consider only the unseen energy at work I believe you will understand both why and how I am here tonight and why and how you could see my Colorado lab.”

Tesla gratefully paused to allow me time to absorb this and then moved on. “The energy of the colliding waves is neither cancelled nor accumulated, it is *exchanged*. The energy of the waves from the first point of origin is traveling towards the second point of origin, and conversely the energy from the second point of origin is traveling towards the first point of origin. When they collide and a standing wave is created, at every point of their intersection the energy can be exchanged and either continues in its forward movement or reverses and travels backwards to one of the two points of origin. Energy exchanged in this manner travels backwards in space and time to its own point of origin.”

Again, another much needed pause occurred and I asked Tesla, “If I understand correctly, you are saying the energy that left the first point of origin, for instance from your lab in Colorado Springs, collided with the energy from the second point of origin, say from NuTesla’s lab, and this caused an energy exchange and now we’re like those waves of tea standing still in the saucepan?”

Tesla’s face turned to a bright smile and he nearly chirped, “Precisely! You are transmitting a standing wave from your space and time and I too, am transmitting a standing wave from my space and time. The resonant frequencies of the two waves are identical and in phase. When they collided there was an energy exchange and I appeared in your lab. If someone were to observe us now we would appear to be motionless. Time has collapsed between these two standing waves and my appearance here and frankly your appearance in my lab is the resulting transverse wave created from the collision.”

Dumbfounded, I said, “That’s why you didn’t just tell me this when you first appeared.”

To which Tesla replied, “I’ve been sending this signal out for years, looking for someone in the future who had revived my discoveries of resonance and standing waves so I could complete my life’s work. I used to scan wide bands of energy hoping anyone might have caught on. After several years of nothing I realized harmonic resonance needs to accumulate, so I needed to settle on one frequency, one that would only collide with someone trying to heal not hurt. There are frequencies to heal and frequencies to kill and I selected one used to heal. And it had to be a Prime number in the Fibonacci sequence.”

Then I recalled I was testing a new frequency for my wellness instruments, a frequency that was both a Prime number and in the Fibonacci sequence, 28,657 Hertz. I had created a standing wave of the same frequency which collided with an identical standing wave generated a hundred years ago by Tesla. And as standing waves they had not diminished while traveling through time and space until encountering the other.

Tesla saw the look of realization on my face and spoke, “With that out of the way maybe now we can get down to the real reason I am here.”

This is the end of Part 3 of [Nikola Tesla Visits the 21st Century](#).