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The State of Electromagnetism During the Civil War
(A Confederate Colonel's Charge to His Men on the Precipice of Battle)

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Abstract. **On the eve of the Battle of Atlanta—Georgia, 21st July 1864—Colonel Sherburn, best known as the retired soldier who stared down a lynch mob in *The Adventures of Huckleberry Finn*, stands again in command, now leading a regiment in Walker's division. Bivouacked southeast of Atlanta awaiting nightfall orders, Sherburn, sensing the first tremors of a new technological dawn, addresses his soldiers in the falling twilight.**

"You boys know bravery. You march toward cannon fire. You bleed for this soil. But I'll tell you something you don't know—not because you're ignorant, but because most men, even the educated ones, are blind when staring straight into truth. They blink. They flinch. Scientists especially.

Now I heard tell of what them Germans did back in '55—Weber and Kohlrausch. They weren't just fiddlin' with sparks in a Leyden jar. They designed that experiment with purpose. They knew the ratio they were measurin'—between electrostatic and electrodynamic units—stood for a speed. A reducing speed, drawn straight from Weber's own force law, back in '46. The point where that pull starts to slacken—like hittin' escape speed from the bindin' hand of electric charge.

And make no mistake—this wasn't Benjamin Franklin with his kite in a thunderstorm. He drew electricity from the sky, sure enough. But these Germans? They pulled it from a jar in their shop—then measured it. Didn't guess. Didn't marvel. They pinned it down. Cold. Precise. Like a knife drawn across a map. Not a spark for spectacle, but a number pulled clean from nature's hidden law.

Yet they didn't go so far as to call it the speed of anything in the world. Why? Because the whole line of thinkin' was still under the shadow of Fechner's hypothesis. That idea from '45 that current is just oppositely charged particles movin' in opposite directions.

And I won't cast Fechner aside entirely. His view holds true—in electrolysis, where ions drift through solution with purpose. But when

you try to stretch that same picture onto a metal wire, it don't fit. That's where the thinking went foggy. Kirchhoff came along in '57. Sharp man. He reckoned it was the speed of electricity through a conductin' wire. Not the movement of anything real—just a ripple. A disturbance. Like sound rolling through air. Course, he didn't hit the bull's-eye—got mighty close to the target, though. And I'll tell you, that speed—it ain't the speed of particles bumpin' down a wire like cattle in a chute. No. It's the speed of the electric fluid itself. That fundamental fluid, deep and indivisible, old as God's first whisper, faster than any speck man's eyes ever tracked, older than any field equation.

But now here's the part that oughta make a man sit up and take note. Herr Kirchhoff looked at that ratio Weber and Kohlrausch measured—it wasn't just big. It was damn near the speed of light. And that meant somethin'. That ain't just chance knockin' on the door. It meant that electricity and light weren't strangers. They were kin. Cut from the same cloth.

But y'all want to hear about what's been brewin' across the sea — over in England. Maxwell. Smart Scotchman. See, he noticed how when you push two magnets together they fight, like mules with the same mind. Faraday, he said it was lines of magnetic force—and he meant it. But Maxwell? Maxwell didn't stop at seein' what was there—he dug. He didn't treat them lines like some notion just suspended in nothin' out yonder in empty space. No, sir. He looked at the space itself and said it was full of tiny whirlpools. Little circles, turnin' in the great ether that fills every corner of creation. You bring a magnet into it, then those whirls line up like smoke rings marchin' in step. And when it's two magnets with the same side facin' — that's when they shove off like dancers spun out by the same turn. That's centrifugal force at work, sure as steel.

Then here's where Maxwell hesitated, like all men do on the edge of a revelation. He saw the whirlpools don't die. They stay. Stable. Like angels locked in orbit. So he said to himself, *'There must be electric particles here too. Carriers. Anchors.'* But he didn't reckon what those particles really are.

Now I, Colonel Shadrack Sherburn, say to you—those ain't just particles. They are portals. Openings to the beyond. To where the power of God himself keeps the universe pinned together. And those

whirlpools? They are vortices within the electric fluid. But the fluid itself—the ether—it ain't made of particles. It's made of being. The true one. The potter's clay. The eternal sea. And those portals—*that's* where it comes through, and that's where it returns. The breathin' places of the world.

And here's where most folks get lost. They see the sea of tiny vortices and they think that *is* the ether. But it ain't. That's like mistaking the whirlpools for the ocean. The vortices are the structure. The turbulence. But the electric fluid itself—that's the medium beneath the medium. The one that carries all.

Meanwhile, Scotch as a thistle and twice as sharp, Maxwell pressed on. He took Weber's ratio—that speed of electric current—and tied it to what they call the dielectric coefficient. Said it had to do with how the electric particles move outta line—somewhere 'twixt straightenin' up and slidin' sideways, like they're stretchin' and shiftin' from where they oughta be. He said the whole thing had elasticity—like it could stretch and snap back again.

But he never saw the final stroke of his own genius. He didn't see he was linking the speed of electric current to the spin in them tiny whirlpools — 'cause in a changin' magnetic field, that electric fluid don't stay put in its own little eddy. It magnifies — it starts spillin' into the next. Jumps from one vortex to another, crossin' the gaps like a man leapin' creeks on horseback. That—*that's* your light. That's Maxwell's displacement current. Not just a wave rollin' through space, but a river—ridin' between the whirls, fast and sure as a rider over hills.

And mark me—soon, we'll control that overflow. We'll learn how to make it dance at will. Vary the frequency. Send messages through the air—no wires needed. Just oscillation. Just will. Just understanding. Soon enough, men will speak to each other across oceans, across battlefields, with no wires at all. I'll die tomorrow, maybe. You too. But that current—that river—will keep on flowing, eternal. Because it's not just electricity. It's the breath of God himself. And listen here — it ain't the speed of light settin' the pace for electric current. No sir. It's the other way 'round. The current itself, ridin' through them tiny whirlpools, dictates just how fast that light can move. The speed of light's just followin' its lead, plain as day.

So when you march into fire come morning, know this— the old world's already gone. And this war? It ain't the only one bein' fought. There's another. Between ignorance and truth. Between what men think they see... and what's really there."

Shadrack Sherburn steps back. The cicadas rasp. The night listens.

This speech was written with the assistance of artificial intelligence, specifically ChatGPT. The request was to present the message in the words of Mark Twain's fictional character, Colonel Sherburn, who appears in, ***"The Adventures of Huckleberry Finn"***.