

This Month's Stiff: Charles Proteus Steinmetz

Entered Mortal Coil: 9 April 1865

Assumed Room Temperature: 26 October 1923



The Mighty Midget

Good things often come in small packages. I'm sure we've all heard this old saying quite a few times. In this particular instance, Proteus immigrated to the United States on July 1, 1889, as a result of the repression of radical thinkers and writers in his former home of Breslau, Germany.

Steinmetz was only four feet tall. Apparently this was the result of a physical deformity acquired at birth, which he may have inherited from his father, Karl, who was also crippled. Steinmetz's middle name, Proteus, is also the Greek god of mythology who could assume any shape or size.

Steinmetz was a brilliant electrical engineer. A common problem around the turn of the century was that no one really fully understood how generators or electric motors worked in detail. Often, an electrical device was built with no definitive engineering design work being performed by the manufacturer. If the gadget ran well and didn't go boom, then it was marketed. However, this process was often hit or miss at best. Needless to say, the whole process had a lot of overhead built into it.

What Proteus did to help out with this sad state of electrical affairs was to codify and explain the laws governing alternating current via the use of complex numbers. During a seminal lecture given to the International Electrical Congress in 1893, Steinmetz explained his calculations and thoughts to a group of engineers, who basically had very little understanding of the material being presented. Proteus co-wrote a *"Theory and Calculation of Alternating Current Phenomena"* with Ernst J. Berg in 1897. The engineering world didn't digest this little tome either. The apparent problem at the time was that engineering schools were not requiring an adequate amount of

advanced mathematics instruction in their curriculums. Proteus met this problem head on, and wrote textbooks to educate the engineers so they could understand what in the heck he was talking about!!! The poor chaps didn't have the proper tools to begin with!



Albert Einstein and Steinmetz

Charles was a longtime employee of General Electric, and was considered a major asset to the company. Without Proteus' numerical calculations, it would have been impossible to construct the electrical generators at the first power plant in the United States, located at Niagara Falls. The modern power generation and distribution industry would not be what it is today without Proteus' pioneering work.

Steinmetz's other achievements included an explanation of the laws governing hysteresis in magnetic materials and the invention of the metal halide high-intensity discharge lamp, which is a ubiquitous "fixture" along our roadways. In all, the Mighty Midget held over 200 patents.

Proteus was a pugnacious individual, but he had a heart of gold. There is a story about Steinmetz that may not be true, but anyway it goes like this.....

"Here's an interesting anecdote, as told by Charles M. Vest, President of the Massachusetts Institute of Technology, during commencement on June 4th, 1999. "In the early years of this century, Steinmetz was brought to General Electric's facilities in Schenectady, New York. GE had encountered a performance problem with one of their huge electrical generators and had been absolutely unable to correct it. Steinmetz, a genius in his understanding of electromagnetic phenomena, was brought in as a consultant - not a very common occurrence in those days, as it would be now. Steinmetz also found the problem difficult to diagnose, but for some days he closeted himself with the generator, its engineering drawings, paper and pencil. At the end of this period, he emerged, confident that he knew how to correct the problem. After he departed, GE's engineers found a large "X" marked with chalk on the side of the generator casing. There also was a note instructing them to cut the casing open at that location and remove so many turns of wire from the stator. The generator would then function properly. And indeed it did. Steinmetz

was asked what his fee would be. Having no idea in the world what was appropriate, he replied with the absolutely unheard of answer that his fee was \$1000. Stunned, the GE bureaucracy then required him to submit a formally itemized invoice. They soon received it. It included two items: 1. Marking chalk "X" on side of generator: \$1. 2. Knowing where to mark chalk "X": \$999."

In his spare time, Proteus like to grow unusual plants in his greenhouse; the uglier the better. He was almost never seen without one of his favorite Blackstone panetella cigars. Another story about the inventor relates to his reaction to GE's new anti-smoking policy, to which he replied, "If the cigar goes, Steinmetz goes!"

Steinmetz never married. Apparently he was afraid he would pass his disability on to any offspring. However, children loved him, and he helped out those less fortunate than himself whenever possible. The man was genuinely loved by those who knew him.

Internet References:

<http://chem.ch.huji.ac.il/~eugeniik/history/steinmetz.html>

<http://inventors.about.com/library/inventors/blsteinmetz.htm>

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