**Coley's Toxins, and Questions of Reproducibility of Experimental Results:**

***Sarcomas***(=cancers of mesenchymal and other non-epithelial cell types), even when very advanced, have occasionally been ***cured by infection with certain pathogenic bacteria, or by injections with non-living extracts of the same species of bacteria***. This was discovered over 100 years ago and is known (for sure) to have cured a total of at least several hundred people. The mechanism is not known.

Such bacterial extracts intended to cure cancers are called "**Coley's Toxins**", in honor of a strong advocate of this method, and also his son. Although many unjustified claims have been posted on this subject, one very trustworthy researcher (Lloyd Old, MD), gathered hospital records sufficient to prove that hundreds of lives were saved by Coley himself, and that these included patients who had such advanced tumors that survival should have been impossible.

***Unfortunately, nobody has succeeded in discovering the mechanism of those cures. Nor are first rate scientists continuing the effort to find the mechanism***, and improve the percentages of patients who can be cured. Nearly everyone assumes that stimulation of the immune system must be how Coley's toxins work. Unjustified and untested assumptions will probably turn out to be major reasons why progress in this field has gradually come to a halt. Maybe members of this class can figure out possible explanations, both for the cures and for the lack of subsequent progress.

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**"Sometimes The Magic Works; Sometimes it Doesn't" Quote from a Dustin Hoffman movie**

**"Reproducibility" of Scientific Data**

To say that a scientific observation "can't be repeated" will be interpreted as meaning that the observation is at least false, and perhaps fraudulent. It is one of the worst accusations anybody can make. Indeed, "not reproducible" is often meant as a euphemism for "fake".

Nevertheless, it can happen that real phenomena are inherently inconsistent. Small differences in initial conditions, or other "boundary conditions" can consistently result in huge differences in end results. Thus, true results can be non-reproducible - especially if you don't know which particular variables a system is so sensitive to. I suspect and hope that the curative effects of Coley's Toxins will turn out to be "not repeatable" in this sense.

Going back to advanced mathematical predictions of planetary orbits in the late 1800s, much has been learned about the qualitative behavior of interacting systems. Digital computers greatly stimulated studies of this kind. Two related fields that have developed as results are called "Catastrophe Theory" (in the 1970s) and "Chaos Theory" in subsequent years. Although I wrote a series of desktop computer programs to demonstrate these subjects, these can no longer be run because of blockage of anything that operating systems suspect might be a virus. If you or anyone you know has the skills to get these programs working again, please get in touch with me. The university no longer employs any competent programmers.

Please read the following : **http://www.albertkharris.com/math\_2015.html**

as a start toward understanding how even very simple equations produce non-reproducible results.