



Greg Adamson

Technologists are problem solvers. We work out answers to questions (sometimes simple, sometimes difficult), and apply these to the world. But what sort of world do we live in? For more than a century we have known that this isn't the deterministic world of Sir Isaac Newton. It isn't a mechanical world in which each part moves in lock step with each other part. Our world is statistical.

IEEE-SSIT is concerned with the context of technology, including unexpected consequences. Some consequences are unexpected because the team working on the technology simply isn't aware of the possibility of those consequences (this is why multi-disciplinary teams are so important). To paraphrase Henri Poincare, in deterministic systems a small change in a cause yields only a small change in the result, while in a statistical system a small change can yield a result of any finite size.

I came across this reference while reading a 1924 article "Thoughts on earthquakes" by Torahiko Terada (1878-1935), a Japanese physicist, poet, and author, an

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Deterministic and Statistical Worlds

early pioneer of earthquake studies and the father of nonlinear physics in Japan (*Enjoying Torahiko in English*, Tom Gulley (trans.) 2013). Terada's writings intrigue me, because he asks how society can prepare for unexpected events. His approach is scientifically informed, locally specific, socially aware, multi-disciplinary, and multi-focussed in its solutions.

Terada uses a metaphor for addressing the unexpected: "Night comes every 24 hours, so it's no problem. But imagine what would happen if night fell suddenly, at irregular intervals, only once every 50 years or so. Indescribable chaos would likely occur, perhaps accompanied by heavy losses of life and property."

Terada's insights remind me of two other 20th century researchers, Prasanta Chandra Mahalanobis and Norbert Wiener. These three researchers all contributed signifi-

cantly to the technology and society field. By establishing the Indian Statistical Institute in Kolkata, Mahalanobis laid the basis for the role that IT has played in India's development. Wiener, founder of cybernetics (the "cyber" in everything) is considered the co-founder of information ethics for his 1947 statement, "A scientist rebels."

Technical discovery has a notoriously short timeframe. Smartphones can have a shelf-life of months or even weeks. Yet many of the key discoveries in the technology and society field of the past 100 years are still to be applied.

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