Editorial

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Johannes Kepler is one of the unsung heroes of the scientific revolution in the seventeenth century that ushered the age of modern science. His work is often reduced to three prosaic laws of planetary orbits, that lacks the glamour compared to the works of Galileo and Copernicus in the public eye. Even during his lifetime, he received far less attention than he deserved: he died a pauper and was buried in a common grave.

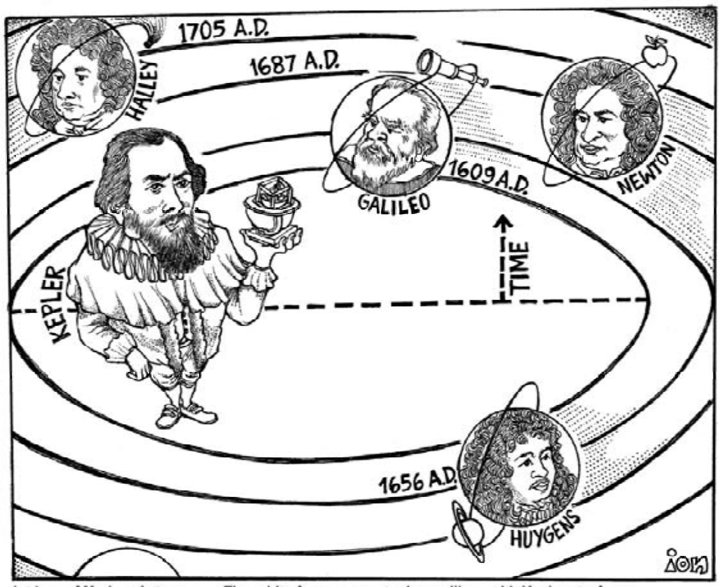
Yet this was the person who truly represented the spirit of modern science, and one could argue, even more than Galielo. Much before Galileo's peering through his telescope, Kepler had started the painstaking work of analysing the observations of Mars. He had at his disposal the most accurate data available at that time, taken by a careful observer, Tycho Brahe, and it was accurate to about an arcminute (one sixtieth of a degree). For nine years he tried fitting the data with circular orbits but he found a discrepancy of about eight arcminutes. It was a rather small difference, and Kepler could have easily ignored it. But he was scrupulous about the data, and argued that the discrepancy was too large to be explained away by errors in the measurements. And it was this stubbornness about details of data, and not some grand philosophical ideas, that gave birth to modern science. He found that he had to discard the notion of circular orbits and wrote about his new ideas in a book in 1609, the year Galileo also looked through his telescope.

History of science is replete with many such examples of scientists being stubborn and sticking to the facts in the face of dogmatic views that would rather explain the facts as some aberration. Darwin's insistence that the living creatures of Galapagos told a different story than the existing lore, or in Lavoisier's insistence that careful measurements of weights of chemical substances undergoing reactions are more important than qualitative descriptions, form the cornerstones of modern science. In this regard, Kepler was a pioneer.

Kepler was not a mere calculator of orbits. When he heard of Galileo's telescope, he tried to improve upon its design, and within a year came up with an innovation that has become standard textbook affair now. Galileo's telescope had a concave and a convex lens, and suffered from a serious drawback that its 'field of view' was very small. Kepler's design (with two convex lenses) helped increase the field of view and enhanced its capabilities. As it turns out (and explained in one of the articles appearing this issue of *Resonance*), Kepler attempted to explain his laws with a law of gravitation (which had to wait half a century until Newton perfected it), and was the first person to use the concept of 'inertia' in dynamics.

Kepler was also rather disappointed by Galileo's recanting in front of the papal court, and suggested that perhaps Galileo should come to Germany if the catholic church continued to harass him. In a letter to Galileo, he wrote: "I could only have wished that you, who have so profound an insight, would choose another way."

We pay homage to this extraordinary scientist in this issue. Apart from a biographical sketch, there is an article on the evolution of the ideas of dynamics from Galileo to Newton who finally explained Kepler's laws of planetary orbits. This issue also marks the end of our two-year long series, 'Snippets in Physics', with an article on an interesting aspect of Kepler's laws.



1st Law of Modern Astronomy : The orbit of every new star is an ellipse with Kepler at a focus