

Editorial

G K Ananthasuresh, Editor

When we are asked to name a great scientist, many names quickly come to mind. There may even be universal agreement on a few names. More importantly, we can also associate a fundamental discovery with the name of a great scientist. What if we are asked to name a great engineer? Indians might say Mokshagundam Visvesvaraya; the English might say Marc Brunel and Isambard Brunel; continental Europeans might say Gustave Eiffel; and Americans might say Nikola Tesla. Not many of these have universal appeal beyond the confines of the geographical boundaries where they lived. We can add more names that befit this list: James Watt, George Stephenson, Guglielmo Marconi, Alexander Graham Bell, Thomas Alva Edison, John Baird, the three inventors of the transistor, and many, many more.



suresh@mecheng.iisc.ernet.in

All the above names have well-known physical entities associated with them. So, it appears that engineers ought to have created colossal structures or invented products of universal appeal and utility to reckon them as great. Some inventors got mixed with engineers in the list above. Some scientists, physicists in particular, appear in the list as inventors; e.g., John Bardeen, William Shockley, and Walter Brattain who invented the transistor were awarded the Nobel Prize in Physics. A scientist who has a great invention to his/her credit may be called a great engineer. An accomplished inventor may be called an engineer too.

Many, if not all, aforementioned great 'engineers' were actually great inventors or innovators. Some, like Mokshagundam Visvesvaraya, Isambard Brunel, and Gustave Eiffel, were acclaimed practitioners of the engineering profession and did not have a major invention that can be readily associated with their names. Their contributions were relevant in their times and some

A scientist who has a great invention to his/her credit may be called a great engineer. An accomplished inventor may be called an engineer too.



continue to be relevant today. But the body of knowledge that they possessed or created is not necessarily passed on or taught to the future generations as it is done in the case of scientists. How many of us know today what principles John Harrison, the English clock-maker, had used to build the most perfect mechanical clock that was the need of the hour in his time? He had solved a problem that had eluded many great individuals of his time, including some scientists.

In the spectrum of scientists, engineers, and inventors lies, straddled somewhere in between, another category of engineering scientists or academics who conduct research in engineering. Most research universities today have as many, if not more, engineering departments as science departments. In fact, it has been that way ever since engineering departments came into existence and grew. When we look for great engineering scientists, we often end up identifying individuals who can be better described as scientists. Occasionally, we also find some engineering academics who may be called inventors. What then can be described as a truly great contribution of an engineering scientist? It may often be the body of work that may count as the contribution rather than a singular invention or a discovery.

The essence of research in engineering appears to be distilling the scientific discoveries and transferring them to practical applications. Interpreting science and exploring its utility in practice is far from trivial. Developing methods and devices too is not straightforward. System integration, the process of putting relevant things together, is actually one of the most difficult things in taking research outcome to practice. But these tasks are less likely to be perceived as major intellectual contributions. More interestingly, it is also difficult to succinctly describe the results of engineering research to those who are not well versed with science and technology. The society perceives an engineer as someone who builds and fixes things and a scientist as someone who tries to understand natural phenomena to formulate theories that were not known before. An engineering scientist then has to do both. Excellence and a lasting contribution in either will only earn him/her the title of an inventor/innovator or a scientist! In this issue, we present a distinguished engineering scientist, G K Batchelor. He was an applied mathematician who studied some of the many complex problems in fluid mechanics. His influence, as eloquently described in two articles in this issue, on education and research in fluid mechanics is immense. Great contributions can also come in the form of great books. Batchelor's book, *An Introduction to Fluid Dynamics*, remains his everlasting contribution to engineering and science.

