

Satish Dhawan

In the mid-1950's, Satish Dhawan was a handsome and dashing young professor at the Department of Aeronautical Engineering in the Indian Institute of Science (IISc). He drove a trendy sports car, wore a red shirt and a broad smile [1], and built India's first supersonic tunnels. Earlier, in 1947-51, he was a researcher at Guggenheim Lab (GALCIT) of the California Institute of Technology (Caltech) who toggled between aeronautics and Shakespeare and even managed to defeat his PhD supervisor (Hans Liepmann) at ping-pong (by being "a crafty Asiatic" [2]).

Dhawan went to Caltech with degrees in science, engineering and English literature. His doctoral work at Caltech, to directly measure skin friction, was widely hailed. His work with Anatol Roshko, on the design and construction of an ingenious flexible nozzle for research in supersonic flows, was equally inspired (Liepmann describes it as "an example of ingenuity substituting large amounts of grant money"). Dhawan also won many friends at Caltech with his amiable disposition and charming manners. S R Valluri, who was one of Dhawan's many friends during 1949-51, recalls how his GALCIT colleagues refused to erase Dhawan's blackboard scribbles even after Dhawan left GALCIT [3].

At IISc, Dhawan came like a whiff of fresh air. His youth, freshness and Californian informality "captivated students and colleagues" [1]. Dhawan made more friends and influenced a wide cross-section of people. He also started becoming a natural mentor to his younger colleagues (notably Roddam Narasimha) and showed unusual maturity in judging both scientific and human problems (something that Liepmann had already noted in Caltech). It therefore came as no surprise when he became Director, IISc in 1962 at the age of 42.

Dhawan proved to be an exceptionally successful and durable Director (he was Director till 1981) and largely responsible for making IISc the "multifaceted institution of excellence in higher science education and research that it is today" [4]. He also managed to find the time to continue his work in aeronautics – although it would seem that meaningful technology, rather than papers in scientific journals, was now his real love. In fact, Dhawan's R&D philosophy always stressed on *low cost* ("ingenuity, not big money") and *industrial or social relevance*.

Dhawan was spending a sabbatical year at Caltech in 1971-72 when he suddenly received a call from the Prime Minister's Office asking him to take over as the Head of India's space programme following Vikram Sarabhai's unexpected and shocking death. Dhawan clearly didn't enjoy the interruption and put conditions that must have really angered New Delhi's bureaucrats: "I will continue to be Director, IISc and I will only run the Department of Space from Bangalore", he insisted. Indira Gandhi – she was a shrewd lady! – agreed to all these conditions immediately. "I couldn't refuse the PM after that", Dhawan told Valluri as he returned to India to take up this new challenge.

Dhawan's leadership of India's space programme would probably be rated as his finest contribution to the nation. President A P J Abdul Kalam [5] is fond of recounting how Dhawan converted Sarabhai's 'vision' into an outstanding national 'mission'. The President has another heart-warming story about how Dhawan accepted all the blame for the SLV-3's first failure ("We have tumbled, but not fallen flat", Dhawan re-assured him after the first setback) but gave him all the credit for SLV-3's subsequent success.

But this really is what Satish Dhawan was all about. He was a magnanimous and towering leader, and one of India's greatest sons. While Dhawan did get his share of acclaim and awards (he was awarded the Padma Vibhushan in 1981 and elected to the US National Academy of Engineering), I believe that not enough Indians appreciate the true import of Dhawan's contributions. Dhawan of course didn't care about all this. When he received another award in his last years, he asked: "What have I done to deserve this honour?"

Dhawan was a humanist to the core. He held the firm view that science and technology must ultimately serve the country and its people. Dhawan was also perhaps India's first champion of numerical weather prediction. Liepmann writes that Dhawan often talked about how "accurate weather prediction could improve India's economy decisively". Expensive or esoteric R&D programmes, on the other hand, didn't amuse Dhawan too much; I remember an angry outburst – he could get quite angry sometimes – at National Aerospace Laboratories (NAL) when he asked what was the use of technology if it didn't serve the common man. Dhawan was also the "widely accepted moral and social conscience of the scientific community" [1]. Indeed, for many, the ultimate question to ask before commencing any new project or endeavour was: "Would Dhawan approve?" [3].

After retirement, Dhawan became a gracious and affectionate elder with a special fondness for NAL. He had worked with NAL teams during the Avro (HS-748) aircraft investigations in the 1970's; and, in the 1980's, he strongly urged NAL to champion the country's civil aviation programme. He could be very forceful and demanding, and yet articulate his viewpoint with great charm and wit (he once remarked that, without a suitable aircraft development

programme, NAL was like a "beautifully decked up bride with nowhere to go"). Dhawan would have been delighted with NAL's progress on the SARAS programme although he would have felt uncomfortable when told that the first aircraft was to be named after him (VT-XSD).

Dhawan loved birds. He once wrote: "Whenever my work related to the country's space programme became a little taxing, I went to see the birds of SHAR – and came back feeling happy and invigorated". In the late 1980's, Dhawan delivered a series of remarkable lectures on bird flight; in fact, the only authoritative monograph that Dhawan ever found time to write was about bird flight. I had the pleasure of assisting him in the publication of this monograph and found him to be a very charming and uncomplicated gentleman. When I asked him, in all earnestness, what typeface and design scheme I must use, he told me: "Just choose what you think is right, but make sure that there's a photograph of Salim Ali somewhere. He was a great Indian".

Satish Dhawan, another truly great Indian, passed away on 3 January 2002, at the age of 81.

Suggested Reading

- [1] **Roddam Narasimha, Prof Satish Dhawan**, <http://www.iisc.ernet.in/nias/sdhanan.htm>
- [2] **Hans Liepmann, Remembering Satish Dhawan**, <http://pr.caltech.edu/periodicals/EandS/articles/LXV4/jobituaries.html>
- [3] **S R Valluri, Would Satish approve?** in *Satish Dhawan: A cherished association with NAL*. March 2002.
- [4] **R Ramachandran, A visionary scientist**, *Frontline* 19(2), Jan 19 – Feb 01, 20025.
- [5] **A P J Abdul Kalam, Vision and leadership** – http://presidentofindia.nic.in/S/html/speeches/others/nov18_2002_4.htm

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