



*“The brave women I knew have grown old.
Each was like a tree, or like a lighthouse,
Or like a gull circling the lighthouse,
Or like a dolphin circling the gull,
Who circles the lighthouse
As my thoughts circle inadvertently.”*

- Tribute to Anna Mani by Suniti Namjoshi

In the 1950’s when Homi Bhabha was setting up the infrastructure for atomic energy Anna Mani’s feminist sensibilities were searching for solar and wind energy. Mani made sterling contributions to the development of meteorology in Independent India.



Anna Modayil Mani was born on 23 August 1918 in Peermedu in Kerala. Her father owned a large cardamom estate. Despite his Syrian Christian ancestry, he was a staunch agnostic. Anna was fond of books and by the time she was twelve she had lapped up just about every book in the local library. On her eighth birthday she declined a set of diamond earrings and opted instead for the *Encyclopaedia Britannica*.

Books opened up a new world and imbued her with a sense of social justice. Gandhi’s visit to her

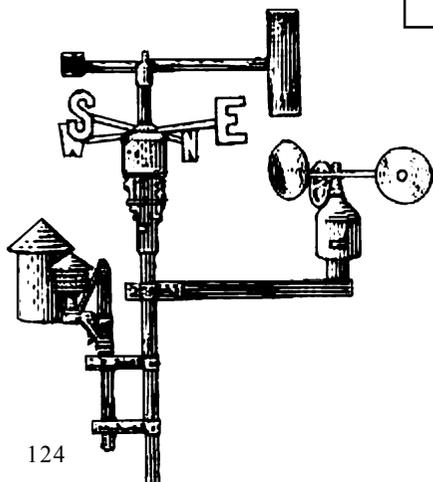
hometown in 1925 had a deep impact on Anna. Instead of marrying early like her sisters she opted for higher education. She wore *khadi* all her life.

Anna wanted to study medicine, but then decided in favour of physics because she was good at it. She took an honours degree in physics from the Presidency College, Madras. During her college days she was drawn to socialist ideas. In 1940, she won a scholarship to do research at the Indian Institute of Science, Bangalore under C. V. Raman. Here she worked on the spectroscopy of diamonds and rubies recording their fluorescence, absorption etc. She had to expose photographic plates for 16-20 hours so she often slept in the lab! She wrote five research papers on the luminescence of diamonds. In 1945 she submitted her PhD dissertation to the Madras University. As she lacked a master's degree she was denied the PhD which she so rightly deserved. Fortunately, the lack of a paper PhD never deterred her.

Subsequently, she was awarded a government scholarship for an internship in England. In 1945, Anna Mani went on a troop ship to the Imperial College, London to pursue physics, but landed up specializing in meteorological instrumentation. Here she studied weather instruments, their calibration and standardization procedures.

In 1913, the year of Mani's birth, the literacy rate for women in India stood at less than 1 percent. The total number of women enrolled in colleges was less than one thousand. Even in 1930, when Mani went to college, opportunities for women to pursue science were very limited. There was a consensus at that time that education for women should be tailored to their particular roles as mothers and homemakers.

Independent India offered ample opportunities and Mani seized the challenges. In 1948, she joined the Indian Meteorology Department (IMD) at Pune in the Instruments Division then headed by S. P. Venkiteshwaran, a visionary with boundless energy. Before 1947, even simple meteorological instruments like thermometers and barometers

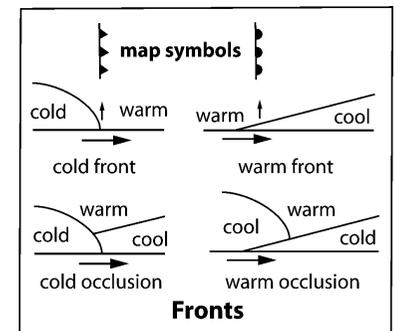


were imported. Being a nationalist Venkiteshwaran wanted to make them in India. He set up a workshop with precision machines to manufacture simple instruments like rain gauges, evaporimeters, thermometers, anemometers, wind vanes etc. He initiated the development of self-recording instruments like thermographs, hydrographs etc. Anna Mani was inspired by all this and wanted to use her newly acquired expertise and her dreams to make India self-sufficient in weather instruments in the shortest possible time.

This was not very easy as skilled human power to operate sophisticated machines was not available. She had to make do with what was available. She inspired the 121 men under her to put in their best. *'Find a better way to do it!'* was her motto. She never compromised quantity for quality. It was a period of intense activity and soon she assembled a core group of Indian scientists and engineers to carry on the task.

Anna Mani standardised the drawings for nearly 100 different weather instruments and started their production. She was deeply interested in solar energy as an alternate source for a tropical country like India. However, data on seasonal and geographic distribution of solar energy in India was limited. During the International Geophysical Year (1957-58) she set up a network of stations in India to measure solar radiation. Initially, only imported equipment was used but soon Mani undertook the design and manufacture of a whole range of radiation instruments.

Mani believed that wrong measurements were worse than no measurements. She insisted on proper design and accurate calibration of all apparatus. In 1960, she started studying *ozone* – when the word was not so famous. The vital role played by ozone in shielding all life forms on earth came to light only two decades later! She undertook the development of an apparatus to measure ozone – *ozonesonde*. This enabled India to collect



very reliable data on ozone. Because of Mani's singular contribution she was made a member of the International Ozone Commission.



In 1963, at the request of Vikram Sarabhai she successfully set up a meteorological observatory and an instrumentation tower at the Thumba rocket launching facility. Anna Mani retired as the Deputy Director-General of Indian Meteorological Department in 1976. Later she set up a millimetre-wave telescope at Nandi Hills, Bangalore. Her two books *Handbook of Solar Radiation Data for India* (1980) and *Solar Radiation over India* (1981) have become standard reference guides for engineers engaged in solar thermal systems. As a visionary she realized the wind energy potential for India and organized round the year wind measurements from over 700 sites using state-of-art equipment. Today as India takes a lead in setting up wind farms across the country, part of the credit goes to Anna Mani.

For several years Mani headed a small private enterprise in Bangalore which manufactured instruments for measuring wind speed and solar energy. Mani never married. She was passionate about nature and loved trekking, and bird watching. She was a member of many scholarly academies – Indian National Science Academy, American Meteorological Society, and the International Solar Energy Society etc. She received the INSA K. R. Ramanathan Medal (1987). In 1994 she suffered from a stroke which left her immobilised for the rest of her life. She passed away on 16 August 2001 in Thiruvananthapuram.