

## Fred L. Whipple

Fred Lawrence Whipple, one of the last giants of 20 century astronomy, passed away on 30 August at the age of 97 following prolonged illness. He was Phillips Professor of Astronomy Emeritus at Harvard University and a Senior Physicist at Smithsonian Astrophysical Observatory (SAO). 'Fred Whipple was one of those rare individuals who affected our lives in many ways. He predicted the coming age of satellites, he revolutionized the study of comets and as Director of the SAO, he helped form the Harvard-Smithsonian Center for Astrophysics', says Charles Alcock, present Director of the Center.

A discoverer of six comets, Whipple is best known for his comet research. Five decades ago, he suggested that comets were 'icy conglomerates', what the press called 'dirty snowballs'. His dirty snowball theory caught the imagination of the public even as it revolutionized comet science.

Never one to limit his work to one area of research, Whipple also contributed to more earthly challenges. During the World War II, Whipple co-invented a cutting device that converted lumps of tinfoil into thousands of fragments known as chaff. Allied aircraft would release chaff to confuse enemy radar. Whipple was particularly proud of this invention, for which President Truman awarded him a Certificate of Merit in 1948.

Whipple and a handful of other scientists had the foresight to envision the era of artificial satellites. Only Whipple had both the imagination and the managerial skill to organize a worldwide network of amateur astronomers to track these, then hypothetical objects and to determine their orbits. When *Sputnik I* was successfully launched on 4 October 1957, Whipple's group was the only one prepared to track the satellite. Cambridge became a nerve center of the earliest part of the space age. Later, SAO successfully developed an optical tracking system for satellites using a network of Baker-Nunn cameras. For his work on the network, Whipple received the Distinguished Federal Civilian Service award from President John F. Kennedy in 1963.

In 1946 Whipple married Babette F. Samuelson, by whom he had two daughters, Sandra and Laura. He also had a son, Earle Raymond, by his first marriage.

I visited the USA for the first time in 1967 as the first Donald Menzel Fellow to carry out post-doctoral work with Menzel

at the Harvard Observatory. On my arrival there Menzel introduced me to Whipple and then through Mrs. Menzel, Babette Whipple. I must have appeared a rather helpless, confused young woman; the kind-hearted Whipples announced that I should treat them as my 'American Parents' and not feel lonely in America. Then started the best year in my life and a long-lasting relationship with the Whipples. Every Sunday I joined the family for lunch.



The author with Whipples at their residence in Belmont in 1968.

Looking back on that year with a 'matured' view, I have realized what an honour it was for me to be made part of a most distinguished and large-hearted American family. We held long discussions on many a Sunday on Plasmas as Fred was very sure that Plasma Physics would find answers to many astrophysical problems, especially to cometary phenomena and I used to tell him jokingly that Harvard Observatory was trying to 'do' astrophysics without the physics of the most prevalent matter in the Universe! Much to my regret, during those fifty-odd Sundays I met Fred Whipple I never brought up the topic of Space Weather, a subject which is of great current interest in space physics. 'Space Weather', a recently coined phrase referring to the understanding of the effect of solar-terrestrial system on human technical systems, placed on the ground or in space, has a long history. Nearly six decades ago, in 1946, Whipple, then a consultant to the project RAND funded by the Douglas Aircraft Company, did pioneering work on the possible hazards to satellite vehicles from meteorites. Much before the dawn of the Space Age, he cautioned scientists and technical men about the impact of meteor showers and magnetic storms that arise during solar

maximum period on satellite vehicles. He was a scientist with a vision.

When I asked him once whether women and men as scientists were equal or not, he agreed about the equality but added that the only trouble is that women want to do too much. This statement, though may not appear to be profound, did help me when I had to play the role of wife, mother, housewife and an active scientist.

On one occasion he was reminiscing about his childhood and told me how he grew up in a farm in a joint extended family that included his father's brother and his wife. He was the only child in the family and was, naturally, pampered and spoilt. He laughed in his characteristic low-laugh way and told me, 'Chanchal, to be a successful creative scientist you are to be cared for and be a pampered child'. Today, we know that creativity does require a childhood spent in a loving extended family. He and Babbie saw to it that all members of his extended family (including me) took part in social events that took place in their home.

After my return to India, keeping up the bond of love established between the Whipples and me, I sent my wedding invitation to them in 1969. Promptly they wrote asking me whether they could send any specific gift on the occasion, like any parent would of a daughter. I knew what I wanted! Whipple was writing a book on the Moon; the USA had just put the first historic step on the Moon. So my choice was the book co-authored by him with Wernher von Braun and Silvio Badini. I have this prized gift autographed by Fred and Babbie in my library at home.

My subsequent occasional visits to the Harvard Observatory were made as homecoming, both by the Menzels and the Whipples. I always had a home at Belmont and on a few occasions I stayed with them too. During all these visits I met Fred and enjoyed talking to him. The last time, I along with my husband, met Whipple was in 1998. I shall always miss my 'American Father' or, as we way in Sanskrit, my 'Dharma Pita'.

CHANCHAL UBEROI

Department Mathematics,  
Indian Institute of Science,  
Bangalore 560 012, India  
e-mail: cuberoi@math.iisc.ernet.in