

URSULA MARVIN

August 20, 1921 – February 12, 2018

Those of us who have been in the Society more than 10 years will remember Ursula Marvin as a vibrant and enthusiastic member of the society who loved what she did and enjoyed the friendships it brought her (Fig. 1). She was one of the first researchers to discuss the Allende meteorite and its fascinating refractory inclusions, and she made important contributions to the study of lunar samples and to collecting and describing Antarctic meteorites. She also made unique contributions to recording the history of The Meteoritical Society and to the history of meteorite research. Ursula passed away on February 12th, 2018, at the age of 96.



Fig. 1. Ursula Marvin in 1993.

Ursula Marvin was born in Bradford, Vermont. She majored in history as an undergraduate student at Tufts University. However, she was required to take two years of science subjects so she started with biology and then moved on to geology. “It lit a fire”, she said. What fascinated her most were the lectures of Robert L. Nichols, head of the science department and a well-known Antarctic geographer. Having grown up in rural Vermont, with its beautiful towering mountains, it was not difficult to be fascinated by Nichols’ lectures. Geology was beginning to hold great appeal. However, Nichols would not consider a request from Ursula to change majors. Geology was a man’s subject, he claimed; women could not do geology. So a history major it was. Ursula soon found that she was free to take as many geology courses as she wanted, even though it lengthened her undergraduate program. Mineralogy, petrology, mapping, and so on, and she included some courses in mathematics. In 1943, at the age of 22, she graduated and, with encouragement from Katherine Billings, who taught at Tufts and was

married to Marland Billings, head of geology at Harvard, she applied for and won a Folsom Scholarship to study geology at Radcliffe College. Working mostly at Harvard, she earned a master's degree in geology in 1946.

Upon graduating from Radcliffe, Ursula obtained a position as an assistant to Julian Goldsmith in the geology department of Northwestern University. Her topic was the optical mineralogy of synthetic feldspars and understanding their structure. Ursula published her first two papers in the *Journal of Geology* in 1950¹. Her reason for choosing Northwestern was that her husband was enrolled in dental school, however when he completed his course the two returned to Massachusetts. The couple almost immediately split up. Back at Harvard and working with Cliff Frondel on meteorites, she met Tom Marvin, a mining geologist and fellow PhD candidate, and in 1952 the two not only decided to marry but to spend two years in Brazil and Angola in search of ore deposits. They very much enjoyed this phase of their lives, traveling off-road, under the tree cover, and negotiating the many termite hills. After two years they toured through war-torn Europe and returned to the U.S. on the M.S. Stockholm, famous for its role in sinking the Andrea Doria.

Tom and Ursula expected to continue their PhD studies, with Ursula working with Clifford Frondel on the Lawrence Smith meteorite collection². The meteorite collection had recently narrowly escaped being donated to the Smithsonian. Instead, Fred Whipple invited Ursula to join the research staff of the Smithsonian Astrophysical Observatory, which had just moved from Washington, D.C., to Harvard. She became a civil servant a few years later and lost interest in obtaining a Ph.D. Discoveries flowed like water and soon Ursula published her first meteorite paper on a cristabolite inclusion in an iron meteorite³ and the mineralogy of recovered fragments of the Sputnik 4 spacecraft⁴.

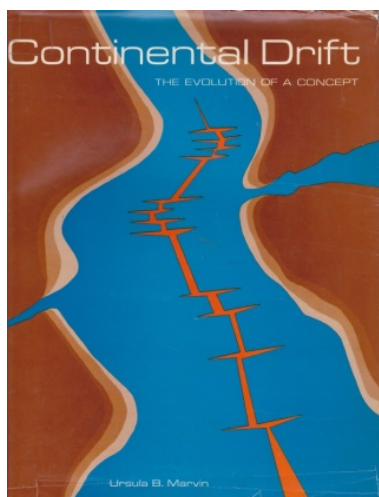


Fig. 2. Published originally as an SAO special report, Ursula's first sortie into writing history was a book on continental drift published in 1973 by the Smithsonian Institution.

Throughout the sixties the Harvard-SAO ran a series of summer seminars that Ursula attended. At one point she was asked to contribute a lecture on crustal movements around the rift valley in East Africa. After considerable reading, Ursula was able to make a presentation on the history of continental drift that led to an SAO publication in 1966. A few years later, she was asked by the Smithsonian Press to write a book and this appeared in 1973 (Fig. 2)⁵. Ursula was also asked to write a children's edition which to her lasting regret she declined.



Fig. 3. The SAO research group in 1971. From left to right, John Wood, Ursula Marvin, John Reid, Janice Bower and Jeff Taylor. (From <http://home.earthlink.net/~jawood> courtesy of John Wood).



Fig. 4. Fragments (immersed in oil) from the Allende meteorite, showing octohedra of spinel embedded in a Ca,Al-rich glass. (Refractive index 1.646). (Marvin et al., 1970).

The 1960s and 1970s were very productive years for Ursula and the SAO group. It was a happy group of up to about 10 people; a group photograph was an annual event (Fig. 3). As 1969 approached, Frances Bosch, head of the geophysics department at Harvard, asked Ursula for a stack of her papers and on the basis of these Ursula was awarded a Ph.D. Soon afterwards Ursula published the first paper on the Allende meteorite co-authored with John Wood⁶. The paper reported on unusual glass inclusions and, of course, the famous refractory inclusions (Fig. 4).

When the Apollo 11 samples were brought to Earth the Harvard-SAO group requested soil, which Wood thought would better represent the Moon as a whole better than the large rocks. Sure enough, the anorthites were found which ultimately gave rise to the idea that the Moon was once covered with an anorthositic magma ocean. The group went on to work on all the returned lunar samples, the six Apollo sites and three Luna sites, describing the mineralogy and petrology of the samples and comparing the various sites.⁷

Ursula was very fond of The Meteoritical Society and cared much about its well-being. For the 1975-1976 term she served as President and during her term the society met at Tours, France, and Bethlehem, Pennsylvania. Many important issues were dealt with during her presidency, such as breaking the Society's ties with the AAAS, renegotiating a contract with Pergamon for the publication of GCA, the role of the Society in advocating NASA missions, and the relative roles of the local organizing committee and the Society in running annual meetings. Some of these issues were very difficult to deal with and others somewhat emotionally charged, so Ursula's management abilities were most welcome by all concerned.



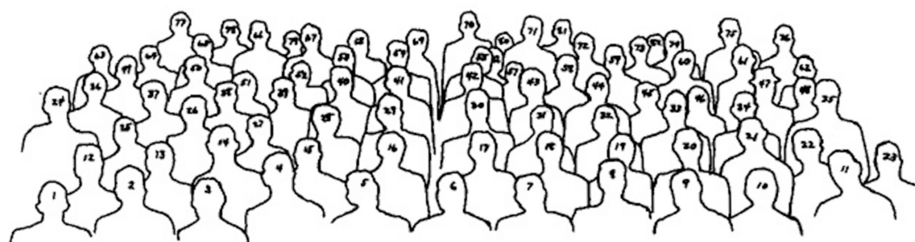
Fig. 5. Ursula in the 1980s trying on somewhat oversized attire for Antarctic meteorite hunting.

Ursula participated in the 1980, 1981 and 1982 U.S. Antarctic meteorite expeditions (Fig. 5). In 1969, an important year for our field, a Japanese team found meteorites in the Yamato Mountains, officially Queen Maud Land. Bill Cassidy wrote three proposals to the NSF for US teams to search for meteorites but it was only in 1976, after the Japanese brought back 600 meteorites, that he was successful. Ursula was part of the group that found the first meteorite from the Moon in Antarctica⁸. She was also asked to serve on an NSF advisory board for Antarctic meteorites and she edited three issues of the *Smithsonian Contributions to Earth Sciences* describing the discovered meteorites⁹. A few years later Ursula went to Antarctica again to visit the K-T boundary on Seymour Island. It was an interesting trip but scientifically frustrating because when the sample boxes were opened they were empty. Thieves had raided the boxes looking for valuables.

In the 1990s Ursula's interests returned to history and she produced a series of well-researched and beautifully written articles. After visiting the archives at Strasbourg and Ensisheim with Tom, she produced a paper on the Ensisheim meteorite¹⁰. She followed up with articles on Chladni¹¹, Troili¹² and published a series of history articles on more general topics¹³. She also tackled the history of The Meteoritical Society, first in presentations at the Mainz meeting in 1983 and the Newcastle upon Tyne meeting in 1987 and then in a 53-page article in *Meteoritics* in 1993¹⁴. This required raiding the Society's archives, then at the Center for Meteorite Studies in Arizona State University, Tempe, and consulting people such as Harvey Nininger and Edward Anders. There can be few societies the size of The Meteoritical Society with its history documented so well (Fig. 6). These history publications led to Ursula becoming an active participant of the International Commission on the History of Geological Sciences.

Table 1. Oral Histories published in *Meteoritics* and *Planetary Science*

No.	Subject	Volume	Pages	Year
I	Edward Anders	36	A255-A267	2001
II	Robert N. Clayton	36	A269-A274	2001
III	Robert M. Walker	36	A275-A283	2001
IV	James R. Arnold	36	A285-A292	2001
V	Brian Mason	37	B35-B45	2002
VI	Stuart Ross Taylor	37	B47-B56	2002
VII	Alastair G. W. Cameron	37	B57-B67	2002
VIII	Friedrich Begemann	37	B69-B77	2002
IX	Heinrich Wänke	37	B79-B88	2002
X	Ralph B. Baldwin	39	A163-A175	2003
XI	Masatake Honda	39	A177-A187	2003
XII	Gerald J. Wasserburg	39	A187-A197	2004
XIII	Fred L. Whipple	39	A199-A213	2004



Key to Group Photograph

1. James Short	17. Ronald A. Ortti	33. Gerald R. Rowland	50. Louis S. Walter	67. Ralph A. Hall
2. Klaus Kell	18. Robert C. Wrigley	34. Charles F. Lewis	51. Frances W. Wright	68. Clay P. Butler
3. Ursula B. Marvin	19. Richard Barringer	35. Elbert A. King, Jr.	52. S. R. Taylor	69. Robin Brett
4. Edward Anders	20. John A. Russell	36. John T. Wasson	53. Ian Halliday	70. Roy S. Clarke, Jr.
5. E. P. Henderson	21. J. L. McCall	37. Howard J. Axon	54. J. A. V. Douglas	71. Dean R. Chapman
6. Harold C. Urey	22. Max H. Hey	38. William D. Ehmann	55. George W. Reed, Jr.	72. Edward C. T. Chao
7. Oscar E. Monnig	23. R. D. Buchheit	39. James Tanner	56. Edwin D. Friton	73. James C. Cobb
8. Carleton B. Moore	24. John A. Wood	40. J. Paul Barringer	57. Dieter Heymann	74. Truman P. Kohman
9. Joseph I. Goldstein	25. Milton Blander	41. Brandon Barringer	58. H. Wänke	75. Donald E. Gault
10. William F. Read	26. E. Mazor	42. H. G. Fales	59. Kurt Marti	76. Peter R. Buseck
11. Robert E. Oigivie	27. Joseph A. Nelen	43. Esther L. Sprengel-Segel	60. Frank Cottitta	77. Edward Olsen
12. Harry Grahl	28. Roland G. Ostic	44. Thomas E. Allen	61. Robert L. Darnel	78. Glenn I. Huss
13. J. Larimer	29. Robert S. Dietz	45. Frank Dachs	62. Theodore E. Bunch	79. H. H. Nininger
14. W. R. VanSchmus	30. Kenneth G. Snetsinger	46.	63. Brian H. Mason	80. Reed Knox, Jr.
15. Eugene Jarosewich	31. Von Del Chamberlain	47. Allan O. Kelly	64. Louis H. Fuchs	81. George Baker
16. Ananda Dube	32. Armand Yramategui	48. Robert W. Dondon	65.	82. Clifford Frondel
		49. M. Abdel-Gawad	66. Philip J. Cressy, Jr.	

Fig. 6. The Meteoritical Society in 1966 taken from Ursula's article on the history of the society. (From Marvin, 1993).

Ursula also published a series of thirteen oral histories of prominent people in the field (Table 1). Her criterion for selecting participants was that they should have received the Leonard Medal or the Barringer Award of The Meteoritical Society. With her charm and enthusiasm she had no difficulty in finding interviewees, and inevitably there were some interesting moments. Bob Walker wanted to pull out when he learned that one of the journal reviewers thought his was "too conversational", but went ahead when the reviewer was made known to him. Heinrich Wänke talked without interruption and invited Ursula to insert questions later as she thought appropriate.

When I took over producing the oral history articles I wanted to make Ursula my first subject, she was to be number XIV in the series, but after the article was ready to submit she decided against its publication. It was a rerun of an incident Ursula described to me in which one of her interviewees, George Wetherill, changed his mind at the last moment. “He was a good friend and he didn’t want me to, and I won’t”, she recounted to me. I followed her example in honoring her wishes.

Ursula was well-known and, whether she knew it or not, she served as a role model for many women in science. She participated in various efforts to promote women, especially in the seventies. Despite her experience with Nichols, a setback she thought easily overcome, she never felt much prejudice throughout her career. “Most people seemed to be pleased to have me around”, she told me. She laughed at Harvard’s President Summers for remarking that women were not as smart as men, which caused him to be “booted out”, and she recalled an instance where she was asked to talk at the Radcliffe Institute and chose to speak on Antarctic meteorites. “We normally talk about relationships”, she was told.

Ursula published over 160 research papers in her career and she received awards from the Geological Society of America (1986), the Geological Society (2005) and received The Meteoritical Society Service Award (2012) for her research on the history of geology. She won the Lifetime Achievement Award from Women in Science and Engineering from the U.K. campaign for Women in Science and Engineering (1997). A nunatak and asteroid have been named after her. Both for her personality and her contributions to our Society, Ursula will be missed.

Derek W.G. Sears

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- ¹ Chaisson U., 1950. The Optics of Triclinic Adularia. *The Journal of Geology* **58**, 537-547.
Laves F. and Chaisson U., 1950. An X-Ray Investigation of the "High"- "Low" Albite Relations. *The Journal of Geology* **58**, 584-592.
- ² Frondel C. and Marvin U.B., 1967. Lonsdaleite, a Hexagonal Polymorph of Diamond. *Nature* **214**, 587-589.
- ³ Marvin U.B., 1962. Cristobalite in the Carbo Iron Meteorite. *Nature* **196**, 634–636.
- ⁴ Marvin U.B., 1963. Mineralogy of the oxidation products of the Sputnik 4 fragment and of iron meteorites. *Journal of Geophysical Research* **68**, 5059–5068.
- ⁵ Marvin U.B., 1966. *Continental Drift*. SAO Special Report, #236. 31 pp. Marvin U., 1973. *Continental drift - the evolution of a concept*. Washington, D.C., Smithsonian Institution Press, 256 pp.
- ⁶ Marvin U.B.; Wood J.A. and Dickey J.S., 1970. Ca-Al rich phases in the Allende meteorite. *Earth and Planetary Science Letters* **7**, 346-350.

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- ⁷ Wood J.A., Dickey J.S. Jr., Marvin U.B. and Powell B.N., 1970. Lunar anorthosites and a geophysical model of the moon. *Proceedings of the Apollo 11 Lunar Science Conference. Volume 1: Mineralogy and Petrology*, 965-988. Wood J.A., Dickey J.S. Jr.; Marvin U.B. and Powell B.N., 1970. Lunar Anorthosites. *Science* **167**, 602-604.
- ⁸ Marvin U.B., 1983. The discovery and initial characterization of Allan Hills 81005: The first lunar meteorite. *Geophysical Research Letters* **10**, 775-778.
- ⁹ Marvin U.B. and Mason B., 1980. Catalog of Antarctic Meteorites, 1977-1978. *Smithsonian Contributions to the Earth Sciences* **23**, 1-50. Marvin U.B. and Mason B.M., 1982. Catalog of Meteorites from Victoria Land, Antarctica, 1978-1980. *Smithsonian Contributions to the Earth Sciences* **24**, 1-97. Marvin U.B. and MacPherson G.J., 1992. Field and Laboratory Investigations of Antarctic Meteorites Collected by United States Expeditions, 1985-1987. *Smithsonian Contributions to the Earth Sciences* **30**, 1-116.
- ¹⁰ Marvin U.B., 1992. The meteorite of Ensisheim - 1492 to 1992. *Meteoritics* **27**, 28-72.
- ¹¹ Marvin U.B., 1996. Ernst Florens Friedrich Chladni (1756-1827) and the origins of modern meteorite research. *Meteoritics & Planetary Science* **31**, 545-588.
- ¹² Marvin U.B., 2002. Cosmo Mario L. Domenico Troili (1766): "The true cause of the fall of a stone in Albereto is a subterranean explosion that hurled the stone skyward" *Meteoritics & Planetary Science* **37**, 1857-1864.
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- ¹⁴ Marvin U.B., 1993. The Meteoritical Society: 1933-1993. *Meteoritics* **28**, 261-314.