

NOMINATION OF SHARON BERTSCH MCGRAYNE FOR THE LANG AWARD

The Lang Award was established to recognize a Swarthmore graduate who has had an impact on society at large. I propose Sharon Bertsch McGrayne (Sharon) as the 2023 recipient of this award. Sharon has written a series of books on the subject of science and scientists for the general audience, including Nobel Prize Women in Science, The Theory That Would Not Die, Prometheans in the Lab, and A Lab of One's Own: One Woman's Personal Journey Through Sexism in Science (co-authored with former National Science Foundation director Rita Colwell).

The publishing of books, by itself, does not necessarily impact society. Sharon's contribution is unique in that she has also pursued an extensive career in dissemination of the content of these books, with remarkable effectiveness. The number of people alone that she has reached through her lectures and writings argues for substantial social influence.

Studies have revealed that in recent years our population has downgraded the importance of science in their worldview and increasingly dismissed important ideas promulgated by scientists such as the danger of climate change, the effect of the petrochemical industry on global warming, and the theory of evolution. Sharon's efforts have provided strong countervailing pressure to this trend, as confirmed by the following analysis of her books.

Nobel Prize Women in Science has been in print for 30 years and has become a classic in the history of science. A second edition was published, adding biographies of additional women as prizes were awarded. In 1995, UCLA organized two courses using it as a text, one for science majors, one for nonscience majors. When Sharon told one professor that she was writing a book about women in science, he said, "That'll be a short book; there aren't any." This view is now obsolete.

As suggested above, Sharon has had an extensive career addressing groups at educational institutions, including at least 16 in the United States:

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| University of Illinois at Urbana, 3 talks | Shoreline Community College |
| Michigan State U | Dartmouth |
| Ohio State | George Mason |
| U of Michigan | Eastern Illinois U |
| Harvard | U of Wyoming Laramie |
| U. of Washington | Rutgers |
| UC San Diego | Radcliffe |
| Penn State | |

In addition she addressed a number of universities abroad, including the German Technical University in Darmstadt, Heidelberg University, the University of Kyoto, Japan, and the Free University of Belgium. Nobel Prize Women in Science has been translated into German, Japanese, Brazilian, South Korean and Polish. Through this wide dissemination, Sharon has

greatly magnified the social influence and awareness of changing social and gender roles in this country and abroad.

She has also addressed over 20 other groups and written for or been covered by various publications, including being interviewed on NPR, a one-hour interview on Talk of the Nation; she has been covered in Science Magazine, and has spoken to numerous scientific societies, government agencies and corporations in this country and abroad, including:

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| National Science Foundation of Japan | American Association of University Women |
| American Women in Science (AWIS) | Argonne National Laboratory (2) |
| 2 articles for Journal of History of Science | Royal Statistical Society, England |
| Dupont-Merck Pharmaceutical | <u>Physics Teacher Journal</u> |
| American Chemical Society, Chicago | <u>Chemical Educator</u> |
| AWIS, Seattle & Detroit | Grolier Club NYC (book collectors) |
| American Physical Society, several talks | Roland Park Country School, Baltimore |
| Michigan Science Teacher Assoc, Lansing | League of Women Voters, Seattle |
| National Institute of Science and Technology | <u>Metode</u> , Spanish popular science magazine |
| Joint meeting in Montreal of Royal Statistical Society and American Statistical Association | |

On the subject of misogyny in science, the career of Rita Colwell, former NSF director, as portrayed in A Lab of One's Own, could not be more telling and illustrative. Again, putting forth these ideas before groups of young, educated, and influential people certainly had a powerful social and ideological effect.

In The Theory That Would Not Die: How Bayes' Rule Cracked the Enigma Code, Hunted Down Russian Submarines & Emerged Triumphant From Two Centuries of Controversy, we find the history of the much-debated Bayes' theorem, a statistical method promoted by an 18th century British amateur mathematician, Rev. Thomas Bayes, who rediscovered and modified a formula developed by the French mathematician Pierre-Simon Laplace. The book abounds in astonishing stories concerning, for instance, the discovery of the wreckage of an Air France plane that left from Rio de Janeiro en route to Paris and went down somewhere in the South Atlantic. The search for the downed plane, conducted by the French equivalent of the FAA, (Bureau d'Enquetes et d'Analyses (BEA)), Air France, Airbus, and various military authorities including the U.S. Navy, was unsuccessful for two years. One year after the crash, a company from Reston, VA, was hired to conduct a Bayesian review of the entire search effort. After a search lasting one week, they found the wreckage of the plane. This incident, presented in the Epilogue of the book, creates an unforgettable climax, especially after the previous lengthy discussion of the Strategic Air Command's loss of atom bombs in the downing of planes. It's like a surprise ending: the story appears to be over, but it's not. One reviewer remarked: "To have crafted a page-turner out of the history of statistics is an impressive feat." This and other narratives from The Theory That Would Not Die illustrate the direct and powerful influence of math and science on everyday life, characteristic of Sharon's writings and generally absent from the textbooks from which most of us gain our understanding of science.

Another of her books, Prometheans in the Lab: Chemistry and the Making of the Modern World, tells memorable stories of the often trying and traumatic lives of inventors in the field of chemistry. Engineer Robert Rillieux, probably the first significant African-American inventor, had to be trained in France due to his mixed-race origin. He developed a method of refining sugar which conserved energy and spared workers, specifically slaves in Louisiana, from the dangerous tending of kettles of boiling syrup. Sharon's development of this story includes a careful analysis of the social situation of free people of color in Louisiana, a brief introduction to thermodynamics, and a sidelight on economic conditions affecting the price and production of sugar before and after the Civil War. Similarly the development of leaded and then unleaded gasoline is chronicled to highlight the environmental effects of socially important inventions. Above all, it is Sharon's explanation of surrounding social and economic conditions that puts the scientific advances of which she writes in perspective and makes them meaningful to the average person.

Telling a good story is key. The National Science Foundation sponsored a panel discussion in which Sharon participated along with cellist Yo-Yo Ma, among others, about the importance of the ability of scientists to tell about their work in story form. Sharon's books abound in memorable stories, for instance that of Maria Goeppert Mayer, the second woman Nobel-Prize winner in physics (after Marie Curie), who for most of her career was denied an academic appointment, as a result of nepotism policies, but granted office space at the university where her husband taught. In fact, there has been a succession of women scientists who were treated in the same way, granted an office but no academic appointment or compensation, like wraiths haunting academia by their silent presence in offices and absence in departmental payrolls.

How can an author of books about science influence society? That influence is necessarily indirect, through the ideas Sharon has promoted and inspired others to adopt. Sharon's books focus on formerly little-known stories of scientists who have broken new ground, e.g., Nobel Prize winning women; scientists who have created new products and procedures, e.g., Robert Rillieux; and scientists who have championed new ideas and procedures, e.g., Bayes' rule. In addition to her success as an author, Sharon has had a strikingly successful career as a lecturer and opinion maker in the U.S. and abroad, promoting a variety of ideas: the presence and success of women in science, questioning the limited roles women were believed to be capable of fulfilling, as well as promoting greater understanding of science and mathematics among nonprofessionals. In all her writings, she has looked two steps ahead of the narrative to analyze the social and economic environments so inextricably intertwined with scientific developments. In view of the large audience she has reached through her addresses as well as the stories she tells that are so well-tailored to a general audience, she has made significant changes in social attitudes and general readers' educational level.

Elizabeth Morrow Edwards

