June 2006

STATUS

A REPORT ON WOMEN IN ASTRONOMY

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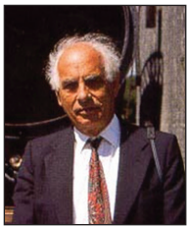
A Publication of the American Astronomical Society Committee on the Status of Women in Astronomy

Caroline Herschel as an Observer

By Michael Hoskin



In the last quarter of the eighteenth century, William Herschel designed and built reflectors large and small, and he used them in observational campaigns that lasted for years. His so-called sweeps for nebulae and clusters extended over two decades; and by his daring interpretations of his specimens of nebulae, he did more than anyone to transform astronomy from the mathematical study of the unchanging, clockwork planetary system of Newton and Leibniz, to the exploration of a universe in which everything from the individual stars to the cosmos itself has a life story.

It would have been impossible for William to do this without the selfless help of his sister Caroline, born in Hanover in 1750 and twelve years his junior. While William was at the eyepiece of the south-facing telescope waiting for another of the mysterious nebulae to be brought into his field of view by the rotation

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Betty Naomi Friedan was a feminist author and lecturer. She was born February 4 1921 and died February 4 2006.

The Feminine Mystique

By Betty Friedan

The problem lay buried, unspoken, for many years in the minds of American women. It was a strange stirring, a sense of dissatisfaction, a yearning that women suffered in the middle of the 20th century in the United States. Each suburban wife struggled with it alone. As she made the beds, shopped for groceries, matched slipcover material, ate peanut butter sandwiches with her children, chauffeured Cub Scouts and Brownies, lay beside her husband at night—she was afraid to ask even of herself the silent question—"Is this all?"

Over and over women heard in voices of tradition and of Freudian sophistication that they could desire no greater destiny than to glory in their own femininity. They were taught to pity the neurotic, unfeminine, unhappy women who wanted to be poets or physicists or presidents. They learned that truly feminine women do not want careers, higher education,

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Editor's Note

By Fran Bagenal

In the past couple of issues of STATUS we have been exploring family-work issues. In this issue we report on a program that supports graduate students at Stanford University when they have a baby and another program that supports mothers returning to research after a career break to have children. Our historical focus is on Caroline Herschel and the contributions of her extensive observations to astronomy made two centuries ago. In February of this year Betty Friedan, giant of the feminist movement, died at the age of 85. We celebrate her contributions to a movement that brought huge changes to society with an extract from her book *The Feminist Mystique* and an obituary written by feminist scholar Sheila Rowbotham. We also present an alternative view of Betty Friedan from another feminist giant, Germaine Greer. Many women scientists keep their heads buried in physics books instead of feminist literature. We present these articles as a reminder of the social and political battles fought over the past 40 years and in appreciation of how their victories have allowed us to concentrate on our science. ❖

Silhouette of Caroline Herschel. Courtesy of the Museum of the History of Science, Oxford University

Caroline Herschel *continued from page 1*

of the Earth, she was at a nearby window ready to write down his shouted observations. It was she who wrote up a fair copy next day, and later compiled the catalogs for publication. It was she who prepared a star catalog by zones of north polar distance so that she could call out to William and tell him the stars that would next come into view and which he could use as reference points for the positions of any nebulae. And later in life it was she who arranged their two-and-a-half thousand nebulae into similar zones of north polar distance so that William's son John could systematically re-examine his father's nebulae, work that led to his General Catalogue and so to the New General Catalogue that we use today. In all this, and much more, Caroline's contribution was crucial; William could not have done it without her, and she fully deserved the Gold Medal and the honorary membership of the RAS that she was awarded in old age. But she was also an observer on her own account and we must ask, What did she achieve by her observations?

William, who joined his father in the band of the Hanoverian Guards when he was fourteen, had fled from Hanover to England during the Seven Years War and by 1772 was well established in the musical life of fashionable Bath. Caroline was then a household drudge in the family home in Hanover, in the clutches of a mother who hoped to keep her forever as an unpaid servant, and she was badly in need of rescuing (see box). William proposed that she come to Bath to see if she had the voice that might make of her a solo singer in Handel's oratorios (as indeed she had); this, we may think, was a pretext, and that the real motive was to acquire a housekeeper to manage his bachelor household.

DATES OF CAROLINE HERSCHEL'S LIFE

1750	Caroline Lucretia Herschel born in Hanover, Germany to Isaac Herschel and Anna Ilse Moritzen.
1757	French occupation of Hanover. William flees to England.
1772	Caroline moves to live with her brother William in Bath, England.
1781	William discovers Uranus (initially named after King George III).
1782	King George III provides an annual salary to William.
1786	Caroline discovers her first comet.
1787	King George III provides an annual salary to Caroline.
1786–97	Caroline discovers 8 (9?) comets.
1822	William dies and Caroline moves back to Hanover.
1828	Royal Astronomical Society gives Caroline a gold medal for her catalogue of nebulae.
1848	Caroline dies in Hanover.

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Caroline was thrilled to escape to England, but less so when she found that her arrival had by chance coincided with William's development of an amateur passion for astronomy. In the time he could spare from his own musical duties he was simply too busy making telescopes to give her music lessons, and she was even roped in to help with the construction work, sometimes by putting food into his mouth while his hands were engaged in holding a mirror he was polishing.

In 1781, William's systematic examination of the brighter stars led him to the discovery of the planet we know as Uranus. His friends were anxious that he should be free to dedicate himself to astronomy, and they persuaded him to name the planet the Georgian Star in honor of King George III, that most enlightened of British monarchs. The custom of patronage would then require the King to make a financial gesture in return, and George hit upon the idea of conferring a pension on William, on condition that he live near Windsor Castle and be willing to show the heavens to royal guests after they had dined at the castle. And so William and Caroline arrived at Datchet near Windsor in the fall of 1782.

While they were still in Bath William had made her a small reflector, but there is no evidence that she ever used it. Now that they had abandoned Bath with its vibrant musical life and lived in a tiny village where there was little employment for sopranos, Caroline's musical career was curtailed and she had (William thought) time to spare. He therefore gave her a little refractor mounted about a vertical axis so that she could use it for horizontal sweeps of the sky when she had nothing better to do, and he told her to look out for interesting objects, such as double stars, clusters, nebulae, or comets.

At the end of the following year, 1783, Caroline found herself having to give priority to acting as amanuensis to William as he swept for nebulae and clusters. It was therefore during 1783 that she had ample leisure to observe on her own account, at first with the little refractor, then from the summer with the ingenious Newtonian sweeper that William made for her. During that year she came across some double stars, she watched Algol drop from second to fourth magnitude, and she compiled some simple sequences of stars in order of brightness. But her main interest was in nebulae and clusters, searching out those listed by Messier while at the same time on the lookout for new ones. A turning point occurred on 26 February 1783, when she first saw M 47 and M 41, and then found two clusters for each of which she proudly noted: "Messier has it not." William was nearby and happy to interrupt his own searches for double stars in order to examine the objects his little sister had discovered, and he confirmed they were new discoveries.

Study of her observing books, and of her newly-discovered draft Catalogue of Nebulae and Star Clusters, shows that in the course of 1783, Caroline in fact found 11 nebulae and clusters previously unknown to astronomers, and she found one more in 1784 and a final one in 1787. Two of these 13 were in fact galaxies: the second companion to the Andromeda nebula, sometimes referred to as M 110, which Messier had in fact observed but not yet published; and the bright edge-on spiral in Sculptor, NGC 253. The remaining 11 were clusters, and these included the so-called 'missing' M 48 whose position Messier had miscalculated. When one remembers that Messier's final list consists of 103 objects, for Caroline single-handedly to discover 13 was a fine achievement. In fact she found a fourteenth, the cluster IC 4665, but for some reason she credits it to William (and William to her, but correctly so).

But individually her discoveries counted for nothing, for they were published only if William chanced upon one of her nebulae in the course

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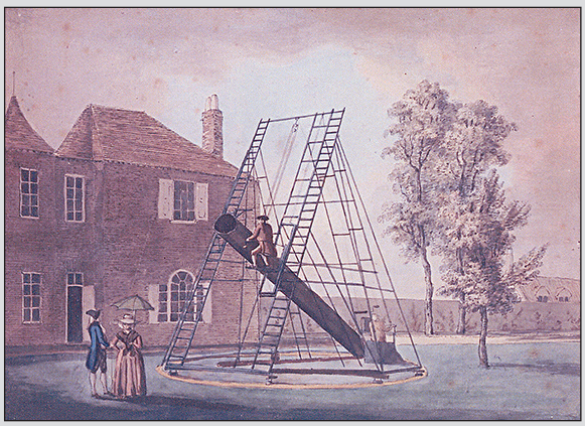
WHY HAD CAROLINE BECOME "A HOUSEHOLD DRUDGE"?

Caroline Herschel's mother Anna saw her as life-long help around the house and did everything she could to prevent her acquiring any skills that might enable her to get employment outside the home (e.g. as a governess for children). The eldest daughter had long since married and left, and the other two daughters had died young. Anna prevented her husband giving Caroline violin lessons, she forbad Caroline to learn the French expected of a governess, she allowed her to learn only basic skills in needlework. Caroline was considered physically unattractive for her era (well under 5 feet tall) and disfigured by smallpox, so marriage was not considered as an option. We have the sad scenario whereby the father was keen to advance Caroline's education (e.g. by learning the violin) as he advanced that of the boys, but the girls were the responsibility of the mother, and the father could give Caroline a music lesson only in secret, when the mother happened to be out of the house. Hence her situation was desperate.



William at the 20ft reflector he completed in 1783. Courtesy of John Herschel-Shorland.

Caroline Herschel *continued from page 3*

of his regular sweeping, and Caroline afterwards realized it was already in her own list. Then William's catalog entry would carry the initials C.H. to acknowledge her priority. Every one of Caroline's nebulae that was published had been independently rediscovered by William, and the inclusion of the initials C.H. made no difference to the scientific value of his catalogs.

Collectively, however, their significance was immense, nothing less than epoch-making. We saw that on 26 February 1783 William had to interrupt his own searches for double stars to examine two clusters that his sister had found. One was a genuine discovery, the cluster NGC 2360, while the other was in fact M 93. But Caroline's observations that evening evidently alerted William to the fact that the mysterious nebulae, whose nature was one of the unsolved mysteries of deep-sky astronomy, were so numerous that a novice observer equipped with what was little more than a toy could find new ones.

Until then, William's own observing books are mainly filled with observations of double stars, a subject that he had made his own. But on 4 March 1783, a week after Caroline had brought him these two nebulae to examine, he made the momentous decision "to sweep the heaven for Nebulas and Clusters of stars". And the entries in his observing books suddenly change: the double stars largely disappear, and nebulae and clusters take their place.

That fall, William completed his magnificent new 20ft and with it he began his great campaign of sweeps for nebulae. At first he worked alone, but he was continually frustrated by the need to go into artificial light to record his observations. At the year's end he decided that he must work in partnership with Caroline as his amanuensis, and over the next two decades they were to sweep most (but not quite all) of the sky visible from Windsor, and to discover 2507 nebulae and clusters.

In the early years they worked intensively and Caroline had almost no time for her own observations. But in the late summer of 1786 William was away in Germany, and his absence allowed Caroline time to observe once more on her own account. On 1 August she discovered what she suspected was a comet, and observations the following night confirmed this.

In William's absence it was up to her to make her discovery known, and she sent details to Dr Charles Blagden, Secretary of the Royal Society. A few days later the President of the Royal Society, along with Blagden and Lord Palmerston, arrived at the Herschel home and begged the favour of sight of Caroline's comet.

And when William returned he was summoned to Windsor Castle to demonstrate Caroline's comet to the Royal Family. The novelist Fanny Burney was there: "The comet was very small, and had nothing grand or striking in its appearance; but it is the first lady's comet…"

Caroline was doing everything in her power to repay William for rescuing her from the scullery in Hanover. She had sacrificed her musical career to his ambitions in astronomy, she ran his household for him, and she partnered him in his researches day and night. To her anger and dismay, in May 1788, at the age of 49, he married; Caroline was no longer needed as housekeeper, and was banished to the cottage in the garden. William offered her money in compensation, but instead she persuaded him to ask the King for a salary as his assistant, and so she became the first salaried female in the history of astronomy.

William now had better things to do at night than observe the stars, and so Caroline found herself with plenty of time and a flat roof from which she could sweep for comets to her heart's content. This state of affairs continued for nine years, until October 1797. In those nine years she found no fewer than seven comets: three with her existing sweeper, three with a larger version that William made for her, and one with her naked eye. Male astronomers throughout Europe were charmed, and even the public got to hear of Caroline.

The larger sweeper that William made for her was a Newtonian of 5ft focal length, and so to use it she had to stand on a stool, whereas its predecessor she could use sitting down. This was less than welcome, but the 5ft was equipped with wires that allowed her to measure relative positions as opposed to estimating them. We

have an account by the Astronomer Royal as to how she worked:

I paid Dr & Miss Herschel a visit 7 weeks ago. She shewed me her 5 feet Newtonian telescope made for her by her brother for sweeping the heavens. It has an aperture of 9 inches, but magnifies only from 25 to 30 times,…being designed to shew objects very bright, for the better discovering any new visitor to our system, that is Comets, or any undiscovered nebulae. It is a very powerful instrument, & shews objects very well. It is mounted upon an upright axis, or spindle, and turns round by only pushing or pulling the telescope; it is moved easily in altitude by strings in the manner Newtonian telescopes have been used formerly. The height of the eye-glass is altered but little in sweeping from the horizon to the zenith. This she does and down again in 6 or 8 minutes, & then moves the telescope a little forward in azimuth, & sweeps another portion of the heavens in like manner. She will thus sweep a quarter of the heavens in one night… Thus you see, wherever she sweeps in fine weather nothing can escape her.

But cometary discoveries at that period, though of widespread popular and professional interest, had little impact on the history of astronomy. With rare exceptions, all that could be computed for most comets was a simple parabolic orbit; and in the case of Caroline's discoveries, for this to be done accurately much depended on how quickly Maskelyne and other astronomers were notified of the visitant. So for example the letter to Nevil Maskelyne announcing her second comet had taken the best part of 48 hours to travel from Slough to Greenwich "owing to the slowness of our penny post", and by then the weather had turned bad, with the result that Maskelyne had not been able to observe the object for several nights.

By ill chance William was absent when she found her eighth comet. To make sure the news reached Maskelyne promptly this valiant woman decided on direct action. She allowed herself an hour's sleep and then she saddled a horse, and road the twenty miles to London and then the six or seven more to Greenwich, to present herself at the front door of an astonished Astronomer Royal.

Her comet of 1793 had already been seen by Messier, and that of 1797 was a naked-eye object seen the same night by Eugène Bouvard and Stephen Lee. But her 1795 comet proved to be of considerable interest because in 1819 it was recognized as being identical with comets of 1786, 1805 and 1818, and so having a period of only 3.3 years (we of course know it as Encke's comet); and her 1788 comet surprised observers by returning in 1939.

In October 1797, for reasons that remain obscure to this day, she left her brother's home and moved into lodgings. Her observing platform was now some considerable distance away, and even if she expected a clear night and planned to visit her former residence and sweep for comets, she would need to arrange in advance to hire a man to escort her safely back to her lodgings when her observations were ended for the night. It was all so different from the years when her sweepers were yards away and available for use whenever the skies were clear. And so the move effectively ended her career as an observer. From that time on she was forever on the move. When William died in 1822 she returned to her native Hanover where she lived, an honored figure in the town, until her death in 1848 at the age of 97.

Individually, as we have seen, Caroline's nebulae and clusters counted for nothing. They were known only to her brother, who had little interest in occasional discoveries of nebulae (whether by Caroline or himself) but only in those he came across in his systematic sweeps. If a nebula of Caroline's was published, this was because it had been independently rediscovered by William. But by demonstrating to William that these mysterious objects were so easy to find, she triggered his great campaign and changed the course of history.

Her eight comets brought her fame. One of them contributed to the recognition of Encke's comet, another returned in 1939 and so is known to be periodic. For the others we have little more than a parabolic orbit.

But there is a coda to the story. As I examined Caroline's and Willliam's observing books and sought to identify her nebulae, I was baffled by two entries. On 24 August 1783, Caroline saw "Between γ & δ of Equule[us] a rich spot". These two stars are little more than one degree apart, and so the location of the "rich spot" is well defined. Yet inspection of the Palomar Sky Survey shows that today no such object that would have been visible to Caroline is to be found there.

Remarkably, a few weeks earlier, on 30 July, she writes that there is a "rich spot"—a term she uses only on these two occasions—not far away, near the little triangle of stars, 3, 4 and 7 of Pegasus. This triangle is again a well-defined location, and again no such "rich spot" is to be seen there. It is likely, therefore, that Caroline's rich spots were a comet that she saw on 30 July and again on 24 August. Brian Marsden has kindly studied the possible elements of such a comet; and it seems that we now know a ninth comet that should be credited to Caroline. ❖

Continued on page 6

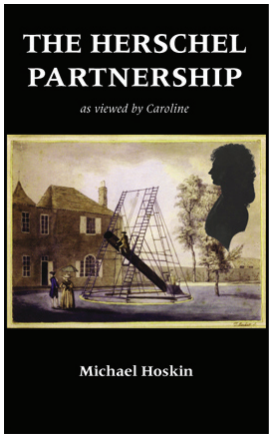
Caroline Herschel *continued from page 5*

Further reading:

For a detailed study of Caroline as an observer, see Michael Hoskin, "Caroline Herschel as Observer", Journal for the History of Astronomy, vol. 36, pages 373-405, 2005.

For Caroline's life-story, and in particular her role in the great partnership with her brother, see the author's two books: Caroline Herschel's Autobiographies and The Herschel Partnership: As Viewed by Caroline, both published by Science History Publications Ltd, Cambridge, 2003 and available via **www.shpltd.co.uk**.

Also **http://www-history.mcs.st-andrews.ac.uk/Mathematicians/Herschel_Caroline.html**



Michael Hoskin is a Fellow of Churchill College, Cambridge. He has written many books on the history and philosophy of science. He edits Journal for the History of Astronomy, which he founded in 1970.

THE CAROLINE HERSCHEL VISITOR PROGRAM

The Space Telescope Science Institute has created a visitor program, named after this extraordinary woman astronomer, to enhance the representation of women and minority astronomers at the Institute. This program has been designed with two goals in mind: provide a stimulating and productive environment for distinguished women and minority scientists to spend time at the Institute working and lecturing on their scientific projects and providing active mentoring to the Institute's junior scientists, especially women and other underrepresented groups.

The Caroline Herschel Visitor Program is intended for distinguished women and minority scientists from the international community who are committed to mentoring junior colleagues. STScI will offer them a scientific base for a sabbatical period or long research leave, typically 1-3 months and invites them to participate fully in the life of the Institute, including events organized by our mentoring program and memberships in short-term committees.

Antonella Nota, Science Division Head at STScI says "We believe the Caroline Herschel Visitor Program will bring fresh perspectives from other international institutions to the Institute and provide benefits both to the visitors and the Institute staff as a whole. We are delighted to report that the program has already generated considerable interest."

Readers interested in this program should contact Antonella Nota (*nota@stsci.edu*).

Feminine Mystique *continued from page 1*

political rights—the independence and the opportunities that the old-fashioned feminists fought for. Some women, in their 40s and 50s, still remembered painfully giving up those dreams, but most of the younger women no longer even thought about them. A thousand expert voices applauded their femininity, their adjustment, their new maturity. All they had to do was devote their lives from earliest girlhood to finding a husband and bearing children.

Fulfillment as a woman had only one definition for American women after 1949—the housewife-mother. As swiftly as in a dream, the image of the American woman as a changing, growing individual in a changing world was shattered. Her solo flight to find her own identity was forgotten in the rush for the security of togetherness. Her world shrank to the cozy walls of home.

In the 15 years after the second world war, this mystique of feminine fulfillment became the cherished and self-perpetuating core of contemporary American culture. Words like "emancipation" and "career" sounded strange and embarrassing; no one had used them for years. When a Frenchwoman named Simone de Beauvoir wrote a book called The Second Sex, an American critic commented that she obviously "didn't know what life was all about," and besides, she was talking about French women. The "woman problem" in America no longer existed.

If a woman had a problem in the 1950s and 1960s, she knew that something must be wrong with her marriage, or with herself. Other women were satisfied with their lives, she thought. What kind of a woman was she if she did not feel this mysterious fulfillment waxing the kitchen floor? She was so ashamed to admit her dissatisfaction that she never knew how many other women shared it. If she tried to tell her husband, he didn't understand what she was talking about. She did not really understand it herself.

No other road to fulfillment was offered to American women in the middle of the 20th century. Most adjusted to their role and suffered or ignored the problem that has no name. It can be less painful for a woman not to hear the strange, dissatisfied voice stirring within her.

Gradually I came to realize that the problem that has no name was shared by countless women in America. Just what was this problem that has no name? What were the words women used when they tried to express it? Sometimes a woman would say "I feel empty somehow… incomplete." Or she would say, "I feel as if I don't exist." Sometimes she blotted out the feeling with a tranquillizer. Sometimes she thought the problem was with her husband or her children, or that what she really needed was to redecorate her house or move to a better neighborhood, or have an affair, or another baby.

If I am right, this problem stirring in the minds of so many American women today is not a matter of loss of femininity or too much education, or the demands of domesticity. It is far more important than anyone recognizes. It may well be the key to our future as a nation and a culture. We can no longer ignore that voice within women that says: "I want something more than my husband and my children and my home."

The problem that has no name—which is simply the fact that American women are kept from growing to their full human capacities—is taking a far greater toll on the physical and mental health of our country than any known disease. If we continue to produce millions of young mothers who stop their growth and education short of identity, without a strong core of human values to pass on to their children, we are committing, quite simply, genocide, starting with the mass burial of American women and ending with the progressive dehumanization of their sons and daughters. These problems cannot be solved by medicine or even by psychotherapy.

A woman today who has no goal, no purpose, no ambition patterning her days into the future, making her stretch and grow beyond that small score of years in which her body can fill its biological function, is committing a kind of suicide. The feminine mystique has succeeded in burying millions of American women alive. There is no way for these women to break out of their comfortable concentration camps except by finally putting forth an effort—that human effort which reaches beyond biology, beyond the narrow walls of the home, to help shape the future. We need a drastic reshaping of the cultural image of femininity that will permit women to reach maturity, identity, completeness of self, without conflict with sexual fulfillment.

Who knows what women can be when they are finally free to become themselves? ❖

This is an edited excerpt from The Feminine Mystique, first published in 1963, reproduced by permission of W. W. Norton & Company.

Betty Friedan soon after the 1963 publication of The Feminine Mystique. Photo credit Fred Palumbo, 1964. Copyright transferred to Library of Congress through a gift.

Sheila Rowbotham is Professor of Gender and Labour History School of Social Sciences at the University of Manchester, England.

Betty Friedan: Feminist icon of the 1960s, renowned for her bestseller, The Feminine Mystique

By Sheila Rowbotham

The follow is reproduced from the Monday February 6, 2006 edition of The Guardian © Guardian Newspapers Limited 2006.

Betty Friedan, who has died of congestive heart failure aged 85, played an influential role in the re-emergence of the United States women's movement in the 1960s. In her 1963 bestseller The Feminine Mystique, she articulated "the problem that has no name"—the misery, self-hatred, neurosis and frustration of suburban middle-class women festering in domesticity. She blamed educators, advertising men, psychologists and sociologists for driving women out of the workforce and public life; the result was to be sacks of grateful letters and a message that had an international impact.

American women were already stirring in 1963: black and white women had been mobilized through the civil rights movement and through community politics. Trade union women were arguing for equal pay for work of equal value—later to be called comparable worth. President John Kennedy had appointed the labor educator, Esther Peterson, to head the Women's Bureau of the Department of Labor, and, with Eleanor Roosevelt, she had persuaded him to appoint a presidential commission on the status of women. The commissions were to be important rallying points, but their ponderous prevarication and ribald jokes about male (Playboy) bunnies in the press had a radicalizing effect.

Famously in June 1966, at the third annual conference of commissions on the status of women in Washington DC, Friedan bumped into Dorothy Haener from the United Automobile Workers' Union and Pauli Murray, the black lawyer who had helped draft civil rights legislation. She invited them to meet in her hotel room: about 20 women crammed in that night, mainly professionals, administrators and trade union officials. The next day at lunch Friedan scribbled "National Organization for Women" and the acronym Now on a paper napkin. The new organization had a budget of $135.

Friedan was to be elected president of NOW at the first conference in October 1966. No organizer, she was the speaker, writer and publicist. She dressed carefully in frilly blouses and handled the news media well. NOW's first cause was the sexually segregated help-wanted advertisements. NOW's president was careful to keep the focus on employment issues: paid maternity leave, tax deductions for child care, educational aid and training, along with access to contraception. NOW was to be guided by "a passion for the possible".

However, a very different women's movement was stirring by 1967. There were grassroots women's liberation groups inspired by civil rights, there was student activism, opposition to the Vietnam war, the mobilization of women on welfare and rebellions in the black ghettos. These were part of the new left's "great refusal" of American capitalism. Its supporters wanted radical transformation of society and of personal life, and were ready to speak out about abortion, rape, lesbianism, orgasms, imperialism and welfare rights. They surfaced in the media at the Miss America contest in 1968, burning girdles and the Ladies Home Journal in a dustbin. The frilly-blouse strategy was wiped out: from then on women's lib and bra burning were twins as far as the media was concerned.

Friedan was initially appalled, but her strategic caution was overborne in the extraordinary growth of the women's-liberation movement. In 1969 she was a co-founder of the National Association for the Appeal of Abortion Laws. In 1970 she retired from the presidency of NOW with a surprise call for a women's strike for equality day and led the march down New York's Fifth Avenue hand in hand with the suffrage veteran, Judge Dorothy Kenyon. In 1971 she was a co-founder of the Women's Political Caucus.

In the early 1970s American feminists made demonstrable gains. In 1970 New York liberalized the abortion laws and in 1973 the Supreme Court legalized abortion. Now joined older feminist organizations in lobbying for the equal rights amendment. Legislation on sex discrimination was going through and shifts were occurring in popular culture. By 1977 the radical women's liberation groups were in disarray, but NOW had positioned itself in the centre. Its 1967 demands were endorsed in 1977 by the national women's

conference in Houston attended by Rosalyn Carter, Betty Ford and Ladybird Johnson.

Friedan had had a series of disputes with members of NOW, but she remained the visible symbol of liberal feminism while, across the political spectrum, Phyllis Schlafly focused the ire of women of the new right on Friedan's claim to speak for American women. Ronald Reagan's election in 1981 forced feminists on to the defensive; not only was funding for projects reduced, but the new right was committed to reversing the legislative gains. In The Second Stage (1981), Friedan, her eye on middle America, argued that feminists were alienating support by being confrontational and anti-men and by opposing marriage and the family. In the US Schlafly was delighted, but in France Simone de Beauvoir was so irritated with the book that she threw it across the room. Out of step with an embattled feminist movement, Friedan lectured in universities, including Harvard and Yale, and established a think tank at the University of Southern California on women's issues. She was a well known international figure, attending the 1985 international women's conference at Nairobi and the 1992 women's summit at Dublin organized by the National Women's Political Caucus.

The rightwing onslaught on abortion had galvanized a new wave of feminist activism and she spoke at a pro-choice rally in New York in 1992.

She was becoming increasingly involved in Jewish issues and studying the Torah. In 1993 her Fountain of Age called on elderly people to reject stereotypes and live a more active life; but, for once, it was matter over mind, for her own health was affected by asthma and she had suffered from heart trouble. Harper's magazine, never the best friend of feminism, unkindly announced Joan Smith's interview with her in 1993 as "Feminism's death rattle".

She had been called the mother of feminism by the news media, but some of the daughters and granddaughters were not too impressed. Susan Faludi in Backlash (1991) accused her of "stomping on a movement she did so much to create"; a disgruntled Friedan was inclined to see younger feminists as stomping on her. Friedan had lost that old news-media touch and got stuck in the publicity package she had created in the 1960s and 1970s of that girl from Peoria, Illinois, who had lived the feminine mystique as a suburban mum.

The actual Betty Goldstein was much more interesting. Born Bettye, in Peoria, her mother had edited a local newspaper women's page before becoming a housewife. Her father was an immigrant from Russia who became proprietor of a jewelry store. Radicalized as a student at the elite Smith College in Northampton, Massachusetts, from which she graduated in 1942, she had been inspired by the militant mood of US labor and black Americans. She went on to graduate work at the University of California at Berkeley. She then moved to Greenwich Village, by way of Peoria.

Betty Friedan leading a group of demonstrators outside a Congressional office in 1971 to show support for the E.R.A. Photo reproduced with permission of the Veteran Feminists of America. The Veteran Feminists of America is a non-profit organization whose purpose is to honor and keep alive the struggles and achievements of the 2nd Wave Feminist Movement.

In New York she initially worked for a news service that supplied trade union papers. Between 1945 and 1947, she was writing for the leftwing United Electrical Radio and Machine Workers' journal, UE News, on the workplace demands and domestic grievances of women in the union. Unlike her later work, this early journalism challenged class injustice and inequality. She married Carl Friedan, a theatre producer, in 1947 and through the McCarthy era, when leftwing views meant ostracism and persecution, she was bringing up their three children.

She retained her social commitment, but she was a journalist and she wanted to be published, and equal pay for women workers was not exactly a selling topic. However, the civil rights movement had broken through 1950s conservatism. A new spirit was evident by the late 1950s and early 1960s. Upset because young women graduates at Smith told her they wanted marriage rather than a career, she did a questionnaire for her class reunion. "What do you wish you had done differently?" she asked the women that had studied with her back in 1942. Ennui and despair came back. The light chatty article she was planning turned into a tale

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Betty Friedan was interviewed for a Public Broadcasting Service documentary *The First Measured Century* (2000). A transcript of her interview can be found at **http://www.pbs.org/fmc/interviews/friedan.htm**.

of woe. McCall's magazine rejected it; so did a friend at Redbook. Who wanted to read about hysterical housewives? But Betty Friedan was on to something. It was an era when social criticism like William H Whyte's The Organization Man and Vance Packard's Hidden Persuaders had become popular hits. Americans wanted to hear about what was going wrong. She persuaded a publisher to take a gamble.

The Feminine Mystique was to be the result. Again she oversimplified and packaged neatly. She quoted selectively; American magazines in the 1950s were in fact more ambiguous about the housewife as they were keen to celebrate individual success stories. Suburban women in the 1950s were often busy indeed outside their homes in a whole range of community groups, because the suburbs lacked the most basic amenities.

The Feminine Mystique also ignored the contemporary achievements of black women and did not touch on questions of redistribution of wealth. Her assumption was that work was necessarily fulfilling and she implied that the combination of child rearing and paid employment could be easily done. Her solutions were about changing attitudes not about structures and resources. The book struck such a deep chord because she was reworking ideas about individual development already present in popular culture. Her success was in crystallizing widespread dissatisfactions simmering beneath the surface. Despite all its limitations, The Feminine Mystique had a radical impact on mainstream culture in the 1960s and early 1970s. That was no mean achievement, and by the end of the 20th century the book had sold more than 3 million copies.

After the late 1970s it was much harder for Friedan to appeal to a broad constituency, and that clearly distressed her deeply. Her political instincts were those of the 1930s old left with its popular front, not the new left's search for beloved communion. She aspired to strategy not purity. But she got the strategy wrong when she tried to placate a new right driven by a fundamentalist faith which she could not understand.

Friedan's other books include: It Changed My Life; Writings on the Women's Movement (1976); and Through the Prison of Gender (1998). In 2000 she published a memoir, Life so Far.

Friedan can be understood as the last survivor of a tradition of writing about women's issues developed by writers such as Margaret Mead, Pearl S Buck and Dorothy Thompson. But their radical proposals were always couched in moderate tones. With Friedan it was the other way round. Try as she would, her efforts at moderation somehow came out sounding more extreme than they were—perhaps because she was always inclined to find culprits. That served her well in 1963; but it no longer had resonance when the new right reclaimed the territory she had opened up for liberal feminism. Instead she alienated many feminists by blaming them for the victory of the right. Radical movements are often too embedded in defiance to exercise generosity and in politics you can get stamped on; on the other hand, Friedan did her share of the stamping.

Her marriage ended in divorce in 1969. She is survived by her daughter, two sons and nine grandchildren. ❖

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Was Betty Friedan really as pivotal as she thought she was, asks Germaine Greer. Feminist academic, critic and self-acclaimed anarchist, Germaine Greer has written 36 books including The Female Eunuch (1970).

The Betty I Knew

By Germaine Greer

The following article appeared in The Guardian on Tuesday February 7, 2006 Guardian © Guardian Newspapers Limited 2006.

Betty Friedan "changed the course of human history almost single-handedly". Her ex-husband, Carl Friedan, believes this; Betty believed it too. This belief was the key to a good deal of Betty's behavior; she would become breathless with outrage if she didn't get the deference she thought she deserved. Though her behavior was often tiresome, I figured that she had a point. Women don't get the respect they deserve unless they are wielding male-shaped power; if they represent women they will be called "love" and expected to clear up after themselves. Betty wanted to change that forever. She wanted women to be a force to be reckoned with, and yet she let Carl Friedan have all the income from The Feminine Mystique. Or so she told me, sotto voce, in 1971. Something to do with community property, I guess. She was not yet divorced from him then.

In its time, The Feminine Mystique was a book that spoke to American women loud and clear. It was based on a questionnaire Betty sent out to the women who were at college with her in the 1950s, all "happily" married and bringing up kids in the suburbs. Betty, who was in the same boat, was feeling restless and dissatisfied. To her immense relief and considerable surprise, she found that just about all the women in the same situation who replied to her questionnaire were feeling the same. Betty was not one to realize that she was being lifted on an existing wave; she thought she was the wave, that she had actually created the Zeitgeist that was ready and hungry for her book. And so, as you see, did her husband, and, though he claims that her descriptions of their married life in her last book Life So Far are wildly skewed, he still does.

My difficulties with Betty begin with the fact that, as I see it, it's the three million readers of The Feminine Mystique that made the book great. Moreover, I disagreed with its basic premise. Betty's Zeitgeist was not mine. She had seen the alternative roles that women had fulfilled perfectly adequately during the war years closed to them, so they were forced to return to Kinder, Küche, Kirche. She contributed three children to the baby boom. That was the era of the New Look when hemlines dropped and waists were cinched and breasts were pushed out. According to Betty, what happened was that women's sexuality was emphasized at the expense of all their other talents and attributes. What Betty saw as sexuality, I saw as the denial and repression of female sexuality. The Female Eunuch was conceived in reaction to The Feminine Mystique.

The National Organization for Women (NOW) was Betty's idea; she certainly founded it but it harvested a huge amount of energy that had been building up for years. The bringing of the important class action suits that would improve the lot of working women is something that American feminists should always be proud of. Betty was important to all of that, but not as important as she thought she was.

When the American edition of The Female Eunuch was published in 1970, I was invited to a NOW benefit. Betty grabbed me by the hand and dragged me round, introducing me to the company as if I had been one of her disciples. I kept trying to explain that I wasn't an equality feminist but everything I said sounded callow and ungracious. Betty kept beaming and holding my arm, completely unfazed by anything I said, until I had practically to rip myself from her grasp and explain that I was there under false pretences, and didn't share their belief that you could be a loyal member of the Republican Party and a feminist. We now know that Betty didn't think you could either, but she could have fooled me and she certainly fooled everybody else.

In 1972, Betty and I, and Helvi Sipila of the United Nations, were together in Iran as guests of the Women's Organization of Iran, and once again I had difficulty in dissociating myself from Betty, who would usually take over my allotted speaking time as well as her own and inveigh against younger feminists who burned bras and talked dirty. Her line was that American feminists had taken power, that everything was on the move and the Iranian women should follow suit. "There's more to life than a chicken

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The Betty I knew *continued from page 11*

in every paht!" Betty would howl. She would pour scorn on a life spent reheating TV dinners to women with a houseful of servants. When we were in the air-conditioned Cadillac, she never spoke to me, but rested with her head against the leather and closed her eyes. When I was talking to one of our minders about the particular way Iranian women wore the veil, she yelled "Don't you know the veil has been abahlished in Iran?" If she had opened her eyes she would have seen that the women in the streets were all veiled.

Betty's imperiousness had the shah's courtiers completely flummoxed. She ordered a respirator for her hotel room and one was brought over from the children's hospital. Three days later the courtiers asked me if it would be possible to remove it, as the hospital only had two and she wasn't using hers. I told them to go ahead and grab it, and that I would deal with Betty myself, but she didn't seem to notice that it was gone.

Again and again our escorts, aristocratic ladies with bleached hair and eyebrows, dressed from head to toe by Guy Laroche, would ask me to explain Betty's behavior. "Please, Mrs Greer, she behaves so strangely, we think she may be drinking. She shouts at us, and when we try to explain she walks away. Sometimes her speech is strange."

I got so sick of being made to admire the Shahbanou's restoration work and eat cake at girls' schools while Betty held the floor, that I arranged to be taken on a side trip to Shiraz University. The night before, Betty swept into my room, fetchingly clad for bed in a cascade of frills and flounces. "Whuttzes extra trip they've laid on for tomorrow?" she shouted, trotting back and forth in a continual frou-frou. "I've told them to cancel it! I've done enough!" By that time I knew her well enough to know that there would be no point in telling her that the trip had been arranged for me. I let her think it had been cancelled, went to Shiraz and met Islamic Marxist women, dressed head to foot in heavy woolen chadors, who told me that no truth could come from the mouth of a western doll. Four years later those same women surrounded the American embassy in Tehran, and the world really was never the same again.

As we were leaving our farewell party to go back to the hotel, Betty propped herself in front of our Cadillac and refused to get in. "Dammit!" she shouted, "I wunt, I deserve my own car! I will nutt travel cooped up in this thing with two other women. Don't you clowns know who I am?"

"Mrs Greer," pleaded the courtiers, who were shaking with fright. "What shall we do? Please make her quiet! She is very drunk."

Betty wasn't drunk. She was furious that the various dignitaries and ministers of state all had their own cars, while the female guests of honour were piled into a single car like a harem. Helvi and I looked on from our Cadillac at Betty standing there in her spangled black crepe-de-chine and yelling fit to bust, "I will nutt be quiet and gedinna car! Absolutely nutt!"

Eventually one of the ministers' cars was sent back for Betty. As it pulled out of the gateway I caught sight of her, small, alone in the back, her great head pillowed on the leather, eyes closed, resting after this important victory.

Betty and I met a few times after that, in circumstances where she didn't get to use my time as well as her own. I always let her speak first because it was easier to explain my position by stepping off from hers. Everything Betty said was up-beat, triumphalist, even as state after state was failing to ratify the equal rights amendment. Betty believed that freeing women would not be the end of civilization as we know it; I hope that freeing women will be the end of civilization as we know it.

Betty was disconcerted by lesbianism, leery of abortion and ultimately concerned for the men whose ancient privileges she feared were being eroded. Betty was actually very feminine, very keen on pretty clothes and very responsive to male attention, of which she got rather more than you might think. The world will be a tamer place without her. ❖

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Kendra Snyder is an intern at CERN, Geneva.

Breaking for Families: Women physicists find taking a leave is often hazardous to their career.

By Kendra Snyder

From the time she earned her PhD, it took almost a decade for Elizabeth Freeland to get where she is now, crunching numbers for Fermilab's Theoretical Physics Department on the third floor of Wilson Hall. After receiving her doctorate in condensed-matter physics from Johns Hopkins University in 1996, Freeland took a five-year career break for motherhood before returning to the field. She was met with a series of hurdles built by her absence. "There's this mindset that if you take time to do anything but physics, then you're not serious," Freeland says.

Geography limited Freeland's initial job search. Her husband, also a physicist, accepted a job at Brookhaven National Laboratory. Freeland followed, unable to find a job in her own field. Shortly afterward, she followed again when her husband accepted a job at Argonne National Laboratory near Chicago. Freeland always wanted to have children, and she says she didn't want to push her personal dream aside for a professional one. So in 1999, the couple had their first child, Raymond. "I didn't want to have children when I was 40," Freeland says. "I wanted to have them in my late 20s or early 30s, which is not the best time in terms of an academic or science career."

After giving birth to her daughter, Eleanor, in 2002, Freeland renewed her job search. A full-time job demanded research experience, so after sending out numerous letters looking to help labs on "small projects," she came to Fermilab hoping to collaborate on summer research. Although Freeland said the lab's staff was encouraging, she needed a grant to support her research. And the grants required her to have a full-time affiliation with less than a five-year break after graduate school. As a mother of two and a part-time physics teacher at the School of Art Institute of Chicago, Freeland had neither. The search for a grant came up empty. "If I couldn't get a grant, I couldn't have day care, and if I couldn't get day care, I couldn't do the work," she says.

Balancing work and family: After receiving her doctorate in condensed-matter physics in 1996, Elizabeth Freeland took a five-year career break for motherhood. Photo credit: Sandbox Studio.

Still the minority

Whether for motherhood, family needs, illness, or other reasons, career breaks can be detrimental to the livelihood of research physicists and scientists on tenure tracks at universities. Long work weeks, grants that assume an unbroken career path, and a disdainful attitude directed at scientists who leave the field for an extended period of time can make a physicist's return to the lab difficult, and sometimes impossible. "A gap in the resume is viewed as suspicious," says University of Colorado Research Associate Sandra Laursen, who is working on a National Science Foundation Advance project. Advance grants are meant to increase the representation and advancement of women in academic science and engineering careers. Laursen continues: "Science career paths tend to be fairly linear and constrained, and people who are not following that path have a hard time getting back on it."

Although men also take breaks from scientific careers, women are most likely to face the decision to do so, some with "heartbreaking" stories, Laursen says. "There was one woman whose husband had brain cancer," she says. "She

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Elizabeth Freeland has two children, Eleanor and Raymond. Photo credit: Sandbox Studio.

A grant from the American Association of University Women has allowed Elizabeth Freeland to resume her research career. Photo credit: Sandbox Studio.

just needed to be home when her husband was dying. You can't fault that choice, but to take that hit to your career because of it is pretty tough."

The most common reason women take a leave from their jobs is related to a conflict between the biological clock and work demands, says Joan Williams, Distinguished Professor of Law and director of the Center for WorkLife Law at the University of California's Hastings College of the Law. WorkLife Law is a research and advocacy center in San Francisco that aims to spur conversation about families and their experiences in the work- place. Through her work there, Williams has written extensively about discrimination against women in the workplace, including Unbending Gender: Why Family and Work Conflict and What To Do About It.

Women are disadvantaged in science careers because of the path they're expected to follow after earning their PhDs, Williams says. According to the American Institute of Physics, the average age at which physicists earn their PhDs is 29. "In science you have to complete a postdoc, so if you wait until you get tenure, you're much more likely to be infertile," Williams says. "The track assumes an ideal worker doesn't take time off for child bearing. Women in science have trouble even taking maternity leave."

Those difficulties could be partly responsible for the field's lack of women. Although more women are earning physics PhDs, the gap between physics and other fields is becoming wider, according to a 2005 study conducted by the American Institute of Physics. In 2003, women earned just 18 percent of the PhDs in physics compared to about 45 percent in the biological sciences. However, this reflects a steady increase from 1972–73, when 3 percent of physics PhDs were earned by women.

"The climate for women is better, but not anywhere near where we'd like it to be," says Judy Franz, Executive Officer of the American Physical Society (APS). After doing a postdoc in Europe and giving birth to her son, Franz worked part-time for three years before she was able to "climb out of the hole" and secure a faculty position at Indiana University at Bloomington in the early 70s. "I had people tell me, 'Don't you think you're destroying the life of your child?'" she says. "It was an entirely different climate then."

Although the idea of a working mom is now accepted, Franz says troubles for mothers in the science field remain. "One of the hardest challenges is having a family and being a physicist," Franz says. "Some people think it's natural that men shouldn't have to participate in the family. A lot of men do now, but there are old-timers around that think unless you're working 80 hours a week, you shouldn't do physics. That's very hard on women who would like to have a family."

Hourly demands

Ruth Howes considers herself one of the lucky ones. When the Marquette University nuclear physicist was at Columbia University for graduate school, she did the unthinkable for a female physicist of the time—she had a baby. "You didn't

get pregnant in grad school," she says. "I tried to hide it and then begged them to please, please let me work." Fortunately, Howes' advisor, C.S. Wu, didn't complain when Howes returned to the lab a month after the delivery, diapering her child on the lab table. Howes battled the odds again when after four years of part-time work and one more pregnancy, she secured a faculty position at Ball State University.

Stereotypes about women in the field, especially mothers, stayed with her. "It was about who could work hardest and who could be the most tired," Howes says. "The physics field as a whole needs to take a deep breath and stop looking at itself as a religion and recognize that doing physics is a job and people need to balance work and other aspects of life."

The average university faculty member works more than 50 hours a week and 95 percent of American mothers aged 25–44 work less than 50 hours a week year-round, says WorkLife Law's Williams. "There's a really dramatic mismatch between the workforce and the workplace," she says. "You don't have to do much more than design a full-time job at 50–plus hours a week to wipe mothers out of the labor pool, thereby wiping a majority of women out of the labor pool."

Ultimately, that workforce mismatch forces scientists to choose between a family and a career. For now, condensed-matter physicist Elvira Badica chooses family. For the past year and a half, Badica has stayed at home to take care of her two children. After she had her first child as a graduate student at the University of Illinois at Urbana-Champaign, Badica went on to complete her postdoc at Argonne National Laboratory. Around the time Badica's second child was born, she stayed in Illinois while her husband moved to New Jersey to complete his own postdoc. But suddenly, mixing research and family have become too much to juggle by herself.

"I thought it was the right thing to do for the sake of the family being together," Badica says. "Research involved more time, family involved more time, and it was hard to balance." She expects stability soon. Within a year, the family plans to reunite in Virginia, where Badica's husband will complete another postdoc at the University of Virginia. The move also could allow Badica another stab at the science she left behind. In Virginia, Badica hopes to become a student once more, earning an education degree and eventually teaching physics. She doesn't expect an easy re-entry to the field, but says she hopes that a third option will present itself in the physics-versus-family dilemma: the opportunity to do both.

"If I couldn't get a grant, I couldn't have day care, and if I couldn't get day care, I couldn't do the work." Photo credit: Sandbox Studio.

Finding a "loophole"

Fermilab's Freeland eventually earned enough money from teaching at the Art Institute to pay for day care while conducting part-time research. Then she found a "loophole"—a grant from the American Association of University Women did not require full-time affiliation with an institution, and did not exclude those out of graduate school for longer than five years. Her application was accepted, and the one-year grant allowed her to start at the lab full-time in July, working on Lattice QCD calculations. QCD, or quantum chromodynamics, is a theory that describes the strong nuclear force. Now collaborating with the Lattice QCD group, Freeland studies through numerical analysis QCD's effect on the decay of subatomic particles.

Grants that cater to scientists who take career breaks are extremely limited, but they do exist. In addition to the American Association of University Women, the Sloan Research Fellowship also accommodates those who take career breaks. Similar grants are being created, such as the American Physical Society's M. Hildred Blewett Scholarship. The one-year award of $45,000 is designed to assist women who have interrupted their research careers because of family demands. It was made possible by a bequest from M. Hildred Blewett, a female particle accelerator physicist who died in 2004. "Everyone was very happy to see this award created—and who knows, maybe it will inspire other donors," says APS Education Programs administrator Sue Otwell.

Additional grants are encouraging but help only a small number of women to re-enter the

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field, Freeland says. A real solution would go much deeper, by scrutinizing hiring methods, changing cultural attitudes, and encouraging communication. "You should be able to sit down at a lunch table and say 'When is a good time to have children, or how can I deal with this?'" she says. "You should be able to ask that question to a group of physicists and not have it looked at as a negative."

The APS Committee on the Status of Women is trying to help women deal with hurdles in their careers through a series of workshops on communication and negotiation skills. WorkLife Law will offer training in handling the disadvantages women face in the workplace. This approach to cultural education also should be adopted at universities and institutions to change some of the deeply rooted stereotypes female scientists face, says APS's Franz. "People in positions of power and influence should speak out and say 'Women physicists are important, and in order for them to participate we're going to have to make some changes," she says.

In addition to training, Williams suggests one quick fix to help scientist moms in the field: job shares. "There are always far more qualified applicants than can be hired, so why not divide a 50-to-60 hour-per-week job into two 20-to-30 hour-per-week jobs?" she says. "That is an easy solution and it could be done tomorrow."

A greater number of part-time jobs, however, won't work unless the stigma attached to them and to physicist mothers is erased, Freeland says. "Family issues need to be talked about more instead of brushing them aside," she says. "I made a lot of mistakes because I wasn't allowed to talk about the decisions I was making. Wanting to have children is independent of your ability as a scientist." ❖

*This article appeared in the March 2006 issue of Symmetry. Symmetry is a joint Fermilab/SLAC publication (***www.symmetry magazine.org***)*

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Michael Peña is Staff Affairs Reporter on the Stanford Report. Gail Mahood, professor of geological and environmental sciences and associate dean for graduate policy at Stanford University.

New Childbirth Policy for Female Graduate Students

By Michael Peña with Gail Mahood

Stanford University has adopted a childbirth policy for female graduate students to accommodate the demands of late-stage pregnancy, childbirth and the care of a newborn. The new policy will allow the new mother to maintain full-time, registered student status, as well as facilitate her return to full participation in class work and, where applicable, research, teaching and clinical training in a seamless manner.

Photo permission: Michael Pena

Michael Peña

Photo credit: Linda A. Cicero /Stanford News Service

Gail Mahood

The childbirth policy, effective immediately, was announced by Gail Mahood, a professor of geological and environmental sciences and associate dean for graduate policy, during a regular meeting of the Faculty Senate on Thursday, Jan. 26. Stanford is only the second major U.S. university to offer such a policy, according to Geraldine L. Richmond, chair of the Committee on the Advancement of Women Chemists and a professor at the University of Oregon. The Massachusetts Institute of Technology introduced its "childbirth accommodation policy" in 2004.

One of Stanford's top priorities is to increase the number of women pursuing advanced degrees that will prepare them for leadership positions in academia, industry and government. And, as stated in the Stanford Graduate Student Handbook, "it is important to acknowledge that a woman's prime childbearing years are the same years she is likely to be in graduate school, doing post-doctoral training, and establishing herself in a career."

"So our main goal in designing this policy was to make sure that we retain in the academic pipeline women graduate students who become pregnant and give birth," Mahood said on Thursday.

The Childbirth Policy has four components. All female graduate students—including those in the professional schools—who are pregnant or have recently given birth and who are registered and matriculated:

- are eligible for an "academic accommodation period" of up to two academic quarters before and after the birth, during which the student may postpone course assignments, examinations and other academic requirements; and
- are eligible for fulltime enrollment during this period and will retain access to Stanford facilities, Cardinal Care student health insurance and Stanford housing.
- Students also will be granted an automatic one-quarter extension of university and departmental requirements and academic milestones—with the possibility of up to three quarters by petition under unusual circumstances. (A Ph.D. qualifying exam is an example of an academic milestone.)
- In addition, female graduate students supported by fellowships, teaching assistantships, and/or research assistantships will be excused from their regular teaching or research duties for a period of six weeks during which they will continue to receive support.

(Students will not receive a stipend or salary if none was received previously but are eligible for the academic accommodation period and the one-quarter extension of academic milestones.)

The policy also allows eligible students to avoid interruptions to on-campus housing, eligibility for student loans and deferment of student-loan repayment, Mahood said. For international students, the provision allowing a new mother to maintain full-time status will ensure that the status of her visa is unaffected, Mahood added.

"I want to emphasize that this academic-accommodation period is not a leave of absence. We are expecting that the woman, to the extent that her health and the health of the infant will allow, will be in residence and will participate in course work and research—even if it is at a somewhat lower level than prior to the birth," Mahood said.

The new policy sets a minimum standard for accommodating female graduate students who give birth, Mahood said. It is expected that advisers, academic staff and department leaders "will work with sensitivity and imagination to provide more than this minimum, as some parts of the university are already doing," she added.

Last fall, the Chemistry Department unveiled a maternity policy for graduate students that would allow pregnant women or new mothers to scale back their course work or research for up to 12 weeks and still be paid. Instituted by department Chair Richard Zare, the policy—along with Stanford's—are among the most generous in the country.

"There's nothing in this policy that replaces the communication and cooperation between student and adviser and the good-faith efforts of both of them to accommodate the birth of a child," Mahood said. "And it's our intention, in establishing this policy, to reinforce the importance of that cooperation and to have the university provide the support that makes that accommodation possible."

Adoption, foster-care placement, and paternity leave are covered under existing policies in the graduate student handbook that govern medical, maternity and paternity leave. The handbook also states that birth mothers may opt to use medical and maternity leaves in addition to or instead of the benefits provided by the new childbirth policy.

The policy will be administered by the Office of the Dean of Research through a petition process. For the policy's full text, please visit **http://gsh.stanford.edu/childbirth.html**. ❖

SNIPPETS

NEWS BRIEFS AND HIGHLIGHTS

A Scientific Point of View

In a recent issue of Physics Today astrophysicist Evalyn Gates has a thought-provoking article challenging physicists to address the lack of women in science. "The polarization of the cosmic microwave background did not measure itself—and the number of women in physics will not increase significantly until we begin to approach the question with the same enthusiasm and skill."

She also includes an excellent list of 19 references of good articles and books on the topic of women in science. It makes a good single-sheet hand-out to stuff into mailboxes or distribute to classes.

Physics Today, April 2006 issue page 64, published by the American Institute of Physics, the umbrella organization for the AAS, APS, AGU, etc.

A Little Help from Our Sisters

Readers new to AAS, CSWA or STATUS may not know about our sister organization: the Committee on the Status of Women in Physics or CSWP. Their Gazette is now available on line. The CSWP website also has a lot of useful information for students, department chairs, women faculty, researchers (**http://www.aps.org/educ/cswp**).

Try their new FAQ page. Are you thinking about graduate schools? Are you looking for one that is "female friendly"? Check out the results of an informal survey and read what departments say about themselves at **http://cswp.catlla.com/results.php**.

For several years CSWP has published a list of women speakers and even offers to pay expenses—no excuses for lack of women on the colloquium schedule! The CSWP also runs a program of site visits for physics departments where a team of experienced physicists visit a department (at the invitation of the chair) and provide advice on how to improve the climate for women (both faculty and students) within the department.

Learning from Chemistry

The chemistry community organized a national workshop that was impressively sponsored by NSF, DOE, and NIH—Building Strong Academic Chemistry Departments through Gender Equity, held on January 29–31, 2006. See **http://www.chem.harvard.edu/groups/friend/GenderEquityWorkshop/** for material (under resources).

In particular, an outcome of the workshop was a 13-page list of recommendations. We show here the Workshop Action Items

- Departmental Level: Each department is to select 2 action items for implementation within the next 2 months
- Administrative Level: Propose gender equity action items to institutional administration
- Funding Agency Level: Work with funding agencies to develop new strategies for funding equity
- Further Follow-up
  - Interactive website to be created by COACh to provide on-line resources, follow-up surveys and reports.
  - Survey in ~ 6 months to evaluate progress
  - Follow-up workshop in 1 year to evaluate progress and chart the next steps to achieve gender equity in our departments

The website provides food for thought for other scientific fields—such as astronomy—about ways to bring institutional change to improve gender equity.

Maria Mitchell Award

The Maria Mitchell Association (MMA) offers an annual award of $5,000 to recognize an individual whose efforts have encouraged the advancement of girls and women in the natural and physical sciences, mathematics, engineering,

computer science and technology. While there are many awards for scholastic and professional achievement in the various fields of science, the MMA believes it is equally important to recognize the people whose influence and support make it possible for girls to become engaged in science and for women to reach the same high levels of accomplishment as their male peers.

Maria Mitchell (1818–1889) was America's first woman astronomer and first woman astronomy professor. The MMA believes that a significant legacy left by Maria Mitchell was the vision and quality of education she gave to her students. The women she trained during her twenty-three years at Vassar College went on to make enduring contributions to the progress of women in all fields of science. Teacher, mentor, role model—Maria Mitchell epitomized the full measure of what a woman scientist could be. Were she with us today, her remarkable energies would surely be focused on academic and social reform, and career advancement opportunities for women in science.

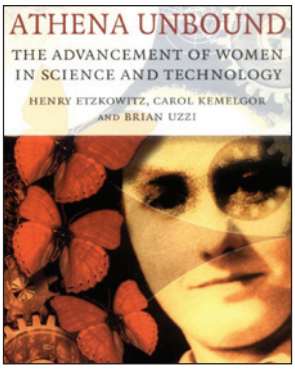
The first award was presented on October 4, 1997 and eight awards have been made to groups and individuals who have made a positive impact on girls and women in science, mathematics and engineering. Nominations are due at the end of February. Forms and further information are available from the Maria Mitchell Association at **www.mmo.org**. Know someone you would like to nominate next year?

Athena Unbound*: *The Advancement of Women in Science and Technology by Henry Etzkowitz, Carol Kemelgor, Brian Uzzi (Cambridge University Press, 2000)

Review by Fran Bagenal

Sociologists seem to like to study women in science as if they were rare plants in the tundra or disappearing tribes in the jungle. They put lots of numbers in tables (to show they are real scientists, presumably) to indicate something rather obvious to those of use who "live in the field" (e.g. women scientists tend to marry other scientists, men scientists tend to marry non-scientists). While Athena Unbound promises to discuss large surveys of women scientists, very little beyond anecdotes is reported for most of the book.

But the authors do present much of the recent literature on the topic of women in science. This is the place to come if you want a review of sociological studies (up to late 1990's) of women in science. Picking a section heading at random—"Gender socialization and undergraduate science education"—gives you an idea of the sorts of topics discussed. All very interesting stuff. It just seems rather out of touch with recent institutional changes and debates that were initiated by the MIT women faculty study and the Summers' debacle at Harvard. So, Athena Unbound is a useful reference to add to your women in science bookshelf but if you only have time to read one book on this topic I recommend Virginia Valian's Why So Slow? which neatly summarizes the best gender studies from psychology.



credit: Illustration by Steve Xerri. Cambridge University Press

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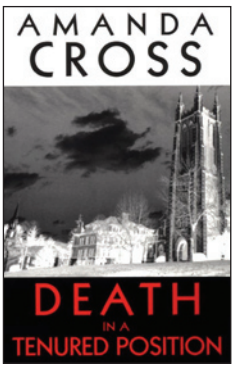
Death in a Tenured Position

by Amanda Cross (A Kate Fansler Mystery, Ballantine Books, 1981)

Review by Fran Bagenal



Ballantine Books

Oh, poor Harvard. It is just such pleasure to make fun of the most elite institution. In need of airline brain fodder I grabbed a book I fondly remembered from my early days on the faculty and wondered if it would stand the test of a couple of decades. Sure enough, it was a rollicking good read—lots of carefully planted red-herrings and cultural distractions from the main plot. But the joy comes from a combination of vivid descriptions of characters (who have familiar traits of "typical academics") and their witty repartee. Most interesting to me on my second read was to see that over the past 25 years there really has been substantial change to academia, even at Harvard.

The plot: a large donation obliges a department of English to appoint their first woman professor who is then found dead under strange circumstances. In comes Kate Fansler to solve "who dunnit", put the world to rights, and drop literary quotes along the way.

The descriptions of Cambridge in the late 70s / early 80s were spot-on and brought back memories of my graduate student days at MIT. While I cannot say whether the Harvard faculty really was that fuddy-duddy, I do believe that much of the stereotypical sexist behavior has died out (at least in most places). And we are now left to complain about the low standards of students these days. At least some things haven't changed in 3000 years.

Send your "Notes" to
bagenal@colorado.edu

Notes From a Life

Contributions from our readers

♀ Two incidents last week made me stop, think and laugh at myself. On the first occasion I walked into a small conference room for an undergraduate honors thesis defense to see the woman candidate putting out a tray of small muffins and fruit. "Typical woman," I thought, "She needs to learn not to do these things. Her male colleagues would not provide food. It gives a bad impression." Immediately, I realized that I had skipped breakfast and was actually starving. She was not trying to "buy" our support—she was just being nice. What's so wrong with that? The second incident was the arrival of a handwritten note on quality paper from the dean at a university thanking me for participating in an external review of one of their departments. "Typical woman," I thought, "A male dean would not have *dreamt* of writing a handwritten thank-you note."

I recalled these incidents to a colleague later in the day, laughing at myself for criticizing women for doing unnecessary things, behaviors that seemed typically female in our male-dominated world of science. But they were harmless things, pleasant gestures that spread a little goodwill in our hectic workday. She pointed out that while young women entering the academic fray may have to watch out for being judged as conforming to stereotypes, we established (not to say old) women can—nay, *should*—take pleasure in injecting behavior of "typical women" into our work-lives. "I had to come to grips with overt female behavior when I had babies," she said. "There were things I *had* to do that no guy was certainly ever going to do, and no one was really ever going to mistake me for a man, no matter how I behaved. So I decided to embrace what I think can be positive differences, even if stereotypical. A big point, however, is that it's *my* choice, and woe to anyone who *expects* me to make coffee or bring cookies, because I'm female!"

Now, don't expect to see me in a dress any time soon, but perhaps I can back-off a little on the "gnarly-dude" attitude. And perhaps guys will begin to feel more comfortable bringing in food. ❖

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