January 2006

STATUS

A REPORT ON WOMEN IN ASTRONOMY

CONTENTS

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

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Amy Simon-Miller is an Astrophysicist at the NASA/Goddard Space Flight Center in the Planetary Systems Laboratory of the Solar System Division of the Sciences and Exploration Directorate where she is busy analyzing data on Saturn from the Cassini Composite Infrared Spectrometer.

Implementing Change and Finding Balance at NASA's GSFC

By Amy Simon-Miller

The Pasadena Recommendations make a variety of suggestions to institutions for helping employees achieve balance in their lives, while also leveling the playing field for women in science. At the same time, external site reviews have provided a reality check to many people on how well their institution is (or isn't) doing when it comes to equity and employee happiness. As various departments begin to look inward and see how their policies do or do not meet equity goals, we present an example of how Goddard Space Flight Center (GSFC) is meeting some of those same challenges and is working towards the future. We also are hopeful that GSFC administrators will endorse the Pasadena Recommendations when the nationwide call for endorsement is released.

History and Statistics

The primary groups enacting change at GSFC are the Goddard Employee Welfare Association (GEWA) and the Women's Advisory Committee (WAC). GEWA formed to "stimulate and strengthen the esprit de corps and morale of the GSFC employees ... through social, athletic, educational, and cultural activities." GEWA is responsible for a wide range of activities and property: maintenance of the campus Recreation Center, picnic facilities and sports fields, oversight for over 50 employee

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Editor's Note

By Fran Bagenal

This issue of *STATUS* provides three different views of family-work issues. We aim to publish more articles on this theme in the future, exploring how different people and institutions are tackling what is a primary concern of many professional astronomers. Readers are encouraged to submit their perspectives. *STATUS* continues to celebrate women astronomers who have made major contributions to our field with an interview of Dorrit Hoffleit plus an insightful review she wrote of Cecilia Payne-Gaposchkin's autobiography 21 years ago. Finally, we have created two new sections in *STATUS*: Feedback of responses to articles in previous issues and Snippets that presents short pieces from the news. ❖

Career vs. Family – How "The Man" Can Help

By Sarah Gibson

As a tenure-track scientist and the mother of two little boys, aged 5 and 2, the issue of balancing career and family is of preeminent interest to me. Luckily, I have found a balance that works, to the benefit of my work, my family, and my personal sanity.

My secret? Help from two manifestations of "The Man". First and foremost, my husband Mark, also a scientist, has been an equal partner in raising the children. We take turns with everything, from dirty diapers to bedtime stories, and so share the often exhausting duties of parenthood but also its many joys. The second great help to me has been, at the risk of propagating a gender stereotype, "The Man" in its colloquial meaning, i.e., "Working for The Man."

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Career vs. Family *continued from page 1*

This is the primary subject of this article, which will demonstrate how a company or university can work with the women (and men!) they employ to create a flexible enough environment to allow both career and family to flourish.

I am a staff scientist at the National Center for Atmospheric Research (NCAR), which is governed under the auspices of the University Corporation for Atmospheric Research (UCAR). Just as in a university tenure track, staff scientists progress through an "up or out" process of reviews until moving from term appointments to an indefinite appointment. Just as in the university, the pressure is on to prove oneself with ground-breaking research and multiple publications. As a mother of two small children, however, spending twelve hours a day (or more) in the office to reach this goal is a price too high to pay for tenure. On the other hand, I am lucky to truly love my job, and completely giving it up for months or years while the children are young would be, quite frankly, a depressing option for me. What I want to do, and what working for UCAR has enabled me to do, is to design a slower, more flexible work plan than the traditional tenure-track treadmill.

UCAR has made an effort to cultivate a family-friendly atmosphere over the years, leading to employment policies that are widely recognized for their excellence. In particular, Colorado Parent magazine announced in August that it had ranked the organization as the top nonprofit employer in the state for working families. A panel of judges, composed of community leaders, used such criteria as flexible work arrangements, child care assistance and support, adoption benefits, extended leave for new parents, subsidized health and wellness benefits, and community involvement. The magazine's October issue profiled the winners.

"We are very honored to be recognized as one of the best employers in the state," says UCAR president Rick Anthes. "UCAR has long prided itself on providing top-tier benefits to its employees, enabling them to balance their lives between work and personal pursuits."

Rick can speak from experience. While his kids were in school, he worked a flexible schedule, arriving at the office before dawn and leaving in the mid-afternoon so he would be home for them.

Katy Schmoll, UCAR vice president for finance and administration, says the orga-

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nization's rationale for the excellent benefits goes beyond supporting healthy lifestyles. "We're really selfish," she says. "We like to attract good people and we like to keep them. In my mind these programs are essential to accomplish that in today's workplace."

I can testify personally to the benefits of these programs to the working parent, as my husband and I have taken advantage of just about every family-friendly policy UCAR provides. These include:

- The UCAR child care center. Established last year just a few blocks from the Center Green and Foothills campuses, the center offers exceptionally low teacher-child ratios as well as discounts for UCAR employees. Our two-year-old son, Jeremy, attends the center, and our five-year-old, Nicholas, who is in kindergarten, is able to use it on a drop-in basis when the local schools are closed.
- Flexible work arrangements that allow many staffers to telecommute or to adjust their schedules according to family needs, as long as they can get their jobs done. Mark and I have taken turns working part-time, and also often work evenings or weekends as needed.
- NCAR's Salary Continuation Plan enables new mothers to take fully paid leave after the birth of their child as recommended by their doctor (usually between six and eight weeks) without having to use more than two weeks sick leave. At the time Jeremy was born I had not been employed long enough to accrue six weeks sick leave, so this recently enhanced program was directly beneficial to me.
- A family sick leave policy that allows staffers to take time off when children or other family members are ill. This annual ten-days benefit can also be used as paternity leave. In addition to this benefit, if a staffer cannot easily take the time off from work, UCAR helps defray the cost of hiring a designated child care professional to watch a sick child at home.
- A "stop the clock/slow the clock" policy that allows early-career scientists to take time off without being penalized for failing to adhere to a fixed schedule when moving up the scientific ranks. Because I worked part-time after Jeremy's birth, I will have the option of extending my current term appointment and being evaluated on a pro-rated basis.
- Leave donation, which allows staffers who have accrued more PTO (paid time off) than they will use to donate to a pool for staffers who need to take time off for themselves or their families. We have not needed to use this recent addition to UCAR's benefits, but it is reassuring to know it is available.

Many of these benefits have been developed or enhanced over the past few years, in part in response to a UCAR site visit in 1999 by the Committee on the Status of Women in Physics of the American Physical Society (APS). This group interviewed employees and presented findings on how to improve the atmosphere for women at UCAR. A day care center and improvements to maternity leave were specifically recommended. The quick action taken by UCAR in response to these findings demonstrates first of all the value of such site visits, and second that it is possible for a company or university to make significant improvements in a short time.

Photo by Carlye Calvin.

Sarah Gibson and Mark Miesch with their sons Jeremy (left) and Nicholas (right).

In conclusion, I think it is important to emphasize to young women starting out in Astronomy and Physics that no, you cannot have it all — or at least not everything all of the time. My work has definitely been slowed down by having children. However, by making good choices, I can try to make this result in a diminishment of quantity of work, not quality. In fact, at a time in my career when I am overwhelmed with offers to collaborate or be on committees, and it is all too tempting to do everything, perhaps being forced to slow down and make careful choices is a good thing. A pell-mell rush to success is all very well, but sometimes it is a good idea to stop and smell the diapers. ❖

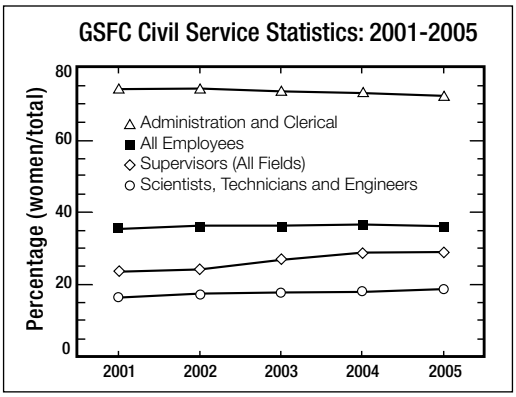
Sarah Gibson is a solar physicist at the National Center for Atmospheric Research (NCAR). For this article, she worked with David Hosansky, an editor and writer for the University Corporation for Atmospheric Research (UCAR) who wrote about the organization's family-friendly benefits in NCAR/UCAR's Staff Notes.

Implementing Change *continued from page 1*

clubs and sports (from aerobics to Zymurnauts, and everything in between), and management of the employee exchange store, Visitor Center gift shop, cafeterias and vending machines. Thus, they are directly responsible for many aspects of employee well-being and offer a range of opportunities for activities outside of work; employees are encouraged to join these groups and to participate in their many center-wide events.

The mission of the WAC, which formed in 1995 under the Federal Women's Program, is to "promote a creative, flexible environment where the continuing contributions of women in the workforce are endorsed, enhanced and valued." The WAC members have been the facilitators for many in-reach efforts and community-building activities, and have tracked the hiring, retention, development and promotions of women at GSFC. They have been a major force in implementing new facilities at GSFC and pushing for workplace change. As part of a recent expansion of activities designed to reach individual women, the WAC has sponsored a number of work-life surveys, networking events and opportunities for women scientists and engineers to meet and share their experiences. The WAC was recently recognized by GSFC with the 2005 Annual Center Director's Award for their hard work and center-wide impact.

Figure 1



Goddard Space Flight Center employment statistics.

To understand the demographics of GSFC, the civil service workforce break-down over the past five years can be seen in Figure 1, noting that only about one third of GSFC employees are civil servants. From 2001-2005, the composition of the science, technical and engineering staff held steady at roughly 18-19% women. The overall staff was constant at about 36% female, dominated by those in the clerical and professional administration staff pool, which is nearly level at 70%-75% women. Slight improvement was seen in the overall number of women in supervisory positions, increasing from 24% to 29% (in science and engineering, about 19% of the supervisors are women). To put these numbers in perspective, in 1995 women comprised approximately 19% of the science and engineering positions, and 32% of the overall GSFC workforce, similar to what is seen today. By contrast, however, in 1995 women held only 17% of overall supervisory positions and ~11% of the science and engineering supervisory positions, showing improvement in the numbers of women trained and promoted over the past decade. Of course, one must be cautious of over-interpreting these numbers, due to the small number statistics involved.

Facilities, Programs and Activities

GSFC has many facilities designed to make balancing work and life easier, and most are open to all employees. For family balance, examples include the Child Development Center (GCDC) and specialized Lactation Facilities in ten buildings. For those with small children, the GCDC serves as a daycare and education center for children ages 2 through kindergarten and has been in operation since the 1970s. Studies are currently underway to determine the feasibility of expanding to include infant and sick-child care. The GCDC is run as a "club" by GEWA with employee memberships to help finance the center and to provide volunteer hours for clean-up, etc., but it also employs a professional full-time staff dedicated to the education and development of the children. For nursing mothers there are Lactation Facilities, set up largely through the efforts of the WAC, and designed as a private place for pumping that offers refrigerators and hospital-grade pumps. As demand increases, more rooms are added in buildings around the center.

For overall needs, GSFC has signed up with WorkLife4You, a web resource that can help answer employees' questions on child care, health issues, retirement and investments, legal matters and more. There is also an Employee Assistance Program designed to assist with personal issues. For health-related issues, there is a medical Health Unit for medical emergencies, allergy and flu shots and physicals, and an on-site fitness facility, though some of these services are limited to civil servant employees only.

Many more important programs are still in progress. A number of dialogs on diversity, work culture and other topics have been underway for quite some time. These seek to understand the culture at GSFC and to implement changes to make a better working environment for everyone. As a result, new programs include a New Employee Welcoming Board, which offers seminars and quarterly fairs for all interested employees to learn about facilities and procedures at GSFC, and a formal mentoring program.

In addition, the Sciences and Exploration Directorate (formerly the Space Sciences and Earth Sciences directorates) has been engaged in a number of activities focused on the women scientists and engineers at GSFC. In 2002,

Director Dr. Jonathan Ormes began a series of meetings with women scientists in the directorate to discuss their concerns and issues. This included calling for an American Physical Society review of the climate for women and minorities at GSFC, in addition to the normal visiting committee reviews. Those reviews and meetings culminated in a WAC-sponsored facilitated dialogue in 2004, run by an external group that specializes in such meetings. This highly structured meeting of women scientists and their supervisors made many people aware of the wide range of working conditions around the center and highlighted some specific areas where improvements could be made. Continued dialogues and actions are being discussed by many groups, including the WAC. As part of this effort, the WAC is getting more women involved by sponsoring Women's Equality Day events, Knowledge Sharing Workshops and bi-monthly networking lunches. They also publish a monthly newsletter, and are compiling a book of short biographies as part of a push towards creating an informal women's networking and mentoring program.

In summary, change takes time and effort, but is worthwhile for all employees. Obviously, the WAC has been a driving force for improving GSFC over the past decade. However, the increased participation by women across the center is of equal importance, because without their input, problems are not as easily identified or addressed. Finally, we are pleased to announce that the newly appointed Director of the Sciences and Exploration Directorate is Dr. Laurie Leshin, replacing Dr. Jonathan Ormes, whose efforts were greatly appreciated by the women scientists at GSFC. We look forward to watching GSFC as it continues to evolve into a wonderful work place for all employees. ❖

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Dr. Jang-Condell is a Carnegie Fellow at the Carnegie Institution of Washington, which does provide health care and maternity leave to postdocs, and the proud mother of two incredibly sweet boys, ages 1 and 4.

The Balancing Act: A Postdoc's Perspective

by Hannah Jang-Condell

Balancing career and family is a tough act for anyone, but it's particularly difficult for women in science. The pressure to publish or perish is so great that taking time off for maternity leave can jeopardize your entire career. The advice I got from many people was either to hold off on having children until you get tenure, or to have them while you're a grad student, since taking an extra year or two to finish your thesis isn't a big deal. So my husband and I made a conscious decision to do the latter, since who knew when I might land a permanent position? Perhaps I'd be in my forties, older, slower, and more affected by sleep deprivation, not to mention facing increased health risks for myself and my baby. And what if we encountered fertility problems? Tick, tick, says the clock….

I was lucky. Most graduate students aren't in a position either financially or socially to even think about having children. Fortunately, we had a few things going for us. We married during my first year in grad school, so we had an established, stable relationship. I went into theory rather than observational astronomy so I wasn't constantly traveling to telescopes. My husband earned enough at his job to afford having children. His company allowed him to telecommute and work on flex time, so he could rearrange his schedule to take care of our babies. And, perhaps most importantly of all, my husband does more than just help out — he's a full partner in taking care of household chores and childcare.

Not to say that it's been easy. Having children is never convenient, though you can try to time things so that it's easier to rearrange your life. While it's good to be past those difficult early days (and nights) of infancy, it's merely a different set of challenges now that I'm a postdoc. When I go job hunting, I not only have to worry about my own career aspirations, but I also have to consider job prospects for my husband, relocating our family, and finding schools and daycare for my kids. My two-body problem is now an N-body problem, which is well-known to result in chaos.

Given my perspective on the matter, I'm happy that high-level people, such as certain university presidents, are trying to increase the representation of women on their science faculties by instituting family-friendly policies. Tenure clock extensions for parental leave,

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child care assistance, flexibility in teaching load — these are all great ideas. But with all the focus on helping junior faculty, postdocs are getting left out of the picture. Unless institutions apply those family-friendly policies to postdocs too, you risk losing some of your most promising women faculty candidates.

For further reading:

Enhancing the Postdoctoral Experience for Scientists and Engineers: A Guide for Postdoctoral Scholars, Advisers, Institutions, Funding Organizations, and Disciplinary Societies.
National Academy Press,
Washington, DC, 2000.
http://www.nap.edu/catalog/9831.html

The truth is, postdocs get short shrift, men and women alike. Typical postdocs are two- or three-year positions, and you're expected to move on after that, either to yet another postdoc or, if things go well, an assistant professorship or some other type of permanent position. For example, the Hubble Fellowship, one of the most prestigious independent fellowships in astronomy, states clearly that awardees should not continue at their current institutions. While it is possible to get around this requirement, this is the exception rather than the rule, and the applicant has to make a very strong case. In order to get more bang for their buck, many institutions hire postdocs as contractors so that they don't have to offer benefits to such as health care or extensions for maternity/paternity leave. Since postdocs are are only temporary workers, employers have little motivation to make concessions for them, so postdocs end up with very little negotiating power.

It's a hard enough life for a single person without any dependents, but there are things institutions can do to make it easier for those of us with families. Here are just a few:

Health Care Benefits

In a survey published in 2000 of academic and non-academic institutions which hire science postdocs (see below), only 25 out of 40 institutions reported that they provided health benefits for all their postdocs. Several reported that coverage depended on the postdoc's funding source, and two universities stated that they did not provide any benefits at all. Ideally, institutions should provide health benefits for all postdocs and their dependents, but at the very least should make group rates available.

Parental Leave

Postdocs should get maternity and paternity leave equivalent to the policies in place for faculty or otherwise permanent staff. In addition, if a postdoc opts to take unpaid leave, his or her appointment should be extended for an equal amount of time. For some postdocs, it's not necessarily the cut in salary that hurts, it's the time away from doing research and writing papers and proposals. Allowing such an extension comes at no additional cost to the institution and enables postdocs to re-establish their research after taking parental leave.

Longer Postdoc Appointments

Having to move every two or three years and start up again at a new place is very disruptive, to both career and family. It takes time to find a job, pack up, move, unpack, and repeat, all of which is time away from research. It also causes stress to family members who have to find new jobs or settle into new schools. Five-year positions would also allow postdocs to further develop their research interests and enable them to work on projects that they otherwise would not have time to do.

Some institutions do offer longer-term fellowships, but they tend to be reserved for those who already have postdoctoral experience. These institutions include NOAO (Leo Goldberg Fellowship), the Harvard-Smithsonian Center for Astrophysics (Clay Fellowship), the Canadian Institute for Theoretical Astrophysics (Senior Research Associates), and the Institute for Advanced Studies.

Remove the Stigma of Staying in One Place

Professional astronomy, especially among academics, seems biased against people who stay at the same institution for too long. For example, some of the most prestigious postdoctoral fellowships, including Hubble, Spitzer, and Chandra, specifically state in their application guidelines that they look askance at applicants who wish to stay at their current institutions. It is possible to get around this requirement, but since these fellowships set the standard for the profession, this attitude is widespread. Even if you manage to secure a position that allows you to remain at the same place, potential future employers may still bring into question why you didn't move. Certainly there are benefits to moving, like forming new collaborations and getting some independence from one's thesis advisor. But there are also benefits to staying, like pursuing an existing project in greater depth and being able to work on long-term projects, in addition to creating stability for young families.

Helping women at the top levels is a good starting point, since they can serve as role models and advocates for their younger colleagues. Still, institutions serious about helping women break the glass ceiling need to help them reach that

ceiling in the first place. And things are getting better. I know women decades older than me who have succeeded both as scientists and mothers in the days when just being a woman scientist was a novelty. Several of my senior colleagues have children of their own, and just knowing that they understand the difficulties of parenting young children while pursuing a career in science helps me achieve balance in my own life. I also know fellow postdocs who are starting families of their own. I'm beginning to see more and more women around me, facing similar choices and challenges. So I'm not alone, and just knowing that makes it a little easier. Yes, it's still difficult. But yes, it can be done. ❖

Dorrit Hoffleit: From four-leaf clovers to variable stars

by Pangratios Papacosta

As a young girl she could pick four-leaf clovers out of the field so easily she often made them into little bouquets for family guests. In her professional work she used the same keen eye to pick out variable stars in photographic plates at the Harvard College Observatory. After reading about Mendelism, at age 12 she decided never to marry, fearing that her children may inherit the genetic characteristics of her grandmother, who died in a mental asylum. At that young age she worried that something was wrong with her due to her quiet demeanor and "do not speak until spoken to" attitude. While stationed at the Nantucket observatory she was nearly killed during a hurricane because she rushed to secure a tripod on the roof of the observatory during the eye of the storm, which she mistook as the end of the storm. Despite these and the many other struggles that she endured in her personal and professional life, she kept a cheerful and optimistic outlook toward life, so much so that she chose *Misfortunes as Blessings in Disguise* as the title for her recent autobiography. To Dorrit Hoffleit, every difficulty in her life often had a silver lining.

I did not know what to expect as I walked towards the office of Dorrit Hoffleit, who graciously agreed to meet with me that January 2003 cold winter day at Yale University in New Haven. I was overwhelmed by a mixture of feelings — pleasant anticipation, reservation and admiration, among them — as I knew this was not an ordinary astronomer but the embodiment of living history. I was about to meet a 95-year old lady whose autobiography I had just read and whose monographs on the history of astronomy I have studied and used in my work. As I entered her office, Dorrit stood up and walked toward me in welcome with an unforgettable smile on her face, one that radiated calmness and kindness of the rarest sort. After some refreshments I set up my tape recorder and started recording a two-hour conversation. She spoke slowly with elegance, humor and an impressively sharp memory about events that took place almost a century ago.

Dorrit Hoffleit was born on March 12, 1907 on their family farm in Florence, Alabama, of German parents who came to America for a better life. Her father, Fred Hoffleit, could not make a living out of the farm so he was forced to start a new job as a bookkeeper in New Castle, Pennsylvania few months earlier. He left behind his wife, pregnant with Dorrit and his two-year old son Herbert.

When a few months after her birth the farmhouse was burnt down (Dorrit suspects by arson) they moved to New Castle, Pennsylvania. Life was hard and everyone had to do some extra work; mother worked as a nurse and little Dorrit helped out as a share-cropper, picking vegetables, berries and apples. These were hard times yet they were also filled with moments of joy, like playing chess with her brother Herbert, whom she admired and adored, and reading from such books as an early Webster unabridged dictionary, an atlas of reproductions of fine arts paintings, and the *Encyclopedia Britannica*. On Sundays the children accompanied their mother in singing Psalms and read books on biblical stories. Sometimes their father would take them on long walks through the woods, pointing out fascinating creatures and plants.

Dorrit Hoffleit, Ph.D. Radcliffe, 1938. Courtesy of the American Association of Variable Star Observers (AAVSO).

Compared to her brilliant brother, Dorrit admits that she was merely an average student. Encouraged by her physics teacher and her mother, Dorrit enrolled at Radcliffe College;

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Herbert, who entered Harvard at age 14 and graduated at 18, was going on for a doctorate. She was unhappy that she could not combine mathematics and fine arts as her major. Ultimately, Dorrit chose mathematics because she loved geometry. She also took the only two available astronomy courses offered at the time. Upon her graduation in 1928, she accepted a position as a research assistant at the Harvard College Observatory (HCO), where she earned a minimal salary — just 40 cents per hour. She chose this over a much higher paying job

Treatment of Women Astronomers

- Women astronomers were paid about a quarter of what men were earning, doing the same job.

- Cecilia Payne-Gaposchkin stated that Pickering chose his staff to work, not to think.[1] Cecilia was herself a victim of gender discrimination. The results of her Ph.D. thesis (quoted as "undoubtedly the most brilliant Ph.D. thesis ever written in astronomy") were first brushed aside by Henry Norris Russell as impossible. In a letter to her in January of 1925 he wrote:

  "There remains one very much more serious discrepancy, namely, that for hydrogen, helium and oxygen. Here I am convinced that there is something seriously wrong with the present theory. It is clearly impossible that hydrogen should be a million times more abundant than the metals."

  Later on Cecilia's proposition on the abundance of hydrogen was proven to be correct and made public by none other than Henry Norris Russell in one of his own papers, proposing his theory with only a minor reference to Cecilia and not mentioning his earlier rejection of he proposition. On this very point Dorrit Hoffleit said during an interview:

  "When she finished her thesis Shapley was obviously pleased with it so he gave it to Henry Norris Russell. It was Henry Norris Russell who objected to the thesis. She [Cecilia] continued to think that Henry Norris Russell was a friend, and she thought it was Shapley who had decided that there was something wrong with the thesis. And here Cecilia all the rest of her life mistakenly blamed Shapley for not having supported her."

- Women astronomers were denied promotion and recognition, even in the person of such a great astronomer as Annie Cannon. While honored by Oxford University among other institutions, her home institution Harvard dragged its feet in terms of faculty and tenure status.

- In a letter (March 17, 2005) Dorrit referred to the discrimination that women astronomers suffered at the time:

  "I found your article so interesting that I made a point of looking up all your references. E. C. Pickering lost my respect many years ago when I noted the highly unjust treatment he gave Antonia Maury by denying her credit for her discovery of her c-characteristic in 1897 which was the first criterion by which to recognize differences between giant and dwarf stars as Hertzsprung was able to ascertain. Because the highly egocentric Pickering had not discovered the luminosity criterion himself he maintained that it represents only the photographic quality of the plates she used and had nothing special to do with the character of the star itself. How possibly could a young upstart Hertzsprung, a generation younger than Pickering, dare to laud what a mere young woman had discovered! Because Pickering disapproved of Maury, a niece of Henry Draper. Mrs. Draper, his widow sided with Pickering and suggested to him that he simply fire Miss Maury! I am certain if Draper had still been alive he would clearly have supported Antonia Maury's significant discovery and not followed his wife's recommendation. …Miss Maury in her old age was one of my very best friends and a highly gifted astronomer, who never spoke a derogatory word about Pickering's blatant discrimination against her. She obviously suffered in silence."

[1] From "Pioneering Women in Spectral Classification", by Dorrit Hoffleit, *Physics in Perspective*, page 386, 2002.

working with a statistician, and never regretted the decision. On the subject of choosing a career after graduation, she offers this advice to young graduates:

"Figure out what the least salary is you can live on and within that limit pick what you like best, otherwise you won't ever be happy. Because if you're working for money, it's drudgery when you have an interest in something else. Whereas if money is all you're interested in then fine, but if you're interested in astronomy then don't go into banking (laughter)."

Harlow Shapley, the director at the Harvard College Observatory at the time, encouraged Dorrit to pursue graduate work. Dorrit took graduate classes at Radcliffe and earned an M.A. in 1932. She loved to work on meteors, a phenomenon that she found fascinating. She remembers an August evening in 1919 when she and her mother witnessed the rare and spectacular phenomenon of a bright Perseid colliding with an equally bright sporadic meteor. That event, etched permanently in her mind, was the single cause of a life long fascination with the night sky. Eventually her work on meteors was published and earned favorable reviews from experts in the field. Harlow Shapley, pleased by the success of his young assistant, knew that she could rise to the next level. One day he called her to his office and despite her pleas that she was never an "A" student he convinced her to pursue a Ph.D. in astronomy. Dorrit, who dedicated her autobiography to Harlow Shapley, admits that this was the happiest day of her life, explaining,

"It is because if it hadn't been for that day I would have stayed, oh something like Henrietta Swope's assistant or something like that and enjoyed life moderately and probably lost the job in the depression and so on. Whereas this way Shapley is responsible for my life being successful. And he was also responsible for my learning how to fight. (Laughter) Not with a gun but by talking back to the boss."

Dorrit completed her doctoral degree at Radcliffe with a thesis on the spectroscopic absolute magnitudes of stars, for which she won an award for best original work. Dorrit worked at the Harvard College Observatory for 27 years (1929–1956), most of which were under the directorship of Harlow Shapley, whom she regarded not only as her boss but also as her mentor. Her work included such areas as the study of variable stars, meteor velocities and stellar distance measurements using trigonometric and spectroscopic parallaxes. Work at the Observatory was often demanding and posed special challenges for any woman who worked there. She remembers well the unfair treatment that women astronomers and dear friends like Cecilia Payne and Antonia Maury had to endure (see box "Treatment of women astronomers"). Compounding the gender discrimination, women doing research in astronomy were often also the victims of petty ego wars amongst some of their male colleagues and victims of outright professional jealousy. The hardships and pressure of work finally caught up with her health, creating a severe medical situation. Once feared to be due to a brain tumor, medical diagnosis showed that the symptoms were due to overwork and malnutrition.

"... Shapley is responsible for my life being successful. And he was also responsible for my learning how to fight. (Laughter) Not with a gun but by talking back to the boss."

During her many years at the HCO she met and or worked with many distinguished astronomers like Henrietta Swope, Antonia Maury, Annie Cannon, "the great" Ejnar Hertzsprung, Ernst Opik, Peter van de Kamp, Fritz Zwicky, Donald Menzel, Henry Norris Russell, and Cecilia Payne-Gaposchkin. But standing above all is Harlow Shapley, whom Dorrit admired and respected as a colleague, as mentor and for his vision as a scientist. Like his predecessor Edward Pickering, Shapley reached out to astronomers everywhere and tried to boost astronomy on a global scale. His work included collaborations with astronomers from many countries, including some from the Soviet Union. This known pacifist's help of Russians, even during the cold war era, raised eyebrows among some of the members of the House Committee on Un-American Activities, and in November of 1946, Shapley was summoned for questioning. Yet under these most difficult of times, Shapley demonstrated courage by standing up to Joseph McCarthy and his inter-

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Dorrit Hoffleit *continued from page 9*

rogating committee. No apologies were needed for being a pacifist. Having the courage of standing up for what he thought was right was a trait that Dorrit admires. Commenting on those events, she says,

Herbert and Dorrit, about 1911. Courtesy of the AAVSO.

"That was a horrible time for Shapley. He lost a lot of friends during that time because many people thought that the person who was persecuting him was a patriotic person. Being a pacifist doesn't necessarily mean you are unpatriotic. …It seems that politicians thought that if they didn't understand something then it must be anti-American."

In 1952 Harlow Shapely retired and Donald H. Menzel became the new director of the Harvard College Observatory. The following four years were some of the saddest in Dorrit's long tenure there because she felt a *Persona Non Grata*. Menzel was not too enthusiastic about her research (he considered it obsolete), and his desire for more office space resulted in the removal of much of the photographic plates collection that gave HCO its global prestige. For the same reasons Menzel also forced the American Association of Variable Star Observers (AAVSO) out of Harvard's premises. Since its creation by Edward Pickering, the AAVSO assisted loyally in the tedious work involved in the study of photographic plates and without any cost to the Observatory. Dorrit believes that their eviction may have been the greatest blessing in disguise for the AAVSO, because it was forced to become the independent organization that it is today. Menzel also reassigned Dorrit (she prefers the term "evicted") into a much smaller office next to the men's room. Instead she moved to an office at Radcliffe, and soon after that, with great sadness, decided to leave the Observatory.

In 1956, at the age of 49, Dorrit became the director of Nantucket's Maria Mitchell Observatory, which operated mostly during the summer season. She was also offered a position at Yale University for the rest of the year. During her 21 years at Nantucket, she initiated and supervised a summer program that provided 102 college-aged women with research opportunities in astronomy. Of these young women more than 20 have gone on to become professional astronomers. Consequently these women astronomers became role models to hundreds of other young women aspiring to such a career. The summer program that Dorrit Hoffleit ran was a very effective program, adding many women astronomers to the profession. Since Maria Mitchell (1818–99) was America's first woman astronomer, it is most appropriate that such a program was connected to her name by another kindred spirit, Dorrit Hoffleit.

Like most women scientists of her time, Dorrit had to endure gender discrimination in her profession. She writes in her autobiography "Being a woman seemed to be a natural handicap wherever I was." But besides the pains of professional discrimination, Dorrit is not shy to describe in her autobiography another kind of pain, the one of the emotional neglect she felt from her own mother. She writes, "I was yearning for the same obvious love she bestowed upon my beloved brother." Her birth was a disappointment to her mother who is known to have said, "The good Lord could not be good to me twice; it's only a girl." Once, her fifth grade teacher told her mother that she was not as bright as her brother was.[1] What hurt young Dorrit most was her mother's response: "What can you expect? She's only a girl!" She also recalls ethnic discrimination experienced at school. During the years of WWI she was isolated and treated as "the enemy" by her classmates who knew of her German origins. Yet none of these forms of discrimination caused hatred or bitterness in her heart, only sadness and at times a reasonable degree of anger. During our conversation I noticed these qualities in her, particularly her remarkable degree of kindness and seeming peace with the world. This prompted me to ask about the role that religion may have played in her life. She said:

"Father was an atheist and mother was a very devout Christian, but she was also true to her husband and so she fixed things up so that she gave us the Christian religious training. I think it was good. We did all the reading but we were not supposed to take things for granted — we had to think. And I have a feeling that if people

[1] Dorrit adored her brother Herbert. She remembers when he taught her how to play chess and she enjoyed all the games that they played. She lost most of them. Once when she was sick she won the game but she suspects that Herbert allowed her to win so to cheer her up. Herbert was a brilliant student at Harvard. He graduated at the age of 18 and went on to earn a Ph.D. in three years. His field was Classics and he taught Latin. He was a professor at UCLA. In 1938 they took a trip together to Europe. In 1946 he got married despite the objections of his mother who never liked his wife. She even "ordered" Dorrit not to meet "that woman."

have to think about some of the things that are required in religion, how can they believe it all? They are analogies and people take them for facts." In her autobiography Dorrit writes: "We were to make up our own minds about what to believe and what to question. Ultimately brother became an atheist while I am an agnostic, a term meaning uncertain. To the moral issues in the Bible I subscribe, but Genesis is scientifically unacceptable."

During WWII Dorrit, like many scientists at the time, took a leave of absence to volunteer for service. She worked on the theoretical calculation of trajectories of cannons fired from Navy vessels. Upset by the demeaning treatment she received, she resigned to go back to the Observatory.[2] Soon she was invited to join the team of scientists at the Army's Aberdeen Proving Grounds, where she was interviewed by none other than Edwin Hubble, whom Dorrit calls in her autobiography "the enemy of Shapley." When I asked her to discuss the meaning of the term "enemy" she said:

"What Hubble tried to tell me was that while he, Hubble, was engaged in patriotic work at Aberdeen Proving Ground, pacifist Harlow Shapley was at Mount Wilson Observatory stealing Hubble's research project. I discussed this with both Shapley and Hubble and finally with several astronomers at Mount Wilson. One astronomer, who had been at Mount Wilson while Hubble was there, confirmed that Hubble had never done any work that Shapley was subsequently doing at Mount Wilson. Shapley had never stolen anything. He did not work on anything that Hubble had been doing!"

Dorrit's task at Aberdeen Proving Ground was to work on computations of anti-aircraft missiles. Once again she felt she was unfairly treated, assigned to a far inferior status only because she was a woman. She did not complain, but after a stir she was finally given the appropriate status. Later she was transferred to a ballistic measurements team that towards the end of the war used V2 rockets captured from the Nazis. V2 rockets were then launched from White Sands in New Mexico to study the upper atmosphere. She recalls the embarrassment caused to her team when in one launch she saw one V2 rocket go astray and land south of the Mexican border. Dorrit writes: "This caused the Commanding

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[2] Dorrit Hoffleit gives two examples of the demeaning treatment she received while serving for a brief period in the Navy. (Page 42 of her a utobiography). During the period when she was helping out with computations of cannon trajectories she writes "...I was treated as though I was no better than a high school computer. In the early stages of the project I had been introduced to the Naval Officer who came occasionally from Washington to check on progress. Later when he came he treated me as though I were non-existent; he never even deigned to respond to my 'Good Morning' salutation."

Melissa McGrath (currently Deputy Director of the Solar System Division at NASA HQ) comments:

"There was one other woman summer student that year, Mary Brewster. She must have taken this photo. We all lived together in the cottage across the street from the observatory, which had one large room with several beds, and one small single room. Because I arrived on Nantucket first among the summer students I got the small single room. There was one bathroom for all of us.

"I have lots of vivid memories from that summer. One of the most vivid was one night when we were observing we forgot to close the blinds in the observatory, and in the middle of exposing a plate a flashlight came shining into the slit of the dome from outside and we heard 'Come out with your hands up.' It was the police, who had been alerted by a neighbor that the lights were on and people rooting around in the observatory. Dorrit lived in the cottage next to the observatory (our cottage was across the street), and she had to be awakened in the middle of the night to come straighten out the mess. She was always unflappable. Whenever we made a big mistake (not uncommon) she just patiently explained 'don't forget to close the blinds,' 'don't use the fixer to develop the plates.' She was a perfect supervisor for very green young women with an interest in astronomy."

Dorrit's Girls at MMO in 1975: (from left) Pattie Guida, Debby Carmichael, Valerie Mehlig (library assistant), Dorrit Hoffleit, Mary Jane Taylor (who now is a professional astronomer), Joan Lukas (a great-great-grand-daughter of William Mitchell), and Melissa McGrath (who is also now a professional astronomer). Courtesy of the AAVSO.

Dorrit Hoffleit *continued from page 11*

General of White Sands Proving Ground to make a hasty trip to Mexico! The missile was reported to have landed on a deserted road between a cemetery and an abandoned small airport — quite an appropriate resting place for so famous a rocket!" (German rockets such as V2 and a substantial part of the German rocket team, including the director Werner von Braun, became part of the American space program.)

The author with Dorrit Hoffleit in 2003. Pangratios Papacosta came to the US from Cyprus (via the University of London, England) and teaches science at Columbia College, Chicago. He wrote an article about Henrietta Leavitt for the January 2005 issue of STATUS.

For a scientist whose professional work spanned two world wars as well as the cold war, it is inevitable that war be a part of her life as well as impact her profession. In a 2003 interview, around the time that Saddam Hussein of Iraq was suspected of having weapons of mass destruction, she talked about war in general, the post-September–11 tension and preparations for war in Iraq:

"With present conditions people appear to think that a war is fought in order to rectify a serious wrong, especially a wrong involving the loss of many innocent lives. But thereby many more lives are sacrificed. My view of war? Wholesale murder to somehow rectify the murders by the nations we are opposing. The world needs to improve diplomacy to make it more successful in preventing murderous wars. The United Nations does not seem to have been successful in this."

Her mentor, Dr. Shapley, a known pacifist and one who fought to include the letter S for Science in the acronym UNESCO, also contributed in the writing of its constitution; its Preamble declares that "Since wars begin in the minds of men, it is in the minds of men that the defenses of peace must be constructed."

Although she retired from the astronomy department at Yale in 1975, Dorrit still retains the title of senior research astronomer there. She walks each morning to her office from her one bedroom apartment across from the astronomy department. Every day, from early in the morning until late in the afternoon, she works with the same energy and enthusiasm as that of a young post doc. She is known for her saying "Most people work for a living. I live in order to work. It's what I love to do." This love of work has produced a substantial body of work. She discovered over 1000 new variable stars and is credited with over 400 scholarly articles and other writings in astronomy. Amongst them is *The Bright Star Catalogue*, a compendium of 9,100 of the brightest stars seen in the sky with the naked eye. Some have called this book "the bible of stellar astronomers." She is also the co-author of *The General Catalogue of Trigonometric Stellar Parallaxes*, which provides precise distance measurements of 8,112 stars in our galaxy. She also produced a series of publications on the history of astronomy (especially on the role of women astronomers) as well as *Astronomy at Yale*, the official book of the history of astronomy at Yale University in its first 250 years.

Dorrit has received numerous honors and awards, amongst them Honorary Degrees, Certificates of Appreciation and Medals from academic and state institutions, even the military. In addition to being the Director of the Maria Mitchell Observatory in Nantucket (1956–1978), she served as President of the AAVSO (1961–1963), and in 1987 the International Astronomical Union decided to honor her by naming asteroid #3416 Dorrit. (Jokingly she said that this asteroid would be the celestial home she will go to when she dies.) In 1988, Hoffleit was awarded the George Van Biesbroeck Prize by the American Astronomical Society for extraordinary lifetime service to astronomy.

When she celebrated her 90th birthday in 1997, astronomers from all over gathered at Yale University to celebrate this extraordinary woman. They honored her with a special symposium, the Anni Mirabales, which included the presentation of 27 papers by 36 authors. These, along with the bibliography of 416 papers by Dorrit Hoffleit, were printed in a special book entitled *Anni Mirabiles: A Symposium Celebrating the 90th Birthday of Dorrit Hoffleit* (L. Davis Press, Inc). Dorrit considers *Anni Mirabiles* to be one of her most prized possessions. It is compendium of a long lifetime's work along with papers presented by people whose lives she has touched.

Dorrit Hoffleit lived and worked through the entire 20th century, and has seen many breakthroughs and innovations in astronomy. I asked if any one specific discovery or technological advancement stood out as most important to her. "Well," she said, "I think the overall development of astrophysics, not to cite any specific evidence, but just the real good cooperation between physicists and astronomers to make good astrophysics."

"What are the common and essential traits that an astronomer must have in order to succeed?" I asked. With intensity in her eyes and a smile on her face, Dorrit answered,

"The love of the subject, I think, is extremely important, not just the curiosity but the love of it. And then of course there is the curiosity and trying to satisfy the curiosity. How well those two characteristics go together, love and curiosity [determines success].... I think probably a higher percentage of astronomers are happy with their research than in any other field because they had to make the choice on the basis of what they like and not on the basis of the remuneration."

Appendix 3 of her autobiography *Misfortunes As Blessings in Disguise*, contains a sample of colorful quotes from those who knew her best, friends, colleagues and students. These were words of gratitude and recollections of the best memories, compiled during Dorrit Hoffleit's 90th birthday celebration at Yale University in 1997. One of these was written by a colleague, astrophysicist Richard B. Larson. It captures the essence of Dorrit Hoffleit who as a young girl fell in love with the night sky.

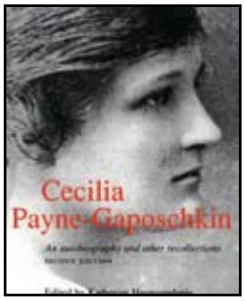
"To me, Dorrit has above all been a symbol of endurance, and of dedication and perseverance through thick and thin; she has been a fixed star in an ever-changing firmament.... Day after day, year after year, she has been there and always in her office, working steadily as the world turned.... I am pretty sure that she has logged more hours, directed more projects, supervised more assistants, made more contacts and friends throughout the astronomical world and published more pages than any one of the rest of us. [...] The going hasn't always been easy, and suitable recognition has not always been immediately forthcoming, but Dorrit exemplifies to me how, in the long run, sheer perseverance and endurance can overcome all obstacles, win all battles, and even all scores. I think that all of us can learn a lesson from this, and we can thank Dorrit for having shown us such an inspiring example."

Acknowledgments:

I wish to thank Columbia College Chicago for a grant that enabled me to do this project and Michael Saladyga of AAVSO for some of the photos.

Misfortunes as Blessings in Disguise: The Story of My Life, by Dorrit Hoffleit, published by AAVSO (The American Association of Variable Star Observers) Cambridge, Massachusetts, 2002.

Personal interview, (Papacosta and Hoffleit) Astronomy Department, Yale University, New Haven, 29 January 2003. ❖



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The following is a review by Dorrit Hoffleit of Cecilia Payne-Gaposchkin's autobiography that provides interesting insight of astronomy in the first half the 20th century as well as the professional lives of both these women astronomers. The article was originally was published in Sky & Telescope, *September 1984, Vol 68, no 3. © 1984 by Sky Publishing Corp. Reproduced with permission of the publisher.*

STATUS *was not able to track down the original photographs from the* Sky & Telescope *article so we are showing similar photos from the Harvard College Observatory collection*

BOOK REVIEW

Cecilia Payne-Gaposchkin: An Autobiography And Other Recollections

Katherine Haramundanis, editor. Cambridge University Press, New York, 1984, 269 pages.
ISBN 0-521-25752-2
$34.50 (1984 price; available 2005 as paperback for $25)

"To see ourselves as others see us" is an oft-quoted admonition. The converse, however, is sometimes even more important: to show others how we see ourselves. Would that I had been aware, when I first knew her, of some of the things Cecilia Payne-Gaposchkin has so candidly revealed in her autobiography, "The Dyer's Hand" — the major part of the book under review. Then I would have understood and sympathized with her frequent displays of tantrums and ill-concealed jealousies. While well-nigh worshiping her superior

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Payne-Gaposchkin *continued from page 13*

intellect and evident accomplishments, I always felt in awe of her and somewhat terrified in her presence. It was clear why she should be jealous of the men at Harvard College Observatory, whose abilities (significant as they were) were almost to a man inferior to hers, while they enjoyed higher titles, more pay, and greater benefits than were accorded her. But how to account for jealously toward one like myself, whose abilities and position were so far beneath hers? At last I think I understand.

During the more than 25 years I worked under Harlow Shapely, I concurred completely with his philosophy that half one's salary was the privilege of working at Harvard Observatory. Nowhere else in the world was there a collection of celestial photographs in which so many discoveries awaited keen and eager eyes. After I had been there only a few years, the projects I pursued were (with but a few major exceptions) largely of my own choosing. Shapley might suggest, but he never commanded. I assumed that this was the case with all the women who worked there.

An all-star cast for the performance of "Observatory Pinafore" included Cecilia Payne-Gaposchkin (first woman from the left). The occasion for this parody (in the style of Gilbert and Sullivan) satirizing the goings-on at Harvard Observatory was the American Astronomical Society meeting of 1929. Photo credit: Harvard College Observatory.

Cecilia, the most brilliant among them, seems to have been a major exception. Her heart and soul were in spectrum analysis; in her 1925 Ph.D. thesis, she clearly demonstrated an outstanding ability. It would have been simple justice to let that exquisite brain pursue its own course, regardless of how valuable her services could be in other branches of astronomy. She was, for what we might consider political reasons, restricted in her spectroscopic investigations and forced into the photographic photometry, which would soon be replaced by photoelectric photometry (though at that time not yet practiced at Harvard). The curtailment of her spectroscopic research, it is now revealed, came about because the eminent Henry Norris Russell had an able student at Princeton interested in very similar problems.

Donald Menzel was sent to Harvard to write his doctoral thesis on an analysis of the Harvard spectra. At Russell's suggestion — and this is not the only time Shapley curtailed a Harvard research project in deference to his mentor — Cecilia was the first restricted to investigating only half the spectral sequence, the other half being reserved for Menzel. (Ultimately Menzel, then Payne herself, covered the whole range.) Naturally she held Shapley primarily, if not entirely, responsible.

However, I cannot help but feel that Shapley's hands were largely tied. When Cecilia had written her masterpiece thesis "Stellar Atmospheres" (described independently by both Russell and Otto Struve as the best Ph.D. thesis ever written), there was not yet an astronomy department at Harvard authorized to award the degree. Theodore Lyman of the physics department and A. Lawrence Lowell, then president of Harvard, were both adamantly opposed to awarding the degree to a woman. Shapley had to fight to get her the degree she had originally not really wanted, but for which she had qualified herself at his urging. That he succeeded was a triumph for both of them. But must he now continue always to fight on her behalf?

Russell was not only Shapley's own esteemed professor; as an automatically recognized authority in all branches of astronomy, he was influential wherever he turned his attention. In her thesis Cecilia had made the remarkable discovery, far ahead of its time, that hydrogen and helium were the major constituents of the stars. Because Russell, in the light of then current knowledge, did not believe this, she toned down her conclusions by ostensibly admitting something must be wrong with her analysis. Should Shapley continue to encourage investigations that might go contrary to accepted beliefs?

Meanwhile, Shapley desperately needed improved photographic photometry; so why not assign Cecilia that task, instead of encouraging pursuits that could bring him into further embarrassment with his administrative and intellectual superiors? Small wonder that not many years later she felt jealous of someone free to work on her beloved spectra, even though that person was examining them from an entirely different standpoint (their practical application of luminosity and distance determinations, rather than her more erudite theoretical chemical and physical analyses).

At that time I was completely unaware that my own freedom of choice accentuated another's sense of personal discrimination. I was puzzled why she should have turned her energies from the study of spectra, in which she was preeminent, to the light curves of variable stars. I simply assumed it was in deference to the interests of the astronomer she had recently married. Magnificent as her work on variables has been, I always felt it was something an

equally industrious but somewhat less brilliant mind could have accomplished almost as well, while her outstandingly superior talents went to waste. This turn, it is now revealed, occurred because she was a woman in what was still mainly a man's world. Unfettered, she probably would have outstripped the rival from Princeton.

Cecilia Payne-Gaposchkin, edited by her daughter Katherine Gaposchkin Haramundanis, is fascinating reading. The core of the book is Cecilia's autobiography, "The Dyer's Hand," written shortly before her death. Jesse Greenstein of the California Institute of Technology, a former student of both Payne-Gaposchkin and Menzel, has supplied an introduction. Evaluating her early work, Greenstein concludes, "it showed the bravery and adventure of a mind exploring the unknown with the available scientific apparatus and a complete belief in the power of human reason and logic."

Peggy A. Kidwell of the Smithsonian Institution provides "An Historical Introduction to 'The Dyer's Hand,'" revealing hitherto unpublished facts gleaned both from interviews and from Harvard's archives. It is an elucidating and sympathetic account, again stressing her early spectroscopic investigations. Kidwell relates an amusing incident on the occasion of Cecilia's preliminary written Ph.D. qualifying examination, where "Her reaction to the whole procedure is not recorded." Her final oral examination is not mentioned at all in this book. However, I recall Margaret Harwood's telling how, many hours after the examination, she found Cecilia weeping in her office because nobody as yet had told her whether or not she had passed. Her outstanding performance had been so obvious that nobody had deemed it necessary to inform the distraught student of the result!

Katherine Haramundanis has contributed 28 pages of "A Personal Recollection," a warm-hearted, understanding account of the family's life. Although she does not specifically say so, one feels Katherine appreciated the privilege of being the daughter of a great woman who, after working hours, was a loving parent, not always neat and tidy, but always inventive, constructive, and understanding. What wonderful times mother and daughter enjoyed touring Europe! This chapter brings out the best human aspects of a character, as no purely scientifically oriented biography could. It balances the story.

To Cecilia's own account has been added her bibliography of some 350 references, including 11 books. A "Postlude" summarizes her curriculum vitae. The index requires mention. It refers only to "The Dyer's Hand," the major portion of the book. Unlike in most indexes, additional vital statistics not found in the text are provided here. Unfortunately, the sections by Greenstein, Kidwell, and Haramundanis are not indexed.

The book is clearly a credit to its editor. It is attractively printed and well illustrated. Only a few minor errors have been detected. On page 16, Harlan T. Stetson is cited as being at MIT, where he did indeed spend the last years of his scientific career, but at the time in question he was an assistant professor of astronomy at Harvard. Shapley was the Observatory's director for 32 years, not "nearly 40," as page 210 states. On page 256, "the first graduate student to receive a degree from Harvard College Observatory" should read "first... to receive a Ph.D. degree;" on page 29-30 we learn that Adelaide Ames received an M.A. the year before, in 1924.

I recommend this book heartily to all who knew Cecilia Payne-Gaposchkin, to all interested in the history of astrophysics, and particularly to all concerned about the history of discrimination against, and the advancement of, women in science.

When Cecilia was finally made a full professor after more than a quarter of a century of heartbreaking denial, she gives Menzel full credit. However, her promotion may not have been due so much to his belatedly found friendship as to the fact that the time was ripe. By then, the women's movement was too far under way for any further procrastination to be tolerated in a case as strong as hers. The promotion was expedient for all concerned.

The lesson to be drawn from Cecilia Payne's early work — and the nonacceptance of her surprising discoveries — should be: Do not discount your own well-considered results simply because they happen to disagree with currently accepted authority. As Maria Mitchell (1818-89), the first woman astronomer in America, said, "Until women throw off reverence for authority they will not develop. When they do this, when they come to truth through their own investigations, when doubts lead them to discovery, the truth they get will be theirs, and their mind will go on and on unfettered." It is a pity that so many years after the first American woman astronomer, the greatest to date had to struggle, not for recognition, but for sheer justice.

by Dorrit Hoffleit
Yale University Observatory ❖

Cecilia Payne-Gaposchkin Photo credit: the Harvard-Smithsonian Center for Astrophysics

Book Review

by Beth Hufnagel

Beamtimes and Lifetimes: the World of High Energy Physicists

by Sharon Traweek (Harvard University Press: 1988), 162 pages ISBN 0-674-06348-1

Beth Hufnagel is Associate Professor at Anne Arundel Community College

How many times have you heard about a book that speaks to the experience of an outsider in a white male world and it sounds so interesting… but you never have the time to find it, much less read it? I was fortunate enough this summer to be selected by my college's Women's Institute for their Summer Seminar on Gender and Race (**http://www.aacc.edu/womensinst/Summer_Seminar05.cfm**). This was a chance to spend the summer reading all those books that promised a sympathetic and independent viewpoint of my culture — and get paid for it!

A good place to start is with a book by an anthropologist studying the "exotic" culture of physics. I was eager for a fresh look at my profession through a trained outsider's eye! When I decided to become an astronomer in 1985, I was coming out of a white male profession — corporate auditing — that had shifted dramatically in its acceptance of women over the thirteen years that I was in it. Naturally I assumed that this was about to happen in physics. Traweek addresses some reasons why it is not changing.

The story is a little out of date; Traweek studied the physics community for five years in the mid-1980's, spending time at KEK (Japan), SLAC, and Fermilab. (She also earned her Ph.D. from UCSC, but thirteen years before I did.) This was before the SDI (a.k.a. Star Wars) and the superconducting supercollider (SSC) debacles yanked the high-energy physicists off the pedestal they'd built during World War II. However, it is fun (with 20-20 hindsight!) to identify the seeds of the downfall. Traweek starts by comparing the great particle accelerators to medieval cathedrals — "free from the constraint of cost-benefit analysis" run by "heroes of the search for truth."

Whenever I'm sitting in some plenary rolling my eyes at a particularly sexist or bigoted comment from an otherwise highly-respected scientist, I get these messianic ideas about changing the culture. However, before you can change a complex system, you've got to understand it — and I don't have the background. So it's good to start with the basics, like what are "culture" and "community." "Culture" to an anthropologist is a group's shared set of meanings, the patterns of how the group makes sense of their experience. The four domains of community life are studied in this ethnography: ecology (e.g., means of subsistence), social organization, developmental cycle (e.g., training novices), and cosmology (e.g., the system of knowledge, skills, and beliefs). So I learned that, appropriately enough for an astronomer, it was the cosmology of physics that I wanted to change.

I frequently felt the shock of recognition with Traweek's experience as an outsider in high-energy physics and my own experiences in my quest to be an astrophysicist. For example, she found that senior physicists were courteous and helpful, e.g., shocked by her low pay and small grants; they gave her advice on how to work the system better. The junior physicists, though, told her secrets that "we never tell anyone." Granted, she wanted the information, but on the other hand she was disconcerted about not being "anyone." I also experienced senior physicists as kind and helpful, if a little bemused by a 30-something woman wanting to be a scientist. I soon learned to recognize the bright and/or powerful scientists — they were not threatened by my aspirations.

Traweek describes the particle-physics community as functioning with "elaborate and stylized combat." This could explain why a physics professor told me in 1988 that men were intrinsically better at doing physics. It's helpful to me almost twenty years later to re-process that statement differently, less painfully. Perhaps he didn't mean that I was intellectually challenged, but rather that women were not equipped to win the physics "war." Now *that* I can take pride in: I like to think that women will recast physics as a cooperative quest for knowledge rather than a war for personal fame and glory.

The other theme she explores is the parallels of physics and religion, which I first explored with Margaret Wertheim in *Pythagoras' Trousers: Physics, God and the Gender Wars*. This idea appeals to me because I see a parallel between physics and the traditional religions struggling with how technology has eliminated traditional gender roles, and reacting as if their very foundations are being attacked. *The DaVinci Code* (Dan Brown) may have taken this a bit too far, but the fact that my otherwise-progressive ordained-minister niece won't read it tells me maybe not.

Traweek also identified a trait of the physics community that had been a common theme in my first profession, so I was not aware of it. This is the "… deeply felt tensions about time that I found coiled at the center of this culture." When I first read this sentence, I felt that it accurately

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Apollo Fever

By Fran Bagenal

Thirty years after Apollo, Cocoa Beach still exudes the romantic lure of spaceflight. I marvel at the lush, almost-tropical greenery as I drive along the Beeline Highway from Orlando to the coast and get a thrill out of spotting the huge flight facilities on the skyline. The two times I have seen launches were the small cozy Delta II launch of Deep Space 1 and the populous jamboree of a shuttle launch, for me the special occasion of seeing my colleague Ed Lu off on his first flight. This time my business, press briefings for the New Horizons launch still 90 days away, allows me some time to explore.

I imagine jogging along the beach like the 60s astronauts, gawking at the immensity of the Saturn V in the rocket museum and perhaps taking a tour of what's left of the Apollo facilities. You see, I have caught a bad dose of Apollo fever. I insist it has nothing to do with the nonsense talk of Exploration Vision to go back to the Moon, Mars and Beyond. I agree with the students in my classes who say "Been there, done that — why go again?" It seems to them that the Apollo astronauts picking up lunar rocks are as much "Dead White Men" as Galileo rolling balls down planks. No, in my case, I have to admit the nostalgia of being a teenager in Britain staying up until 4 in the morning to watch the Apollo 11 moon landing. Not that I've ever been one of those fanatics who remember all the names of the astronauts and what each of them did, nor reveled in the acronyms and technospeak. As a teenager I was just curious as heck about what was there on the Moon.

Fran Bagenal standing next to a copy of Alan Shepherd's Freedom-7 capsule atop the Redstone rocket that made him the first American in space, albeit a sub-orbital flight, in April 1959. The two towers to the distant right are active Delta assembly buildings. Fran Bagenal is a co-investigator on the New Horizons mission to Pluto that is due to launch after January 11th, 2006.

My interest now is about the boldness of the policy, the drive to surmount enormous technical challenges and the human stories behind the characters involved, including the women who also wanted to fly in space.

It started by reading the (auto)biography of Mercury astronaut Scott Carpenter — as much to read about Boulder in the 50s as spaceflight. The book caught me deep in the battle between scientists and engineers for primacy of NASA. Ed Lu and I had a shouting match: "You scientists are all about 'me, me, me' and 'my precious science' when we all know NASA is all about human exploration — without it there's no science. You scientists need to help out and get the human side back on track," insisted Ed. I ignored the easy quip that he is in fact a scientist himself. "Help out?!" I yelled back, "Your human exploration adventure will eat our science budget as an *amuse bouche* and then Congress will baulk at the cost of the appetizer to the Moon, let alone the main course of getting to Mars." Scott Carpenter pointed out that this battle goes back to the very beginning of space exploration. He vividly described taking scientific measurements of what he thought was atmospheric airglow on 3 orbits of his Mercury flight in May 1962. He thought the phenomenon was neat as well as having important engineering implications for future flights. But flight control kept telling him "Just fly the machine." I later read other Apollo astronauts make discrete understatements that "Carpenter had made a mistake". But reading about the incident had gotten me thinking about battles between scientists and engineers on missions such as Cassini where the decision to cut the scan platform had an enormous cost to science. And the fact that no expense seems to be spared during building of spacecraft but science always seems to come up short when it comes to analyzing the data. We argue and fight but each side knows they need the other. Each is actually

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Apollo Fever *continued from page 17*

in awe of the other. I thought of writing an article called "NASA engineers are from Mars, NASA scientists are from Venus." But somehow planning the next planetary mission got in the way.

To feed my Apollo fever, I browsed the biographies at the new National Aerospace Museum near Dulles airport. I came across a slim, rather different book. It had the obligatory rocket liftoff on the front but the fifties photos were not swaggering, grinning crew cuts but neatly coiffeured, smiling women. I had heard of a book about the Mercury 13 women but somehow it just seemed too depressing to read. The smiling women exuded such calm confidence that I just had to pick up the book. As I read I began to see why they were so confident. While they had no military or jet flight test experience like the men, these women had flown thousands of hours as pilots, often more hours than the selected male astronauts, in different types of planes and through all sorts of conditions. To them it seemed natural that their flight experience should qualify them for the new adventure of spaceflight.

To some of the doctors involved in testing the astronauts as part of the selection process, particularly Randolf Lovelace, it seemed obvious that women should become astronauts and he began to put a few of the top women pilots through the same rigorous tests that the men had experienced. These tests were grueling (graphically described in Tom Wolfe's *The Right Stuff* and apparently much worse than current astronaut tests) so that when they were told they had passed they were optimistic that they would become astronauts. But this was in the late 50s to early 60s, a time that has to be an all-time low for belittling any meaningful contributions of women, except childrearing, to society. For example, Colonel John Stapp, chief of the Wright-Patterson Aeromedical Laboratory claimed (without citing any evidence) that females were considerably less equipped to withstand the emotional stresses that accompany spaceflight. Furthermore, he argued "Economically, the cost of putting a woman in space is prohibitive, strictly a luxury we cannot afford." Women, he said needed to be protected against exposure to dangerous work. "To expose women needlessly," he said," to the known as well as the incalculable dangers of pioneering space flight would be like employing women as riveters, truck drivers, steel workers, or coal miners." Of course, there are plenty who still think these things but at least they cannot say so in public without ridicule.

Photo credit: NASA

STS-31 Mission Specialist Kathryn Sullivan, the first US woman to do an EVA.

What rather surprised me in *The Mercury 13* was the battle between two women pilots, Jerri Cobb and Jacqueline Cochran, for leadership of any women astronauts program. In the absence of any real hope of following their ambitions to fly in space, I can understand how they might be pitted against each other. The book provides a detailed, blow-by-blow account of their being defeated by the authorities of NASA, Congress and Vice President Johnson. As I read about the duplicitous actions of NASA Administrator James Webb, I wondered why we are naming the next space telescope after such a character. But *Mercury 13* falls short of putting the story of these early astronaut wannabes in proper political or sociological context.

For the political context of the space race, I recommend *Two Sides of the Moon* in which astronaut David Scott and cosmonaut Alexei Leonov (ably assisted by journalist Christine Toomey) describe their views from either side of the cold war race to the Moon as well as their subsequent meetings and activities as the cold war eventually thawed. And, of course, there's lots of the right stuff for an Apollo junkie — tales of daring-do, technical wizardry and jock-ular astronaut pranks.

For the sociological context of not just the Mercury 13 women but also the women who were chosen to fly in space, I was enthralled by *Almost Heaven*. Bettyann Kevles has produced delightful book that describes how the changing of women's role in society opened up possibilities for women to go into space. I suppose I had thought that the active roles of women in the Soviet regime produced many women cosmonauts. But the first woman space, Valentina Terashkova (June 1963), was primarily a huge publicity stunt, a show of one-up-manship (literally) for the Soviet very-largely male space technocrats. The Soviet engineers and fellow cosmonauts were just as disparaging against women going into space as their American equivalents. The second woman cosmonaut, Svetlana Savitskaia, did not fly until 1986, three years after Sally Ride flew as a mission specialist on the Shuttle.

Kevles describes how films like *Barbarella* and TV series like *Star Trek* began to give society a view, albeit still fictional, of the possibility of women in space. But NASA resisted. Chris Kraft, the "cool guy" Apollo mission controller, is quoted as saying that in the seventies "the subject of including women never came up until

it was raised by outsiders" — where he obviously meant outsiders to be those who were not part of his exclusive white male techno-elite. Kevles points out the ways that the changing world outside NASA meant that women began training as airforce test pilots in 1974, six women joining the class of 1978 astronaut corps as mission specialists and eventually test pilot Eileen Collins flying in 1990 as Shuttle pilot and then in 1999 as commander.

Sociologically, the post-Apollo eras of Soyez, Mir, Shuttle and ISS are much richer than Apollo (the "right stuff" gets a bit predictable). Kevles points out the cultural differences between the treatment of women in the Soviet-later-Russian space program vs. in the US that not only kept women from flying but also led to major misunderstandings when the two space-faring nations began to work together. It seemed that Russian cosmonauts were more prepared to accept aggressive/competent American women but continued to insist that Russian women — even doctors and engineers — remain "feminine" as well as do all the household chores. I could only shake my head when reading that on arriving at Mir, Savitskaia was handed an apron, a symbol of her subservient, female status. That was 1986 — just 20 years ago. When Helen Jarman was picked to be the first Briton to go into space in 1990, her cosmonaut host on Mir, Anatoli Artsebarsky declared "It is not a woman's business to fly into space. More work can be done by a man." And Alexei Leonov, by then cosmonaut director, gave her a pink chiffon jumpsuit to wear on board. While American astronauts and NASA officials quickly learned to be "politically correct" Kevles chronicles incidents where male astronauts resented that women were not only being selected but getting lots of limelight. Unfortunately, she gets onto rather wobbly ground in discussing females styles of leadership, comparing male pilots with Eileen Collins, Pamela Melroy and Susan Kilrain. It is an interesting topic to discuss but needs much deeper analysis.

My biggest beef with space exploration literature is where's the science? It's all about getting selected, training and then flying the machine. Or staring in awe at the Earth. In Andrew Chaikin's 650-page tome *A Man on the Moon*, there is scant mention of the hundreds of lunar science experiments, even though the astronauts themselves got pretty wrapped up in the science. Tom Hanks' delightful 3-D IMAX movie *Magnificent Desolation* has all sorts of fabulous visual effects and provides the basic story — all to inspire young people to go to the Moon — but makes no mention of science. OK, so the Moon is just a big dead rock compared with Europa, Titan or giant Saturn and its complex ring system. But wasn't the ISS justified in terms of the science that would be done there? There's often mention of biomedical experiments, growing seeds and lighting matches in zero-g, but I feel insulted as a taxpayer that so little is explained about what we have learned from all the hoopla about humans in space. I admit it's still cool and when New Horizons blasts off to Pluto in January 2006 I will again wander around Cape Canaveral, marvel at the massive machinery and admire those brave, clever, skillful astronauts, (as of February 2003, 160 men and 36 women) who happily ride up into the sky. ❖

Photo credit: NASA/KSC

Women of New Horizons (Leslie Young, Yanping Guo, Cathy Olkin, Jeanette Thorn, Debi Rose, Ann Harch, Heather Elliott, Fran Bagenal) in front of the Atlas V rocket being assembled for the January launch of the mission to Pluto.

For further reading on human spaceflight:

For Spacious Skies: The Uncommon Journey of a Mercury Astronaut, Scott Carpenter and Stoever, Harcourt Books, 2002.

The Mercury 13, Martha Ackmann, Random House, 2004.

The Right Stuff, Tom Wolfe, Bantum Books, 1979.

Two Sides of the Moon, David Scott and Alexei Leonov, Simon & Schuster, 2004.

Almost Heaven, Bettyann Holtzmann Kevles, Basic Books, 2003.

A Man on the Moon, Andrew Chaikin, Penguin Books, 1994.

Feedback

STATUS welcomes readers' responses to our articles. We encourage readers to include their name but will consider requests to remain anonymous, and we reserve the right to edit all material submitted.

Send your Feedback to ***bagenal@colorado.edu***

Response to Fran Bagenal's article on the physics GRE exam in the January 2005 issue of STATUS

For many years, we had a summer class on how to teach physics for incoming grad students. When the person who originated it retired, our Vice Chair took it over and made me his assistant because I had experience with working with students in that class while teaching special summer courses for minority students.

Eventually I took it over myself, and introduced the Force Concept Inventory at the beginning to familiarize the grad students with the student misconceptions they would be encountering. We began to notice that the grad students who did poorly on the FCI tended to be those who left with a terminal masters. Our Vice Chair at the time did not want me to mention that to anyone, because he thought it would reflect poorly on the department. However, when talking to David Hestenes who designed the FCI with Ibrahim Halloun, I discovered that he had similar data.

One thing to note: our grad students complained about taking this test, because they saw it as putting them down, rather than as an indication of where they needed to work. Two years ago our summer course was replaced by a seminar during the school year, since most of our grad students now come in with fellowships and do not teach in the first year. We are finding that they need to hear more about student misconceptions. Moreover, in the previous few years, our grad students were getting scores way above the minimum to indicate they were Newtonian thinkers, indicating our department found a way to admit better-prepared students. Our most recent results are extraordinarily encouraging.

In one year, I found three students admitted from a smaller school had done poorly on the FCI, and did not do well at all in graduate school. But I am aware of at least one more recent student from that school who did very well in graduate school. It is dangerous to generalize. But you have opened up a Pandora's box with your article, and many department chairs probably will not want to see the "gifts" therein. And the legend tells us that the one thing remaining inside the box was hope….

Reference:

"Force Concept Inventory,"
David Hestenes, Malcolm Wells, and
Gregg Swackhamer,
The Physics Teacher, Vol. 30,
March 1992, 141-158
http://modeling.la.asu.edu/R&E/FCI.PDF

from Edward Adelson
Academic Program Specialist
The Ohio State University ❖

Beamtimes and Lifetimes *continued from page 16*

described how I feel about time; never enough, never spent effectively or efficiently enough, things always take too long, why do all those co-workers just want to chat? I must get certain tasks done today! I have a wonderful family, interesting students and pleasant colleagues — why do I resent taking the time to enjoy them? As a colleague at Michigan State commented as we drove by people lolling on their porches on a Saturday afternoon "Don't those people have data to reduce?" Well, no, they don't. Traweek perceives this "terror of losing time" as deliberately cultivated by the culture as a driving force. What a relief — I'm not dysfunctional, merely over-indoctrinated!

I enjoyed Traweek's tour of SLAC and KEK, partly because I've spent time at Argonne and Livermore and the descriptions, like the female "pinups," brought back old memories. It's not surprising that she's good at giving tours of particle accelerator facilities, as this job was her introduction to this world. I again empathized with some of her experiences: it seems hard for men to understand how insulting it is to a woman when outsiders assume on sight that she can't possibly be a source of information, but she captures it here beautifully. She also noted the conformity in dress — "a distinct lack of fashion, quality or fit" — required by the physics culture, although she seemed to miss that the physicists insist that there are no such rules, yet haze those who dare to wear a skirt or makeup. And of course, it's interesting to learn basic information, like the SLAC accelerator is a 4-inch diameter copper pipe.

Beamtimes and Lifetimes explores some themes I've read about before (like physics as religion), but also gave me some fresh insights into differentiating between my cultural indoctrination and myself. Not bad for a 15-year-old book! ❖

SNIPPETS

NEWS BRIEFS AND HIGHLIGHTS

From Inside the Beltway

The RAND Corporation has published a report that assessed gender differences in the distribution of external Federal research and development funding, released on September 14, 2005. After looking at grants funded from 2001-2003, RAND reports "no differences in the amount of funding requested or awarded" with respect to gender by the National Science Foundation or the US Department of Agriculture. Turning to the National Institutes of Health, RAND reports that women receive only 83% of what men receive in NIH grants, after eliminating very large awards and controlling for age, academic degree, institution, grant type, institute, and year. The RAND study was not able to conduct similar studies of the Departments of Defense and Energy claiming that too little information about the grants was kept by those departments. Senator Wyden, a strong supporter of enforcing Title IX, notes "I don't see how Federal agencies can possibly be in compliance with Title IX if they don't even track the gender of their grant applicants, and Congress certainly can't oversee compliance without this basic information. It's time to make certain that these appropriated taxpayer dollars are being distributed in accordance with Federal law, in a way that gives a basic fair shake to every applicant." The 6-page report "Gender Differences in Major Federal External Grant Programs" is available for free at **http://www.rand.org/pubs/technical_reports/2005/RAND_TR307.sum.pdf.**

The Government Accountability Office published a report in February 2005 on Equal Employment Opportunity of contract workers at six Department of Energy laboratories (**http://www.gao.gov/new.items/d05190.pdf**). While the report shows some relatively minor gender differences in hiring, pay and promotion, it is perhaps most useful to *STATUS* readers for comparison with their home institutions. In reading between the lines of these legalistic documents one has to hope that while the words themselves seem inconsequential, the very process of gathering and evaluating statistics is a useful exercise for these institutions.

The National Research Council is conducting a congressionally-mandated study on Gender Differences in Careers of Science, Engineering, and Mathematics Faculty. The committee is chaired by MIT astronomer Claude Canizares who has promised an interview with *STATUS* on the release of its report next spring. Progress of this committee can be tracked at **http://www7.nationalacademies.org/cwse/Gender_differences.html**.

Career Break Scholarship and Early Career Fellowship

NASA's new Early Career Fellowship for planetary science is open to all planetary science researchers with less than seven years post-Ph.D. work experience. The NASA Research Announcement specifically encourages researchers who have been inactive from the field for a period of time (for example, for child-rearing) and wish to reenter solar system research to apply for this Fellowship as a type of reentry vehicle.

Program Manager Susan Niebur notes "The program is in its first year, but already we have seen interest in the program from researchers just getting established in the field. We hope to see increased interest from women and men returning to the field after taking time off to care for children, parents, or spouses in the future. There is no additional requirement to 'justify' one's time off, as we believe returning to the field can be difficult enough."

NASA is interested in hearing about the reentry of planetary scientists and the professional difficulties they face. Members of the AAS' Division of Planetary Science and other planetary scientists are welcome to contact Dr. Susan Niebur at **susan.m.niebur@nasa.gov** with their stories. Susan says, "we can make it possible for all of our community members to contribute

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Snippets *continued from page 21*

to the exploration and understanding of our universe."

The American Physical Society has a new, $45,000 scholarship, the Blewett Scholarship, to aid women scientists returning to research after raising a family. In September the award was made to Rebecca Forrest of the University of Houston (**http://www.aps.org/media/pressreleases/090205.cfm**).

Elizabeth Freeland pointed out in a recent *AASwomen* enews that she has gathered about career breaks and put together a website — **home.earthlink.net/~papagena/CareerBreaks.html** — where she has gathered information about career breaks in science: general info, grant information, people who have done what and so on.

The Woman Physicist's Guide to Speaking

An article by Heidi Newberg (Rensselaer Polytechnic Institute) called "The Woman Physicist's Guide to Speaking," was published in the February 2005 issue of *Physics Today*, published by the American Institute of Physics. The original article can be found at **http://www.rpi.edu/~newbeh/WIPcommText.htm**

AAS Awards

Help ensure that our best women astronomers are getting their just desserts — nominate someone for an AAS prize. The AAS Prize Nominations are due by 1 October of each year. Now is the time to start campaigning for someone you feel deserves recognition. AAS prizes include the Russell Lectureship, Pierce Prize, Warner Prize, Tinsley Prize, Weber Award, Heineman Prize, Van Biesbroeck Prize, Education Prize, and Cannon Award. If you know of a worthy candidate, please consider nominating her or him. More information on the prizes can be found at **http://www.aas.org/grants/awards.html**. All nominations should be sent to the Secretary of the AAS. Forms are available in the Members Only section of the AAS website (**http://www.aas.org**).

Teens Battle Abercrombie with a "GirlCott"

With so much news related to women in science since "Summers January" it is interesting to monitor the activity online with Google Alerts which will email you every day with a list of links to items posted that day with certain key words — such as "women in science". One of the more heartening items was an article from the St. Petersburg Times by Susan Aschoff (Monday, November 14, 2005) which starts "A group of 13- to 16-year-old girls have something they want to get off their chests: Abercrombie & Fitch T-shirts emblazoned with slogans they say degrade the girls that wear them. They want young women across the United States to 'girlcott' the popular clothing chain until it stops selling the attitude Ts. 'Who needs brains when you have these?' reads one." OK, interesting, but what's this got to do with women in science, I was wondering, as I ploughed through more dumb stuff about teenage fashion. At the bottom was the explanation that "The Allegheny County Girls as Grantmakers — a group of 23 teenagers from different ethnic groups, neighborhoods and schools in the county — are behind the call for a girlcott. The organization is newly formed and is sponsored by several nonprofit women's organizations. It plans to award $10,000 in grants this year to youth projects on women in politics; women in science and technology." You go girls!

Send your "Notes" to ***bagenal@colorado.edu***

Notes From a Life

Contributions from our readers

NOTES FROM A LIFE, first printed in the June 1999 issue of STATUS, are anonymous vignettes describing the quotidian life of a woman in science. We continue to welcome submissions of "Notes" for publication in future issues of STATUS. ❖

Xena and Gabrielle

The July 2005 announcement of the discovery of an object (IAU temporary label 2003 UB 313) that is likely bigger than Pluto by Mike Brown (Caltech), Chad Trujillo (Gemini Observatory), and David Rabinowitz (Yale University) has produced all sorts of public discussions about whether it is a 10th planet, re-ignited debates about whether Pluto is a planet, as well as provoked real scientific discussions of about the Kuiper Belt and solar system formation and evolution.

STATUS Editor Fran Bagenal was delighted by the choice of Xena as a code name, particularly when it turned out to have a moon that could be Gabrielle. She approved that Mike seemed to be living up to promises of being a "new dad" by taking paternity seriously in terms of inspiring his newly-born daughter Lilah (as well as doing his share of childcare **http://www.gps.caltech.edu/~mbrown/lilah/sleep/Sleep_Data.html**). Not only have the Xena & Gabrielle names fueled lots of newsprint ("all news is good news") but they also show astronomers can have some contact with the "real world" (albeit somewhat dated). And, just perhaps, some young women feel a little more involved. Below is an interview with Mike on his unusual choice of code name for 2003 UB 313.

***STATUS*:** OK — so why Xena?

Mike Brown: We always come up with code names for these things so we can keep mental track of them before they get real names. We had decided on code name Xena a long time ago for the first object we found bigger than Pluto. We chose it since it started with an X (planet "X"), it sounds mythological (OK, so it's TV mythology, but Pluto is named after a cartoon, right?), and (this part is actually true) we've been working to get more female deities out there (i.e. Sedna). Also at the time we chose the name Xena the TV show was still on TV, which shows you how long we've been searching!

Mike Brown with STATUS editor Fran Bagenal holding the Nicole Hollander cartoon about another large KBO called Sedna (see STATUS Jan. 2005). Photo from Bagenal collection.

I always joked that the reason that we were going to use "Xena" was so that I could meet Lucy Lawless. I didn't actually get to meet her, but she did call to congratulate us. I don't think we'd get that sort of kind response from some real Greek god, so I think we did good.

Xena (left, Lucy Lawless) with "sidekick" Gabrielle (right, Renee O'Connor) Still image from Xena: Warrior Princess *reproduced with permission of Universal Studios.*

***STATUS*:** Did you intend to mock the IAU/Astronomy Establishment? TV super-heroines? Both?

Brown: We only intend to mock ourselves. We never actually thought the name Xena would escape our own confines. But since the IAU is taking so long to decide the status (and thus possible name) of this thing the Xena name has taken on a life of its own.

***STATUS*:** Did you have an expectation that Xena had a moon so you had Gabrielle all lined up? Or are you just a lucky guy?

Brown: We had no idea that the moon was there, but we knew all along that if there WAS a moon there was pretty much no other choice for the code name to the moon.

***STATUS*:** Any words of wisdom for young women who want to become TV super-heroines or astronomers?

Brown: Work hard, but don't take yourself too seriously. ❖

Image credit: Robert Hurt (IPAC)

Artist's concept of the view from Xena, looking back towards the distant sun.

For information about object 2003 UB313 see:

Mike Brown's Website
http://www.gps.caltech.edu/~mbrown/planetlila/

"Scientist at Work/Michael Brown; 10 Planets? Why Not 11?" Kenneth Chang; *New York Times*, August 23, 2005.

*Illustration by
Ann Feild-Didyk*

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