
STATUS

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

January 1997

About This Issue *From the Editor*

Partly through design and partly through accident, this issue has developed a theme: What is important in a career? The articles I had originally requested from authors were to be on topics quite different from those you see here, though all were related to career matters. Suffice it to say that this issue of *Status* was my most challenging with regard to obtaining articles. One author who was writing about balancing career and family sent me an e-mail saying, "... I realize that being a mother, when something happens to your children, is incompatible with work. At least in my case." And here I thought she had it all figured out! My angst over the need to find a replacement article was superseded by the reaffirmation that it is hard for us all and that there are people out there making the right choices.

After knowing the author of "Derailed on the Track to Success" for only a short time, I asked "Annie" about her plans after graduation. She said she had decided against graduate school. I was impressed at how articulately and thoughtfully she expressed her reasoning. I was further struck by how clearly her feminist convictions came through what was otherwise a composed presentation. I thought to myself, "something bad has happened to her." It is my experience that the most committed feminists are those that have faced harassment and discrimination. Further, they speak with a passion and intensity characteristic of people who have personally dealt with a particular adversity (rather than having simply an intellectual understanding of it.)

People are always asking, "Why do a higher fraction of women than men leave astronomy?" Annie answered this question perfectly, so I asked her to write an article for *Status*. When I received Annie's article, I found that my intuition was correct: she had been the target of harassment. (I am not making a legal judgment here, merely a moral

one.) While her story is personal, it gave me insight into why a higher fraction of women are filtered out by a system with narrow and rigid expectations. Apart from sexism (or maybe because of it) I think that women simply think more about the consequences of working in such a system and are more likely to believe that there are alternatives. Men may believe, in whole or in part, because of societal expectations, that they have no choice but to endure the system.

During our correspondence, Annie requested anonymity. Though I was reluctant to have two anonymous articles in two successive issues, after careful consideration I decided that the need for her story to get out and the need for her to feel "safe" in doing it, outweighed the reasons to publish her name. Publishing anonymous contributions is certainly a debatable issue and I considered discussing this situation here. However, I quickly realized that the journalistic issue might obfuscate the profound societal implication. Women are receiving treatment so malicious that they have legitimate fears of retribution for writing about it.

While neither the harassment nor the apprehension is a surprise to me personally, I think there are many in our field who are surprised, or who in fact may question that these

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situations (Annie's and Anonymous' [*Status*, June 1996]) even occurred as reported. After the June issue, I received a letter from someone who compared Anonymous' story to stories of alien abductions (in that the abductions are real only in the mind of the abductee.) I found this letter profoundly troubling. However, I also received many supportive e-mail messages making it clear to me that readers believed Anonymous. I was no longer troubled; I was gratified, both personally and editorially.

The status of women in astronomy and society has certainly improved in the past few decades. The recent discussion in AASWomen of the relaxation of housing restrictions at certain observatories was a rather amusing reflection of how our status has improved. (Though it probably was not the least bit amusing at the time.) However, while many explicit impediments to success have been removed, there are still implicit impediments which are just as effective at disproportionately discouraging women from staying in astronomy.

Kathryn Mead, kmead@nrao.edu

Acknowledgments: Those who have read the previous two issues of *Status* have probably noticed that the proofreading was lacking at best. I knew I needed help, so I went (desperately) looking for a good proofreader. Nadine Dinshaw graciously agreed to take on this task. She did an exceptional job proofreading and editing, and this newsletter is vastly improved because of her input. Any remaining errors or problems in this issue are my responsibility alone.

Changes Can Be Made

Carol Sibley

This article first appeared in The Next Wave (http://sci.aas.org/nextwave/forums_postdoc/), an internet forum hosted by Science magazine. It is reprinted here with permission from the AAAS. Following the internet article is an interesting discussion in which these issues are further explored.

I earned my Ph.D. in 1974, did a postdoc for 2 1/2 years, and began my job as an assistant professor in 1976. While I was a student and postdoc, I did little thinking about my future career. I assumed that I would go on to become a faculty member at some academic institution, and when the time came, I did. This may seem like a fairy tale to most of you who are currently at the beginning of your careers. The world has changed radically in the subsequent 20 years. The problem is that most newly trained scientists have mentors

whose own experience was much like mine. As a group, senior faculty members have no experience in helping students and postdocs in their labs to make headway in the current job market. I think that we, as advisors, need to take three very important steps to improve the situation.

First, we need to recognize that scientific training can and should be used in a wide variety of interesting careers. The atmosphere in many academic departments still supports the idea that any career outside academia or research institutions is second-rate. Younger scientists are frequently afraid even to admit that they are considering alternatives, fearing that their advisor will conclude that they "don't have what it takes" and will write recommendations that reflect that conclusion. Unfortunately, this fear is not always unfounded.

We all have a formidable task: educating the faculty so that we recognize the impressive diversity of creative and interesting career paths that already exists. Career seminars, personal visits, and informal contacts can all make an impression. I graduated just at the time when the first biotech companies were being founded (giving you a sense for what a fossil I am!). At the very beginning, there was a sense that no "real" scientist would choose that career, but that idea was dispelled very rapidly. Even skeptics noticed that the creativity of the scientists at Genentech easily equaled that at universities. Faculty members can be obdurate (I don't suppose I need to say that!), but we do usually respond to clear evidence that creative scientists are productively using their training in a variety of new ways. We need to keep pointing this out, pushing for a change in the prevailing notion.

Second, we need to begin to put more diversity into our Ph.D. training. I don't have very radical views on this. I have talked with many people who have moved out of academic research into other interesting areas. To a person,

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Edited by

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they emphasize that they use their scientific training even if they are no longer working directly in research. It may sound trite, but the scientific skills you learn in the lab—critical, logical analysis of data; organization of your own work; definition of a problem clearly enough so that it can be solved; creative solution of problems—are all highly valued in many other situations.

In addition, many people who work in a large lab acquire skills in management of people, resources, and budgets that become vital when they move into other areas. The worry that moving out of bench science will somehow "waste" the time spent on master's- or Ph.D.-level training is clearly unfounded.

However, we do need to make room for people to add to this training. This can take the form of formal course work, but we can also make opportunities for people to try out alternatives—to teach courses, to work with people outside academia, to seriously explore alternatives they might find attractive. For example, we have had two graduate students who took a leave of absence toward the end of their graduate career and taught at a small college for a year or two. In both cases, the opportunity arose for them to fill in during a sabbatical, so they could capitalize on the opening only by interrupting their graduate training. This is always a bit tricky for an advisor: Will that person really return and finish? However, in our case, both people did return to finish their Ph.D.s and are now teaching at liberal arts colleges, positions they could not have landed without their teaching experience. Flexibility of this kind will be increasingly important in helping younger scientists get the full range of experience needed to identify and follow satisfying career paths.

Third, all of us, faculty and students alike, need to learn how to identify and land these new kinds of positions. My contemporaries and I are reasonably good mentors for those who want to choose the traditional academic route. We know how to look for a position, whom to contact about possible openings, how to write a recommendation that will be effective, how an academic CV should look. When it comes to advising younger scientists about positions in other areas—such as business, law, forensics, journalism, teaching at institutions other than research universities—we are more lost than our students. Improvement in this vital area will also take effort from both sides. As more scientists make advances in these other areas, we can begin to identify

colleagues who can advise students in practical ways and involve them as mentors, as well.

Here in the genetics department at the University of Washington we are experimenting with one approach to this problem. Last summer, we had a weekly informal seminar series on careers outside the university. We featured scientists from the Seattle area who have earned a Ph.D., but who are using their training in some area that is outside the usual academic research arena.

We had enthusiastic support from an impressive array of scientists who volunteered to participate in this series. They were not only willing to talk with students at seminars, but they have advised them individually and encouraged all of us to broaden our horizons. We plan to hold such a series every other year. In most areas where there is a research university, a similar forum would be reasonably easy to organize. If faculty members are not doing things of this kind, then students and postdocs will need to take the first steps, but most faculties have at least some members who can and will help. Identify these individuals, get some initial contacts made, and I think that the effort will expand to include even some of the reluctant "old fogies."

The world of science has changed a lot since I got my Ph.D. We can no longer persist in the fiction that the only proper use of scientific training is a career in academic research. Mentors need to learn a new set of attitudes and skills if we are to be effective resources for our students.

We will need help from our students, postdocs, and colleagues in the widest possible range of careers if we are to make the necessary changes, but the changes can be made. This forum on Science's Next Wave is a start. Let's use it as an exchange for practical ideas to make the first steps.

Carol Sibley is a Professor of Genetics at the University of Washington. She is happy to provide more information on her department's job seminar or other related topics. Contact her at Genetics, Box 357360, University of Washington, Seattle, WA 98195-7360, sibley@genetics.washington.edu, (206)685-9378.

Physicists Working in Industry, Two Views

These contributions are reprinted with the authors' permission from the October 8, 1996 Women in Physics e-

We had enthusiastic support from an impressive array of scientists who volunteered to participate in this series.

We can no longer persist in the fiction that the only proper use of scientific training is a career in academic research.

mail discussion group (wiphys@aps.org)

Kathy Kirby

I have been working in the aerospace industry (Hughes) for over 8 years, starting only weeks after graduating with my Bachelor's degree in physics. While working, I took advantage of industry fellowship programs and obtained my Master's degree in Physics in 1993.

First of all, the difference between the academic community and the aerospace industry is *very large* (and not just pay scale). They differ in their objectives, their philosophy regarding employees, their ability to help you achieve personal goals, and pay. Both industry and academia have their advantages and disadvantages in both categories. Personally, I prefer industry's constant exposure to new technologies and the team atmosphere versus the academic "publish or perish" stereotype.

Second, I will tell you right away, that you will either like working in industry or detest it. The only way to tell is to try it, and that means applying for jobs and interviewing.

Third, as a physicist in industry, I do not use my physics training all the time. I have certainly used what I learned to solve problems encountered (mechanics, E&M,...), but I do not do research (some places do! Ball Aerospace in Boulder, Colorado, for instance). One of the primary advantages of being a physicist in industry is that your physics background exposes you to so many fields that you can quickly perform on many different types of tasks. This "non-specialized" performance is becoming more and more valued as competition in the market increases.

Many physicists in industry, such as myself, become "fire-fighters": because of their diversified knowledge basis, they can attack just about any problem and help get programs back on track. I have fought technical problems, hardware problems, software problems, and even administrative problems. I assure you, I am *never* bored!

Because of demonstrated abilities in a number of areas, I no longer fight fires on a regular basis. I currently serve as a Programs Manager, Technical Manager, and Business Area Exec. I fight fires in my spare time just for fun!

Kathy Kirby works for Hughes in Colorado

Nancy Forbes

In regards to the query about non-academic career tracks, my own experience might be helpful to others considering different kinds of careers with a physics background. I attended Columbia University (undergrad and grad) in

physics as a "second career" of sorts. I had previously completed an M.A. in a liberal arts field, and worked as a journalist, before returning to school at CU in 1980. I ultimately left with a Master's degree in physics, as I was tired of school, discouraged, and felt there were many options out there with my level of training. I ultimately came to Washington D.C. as I believed (and still do) there is a real need for scientists who have good communication skills to work in the science policy arena, and to help bridge the gap between the scientific world and the lay public.

Non-scientists, particularly legislators in Congress, need to become better informed about technical issues, and I think those with a good science background could consider possible careers in this area. I currently work for a government consulting firm, PRC Inc., where I provide technical/scientific support for the Defense Advanced Project Research Agency. I use my physics background a lot, and also have the chance to write, which I enjoy, explaining technical ideas to non-scientists.

For those who are interested, I would suggest taking a look at the Encyclopedia of Associations in the library, to see what organizations might employ those with a science background, for programmatic kinds of positions. Other avenues are government consulting firms, which provide technical support to DOD, EPA, DOT, etc. Your school's career counseling center should have info. on these. I would also suggest networking as much as possible with organizations like AWIS, SWE, WISE, etc.

The above is rather sketchy, but I would be glad to answer more specific questions for anyone who is interested.

Nancy Forbes works for PRC, Inc. in Arlington, VA

Derailed on The Track to "Success"

I entered a large, respected university in the fall of 1993 to begin my studies in astronomy and physics. I was going to go straight on to graduate school to get my Ph.D. in astronomy, take on a couple of post-doc positions, and then go directly into a tenure track job in academia. My life had a goal and direction.

I was a bright-eyed freshman blind to the social nature of the department around me. I immediately began doing computer programming for a research scientist in the department. Little did I realize that as I was programming code for the project, I too was being programmed. In a matter of a few months I knew that there was nothing else for me to do

other than follow the path of grad school to get the all-important Ph.D. and go right on through the ranks of post-docs. That is how those before me did it and that is how everyone after me must do it.

In my junior year, I started taking 400-level physics classes. I knew going in that these classes would be quite challenging, but I thought the challenges would be purely academic. I never could have imagined the obstacles that would be directed at me because, as a woman, I approached the material differently than that men who made up 95% of the classes. Sure, I had heard that the hard-core sciences weren't the most "female friendly" of the disciplines. But nothing could prepare me for what I experienced.

Group studying was encouraged. I made it a point from the very beginning to find the best people in the class and work with them. But little things started to happen to separate me from the group. People started to laugh at my problem-solving suggestions. Eventually, they didn't take me seriously at all. I would frequently go to the professor's office hours to ask for help on the homework. The other students interpreted this as evidence of my alleged secret love affair with the professor, a rumor that made its way back to the professor.

Eventually I became bothered by things that didn't bother me before. For instance, I began to be bothered by the fact that I was one of two women out of a class of forty. The second woman, who also was in my study group, was having the same problems with the male members of the group that I was. I also became very sensitive to how my professor would treat me when I would ask questions or make suggestions in class. They would never take my suggestions as seriously as those from the men in the class.

My problems weren't limited to my fellow students. In fact, I had an astronomy professor try to explain why I didn't do as well on an exam as some of the other (male) students by saying, "I understand that women try to compete with men mathematically, but sometimes it just isn't possible." To this day I have to check how I type that because I am trying to convince myself that he meant something else. I was later told by another professor that the professor who made this statement was not sexist and that I simply misunderstood him. At that point, I really began to wonder if every woman in science had to face such issues or if it was just me.

Little did I realize that as I was programming code, I too was being programmed.

In fact, my experience with the statements this professor made illustrated to me just how much of a communications problem there was between myself and my (male) professors. Men and women are different. Period. We think differently, feel differently, and communicate differently. But there is also a difference between communication differences and someone just not thinking before they say something. Even if I had misunderstood his meaning, he should never have said that to begin with.

Many of the female readers will most likely recognize these events as being similar to events in their own lives. My problems were nothing out of the "ordinary." The part that really began to bother me was that there was nothing I could do about it. Plain and simple I *needed* to study with the best people in the class. When the other female student in my class and I approached the professor about our problems with the other students, he stated to us that he had been observing the group dynamics all semester but there simply wasn't anything he could do about it. While I have come to accept that fact that there was little he could do, he also was unable to offer us any other suggestion than to just live with it.

I talked with several other professors and academic advisors about my dilemma. They all told me that I should just put up with it because it wasn't going to go away. Some of the female faculty members told me that if they put up with it during the years when it was *really* bad, so should I. Everyone seemed to think that my discomfort with the tenure track and my resistance to the sexism were signs that I just didn't take astronomy seriously enough.

So I started to question what the signs are that indicate to the astronomy community how serious a student is. I noticed that "serious students" assume that it is a natural course of life to go directly on from undergraduate to grad school to postdoc to tenure track positions. "Serious students" never consider doing something as "foolish" as taking time off to get married, have children, or anything else. "Serious students" understand that true "success" can only be achieved when one is working 50-70 hours/week on their research regardless of the impact it might have on their physical or emotional well-being.

There are always those who learn how to balance a "serious"

Some of the female faculty members told me that if they put up with it during the years when it was really bad, so should I.

career and handle an existence such as a family outside of the field. However, in the "publish or perish" world, it is difficult to have both. Where does one find the time to both work on research and care for a sick child? How can one manage to survive the "publish or perish" environment and do something else equally meaningful outside of work?

This way of thinking isn't something that people are born with. Students are taught this by observing their professors. However, this is to be expected. Professors thrive on taking students under their wings to teach them their area of expertise. It is then expected that the student will follow in *exactly* in their footsteps. This involves following their course of education which, more often than not, is the track leading straight on to grad school and a Ph.D. and then to a postdoc to a tenure-track job. When a student is expected to become a direct image of their mentor, where in that model is there room to explore other things? If a student's ability to follow this track is a testament to their seriousness and capability for success, how can someone choosing a different path be considered at all successful?

Instead, shouldn't success be measured not only on the basis of one's work, but also on the achievement of one's goals for personal growth? I have come to establish some goals for personal growth. I know that I would like a family life and that I need some brief time away from astronomy. If having such goals indicates that one is not a serious student, there is no hope for me.

Astronomy Outside of Academia?

In January of 1996 I went to the AAS meeting in San Antonio, TX. I hadn't resolved anything with my life and so went in with an open mind hoping that there would be someone who could convince me that I wanted to put up with the sexism so I could do astronomy. The best session that I attended was the annual session on how to land a job with a degree in astronomy. There were several speakers and some of them represented a whole new world that I never considered an option: *industry*.

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Get back issues from
<ftp://ftp.aas.org/committees/cswa/bulletin.board/1995/>

Attending this meeting was an eye-opening experience. I began to question the things my advisors and professors kept telling me about what I should do upon receiving my B.S. I began to fully examine my options—and I did have them! I came to realize that this track I was being placed on wasn't the only way to be successful in astronomy or physics. And I now work on a new set of beliefs—my commitment to the sciences is not measured on whether or not I plan on going to grad school, but whether I am mentally challenged and satisfied by my work, whatever that may be.

Recommendations to the Community

My story is a long-winded way of saying that the academic community is not acknowledging the problems that face women and men in astronomy nor does the community accept the fact that there are options for those feeling trapped by this system. There are several points that need to be addressed by the community if the number of women in astronomy is to begin to reflect the rest of society. These include:

1.) The astronomy community needs to acknowledge the fact that, while attempts have been made on a large scale to reduce the sexism in the community, there is still much to be done. Professors cannot sit idly by assuming there is nothing they can do or that they have already done enough. They have an obligation to their female students and to the field to eliminate the sexism present in the classes they teach—whether it come from them or their students.

2.) The astronomy community must accept the fact that working outside of academia is just as desirable and rewarding as working inside academia. To do this, students must be allowed the liberty to chose whether or not they want to pursue a career in academia and that choice must be respected. That respect must be demonstrated, not only in the obvious ways, but also in the subtle feedback that can make students uncomfortable with their choice.

3.) Academic advisors need to advise their students that there is a shortage of jobs in astronomy and actively encourage the students to consider employment outside of academia either before or after obtaining a Ph.D.

4.) The academic community needs to understand that it is acceptable for a mother or father to take some time off of the "academic track" to start a family and not frown on them when they take time during the course of their research to nurture that family. This must be demonstrated by some leniency in the "publish or perish" attitude. The academic

community must realize that activities as rewarding as raising children might require the parent to take some time away from research leading to publications.

5.) Graduate students should be told that they are also very valuable in the job market with a master's degree. This would reduce the number of Ph.D. recipients looking for a job in academia.

Conclusion

I have taken several more physics classes since the ones that I mentioned. None of them was much better. I managed to rearrange my schedule so I didn't have to study with the same people. That helped a bit. During this summer I worked in astronomy on an NSF-funded REU program. Over the course of the summer, I finally figured out what it is that I want to do. I have decided, much to the dismay of several faculty members and advisors, which I am going to leave astronomy for a while. I am currently interviewing with companies to do engineering or computer programming. There isn't a day that goes by without someone wanting me to explain how it is that I could leave the sacred world of academia. And there isn't a day that goes by when I don't reconsider, if only for a minute, whether I am making the right decision . . . but I know that I am. I am planning to keep my options open should I some day decide to pursue grad school and my Ph.D. But, then again, I may never go back. If the astronomy community intends to ever be a community that reflects societal norms, they need to make sure that stories like mine never happen.

The author is a senior at a large, Midwestern university.

Update on Job Guidelines

The CSWA has decided to transfer responsibility for the Job Guidelines to the Employment Committee because, obviously, jobs are not strictly a woman's issue. The transfer was made in June 1996. The hope is that ultimately some version of the Guidelines will be submitted to the AAS Council for consideration and endorsement. Ed Guinan, guinan@ucis.vill.edu, is the Chair of the Employment Committee.

New CSWA Web Pages

The Committee on the Status of Women has a new set of web pages. The CSWA site can be reached directly at

<http://www.aas.org/~cswa/>

or from the AAS site by clicking on *Committees* and then on *CSWA*. The webmaster of the old graphics-intensive and highly informative web site (which was not part of the AAS site) was no longer able to maintain that site, so the Committee decided to design a streamlined site which could be accessed from the AAS site. Comments on, or suggestions for, the new site are vigorously encouraged and can be directed to Meg Urry, cmu@stsci.edu or Kathy Mead, kmead@nrao.edu. We hope that you find the site informative and interesting.