S T A T U S

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Committee on the Status of Women in Astronomy

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About This Issue

I am pleased to present in this issue the first two *Letters to the Editor*. (More precisely, they are e-mails to the editor.) One of my goals when I became editor was to build a healthy *Letters* section and I hope these letters, as well as the provocative articles in this issue, will encourage additional thoughtful letters.

I have strong opinions about graduate education and tenure and I'm pleased to have an article on each of these important topics. Careful, diligent and open-minded attention by the astronomical community to these issues is critical to the future health of our field. These articles explore their respective issues in a thorough and thought-provoking manner.

Zodiac Webster, a graduate student at UC Santa Cruz, was her department's student representative at the "Examining Graduate Education in Astronomy" regional workshop in Tucson. Because this topic is so important, I wanted to include an article in *Status* which reported on the facts of the meeting and provided personal perspective, for interest and context. Zo has presented a balanced and interesting treatment of an emotional and complex topic. (More information on the graduate workshops and the entire AAS initiative, partially funded by the NSF, can be found at http://earth.ast.smith.edu/ED.GRAD/workshop.html.)

Here in Arizona, the tenure system is under attack by the state legislature. Apparently this is also true in Texas, as, on a recent visit to Austin, I read an editorial column in the newspaper about the legislature's consideration of tenure. Marc Kutner has written on the merits and drawbacks of tenure, and his opinion on how faculty can best deal with impending changes. In his article, Marc tells you what you need to know about him to in order to put his opinions in context. In the interest of full disclosure, I add here that Marc is my husband.

The 'dessert' article of this issue is about leaving astronomy for a new career. I met the author, Barry-Meyers Rice, when he and I were students at the same institution (I was a graduate student, and he an undergraduate.) He departed for graduate school at the University of Arizona and we lost contact for many years. We became reacquainted when I (and Marc) moved to Tucson. Barry has a unique view of life and a delightful way of expressing it. I'm pleased to share with you his humorous but thought provoking reflections on his departure from astronomy for a new career in environmental conservation.

Finally, I have written some comments about current events. Though there are often current events about which I'd like to write, for previous issues of Status, I have not had time to write an opinion column. For this issue, I made time. I call it, "About some things there is too much equality, about others, not enough."

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Note: This is a reminder that articles are welcome from anyone on topics related to what I call 'sociological' issues in astronomy. The fact that most articles are written by people that I know means only that I don't get many unsolicited articles. You can change that. A general description of my editorial policy can be found on the publications page of the AAS CSWA pages,
http://www.aas.org/~cswa/pubs.html.

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Letters to the Editor

It's Not Bad Everywhere

I feel I need to comment on the content of the past few *Status* issues because, frankly, I'm tired of hearing and reading about how awful it is for women in Astronomy. While I do believe that it's important to make women aware of the discrimination and sexism that may exist, I also think CSWA should discuss the "other side" – success stories of women in Astronomy.

Like "Annie", of Derailed..., in the January 1997 issue, I attended a "large Midwestern university." I received B.S.'s in Astronomy and Physics in May, 1993 and I have nothing but good things to say about my time there and the people I associated with. Only 2 instances of what might be remotely described as sexism – perhaps "discouragement" is a better word – occurred: I had an Astronomy professor tell me I could count on him for a letter of recommendation if I intended to work at a planetarium or other such job but not if I intended to go to grad school; I also had a Physics professor tell me that I would never make it in grad school if I didn't get A's in my undergraduate physics courses. Do you know what I did? I didn't listen to them, and I didn't let those comments get me down.

I'm in graduate school now, pursuing a degree in Physics after taking off 3 exciting years working in Astronomy as an observer and as a member of a telescope team that was involved with a space shuttle mission. As a matter of fact, it was that experience that helped me decide to go back to school to get an advanced degree so that I could work in the space industry – and I had total support and encouragement from my undergraduate professors who wrote my grad school recommendations. These men are aware of the situations in Astronomy and Physics and think I made the right decision to not follow the traditional academic career path.

This attitude was not unique to my undergraduate institution. I'm finding the same support here in grad school. I've had several co-op offers from JPL and GSFC, and my advisor and other faculty are supportive of my decision to leave school for a semester to work and gain more experience in my field of interest. Of course, I'm not leaving Physics and Astronomy altogether – I will return for the Masters and Ph.D degrees and then move permanently into the space industry, not academia.

I'm considered to be a serious student. My decision to work right after my BS was my own – I felt no pressure to go right on to grad school, even though most of my classmates did. Not once during those 3 years I worked was I looked down upon by any of my Physics or Astronomy professors for not going directly onto grad school.

I'm sorry "Annie" had such an awful experience. Not all institutions, professors, or classmates are like hers, though, and I thank you for letting me share my

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For a description of the editorial policy and back issues on-line, please see
http://www.aas.org/~cswa/pubs.html

experiences.

Nicole Zellner

Nicole is a graduate student at Rensselaer Polytechnic Institute.

No Excuse for Sexism

I was very touched by one of the articles in the January 1997 issue of Status. The harassment and discrimination experienced by the author of Derailed on the Track to "Success" is not uncommon, and astronomers must rid the field (and in some cases themselves) of such attitudes towards women. Most troubling to me was the following statement made by one of "Annie"'s astronomy professors:

"I understand that women try to compete with men mathematically, but sometimes it just isn't possible."

Another professor claimed that this man wasn't sexist and that Annie had simply misunderstood him.

I am fortunate that most of the undergraduate and graduate astronomy courses I took had at least as many women as men. In almost every class, the person with the best math skills was a woman. I do not conclude from this that men can't compete with women mathematically. I have seen no evidence for correlations between gender and mathematical ability in the classes I've taken or in the discussion sections or labs that I have taught. It is possible that the best student has been male in most of the classes that Annie's professor has taught, but why should he expect anything else if 95% of his students have been male? In any case, if professors treat women as less mathematically competent then men, and take their in-class questions or comments less seriously than those of men, then women will be less likely to contribute in class and therefore less likely to do well. Astronomy and physics do not come naturally for most of us, and if we are discouraged from asking questions then classes don't teach us any more than reading a book would.

And just because someone says they aren't sexist, or has done things in the past that aren't sexist, it doesn't mean that they aren't sexist. Someone who believes that women aren't as good at math as men are is sexist. Someone who treats questions from women less seriously than questions from men is sexist. Astronomy cannot afford to protect sexist professors; we must make every effort to change their attitudes.

Annie also makes a number of important points about how members of the astronomical community, in particular tenured professors, need to change their attitudes towards students who consider careers outside of academia. Only 20% of the astronomers who got their Ph.D.'s since 1980 have remained in academia; we must change our attitudes, our classes, and our undergraduate and graduate programs to accommodate the fact that most of our students are not going to be tenured professors of astronomy.

Annie has decided to leave astronomy, at least for now, and that is our loss. Perhaps a large part of her decision was based on the sexism of her physics and astronomy professors and classmates. Perhaps another large part of the decision was based on the unrealistic expectations that most departments have for the amount of research that tenure-track faculty must do if they are to get tenure. These are things that we can and should change. But part of her decision was certainly based on the fact that there are more astronomy Ph.D.'s than there are jobs for them in astronomy. In my opinion, there is nothing wrong with getting a B.S. in astronomy and then working in medical physics. There is nothing wrong with getting a M.S. in astronomy and then becoming a software engineer. There is nothing wrong with getting a Ph.D. in astronomy and then going into finance. The sooner the astronomical community realizes that leaving astronomy doesn't make one a failure, the better off our field will be.

Eric Schulman

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Graduate Education

Zodiac Webster

This is a version of an article that will appear in a special issue of Mercury *magazine (the journal of the Astronomical Society of the Pacific) devoted to graduate education in September/October of this year.*

In 1994, 953 full-time graduate students were enrolled in Astronomy programs in the United States and 140 graduated with Ph.D.s. Every year there are around 50 tenure-track faculty positions in astronomy available. What are the other 90 students going to do with a Ph.D. in Astronomy?

(These statistics are from a report by the National Research Council, titled "Reshaping Graduate Education" distributed at the Examining Graduate Education Regional meetings. It can be found at http://www.nap.edu/readingroom/books/grad/index.html. The NRC home page is at http://www.nas.edu/nrc/)

The astronomy career path used to read like a standard recipe

Until recently there was no problem with the standard career track – Ph.D., post-doctoral position, tenure-track position – but today's numbers tell a scary story. The number of astronomy post-doc positions has doubled in the last 10 years (1985-1994) which has allowed the ever increasing numbers of doctorate holders to be rather successful at the first step in the post Ph.D. career ladder. After that rung, however, the situation becomes more grim as the number of tenure-track positions open world-wide each year in astronomy has remained roughly constant at around 50 in the past few years. (This number is from a packet of statistics given to us in Tucson by R. Milkey. The number cited is from the graph: AAS Job Register Listings.) It is clear that in the future a significant fraction of astronomy Ph.D. holders will be forced to abandon their hopes of being an astronomy professor. But what exactly will they do, and will they be prepared?

The American Astronomical Society (AAS) and the NSF sponsored a series of three regional workshops entitled "Examining Graduate Education in Astronomy." The purpose was to address the "goals and funding of graduate education" within the astronomy community in order to be proactive in making changes, much in the tradition of the decadal reports. The meetings were designed to bring together department chairs or graduate program chairs, "thoughtful" graduate students, and industry representatives to discuss three major issues: funding of graduate students, broadening the graduate curriculum, and implementation of a meaningful Masters degree. The meeting I attended as the graduate student representative from my school was the third in the series, held in Tucson, Arizona. The one and a half days of discussions were attended by 28 faculty representing 20 schools, 11 graduate students, and 4 representatives from industry.

The workshop involved numerous discussions attended by the represented constituencies. Each participant was encouraged to read two recent studies as background material and to discuss the salient issues with other members of her or his own department. (Reshaping the Graduate Education of Scientists and Engineers, COSEPUP Report (Griffiths, 1995), http://www.nap.edu/readingroom/books/grad/ and Graduate Education and Postdoctoral Training in the Mathematical and Physical Sciences, (Armstrong, 1996) http://www.nsf.gov/mps/workshop.htm.) To further frame the context for our discussions, we heard from Judy Franz, with the American Physical Society, who summarized recommendations about similar issues made in the Department Chairs' Conference Report (http://www.aps.org/jobs/dcc/DCC.html). We were also presented with the relevant national enrollment and funding statistics for the physical sciences and astronomy.

It was clear that two categories of schools were represented at the meeting: those ready for change and those that were not!

We separated into three groups to discuss graduate funding, the astronomy Masters degree, and curriculum broadening in detail. The conference organizers charged us to think about the issues and suggest creative solutions. In many ways these are inter-linked subjects, and issues from all three areas came up in each group. There were 3 hours of breakout sessions followed by a summary session consisting of a report by each group and further group

discussion. The AAS has followed up with on-line summaries, with sessions at the Toronto meeting, and plans to present a compiled summary of all three workshops at the June AAS meeting in Winston-Salem.

Given the numbers, are students getting the skills they need to succeed, and is the federal government getting its money's worth?

It was clear to me from dinner conversations, the breakout sessions, and the summary session that two categories of schools were represented at the meeting: those ready for change and those that were not! The schools ready for change were already creatively approaching local industry to form closer ties, and preparing students to work in those companies. These schools tended to be those with smaller departments. The schools happy with the status quo tended to be the schools with larger, more established departments. These schools have been successful placing their students in faculty positions in the past and did not seem willing to recognize that any changes in their programs were needed.

Incoming and current graduate students are very aware that the academic job market is tough. However, most individuals (at least in my own department) think that they will be the lucky one to get a job. Once starting graduate school, students are surrounded by people who have been successful at getting a faculty job. Most recent Ph.D.s are able to find a first post-doc position which also leaves a favorable impression on younger graduate students.

Students are in a situation where they have information about academia only from the point of view of successful academics.

Additionally, astronomy faculty are distanced from non-academic science career track requirements and don't have much valuable information to pass along to the students about the alternatives that may be available to them. Even advice about the astronomy job market is rather suspect, as it is no longer clear what is needed to succeed in the rapidly changing and competitive astronomy job market. Students are in a situation where they only have information about academia from the point of view of successful academics.

In addition to not being fully informed, students are not confronted with their future for 5+ years once they start graduate school. Programs are designed with no clear point for students to stop and reconsider their options. Leaving a Ph.D. program with only a Masters degree is considered a tremendous personal and professional failure, so is not usually discussed as a viable option. In this situation, there is no time to consider alternative options, and no gracious path in which to exit the program early. It is understandable that most students pick the path of least resistance: stay in the Ph.D. program and work towards the career path they understand.

One serious issue brought up repeatedly in Tucson, but consistently left unaddressed in discussions, was that the status quo is changing as the federal government tightens its belt. Astronomy has ridden the coattails of basic science research funding since World War II without having to justify its contributions to society. However, when faced with the possibility of a 30% cut in basic research funding, it is entirely realistic to expect that fields that do a better job of proving their cost effectiveness and value will receive a larger portion of the shrinking budget pie. The US government wants to maintain its position as a world leader in science and technology and is willing to pay for graduate education in science in order to maintain that. However, astronomy Ph.D. students may not be learning skills that are easily transferable to industry. Additionally, Ph.D. students are spending around 6 years beyond their undergraduate degree learning these marginally useful skills.

I think people are ignoring an impending astronomy budget crisis because it is so intangible and unrelated to day-to-day research activities. PI's are having more difficulty getting grants, but other PI's in same department are having the same difficulties. Everyone then assumes cuts are being spread around equally and no action can be taken to reverse the downward funding trend, or they assume that this is just a temporary problem and funding levels will eventually "return to normal." It has not yet become imperative to a typical faculty member or graduate student to lobby in order to achieve changes at the national level.

Unfortunately, the prevailing view seems to be that since astronomy is "interesting,"astronomers are "entitled" to funding by the government. It is my opinion that this view is naive as every scientist thinks the same about his or her own field. I firmly believe it will be necessary in the very near future to

justify funding with more concrete arguments focusing on direct benefits to the American public.

How should my workers, ahem, the graduate students be funded?

Most students are funded through PI grants for the majority of their time in graduate school. However, students are frequently paid as Teaching Assistants (TA's) early in their graduate career due to program requirements, or before they have found a thesis advisor (PI) to work for. At the meeting, we discussed ways in which we could change this funding model, especially in the context of encouraging curriculum changes and better preparing students for a wider range of careers.

It has not yet become imperative to a typical faculty member or graduate student to lobby in order to achieve changes at the national level.

One funding model already in limited use is unrestricted, entry level research fellowships primarily funded by the National Science Foundation. These research fellowships allow students to be flexible in picking projects that may be of interest to them, or that may enable them to further develop skills that they think are weak rather than working on a project because it can pay them. Students can focus on their own development as a scientist and are better able to design a program to fulfill their needs. Fellowship students do not usually have to serve as TA's as often as non-fellowship students because their research funding is guaranteed over multiple years.

Industry representatives mention two drawbacks to hiring a person with a science doctorate: the high level of specialization and the length of time the new hire has spent in school.

One suggestion presented at the outset of the meeting was to redistribute money from PI grants to more portable research fellowships. The faculty were overwhelmingly against increasing the funding for such unrestricted entry-level fellowships at the expense of funding graduate students through PI grants. The main arguments against the increased use of these fellowships seemed to be counter to the stated goals; fewer students will be available to perform menial data reduction tasks and teach the undergraduates since fellowship students don't have to TA to support themselves and can choose projects that will help them reach their goals instead of well funded but not necessarily useful projects.

As a beneficiary of such a government fellowship, I must confess my bias in favor of fellowships because they do allow such flexibility. I have been able to choose projects to round out my computational skills and that enabled me to learn more about observational astronomy. Most importantly, I was able to choose projects that piqued my interest and advisors I thought would be most helpful in my professional development.

Mine was the minority view, however, as further discussions revealed that the majority of people at the Tucson workshop (as well as the graduate students from my department) thought that the current model of funding graduate students through PI grants was a satisfactory method of funding. In my opinion, connecting with a single PI for funding leads the student to specialize early in the graduate career. Instead of working on a few small projects in different areas, students are enticed to work with a single big money project that will provide some measure of financial stability in the long term. These types of projects may not be the most conducive to timely completion of a thesis as the overall scope of the project is broad and the graduate student may frequently be called upon to perform mundane tasks to further the goals of the project but that detract from time spent on their own research. The best evidence that this system for funding graduate students is not ideal is that the time to degree is currently increasing in this system. I hope that funding changes are considered at the national level at least on an experimental basis.

Is there room in astronomy for a terminal Masters degree?

Currently most terminal Masters degrees are awarded if the student leaves the program after "failing" some aspect of her or his degree program and is unable (or unwilling – which is often viewed as failure in the mind of academics) to continue the program to earn the Ph.D. Outside academia, a Masters degree in science is recognized as a positive achievement, but within astronomy the Masters degree is viewed as a

"booby prize."

Industry representatives mention two drawbacks to hiring a person with a science doctorate: the high level of specialization and the length of time the new hire has spent in school. Both drawbacks are eliminated for students who have left school after obtaining a Masters degree. By putting together a Masters degree program that has a strict set of requirements and introduces students to useful information and skills as an integrated part of the program, it would be possible for students to receive the many benefits of having Ph.D. training without over-specializing. Additionally, these skills would be imparted on a far shorter timescale, making these students more attractive to non-academic employers.

The biggest question everyone asked was, "what is a Masters degree in astronomy good for?" The obvious answer is "very little" as it is currently structured. However most agreed that, if designed correctly, a Masters degree program with its own admissions cycle (to avoid the confusion with the "booby prize" Masters degree currently available) could be a pipeline for people interested in education or instrumentation, or who would like to learn astronomy while getting an advanced technical degree. If the degree included teamwork activities, practical projects, and personnel and/or project management skills, it would be more useful to students who do not go on to become professors, but instead join the technical community outside academia.

"We don't know how to teach those things..." is not the same thing as "It should not be done."

An alternative to the suggestion of a separate Masters track was proposed; the Masters degree should be a mandatory first step in receiving a Ph.D. Students would then reapply to schools in order to continue their degree. In order for such a system to work, it would have to be adopted by the majority of graduate schools. This would enable Ph.D. programs to be more selective in their Ph.D. admissions process, as students will have had to prove themselves at the Masters degree level before moving on. An additional benefit is that there would be a natural point for students to stop and think about the next step in their career and to possibly leave academia to pursue other career tracks. This type of system could also increase the pool of people available to teach undergraduates as it would be possible to have a larger number of Masters degree candidates than eventually stayed on for the Ph.D.

During discussions at my school, people expressed mixed reactions to the idea of a mandatory Masters degree. I personally think there are benefits to a well-designed mandatory Masters degree program, but it is not clear if my school is the right place for such a program because of prevailing attitudes about our department's niche in the graduate education market. As a matter of fact, I got the impression in Tucson that many schools had similar doubts about whether a Masters degree program was right for their school. On the other hand, there are schools that are already implementing a more meaningful Masters degree program because they did feel it was appropriate for their school.

How can we make the curriculum more useful to the majority of students (i.e. the ones not going on in astronomy)?

The topic of how to, and whether to, broaden the graduate curriculum sparked very lively debate among the participants. The main issue to be addressed was: since the majority of students will not be doing what they are spending many years training to do, perhaps the training should be re-tooled to more accurately reflect the skills the students will need. One of the ideas presented as a way to broaden skills of astronomy graduate students was participation in government sponsored internships at national labs (or even summer internships in industry).

The reaction to this suggestion was quite negative. First, people could not see what value would be gained by working in a non-academic environment. Second, it was felt that a summer away from the academic environment might lengthen time to degree. And last, a small minority of faculty did not want to waste their time during the year training people who would be away for the summer. The views expressed by participants in Tucson are the same as the views expressed by the graduate students from my school. Everyone with an opinion seems to think that time away from the academic environment will be detrimental to the Ph.D. process.

I heartily disagree. People in academia may have little or no knowledge of what may lie outside academia, but it is close-minded to assume that there is nothing to be learned there. Having worked in the "real world" for a short time before returning to graduate school I can safely say there are plenty of areas in academia that could use some sprucing up by

taking cues from industry. Learning to work on projects with clear deadlines and meeting those deadlines is one example of something that could be learned in industry and then easily transferred to academia and may even shorten time to degree.

Since the idea of using an internship to learn new skills was dismissed, it was suggested that skills be taught to students in graduate school, for example, project management skills, or focus on teaching and learning styles. These suggestions were met with "we don't know how to teach those things..." which may indeed be the case. However, this is not the same thing as "it should not be done." The fact that "no-one" within the astronomy department knows how to teach those things is an indicator that perhaps an outside person should be brought in to teach everyone, faculty and students, at once. One day project management seminars are taught around the country by professional organizers. Many schools have education departments that could be worked with to improve the teaching skills of the astronomy graduate students.

Another way students can improve their teaching skills, and thus better market themselves to the small college market, is to spend time later in their career serving as Teaching Assistants. This seems like a logical thing to do, as with a bit more maturity, more knowledge and without having the added pressure of taking classes while teaching, the graduate student can focus on improving teaching style. I think this would have benefits for the graduate student who will hone teaching skills *and* for the undergraduates who will have a better learning experience. However, it is true that any time spent teaching is time not spent on research.

All the suggestions related to adding more to the curriculum had one objection in common; time to degree. Any activity, it was argued, taking the focus away from thesis research (as in the above examples) may cause students to take longer to receive their degree. I disagree with the assertion that adding more *necessarily* leads to taking longer to graduate. Successful multi-tasking is a valuable skill to develop and one that is difficult to master if you spend all your time working on one thing!

The students' view was that any time spent doing internships, additional teaching, or other activities not directly related to research would reflect negatively on future job prospects. Graduate students think only those focused 100% on research will be successful in getting academic jobs. Here again, I disagree. I do not believe that developing team-work skills or organizational skills outside of the astronomy framework will hurt your astronomy career. However, the students believe, and it is anecdotally known, that people doing the hiring do not recognize the value of any activities outside of research. Until the focus changes at the hiring level, it will be difficult to convince students to partake in any skill broadening activities.

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Conclusions

There are many barriers to widespread reform. The first and most fundamental change that needs to be made is a change in attitude: about the potential value of a Masters degree and about the value of teaching. The majority of students will not leave a doctoral program with a Masters degree, nor enroll in a terminal Masters program, unless the astronomy community places a positive value on the Masters degree. In the same spirit, students will not attempt to develop teaching skills or seek jobs where teaching is the primary focus unless their mentors, the professors, encourage them to do so. Until there is a fundamental shift in attitude of the entire astronomical community, it will be difficult to implement changes in the curriculum that emphasize the Masters degree or teaching.

The second challenge is changing the current no-win situation for the graduate students. It is the prevailing wisdom that students who invest time to develop teaching skills or work outside astronomy for a summer in order to broaden their skills are thought to be less serious about their astronomy career by faculty who write letters of recommendation and do the hiring. However, it is extremely likely that graduate students can spend all their time on research and still not end up with an astronomy faculty job at the end of the pipeline. Students who have spent time preparing for the possibility of not receiving an astronomy job are *guaranteed* not to get one, but people who have maintained a narrow research focus in order to maximize their chance of obtaining an astronomy job will not be fully prepared for a job outside of astronomy. Until this dilemma is resolved,

students will continue to do what they think is most likely to get them an astronomy job in the future, even if this is not likely to be the career path they follow.

Third, we need to strike a balance between adding new material to the graduate curriculum to broaden the skills and information obtained with the need to reduce the time to degree. Most people were convinced that modifying the curriculum to create a well-rounded student would lead to an increase in the length of time for that student to obtain a degree. Since students are already taking too long to get the Ph.D., adding more to the curriculum, in the majority opinion, is out of the question. I believe it is possible to do more in less time in a well planned program, and I think that departments should strive to maximize the benefits for the students by implementing more *and* reducing time to degree.

The final barrier to reform is the lack of information. Statistics about what people who leave astronomy are doing are non-existent. There is very little information within the academic astronomy community about what can be done with the training received in an astronomy Ph.D. program or what skills are valued outside of astronomy academia. It is imperative that complete statistical information about the astronomy job market and about alternative career paths others have taken be gathered and disseminated to current and incoming graduate students so that advisors can provide up-to-date information and students can make informed choices.

It is clear that changes can and will be made at open-minded institutions. At the national level, making changes will be difficult until a larger segment of the community becomes serious about reform. Current and recent graduate students will be caught in the middle until widespread reforms in curriculum and attitude occur.

Departments and faculty members nation-wide need to open their eyes to the current and future challenges graduate students face and ensure the needs of the students are placed at the forefront. Mentors for graduate students, or senior undergraduates, must examine their own attitudes and biases. As we move into the 21st century, the astronomy community will experience many changes. We need to be ready to embrace the career paths of the future, not look to the past.

Persons interested in discussing these issues further can subscribe to the Mercury magazine listserv by sending a "subscribe" message to mercury-request@lists.best.com. Messages can be posted by mailing to mercury@lists.best.com. An additional discussion forum sponsored by the AAS is available on the world wide web at /ast1.spa.umn.edu/AASgrad/.

Zo Webster is just completing her second year at University of California, Santa Cruz, zodiac@ucolick.org.

Some Thoughts on Tenure

Marc L. Kutner

An increasing number of college administrators and state legislators see the elimination of tenure as the solution to economic and pedagogical problems that afflict higher education. They suggest, in ominous tones, that the system must be changed. In response, faculty members get defensive about these threats to "academic freedom" and defiantly reject any suggestion of change.

My thoughts are based on twenty years on the faculty of a private university (Rensselaer Polytechnic Institute) as well as sabbaticals at large state

Modifications of the current system, based on "Trust me" are doomed to fail to protect faculty members.

universities. At Rensselaer, I went through the usual progression from untenured Assistant Professor to tenured Full Professor. I was also involved in issues of faculty governance, including participation in writing a Faculty Senate constitution.

My first thought is that, given the financial constraints on many universities, and the vast oversupply of people applying for faculty positions it is only a matter of time before the major changes in the tenure system are unleashed. The main issue is who will decide those changes. If faculty members collectively (through faculty senates and similar organizations) take the lead in this area then *they* will get to write the new rules. If faculty members simply say "No!" then changes will be *imposed* by administrators or (even worse) state legislatures.

My second thought is that if we lived in an ideal world, in which faculty and administrators totally

trusted each other, then tenure would not be necessary. However, that trust does not exist, and given the heavy-handed actions of many administrators I don't see that trust coming on a useful time scale. Therefore, modifications of the current system, based on "Trust me" are doomed to fail to protect faculty members.

If we accept that some things must change, the next step is to think about the perceived benefits and drawbacks of tenure. By perceived benefits I mean the positive features that the proponents of tenure claim that it provides; by perceived drawbacks I mean those negative features which the critics of tenure point to. We can then look at whether the current system actually provides those benefits or creates the drawbacks. We can then think about how a modified system might do a better job in providing the needed benefits and eliminating the actual drawbacks.

As administrations have allowed departments to shrink by attrition, they have made the problem of deadwood worse.

Benefits of Tenure?

What are the expected benefits? Tenure is supposed to encourage creative approaches to teaching and research by allowing tenured people to think in terms of longer time scales (than annual) for measuring success. It is also supposed to protect faculty members from reprisals arising from unpopular political views (both in terms of general political issues and those of university governance). Finally, it is supposed to help foster institutional loyalty.

Does tenure allow creative long term approaches to teaching and research? I think that this works in many cases, especially with the new emphasis on undergraduate science education. It is encouraging to see groups of tenured faculty at a number of schools working on curriculum and pedagogy innovations. However, as attrition leads to smaller faculty sizes and increased teaching loads, with a continued expectation of research, more and more faculty are too overloaded to take advantage of the opportunity to think creatively about their teaching. Moreover, the rigors that junior faculty must go through to get tenure seems to leave many of them shellshocked and incapable of innovative thinking for years after they get tenure. On the research side, even if getting tenure encourages faculty members to try innovative ideas in research, those are for the most part discouraged by the polices of the funding agencies.

What about protection from reprisals? While it is true that it is very hard to fire a tenured faculty member, usually requiring non-performance of duties, like teaching, or moral turpitude, termination is not the only form of reprisal. I know from personal experience. At most schools it is possible for deans and department chairs to increase your teaching load. They can do this since many schools have a crippling maximum load, from which you can get partial release based on research or university service. Usually this release is via some ill-defined rule, and is left at the discretion of the dean or chair. The targeted faculty member can also be moved to an undesirable office or laboratory, or can lose the use of teaching assistants, etc. All of these can ultimately force a tenured faculty member to resign, or at the very least, that faculty member can serve as a reminder to other faculty members about the dangers of becoming an outcast of the administration. Schools that carry out this kind of harassment rarely have a meaningful grievance procedure which might protect the "outcast" faculty member.

I think that tenure does help promote institutional loyalty. (For example, I got tenure early and felt good about Rensselaer for many years afterward.) However, there are things, short of agreeing to pay your salary for the next 30 years, that an institution can do to make you feel good about it. Already, many schools give awards for outstanding teaching and research. But they can do more. They can give seed money to encourage the development of new ideas in teaching and research. They can give real raises each year.

I also think that there is a risk to the faculty member for having institutional loyalty. Once you get tenure you feel good about your institution, so you develop your career in a way that has the maximum benefit to the school (e.g. taking on more administrative work). This makes it harder for you to leave if they decide to make your life miserable in the future.

Drawbacks of Tenure?

What about the purported evils of tenure? The complaint I hear most frequently is that it protects "deadwood". The other complaint is that it doesn't allow universities to respond, on appropriate time

scales, to changes in student interest (e.g. the growth of interest in the biological sciences at the expense of physical sciences).

The issue of responding to changes in student interest is a serious one. It is hard to move from one area of physics to another, and even more so from physics to biology. With the current tenure system, the time scale for significantly changing the composition of a faculty is tens of years. While you would not want administrators to try to respond to every fad, this is too long a time scale. My sense is that being able to change on a time scale of five to ten years is necessary.

For many years I would have argued that deadwood was not a serious problem. This was not because I thought that there was no deadwood. Rather, I felt the incidence was so low that it was not affecting department productivity. However, as administrations have allowed departments to shrink by attrition, they have made the problem of deadwood worse. In a department, where faculty members are already heavily loaded, even one or two members who are not carrying their fair share of the load, places an incredible burden on an already saturated faculty.

Tenure artificially deflates academic salaries and limits academic mobility.

To further analyze the problem, I look at different categories of deadwood (as defined by administrators). First there are the people who get tenure and then do nothing until retirement. While such people would be a problem if they existed, I have yet to hear of one. The gauntlet that we must run to get tenure insures that only those highly motivated to teach and do research will get through. While these people might be a little burnt out after getting tenure, they are still highly motivated to work hard. Another category would be people near the end of their careers who really do turn off years before they officially retire. These people are a problem since they are insensitive to the normal modes of administrative harassment, and they often do not respond to early retirement incentives.

A third classification of deadwood falls into a gray area – some consider them deadwood, but they can be assets to a department. These are people who lose their passion to do research – carrying out only a small program or none at all. However, they retain an interest in teaching and are good at it. While these people may seem to be deadwood in the eyes of deans, who are more interested in research output, they can still make important contributions. I have seen creative department chairs argue to their deans that if these people willingly take higher teaching loads that frees the research active faculty of some of their teaching load. The hard part is to provide suitable rewards to these teaching-oriented faculty.

I will add two other problems that seem to be associated with tenure. It artificially deflates academic salaries and limits academic mobility.

I believe that because tenure is viewed by faculty and administrators as having a certain financial value, many administrators offer, and faculty accept, a substandard wage. The value to the faculty member comes from the guaranteed nature of the employment. (This is just like accepting a low interest rate on a safe investment.) The cost to the administration is in having to have the resources to provide the guaranteed salary. I would argue that if faculty members take the lead in revising the tenure system, in return for "giving up" the guaranteed 30 year employment, they should insist that administrators give them a higher wage.

How much should the wages increase? That could be the subject of many additional articles. Among other things, certainly some actuarial type analysis is needed to decide on the economic value of a guaranteed wage. However, as a starting point, I would argue that salaries should be high enough for faculty to survive without having to supplement their income with summer activities (either teaching or paid research). This is because the summer is the only time when most faculty members have enough time to do research or work on new teaching ideas – things that are actually part of their academic year job requirements. It is getting increasingly difficult to get grants to pay summer salaries for such activities.

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The final issue that I will discuss is academic mobility. When I was in college in the 1960's, it seemed that there was a constant movement of faculty from institution to institution. My sense was that this was a good thing. There was a steady injection of new ideas, both in teaching and research. However, now, with the oversupply of faculty and the current tenure system, we have what I call academic gridlock. Too many faculty spend their whole careers at one school. There is very little cross fertilization of ideas. Sabbaticals help a little, but after one, you return to the same rut. I believe that this lack of mobility has a severe negative impact nationally on research and teaching quality.

Where do we go from here?

So where do we go from here? I have heard numerous suggestions for replacing tenure with some form of long term contract. The basic units that I have heard are multiples of five years. I have heard versions where you are evaluated after five years and if there is a problem, you have five years to improve. There are other plans where there would be rolling contracts, but they would have to give you five years notice if they want to terminate you. These types of plans provide some of the important benefits of tenure, especially the security of a reasonably long (5 to 10 year) commitment, which would allow faculty to develop creative long-term approaches to teaching and research. These benefits could be provided without locking an institution indefinitely into an individual or a program.

Tenure is not as good a protection from harassment and for academic freedom as we think.

A crucial feature of any modification of the tenure system is the development of an effective grievance process. This would have to provide real protection from improper termination and various forms of harassment. This would be the guardian of academic freedom. As I said above, tenure is not as good a protection from harassment and for academic freedom as we think.

In talking to faculty at many schools, I have been amazed at how few schools have a real grievance procedure. Many places have appeals processes for tenure and promotion decisions, but that addresses only a narrow range of circumstances. (Likewise some schools have review procedures in certain narrow areas, like patent rights.) However general grievance procedures rarely exist. This tells me that there must be something about such procedures that scares many administrators. At Rensselaer, when a new Faculty Senate constitution, which included a grievance procedure, was adopted by the faculty, the university president unilaterally told the Faculty Senate leaders that he would not recognize the new constitution unless they dropped the grievance procedure.

Conclusion

I have two conclusory thoughts. First, it is *crucial that faculty take the lead* in developing these new non-tenure systems. Otherwise, the new system will be designed by people whose interests are counter to those of the faculty.

Second, in any non–tenure system, *faculty must have recourse should their jobs or academic freedom be threatened by capricious administrative actions.* There must be a concrete grievance process to address issues related to performance evaluations, or teaching load, lab space, etc. The grievance process should be operated by a committee composed primarily of elected faculty members. This committee might even be broken into two levels, where part of the committee would make a finding, and the rest of the committee would review that finding. For the most effective protection, this committee must be totally autonomous. Their decisions must be binding and not subject to review by any administrators (even the provost or president).

I know that this sounds difficult and revolutionary, but giving up tenure is also difficult and revolutionary.

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Life After Astronomy

Barry Meyers-Rice

Inside conference room N305, my committee deliberated. The defense had been bearable – the discomfort rated somewhere between a periodontal cleaning and being mugged – so all I could do was hover ghostlike about the halls and wait. I aged

rapidly. After a Hubble time or so, the door opened and my advisor stepped out, all grins. Was he anticipating the sweet pleasure of informing me of my failure–thrilling at the notion of seeing me die at his feet? Had I disobeyed him one too many times? He extended his hand–did he have a gun?

"Congratulations, Doctor."

After the celebrations and jubilations, it was time to look forward. Did I have a post-doc arranged? No. Had I been rejected by all my prospects? No. Had I even looked for jobs? No. I was an astronomer with a sinful, shameful secret. My dark heresy was that I planned to leave astronomy. While I enjoyed astronomy and had made some interesting discoveries, the thrills derived from exploring the frontiers of astronomical understanding were not invigorating enough to propel me through a happy career.

During most of my graduate student years I had not revealed my dissatisfaction to others. I could not. The whole issue was dosed with embarrassment, and flavored with self-doubt and shame. Was I giving up? The phrases that bedeviled me – Abandoning the field, Leaving astronomy, Quitting, Not being able to hack it – all emphasized the inevitable loss I would suffer, and what were apparently my inadequacies. For some reason the default feeling about leaving astronomy was one of shortcomings on my part. (Later discussions with other astronomers changing careers often revealed they suffered the same neurosis. It was as if by leaving astronomy, we were betraying some sacred duty or honor. We were defectors.) Only with effort could I grasp a positive perspective. The changes that brought the "inevitable loss" would be accompanied by inevitable gain. The perspective that I had "inadequacies" was generated from an external socialization process, and did not really agree with my own feelings. My own feeling was that by staying in astronomy I was stagnating. By leaving I was gaining the opportunity to do something I enjoyed more – I was Embarking on a new career, Exploring new options, Making a brave choice, and Following my dreams.

I remember the day I decided to come out of my closet. My brother, who had already earned a biology Ph.D, had reminded me that even in the most petty of institutions the worst aftermath of exiting the field was that I would be the subject of a few post-colloquium discussions. Thinking about departmental dynamics and politics, I knew he was right. I also knew this should not be an important consideration in charting my life's path. So I confided in my closest friends and in time leaked the news to others.

My shocking secret released, I braced myself for the onslaught of criticism. My first astonishing realization was that most people did not care – approaching grant and observing proposal deadlines and other responsibilities governed their days. Despite my egocentric projections, their lives did not orbit mine. The responses I did get were interesting. Most people were surprised. Some did not even seem to understand the concept, "Leave astronomy? What do you mean?" It was if I told them I had decided to turn into a spring breeze. Others muttered about the atrocious job market. Surprisingly, a few nodded and quietly told me they were considering the same route. My advisor was thoughtful and supportive. The aftermath of my disclosures was far less painful than I had anticipated. The AAS did not revoke my membership, nor did it burn me in effigy (at least, not at the most recent meeting, although I might have overlooked something at the poster sessions).

"Leave astronomy? What do you mean?" It was if I told them I had decided to turn into a spring breeze.

So what was I going to do instead? I had traveled directly from high school to college to graduate school. In other words, I knew little of the job world. What were the options I knew? My world consisted of astronomers, staff, and support crew. There were also administrators, secretaries, janitors, and the guy that came by to lock the building at 5:00 p.m.

Not much there that interested me.

Jobs in industry or the military, despite their financial benefits, did not agree with my ethos. Instead I looked for jobs in education, after all I am a very good teacher and my students enjoy my classes. I dreamed of finding a science faculty position in a private college where I could teach a variety of classes–not just physics, astronomy, and math, but also biology (botany is one of my hobbies). But during a long hike in the desert (when out of work, one has time for many long hikes), I realized I was interested in teaching mostly because it was a low-imagination solution to my career quandary. I know several scientists who settled upon teaching because it was a consolation career for them–they did not get the

research job they really wanted so they instead reconciled themselves to a career several rungs down their personal ladders. I was about to repeat this mistake. I was not being creative about my life's path–I was steering towards the ruts. Being a teacher would not have been in my best interests, nor would it have served the students–they deserve enthusiastic, invigorated, and genuinely involved teachers who are proud and honored to be in a classroom.

I needed time to understand what I wanted. I took a year off from work (I still taught a few classes at the local community college to keep my financial situation only partly catastrophic). I explored my interests.

My new career was not simply a sudden leap into the unknown. Ten years previous to all this, I had bought a Venus Flytrap (a small carnivorous plant, or CP) at a grocery store. In the years that followed, my interest in carnivorous plants grew until I had a greenhouse filled with hundreds of species, maintained a CP related internet site, co-edited an international CP journal and was an invited member of the World Conservation Union's Species Survival Commission. My botanical interests had expanded to include wetlands, where most carnivorous plants live and a dedication to conservation germinated after seeing favorite habitats destroyed by land development. It was during this time that The Nature Conservancy caught my eye. This national nonprofit environmental organization is dedicated to preserving biologically significant lands by direct action (for example, by buying it).

For many of my graduate student years I had sent them a minute annual donation, and had volunteered on the preserves a day or two every few months. Now that I had more time, I decided to volunteer more frequently. It was great fun. The organization was efficient, the departments were receptive to appropriate applications of technology, and the staff members were mission-oriented. I met people. I made connections. I started reading the weekly job roster–at first tentatively and only in the dark of night, then openly and brazenly. I announced to my friends and connections that I was looking for a job with "The Conservancy." I sent application letters–many, many application letters. I made many calls. In time, following a sea of rejection slips, after promising starts and depressing ends, with luck, a great job and I found each other.

I am no longer writing observing proposals. Nor am I writing code to model dusty star formation regions. My datebook lists no curriculum committee meetings to attend. But I am working with data, literature, and people focused on goals that I find fulfilling. I am helping distribute information on how to manage invasive, foreign plant species that are displacing the native plants in The Nature Conservancy's many preserves. Our wild lands are continually threatened by new problems that have hidden solutions. Some days I may be researching methods of combating *Ficus carica* trees or any of the hundreds of other biological threats to the preserves. Other days I may be plowing through the literature on new ways to use controlled burns. Soon we will be analyzing the effectiveness of our methods using data from the field. And in a few months I will flex my HTML skills to help design a new early warning "Weeds on the Web" site to keep our preserve managers updated with the most recent stewardship tools. I am not using all my training, but I did not want to anyway. Instead I am letting myself be happy. There is life after astronomy.

Barry Meyers-Rice has left his work on dusty stellar environments to work as the Assistant Weed Specialist for The Nature Conservancy. *He can be reached through his home page at http://www.indirect.com/www/bazza.*

From the Editor

Sometimes there is too much equality, sometimes not enough.

There are two interesting stories in the newspaper today (21 May 1997) on which I cannot resist commenting. A continuing and very serious issue is that of Lt. Kelly Flinn, graduate of the Air Force Academy and first female B-52 bomber pilot. She is charged with adultery, lying, and disobeying an order – all felonies in the Air Force. Another issue, also serious, but so simple as to be silly, is the case of Melissa Raglin, 12, who has been forbidden from playing catcher on her Babe Ruth baseball team because she refuses to wear a protective cup.

When I was a girl, I could not play Little League because of concern that girls might injure their reproductive organs. This was despite the obvious (but I guess not to everyone) natural protection of skin, fat and muscle. I guess it was accepted that reproduction was our only function, thus no risks could be taken. For the boys however, apparently

reproduction was less important because a "cup" (where did that name come from, anyway?), was considered adequate protection for their reproductive parts which, um, hang right out there.

I thought this backward mentality was long behind us until I read that Melissa was playing outfield because she refused wear a cup. James Stewart, Babe Ruth commissioner for the Southeast Region, was quoted in an AP newspaper article as saying, "It's for her protection. A blow there to a young girl could have devastating long term effects. It's no different than her mask." Uh huh. Well, I think there are problems with this analysis.

First, there is the anatomical mismatch between the location of the cup (but I've never worn one, so I could be wrong) and the location of certain delicate tissue in the female anatomy. Second, I have seen men who got hit in the groin (even those wearing cups) fall to the ground and spend minutes in near paralysis eventually get up and walk away with no permanent damage. I guess women do not have this recuperative ability.

This whole controversy is just stupid. Since the men in authority can't see the complete illogic of their decision, I can only conclude that they are thinking only with that part of the brain governed by instinct rather than intelligence – their lower brain. Perhaps very low. Since there are men in the world who still can't get past the minor hangup of having girls play "boys' sports" then it's no wonder that cases such as the Flinn case are still common.

If you don't know about the Kelly Flinn adultery/lying/disobeying-an-order case, then you have been observing in Antarctica. While this case is much more complicated than the Raglin case, my bottom line is simple: I wonder if she was set up.

At first, I tended to have sympathy for Flinn – the guy she slept with was supposedly her first love, and she had a lapse of judgement. Being in for the first time certainly compromises one's personal judgement. However, this was a darned big lapse, especially considering she's an Air Force officer, and as such, she should have been aware of the consequences. But apart from her problems with judgement in this situation, what kind of an officer was she? What was the quality of her record in the Air Force?

Flinn was the Air Force's superstar woman - Academy graduate and first female B-52 pilot. Impressive. The Air Force made her their poster girl. Then, she committed adultery, a felony in the Air Force. It is reasonable to assume, and the press has widely reported that, many (male) Air Force officers have committed this same crime. (A friend of mine commented, "I thought that adultery was a requirement for promotion!') But the public hasn't heard about these other cases with nearly the same volume as this case. Reportedly, male officers in this situation typically receive a reprimand and a fine, not a court martial. If Flinn was an exceptional officer until this incident, why the aggressive, atypical prosecution of her?

Is the Air Force's staunch pursuit of her case part of an effort to show publicly that women are guilty of sexual misconduct too? With all the attention to Tailhook and the Aberdeen sexual misconduct incidents, does the military need to target a woman's sexual misconduct to show that both sexes misbehave and are prosecuted equally? If Flinn was a bad officer – disobeying orders and lying - how did she get to be such a superstar? Surely all officers slip up once in a while, if this is the first time for her, why such aggressive pursuit? Why couldn't they give her a fine and a reprimand like they have done for so many other officers?

These inconsistencies don't make sense to me. That's why I wonder if she was set up: the Air Force's point being that women simply can't be trusted – even the most outstanding female in the Air Force chose not to abide by Air Force law. The taxpayers paid millions of dollars to train her, the Air Force supported her and touted her publicly as a superstar. But, her conduct is so egregious that she could be court martialed. Even the best of women is not good enough to be in the Air Force. I just wonder.

Last update before going to press (23 May 1997): Raglin is back at catcher, wearing some sort of female jock strap. The Air Force has announced that it will grant Flinn a general (as opposed to honorable) discharge, in lieu of a court martial.