

ASTRONOMERS AS AMATEURS

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Abstract

The role of amateurs in astronomy is in need of redefinition. Such a redefinition would be consistent with recent sociological studies that distinguish avocation science from casual or recreational pursuits. While additional support and encouragement from professional astronomers will facilitate this development, the main initiative must come from amateurs.

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There seems to be a growing doubt among amateur astronomers that amateurs can contribute in a substantive way to the science of astronomy, or that such contribution is needed. These doubts come at a time when opportunities for contribution are large and growing. It seems important to understand the origins of such concerns. Is there a problem here that is impairing the effectiveness of amateur contributions to astronomy?

In the history of astronomy, there is a strong tradition of amateur contribution. One need only to consider the contributions of such outstanding amateurs as John Franklin-Adams, Sir William and Lady Huggins, William Tyler Olcott, Leslie Peltier, T. E. R. Phillips, Russell W. Porter, Lord Rosse, Lewis Rutherford, and many others too numerous to list here to realize how great this contribution has been. More recently, however, that tradition seems to have gotten lost. In fact, one professional astronomer stated, "Today an amateur astronomer is one who does trivial astronomy in his spare time, and with equipment that is not normally suitable for serious research" (Mulholland 1982). Here is an open acknowledgement that the problem exists not only in the minds of amateurs, but also in the minds of some professionals as well. The time has clearly come to re-examine this relationship and the role of the amateur in astronomy.

The word "amateur" has its root in the Latin word "amator," or lover. The usual contemporary definition is "one who cultivates any art or pursuit for the love or enjoyment of it, instead of professionally or for gain." It is interesting to note that the definition of "professional" includes "following a business or occupation ordinarily engaged in as a pastime as a means of livelihood (as professional golfer)." In this context then, the definitions of amateur and professional are reflexive and complement each other if activities are directed to a common goal -- i.e., the advancement of astronomy.

Sociologists have studied extensively the rise of professionalism in the last two centuries. Robert Stebbins of the University of Calgary has made an effort to systematize an understanding of the amateur role as it relates to the professional in a number of diverse areas including astronomy (Stebbins 1982).

Stebbins identifies several levels of interest and proficiency in a field. These levels range from a low level in the "general public," through a broad class of "hobbyists," to a redefined class of "amateurs," and finally to the "professional" level of highest

interest and proficiency. "Hobbyists" are distinguished from "amateurs" in that the hobbyist is one whose involvement is casual and undirected despite a high level of interest and proficiency. The "hobbyist's" effort does not result in the creation of new understanding or contribution to the field. On the other hand, the "amateur" is characterized by Stebbins as having an intense and serious interest directed to the application of rigorous, near professional, methods to the field with varying levels of proficiency, but with programs dedicated to making a contribution of value to the field.

As characterized by Stebbins, "amateurs" frequently work alone with a high risk of failure, recognizing that "solo work brings solo rewards." The recognition among peers of the contribution from amateurs is high. Recognition from professionals may also be high in some fields. Amateur emphasis is on fieldwork and observations, while data reduction is usually left to the professionals. Stebbins comments that, for most individuals who qualify as "amateurs," hard work appears to be its own reward.

With the above as background, it is possible to consider the relationship between amateur (as defined above) and professional astronomers with somewhat more clarity. At least three problem areas can be identified: 1) amateur identity, 2) amateur/professional communication, and 3) organizational ties. Each of these will be touched on briefly.

The characterization of amateur astronomy as "trivial" is, more than anything else, a reflection of the unclear understanding that many professionals have of amateur astronomy. This lack of a clear amateur identity is traceable to at least two factors. First, most professional astronomers are only infrequently in contact with amateurs. These contacts usually involve a brief visit to a local society meeting to give a talk. It must be very difficult for the professional, under these circumstances, to distinguish the amateurs from the hobbyists when the majority of the group are hobbyists. Thus, he leaves with, at best, a confused view of what amateur astronomy is all about. A second possible source of this identity confusion may be related to the backgrounds of professional astronomers themselves. In most sciences of interest to amateurs, the professionals have come from the amateur ranks and are truly familiar with the amateur practice of that particular science. In astronomy today, there are many professionals who first became interested in astronomy in graduate school. These professionals may not have backgrounds as amateur astronomers. Further, many of these professionals do not consider themselves "observational astronomers," and it may be particularly difficult for such astronomers to relate to the amateur.

Compounding the identity problem are barriers to effective communication between amateur and professional astronomers. The professional has, by reason of his years of apprenticeship in graduate school, acquired the language of astronomy and a sense of what problems are worth attacking. The observational work that a professional undertakes usually requires elaborate instrumentation and/or observation time on large telescopes. The observational work that is within the scope of a typical amateur's resources does not overlap with such sophisticated observation, but is nonetheless of real value to the science of astronomy. (This natural division of labor also limits an exchange of information on techniques and equipment that could be mutually beneficial.) These two factors - limitations on a common language and a division of labor - result in amateurs being cut off from the mainstream of intellectual effort that is required for any science to evolve. Stebbins points out that this

isolation limits effective mutual criticism and peer review which help to purify scientific efforts. In addition, the isolation obscures the unanswered questions and unsolved problems to which the amateur might well contribute. Thus, the amateur continues to over-observe some objects, gather the wrong data, and let exceptions that he alone may observe pass unnoted.

The professional astronomical community should help structure and guide amateur efforts. Organizational and financial ties between amateurs and professionals, characteristics of the amateur/professional relationship that are common in other activities, appear to be exceptionally weak in astronomy. Support of amateur astronomy by individual professional astronomers can, and indeed does, take many useful forms.

The most direct, and perhaps the most rewarding, means of providing this support is "one-on-one." There are exciting contemporary examples which illustrate the value to professional astronomers of such liaison with amateurs. Douglas Hall of Dyer Observatory, Vanderbilt University, organized a campaign of photoelectric photometric (PEP) observations of RS CVn stars by AAVSO members. These observations have been a vital part of the recent rapid evolution of understanding of these unusual and important stars. In particular, extended series of high quality PEP measurements by amateurs were critical to the discovery of the presence of extended "dark spots" in the chromospheres of the giant companions in these binaries (Hall and Genet 1982). Dorrit Hoffleit of Yale University and John Percy of the University of Toronto have suggested that a similar campaign be mounted to study the large number of stars already identified as suspected small-amplitude variables in the preparation of the 4th Edition of the Yale Bright Star Catalogue (Hoffleit 1979, 1980; Percy 1981). Percy has also suggested a joint amateur-professional campaign of PEP observations of classical Be Stars (Percy 1982). These are excellent examples of the role professional amateurs can, and should, play in the direction of amateur contributions to astronomy.

Means of providing or strengthening inter-organizational support of amateurs by the American Astronomical Society should also be considered. The American Association of Variable Star Observers (AAVSO) provides an excellent example of the value of organized effort of amateurs in support of professional astronomy. AAVSO contributions include the development of large numbers of light curves of long period and cataclysmic variables as well as other types of variable stars. Such archival records are invaluable to theoretical studies of stellar evolution. In contrast to this archival service, AAVSO observers have recently been linked in "real-time" to observing programs involving orbiting infrared, ultra-violet, extreme ultraviolet, and X-ray observatories. Timely notice to professionals around the world of the need to observe certain stars during transient events has greatly facilitated efficient use of the available observing time on these satellites (Cordova 1979, 1980; Mattei 1978, 1979, 1980, 1981). Such real-time services would not be possible without an organizational structure having both amateur and professional involvement and cooperation.

However, a major initiative must come from the amateur astronomers themselves. It is the amateur astronomer who has the most at stake in this matter. It is the amateur astronomer who invests hundreds and, in many cases, thousands of dollars in equipment, observing aids, and books with the expectation of serving science. It is the amateur astronomer who invests hundreds of hours of observing time each year in the hope that the results will make a real contribution to astronomy. And so it is the amateur astronomer who

must strive for a new and stronger relationship with the professional community, either individually or through whatever organizational means are available. Amateur astronomers must learn to seek and accept "peer" review and criticism of both programs and results, striving continuously for high quality in all aspects of their activities. There is, of course, substantial risk of rejection and/or misunderstanding in approaching the amateur/professional relationship in this way. I believe the rewards will be more than commensurate with those risks.

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