Preface

In some astronomical circles, if you are not a professional astronomer, then by default you are an amateur astronomer. What is the difference between a professional astronomer and an amateur astronomer? If a person has a Ph.D. in physics or astronomy, that person is certainly a professional. I have great respect for anyone who has a PhD, particularly in physics or astronomy.

I am called an amateur astronomer, but do professional quality work. I am still labeled an amateur, however. I have written several astronomy-related books, articles for *Sky & Telescope* and a cover feature for *Astronomy* magazine. *Sky & Telescope* even classified me among others as "Super Amateurs." So-called amateur astronomers contribute a great deal to astronomy, but are usually unsung heroes. Oh we hear about an occasional amateur astronomer discovering a new comet or perhaps supernova, but there are actually hundreds of amateurs contributing real science to astronomy every day.

The American Association of Variable Star Observers (AAVSO) is composed mostly of non-professional astronomers. Many of the more serious amateur astronomers have college degrees and many have a PhD in fields other than physics or astronomy. They are all considered amateur astronomers. Everyone associated with astronomy has heard of George Ellery Hale (1868–1938). He was responsible for the giant 40″ Yerkes refractor telescope, Mt. Wilson telescopes such as the Hooker 100″ and the most famous one the Mt. Palomar, the 200″ Hale Telescope. Hale is also responsible for many important discoveries through his observing. Hale had only an undergraduate degree and never received a graduate degree, no Ph.D. Yet Hale was certainly a professional, but by most current definition, he was an amateur astronomer. He surely was not an amateur, however. Clyde Tombaugh (1906–1997), discoverer of Pluto, was an amateur astronomer. He never received a Ph.D., but in most circles he was considered a professional.

While my BS is in physics and I have done graduate study in physics and astronomy, I have never considered myself a professional in those fields. Most of my life's work has been as an electrical engineer. What I find most interesting is that there are also amateur radio operators, HAMs. While they are considered amateurs as opposed to professionals, most of my fellow professional electrical engineers including me were or are also amateur radio operators. We have a HAM license. Many of the advances in radio and electronics resulted from amateur radio operators. I see a great parallel there to amateur astronomers.

One big difference between amateur and many if not most professional astronomers is the amateur usually has more time and freedom to pursue his or her specific interests in astronomy. This is particularly true for those of us who have retired and still possess a desire to make contributions to astronomy. Professional astronomers are usually tied to a university or major observatory. They must struggle to survive. They are limited both in time and as to what projects to pursue. Most amateur astronomers have no such limitations. With your own telescope and observatory in your backyard, you can schedule your projects and observations as you please.

It seems the picture brought to mind when one says amateur astronomer is a person out in a field at night with a telescope looking at stars and other interesting astronomical objects. The person may have trouble finding and identifying astronomical objects other than the Moon. This person is certainly likely to be properly called an amateur astronomer. Perhaps more precisely the term "a beginner amateur astronomer" would be appropriate. More serious observers may participate in what is known as Messier Marathons where during the course of one night all the Messier objects (110 of them consisting of galaxies, nebulae, and star clusters) are observed. While this is of little professional interest, it does show a dedication and mastery of one aspect of astronomy. Others may have a CCD camera connected to the telescope and be taking astronomical images. The telescopes used probably have automatic tracking or may be one of the computer-controlled GOTO telescopes. These amateur astronomers have been taking great images, but there is a great deal more to amateur astronomy than just looking or taking pretty pictures.

Two areas where amateur astronomers have made great contributions over the past 35 years are with astronomical photometry, measuring the changing brightness of stars and asteroids, and within the last 10 years astronomical spectroscopy, obtaining spectra of light from astronomical objects. With the availability of professional-quality, reasonably priced spectrographs, CCD cameras, and telescopes, the field of amateur astronomical spectroscopy is exploding. Just 15 years ago, the idea of doing scientific valuable spectroscopy with a small telescope was considered crazy. One needed very large telescopes and big spectrographs to gather enough photons to produce a good spectrum. When astronomical spectroscopy first was being done, large telescopes and ungainly spectrographs were needed. There were no electronic detectors so photographic plate type cameras had to be used. This complicated things immensely. Plates had to be handled carefully, developed carefully, and then examined in detail manually with a microscope. There were no electronic computers either. Everything was done manually. The revolution started with the availability of high-sensitive CCD detectors and compact spectrographs along with low-cost,

high-performance personal computers with corresponding powerful software. These advances have turned the world of astronomical spectroscopy on its head. Advanced amateur astronomers are pushing the envelope with spectroscopy.

The term “amateur astronomer” may need to be revised for the observers doing astronomical photometry and now spectroscopy. We are surely not in the same category as the struggling beginning amateur astronomer out in the field trying to find M31. A possible title for the advanced amateur astronomer is AAA, but that makes one think of cars. Or perhaps we should be called ProAm or PAM. This conflicts a bit with the professional–amateur collaborations, but still fits well. How about SOAs (small observatory astronomers)? An SOA is an advanced astronomer without a PhD, but doing professional-quality astronomy. Or perhaps we should be called PAAs (professional amateur astronomers). A PAA is an advanced amateur astronomer without a PhD. The answer is still not there. Perhaps with the increased advanced amateurs doing serious and professional-quality astronomical spectroscopy, an appropriate name will be forthcoming.

Hopkins Phoenix Observatory Jeffrey L. Hopkins
Phoenix, AZ, USA

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