



ASTRONOMICAL LEAGUE

**A FEDERATION OF ASTRONOMICAL SOCIETIES
A NON-PROFIT ORGANIZATION**

- ★ *To promote the science of astronomy;*
- ★ *By fostering astronomical education;*
- ★ *By providing incentives for astronomical observation and research;*
- ★ *By assisting communication among amateur astronomical societies.*

ASTRO NOTES

Produced by the Astronomical League

Note 24: Professional Astronomer

Astronomy may be the oldest science, but it is one of the youngest in terms of its new discoveries and understanding. We have all had questions as we gaze up into the night sky. Astronomers try to understand these (and many other) questions and to find answers to them.

What Jobs Are Available?

Professional astronomy is a relatively small field, only about 10,000 individuals being employed worldwide. Only individuals with high quality education and interest will be able to find a position in such a popular, but small, field. About 150 openings occur each year in North America due to new positions, retirements and other losses. This number could increase during the late 1990's as many astronomers who entered the professional ranks during the growth years of the 1960's choose to retire.

Almost 60% of professional astronomers are employed by colleges and universities. Often, an astronomer will be part of a physics department rather than a separate astronomy department. While teaching is part of any academic career, these astronomers are also a major source of astronomical research activity. Most astronomers at leading institutions have not found their research interests seriously restrained by lack of funding or instrumentation. But few astronomers spend more than a few nights each year actually at a telescope.

Even the most avid observers spend only a fraction of their time actually gathering data at the telescope. The rest of their time is spent analyzing the data, developing necessary explanations and writing research reports. Theoretical astrophysicists normally use no major observing equipment, but spend their time using large supercomputers.

About 30% of professional astronomers are employed by the federal government or in a federally supported observatory or laboratory. Since the government agencies have specific goals, an individual's research area is usually defined by the employer. The national observatories may allow a little more latitude for individual research.

The remaining 10% of professional astronomers work in private industry, planetariums or science museums. Consulting firms may supply talent to government or other companies for specific tasks. Other firms may use the astronomer's talents in related areas like remote sensing or instrumentation. Astronomers in museums or planetariums must be able to interact well with the general public.

Education

If you are good in science and have an interest in mathematics, you might want to consider a career in astronomy. But you should begin preparation as early as possible.

In high school, take as many math courses as you can, including analytical geometry and pre-calculus. Both chemistry and physics are strongly recommended and a foreign language would be desired.

In college, plan a solid foundation in physics and mathematics. Physics should include both classical physics, atomic and nuclear physics and quantum theory. Necessary math courses will cover calculus, differential equations, complex variables and computer techniques. Since you will need to communicate your research, you will also need work in English, humanities and communications skills.

Since most astronomy positions require a Ph.D. degree, you should plan on 3 to 5 years of graduate school. Here you will take advanced courses in astronomy and astrophysics and begin working on some research projects. Since most research projects are determined by the institution's faculty, try to pick a university already working in a area of interest to you.

Further Information

This brief introduction to professional astronomy has been condensed from *Understanding the Universe: A Career in Astronomy* which is published by the American Astronomical Society. A copy of that booklet can be obtained online from AAS Education Office, at <http://aas.org/education/careers.php> . Besides giving more detail of the work involved and education required, the AAS publication provides a list of universities in North America which have graduate programs in astronomy and the research interests of each institution's faculty. See <http://aas.org/education/resources.php> for more information.