

Preservation of Our Astronomical Heritage

Notice of Intent to Submit an Astro2020 State of the Profession Paper

Throughout the ages, astronomy has extensive and well-documented legacy that can best be described as “new tools, new universes.” Whenever we have enhanced our tools of perception, from the eye, to the telescope, and then adding photography, spectroscopy, and electronic and digital technologies to the telescope, our understanding of what the universe is has changed in revolutionary ways. Preserving these tools is essential to appreciating how our concept of what the universe is, and where we are in it, has changed. While records of earlier observations have potential to support future scientific research, some items are primarily of historical interest, but they provide critical perspective on what works and what has been superseded. Today’s professionals have a responsibility to their predecessors and their successors to conserve this legacy and ensure that it remains available to future scientists and historians of science. Thus, the preservation and utilization of these materials should be an integral part of the strategic plan for American astronomy in the coming decade.

Preserving the tools, as well as records of how they were used, is essential to understanding how we have come to know what we know in astronomy, how astronomy relates to other sciences, and how the culture of astronomy has evolved. These materials include the papers, letters, diaries, memos and notebooks of astronomers and the institutions in which they worked as well as the physical artifacts, such as instruments, that they used to accomplish their research. Just as critical is to preserve the records of observatories and other institutions devoted to astronomy that are the expression of community priorities and how those priorities changed over time.

As a natural science, astronomy preserves a record of natural changes on the cosmic level. Of vital interest is the preservation of observations that capture otherwise inaccessible earlier epochs, which includes maintaining their legibility. Such scientific data may be recorded in astronomical photographs, technical drawings, observers’ notebooks, and other working papers. These documents must be digitized in order to be exploited by modern scientific techniques; however, digitization does not eliminate the need to retain the original. In addition, astronomical observations that were initially recorded digitally are themselves at risk of becoming unreadable as technology changes.

In some cases, a legacy resource may have competing historic and scientific value. An astronomer’s journal may provide evidence of the techniques used and the development theories proposed as well as contain unpublished measurements. Alternatively, annotations on a photographic plate show how it was used in the past but may obscure a field of current interest. In the case of the journal, digitization and transcription make the information available to both historians and scientists. In the case of the photographic plate, preserving the annotations interferes with digitizing the underlying image for use in a new generation of astronomical research. For an instrument or a site in use for decades, the modernization necessary to its continuing viability for research may damage or eliminate its historic character.

In the past decade, awareness of our multifaceted astronomical heritage has been growing. In addition, the data science techniques developed to support large surveys also

provide opportunities to mine older observational archives in ways their creators could not have foreseen. Therefore, the time is ripe to assess the overall condition of our astronomical heritage, its value from both historical and scientific viewpoints, the infrastructure available to conserve it, and the funds required to maintain it; to prioritize activities to preserve the resources that are at greatest risk; and, to develop recommendations for handling emerging situations. In doing so, we continue our traditions of exploring of our universe, our perceptions of it, and our place within it.

Working Group on the Preservation of Astronomical Heritage
American Astronomical Society