ASTRONOMY LIBRARIES 2000: CONTEXT, COORDINATION, COOPERATION

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Abstract.

This chapter reviews the contemporary astronomical library, examining the services librarians provide in order to assist astronomers in their quest for scientific literature and information. The rapidly evolving environment from paper-based to electronic resources is explored, with an emphasis on "lessons learned."

1. Astronomy Libraries: from Paper to Electronic

During the past decade, astronomy libraries have changed remarkably. In the old millenium, astronomers visited the library regularly. They expected to find a certain range of astronomy as well as physics, mathematics, and computer science journals on display; they would browse the contents tables, read bits and pieces from the contents and photocopy articles of particular interest. The latest preprints, recently received from other institutes, were displayed for perusal. References to already published articles could be retrieved by consulting the big blue volumes of the *Astronomy and Astrophysics Abstracts* or, for even older publications, the *Astronomischer Jahresbericht.* Articles from journals to which the library did not subscribe could be ordered from the librarians who would obtain them via time-consuming, but inexpensive interlibrary loan. Conference proceedings and other books owned by the library could be located through the card catalog where authors' names, book titles, and certain subject terms were indexed. Alternatively, astronomers went directly to the shelf containing books on their research interest to browse currently available titles. New acquisitions were on display, and astronomers usually enjoyed the opportunity to have a look at the contents table or glance at certain chapters even though the book in general might not have pertained to the scientist's core interests. Sometimes, they even took the time to talk to their librarian!

These tranquil days are gone. The search for literature must be organized as efficiently as possible, and early and wide-spread dissemination of research results is critical to scientists. The importance of (electronic) preprints has increased immensely. Monitoring new submissions on astro-ph, the astrophysics branch of the Los Alamos National Laboratory (LANL) e-Print server, has become a daily routine for many astronomers, and every now and then there are voices saying that electronic preprint servers are about to replace traditional peer-reviewed journals. Abstract services, which traditionally indexed references to articles published some time ago, nowadays include references, abstracts, and links to full texts of articles before their actual publication on paper. The NASA ADS abstract service also links to the LANL e-Print server, trying to bridge the gap between published and soon-to-be-published papers. Many astronomy journals including all core titles are available in electronic format and can be reached conveniently from the scientists' desktops. Contents tables of journals from all subject areas can be viewed on the web, and scientists can subscribe to free-of-charge e-mail alerting services to stay informed of publications in their field of research. Full-text articles often are just a mouseclick (and a credit card number) away. Books which are available in-house can be located through the library's online catalog, and lists of recent purchases, distributed by e-mail, announce new acquisitions. Web-based forms invite information requests, purchase recommendations, and feedback from astronomers so that users and librarians often communicate electronically rather than in person.

2. Behind the Scenes

Astronomy libraries today are not "paper-free", but we recognize a growing number of electronic resources, and scientists expect information to be available on the web (regarding the perceived and real situation, see Stevens-Rayburn and Bouton, 1998). Many astronomers don't feel the need to visit the physical library, but often they use our services without even noticing. "Behind the scenes" and invisible to most scientists, librarians are cooperating with publishers and other information providers in order to improve access to and usability of information resources. The Physics-Astronomy-Math (PAM) division of the Special Libraries Association for instance maintains liaisons/representatives to specific publishers (http://www.astro.utoronto.ca/pam/staff.liaisons.html). The list already includes many major science, technology and medicine (STM) publishers, and it is growing.

Differences among electronic journals are remarkable. Publishers may label a publication "electronic" even though it is just an online clone of a paper edition; these journals merely reproduce the printed page in electronic format, neglecting features of electronic publications that really make them superior to paper, for instance extensive links within documents, in particular from references and figures back to the text, as well as to other documents and data resources. Readers seldom demand that publishers enhance their journals as many seem to be content to have at least something accessible from their desktops, provided the access speed is acceptable. From communications with astronomers we know that the ability to print articles still is highly important. The urgent need for quality electronic publications with significantly increased functionality and, even more important, archives in robust formats like SGML (Standard Generalized Markup Language) and XML (Extensible Markup Language) that allow translation into any new standard, remains to be fully recognized by the astronomical community (Boyce, 1997). If a resource is popular for whatever reasons, few users seem to worry about possible improvements or future availability. Librarians are mediators between authors/readers and publishers, and they can play a vital rôle in alerting both parties to values and dangers intrinsic in high or poor quality electronic journals.

The electronic environment changes immensely how publications can be used today and in the future. The traditional copyright is being replaced by license agreements which have to be negotiated and, finally, signed for each publisher, sometimes even for each individual journal. Librarians have to obtain considerable legal knowledge in order to protect as many existing user rights as possible against the restrictive, market-oriented approach of some publishers. Mailing lists and web sites like LIBLICENSE (http://www.library.yale.edu/~llicense/index.shtml) and EBLIDA (European Bureau of Library, Information and Documentation Associations, http://www.eblida.org/), dealing with licensing issues, are to be praised for the support and advice they provide. To the users of electronic journals, the complex licensing procedures are seldom apparent; the only trace often is a header on the e-journal's page or, in only few cases, a screen that appears once per session, informing readers that "this subscription is registered to the XXX library". Libraries appreciate these notes; often they suggested including them as they help to alert users to the ultimate source (at least the financial one) of electronic publications.

Much has been said about the science journal crises. Subscription costs are continuously rising, partly due to an ever increasing number of pages per volume, partly because of the publishers' attempts to meet their shareholders' interests, and, most importantly, electronic versions of existing journals are not available for free, but can increase the subscription price by 20%.

The largest portion of our budgets are for journal subscriptions, and little flexibility is left when it comes to book purchases. To make most efficient use of any remaining money, a carefully considered collection development policy is more important than ever, otherwise the increasing demands from users cannot be satisfied with decreasing budgets.

The LANL astro-ph e-Print server currently is the most frequently used astrophysics preprint database; an increasing number of articles cite astro-ph reference numbers, and to many scientists astro-ph submissions are as good as published ones. However, at the time of their submission to astro-ph, they aren't yet published, and before they are, title, authors, and contents may be modified. Various versions of e-prints can co-exist, and unless the authors care to update submissions by adding the final bibliographic reference, papers can remain marked as preprints forever even though they may have been published in the meantime. The unique reference numbers assigned by e-print servers seem to lend themselves to automating the updating process, but at present these tools are not yet in place. The only reliable databases that allow follow-through from preprints to published articles still are the Space Telescope Science Institute STEPsheet (http://NTweb.stsci.edu/STEPsheet/) and the National Radio Astronomy Observatory RAPsheet (http://annie.cv.nrao.edu/rapsqbe.htm) which are maintained by the STScI and NRAO librarians respectively.

By now the ADS Abstract Service has become the *de facto* standard reference tool in astronomy. Many astronomers start their literature searches at ADS where they retrieve articles published in all major journals, often with the option to "click through" to electronic versions of papers and to cited as well as citing articles. ADS usually gets permission from publishers to link to full texts of e-journals from their database. However, for most conference proceedings including IAU symposia and colloquia and volumes of the ASP conference series, full texts are not yet available in electronic format. In order to nevertheless make these references available through the Abstract Service, librarians assist ADS by copies of contents tables and title pages upon receipt of the published volumes.

Many library activities don't immediately hit the eye of scientists and, ironically, users seem to look at libraries most if they are *not* satisfied with our service. This dilemma is known to everybody who ever tried to run a household; hardly any family member cares to commend a tidy flat, but don't you dare to be sloppy with daily chores – you will get complaints instantaneously. Librarians can react to this "invisibility" in two ways: we can remain quiet and hope that someone, finally, will recognize the value of our existence. Or we can try to increase our presence in the daily life of scientists by actively emphasizing our rôle. There are many ways to advertise library services.

3. Libraries on and off the Web

Traditionally, astronomy has been on the forefront of using computer-based tools and systems; in particular, astronomical publishers developed and implemented new publishing procedures well ahead of publishers in other disciplines (see for instance Boyce and Dalterio, 1996). Astronomy librarians too are enhancing their services to make most efficient use of the electronic environment. While our mission, namely to fulfill the information needs of our institute's scientists and engineers, has not changed, our approach in order to accomplish this mission is changing.

In addition to physical libraries at our institutes, we now maintain virtual libraries on the world-wide-web which provide access to the most important information resources. A paradigm shift takes place from libraries as collectors of items to libraries as facilitators of access to all kinds of information, provided by anybody, located anywhere in the world, accessible at any time. Librarians have always been the link between resources available in-house and those that had to be obtained from elsewhere, but never before have external resources been so easily accessible, not only by librarians, but also by our users. Virtual libraries are characterized by an ever decreasing border between internal and external resources; crossing this border often is only noticeable in a difference in access speed and, ideally, even this difference will vanish eventually.

Because of this strong focus on electronic resources, libraries must pay utmost attention to their appearance on the web. Increasingly, users visit our web pages instead of reading the printed brochure if they seek information about our library – the homepage has become our business card. This is the place to show users the range of services, to provide them with starting points for their information search and to encourage them to contact us for more detailed questions. As users typically don't spend much time on pages which require a lot of reading to be understood, virtual libraries must be clearly laid out and self-explanatory.

Appealing designs are just the immediately visible part of virtual libraries. What really counts are the contents and the service we provide. In the information-rich Western world, information overload is a more severe problem than lack thereof. To create and maintain well-structured library web pages means to put important resources in context by monitoring existing and evolving information systems, selecting the useful ones and arranging them according to their contents.

Many users will find their way to information resources without guidance from librarians, but others will appreciate our assistance. In these cases, prompt responses to enquiries should be a matter of course. From our own experience, we know too well that many companies maintain colorful web pages, but messages from customers just seem to be swallowed by "black holes" and never get any reply. Such an experience is at best annoying for clients and damages the image of the company. Libraries are service entities *par excellence* and should give highest priority to prompt and reliable delivery of information.

Of course we don't have to be passive, waiting for users to request our service. The internet provides us with tools to easily distribute information. Latest developments and announcements can be reported through short, informative e-mail messages which usually produce only a minimal interruption for astronomers. The same information can also be posted in the news section of the library's web pages, but it seems that many users prefer push (sent to their mailbox) over pull (they have to actively solicit information from a web page) services. We also can, and should, actively seek communication with scientists to learn about their way of working, their concerns and their suggestions for improvement (Cummins, 1998). Surveys among users may be appropriate to measure user satisfaction; this means must be used very carefully though as scientists typically receive far too many questionnaires so that they may not be willing or able to respond. Active "advertising" of the library usually results in valuable feedback and enhanced communication between users and librarians; such presentations can include talks at faculty meetings, semi-formal meetings with astronomers, guided library tours, or contributions to the institute's newsletter. Scientists may appreciate brief training sessions on usage of information systems, in particular instructions tailored to meet the needs of remote users at the telescopes. Anything that increases the visibility of the library will be helpful and worth trying.

On a broader scale, communication between librarians and the International Astronomical Union is of immense value to emphasize the rôle of libraries. In the beginning of the year 2000, Brenda Corbin, U.S. Naval Observatory, was the first librarian to become a full member of the IAU, an unprecedented honor and recognition of years of active participation on IAU Commissions. Her successful application will open the possibility of joining IAU to other librarians and lead to an even closer cooperation.

4. Lessons learned

If anybody wanted to start a library today, the first recommendation would be to learn from the activities of fellow librarians. Astronomy has particularly impressive examples of concepts and projects, some of them being exemplary for achievements of librarians in general. We have been dealing with the paper and, for several years now, the electronic environment which has taught us a few lessons.

– Librarians' mission and rôle

  - New tools – same mission
    Over the course of the years, astronomy librarians have developed, adjusted and improved information retrieval techniques; the range of tools we use has been supplemented by new ones as they became available. Our general mission, however, remains unchanged: we continue to fulfill the information needs of our users by selecting, collecting, managing, preserving, and providing access to distributed resources.
  - Non-database specific, system-independent information retrievers
    This description of librarians, coined by STScI librarian Sarah Stevens-Rayburn, illustrates that we know how to apply available tools most effectively in order to obtain requested information. In doing so, we are not limited to any particular database or computer system, but deliver information in whatever format needed, using all kinds of appropriate information resources.
  - Librarians interact with users
    A major advantage of librarians over mechanical databases is our interacting with users. They often appreciate being able to talk to a person instead of searching computer systems that may or may not interpret queries the way they were meant. Up to now, no retrieval system has been able to substitute for this human component.
  - Librarians as mediators
    As we talk to scientists, we learn about their perception of library services, their requirements for electronic and print publications and their suggestions for improvements. Librarians use this favorable situation to mediate between users and providers of information resources.
  - Recognize the changing paradigm
    In the electronic environment, some traditional library functions will no longer be performed by small libraries. In particular archiving will be taken care of by others, probably national or other large libraries together with publishers; librarians in small libraries will be responsible for locating and providing access to archived electronic publications. We must let go of tasks that are accomplished better elsewhere rather than in our small specialized libraries; this will not put us out of business as long as we recognize the opportunities the electronic era bears. As new technologies become available, we need to consider which of them can and should be

used in our libraries to increase efficiency and provide better service. Not everything needs to be applied, but useful improvements must be selected and implemented.

- Electronic publications
  - Electronic journals: good and bad
    When we subscribe to electronic journals, we often would like to be more discriminating than we actually can be regarding "poor" electronic journals – user demand usually dictates that certain e-journals be made available no matter whether or not they meet essential requirements. Particularly crucial features are extensive hyperlinking within as well as across publications, assurance of authenticity and integrity, and system-independent archives which can be transfered into new storage formats for future access. These and other quality standards are yet to be made mandatory for electronic journals.
  - Network of distributed data resources
    The publication paradigm is changing from independent, self-sufficient articles to small interlinked pieces, assembled on demand in "information clusters", and today's journals may develop into a complex network of distributed information (Boyce, 2000). Resources that are not interconnected are in danger of being unaccessible in future. Even if we may struggle with the idea of not owning publications that we can keep physically within our libraries – the future lies in material that is integrated in the network of distributed resources.
  - Protect existing user rights
    The use of electronic journals is no longer regulated by general copyright, but through license contracts. They can change considerably the way readers are allowed to use publications. Some publishers try to establish restrictive licenses, ignoring the fact that publications are different from other goods in that they must be accessible and useable for research, education, and personal purposes by anybody at reasonable prizes. Librarians aim at saving existing user rights regarding accessing, copying, and sharing of publications which have a long tradition in the paper environment. Of particular concern is perpetual access to electronic publications which often is not guaranteed. License agreements therefore require careful scrutiny before they are signed.
- Cooperation: more important than ever
  In a world of interlinked resources, cooperation is more impotant than

ever. Among astronomy librarians, networking has a long-standing tradition. Astrolib, our popular mailing list, has been operative since the 1980s, many astronomy librarians know each other personally, and we often collaborate on projects. The series of LISA (Library and Information Services in Astronomy) conferences have become an established event that takes places regularly. Astro librarians are a very welcoming community, always willing to share their experience. In any profession, continued learning is essential these days, and what we can learn from each other does not (yet) appear in any librarian's handbook, even though it should.

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