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Form Approved
OMB No. 0704-0188

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1. REPORT DATE (DD-MM-YYYY) 01-04-1998		2. REPORT TYPE ADA		3. DATES COVERED (From - To)	
4. TITLE AND SUBTITLE Helping the Astronomer Stay Up-To-Date				5a. CONTRACT NUMBER	
				5b. GRANT NUMBER	
				5c. PROGRAM ELEMENT NUMBER	
6. AUTHOR(S) Brenda G. Corbin				5d. PROJECT NUMBER	
				5e. TASK NUMBER	
				5f. WORK UNIT NUMBER	
7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES)				8. PERFORMING ORGANIZATION REPORT NUMBER	
9. SPONSORING / MONITORING AGENCY NAME(S) AND ADDRESS(ES)				10. SPONSOR/MONITOR'S ACRONYM(S)	
				11. SPONSOR/MONITOR'S REPORT NUMBER(S)	
12. DISTRIBUTION STATEMENT A Approved for Public Release Distribution Unlimited					
13. SUPPLEMENTARY NOTES					
14. ABSTRACT <i>This survey covers some of the sources of current astronomical information which both astronomers and librarians use. Subjects include preprints, electronic journals, astronomical objects, directories and printed bibliographies. Many, but not all, of the information sources that the astronomer consults will be found on the internet.</i>					
15. SUBJECT TERMS USNO COLLECTION					
16. SECURITY CLASSIFICATION OF:			17. LIMITATION OF ABSTRACT	18. NUMBER OF PAGES 6	19a. NAME OF RESPONSIBLE PERSON Brenda G. Corbin
a. REPORT	b. ABSTRACT	c. THIS PAGE			19b. TELEPHONE NUMBER (include area code) 202-762-1463

19991208 149

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Library and Information Services in Astronomy III
 ASP Conference Series, Vol. 153, 1998
 Editors: U. Grothkopf, H. Andernach, S. Stevens-Rayburn, and M. Gomez
 Electronic Editor: H. E. Payne

Helping the Astronomer Stay Up-To-Date

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Abstract:

This survey covers some of the sources of current astronomical information which both astronomers and librarians use. Subjects include preprints, electronic journals, astronomical objects, directories and printed bibliographies. Many, but not all, of the information sources that the astronomer consults will be found on the internet.

1. Introduction

At the present time and in some departments, the accumulation of material is so rapid that there is a danger of indigestion. By a fiction as remarkable as any to be found in law, what has once been published, even though it be in the Russian language, is usually spoken of as "known", and it is often forgotten that the rediscovery in the library may be a more difficult and uncertain process than the first discovery in the laboratory. (Lord Rayleigh, 1884)

It is hoped that this survey will help astronomers find more easily that which is "known" and make "rediscovery" in the library a simpler matter.

2. Astronomy and Astrophysics on the Internet

Almost everything that exists on the web for the subjects of astronomy and astrophysics can be found via AstroWeb (<http://www.cv.nrao.edu/fits/www/astronomy.html>). It is one-stop shopping on the web with links to a large number of other sites. As of July 1998, AstroWeb contained "2713 distinct resource records" covering all aspects of astronomy from telescopes (336 records) to history of astronomy (17 records). The amount of material found via AstroWeb is overwhelming at times. Links are checked daily to assure they are current. Almost all sources which are noted in this paper can be found via AstroWeb. The Universal Research Archive of Networked Information (URANIA) is sponsored by the American Astronomical Society and can be found at <http://www.aas.org/Urania/>.

The paper by Peter Boyce appearing in this volume (page x [*]) describes URANIA in detail.

3. Electronic Journals

For access to the most current information, electronic journals are the first place to look. The electronic version often appears long before the printed version arrives in the library. Libraries usually list on their homepages the journals to which staff members have access. In most cases, electronic journals are only available to the staff of an institution which has a subscription. A signed license agreement is required by most publishers before electronic access is made available. At present, most journals provide electronic access at no additional cost, or a small additional cost, if the library purchases the paper copy of the journal.

4. Bibliographies in Astronomy

Bibliographies are the sources to which librarians turn when looking for information by subject, author or keyword.

4.1. Astronomy and Astrophysics Abstracts

The standard reference in the field of astronomy is Astronomy and Astrophysics Abstracts (AAA), those familiar, blue volumes found in most astronomy libraries. It was announced at the XXIIIrd General Assembly of the International Astronomical Union in Kyoto in 1997 that AAA would cease publication at the end of 1998 due to lack of funding. However, a later announcement from the Astronomisches Rechen-Institut (ARI), Heidelberg, noted that publication might continue as the German government was further studying the situation. Final word is still awaited concerning the fate of AAA.

It is important for librarians and astronomers to remember that AAA is the only publication which gives complete bibliographic coverage of the field of astronomy, either print or online. One of the continuing problems with this series is the long lag time in publication.

4.2. Astrophysics Data System

The Astrophysics Data System (ADS) is funded by NASA and can be found at <http://adswww.harvard.edu/>. The ADS is an excellent tool for astronomical bibliography and contains approximately 400,000 abstracts in astronomy and astrophysics. ADS also has full text available for some 16 journals such as the *Astronomical Journal* (1944-1997) and *Monthly Notices of the Royal Astronomical Society* (1970-1996). ADS hopes to have full text available from the beginning volume for many astronomical journals in the future. The full file of *Astronomy and Astrophysics Monthly Index* (1976-1995) is now available in the system. Many astronomers use ADS on a regular basis and find it a very useful reference tool. However, ADS at present is not as complete as *Astronomy and Astrophysics Abstracts* for full bibliographic coverage of astronomy.

4.3. ARIBIB

The Astronomisches Rechen-Institut has announced the future availability of *Astronomy and Astrophysics Abstracts online (ARIBIB)* covering the volumes from 1983 to the present. ARIBIB gives complete bibliographic information, but cannot give the abstracts which appear in the printed volumes due to legal restrictions. ARIBIB is available at no cost to those institutions who purchase the printed volumes. After a brief test of the database at USNO, it appears to be a very valuable addition to online astronomical bibliography even though abstracts are not present. The ARI plans are to scan AAA volumes published before 1983 and add them to the database.

5. Preprints

Preprints are a subject dear to most astronomers' hearts, but sometimes their organization is one of the biggest problems for the librarian.

5.1. astro-ph

Perhaps one of the easiest online systems to use is astro-ph (<http://xxx.lanl.gov/>). These astrophysics preprints are available from LANL (Los Alamos National Laboratory), in a project supported by the National Science Foundation (US). Preprints are available from institutions worldwide and are submitted on a volunteer basis. One can look at the preprints on the LANL website, or have the latest preprint abstracts sent automatically via e-mail. This website also has preprints available in many other scientific subjects. The astro-ph site can be accessed directly from the ADS, and a mirror site is located in Italy. However, astronomers and librarians must always be aware that astro-ph is not nearly as complete as the preprint lists maintained by the Space Telescope Science Institute and the National Radio Astronomy Observatory.

5.2. Preprint Lists from Space Telescope and NRAO

The most complete lists of astronomy preprints at present are maintained by the Space Telescope Science Institute (<http://sesame.stsci.edu/lib/preprints.html>) and the National Radio Astronomy Observatory (<http://libwww.aoc.nrao.edu/aoclib/rapsheet.html>). The Space Telescope list begins with preprints from 1982 and the NRAO list from 1986. Many libraries have either lists by title or full-text of their own institution's preprints on their homepage and provide links to other preprint servers. An example may be found at the European Southern Observatory Library homepage (<http://www.eso.org/libraries/preprints.html>). Bob Hanisch (STScI), with other collaborators, is currently working on developing a distributed preprint system for the astronomical community. This

grant is funded by NASA, and a paper on this project appears in these proceedings (page x [*]).

6. Astronomical Objects and Catalogs - Databases

6.1. SIMBAD

When an astronomer is looking for information about astronomical objects, the first stop should be SIMBAD (<http://simbad.u-strasbg.fr/simbad/>). This database contains over 1.5 million objects and 2.5 million citations of objects in papers. The only objects specifically excluded from SIMBAD are solar system bodies. Many astronomers use SIMBAD on a regular basis and find it an indispensable resource. This is one of the several services provided by CDS.

6.2. NED (NASA/IPAC Extragalactic Database)

NED is a master list of extragalactic objects containing basic positions, redshifts and other data (<http://nedwww.ipac.caltech.edu/>). There is a link to NED from SIMBAD.

6.3. Planetary Data System (JPL)

Data on solar system bodies can be found in the Jet Propulsion Laboratory database Planetary Data System (PDS). This is an active archive which provides high quality, usable planetary science data products to the scientific community. This webpage is located at <http://pds.jpl.nasa.gov/>.

6.4. Data Centers

Astronomical catalogs and other data can be found at the Centre de Données astronomiques de Strasbourg (CDS) (<http://cdsweb.u-strasbg.fr/cds.html>). CDS is the hub of the world-wide astronomical data system. Data centers containing catalogs are also located in Japan (<http://adac.mtk.nao.ac.jp/index.html>), Russia (<http://www.inasan.rssi.ru/CAD/>), Canada

(<http://cadwww.dao.nrc.ca/>), and the United States (<http://adc.gsfc.nasa.gov/>). Other data archives can be found via AstroWeb.

7. International Astronomical Meetings

If astronomers need to know about meetings planned in their speciality, the list of International Astronomy Meetings (<http://cadwww.dao.nrc.ca/meetings>) covers meetings from 1996-2000, and provides links to meetings which have webpages. This list is maintained at the Canadian Astronomy Data Centre (CADC) with major information supplied by Liz Bryson, librarian at the Canada France Hawaii Telescope (CFHT). To insure conferences are listed, meeting organizers should send information to Ms. Bryson (bryson@cfht.hawaii.edu).

8. International Astronomical Union Colloquia and Other Meetings

It is often simple to find IAU symposia as most have been published first by Reidel, and later by Kluwer. IAU symposia from 1998 forward will be published by the Astronomical Society of the Pacific in their Conference Series. However, the IAU colloquia have been published in many different places and they can sometimes be difficult to locate. A list which gives full publishing information of IAU Colloquia from number 101 to the present can be found under "Lists of Astronomical Interest" at the Space Telescope Science Institute Library homepage (<http://sesame.stsci.edu/lib/other.html>). This list is maintained by librarian Sarah Stevens-Rayburn and also contains publication information for meetings found cited in preprints.

9. Astronomy Book and Software Reviews

If an astronomer is looking for a review of a book he or she has published or perhaps wishes to purchase, the list maintained by Marlene Cummins of the University of Toronto Astronomy Library is a very useful tool (<http://www.astro.utoronto.ca/reviews1.html>). Book reviews are listed from 1987 and software reviews from mid-1994. This listing is more complete for astronomy books than the commercial database Book Review Digest. The most recent reviews are distributed quarterly via email. To be added to this email distribution list, contact Ms. Cummins at library@astro.utoronto.ca.

10. Astronomy Newsletters

Newsletters, whether printed or in electronic format, are problems for most librarians. It is difficult to know if certain newsletters are still being published, if your library is still on the distribution list, and to determine the last issue which appeared. Cathy Van Atta, the librarian at Kitt Peak, began updating the astronomy newsletters list she had prepared some years ago prior to her retirement early in 1998. Sarah Stevens-Rayburn of the Space Telescope Science Institute Library agreed to take over the Newsletters Project and put it on the web (<http://sesame.stsci.edu/lib/NEWSLETTER.htm>). This list gives all information known about a newsletter - whether it is current or has ceased publication, and gives a direct link to the newsletter if it is on the web. As information on such a list changes very frequently, other librarians have been recruited to take care of parts of this list which have been assigned alphabetically. Editors of newsletters are strongly encouraged to contact Ms. Stevens-Rayburn to provide publication details concerning their newsletters (library@stsci.edu).

11. Union List of Astronomy Serials (ULAS)

Observatory publications appeared from individual observatories from the 19th century through the 1960s. If an astronomer needs to find the publication details for any of these series, see the Union List of Astronomy Serials (<http://sesame.stsci.edu/lib/union.html>). Judy Lola Bausch, librarian at Yerkes, compiled and published the first edition in 1983. The second edition (ULAS II) is now available on the web. ULAS II includes 2300 entries with holdings information for 42 libraries. It is the most complete listing of observatory publications available, and is an essential tool for finding

bibliographical information for this type of publication.

12. Observatory Publications - Other Projects

12.1. Catalog of Individual Observatory Publications

Often researchers are looking for bibliographic entries for specific papers in observatory publications. The United States Naval Observatory (USNO) Library has undertaken a project to catalog the papers in these series of publications. Much of the original research in astronomy appeared in observatory publications, and these articles contain observations and data still of great value to astronomers today. Many libraries have these holdings cataloged by the particular series. However, the individual research papers in each series are not usually cataloged so there is no access except by searching the *Astronomischer Jahresbericht* or by checking in the table of contents of the individual volumes of observatory publications. This project is a very large undertaking as there are several thousand volumes of observatory publications. To date, over 4000 individual research papers have been cataloged online. Initial funding came from the Legacy Program within the U.S. Dept. of Defense, and the grant has recently been renewed so that the project can continue. The Naval Observatory's online catalog may be reached via the web page at <http://www.usno.navy.mil/library/>. For further information about this project, contact Brenda Corbin (bgc@sicon.usno.navy.mil).

12.2. Preservation and Digitization of Observatory Publications

In a related project, the Harvard College Observatory and the U.S. Naval Observatory (USNO) have joined together in an effort to preserve photographically the series of observatory publications. This preservation project was originally proposed in the late 1970s by Brenda Corbin, USNO Librarian, and the search for funding has continued since that time. Success was finally achieved in 1997 when the Harvard Libraries received a grant from the U.S. National Endowment for the Humanities for preservation microfilming of several science series, including all of the observatory publications. Donna Coletti, Harvard College Observatory Librarian, will oversee this project in cooperation with the Preservation Department at Harvard. Any observatory publications not in the Harvard collection will be supplied by the U.S. Naval Observatory.

After microfilming has been completed, the film will be scanned and the complete series of observatory publications will be mounted on the web by the Astrophysics Data System. The microfilming will preserve the volumes, many in very poor condition, while scanning and web access will make them available to a much wider audience of researchers. Thanks are due to Guenther Eichhorn of the ADS for his efforts in planning for the scanning of the microfilm and arranging for this series of publications to be available on the ADS website. For additional information contact Donna Coletti (coletti@cfa.harvard.edu) or Brenda Corbin (bgc@sicon.usno.navy.mil).

13. Directories - Institutions, Individuals, Acronyms

If information is needed relating to astronomical institutions, individuals, associations or acronyms, turn to StarPages (<http://cdsweb.u-strasbg.fr/~heck/sf.htm>). These pages, maintained by André Heck (starfam@astro.u-strasbg.fr), are filled with a wealth of information not easily found elsewhere. The International Astronomical Union Membership Directory is available online (<http://www.iau.org/>) and is being updated on a more regular basis than previously.

14. Astronomy Librarians and Libraries

When one has tried all the resources noted thus far in this paper and still cannot find the information needed, turn to your colleagues for assistance. Librarians are found in a directory maintained by Uta Grothkopf at the European Southern Observatory. This listing (<http://www.eso.org/libraries/astro-addresses.html>) has a useful search engine so that one can find a library by searching on a city if the

librarian's name is not known. Please contact Ms. Grothkopf (esolib@eso.org) with information concerning libraries and individuals which have been omitted from this list.

15. AstroLib and EGAL - Information Service

If the information the astronomer needs still cannot be found, why not ask all of your colleagues at the same time? Someone is sure to have the answer. Two email distribution lists are available for astronomy librarians. AstroLib, maintained by Ellen Bouton (library@nrao.edu), has almost 200 members. To post a message on Astrolib, send the message to Ms. Bouton who will then distribute it to everyone on the list. The European Group of Astronomy Librarians list (EGAL) is now maintained by Peter Hingley, librarian at the Royal Astronomical Society (pdh@ras.org.uk). Ingrid Howard, former librarian at the Royal Greenwich Observatory, managed EGAL for many years. Again, to post a message on EGAL, send it to Mr. Hingley.

16. Older Astronomical Literature - Printed Bibliographies

At times, keeping the astronomer up-to-date means giving him "old" information. Certainly in the subject fields of variable stars, eclipsing binaries, cometary observations, etc, older information is very useful and often needed. The following are all printed bibliographies which cover the entire field of astronomy:

Astronomy and Astrophysics Abstracts (1969 - present)

Referativnyi Zhurnal - Astronomy (1953 - present)

Astronomischer Jahresbericht (1899 - 1968)

Houzeau and Lancaster (early times - 1880)

De la Lande (1781 - 1802)

17. Other Literature (Mathematics, Physics, Computer Science)

Astronomers sometimes need references from other subject fields. A good starting place is the homepage of the Physics-Astronomy-Mathematics Division (PAM) of the Special Libraries Association (US). This homepage (<http://pantheon.yale.edu/~dstern/pamtop.html>) links to various other websites in physics, mathematics and computer science. The page is updated by librarians who are subject specialists in these particular fields. UnCover (<http://uncweb.carl.org/>) has article information from over 17,000 journals in all subject fields. This database covers materials from mid-1988. There is no charge to use this database, but one must pay if paper copies of articles are ordered. Another useful aspect of this database is the listing of journals, and the notation of which issues have been received. For example, if your library has not received the latest issue of *Icarus*, one can check UnCover to see the latest issue noted in its listing.

18. Thesauri

If your astronomer needs to find all the terms used for a particular subject, show him the Astronomy Thesaurus (<http://msowww.anu.edu.au/library/thesaurus>). Compiled by Robyn and Robert Shobbrook with the assistance of astronomy librarians and astronomers, a multi-lingual copy is also available. As Robyn Shobbrook has now retired, the Astronomy Thesaurus is not at present being kept up-to-date. Marlene Cummins (library@astro.utoronto.ca) has started discussions with the astronomical library community to see if librarians will volunteer to continue updating the Thesaurus. The NASA Thesaurus (<http://www.sti.nasa.gov/98Thesaurus/98thes.htm>) contains a large number of astronomical terms which could be useful to astronomers. This thesaurus is updated on a continuing

basis.

19. Technical Reports

The NASA Technical Reports Server contains many astronomical technical reports, including those from Goddard Space Flight Center, Jet Propulsion Laboratory and many others. Their webpage is located at <http://techreports.larc.nasa.gov/cgi-bin/ntrs>.

20. Summary

Helping the astronomer stay up-to-date is not always a simple task. This survey is an attempt to help in this task, but is by no means complete, and the author welcomes additional information for any future updating of this report (bgc@sicon.usno.navy.mil). Reports of astronomical information databases outside North America and Europe are especially welcome.

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Referativnyi Zhurnal, 1953- (Moskva: Proizvodstvenno-izdatelskii kombinat VIN ITI)

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