

**AMERICAN ASTRONOMICAL SOCIETY  
WORKING GROUP ON THE PRESERVATION OF ASTRONOMICAL HERITAGE**

**CENSUS OF ASTRONOMICAL PHOTOGRAPHIC PLATES IN NORTH AMERICA  
FINAL REPORT**

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**Abstract**

A census of astronomical photographic plates in North America was carried out to determine the number of existing plates as well as their locations, conditions, availability for research and other relevant information. Two hundred and four census forms were distributed to observatories, astronomy departments and a few individual astronomers. There was a 50% overall response rate, which included full or partial responses from all of the major U.S. and Canadian organizations. The census identified over 2.4 million photographs. Forty-four institutions reported holding at least some photographic plates, however the 16 largest collections account for 97% of the total. Canadian institutions hold roughly a third of the spectral plates. A number of conclusions about photographic plate archives are drawn from the census data.

**Background**

For over 100 years – roughly from the mid 1880's to the mid 1980's – photography was the primary means of recording astronomical observations. The result was an estimated three million or more photographs worldwide, most of which are on glass plates. The photos include direct images of objects and star fields, objective prism spectral survey plates and slit spectrograms. Well over half of the direct images and a large majority of the spectra were exposed at North American Observatories.

Astronomical institutes and observatories have traditionally archived and maintained the plates taken with their instruments along with the associated observing records – date, time, emulsion type, etc. – necessary to interpret them. While many institutions have only small collections of plates, some major observatories have over 100,000 images dating back over 100 years. There are also plates held by individual astronomers. Plates generally have been considered the property of the observatory where they were taken, but plates have often been on indefinite loan to the investigators who took them, especially plates taken at the national observatories (e.g., KPNO and CTIO).

Unfortunately, the future of this unique archival record is presently unresolved, and this material is in danger of being lost. Increasingly, many astronomical institutions no longer have the space, resources, expertise and/or interest to maintain a plate archive. Consequently, some material is deteriorating because of poor storage conditions while in a few cases plate collections have

actually been discarded. Further, some institutions are no longer prepared to deal with returned plates and therefore no longer desire to have their loaned plates returned. This raises the question of what should be done with plates held by institutions that are not their own and plates held by individuals when they are no longer being used, often when the astronomer retires or dies.

### The PARI workshop

With National Science Foundation (NSF) support, a workshop was held on November 1-3, 2007, to discuss the preservation of the rich heritage of photographic observations in North America. The venue was the Pisgah Astronomical Research Institute (PARI) in Rosman, North Carolina. PARI had previously been identified as an excellent potential site for a national astronomical plate archive. The workshop location therefore gave the participants, most of whom were not familiar with PARI, an opportunity to see and critically evaluate its suitability for a leading role in any preservation plan.

Thirty-two persons from twenty astronomical institutions took part in the discussions. These included persons responsible for major plate collections, representatives of observatories engaged in plate preservation efforts, astronomers with an interest in archival plates for research and a science historian as well as the NSF program officer and PARI staff. The main results from the workshop were a series of recommendations. The first recommendation was:

*Given the eventual need for a database of astronomical photographic data, a census of North American astronomical photographic plates should be carried out. This would be done by conducting a survey of observatories and other institutions known or expected to hold plates.*

A detailed summary of the Workshop discussions and the recommendations can be seen at <http://www.pari.edu/library/astronomical-plate-center/workshop/results/Summary.pdf> and <http://www.pari.edu/library/astronomical-plate-center/workshop/results/Recommendations.pdf>

### The WGAH

In response to concerns raised by its Historical Astronomy Division, the American Astronomical Society established a Working Group on the Preservation of Astronomical Heritage (WGAH) in January 2007 (see <http://members.aas.org/comms/wgah.cfm>). The WGAH is charged with “developing and disseminating procedures, criteria and priorities for identifying, designating, and preserving astronomical structures, instruments, and records so that they will continue to be available for astronomical and historical research, for the teaching of astronomy, and for outreach to the general public.” An appendix to the document proposing a Working Group elaborated on the charge by providing a list of matters that would be considered under the general areas of historically significant sites, historically significant instruments and archives. Astronomical photographs are specifically mentioned under the archives area.

Given the Working Group’s charge, the Census was eventually carried out under its general auspices. Specifically, then WGAH chair (S. McCluskey, term 2007-2008) and the two members of the WGAH whose appointments were based on interest in archival astronomical data (E. Griffin and W. Osborn) were involved in developing the census form and were signatories of the cover letter seeking participation.

## **The Census of Astronomical Photographic Plates in North America**

After the recommendation that a census be carried out was adopted at the PARI Workshop, a committee was selected to conduct it. Members were S. McCluskey (West Virginia U./WGPAH chair), E. Griffin (DAO/WGPAH member), W. Osborn (CMU/WGPAH member), M. Castelaz (PARI), R. J. Patterson (U. Virginia) and L. Robbins (U. Toronto). The committee worked by e-mail to develop the census instrument and methods.

### The Census form

The Committee established the following basic parameters for the instrument that would be used to conduct the census:

- The survey form should be short enough and easy enough to complete to encourage a high response rate
- The form should capture sufficient information to identify the locations and conditions of the major plate collections in North America
- The census would focus on traditional astronomical plates – direct images, objective prism plates and slit spectra – not on specialized collections such as solar images, planetary patrol plates, aurora films, etc.

It was decided to use e-mail as the primary mode for distributing the census forms and receiving the responses.<sup>1</sup> Eventually two versions of the form were prepared, one for institutions and a slightly modified one to be sent to individual astronomers believed to have personal plate collections. In both cases, the form could easily be completed by filling in one's responses on the e-mail message or an attached survey form and replying to the sender.

The census form had 14 questions. The first question was “Does your institution hold a collection of astronomical photographic plates?” The instructions were that if the answer was “No” then one should skip the rest of the questions but return the survey. If the answer was “Yes” the thirteen additional questions should be answered. These sought basic information on the collection, recent research or other use of the plates and thoughts on the collection's future. Finally, there was a table that was to be completed listing for each plate series in the collection the telescope employed, types of plates (direct or spectra), and their estimated number, date range and condition.

A cover letter was included with each distributed census form. This explained the purpose of the survey, asked that it be returned by the deadline and provided some information on completing and returning it. The standard cover letter was sometimes modified for the particular recipient (e.g., the letter to observatory directors differed from the one sent to institutional archivists). A copy of the standard cover letter and census form are given in Appendix A.

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<sup>1</sup> The option to use paper and regular mail was made available, but only one response was received by this means.

### The Distribution List

The census was limited to institutions in North America, i.e. in Canada, Mexico or the United States.<sup>2</sup> The distribution list was developed using two approaches. First, the personal knowledge of the committee members was used to identify institutions known to currently have plate collections or which had them in the past as well as some individual astronomers thought likely to hold plates.

Second, a list of presently or previously active astronomical observatories was developed by looking at observatory listings and reports in the astronomical literature. Table 1 gives the sources used, which range from 1907 to 2000. Comparison of the entries allowed an estimate of the activity level and longevity of a given observatory. Observatories with a primary focus on solar, planetary or non-optical observations were not included.

TABLE 1

Reference	Publication date	Description
<i>Observatoires Astronomiques</i> (Stroobant et al 1907)	1907	List of observatories with work in progress for some. Survey sent if a mention of photography.
AAS Reports of Observatories, 1922-23	1924	Descriptions of work in progress
AAS Reports of Observatories, 1928-29	1930	Descriptions of work in progress
<i>U.S. Observatories: a Directory and Travel Guide</i> (Kirby Smith 1976)	1976	List of observatories with descriptions and work in progress for some
<i>The Astronomical Almanac for 1991</i>	1990	List of observatories
<i>The Astronomical Almanac for 2000</i>	1998	List of observatories

The final distribution list can be roughly divided into five general categories:

- Astronomical observatories and programs known to have had active photographic programs. We selected the following 28 institutions in this category: Steward Observatory/University of Arizona<sup>3</sup>, Cerro Tololo Inter-American Observatory (CTIO), Kitt Peak National Observatory (KPNO), Dearborn Observatory/Northwestern University, Indiana University, Harvard College Observatory and the Smithsonian Astrophysical Observatory, Lowell Observatory, Lick Observatory, Mt. Wilson Observatory/Carnegie Observatories, Palomar Observatory, University of Illinois Astronomy Department, University of Michigan Astronomy Department, Perkins Observatory/Ohio State and Ohio Wesleyan Universities, Allegheny Observatory/ University of Pittsburgh, Dyer Observatory/Vanderbilt University, University of Hawaii Institute for Astronomy, McDonald Observatory/University of Texas Astronomy Department, Leander McCormick Observatory/University of Virginia Astronomy Department, Yale University Astronomy Department, U. S. Naval Observatory – Washington, U.S. Naval Observatory – Flagstaff Station, Warner and Swasey Observatory/Case Western Reserve University, Van Vleck Observatory/ Wesleyan University, Sproul Observatory/Swarthmore College and Yerkes Observatory/University of Chicago in the U.S., the Dominion Astrophysical Observatory

<sup>2</sup> Cerro Tololo Inter-American Observatory, managed by AURA and which has many of its plates in North America, was also included.

<sup>3</sup> Including telescopes and observing facilities on Mt. Bigelow, Mt. Lemmon, Tumamoc Hill and in the Catalina Mountains

and David Dunlap Observatory/ University of Toronto in Canada and the Tonantzintla Observatory in Mexico.

- Astronomical institutions that have not carried out photographic observations but hold significant numbers of plates. We identified two in this category: the Pisgah Astronomical Research Institute (PARI) and the Space Telescope Science Institute (STScI). Just subsequent to the mailing of the survey, STScI disposed of all of their institutional plates by shipping them to Harvard. A few Institute astronomers have personal plate collections
- Other astronomy institutions that may have engaged in photographic work or hold plates. These are mainly university astronomy/astrophysics/physics-astronomy departments that were active before 1990, by which time photography was largely discontinued. Some were known to have plates, for others no information was available. Examples are the astronomy departments at the University of Florida, University of Iowa, and San Diego State University.
- Institutions active in the photographic era but no longer in operation. In some of these cases we wrote to the successor department or institution, in others to the appropriate institutional archives, and in a few cases to a retired astronomer that was associated with the institution. Examples are the observatories of Georgetown University and Creighton University. In three cases<sup>4</sup> a successor institution could not be identified.
- Individual astronomers known or believed likely to have individual plate collections.

E-mailing of the census forms commenced the first week of April 2008 with an April 30<sup>th</sup> return deadline specified. If no response had been received by the last days of April, a reminder was sent and selected non-responders contacted by telephone. Two hundred and four census forms were eventually distributed, including 19 to individual astronomers. The distribution list is given in Appendix B.

### Results from the Census

Of the 204 distributed forms, the published e-mail addresses for six were invalid and we could not locate alternate ones. From the remaining 198, we received 90 written responses and 12 responses in our follow up telephone calls, yielding a 50% rate of response. This rate is, however, somewhat misleading as we surveyed a large number of smaller astronomy programs and some institutional archives at institutions with defunct observatories. Furthermore, we were able to obtain partial information for some non-responding institutions from other sources. For example, a number of institutions were known to have transferred most or all of their plate collections to another observatory<sup>5</sup>; available information for these cases was added to the census data under the institution currently holding the collection if not already reported.

Table 2 show the numbers of institutions surveyed by type and the respective numbers and percentages for which census data were obtained from either the survey or from other sources. It is seen that data were secured for all but one of the major observatories. Only for the Tonantzintla y Tacubaya Observatory in Mexico is no information available.

<sup>4</sup> Echo Mountain Observatory (CA), Tiara Observatory (CO), Metcalf Observatory (MA)

<sup>5</sup> These include: University of Michigan - spectroscopic plates are now at PARI, Warner and Swasey Observatory - Schmidt plates are now at PARI, Central Michigan University - small collection of plates now at PARI, University of Illinois - Ross camera plates are now at Yerkes, Dearborn Observatory - wide-field plates are now at Yerkes, Perkins Observatory - many spectroscopic plates now at Yerkes.

TABLE 2

Survey Category	Number of Institutions Surveyed				Number with data obtained from survey or other sources			% rate of sampling
	U.S.	Canada	Mexico	Total	Survey	Other	Total	
Major observatories	25	2	1	28	23	4	27	96
Significant number of plates	2	0	0	2	1	1	2	100
Other astronomical institutions	128	7	0	135	42	13	55	41
Institutions no longer active	20	0	0	20	10	0	10	50
Individual astronomers	18	1	0	19	13	5	18 <sup>6</sup>	74
TOTAL	193	10	1	204	88	24	112	53

### Plate Collections

Forty-four institutions – three in Canada – responded to Question 1 by reporting they have plate collections but seven provided only partial data about their holdings. Data for another collection were obtained from an institutional web site.<sup>7</sup> In addition, 15 individual astronomers reported having small collections, typically a few hundred plates but in some cases over 1000. Forty-six institutions reported not having any plates.

Question 2 asked which types of plates are in the collection – direct images, objective prism plates, slit spectrographs, etc. – while Question 3 asked the total number of each type. Responders were told they need not carry out a detailed inventory, but merely provide rough estimates of the numbers. The reported amounts of direct images, objective prism plates, slit spectrograms and other plates for the five categories of respondents are given in Table 3. The census identified about 1.3 million direct images, 50,000 objective prism plates and 600,000 spectrograms. We note that astrometric and spectroscopic often have several exposures on the same plate.

One can see that the vast majority of plates are held by the major institutions – about 98% for each traditional plate type. Further review shows that by far Harvard holds the largest collection – about 520,000 – of direct and objective prism plates followed by Carnegie Observatories (150,000), Allegheny (115,000), Yale (100,000), Sproul (80,000), Yerkes (72,000), McCormick (67,000), Lowell (51,000), Lick (50,000) and the U.S. Naval – Washington (50,000). Other collections with over 10,000 plates are at KPNO (12,000), Palomar (23,000), PARI (27,000) and Van Vleck (20,000). For slit spectra, collections over 10,000 plates are at the Carnegie Observatories (150,000), Dominion Astrophysical Observatory (126,000), Lick (120,000), Yerkes (81,000), David Dunlap (60,000), PARI (22,000), Allegheny (18,000) and KPNO (10,000). Even if data for a few sizeable collections is missing (e.g., Tonantzintla), one can conclude that efforts to preserve astronomical plates in North America need to concentrate on less than 20 institutions. A summary of the reported and suspected plate collections is provided in Appendix C.

<sup>6</sup> Four unsolicited responses were received. These were neglected in the percentage calculation

<sup>7</sup> University of Minnesota: plates from 10-inch refractor (<http://etacar.umn.edu/~martin/teninch/index.html>)

Table 3. Number of plates by Type

	Number of Plates			
	Direct	Object. Prism	Spectra	Other
Major Observatories – U.S.	1,307,500	23,800	389,000	225,000
Major Observatories – Canada	10,500	40	186,000	5,000
Significant plate collections	2,000	25,000	22,000	56,000
Other astronomical Institutions – U.S.	21,000	750	2,500	102,000
Other astronomical Institutions – Can.	2,300	0	2,500	0
Institutions no longer active	20	0	0	10
Individual astronomers	2,700	1,000	4,200	
TOTAL	1,346,000	50,500	606,000	Solar 318,000 Meteor 56,000 PZT 6,000 Misc. 8,000

### Plate Metadata

A problem in using the extensive photographic archival material has been the difficulty in locating images of interest. Web-based searchable catalogs need to be available if much use is to be made of the photographic material. Question 4 asked where the information about the exposures could be found.

Table 4 shows where the location of information about the plates is located. As well as the overall results, we show the data broken down for the small collections and the large ones, defined as over 10,000 direct, objective prism and/or spectrograms. The survey revealed that in most cases (67% of the 40 collections for which information is available) the data for the plates is available only in paper form – either written on the plate envelopes and/or in observing logs with about one-third of these supplemented by a card file. Thirteen institutions reported having electronic records available for at least some of their holdings; seven of these indicated the information is also available on the web. For reference, the URL's for the web-based data are:

### CTIO

1.5-m: <http://www.ctio.noao.edu/telescopes/60/plate/index.html>

Schmidt: [http://www.ctio.noao.edu/telescopes/cs/plate\\_logs/index.html](http://www.ctio.noao.edu/telescopes/cs/plate_logs/index.html)

Harvard: <http://tdc-www.harvard.edu/plates/plates.html>

KPNO: <ftp://ftp.noao.edu/kpno/platelogs/>

Lowell observatory: <http://www.lowell.edu/Research/library/>

Minnesota 10-inch refractor<sup>8</sup>: <http://etacar.umn.edu/~martin/teninch/index.html>

Maria Mitchell Observatory: <http://www.aas.org/~pboyce/mma/plates.htm>

### PARI:

CTIO Schmidt plates: <http://www.pari.edu/library/astronomical-plate-center/catalog-of-blue-survey-objective-prism-plates-1967-1984/>

Michigan spectra: <http://www.pari.edu/library/astronomical-plate-center/annarborspectrographindex/>

Warner and Swasey Schmidt plates: <http://www.pari.edu/library/astronomical-plate-center/wso/>

Table 4. Where information about the plates is available

<sup>8</sup> Did not respond to survey but a catalogue of early plates is on the web.

Where information about the plates is available	Number of collections			Percent of the 40 collections with data
	16 large collections	29 small collections	45 total collections	
Only on the plates/plate envelopes	1	7	8	20%
Only in the observing logs	0	1	1	3%
On plate envelopes and in a card file	0	1	1	3%
On the envelopes and in observing logs	3	7	10	25%
On envelopes, in logs and in a card file	4	3	7	18%
<b>TOTAL WITH PAPER RECORDS ONLY</b>	<b>8</b>	<b>19</b>	<b>27</b>	<b>67%</b>
Computer-readable file plus paper records <sup>9</sup>	4	2	6	15%
Web accessible file plus paper records	4	3	7	18%
No information provided nor found elsewhere	0	5	5	

For those institutions without electronic records, seven indicated they desire to create them with an additional two interested in doing so if resources become available. Six of these are institutions with collections of over 20,000 plates. However, twenty archives indicated no plans to create such electronic records (or, in one case, to supplement what is now available).

#### Plate Storage and Conditions

Question 5 asked about the state of preservation of the collection and Question 6 asked about the storage conditions. Plates stored in poor conditions often show deterioration – typically emulsion peels. The majority of respondents reported that their plates (at least most of them) are in good condition. The results are shown in Table 5. This is encouraging as most collections are stored in a room subject to typical building environmental control. Only eleven institutions – seven with major collections – keep plates stored in a location designed for archival plate storage and for one only part of the collection. Six responders reported at least some of their plates are presently stored in poor conditions, including parts of three major collections. The data are shown in Table 6.

Table 5. Reported condition of plate collections

Reported condition	Number of collections			Percent of the 39 with data
	Large	Small	Total	
Good	8	14	22	56%
Some good, some fair	1	1	2	5%
Some good, some mixed	2	0	2	5%
Fair	2	6	8	21%
Poor	0	0	0	0%
Mixed	3	2	5	13%
No answer	0	6	6	

Table 6. Reported storage locations of plate collections

<sup>9</sup> Computer readable data for at least some plates, but usually not the entire collection

Characteristics of location where plates are presently stored	Number of collections			Percent of 39 with data
	Large	Small	Total	
In an environmentally-controlled room	7	4	11	28%
Some in controlled environment, others in poor environment	1	0	1	3%
In a room with typical building variations	6	16	22	56%
Some in a typical building room, some in poor environment	1	1	2	5%
In a poor environment	1	2	3	8%
No answer	0	6	6	

### Plate Accessibility and Frequency of Use

Question 7 asked how accessible the plate collection is for research use. There were two underlying factors for this question. First, we were aware of at least two cases where an institution's astronomical plates were inventoried, crated and sealed and then placed in warehouse storage.<sup>10</sup> Therefore, the plates were preserved, but they were unavailable for use. Second, we were interested in views on loaning plates. Loans encourage use by researchers but usually lead to collection shrinkage as some will not be returned. All survey respondents reported that their plates were accessible for research use. For the sixteen major collections, twelve institutions reported that plates were available to qualified researchers either on-site or through loan while four allow use only on site. For the 21 small collections providing information, nine allow loans while twelve only allow use on site.

Question 8 probed the frequency of use of the archival photographic material. The data (see Table 7) reveal that the major collections are being used. About 70% of the large collections reported some use each year on average over the ten-year survey period. The sole report of no use for a large collection was for the Sproul Observatory collection of narrow-field astrometric plates. On the other hand, small collections tended to see little use.

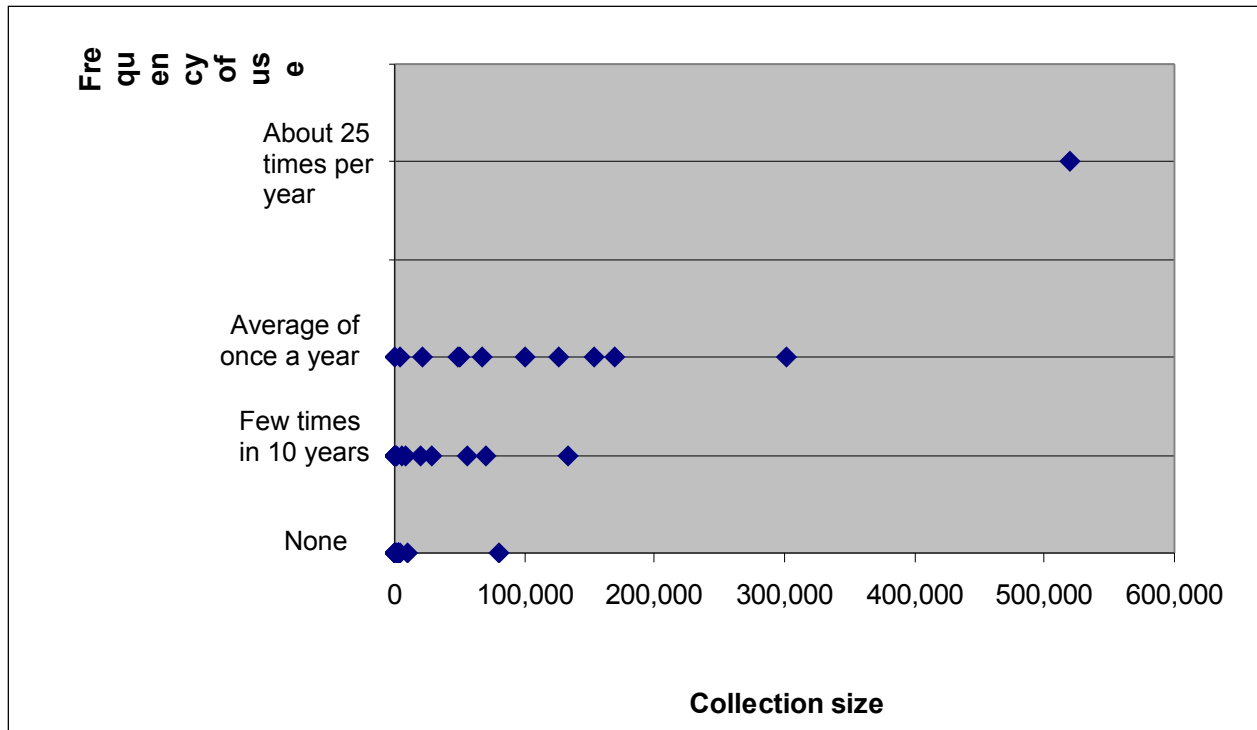
Table 7. Reported use of archival material

	Major Collections (over 10,000 plates)		Minor collections	
Allow use through loan as well as on site	12	75%	9	39%
Allow use only on site	4	25%	14	61%
Very frequent use: average rate of use each month	1	6%	0	
Regular use: average rate of some use each year	8	50%	1	5%
Some plate series regular use, others no use	1	6%	0	
Very occasional use: a few times in last 10 years	5	33%	10	45%
No use in past 10 years	1	6%	11	50%
Unknown/no information provided	0		7	

<sup>10</sup> The Warner and Swasey collection before it was transferred to PARI and the Greenwich Observatory (UK) collection.

As shown in Figure 1 there is some correlation between the size of a collection and its use. Three factors probably contribute to this. First, the larger collections typically have wide-field images or spectra for more objects and are thus more likely to contain objects of interest to researchers. Second, the larger collections and their research potential are better known. Third, most of the large collections allow loans, while the majority of the smaller collections can only be used on site. One can speculate that there would be more use of the archival material if web-based searchable databases of the records were available.

Figure 1. Reported use as function of size of collection



Independent evidence for the use of archival photographic data can be found in the literature. A search was made in the NASA Astrophysics Data System (ADS) database for the two phrases “archival plate” and “photographic plate” appearing in article abstracts from 2000-2008. We then selected only those bibliographic results that were articles reporting on research projects<sup>11</sup> appearing in major astronomical journals, defined to be the *Astrophysical Journal*, *Astronomical Journal*, *Monthly Notices*, *Astronomy and Astrophysics*, *Publications of the Astronomical Society of the Pacific* and their associated supplements and letters. While the journal restriction underestimates the number of such papers, it removes the large number of short notes and conference proceedings which deal with historical aspects of plates or the prospective use of plates rather than scientific results. The search revealed 54 research articles. An additional three articles meeting the same journal criterion were found starting with information provided in the survey

<sup>11</sup> The abstracts, and sometimes the paper, were reviewed to ensure that the article (1) reported work that *utilized* photographic data in the project as opposed to only mentioning previous photographic results, (2) was not just a description of a catalog based on photographs, and (3) was not on instrumentation or data processing techniques that could be or were applied to plate material.

answers. The combined 57 papers are listed in Appendix D. The largest use of archival photographic material (30 papers; 53%) was to study long-term photometric behavior, mostly using either the well known Harvard collection or on the partially-digitized Asiago plate collection in Italy. For 19 projects (33%) the primary use was to obtain early epoch positions for proper motions, in many cases in stellar clusters. We found only two papers on projects making use of archival spectra, although one can envision a number of studies for which such data would be useful.

### Borrowed Plates

During the photographic era it was common for researchers to maintain possession of plates they had taken, transporting them to institutions away from the plates' originating site. It was also common practice to borrow other plates of interest. Many of these plates failed to be returned to the institutional plate collection, and most observatories have accumulated a number of these "orphan plates" as astronomers retired, died or finished a project. Questions 9 and 10 asked if, as far as is known, the institution holds orphan plates or has plates out on loan. It was also asked if the institution wanted its orphan plates returned.

Table 8 shows the responses received concerning plates held from other observatories. Most of the major collections and many of the smaller ones contain plates from other places as well as their own plates. As shown in Table 9, most of the major collections have plates on loan and in most cases would like them eventually returned.

Table 8. Hold others' plates

	Major Collections		Minor Collections		All Collections	
Hold plates from other institutions	11	73%	11	50%	22	59%
Hold only own plates	4	27%	11	50%	15	41%
Responder uncertain/No information provided	1		7		8	

Table 9. Plates on loan to individuals or other institutions

	Major Collections		Minor Collections		All Collections	
Have plates on loan – want them returned	9	60%	4	22%	13	37%
Have plates on loan – do not want returned	0	0%	4	17%	4	11%
Do not have plates on loan	6	40%	12	61%	18	51%
Responder uncertain/No information provided	1		9		10	

### Plate Digitization Plans

Having the archival data in digital form is obviously critical for its use. One may cite the widespread use of the digitized sky surveys. Question 11 asked about the institutional plans to digitize plate collections. The results are summarized in Table 10 for those answering the question. One sees that some digitization has taken place or is planned for most of the large collections, while institutions with small collections generally have no plans to convert the images to digital form.

Only one collection – the 8,000 plates at Maria Mitchell Observatory – has been entirely digitized. Allegheny reported one-third of their plates have been digitized while Palomar Observatory reported about 20%, mostly from the 48-inch Schmidt telescope. In all other cases digitization has occurred for only a very small percentage – about 4% down to only a few plates of interest.

Table 10: Plate digitization

	Major collections		Minor collections	
No plates have been digitized and no plans to do so	3	19%	19	83%
No plates have been digitized but plan to do so in future	3	19%	1	4%
Some plates have been digitized	10	62%	2	9%
Most or all plates have been digitized	0	0%	1	4%
No information on digitization provided			6	

### Maintenance of Plate Archives

Question 12 asked about institutional plans to maintain a plate archive in the foreseeable future. This was prompted by anecdotal stories of institutions wishing to dispose of their collections, usually in order to otherwise utilize the space. The related Question 13 asked if there was support for a national plate archive in which unwanted plates could be deposited and, if one were available, would the institution consider depositing their plates there. Although it was not mentioned in the survey, many of the respondents were aware that the PARI has already established an archive for unwanted astronomical plates and the fact that, after viewing the facilities, the PARI Workshop recommended endorsement of PARI as the North American astronomical photographic data archive.

Only three institutions with plate collections indicated they did not plan to maintain their archive indefinitely. One of these was Harvard which reported a desire to archive the physical plates elsewhere once the collection has been digitized. The U.S. Naval Observatory is arranging to send its plates to PARI, while Florida seeks a new home for its collection and has been in contact with PARI about this.

There was broad support for establishing a national archive, although about a third of the institutions indicated they would not deposit their own plates in one. Two respondents marked that they did not support the idea. An abnormally large number of respondents omitted answering this question and, in retrospect, this may indicate that it was not clear from the question whether support would imply making a financial commitment. The survey results are shown in Table 11.

Table 11. Support for a National Astronomical plate archive

	Major collections		Minor collections		All Collections	
Support establishing a national archive	14	93%	17	94%	31	94%
Would not deposit own plate collection there	5		5		10	
Possibly would deposit plates there			2		2	
Would deposit plates if meets archival standards	1				1	
Would deposit plates and can support transfer	2		5		7	
Would deposit plates but have no funds to send	5		4		9	
Wish to become the national archive	1				1	
Support archive, no answer about own plates			1		1	
Do not support establishing a national archive	1	7%	1	6%	2	6%
No information provided/available	1		11		12	

### Summary and Conclusions

The census of astronomical plates in North America was conducted in the second and third quarter of 2008 under the auspices of the AAS Working Group for the Preservation of Astronomical Heritage. The census identified about 2.4 million photographs. About 2 million are typical astronomical images, of which 600,000 are slit spectra. The remaining 380,000 photos are comprised of solar images, meteor patrol films and other less-traditional types of imaging that were reported by some institutions but were not targeted for inclusion in our census. Forty-five institutions were identified as holding at least some plates.

Our total of two million traditional plates in North America is likely an underestimate. Some institutions may have over-estimated their holdings, but we no doubt failed to identify a number of smaller collections and no information was obtained about one possibly large collection – that known to have existed at Mexico’s Tonantzintla Observatory. Neglecting these, roughly 26% of the plates are at Harvard and 97% reside in just 16 collections. Eight institutions hold 97% of the spectra, with Canadian ones having 31% of this total. In general, the plates are in good condition although less than a third of the collections are presently stored in well-controlled environments. No plate collections were reported as being in danger of being discarded.

The archival photographic material is, and will continue to be, of value for astronomical research. Evidence is its regular, although modest, use over the past ten years, including for published research. There is a correlation between the size of a collection and its use. The present modest use reflects that just a small percentage of the plates have been digitized and most information about the existing plates is difficult to access.

There is wide support for having a centralized archive for North American plates that cannot be kept at their home institution. The Pisgah Astronomical Research Institute has established such an archive and a number of plate collections have already been deposited there. Three more

institutions are exploring archiving their collections at PARI. To support its planned role as a photographic plate center PARI has acquired the two large-plate scanners from the Space Telescope Institute.

We draw the following general conclusions and implications from the survey results, cautioning that there may be specific exceptions:

- The archival photographic material is, and will continue to be, of value in some areas of modern astronomical research and should be preserved.
- Most astronomical plates are not presently in danger of being lost through deterioration or discard.
- Web-based searchable catalogues and eventual digitization of the plate material is needed to facilitate its use by researchers.
- Plate collections that an institution cannot retain should be deposited at the Astronomical Photographic Data Archive of the Pisgah Astronomical Research Institute.
- Small and specialized plate collections see much less use than larger general archives and the centralizing of plate collections in a few centers should be encouraged.
- Funding to support the operation of plate archives, transfer of plates to centralized archives, preparation of catalogues, and digitization of material of interest needs to be found.
- Now that basic information on the locations and states of North American astronomical plate collections is known, a follow-up to the PARI workshop should be organized to develop a plan for preserving this material, cataloguing it and making it accessible electronically.

The survey results were tabulated and this report prepared by the authors, who take full responsibility for any errors or misinterpretations. We would be please to provide the raw survey data to anyone interested.

### **Acknowledgments**

We thank all those individuals who took the time to complete the census. We also recognize the other members of the Plate Census Committee who assisted in designing the survey instrument, identified institutions to be contacted and reviewed the final report. These individuals are Steve McCluskey, West Virginia University and former chair of the AAS Working Group for the Preservation of Astronomical Heritage; Elizabeth Griffin, Dominion Astrophysical Observatory and Chair of the IAU Task Force for the Preservation and Digitization of Photographic Plates; Ricky Patterson, University of Virginia and Michael Castelaz, Pisgah Astronomical Research Institute. Support for this project came from the authors' personal funds.

## APPENDIX A. Census form and cover letter

### AMERICAN ASTRONOMICAL SOCIETY WORKING GROUP ON THE PRESERVATION OF ASTRONOMICAL HERITAGE

**The AAS established a Working Group on the Preservation of Astronomical Heritage (WGPAH) at the January 2007 meeting in response to** concerns expressed by the Historical Astronomy Division (HAD). The charge of the WGPAH includes identifying important astronomical records and working to ensure that they will be available for astronomical and historical research. An important class of records is astronomical photographs (usually plates).

We hope that you will be able to assist the WGPAH in identifying existing photographic records by participating in this census of astronomical plates. We would therefore be grateful if you could complete the attached survey by downloading the attached file, entering your responses, and returning it as an attachment to the e-mail addresses on this message: [Wayne.Osborn@cmich.edu](mailto:Wayne.Osborn@cmich.edu) and [robbins@astro.utoronto.ca](mailto:robbins@astro.utoronto.ca). Two versions of the survey are attached, one in Word and one in straight text; please use whichever is most convenient. If you wish, you may forward the form to another person for completion.

While we strongly prefer an e-mail reply, if necessary the survey form may be printed off and the hard copy completed. Hard copies should be returned by regular mail to Wayne Osborn, c/o Yerkes Observatory, 373 W. Geneva Street, Williams Bay, WI 53191.

Although the form refers to plates, it applies to observations made on film as well. Note, however, that the census concerns astronomical data only, and not photos of people and places. Photographs of instruments, staff members, observing sites, telescopes, and the like should *not* be included.

The survey is aimed at astronomical plates held in institutional collections, but the WGPAH is also interested in learning of significant collections held by individual astronomers. Such collections of which you are aware can be noted in your response. Also, feel free to forward this survey to others that have knowledge of astronomical plate collections.

We seek a timely response, so please answer the questions as best you can without investing too much time in checking the data. We are not expecting answers based on a thorough inventory of your plate collection. **We would like to receive your responses by June 15.**

Thank you very much for your effort in completing the census.

Steve McCluskey, AAS Working Group for the Preservation of Astronomical Heritage  
Elizabeth Griffin, IAU Task Force for the Preservation and Digitization of Photographic Plates  
Wayne Osborn, Ricky Patterson, Lee Robbins and Michael Castelaz, North American  
Astronomical Plate Census Committee

**CENSUS OF ASTRONOMICAL PHOTOGRAPHIC PLATES IN NORTH AMERICA**

Institution:

Name and title of person completing this survey:

**Please feel free to add additional explanations or comments as appropriate.**

1. Does your institution hold a collection of astronomical photographic plates?  
 \_\_\_\_\_ No (please skip the rest of the questions, but return the survey).  
 \_\_\_\_\_ Yes (please complete the rest of the survey)

**Basic information on the plate collection:**

2. What types of plates are in your collection? Please check all that apply.  
 \_\_\_\_\_ Direct plates (images of fields and astronomical objects)  
 \_\_\_\_\_ Objective prism plates  
 \_\_\_\_\_ Slit spectrograms  
 \_\_\_\_\_ Solar images or solar spectra  
 \_\_\_\_\_ Other (e.g. specialized photographic series such as patrol films of Jupiter's surface)  
 Brief description:
3. What is your estimate of the total number of plates of each type? (Please provide details in the table provided at the end of this census. Rough estimates are satisfactory.)  
 \_\_\_\_\_ Direct plates  
 \_\_\_\_\_ Objective prism plates  
 \_\_\_\_\_ Slit spectrograms  
 \_\_\_\_\_ Solar images or spectra  
 \_\_\_\_\_ Other
4. Where can the vital information about the individual plates be found (check all that apply)?  
 \_\_\_\_\_ On the plate envelopes  
 \_\_\_\_\_ In observing log books  
 \_\_\_\_\_ In a card catalogue or other paper file  
 \_\_\_\_\_ In a computer-readable catalogue  
 \_\_\_\_\_ In a Web-based search interface for the catalogue
- When no electronic or online catalogue currently exists, are there plans to create such a catalogue?  
 \_\_\_\_\_ Yes  
 \_\_\_\_\_ No

5. What is the general state of preservation of the plate collection?
- Good
  - Fair
  - Poor
  - Mixed
6. How are the plates presently stored?
- In an environmentally-controlled room specifically designed for plate storage
  - In a room subject to typical building temperature control
  - In a poor environment (e.g., high humidity, variable temperature, possible mold, etc.)
  - Unknown

**Use of the plates for research:**

7. Are the plates accessible for research use?
- Yes, either on site or by loan to qualified researchers
  - Yes, but only on-site
  - No (If "No," please explain)
8. To your knowledge, what use has been made of the plate archive during the past 10 years?
- Frequent use (some use every year)
  - Very occasional (a few times in the past 10 years)
  - None

If use has been made of the plate archive, please estimate the number of projects that have utilized the collection, adding if possible a few words of description and any resulting publications.

9. Does your institution presently hold plates from other institutions?
- No
  - Yes
  - Unknown

10. Does your institution currently have plates out on loan?

- No  
 Yes (If "Yes," do you wish to have these plates returned?  Yes  No)  
 Unknown

11. Have plates from your collection been digitized?

- No, and there are no plans to do so  
 No, but we expect to carry out a digitization project in the future  
 Yes, but only some of the collection (approximately how many? \_\_\_\_\_ )  
 Yes, most of the collection (approximately how many? \_\_\_\_\_ )

If plates have been digitized, briefly provide the following information:

- (a) If the digitization was done recently.  
 (b) What equipment was used (and other relevant details)  
 (c) If the digitized images/spectra accessible to the astronomical community?  
 (d) Who is the primary contact person or persons who could provide more information about the digitized collection.

### Looking to the Future:

12. Does your institution plan to keep its plate archive into the foreseeable future?

- Yes. (Please briefly summarize relevant details below)  
 No. (Please briefly indicate what will happen to the plates, with approximate dates)

13. Would your institution support, in principle, a national archive for astronomical plates?

- No  
 Yes

If "Yes," would your institution participate in a national archive by sending its plates there?

- No  
 Yes, but we have no funds to do so  
 Yes, and we could provide some of the packing and shipping costs

14. Please give a contact name, address and e-mail of whomever should be contacted in the future regarding your plate archive.

### Plate census

Please complete as much of the following table as possible. Rough estimates are satisfactory. "Series" can be used to separate different programs on the same instrument (e.g. parallax series, variable star monitoring) or plate sets taken on different telescopes. Continue on as many pages as necessary and add any information you deem relevant.

SERIES	TELESCOPE	IMAGE or <u>SPECTRA</u>	APPROX. <u>NUMBER</u>	ESTIMATED <u>DATE RANGE</u>	PRESENT <u>CONDITION</u>
_____	_____				

## APPENDIX B: Distribution List for Census

	OBSERVATORY	INSTITUTION	1907 OA	1922-23 AR	1928-29 AR	Kirby- Smith 1976	AA 1991	AA 2000
1	Devon Astronomical Observatory	University of Alberta, Edmonton AB					AA	AA
2	Rothney Observatory	University of Calgary, Calgary AB					AA	AA
3	Dominion Astrophysical Observatory (HIA)	Victoria, BC		AR*	AR*		AA	AA
4	St. Mary's University	Halifax, NS						
5	Elginfield Observatory	Univ. Western Ontario, London, ON						AA
6	McMaster University	McMaster University, Hamilton ON						
	Dominion Observatory	Ottawa, ON	OA	AR*	AR*			
7	David Dunlap Observatory	University of Toronto, Toronto ON	OA*				AA	AA
8	Gustav Bakos Observatory	University of Waterloo, Waterloo ON						
9	University of Montreal	Montreal, QB					AA	AA
10	Observatorio de Tonantzintla y Tacubaya	Tonantzintla, Puebla	OA*	AR	AR		AA	AA
11	University of Alabama Observatory	University of Alabama, University AL				KS	AA	AA
12	Catalina Observatory Steward Observatory	U. Arizona, Tucson AZ				KS*	AA AA	AA
13	Cerro Tololo Inter-American Observatory	NOAO, Tucson, AZ					AA	AA
14	Dept. Earth and Space Exploration	Arizona State University, Tempe AZ						
15	Kitt Peak National Observatory	NOAO, Tucson, AZ				KS	AA	AA
16	Lowell Observatory	Flagstaff AZ	OA*	AR*	AR*	KS*	AA	AA
17	MMT Observatory	MMT Observatory, Amado AZ				KS	AA	AA
18	Northern Arizona University Observatory	Northern Arizona, Flagstaff AZ					AA	AA
19	USNO Flagstaff Station	Flagstaff AZ				KS*	AA	AA
20	Vatican Observatory	U. Arizona, Tucson AZ						AA
21	Astronomy and Astrophysics Dept	University of Calif. Santa Cruz, CA						
22	Brackett Observatory	Pomona College, Claremont CA	OA			KS*		
23	Chabot Observatory	Oakland, CA	OA			KS	AA	AA
24	Department of Astronomy	Calif. Inst. Technology, Pasadena CA						
25	Department of Physics	California State University, Fresno CA						
	Echo Mountain Observatory †	Los Angeles County, CA	OA*					
26	Griffith Observatory	Los Angeles, CA				KS	AA	AA
27	Leuschner (formerly Students) Observatory	U. California, Berkeley CA	OA*	AR	AR	KS	AA	AA
28	Lick Observatory	Mt. Hamilton CA	OA*	AR	AR	KS*	AA	AA
29	Monterey Inst. Research in Astronomy	Monterey, CA					AA	AA
30	Mt. Laguna Observatory	San Diego State Univ., San Diego CA				KS	AA	AA
31	Mt. Wilson Observatory	Carnegie Observatories, Pasadena, CA	OA*	AR*	AR*	KS*	AA	AA
32	Palomar Observatory	Pasadena, CA				KS*	AA	AA
33	Physics and Astronomy Dept.	San Francisco State Univ., CA				KS*		
34	Physics and Astronomy Dept.	University Calif. Los Angeles, CA				KS		
35	Ricard Observatory	Univ. Santa Clara, Santa Clara, CA	OA*			KS		
	OBSERVATORY	INSTITUTION	1907 OA	1922-23 AR	1928-29 AR	Kirby- Smith	AA 1991	AA 2000

						1976		
36	San Fernando Observatory	Cal State Univ. Northridge, CA				KS*	AA	AA
37	Sonoma State Observatory	Sonoma State Univ., Rohnert Park CA				KS		
38	Table Mountain Observatory	Wrightwood, CA				KS	AA	AA
39	Chamberlin Observatory Mount Evans Observatory	Univ. of Denver U., Denver CO	OA			KS	AA	AA
40	Colorado College	Colorado Springs, CO					AA	
41	Sommers-Bausch Observatory	Univ. Colorado, Boulder CO				KS	AA	AA
	Tiara Observatory †	South Park, CO					AA	AA
42	U.S. Air Force Academy Observatory	Colorado Springs CO					AA	AA
43	Observatory	Trinity College	OA					
44	Olin Observatory	Connecticut College, New London CT						
45	Van Vleck Observatory	Wesleyan Univ, Middletown CT	OA	AR	AR	KS*	AA	AA
46	Western Connecticut State Univ. Obs.	WCSU, Danbury CT				KS	AA	AA
47	Yale University Observatory	Yale Univ., New Haven CT	OA	AR*	AR*	KS		
48	Georgetown Univ. Observatory	Washington, DC	OA*					
49	U. S. Naval Observatory	Washington, DC	OA	AR*	AR*	KS	AA	AA
50	Mount Cuba Astronomical Observatory	Greenville, DE				KS*	AA	AA
51	Brevard Community College Observatory	Cocoa, FL					AA	AA
52	Rosemary Hill Observatory	University of Florida, Gainesville FL				KS*	AA	AA
53	Bradley Osbervarory	Agnes Scott College, Decatur GA				KS	AA	AA
54	Mauna Kea Observatory	Univ. Hawaii Manoa, Honolulu HI				KS*	AA	AA
55	Drake University Observatory	Drake University, Des Moines IA	OA*			KS*		
56	Erwin Fick Observatory	Iowa State Univ., Ames IA				KS	AA	AA
57	Grant O Gale Observatory	Grinnell College, Grinnell IA				KS		AA
58	Univ. Iowa Observatory/Hills Observatory	University of Iowa, Iowa City IA	OA			KS	AA	AA
59	Adler Planetarium	Chicago, IL				KS		
60	Behr Observatory/Mark Evans Observatory	Illinois Wesleyan U., Bloomington IL	OA			KS		
61	Henry R. Barber Observatory	Univ. Illinois Springfield IL						
62	Kenwood Observatory	University of Chicago, Chicago IL	OA					
63	Knox College Observatory	Galesburg, IL	OA					
64	Observatory	Wheaton College, Wheaton IL				KS		
65	Prairie Observatory	U. Illinois, Champaign-Urbana IL	OA	AR		KS	AA	
66	Dearborn Observatory Corralitos Observatory	Northwestern University, Evanston IL	OA	AR*	AR*	KS* KS	AA AA	AA AA
67	Dept Astronomy	Ball State Univ., Muncie IN						
68	Goethe Link Observatory Kirkwood Observatory	Indiana University, Bloomington, IN	OA*			KS	AA	AA
69	Holcomb Observatory	Butler University, Indianapolis IN				KS		
70	MacKim Observatory	DePauw University, Greencastle IN	OA			KS		
71	Noblit Observatory	University of Indianapolis, IN						
72	Physics and Astronomy Department	Earlham College, Richmond IN	OA					
73	Valparaiso University Observatory	Valparaiso IN				KS		
74	Clyde Tombaugh Observatory (University of Kansas Observatory)	University of Kansas, Lawrence, KS	OA			KS	AA	AA
75	Zenas Crane Observatory	Washburn University, Topeka, KS					AA	AA
76	Berea College	Berea College, Berea KY				KS*		
77	Moore Observatory	University of Louisville, Louisville KY					AA	AA
	OBSERVATORY	INSTITUTION	1907 OA	1922-23 AR	1928-29 AR	Kirby-Smith 1976	AA 1991	AA 2000
78	Cunningham Observatory	Tulane University, New Orleans LA				KS		

79	Louisiana State University Observatory	Baton Rouge LA				KS*		
80	AAVSO	Cambridge MA						
81	Amherst College	Amherst MA	OA			KS		
82	Boston University Observatory	Boston MA	OA*					
83	Harvard College Observatory Smithsonian Astrophysical Observatory	Cambridge MA	OA*	AR* AR	AR	KS* KS	AA AA	AA
84	Hopkins Observatory	Williams College, Williamstown MA	OA			KS	AA	AA
85	Maria Mitchell Observatory †	Nantucket MA				KS*	AA	AA
	Metcalf Observatory	Private observatory, Taunton, MA	OA*					
86	Smith College Observatory	Northhampton, MA	OA			KS*		
87	Thorton Observatory	Phillips Academy, Andover MA				KS		
88	Tufts University	Medford, MA	OA			KS		
89	Whitin Observatory	Wellesley College, MA	OA			KS	AA	AA
90	Williston Observatory	Mt. Holyoke Col., South Hadley MA	OA*			KS		
91	Johns Hopkins University Observatory	Baltimore MD	OA					
92	Space Telescope Science Institute	Baltimore MD						
93	University of Maryland Observatory	College Park MD				KS*	AA	AA
94	US Naval Academy Observatory	Annapolis MD	OA			KS		
95	Stephens Observatory	Bates College, Lewiston ME						
96	University of Maine	University Maine, Orono ME	OA			KS		
97	Brooks Observatory	Central Michigan Un., Mt. Pleasant MI				KS	AA	AA
98	Department of Astronomy	University of Michigan, Ann Arbor MI	OA	AR*	AR	KS		
99	Michigan State University Observatory	East Lansing, MI				KS	AA	AA
100	Dept of Physics, Astronomy, & Engineering	St. Cloud State Univ., St. Cloud MN						
101	Goodsell Observatory	Carleton College, Northfield MN	OA*	AR*	AR	KS*		
102	O'Brien Observatory	Univ. of Minnesota, Minneapolis MN	OA*			KS	AA	AA
103	Charles Smith Scott Observatory	Park University, Parkville MO	OA					
104	Laws Observatory	University of Missouri, Columbia MO	OA			KS		
105	Morrison Observatory	Central Methodist Univ., Fayette MO				KS	AA	AA
106	Washington University Observatory	St. Louis, MO	OA			KS		
107	Physics and Astronomy Department	University of Montana, Helena MT				KS		
108	Dark Sky Observatory	Appalachian State Univ, Boone NC						
109	Morehead Observatory	U. North Carolina, Chapel Hill NC				KS	AA	AA
110	Pisgah Astronomical Research Institute	Rosman, NC						
111	Three College Observatroy	Univ. No. Carolina Greensboro, NC				KS*	AA	AA
112	Behlen Observaory	University of Nebraska, Lincoln, NE	OA			KS	AA	AA
113	Creighton College Observatory	Creighton University, Omaha NE	OA			KS		
114	Shattuck Observatory	Dartmouth Col., Hanover, NH	OA			KS	AA	AA
115	FitzRandolph Observatory/Halsted Obs.	Princeton U., Princeton NJ	OA	AR	AR	KS	AA	AA
116	Serin Observatory/Schommer Observatory	Rutgers University, Piscataway NJ	OA					
117	Capilla Peak Observatory	U. New Mexico, Albuquerque NM					AA	AA
118	Tortugas Mountain/Tombaugh Observatory	New Mexico State U., Las Cruces NM				KS*	AA	AA

11 9	Department Physics and Astronomy	University of Nevada Las Vegas NV				KS		
12 0	Maclean Observatory	Incline Village, NV					AA	AA
12 1	CHF Peters Observatory	Hamilton College, Clinton NY	OA					
12 2	Dept of Physics, Astron, Engineering	St. Lawrence University, Canton NY						
	OBSERVATORY	INSTITUTION	1907 OA	1922-23 AR	1928-29 AR	Kirby- Smith 1976	AA 1991	AA 2000
12 3	Dudley Observatory	Albany NY	OA	AR	AR	KS	AA	
12 4	Foggy Bottom Observatory	Colgate University, Hamilton NY						
12 5	Harriman Observatory	Harriman NY					AA	
12 6	Hartung-Boothroyd Observatory/Fuertes Ob.	Cornell University, Ithaca, NY	OA			KS	AA	AA
12 7	Hirsch Observatory	Rensselaer Polytechnic Inst., Troy NY	OA			KS		
12 8	Hofstra Observatory	Hofstra University, Hempstead NY						
12 9	Holden Observatory	Syracuse University, Syracuse NY	OA			KS	AA	AA
13 0	Kenneth Mees Observatory	University of Rochester, Rochester NY				KS	AA	AA
13 1	Rutherford Observatory	Columbia University, New York NY	OA*			KS	AA	AA
13 2	Smith Observatroy	Hobart College, Geneva, NY	OA*					
13 3	Stull Observatory (Rogers Observatory)	Alfred University, Alfred NY	OA			KS		
13 4	US Military Academy Observatory	West Point	OA					
13 5	Vassar College Observatory	Poughkeepsie NY	OA*			KS		
13 6	Astronomy Department	Bowling Green State Univ, OH						
13 7	Cincinnati Observatory	Cincinnati, OH	OA*	AR	AR	KS	AA	AA
13 8	Department Physics and Astronomy	Ohio Wesleyan Univ., Delaware OH				KS		
13 9	Elgar Weaver Observatory	Wittenberg Univ., Springfield OH				KS		
14 0	Perkins Observatory/MacMillan Observ.	Ohio State Univ., Columbus, OH	OA			KS	AA	AA
14 1	Ritter Observatory	U. Toledo, Toledo, OH				KS	AA	AA
14 2	Swasey Observatory	Denison University, Granville OH				KS		
14 3	Warner and Swasey Observatory	Case Western Reserve U., Cleveland OH	OA			KS*	AA	AA
14 4	William Chamberlain Gurley Observatory	Marietta College, Marietta OH	OA					
14 5	University of Oklahoma Observatory	Norman, OK				KS*	AA	
14 6	Linfield College Observatory	McMinnville OR	OA					
14 7	Pine Mountain Observatory	University of Oregon, Eugene OR				KS		
14 8	Allegheny Observatory	U. Pittsburgh, Pittsburgh, PA	OA	AR*	AR*	KS*	AA	AA
14 9	Black Moshannon Obseratory	Pennsylvania State U., Univ. Park PA				KS	AA	AA
15 0	Bucknell College	Bucknell College, Lewisburg PA	OA			KS		
15 1	Cole Observatory	Lincoln Univ., Lincoln University PA	OA					

15 2	Dickinson College Observatory	Carlisle, PA	OA			KS		
15 3	Flower and Cook Observatory	U. Pennsylvania, Philadelphia PA	OA			KS	AA	AA
15 4	Franklin Institute Observatory	Philadelphia, PA				KS	AA	AA
15 5	Gettysburg College Observatory	Gettysburg, PA	OA					
15 6	Grundy Observatory	Franklin & Marshall Col., Lancaster PA				KS		
15 7	Kutztown State College Observatory	Kutztown State College, PA				KS	AA	AA
15 8	Lehigh University (has Metcalf papers)	Bethlehem, PA						
15 9	Lynch Observatory	Drexel University, Philadelphia PA				KS		
16 0	Sayre Observatory	Lehigh University, Bethlehem, PA	OA					
16 1	Sproul Observatory	Swarthmore Col., Swarthmore, PA	OA	AR*	AR*	KS*	AA	AA
16 2	Strawbridge Observatory	Haverford College, Haverford, PA	OA			KS	AA	AA
16 3	Traill Green Observatory	Lafayette College, Easton PA						
16 4	Villanova University Observatory	Villanova PA				KS	AA	AA
16 5	Ladd Observatory	Brown Univ., Providence RI	OA			KS	AA	AA
16 6	Melton Memorial Observatory	U. South Carolina, Columbia SC				KS	AA	AA
16 7	Dyer Observatory	Vanderbilt U., Nashville TN	OA			KS*	AA	AA
16 8	Powell Observatory	East Tenn. St. Univ., Johnson City TN						
	OBSERVATORY	INSTITUTION	1907 OA	1922-23 AR	1928-29 AR	Kirby- Smith 1976	AA 1991	AA 2000
16 9	McDonald Observatory /On-campus observ.	University of Texas, Austin TX	OA			KS*	AA	AA
17 0	Sam Houston State Univ. Observatory	Huntsville TX						
17 1	Stephen F. Austin State Univ. Observatory	Nacogdoches TX						
17 2	Texas Christian University Observatory	Fort Worth TX				KS		
17 3	Univ. Texas - Pan American Observatory	Edinburg TX				KS	AA	
17 4	Astronomy Department	Brigham Young Univ., Provo UT				KS		
17 5	Leander McCormick Observatory Leander McCormick Observing Station	University of Virginia, Charlottesville VA	OA	AR*	AR*	KS* KS*	AA AA	AA AA
17 6	Department of Astronomy	Whitman College, Walla Walla WA						
17 7	Jewett Observatory	Washington State Univ., Pullman WA				KS		
17 8	Manastash Ridge Observatory	U. Washington, Seattle, WA				KS	AA	AA
17 9	Rattlesnake Mountain Observatory	Richland, WA				KS	AA	
18 0	Astronomical Observatory	Marquette Univ. Milwaukee WI						
18 1	Pine Bluff Observatory Washburn Observatory	U. Wisconsin, Madison WI	OA	AR	AR	KS KS	AA AA	AA AA
18 2	Thompson Observatory	Beloit College, Beloit WI	OA			KS	AA	AA
18 3	Underwood Observatory	Lawrence University, Appleton WI	OA					
18 4	Yerkes Observatory	Williams Bay WI	OA*	AR*	AR*	KS*	AA	AA

4								
18								
5	Wyoming Infrared Observatory	University of Wyoming, Laramie WY					KS	AA AA

\* Mention of photographic work

† Observatory no longer exists and no successor institution identified. No survey sent.

INDIVIDUAL ASTRONOMERS		
186	Serge Demers	University of Montreal
187	Hyron Spinrad	University of California Berkeley
188	Leo Connolly	California State Univ. San Bernardino
189	John Graham	Carnegie Institute - DTM
190	Ann Merchant Boesgard	University of Hawaii
	Brent Tully*	University of Hawaii
191	George Herbig, astronomer	University of Hawaii
	Karen Meech*	University of Hawaii
	Richard Wainscoat*	University of Hawaii
192	Thom Robertson	Ball State University
193	Arlo Landolt	Louisiana State University
	Jay Pasachoff *	Williams College
194	John Briggs	Dexter/Southfield Schools, Brookline MA
195	Ken Janes	Boston University
196	D. Jack, MacConnell	Space Telescope Science Institute
197	Howard Bond	Space Telescope Science Institute
198	Wayne Osborn	Central Michigan Univ (retired)
199	Donna Weistrop	University of Nevada Las Vegas
200	George McCluskey	Lehigh University
201	J. Ward Moody	Brigham Young University
202	Benjamin Taylor	Brigham Young University
203	D. H. McNamara	Brigham Young University
204	Ivan King	U. Washington

\*Unsolicited response returned

## APPENDIX C. Brief descriptions of major North American plate collections

The listings are arranged geographically: by country, state or province and then city.

### CANADA

#### Dominion Astrophysical Observatory (DAO), Victoria BC

Collections: DAO 1.8-m telescope: 93,000 spectra 1918-1995; 500 direct plates 1935-1950  
 DAO 1.2-m telescope: 16,000 spectra 1961-1998  
 Dominion Observatory Ottawa spectra: 17,000 spectra 1905-1937

Plate information: Paper records only

Loans: Yes to qualified researchers

Want loaned plates returned: Yes

Contact: Dr. Elizabeth Griffin (Elizabeth.Griffin@nrc.gc.ca)

Notes: Hoping to establish a Spectroscopic Scanning Laboratory, a facility dedicated to digitizing spectroscopic plates.

#### David Dunlap Observatory (DDO), University of Toronto, Toronto ON

Collections: DDO 1.88-m telescope: 56,000 spectra 1935-1989; 1000 direct plates 1936-1972  
 DDO 0.4-m telescope: 3,000 images 1964-1972  
 DDO 0.6-m telescope: 3000 spectra, 10,000 direct plates

Plate information: Paper records only

Loans: Yes to qualified researchers

Want loaned plates returned: Yes

Contact: Lee Robbins (robbins@astro.utoronto.ca)

Notes: Most of the direct plates are of globular clusters

#### Dominion Observatory, Ottawa, ON

17,000 spectra taken 1905-1937 are now at Dominion Astrophysical Observatory, Victoria, but log books for 1905-1915 are missing.

#### Elginfield Observatory, University of Western Ontario, London ON

Collections: 1.2-m telescope: 1783 direct plates 1969-1991; 2518 spectra 1969-1974  
 8/12-inch Schmidt: 531 images on film 1955-1974

Plate information: Paper records only

Loans: Yes to qualified researchers

Want loaned plates returned: Yes

Contact: James Moorhead (Moorhead@uwo.ca)

### MEXICO

#### Observatorio de Tonantzintla, Tonanzintla, Puebla

This observatory is known to have had plates taken with a Schmidt camera and for the Tacuyaba zone of the Astrographic Catalog.

## UNITED STATES

Lowell Observatory, Flagstaff AZ

Collections: 33-cm Pluto camera: 10,000 direct plates 1929-1989  
 60-cm refractor: 4000 spectrograms in early 1900's by Slipher  
 Comets photographs with various lenses: 250 direct plates 1905-1920  
 12.5-cm Brashear refractor: 250 direct plates by Lowell 1905-1907, 100 direct plates of second Pluto search 1911-1916  
 22-cm Swarthmore camera: 600 second Pluto search direct plates 1911-1916  
 1-m telescope: 500 direct plates for second Pluto search 1911-1916 plus Lampland's 3000 plates of galaxies, nebulae, clusters; 400 plates of NGC 2261, 750 Pluto plates 1930-1951, 50 plates of Uranus 1914-  
 Lowell 20-cm f/1 Schmidt: 500 3-inch diameter films  
 Cogshall 12.5-cm lens: 1200 direct plates of early Pluto camera fields  
 Giclas parallax series with Perkins 1.8-m and Hall 1.1-m reflectors: 250 direct plates  
 45-cm f/8 astrograph: 250 direct plates  
 Goethe Link Observatory (Indiana U.) 25-cm astrograph: 6000 plates 1946-  
 Palomar Observatory 18-inch Schmidt: 25,000 images to V~18  
 1-m f/7 USNO-Flagstaff reflector: 3000 direct plates by Roemer  
 60-cm/f3.5 Burrell and Curtis Schmidts: 1700 objective prism plates by Houk

Plate information: Machine-readable catalogues available for many of the collections. Some available on the web (<http://www.lowell.edu/Research/library/>)

Loans: Yes to qualified researchers

Want loaned plates returned: No plates currently on loan

Contact: Brian Skiff ([bas@lowell.edu](mailto:bas@lowell.edu))

United States Naval Observatory – Flagstaff Station (USNOFS), Flagstaff, AZ

Collections: 61-inch astrometric reflector: 1,650 plates of various objects, including full moon  
 40-inch reflector: 900 4x5-in images 1955-1965, some spectra, 120 test plates

Notes: Information from e-mail from Conard Dahn; census survey not returned. Many plates taken at Flagstaff were shipped to U.S. Naval Observatory, Washington

Cerro Tololo Inter-American Observatory (CTIO), La Serena, Chile (AURA, Tucson AZ)

Collections: Direct plates, objective prism plates and spectra from 4-m, 1.5-m, 0.6/0.9-m Schmidt telescopes

Plate information: Partial catalogue available in electronic form

Loans: Plates currently at CTIO are only available for use on-site

Want loaned plates returned: Yes

Contact: CTIO Director (Casilla 603, La Serena, Chile)

Notes: Most of the plates taken at CTIO have been retained by the observers or deposited at PARI

Kitt Peak National Observatory (KPNO), AURA, Tucson AZ

Collections: 8000 direct plates, 4000 objective prism plates, 10,000 slit spectra and 1000 miscellaneous plates taken with KPNO telescopes (4.0-m, 2.1-m, 0.9-m)

Plate information: Partial catalogue available in electronic form

Loans: Plates currently at CTIO are only available for use on-site

Want loaned plates returned: Yes

Contacts: Bill Schoening ([Schoen@noao.edu](mailto:Schoen@noao.edu)) for direct plates

Helmut Abt ([abt@noao.edu](mailto:abt@noao.edu)) for spectra

Notes: Some of the plates taken at CTIO have probably been retained by the observers.

Steward Observatory, University of Arizona, Tucson AZ

Collection: About 3000 direct plates, 50 objective prism plates and about 100 spectrograms

Plate information: Paper records only

Loans: Plates are available for use but only on-site

Contact: Thomas Fleming ([taf@as.arizona.edu](mailto:taf@as.arizona.edu))

Notes: As far as is known, the information includes all observational facilities operated by the University of Arizona

Leuschner Observatory, University of California, Berkeley CA

Collection: 11 direct plates of miscellaneous objectd.

Plate information: Paper records only

Loans: Plates are available for use but only on-site

Contact: Robert Magtibay ([Magtibay@astro.berkeley.edu](mailto:Magtibay@astro.berkeley.edu))

Monterey Institute for Research in Astronomy (MIRA), Monterey CA

Collection: Warner and Swasey Schmidt: 300 direct and objective prism plates 1940-1970's

CTIO Curtis Schmidt: 600 direct and UV objective prism images 1970's

Plate information: Paper records only

Loans: Plates are available for use but only on-site

Contact: Bruce Weaver ([bw@mira.org](mailto:bw@mira.org))

Note: In a telephone call Weaver mentioned there are also a few plates taken with the MIRA telescope.

Lick Observatory, University of California, Mt. Hamilton CA

Collections: 36-inch refractor: 16,000 direct plates 1888-2004; 93,000 spectra 1888-1962

20-inch double astrograph: 11,000 plates 1939-1989

36-inch reflector: 3600 direct plates 1890-1980; 4600 spectra 1935-1960, 1980's

3-m reflector: 4000 direct plates 1959-1989, 2100 prime spectra and 19,000 Coudé spectra 1959-1978

Eclipse images: 200 1880's – 1920's

CAT 24-inch: 8000 spectra 1971-1983

Various: 16,600 direct plates and spectra

Plate information: Paper records only

Loans: Yes to qualified researchers

Want loaned plates returned: Yes

Contact: Elinor Gates ([egates@ucolick.org](mailto:egates@ucolick.org))

San Fernando Observatory (SFO), California State University Northridge, Northridge CA

Collection: 100,000 solar images with 61-cm and 28-cm vacuum telescopes

Plate information: Paper records only

Loans: Yes to qualified researchers

Contact: Gary Chapman ([gchapman@csun.edu](mailto:gchapman@csun.edu)) or Angie Cookson ([acookson@csun.edu](mailto:acookson@csun.edu))

Palomar Observatory, California University of Technology, Palomar Mountain CA

Collections: 200-inch reflector: 2100 direct plates; 5500 spectra 1949-1985?

48-inch Schmidt: 4600 POSS I and POSS II plates, 12,700 other plates

18-inch Schmidt: 4300 images on film 1936-1978?

Plate information: Paper records only

Loans: Yes to qualified researchers

Want loaned plates returned: Yes

Contact: Jean Mueller ([jem@astro.caltech.edu](mailto:jem@astro.caltech.edu))

Notes: POSS images available on the web

Carnegie Observatories, Pasadena CA

Collections: Rough estimates of 150,000 direct plates, 150,000 spectrograms and 200,000 solar images. Non-solar plates are from Mt. Wilson 60-inch and 100-inch reflectors (direct plates and spectra), Palomar 200-inch reflector (direct plates and spectra), Palomar 60-inch reflector (direct plates), Palomar 48-inch Schmidt (direct plates), Las Campanas 100-inch and 40-inch reflectors (direct plates)

Plate information: Presently mainly on plate envelopes. An electronic catalogue is in the process of being compiled

Loans: Yes to qualified researchers

Want loaned plates returned: No answer on survey form

Contact: George Carlson ([ngc598@earthlink.net](mailto:ngc598@earthlink.net))

Mt. Laguna Observatory, San Diego State University, San Diego CA

Collection: Mt. Laguna 40-inch reflector: 72 direct plates, 100 spectra

USNO Flagstaff 40-inch and 61-inch telescopes: 200 direct plates

IGY moon observations: 28 direct plates of moon

Patrol camera plates from New Mexico: 200 direct plates taken about 1974

KPNO telescopes: 2000 slit spectra

Plate information: Paper records only

Loans: Plates are available for use but only on-site

Want loaned plates returned: No

Contact: Paul Etzel ([etzel@saciencies.sdsu.edu](mailto:etzel@saciencies.sdsu.edu))

Table Mountain Observatory, Jet Propulsion Laboratory, Wrightwood CA

Collection: 0.4-m reflector: 2000 images and 200 spectra from planetary patrol, 100 spectra of telluric lines

Plate information: Paper records only

Loans: Plates are available for use but only on-site

Contact: James Young ([james.w.young@jpl.nasa.gov](mailto:james.w.young@jpl.nasa.gov))

Chamberlain Observatory, University of Denver, Denver CO

Collection: 20-inch f/15 refractor: about 20 images, mainly of comets about 1895-1920

Plate information: Paper records only

Loans: Plates are available for use but only on-site

Contact: Robert Stencel ([rstencel@du.edu](mailto:rstencel@du.edu))

Van Vleck Observatory, Wesleyan University, Middletown CT

Collection: 20-inch refractor: 20,000 direct plates of about one degree field 1925-1995

Plate information: Paper records only

Loans: Yes to qualified researchers

Want loaned plates returned: No plates currently on loan

Contact: William Herbst ([wherbst@wesleyan.edu](mailto:wherbst@wesleyan.edu))

Yale University, New Haven CT

Collections: 26-inch refractor: 70,000 parallax and 200 cluster plates 1920-1962

Double astrograph: 3000 proper motion and 90 Magellanic cloud plates 1965-1996

Miscellaneous: 10000 direct plates 1900-1965, 1000 Yale Zone plates 1920-1950?

1-m reflector: 1000 direct plates

Plate information: Paper records only

Loans: Yes to qualified researchers

Plates on loan: Want loaned plates returned: Yes

Contact: William van Alten ([vanalten@astro.yale.edu](mailto:vanalten@astro.yale.edu))

United States Naval Observatory (USNO), – Washington DC

Collections: 61-inch astrometric reflector: 50,000 direct plates 1976-1996

Hamburg/Bonn AGK2 plates: 2300 direct plates 1930-1933

Astrograph plates: 3500 direct plates 1976-1996 from 3 instruments

Double star plates: 8500 multiple-exposure plates from eight observatories

40-inch reflector: 400 direct plates

Washington PZT: 6000 direct plates 1915-1984

Spectra: 150 (from 26-inch refractor?)

10-inch photographic telescope: 2000 direct plates 1920-1930

Eclipse plates: 300

Major and minor plate plates: 450 direct plates 1903-1940

Moon camera: 860 direct plates

Plate information: A computer-readable catalogue for some, others paper records only

Loans: Plates are available for use but only on-site

Contact: Brian Mason ([bdm@usno.navy.mil](mailto:bdm@usno.navy.mil))

Notes: Work is underway to transfer this collection toPARI

Rosemary Hill Observatory, University of Florida, Gainesville FL

Collection: 30-inch reflector: 9400 direct plates 1968-1990 from QSO and AGN monitoring

Plate information: Paper records only

Loans: Plates are available for use but only on-site

Contact: Francisco Reyes ([reyes@astro.ufl.edu](mailto:reyes@astro.ufl.edu))

Notes: The institution wishes to deposit the plates in an archive as soon as possible

Special Collections Research Center, University of Chicago, Chicago Illinois

Collection: An unknown number of astronomical plates that had been transferred from Yerkes were reported. A follow up telephone call revealed that most seem to be copies of the original plates, which are likely still at Yerkes.

Loans: Plates can be used only in the archives.

Contact: Daniel Meyer (arch@uchicago.edu)

Dearborn Observatory, Northwestern University, Evanston IL

Collection: An estimated 20 direct plates 1959-1965 and 75 slit spectra 1930-1940 are held in the Northwestern University Archives.

Plate information: Paper records only

Loans: Plates can be used only in the archives.

Contact: Kevin Leonard (archives@welles.library.northwestern.edu)

Notes: No plates are held by the Observatory. About 10 direct plates and 260 red objective prism plates with 10.5-inch camera 1936-1947 are archived at Yerkes Observatory

Prairie Observatory and University of Illinois Observatory, University of Illinois, Urbana IL

Collections: 40-inch reflector: 500 direct plates 1969-1980 and 600 slit spectra 1970-1985

12-inch on-campus refractor: 270 direct plates 1958-1964 by students

Plate information: Paper records only

Loans: Yes to qualified researchers

Contact: Ed Olson (olsomed@astro.uiuc.edu)

Notes: About 1200 direct plates and 55 red objective prism plates with 10.5-inch camera 1936-1947 transferred to Yerkes Observatory in 2007. Electronic catalogue exists for these.

Ball State University Physics and Astronomy Dept., Ball State University, Muncie IN

Collection: Burrell Schmidt: 140 direct plates and objective prism spectra 1977, 1984-1986

CTIO Curtis Schmidt: 28 direct plates and objective prism spectra 1984-1986

Plate information: Paper records only

Loans: Plates are available for use but only on-site

Contact: Thomas Roberson (trobertson@bsu.edu)

Erwin Fick Observatory, Iowa State University, Ames IA

Collection: From a telephone call, there are a few spectra of bright stars used to make masks for a Giffin-type radial velocity spectrometer

Contact: Joe Eitter

Drake Municipal Observatory, Drake University, Des Moines IA

Collection: 8-inch refractor: 500 direct plates 1920-1970

Plate information: A computer readable catalogue exists

Loans: Yes to qualified researchers

Contact: Charles Nelson (charles.nelson@drake.edu)

Clyde Tombaugh Observatory, University of Kansas, Lawrence KS

Collection: From a telephone call, there are some plates (mainly from other observatories)

Contact: Steve Shawl (shawl@ku.edu)

Louisiana State University, Baton Rouge LA

Collection: Several dozen direct plates  
 Plate information: Paper records only  
 Loans: Plates are available for use but only on-site  
 Contact: Arlo Landolt (landolt@rouge.phys.lsu.edu)

Harvard College Observatory, Cambridge MA

Collections: Harvard Observatory northern fields (Series AC, AI, AM, AX, AY, BM, C, DNB, FA, H, I, IR, J, MA, MB, MC, MD, RH, RL, SH) and southern fields (series A, AC, AM, AX, B, BR, DSB, MF, RB, SB, SH, X), see web page <http://tdc-www.harvard.edu/plates/plates.html>): 485,000 direct plates and objective prism plates, 100 spectrograms.  
 3-inch Ross camera in South Africa RB Series): 17000 plates 1928-1963  
 32/36-inch Armagh-Dunsink-Harvard (ADH) Schmidt: 7000 plates 1950-63  
 Radcliff College (R series): 320 direct plates 1937-1958  
 Metcalf Observatory (Taunton MA; MA series): Included under Harvard Observ.  
 Plate information: Some series web accessible at <http://tdc-www.harvard.edu/plates/plates.html>  
 Loans: Plates are available for use but only on-site  
 Contact: Alison Doane ([adoane@cfa.harvard.edu](mailto:adoane@cfa.harvard.edu))

Maria Mitchell Observatory, Nantucket MA

Collection: 7.5-inch refractor: 8000 direct plates 1913-1995  
 Plate information: A web-based searchable catalog exists ([www.aas.org/~pboyce/mma/plates.htm](http://www.aas.org/~pboyce/mma/plates.htm))  
 Loans: Yes to qualified researchers  
 Contact: Vladimir Strel'nitski ([vladimir@mmo.org](mailto:vladimir@mmo.org))  
 Note: The entire collection has been digitized.

Michigan State University Observatory, East Lansing MI

Collection: 24-inch reflector: 1300 direct plates 1970-1990  
 Plate information: Paper records only  
 Loans: Yes to qualified researchers  
 Contact: Horace Smith ([smith@pa.msu.edu](mailto:smith@pa.msu.edu))  
 Note: No census form returned. This information from private knowledge.

University of Minnesota, Minneapolis MN

Collection: 10-inch refractor: 415 direct plates 1897-1946.  
 Plate information: web page (<http://etacar.umn.edu/~martin/teninch/catalog.html>)

Three College Observatory, University of North Carolina Greensboro, NC

Collection: 0.81-m telescope: 50 direct plates 1981-1985  
 Plate information: Paper records only  
 Loans: Yes to qualified researchers  
 Contact: Steve Danford ([danford@uncg.edu](mailto:danford@uncg.edu))

Pisgah Astronomical Research Institute (PARI), Rosman NC

Collections: University of Michigan 37.5-inch reflector: 20,000 spectra 1911-1963  
 CTIO Curtis Schmidt: 3500 direct plates and objective prism plates 1968-1986  
 Warner and Swasey 24-inch Schmidt: 22,000 direct and objective prism plates  
 1944-1992; later images from KPNO)  
 SAO meteor patrol: 56000 wide field images on molded film 1952-1975  
 250 spectra of various dispersions from CTIO, ESO, KPNO, Mount Mégantic, Mt.  
 Palomar  
 220 direct and objective prism plates from AAT, CMU, Mauna Kea, Mt. Palomar  
 (5-m, 48-inch Schmidt, and 18-inch Schmidt), Tonantzintla, USNOFS (40-inch)

Plate information: Partial information is available on the web:

<http://www.pari.edu/library/astronomical-plate-center>)

Loans: Plates are available for use but only on-site

Contact: Thurburn Barker ([tbarker@pari.edu](mailto:tbarker@pari.edu))

Note: PARI has established an archive for unwanted plates and the collection is steadily growing. The above numbers are as of April 2008.

Foggy Bottom Observatory, Colgate University, Hamilton NY

Collection: 16-inch f/4 reflector: 500 direct plates 1960-1985

Plate information: Paper records only

Loans: Plates are available for use but only on-site

Contact: Thomas Balonek ([tbalonek@mail.colgate.edu](mailto:tbalonek@mail.colgate.edu))

Note: Plates are of random objects taken for teaching purposes

Perkins Observatory, Ohio Wesleyan University and Ohio State University, OH

Collection: An unspecified number of plates and spectra were reported to be at the Perkins Observatory, OH. Over 8000 slit spectrograms transferred to Yerkes in 2007. A few plates may remain at Ohio State.

Plate information: Paper records only

Loans: Yes to qualified researchers

Contact: Don Stevens ([perkins@owu.edu](mailto:perkins@owu.edu))

Notes: The 69-inch Perkins Observatory telescope was put in operation in 1931 by Ohio Wesleyan University in 1931 in Delaware OH. Ohio State University was a co-operator of the instrument 1935-1998. The telescope was moved to Arizona in 1961, and was upgraded to a 72-inch mirror in 1964. The census was sent to both Ohio State University and Ohio State University and this summary incorporates both responses.

Ritter Observatory, University of Toledo, Toledo OH

Collection: 1.0-m reflector: 200 low resolution and 100 echelle spectra

Plate information: Paper records only

Loans: Yes to qualified researchers

Contact: Nancy Morrison([NMorris@UYNet.UToledo.Edu](mailto:NMorris@UYNet.UToledo.Edu))

Allegheny Observatory, University of Pittsburgh, Pittsburgh PA

Collections: 30-inch Thaw refractor: 115,500 direct plates 1914-1986  
 30-inch Keeler reflector: 8,000 spectra 1906-1936, 7000 spectra 1960-1975  
 Miscellaneous: 3,000 spectra  
 Plate information: A computer-readable catalogue exists  
 Loans: Plates are available for use but only on-site  
 Contact: Lou Coban (coban@pitt.edu)

Sproul Observatory, Swarthmore College, Swarthmore PA

Collection: 61-cm f/18 refractor: 80,000 direct plates (many with multiple exposures)  
 Plate information: Paper records only  
 Loans: .Yes to qualified researchers  
 Contact: Eric Jensen (ejensen1@swarthmore.edu)

Dyer Observatory, Vanderbilt University, Nashville TN

Collection: 24-inch: 2720 direct plates; 1550 objective prism plates 1953-?  
 Plate information: Paper records only  
 Loans: Yes to qualified researchers  
 Contact: Arnie Heiser (a.heiser@vanderbilt.edu)

McDonald Observatory, University of Texas, Austin TX

Collection: About 2000 direct plates and 175 slit spectrograms. Most are likely from the 2-7-m reflector, but others are mixed in.  
 Plate information: Paper records only  
 Loans: Yes to qualified researchers  
 Contact: Anita Cochran (anita@barolo.as.utexas.edu)  
 Notes: McDonald Observatory is located on the Davis Mountains in west Texas. Observatory originally operated jointly with the University of Chicago and most of the early plates are archived at Yerkes.

Leander McCormick Observatory, University of Virginia, Charlottesville VA

Collection: 26-inch refractor: 50,000 direct plates 1914-1995  
 26-inch Yale-Columbia refractor: 6000 southern direct plates 1977-1992  
 10-inch astrograph: 4000 objective prism plates 1930-1950  
 40-inch Fan Mountain reflector: 1000 direct plates 1970-1990  
 Mitchell solar telescope: several dozen direct plates and spectra 1900-1940  
 Plate information: Machine-readable catalogues available for some of the collections.  
 Loans: Yes to qualified researchers  
 Contact: Ricky Patterson (rjp0i@virginia.edu)

Yerkes Observatory, University of Chicago

Collections: 40-inch refractor: 30,000 direct plates; 35,000 spectra  
 24-inch reflector: 15,000 direct plates and 9,000 spectra 1900-1930  
 Solar direct plates and spectroheliograms (various telescopes): 18,000 in 1892-1940  
 McDonald Observatory 82-inch: 4200 direct plates and 24,000 spectra 1940-1965  
 Dearborn Observatory 10.5-inch camera: 270 mostly objective prism 1937-1947  
 University of Illinois 4-inch Ross camera: 1050 direct plates 1939-1980  
 Ohio State University Perkins Observatory: 8000 spectra 1940-1970  
 20,000 direct plates and 8000 spectra from other telescopes and observatories

Plate information: Mostly paper records only. Electronic catalogues being prepared for a few plate series

Loans: Yes to qualified researchers

Contact: Kyle Cudworth ([kmc@yerkes.uchicago.edu](mailto:kmc@yerkes.uchicago.edu))

Notes: A small number of plates may be in the Special Collections of the University of Chicago Library.

NO PLATE COLLECITON (arranged by state and province)

MMT (former Multiple Mirror Telescope) Observatory, Amado AZVatican Observatory Research Group, Tucson AZCalifornia Institute of Technology Department of Astronomy, Pasadena CA

Plates formerly held on campus have been transferred to Mt. Palomar.

Olin Observatory, Connecticut College, New London CTTrinity College Observatory, Hartford CTInstitute for Astronomy, University of Hawaii, Honolulu HI

No institutional plate collection, but a number of astronomers have personal collections.

Goethe Link Observatories, University of Indiana, Bloomington IN

6000 plates from the 25-cm astrograph were transferred to Lowell Observatory in 1987. A few staff members have individual collections.

McKim Observatory, DePauw University, DePauw INHolcomb Observatory, Butler University, Indianapolis IN

University archives has some astronomical glass plates but these appear to all be commercial lantern slides used in instruction.

Noblit Observatory, University of Indianapolis, Indianapolis IN  
University archives responded “they could be of no help.” Assumed this means they have no plates.

Earlham College Observatory, Richmond IN  
Telescope was placed in operation in 1861.

Grant O. Gale Observatory, Grinnell College, Grinnell IA

University of Iowa Observatory, Iowa City IA

Cunningham Observatory, Tulane University, New Orleans LA

Jordan Observatory, University of Maine, Orono ME

Johns Hopkins University Observatory, Baltimore MD  
University Archives reports no plate collection.

Space Telescope Science Institute, Baltimore MD  
All plates held by the institution were transferred to Harvard in 2008. Several astronomers have personal collections.

Wilder Observatory, Amherst College, Amherst MA

Thorton Observatory, Phillips Academy, Andover MA

Coit Observatory, Boston University, Boston MA  
One astronomer has a personal collection.

American Association of Variable Star Observers, Cambridge MA

Hopkins Observatory, Williams College, Williamstown MA  
Apparently no institutional collection, but observatory director has a small personal one.

Brooks Observatory, Central Michigan University, Mt. Pleasant MI  
86 direct plates 1979-2003 transferred to PARI in 2005, mostly from 35-cm Schmidt Cassegrain

St. Cloud State University Department of Physics and Astronomy, St. Cloud MN

Crow Observatory, Washington University, St. Louis MO

Creighton University, Omaha NE  
Telescope in operation in 1886. Creighton University archives reported they have no collection of astronomical photographs.

University of Nevada Las Vegas Department of Physics and Astronomy, Las Vegas NV

FitzRandolph Observatory, Princeton University, Princeton NJ

CHF Peters Observatory, Hamilton College, Clinton NY  
Observatory in existence 1859-1918 but apparently only used visually.

Hartung-Boothroyd Observatory, Cornell University, Ithaca NY

Rutherford Observatory, Columbia University, New York NY  
The Columbia University Astronomy Department reports no plate collection. John Briggs (Clay Science Center, Brookline MA) has about 200 very early plates (1868-1870's)

Holden Observatory, Syracuse University, Syracuse NY

Bowling Green State University Observatory, Bowling Green OH

William Chamberlain Gurley Observatory, Marietta College, Marietta OH

Pine Mountain Observatory, University of Oregon, Eugene OR

Linfield College Observatory, McMinnville OR

Traill Green Observatory, Lafayette College, Easton PA  
Observatory in existence 1864-1929. College archives report no institutional plate collection.

Gettysburg College Observatory, Gettysburg PA

Strawbridge Observatory, Haverford College, Haverford PA

Grundy Observatory, Franklin and Marshall College, Lancaster PA

Powell Observatory, East Tennessee State University, Johnson City TN

Texas Christian University Observatory, Fort Worth, TX

SFASU Observatory, Stephen F. Austin State University, Nacogdoches TX

Brigham Young University Department of Physics and Astronomy, Provo UT  
One astronomer has a small personal collection.

Washburn Observatory, University of Wisconsin, Madison WI  
No plate collection from any of the University of Wisconsin Observatories (including Pine Bluff)

Wyoming Infrared Observatory (WIRO), Laramie WY  
No plate collection from any of the University of Wyoming Observatories.

#### APPENDIX D. List of selected research papers since 2000 that utilized plate material

Semkov, E. H.; et al. : [2008A&A...483..537S](#)

A long-term photometric study of V 1184 Tauri

Wu, K.; Kiss, L. L.: [2008A&A...481..433W](#)

High and low states of the system AM Herculis

Meaburn, J.; Lloyd, M.; Vaytet, N. M. H.; López, J. A.: [2008MNRAS.385..269M](#)

Hubble-type outflows of the high-excitation poly-polar planetary nebula NGC 6302 - from expansion proper motions

Henze, M.; Meusinger, H.; Pietsch, W.: [2008A&A...477...67H](#)

A systematic search for novae in M 31 on a large set of digitized archival Schmidt plates

Fresneau, A.; Vaughan, A. E.; Argyle, R. W.: [2007A&A...469.1221F](#)

Sydney observatory Galactic survey. Potential for detection of extreme disk-crossing stars

Nesci, R.; Mandalari, M.; Gaudenzi, S.: [2007AJ....133..965N](#)

Optical Variability of the Strong-lined and X-Ray-bright Source 1WGA J0447.9-0322

Berdnikov, Leonid N.; et al. : [2007PASP..119...82B](#)

A Search for Evolutionary Changes in the Periods of Cepheids Using Archival Data from the Harvard Observatory Plate Collection. III. GY Sagittae

Chen, L.; de Grijs, R.; Zhao, J. L.: [2007AJ....134.1368C](#)

Mass Segregation in Very Young Open Clusters: A Case Study of NGC 2244 and NGC 6530

Szabados, L.; Kiss, L. L.; Derekas, A.: [2007A&A...461..613S](#)

The anomalous Cepheid XZ Ceti

Vieira, Katherine; et al.: [2007AJ....134.1432V](#)

Proper Motions in the Galactic Bulge: Plaut's Window

Turner, David G.; et. al.: [2006PASP..118.1533T](#)

The Long-Term Behavior of the Semiregular M Supergiant Variable BC Cygni

Aspin, Colin; et. al.: [2006AJ....132.1298A](#)

The 1966-1967 Outburst of V1647 Orionis and the Appearance of McNeil's Nebula

Fröhlich, H.-E.; Kroll, P.; Strassmeier, K. G.: [2006A&A...454..295F](#)

The RS CVn binary HK Lacertae: long-term photometry from Sonneberg sky-patrol plates

Bochanski, John J.; et al.: [2005AJ....130.1871B](#)

Spectroscopic Survey of M Dwarfs within 100 Parsecs of the Sun

Deacon, Niall R.; et al.: [2005AJ...129..409D](#)

The Solar Neighborhood. XI. The Trigonometric Parallax of SCR 1845-6357

Nesci, R.; Massaro, E.; Rossi, C.; Sclavi, S.; Maesano, M.; Montagni, F.: [2005AJ...130.1466N](#)

The Long-Term Optical Variability of the BL Lacertae Object S5 0716+714: Evidence for a Precessing Jet

Schaefer, Bradley E. [2005ApJ...621L..53S](#)

A Test of Nova Trigger Theory

Omizzolo, A.; Barbieri, C.; Rossi, C. [2005MNRAS.356..336O](#)

3C 345: the historical light curve (1967-1990) from the digitized plates of the Asiago Observatory

Subasavage, John P.; et al.: [2005AJ...130.1658S](#)

The Solar Neighborhood. XV. Discovery of New High Proper Motion Stars with  $\mu \geq 0.4'' \text{ yr}^{-1}$  between Declinations  $-47^\circ$  and  $00^\circ$

Subasavage, John P.; et al. : [2005AJ...129..413S](#)

The Solar Neighborhood. XII. Discovery of New High Proper Motion Stars with  $\mu \geq 0.4'' \text{ yr}^{-1}$  between Declinations  $-90^\circ$  and  $-47^\circ$

Innis, J. L.; Borisova, A. P.; Coates, D. W.; Tsvetkov, M. K.: [2004MNRAS.355..591I](#)

Archival light curves from the Bamberg Sky Patrol: CF Octantis, 1964-76

Samec, Ronald G.; Faulkner, Danny R.; Williams, David B.: [2004AJ...128.2997S](#)

The Physical Nature and Orbital Behavior of V523 Cassiopeiae

Vogt, N.; Kroll, P.; Splittgerber, E.: [2004A&A...428..925V](#)

A photometric pilot study on Sonneberg archival patrol plates. How many "constant" stars are in fact long-term variables?

Berdnikov, L. N.; et al.: [2004PASP..116..536B](#)

A Search for Evolutionary Changes in the Periods of Cepheids Using Archival Data from the Harvard Observatory Plate Collection. II. V1496 Aquilae

Dinescu, Dana I.; Keeney, B. A.; Majewski, S. R.; Girard, T. M.: [2004AJ...128..687D](#)

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