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THE WIDE-FIELD PLATE ARCHIVES IN EUROPE

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Abstract. We examine the wide-field plate archives located in Europe and included in the Wide-Field Plate Database. The total number of wide-field plates stored in 231 archives in Europe (including all former Soviet Union republics) is estimated at ~ 1 140 000 or 56% of all known wide-field plates in the world. Distributions of the number of plates by European regions and countries, and as a function of the instrument aperture are given. The possibilities for plate digitization are discussed.

1. INTRODUCTION

The first attempt for the creation of an inventory of the astronomical plates obtained world-wide was made by Hauck (1982a, 1982b). He sent questionnaires to 48 observatories, 42 of which answered and 32 reported about the situation of the possessed plate archives and the conditions of plate storage. On the basis of these questionnaires the total number of plates, independent of the field size, was estimated at ~ 1.5 x 10^6. Only in 9 cases the log books for the archived plates were prepared in a computer-readable form. Most of the inquired observatories supported a centralization of the information about plate archives. Later Jaschek (1988, 1989) continued the work on the plate inventory creation by summarizing information from 70 observatories. He estimated the total number of plates at more than 1.5 x 10^6 and concluded that 50% of all existing plate archives were in Europe.

In 1991 in the frames of Commission 9 Working Group on Wide-Field Imaging (later Working Group on Sky Surveys) of the IAU began the preparation in Sofia of the Wide-Field Plate Database (WFPDB, Tsvetkov 1992, Tsvetkov *et al.* 1998). The WFPDB contains (1) a catalogue of all known archives of wide-field (> 1°) plates and (2) a merged catalogue of wide-field plates.

The last version of the Catalogue of Wide-Field Plate Archives from March 2000 includes 338 archives with an estimated total number of 2 036 179 plates, while the catalogue of wide-field plates contains 323 635 plates from 57 archives. The data for about 100 000 plates more are in preparation for inclusion in the database. The WFPDB is accessible on-line through the VizieR catalogue browser in CDS-Strasbourg at http://vizier.u-strasbg.fr/cats/VI.htx (catalogue number VI/90).

In the present paper we examine that part of the WFPDB which concerns the wide-field plate archives in Europe. The information for these archives may be useful for those astronomers who are interested in using archived photographic observations. Let us note that the possibilities for an effective usage of the European plate archives are expected to increase considerably in the next years due to the planned creation of an European Plates Centre in the Royal Observatory of Belgium, Brussels (see http://midasf.oma.be/~fido/ovid.html).

2. THE EUROPEAN ARCHIVES IN THE WFPDB

We have first processed the data in the Catalogue of Wide-Field Plate Archives in order to find how the number of plates is distributed by continents (Fig. 1). It should be noted that in order to calculate this distribution we have not sticked rigidly to the geographical borders between Europe and Asia. Instead we have considered as "European" all archives situated on the territory of the former Soviet Union. Let us also note that some of the plate archives located in Europe have been obtained at observatories outside of Europe. As seen in Fig. 1, the total number of wide-field plates in Europe is about 1 140 000 which is about 56% of the total amount of wide-field plates in the world. We have found from comparison of our Catalogue of Wide-Field Plate Archives with the Hauck's and the Jaschek's data that probably about 80 000 plates more, partly wide-field ones for which we still do not possess information, exist in the European plate vaults.

The European wide-field plates are stored in 231 archives located in 68 observatories/institutes as seen in Table 1 (in the WFPDB each observational instrument has a separate archive, or several separate archives if, e.g., it has been moved to different observational sites). Most of the plates are direct observations while the number of objective-prism plates is only about 4% of the total number. So far the information for 316907 plates from 56 archives (28% of all wide-field plates in Europe) have been included in the WFPDB.

In Fig. 2 the distribution of the number of European plates by different regions is shown. More than half of the plates are in Western and Central Europe and nearly 40% are in Russia and the former Soviet republics. The distribution of the number of plates by countries, separately for the direct plates and the objective prism plates, is given in Fig. 3. Germany is the country with the largest number of plates (nearly 370 000) thanks mainly to the very large collection of plates of the Sonneberg Observatory. Russia, Ukraine, Tajikistan, Georgia, and the Czech Republic also possess large archives with more than 50000 plates.

Table 1. Number of European archives and plates

Method of Observation		Archives	Instruments	Observatories	Plates
Direct	all	231	204	67	1 095 022
	in WFPDB	55	55	11	311 100
Objective prism	all	29	27	23	44 202
	in WFPDB	8	8	6	5 807
Total	all	231	204	68	1 139 224
	in WFPDB	56	56	12	316 907

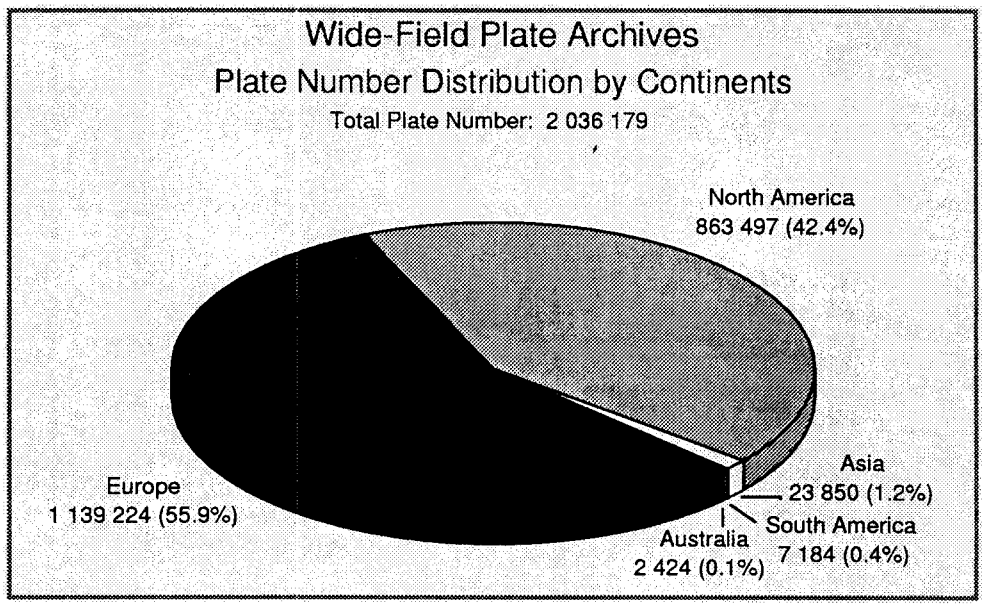

Fig. 1. Distribution of the number of wide-field plates by continents

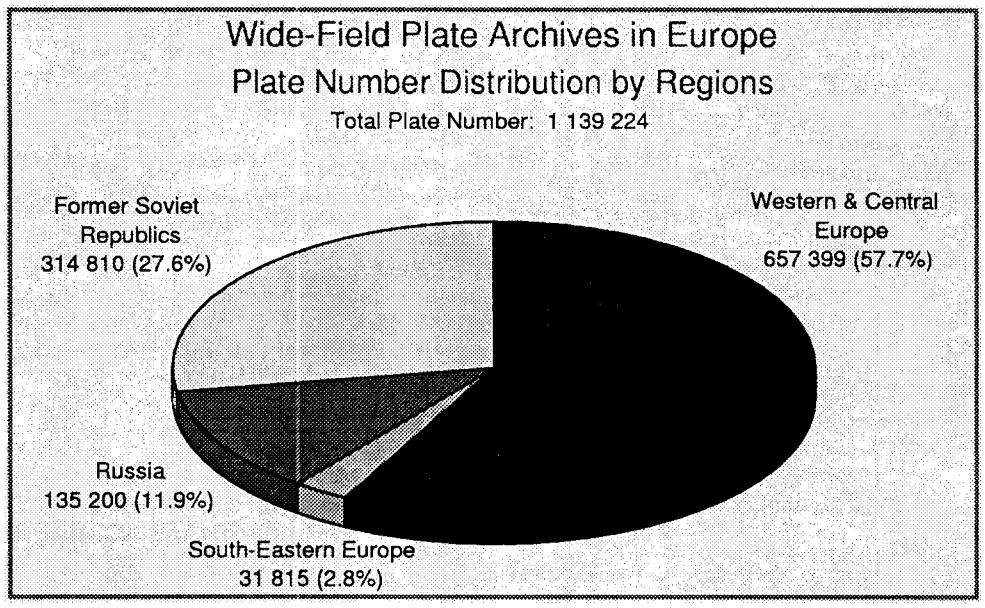

Fig. 2. Distribution of the number of wide-field plates in Europe by regions

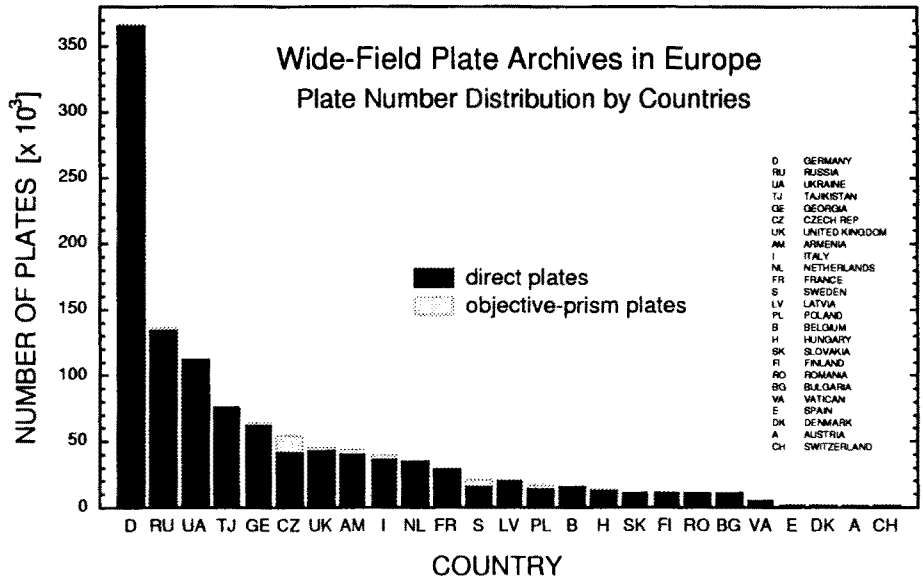

Fig. 3. Distribution of the number of wide-field plates in Europe by countries

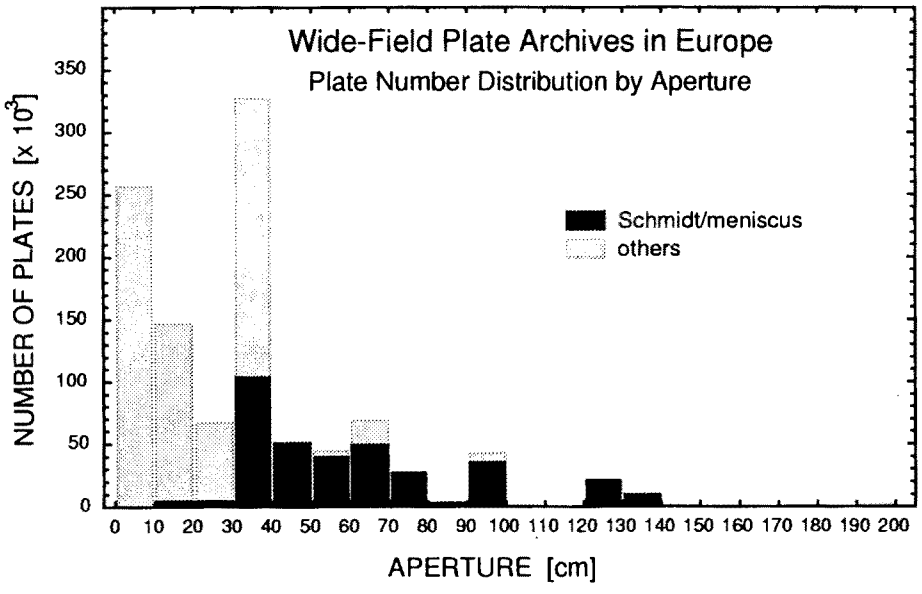

Fig. 4. Distribution of the number of wide-field plates in Europe by telescope aperture

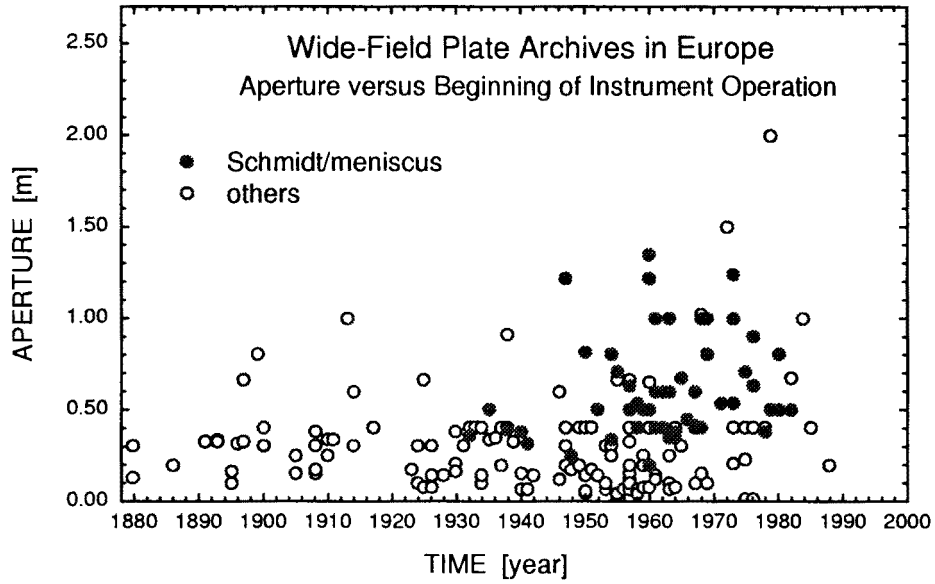

Fig. 5. Aperture versus beginning of instrument operation for the European wide-field telescopes

Fig. 4 shows the distribution of the number of plates as a function of the instrument aperture, separately for the Schmidt/meniscus telescopes and for all others. It is well seen that the great majority of the archived wide-field plates in Europe have been obtained with instruments with aperture < 0.4 m. Fig. 5 shows the increase with time of the number of instruments with larger apertures in Europe in the period 1880-1990. After 1990 new telescopes for wide-field photography stopped to appearing any more due to the wide application in astronomy of electronic detectors of light.

3. PLATE DIGITIZATION

A number of high-speed and high-accuracy scanning machines operating in different European astronomical institutes offer good possibilities for digitization of archived plates. Table 2 contains a list of some larger European microdensitometers. The PDS1010 microdensitometer of the Sofia Sky Archive Data Center (SSADC) was moved from ESO in 1998 and plate digitization started in 1999. Another microdensitometer - the PDS2020GM+ in Muenster (Germany) - was moved this year to Tbilisi (Georgia).

Some of the general pilot projects for plate digitization, proposed by us, are as follows:

- Digitization of the plates in stellar aggregates: Pleiades, Orion-M42, etc.,
- Digitization of the First/Second Byurakan Spectral Survey and the field of M31,
- Wide-field plate archives digitization open tasks: visual binary search, symbiotic long-term variability search, etc.

Table 2. Precise microdensitometers for wide-field plate digitization in Europe.

Country	Observatory/ Town	Microdensitometer
United Kingdom	ROE, Edinburgh	SuperCosmos (WFAU)
	RGO, Cambridge	APM
Germany	Hamburg	PDS1010GM+
	Tautenburg	TMM
	Sonneberg	HSS
France	Paris	MAMA
	Nice	PDS1010
Russia	Pulkovo	Fantazia
Italy	Trieste	PDS1010
Bulgaria	Sofia	PDS1010
Georgia	Tbilisi	PDS2020GM+

4. CONCLUSIONS

The existing 231 wide-field plate archives in Europe contain 1 139 224 plates representing more than half of all known wide-field plates world-wide obtained with professional instruments. We surmise from the comparison of our results with those of Hauck (1982a, 1982b) and Jaschek (1988, 1989) that some 80 000 plates more, part of them wide-field plates, may exist in European archives. Plate vaults are mostly concentrated in Western Europe, but large collections of plates are maintained also in Russia and the former Soviet Union republics. The operating high-speed and high-precision microdensitometers in Europe provide good opportunities for an effective processing of the archived observations.

An important task towards the effective use of the wide-field plate archives in Europe is the continuation of the plate logs cataloguing in a database format despite the great difficulties with organizing and funding of such kind of activity. We expect that the planned creation of a Central Plate Store Unit for the European plate archives will encourage much the usage of the huge quantity of archived photographic observations accumulated during the last century.

Референцес

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