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STRUCTURE AND CONTENT OF THE BELGRADE PLATE ARCHIVE

V. PROTITCH-BENISHEK

Astronomical Observatory, Volgina 7, 11160 Belgrade – 74, Serbia and Montenegro
E–mail vprotic@aob.bg.ac.yu

Abstract. A survey of the present status of Belgrade Observatory's plate archive is presented. It is evident that plate, film and CCD collection of observations gathered over a the time-span of more than 65 years offers possibility of archival research and has to be essential and thoroughly arranged.

The aims of Virtual Observatory and international collaboration on digitizing the data from observatories worldwide are the most urgent for our Observatory also. Our collection with more than 15000 high-quality negatives needs archival systematization and a serious research.

The Belgrade Astronomical Observatory (BAO), founded in 1887, was located first in the center of the city and there were no conditions for any serious astronomical work. Appropriate conditions were secured when the new Observatory was built in 1932 on the Veliki Vračar hill (Zvezdara hill today). Besides other equipment, the Observatory disposed of instruments designed especially for astrophotographic observations: Zeiss refractor (65/1055 cm). Zeiss refractor (20/302 cm visual and two photographic cameras 16/80 cm with Tessar and Petzval lenses), Zeiss astrograph (16/80 cm photographic camera and visual scope 11/128 cm, Astro-Petzval lenses) and Askania equatorial refractor (visual scope 125/1000 cm and photographic camera 13.5/1000 cm). The last instrument substituted Zeiss comet finder (20/133 cm) which was dismantled and taken away by the Germans in 1944 and was never found.

The organization of the Time Service in 1933-34 was one of the primary conditions for any observational activity.

The first photographs of the Belgrade Observatory collection were taken with the Zeiss astrograph in 1935: open cluster Pleiades and four minor planets - 11 Parthenope, 27 Eutherpe, 569 Misa and 889 Erinia with exposure time of whole 3 hours! (Protić 1935).

However, the photographic observations started systematically in 1936 when a detailed rectification of Zeiss astrograph was performed, optical characteristics of its objectives were examined and limiting magnitudes as function of exposure time were determined, as well as the methods of observation (Metcalff, etc.). The astrograph remained the leading telescope of the Belgrade Observatory in the field of photographic

astrometry over many years, recent time inclusive. Despite the small aperture, many hours exposures, limiting magnitudes down to 14-15 could be reached.

The observations can be divided into two groups: technical experiments and scientific observations.

The technical experiments included investigations of classical photographic processes, optical and other tests of instruments, instrument constants and observing methods.

The scientific observations were made in the framework of the programs: minor planets tracking, search for new objects (33 *new* minor planets were discovered at BAO), comet research, systematical observations of the Sun. Observations of the Moon by original photographic method, major planets and natural satellites, variable stars, double stars, star clusters, etc.

Unusual phenomena as was the passage of Mercury across the solar disc (Protitch-Benishek 1984), lunar occultations of stars and planets and special objects have been observed, too.

Between 1936 and 1996 (60 years!) more than 15000 high- quality negatives were obtained. We have to mention that only during AGI and ACI (1957-1959) on 839 days photographic observations of solar photosphere were performed and 2885 plates were obtained.

During the recent years, more precisely from 1994, on CCD imaging has been started with SBIG ST -6 camera attached to the Zeiss refractor (65/1055 cm). Later on, in July 1994 the comet Shoemaker-Levy 9 crashed onto Jupiter and CCD observations (that was the first use of CCD camera) were carried out successfully. During and after the impact period 233 images of Jupiter were obtained (Popović et al., 1995).

Until now, after eight years of CCD observations with instruments and especially the Zeiss astrograph, we collected several thousands of CCD frames, mainly of minor planets and comets.

ST -6 CCD imaging camera has been applied also for spectrophotometry at the Equatorial Solar Spectrograph (Littrow type) of BAO (Jankov et al., 1996).

Several kilometers of film of solar spectra as well as thousands of CCD frames of various solar spectra were taken.

As evident from this brief report on Belgrade plate, film and CCD collection of observations covering a time-span of more than 65 years the provision is there for archival research which has to be thorough.

The aims of Virtual Observatory and international collaboration on digitizing the data from the observatories worldwide, are the most urgent for our Observatory, too, as we have a very good plate and film collection that needs archive systematization and a serious research.

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Instruments:

– Zeiss refractor (65/1055 cm) ; visual objective; plate scale: 19.5 arcsec / mm.

– Zeiss refractor (20/302 cm) + 2 photo cameras (16/80 cm, Tessar and Petzval-lenses) ; plate scale: 68.30 arcsec / mm + 257.8 arcsec / mm.

– Zeiss astrograph (11/128 cm) -visual objective; astro-camera (16/80 cm), Petzval objective; plate scale: 257.8 arcsec / mm.
– Askania equatorial (13.5/100 cm) -visual objective + photo- camera (12.5/100 cm); plate scale: 206.3 arcsec / mm.

Astro-plates (type):

– Agfa Astro- Platten
– Agfa Isopan Platten SO36
– Agfa Printon
– Bauchet Ortho-plaque 30 (anti-halo)
– Ferrania
– Gevaert-Scientia 54A50
– Gevaert Super Chromosa (high speed press plate)
– Ilford plate
– Kodak 103a-O
– ORWO ZU2, ZU21, ZPl
– Superguil- Guilleminot (anti-halo)
– etc.

Plate dimensions:

6 cm × 9 cm, 9 cm × 12 cm, 13 cm × 18 cm, 15 cm × 15 cm, 16 cm × 16 cm.

CCD Cameras:

– SBIG ST -6 375 x 242 pixels (23 x 27 microns)
– SBIG ST-7 765 x 510 pixels (9 x 9 microns)
– SBIG ST -8 1530 x 1020 pixels (9 x 9 microns)

Objects:

– minor planets (NEO, unusual objects etc.)
– comets
– major planets and their satellites
– Sun and Moon
– variable stars
– double and multiple stars
– close binary stars
– open and globular clusters, etc.

References

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