HISTORICAL PHOTOSPHERE OBSERVATIONS OF THE HAYNALD OBSERVATORY FROM 1880 TO 1919.

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ABSTRACT

One of the basic differences between astronomy and other natural sciences is that the objects of the astronomical investigations are far in space and time and the sizes are so large that experimenting with them in the present day is practically impossible. In consequence of this the most adequate way to get acquainted with the celestial bodies is the long-term collection of observations. For those reasons any of historical observations are important and worthy of publication [Hoyt 1998, Webster 2000, etc.]. Such materials are the photosphere drawings of the Haynald-Observatory in Kalocsa, Hungary, which had been made for forty years from 1880 to 1919 and have already been digitalised.

THE BRIEF HISTORY OF THE HAYNALD OBSERVATORY

This small but well-equipped observatory (*Figure 1.*) was founded in 1878 by Ludwig Cardinal Haynald (*Figure 2.*) archbishop of Kalocsa, Hungary and advanced by the help of Miklós Konkoly Thege , landowner and famous Hungarian astronomer. In the observatory three main activities were performed such as solar and meteorological researches furthermore educational activities. The main telescope was a 7 Merz-Browing refractor with 222-cm focal length equipped with a Hilger-type prominence spectroscope while the other 4.5 Merz refractor with 155-cm focal length was applied for the photosphere observations (*Figure3.*).
The first director of the observatory was the highly educated astronomer Pater (P.) Carl Braun Societiey of Jesus (S.J.) (from 1878 to 1884) who had worked at Angelo Secchi for three years. Following him the observatory was led by P. Adolf Hüninger S.J. (from 1884 to 1885), P. Gyula Fényi S.J. (from 1885-1913) (Figure 4.), P. Tivadar Anghern S.J. (from 1913 to 1946) and finally P. Mátyás Tibor S.J. (from 1946 to 1950) when following nationalization the church institute was closed [Braun 1886, Fényi 1896, 1906, Mojzes 1986].
The scientific results of the observatory are primarily connected to P. Gyula Fényi S.J. (Figure 4.) who was born as Julius Fink in 1845, Sopron, Hungary and died in 1927 in Kalocsa. He had observed the solar prominences and the photosphere every cloudless day from 1886 to 1917, nearly for 5000 hours. To our knowledge it was the longest homogenous series of prominence observations all over the world and it served

as a basis for his more then 196 publications and many others. His results have become part and parcel of modern astronomy which were acknowledged by the International Astronomical Union in 1971, when a crater on the Moon was named in his honor [3, 4, Mojzes 1986].

THE PHOTOSPHERE DRAWINGS

As stated above the photosphere drawings (are accessible here) were made from 1880 to 1919 by different observers with the 4 refractor. The picture of the Sun was projected at right angle to the optical axis of the telescope (Figure 5.). A photosphere observation 22-cm in diameter was generally prepared within 10-15 minutes and it contains the visible sunspots, faculaes, sometimes prominences, the terrestrial east-west direction, the observational time in UT and some additional remarks for instance the main weather conditions (Figure 6.) [Fényi 1896, 1906]. The years 1881, 1882, 1889, 1890 and some other pages are missing from the stormy ages world wars, revolution, nationalization, etc.- thus by now 6282 observations are available (Figure 7.).
The digitalisation of them was performed by a scanner with 256 gray levels and 300 dpi resolution in gif format but for the sake of better space utilization the accessible pictures were taken under jpg-compression. Almost every picture contains the terrestrial east-west direction shown by two short lines at the edge of the solar disc furthermore the solar east-west direction that is shown by a straight line inclined with angle P_0 to the terrestrial east-west direction. Generally the terrestrial but in some deficient cases the solar east-west direction is that which is in horizontal position (Figure 8.).

ACKNOWLEDGEMENT

The authors thank Nándor Mező for his support, furthermore András Ludmány, and Béla Kálmán for their remarks. And special thanks go to Lóránt Dezső who did a lot in the interests of saving the observations. This work was supported by the Hungarian National Science Foundation (OTKA: F030957) and the Hungarian Ministry of Cultural Heritage (SzÖP422).

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