EUGENE VON GOTHARD (1857-1909) THE FIRST AMATEUR ASTROPHOTOGRAPHER

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Eugene (Jenö) Von Gothard was born on 31 May 1857 in Herény, Hungary. After receiving a degree in mechanical engineering, Gothard founded the Herény Astrophysical Observatory in 1881 when he was 24 years old (Figure 1).

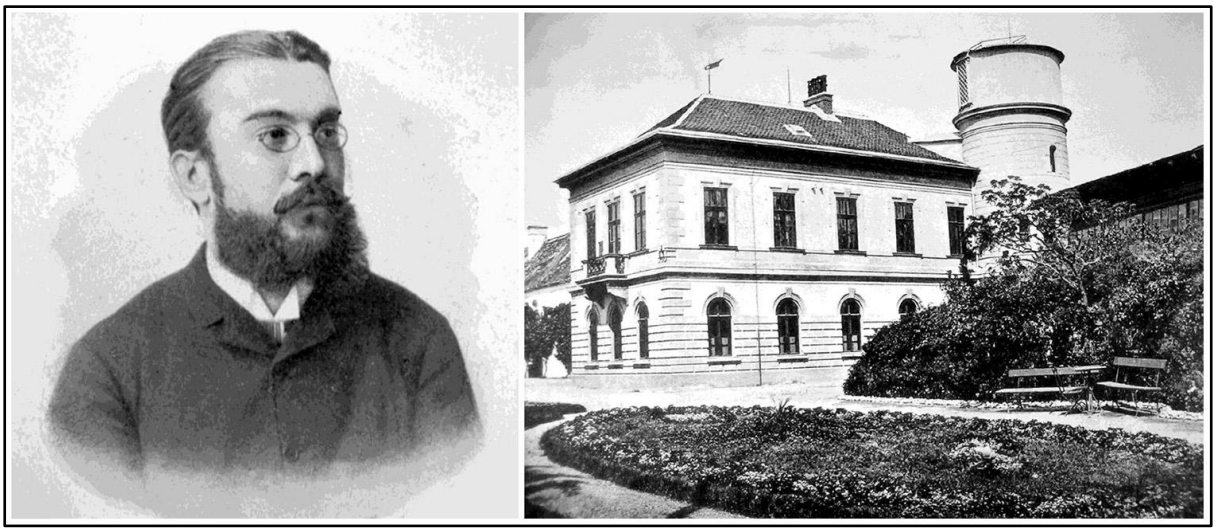


Figure 1- Eugene Von Gothard and the Henéry Astrophysical Observatory.

Eugene V. Gothard played an important role in European astronomy at the end of the nineteenth century. His pioneering astrophotographs were known worldwide. The scientific inheritance of Gothard is preserved by the Gothard Astrophysical Observatory at the Loránd Eötvös University. A valuable part of this material is the astronomical plate collection of 455 plates obtained from 1882 to 1900, containing unique images of comets, star clusters, nebulae, galaxies, and stellar spectra. Eugene recorded the central star of the Ring Nebula, Messier 57, for the first time in September 1, 1886, and in doing so became the first amateur astrophotographer.

After completing his studies in 1879 Eugene studied abroad before returning to his estate at Herény, with the intention of setting up his own Physics Laboratory. Eugene soon changed his initial plans, mainly because of his interest in Astronomy and because of the influence of his friend and astronomer, Nicolaus Von Konkoly (1842-1916). Jenö decided instead to add an Astronomical observatory to his Physics Laboratory and the first observations were made on the 20th of October 1881 at the newly inaugurated Herény Astrophysical Observatory[1].

In 1882 Jenö recorded the total eclipse of May 17, 1882 (partial in Hungary) (Figure 2) and he was also the first to detect the central star of M57 in the autumn of 1886 (Figure 3).

[1] Until 1883, Gothard was assisted in his astronomical observations by his brother Sándor (1859-1939), while their youngest brother István (1869-1948) took part in the recording of meteorological data at the weather station located in the garden of the observatory. At the time of the observatory foundation, Jenö's aim was spectroscopic investigation of emission line stars and comets, while Sándor observed planets and the Sun.

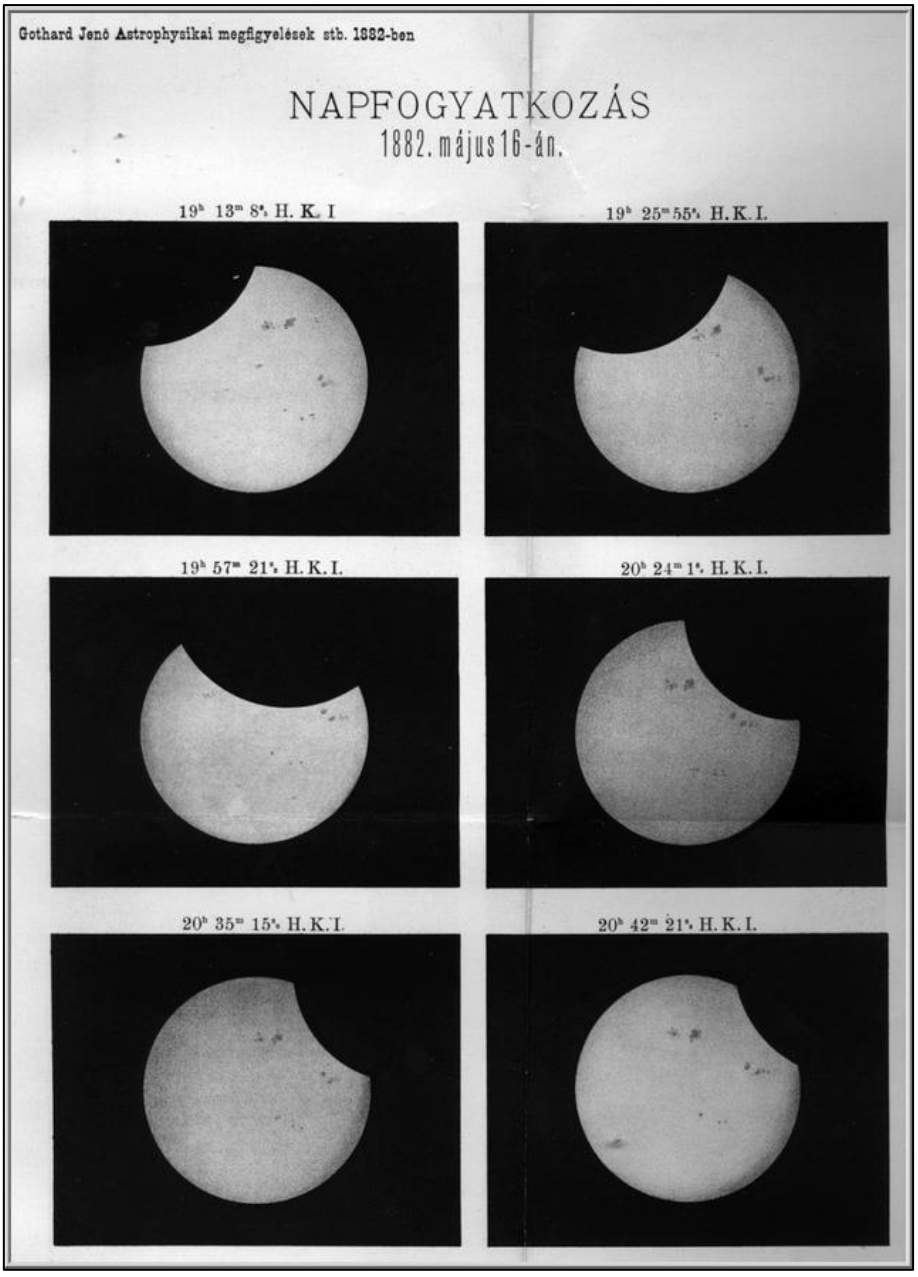


Figure 2- Gothard's original plates of the total solar eclipse of May17, 1882, visible partial from Hungary.

The main building of the observatory had a physical, chemical, and photographic laboratories and a mechanical workshop as well. The observatory had also facilities for meteorological and earth magnetism observations.

The observatory's main instrument was a Newton reflector with a mirror of 254 mm (Figure 4), manufactured in 1874 by the Browning company, London and purchased by Miklós Konkoly Thege in 1881. Jenő Gothard gradually added new and modern tools for astrophotography and spectroscopy. His degree in mechanical engineering from the Polytechnics Hochschule in Vienna proved to be a good basis for his excellent instrument construction work. He designed and, together with his technician, created the instruments and auxiliary equipment for his astrophysical research in the observatory's mechanical workshop.

Figure 3- Gothard's original plate recording the central star of the Ring Nebula (M57) for the first time in September 1, 1886.

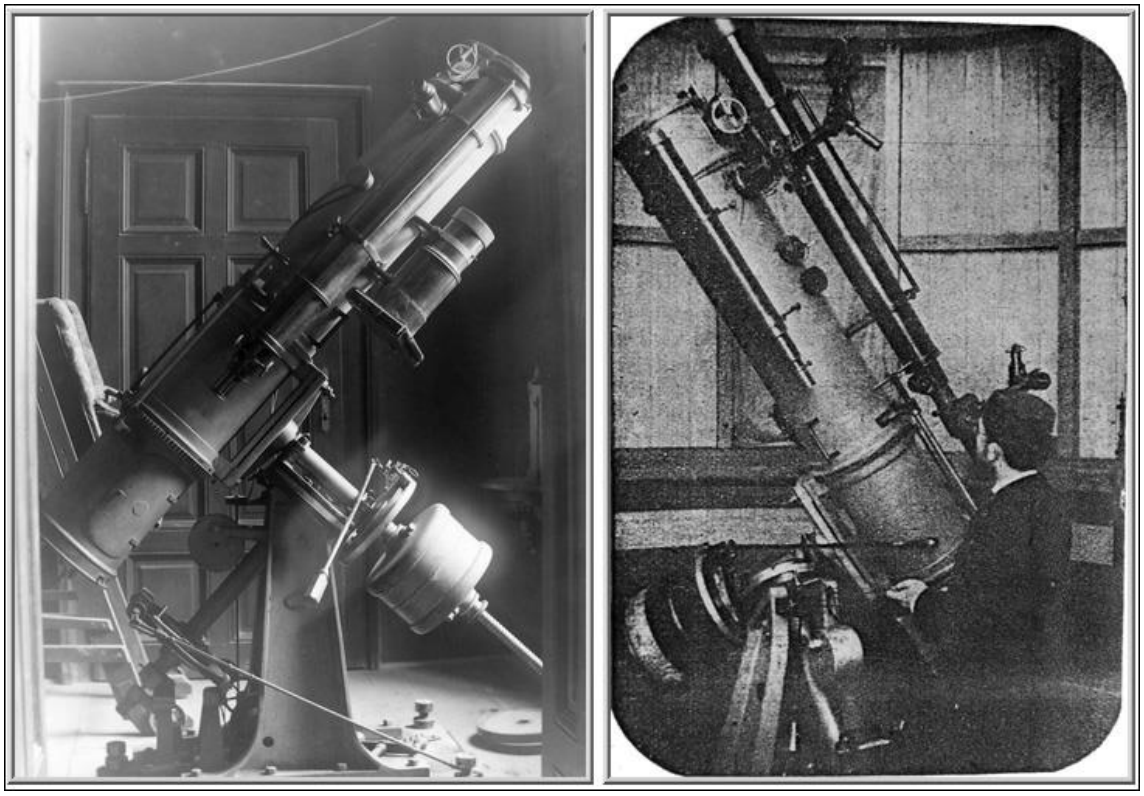


Figure 4- 254 mm Newton reflector, the main instrument of the Gothard's observatory.

At the time of the observatory foundation, Jenö Gothard's aim was the spectroscopic analysis of emission stars and comets.

After 1883, he turned his attention to the examination of the spectrum of the β Lyrae. In his observations he discovered the periodical appearance and disappearance of hydrogen and helium lines. This discovery did not get any attention, as there was no sufficient astronomical background for the interpretation of the phenomenon, which gained significance later. In the scientific community of the turn of the century Gothard attracted attention to his spectroscopic examinations of comets. He photographed a comet invisible visually for the first time (Barnard-Hartwig Comet, 1886).

From 1885 onwards, Jenö almost abandoned visual observations and turned to the new technologies of the age, spectrography and astrophotography (Figure 5). In 1885, he recorded a supernova in the Andromeda Galaxy, Messier 31.

From 1886 onwards he was completely engaged in spectrophotometric examination of clusters, comets, and nebulae. Until 1891, during the first 10 years after foundation of the observatory, Gothard worked successfully in the field of spectroscopy and astrophotography.

In 1892, while studying the spectrum of Novae Aurigae, he revealed a principal connection between nova's and planetary nebulae. Gothard proved that "... *the spectrum of the nova is identical to the spectrum of planetary nebulae*". This discovery was the most outstanding result of his scientific work. His result is regarded by experts worldwide as one of the predecessors of theories on the later stages of stellar evolution.

Eugene Von Gothard was recognized for his research worldwide. In 1883, he was accepted as a member of the Royal Astronomical Society, in 1884 member of the association of leading European astronomers, the German Astronomische Gesellschaft and in 1890 a corresponding member of the Hungarian Academy of Sciences.

In 1894/95 the first Hungarian hydroelectric power plant was built in Ikervár. The Vasvár County Electric Works Inc. was founded with Jenő Gothard as its first technological manager. Besides being engaged in management and organization, he also designed and patented several industrial devices. New tasks and technological challenges reduced the intensity of his astronomical activities.

Only after many years could he return to astronomy for a short period, starting in 1901. With the same precision as earlier, he took a high-resolution spectrum of the "new star", Nova Persei in Perseus.

In the final period of his rich and productive life, Jenő Gothard travelled a lot. He toured Egypt, pursuing his scientific and archaeological passions.

His observations and scientific results appeared in a special volume published (in German) by the observatory, entitled "*Publikationen des Astrophysikalischen Observatoriums zu Herény In Ungarn*" (Figure 6). Articles were issued about his life's work in the series of the Hungarian Academy of Sciences, entitled "*Értekezések a Matematikai Tudományok Köréből*". The series entitled "*Meteorological Observations at the Herény Observatory*" was published from 1890 to 1918.

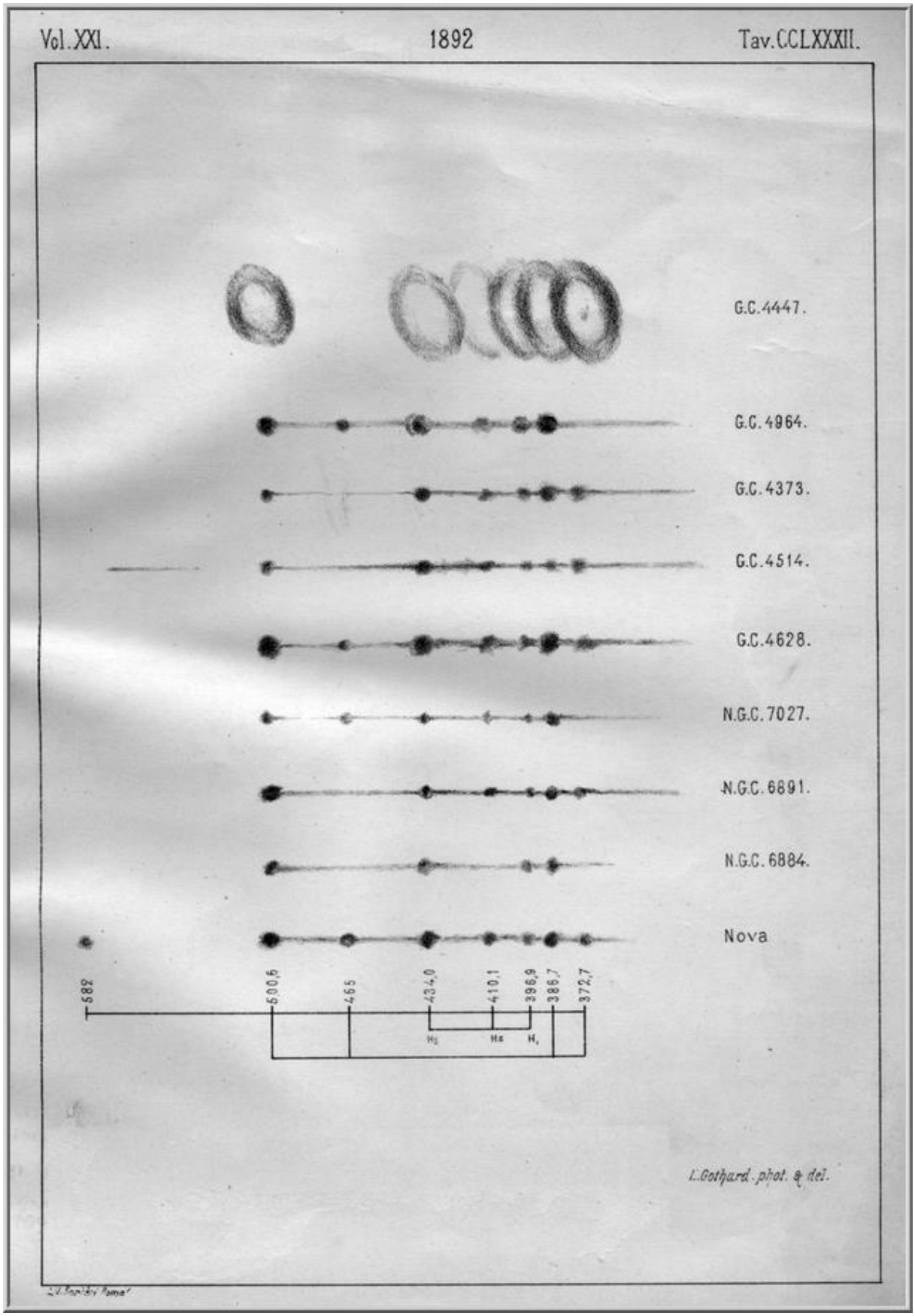
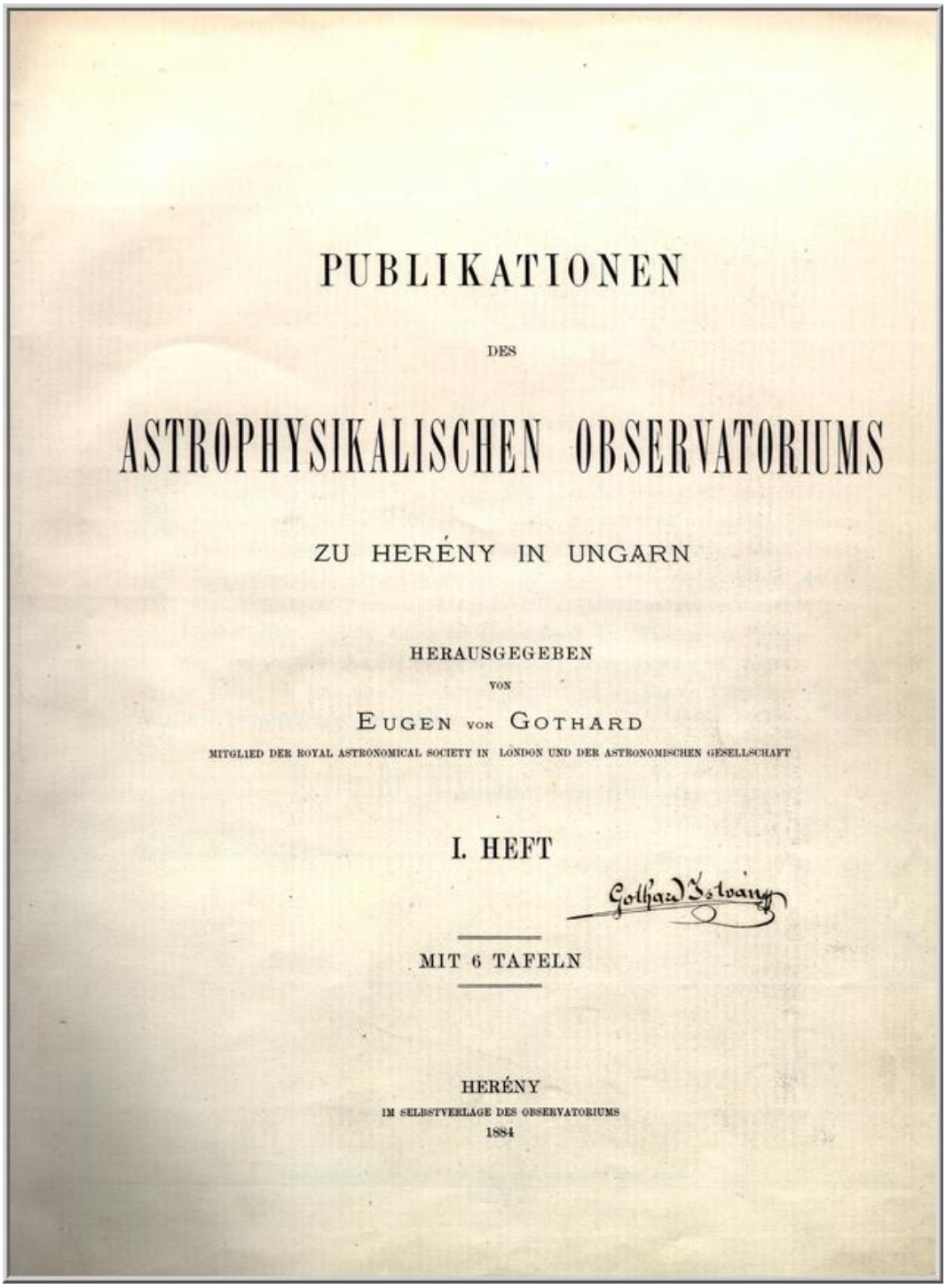


Figure 5- Spectra of several planetary nebulae and Nova Aurigae.



PUBLIKATIONEN

DES

ASTROPHYSIKALISCHEN OBSERVATORIUMS

ZU HERÉNY IN UNGARN

HERAUSGEGEBEN

VON

EUGEN VON GOTHARD

MITGLIED DER ROYAL ASTRONOMICAL SOCIETY IN LONDON UND DER ASTRONOMISCHEN GESELLSCHAFT

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HERÉNY

IM SELBSTVERLAGE DES OBSERVATORIUMS

1884

Figure 6- Special volume published (in German) by the observatory, entitled "Publikationen des Astrophysikalischen Observatoriums zu Herény In Ungarn".

References:

Hughes. S. (2013). *Catchers of the Light*. ArtDeCiel Publishing: 1612 pages.

Vincze, J.I and I. Jankovics (2012). In memory of Eugene (Jenö) Von Gothard: a pioneering nineteenth century hungarian astrophysicist. *Journal of Astronomical History and Heritage*, 15 (2): 105-114.