



Historical sites of astronomical observatories and their new role in promoting diversity and equity in scientific research

Vladimír Karas

Astronomical Institute of the Czech Academy of Sciences
Boční II 1401, 14100 Prague, Czech Republic
email: vladimir.karas@asu.cas.cz

Abstract. Scientific research in astronomy has traditionally been concentrated around major observatories for centuries. However, the evolving global environment, including gradual climate change, population growth, and technological advancements, has challenged the ability of historical sites to maintain their original purpose of cutting-edge observations. Despite this, the persistent atmosphere of active scientific institutions, coupled with their existing infrastructure and culture, provides an ideal setting for contributing to contemporary societal challenges, particularly in promoting diversity and equity in scientific research and education. We illustrate a successful transition achieved at the Ondřejov observatory (Czech Republic) and highlight the fruitful synergies with modern scientific infrastructures.

Keywords. Historical observatories, science accessibility, astronomy outreach

1. Introduction

Astronomical observatories today are hubs of intense research, science education as well as places of culture which the interested public loves to visit [Dorschner & Löffler \(1975\)](#). More than a century has passed since the founding of the Ondřejov observatory near the capital city of Prague (established in 1998). The visionary founder, Josef Frič together, along with his brother Jan, had a grand dream: to develop and test new optical instruments and to conduct their own observations (Figure 1). The goal was achieved with great success. After three decades of intensive work, Josef transferred his then small but functional observatory to the young Czechoslovak state and the Charles University in Prague with the aim of promoting astronomy. The legacy lasts to date. Thanks to the enthusiasm passed from one generation of astronomers to the next, we have achieved numerous results in traditional areas of astronomy. Examples include spectroscopic studies of hot stars (processes leading to swirling of gas in their surroundings and exceptionally intense stellar winds), research in solar physics including the space weather and its impact on our civilisation, astrophysics of interplanetary matter (asteroids crossing the Earth's orbit and meteors entering the Earth atmosphere), and the processes of formation of stars, their life cycle up to their violent demise in the form of a supernovae explosions and collapse into a black hole.†

Ondřejov observatory has gradually grown to the largest professional astronomical institution in Czechia. It has also become the place where general public of any age discovers history of astronomy and meets with astronomers to learn about the new research and explore variety of modern instruments (Figure 2). These include, among other things,

† See also <https://asu.cas.cz/en>.

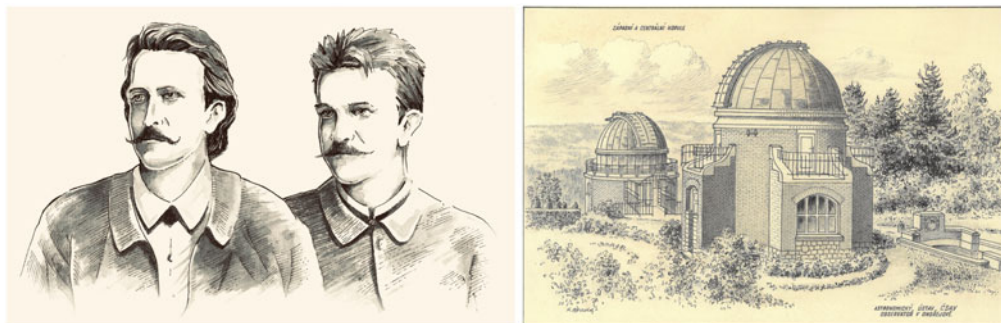


Figure 1. Left: Josef and Jan Frič, the founders of a private observatory in Ondřejov of late 19th century (graphics by T. Kropáček). Right: Historical domes were designed by the prominent Czech architect Josef Fanta; nowadays, together with a museum of astronomical instruments, the domes are the place of encounters between astronomers and the public of any age.



Figure 2. Left: encounters of school children near the historical domes of the observatory during one of open days. Right: the first-light ceremony and a lecture at the site of Cherenkov four-meter telescope SST-1M.



Figure 3. Stone sculptures speak to dishes of radiotelescopes for solar observation and antennas communicating with artificial satellites that are operated next to each other on the campus of Ondřejov observatory.

the two-meter optical telescope for high-dispersion spectroscopy of hot stars and tracking exoplanets, as well as interconnected twin four-meter Cherenkov telescopes that capture showers originating from very-high energy photons hitting the Earth atmosphere from distant cosmos; currently the latter are the most sensitive instruments of their kind operating in the energy range of tens of teraelectronvolts – and they can be visited freely on the institute grounds. Furthermore, short time ago the public attention was attracted by localization of a giant crater, perhaps the largest impact formation on Earth, the remnants of which appear to be hidden under the ice of East Antarctica. The authors came

to these conclusions by studying gravitational anomalies with the help of most precise satellite measurements [Klokočník et al. \(2015\)](#).

In addition to traditional topics, we are developing novel approaches on the borderline between astronomy and particle physics: Cherenkov telescopes [Alispach et al. \(2024\)](#) attract enormous public interest because of the connection between the enormous scales of the cosmos and the smallest scales of cosmic-ray particles and photons. Indeed, by taking a walk through grounds of numerous observatories, visitors can encounter variety of instruments that gather information about processes in cosmos over vast range of wavelength and even employ different messengers – electromagnetic waves, cosmic-ray particles and gravitational waves arriving from cosmological distances, as well as meteoroids that fall on Earth from our immediate vicinity (Figure 3). Broad range of scientific topics sparks interest and supports imagination of young generation.

References

- Dorschner J., & Löffler G. (1975), “Astronomy, a Popular History” (New York: Van Nostrand Reinhold), ISBN: 978-0855242305
- Klokočník J., Wagner C. A., Kostelecký J., & Bezděk A. (2015), “Ground track density considerations on the resolvability of gravity field harmonics in a repeat orbit”, *Advances in Space Research*, 56, 1146–1160, DOI: 10.1016/j.asr.2015.06.020
- Alispach C., Araudo A., Balbo M., et al. (2024), “The SST-1M imaging atmospheric Cherenkov telescope for gamma-ray astrophysics”, *Journal of Cosmology and Astroparticle Physics*, in press, arXiv:2409.11310, DOI: 10.48550/arXiv.2409.11310