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DISSERTATION

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Research and education at astronomical institutes of the Czech and German universities in Prague in years 1882-1945

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Název práce: Výzkum a výuka na astronomických ústavech české a německé univerzity v Praze v letech 1882-1945

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Abstrakt. Tématem předložené práce je vývoj astronomických institucí na univerzitách v českých zemích v letech 1882-1945. V tomto období kulminovalo české národní obrození a narůstal význam vznikající české vědy, což mělo za následek rozdělení tří českých unverzit do českých a německých institucí. Následně se definitivně rozdělily česká a německá astronomická komunita a nadále se vyvíjely odděleně. Tato práce zkoumá souvislosti a návaznosti vývoje a tradic výuky a výzkumu v obou komunitách, jejich vzájemnou interakci a míru izolace. Součásti práce jsou biografie velkých astronomických přístrojů a kolektivní biografie studentů Filozofické, resp. Přírodovědecké fakulty, kteří si zapisovali přednášky z astronomie. Výstupem práce je prohloubení poznání v oblasti historie české profesionální astronomie

Klíčová slova: dějiny astronomie, vědecké komunity, kolektivní biografie, Univerzita Karlova, Deutsche Universität zu Prag

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Abstract. This thesis focuses on the development of astronomical institutions at the universities in Bohemia from 1882 to 1945. During this period, the Czech National Revival culminated. The importance of the emerging Czech science grew, resulting in the split of three major Bohemian universities into separate Czech and German institutions. Subsequently, the Czech and German astronomical communities finally split and continued to develop separately. This thesis investigates both communities' connections and the relationship between development and research traditions, their mutual interaction and isolation. This thesis includes biographies of large astronomical instruments and a collective biography of students of the Faculty of Philosophy, resp. Faculty of Science, who enrolled in astronomy lectures. The outcome of this thesis is to broaden the knowledge of the history of Czech professional astronomy.

Keywords: history of science, scientific communities, collective biography, Charles University, Deutsche Universität zu Prag

Obsah

1. World Astronomy in the 19th and 20th centuries

The second half of the 19th century was a period of discoveries and trends in astronomy and the newly established astrophysics. New fields of research emerged: astrophotography, astrometry and spectroscopy.

The development of astrophysics resulted in the building of astrophysical observatories and the development of astronomic spectroscopes, spectrometers and spectroscopy in non-visual spectra. Methods for increasing the spectral resolution were researched by astronomers Huggins, Lockyer, Secchi and von Littrow and significant manufacturers of astronomical instruments (e.g. Steinheil). Prism spectrographs were widely utilised and adjusted, but issues with thermal instability, telescope deflection and chromatic aberration in refractors needed solution.

1.1. Astrometry

Since the beginning of the 19th century, the number of observable stars had grown immensely. In 1938, Bessel derived the first star distance using extensive measurements of stellar parallaxes. The first stellar parallaxes and distances were published (F. W. Bessel 1838; Friedrich Wilhelm Bessel 1838).

High-quality star maps were of great importance. Friedrich Argelander in Bonn developed a system to capture large numbers of stars within a reasonable amount of time, and in the mid-19th century, the first sky survey projects emerged (Batten 1991). Fixed telescopes performed the Bonner Durchmusterung sky survey. The north sky was

surveyed by Friedrich Argelander and Eduard Schönfeld in Bonn in 1852-1859 and published in 1863 (Argelander 1903). John Thome in Córdoba had surveyed the southern sky since 1892. Sir David Gill and Jacobus Kapteyn photographed the southernmost sky with an accuracy of 1'.

The *Astronomische Gesellschaft Katalog* (AGK1) was first published in 1861 by Friedrich Argelander and included 200 000 stars up to 9 mag. AGK2 succeeded in 1928-32, finished in Bonn and Hamburg and included north sky up to declination -5° and 12 mag. Later in 1956-63, AGK3 and AGK4R were created by cooperation of 10 observatories under IAU Commission 8, and they included the proper motions of stars from AGK2.

The *Carte du Ciel* project began in 1887 with a large international astronomical meeting and concepts of identical telescopes for 20 observatories covering all geographical latitudes. The planned result was an extensive Astrographic Catalogue. Reproduction of glass plates eventually proved to be immensely time-consuming, and much of this project has remained unfinished or unpublished. Astrographic Catalogue was subsequently published in 254 parts from 1902 to 1964. Large parts of the project remained unfinished or unpublished.

In the first decades of the 20th century, astronomers began studying the proper motions of the stars. The Czechoslovak astronomer Vincenc Nechvíle (1890-1964) gained international success in this field.

Stellar parallaxes measurements proved that the Galaxy rotated (Kapteyn 1904), and the density of stars in the Galaxy decreased in the direction from its centre (Kapteyn 1922). These discoveries led to the Great Debate on the structure and dimensions of the Galaxy in 1920. This debate was concluded by the research of Edwin Hubble in 1925

when he utilised Cepheids in Andromeda Galaxy as the standard candles and determined its distance from our Galaxy.

1.2. Astrophotography

In the 1830s, the daguerreotype was invented. John Draper took the first photograph of the Moon in 1840. Warren de la Rue and Leon Foucalt first photographed Sun in 1845. In the 1850s, Panotype and Ambrotype techniques were utilised (including the photograph of the astronomical observatory in Žamberk in 1855). Still, they were replaced by tintype (ferrotype, melainotype) in the 1860s and by gelatine dry plates in the 1870s. In 1874, Pierre Janssen still utilised the wet collodion process in photographing the Sun and the Venus transit 1874. Ladislaus Weinek, the author of the first photographic lunar atlas (1890-1900), took the first photo of a meteor in 1885 in Prague.

Astrophotography was pioneered by Max Wolf, who made the first photographic discovery of minor planet 323 Brucia in 1891.

Glass plates were a primary general photography medium until the introduction of photographic plastic films in the 1890s. Because of the low quality of early photographic films and higher dimensional stability of glass plates, astrophotography preferred glass plates until the 1990s. This resulted in an extensive amount of glass plates in archives.

1.3. Spectroscopy

The nineteenth century was the period of significant development of

spectroscopy. William Herschel in 1800 and Johann Ritter in 1801 discovered infrared and ultraviolet radiation, respectively. The solar spectrum had been studied since 1814. Joseph von Fraunhofer (1787-1826) published the first catalogue of solar spectral lines. J. B. Léon Foucalt (1819-1868) first demonstrated the complementarity of emission and absorption spectral lines of materials in 1849.

In the 1860s, Gustav Kirchhoff (1824-1887) and Robert Bunsen (1811-1899) began systematic research on spectra of different chemical elements. Kirchhoff then formulated his three laws of spectroscopy, and William and Margaret Huggins determined that the spectral lines of stars correspond with elements found on Earth. They used spectroscopy to determine the axial speed of stars based on the Doppler effect and distinguish nebulae from galaxies by spectral techniques. This research discovered spectral lines of the new element helium in solar spectra in 1868 (isolated from cleveite in 1895) and defined the problem of unidentifiable nebular spectral lines. The problem was unsolved until 1927 when Ira Bowen showed these lines are the forbidden lines, which do not occur under standard densities but only in highly rarefied hot gases.

Henry Draper (1837-1882) took the first photograph of the stellar spectrum of Vega in 1872, and the first stellar classifications based on spectral characteristics were created – Secchi classes (1866), Vogel system based on effective temperature (1874), Draper system (1890) and Harvard system (1901).

1.4. Celestial Mechanics and General Theory of Relativity

Celestial mechanics registered several great discoveries and knowledge in the 19th century.

In 1801, the „eighth planet“Ceres was discovered in the „blank space“ between Mars and Jupiter. According to the early modern period paradigm on the harmony of space, this space should have been populated by an undiscovered planet. The search for the unknown planet was organised at the end of the 18h century by Baron F. X. von Zach. He organised an international astronomical meeting to coordinate the search. The planet was found soon by Giuseppe Piazzi, but before he made enough observations to determine its orbit, the planet disappeared behind the Sun. Friedrich Gauss calculated its orbit and predicted its future position, on which the planet was rediscovered. In the following years, another three planets were discovered on similar orbits. In the mid-19th century, a fifth planet was found. Subsequently, these bodies were redefined as asteroids because they did not correspond in size to the planets, and their orbits were very close and intersecting. The names „planets“ and „asteroids“ were often interchanged for several decades in literature. By the end of the 19th century, hundreds of asteroids were known, and calculations of their orbits were demanding work for teams of trained scientists, which could be done in more minor well-equipped professional workplaces using material observed at other observatories.

In 1846, the first planet (Neptune) was discovered on the basis of theoretically calculated positions. After the accidental discovery of the seventh planet Uranus by William Herschel in 1781, the calculations of its orbit had been in process. Still, after decades of observing, the planet's motion did not correspond to the theoretical calculations. One hypothesis explaining this discrepancy was the perturbations of another eighth planet. Urbain le Verrier (Paris Observatory) performed calculations of this new planet’s orbit, and Johann G. Galle and Heinrich L. d’Arrest (Berlin Observatory) confirmed its existence by observation. This discovery was considered a

triumph of celestial mechanics. Attempts to discover an unknown planet between the Sun and Mercury and other trans-Neptunic planets followed, with mixed results usually accepted by a small portion of the international astronomical community.

In 1846, the first disintegration of a comet was observed. The 3D/Biela comet was discovered in 1826 by Wilhelm von Biela and determined as short-periodic by Joseph Morstadt. The comet core split into two parts in 1946, which were observed until 1872, when a meteor shower appeared instead of the core parts. This finding laid the foundation for later research on the genetic connection between comets and meteor showers.

Celestial mechanics focused on the three-body problem connected with the problem of marine navigation. This problem determines the possible motions of three-point masses, which attract each other according to Newton's law of inverse squares. Since 1740, the problem constituted a search for solutions or approximate solutions to a system of full differential equations by Euler, Clairaut and d'Alembert and later developed by Lagrange, Laplace and others. The theory entered a new phase with Henri Poincaré, who focused on new integrals of the problem and its general solvability, and in 1887 proved the general non-integrability of the equation system.

Therefore, the three-body problem is solvable only in exceptional cases, the restricted three-body problem, periodic solutions (Euler 1767; Lagrange 1772), and Lagrange points (1772).

The next stage of solving the three-body problem came only in the 1950s with the development of computers.

As Newton's law of gravity applies to all interactions between planets, the perturbations between planets are strong enough to destabilise the solar system. In

Newton's view, divine intervention was needed to restore the planet's orbits to their proper places from time to time, which slowed the general acceptance of Newton's law. The variations in the orbit of Saturn and Jupiter had been known since Edmund Halley's analysis of Ptolemy observations. The necessary theorems for solving the problem of orbital stability were further developed by Airy and Clifford in the 18th century and carried to completion by Maxwell and Routh. Maxwell published linear stability criteria in two and three degrees of freedom in his essay on the stability of Saturn rings in 1857. In 1877, Routh developed methods for the theory of stability of governors (the control theory).

The outstanding achievement of 18th mathematics was constructing the theory of perturbations. This theory enabled solutions for differential equations from Newton's gravitation theory, defining celestial bodies' motions. The most significant success of the theory of perturbations came in 1846 when discrepancies in the motion of Uranus led to the 1840s prediction of the yet unknown perturbing planet and details of its orbit. The calculated results led to the discovery of Neptune.

Since the 1870s, many anomalies that showed inaccuracies in Newton's theory of universal gravitation were observed, leading to the establishment of the paradigm shift in the first decades of the 20th century. The Newtonian celestial mechanics could not explain the deviation of the detected angular velocity of the precession of the perihelion of the orbit of Mercury from its theoretically computed value. The Michelson-Morley experiment in 1887 showed the speed of light did not change regardless of the observer's motion. Bases for new physics appeared soon after Lorentz's transformation, and many other attempts to refine Newton's physics appeared. Still, Einstein made the unification into a clear new theory in 1905 and 1915. Newton's force of gravity disappeared in

general relativity, and gravitational orbits became the straightest paths in curved space-time.

The general theory of relativity was first published in 1915. Its first immediate applications were confirmation of the relativistic advance of the perihelion of Mercury and solution to the Schwarzschild one-body problem. Subsequently, the problems of Newtonian mechanics were reformulated within the general theory of relativity framework, and the new field of relativistic celestial mechanics emerged. The field of attracting forces between two bodies and the motion of those bodies appear together as mutually dependent in Einstein's field equations. First, particular solutions appeared for a fixed spherical body (Schwarzschild 1916), a fixed spheroid (Levi-Civita 1916) and later a rotating sphere (Kerr 1963).

First articles on constructions of equations of planetary motion in the frame of general relativity were published as soon as 1916.

However, the general acceptance of the general theory of gravitation was slowed down by the dichotomy of practical „German“ and theoretical „Jewish“ physics in German-speaking countries.

The general theory of relativity immediately predicted the gravitational deflection of the Sun, which could be experimentally confirmed only during a total solar eclipse. The first attempt to observe these phenomena took place in 1914 by E. F. Freundlich, but it was abandoned after the outbreak of World War I; therefore, the experimental confirmation was delayed to 1919.

1.5. Variable stars

For observing variable stars, John Herschel and Friedrich Argelander, independently invented the method of comparative stars in the early 19th century.

As the community of amateur astronomers and owners of private observatories grew, their importance for astronomical research grew. Systematic observation is necessary to identify variable stars and establish their types. Depending on the type of variables, these can be observed by larger instruments only or by smaller instruments owned by amateurs. One united observation system had to be negotiated to collect the data effectively.

In 1882 Edward Pickering of Harvard proposed *A Plan for Securing Observations of the Variable Stars* (Pickering 1883). He emphasised the role of amateur astronomers and students of astronomy, including women, and the internationality of this plan. For accurate observations, observers in the southern hemisphere were much needed.

1.6. Photometry

Visual photometry had seen the invention of the Zöllner astro-photometer in 1859, the first measurement of the Sun's apparent magnitude in 1867, and later albedo of planets and radiance of stars up to 10 mag. The smoked glass or photometric wedge reduced the radiance of the observed star and the comparative star.

Photoelectric photometry presented the use of the photoelectric emission, which was discovered by Heinrich Hertz in 1887 and since studied in detail, but thoroughly explained only in 1905 by Albert Einstein. This phenomenon enabled using vacuum

tubes with photocathodes.

The first photometric system used was the north polar sequence. It included stars between 2 and 20 mag in the proximity of the north celestial pole, which visual and photometric magnitude was accurately measured.

1.7. Astronomical societies

The *Astronomical Society of London* was founded in 1820 and became the R*oyal Astronomical Society* (*RAS*) in 1831. The *RAS* ran its *Memoirs* from 1822 to 1878. *The Monthly Notices of the Astronomical Society of London* has been published since 1827, being renamed *The Monthly Notices of the Royal Astronomical Society (MNRAS)* in 1831.

In 1899, the *Astronomical Society of the Pacific (ASP)* was founded as a counterpart for *RAS*, aimed at both professional and amateur astronomers. Its journal, *The Publications of the Astronomical Society of the Pacific (PASP),* has been circulated since 1889.

1.8. Scientific journals

The scientific journal has been known since the late 17th century; this is the case of multidisciplinary journals like *Philosophical Transactions* (created in 1665 by Henry Oldenburg, secretary of the *Royal Society of London,* taken over by the RAS in 1752) and *Journal des Sçavans* (1665-1792). Early journals consisted of letter excerpts, reviews and summaries of recently published books, and accounts of observations of

natural philosophers.

Most of the new journals lasted only for a few years. However, this era also saw the beginning of *Nature* (founded in 1869 by Norman Lockyer and Alexander Macmillan) and *Science* (founded in 1880 by the *American Association for the Advancement of Science*). With the contemporary multilingualism of science, many language mutations of Nature emerged in the 1880s, not only in the prevailing French, German, English and Italian language but also in Dutch, Norwegian and Spanish (Gordin, Tampakis 2015).

Peer-reviewed and outreach journals appeared during the 19th century. They served both to communicate news to scientists, replacing the „invisible college“ and „republic of letters“, and to connect the public to the scientific community.

The first international journals specialising in astronomy appeared in the early 19th century. In 1821, the German-Danish astronomer Heinrich Christian Schumacher founded *Astronomische Nachrichten (AN)*, becoming the leading professional astronomy journal. Schumacher was the AN's editor in 1821-1850. He mainly published letters with reports on observations in the languages submitted in that era. This activity made his observatory in Altona the centre of scientific relations in astronomy. The AN moved with the observatory to Kiel in 1872 and Berlin in 1938.

The *Ciel et Terre* (C&T) was founded in 1880 at the Royal Observatory of Brussels in Saint-Josse-ten-Noode as a French-language outreach magazine.

The *Astronomical Journal (AJ)*, the first American professional journal on astronomy, was founded in 1849 by Benjamin A Gould and modelled on the *AN*. The *AJ* was published with only one break during the American Civil War in 1861-1885. *The Observatory* was founded in 1877, and the *Journal of the British Astronomical*

Association in 1890.

The first outreach magazines on astronomy emerged in the early 1880s. In 1882, Professor William Wallace Payne of Charleton College at Northfield, Minnesota, established *The Sidereal Messenger*, aimed at amateur astronomers and nonprofessionals. After ten years and completing ten volumes, the magazine was replaced by a new magazine, *Astronomy and Astro-Physics*, aimed at amateur and professional astronomers and edited by William W. Payne and Professor George Ellery Hale of Kenwood Observatory.

After this change, Professor Payne renewed his magazine idea for popularising astronomy for teachers, students and other interested readers. In 1893, he launched *Popular Astronomy.* Both *Sidereal Messenger* and *Popular Astronomy* played an essential role in developing amateur variable star observing in the USA in the 1880s-1910s before forming the *American Association of Variable Star Observers* (AAVSO, founded 1911) (Smith 1980). *Popular Astronomy* was discontinued in 1951.

The concept of *Astronomy and Astro-Physics* shifted again in 1895 towards the new field of astrophysics, aiming to create a space to publish its new results. The magazine was renamed *The Astrophysical Journal: An International Review of Spectroscopy and Astronomical Physics (ApJ),* transferred to the University of Chicago and edited solely by George E. Hale (Gingrich 1943).

Other outreach magazines were founded: *Sirius* (Leipzig, 1868), *Bulletin de la Société belge de géographie* (Brussels, 1877), *l'Astronomie* (Paris, edited by Camille Flammarion, 1883-1895, 1910-present, 1895-1910 as *Bulletin mensuel de la Société Astronomique de France*), *Mitteilungsblatt des Bundes der Sternfreunde* (later *Die Sterne*, Stuttgart, 1921).

1.9. Position of astronomy at the university

The general situation at the *Universitas Carolo-Ferdinandea* in the 19th century was closely connected with Czech national revival and the presence of a traditionally substantial and influential German minority, whose position was strengthened due to previous reforms of the Austrian emperors Maria Theresa and Joseph II resulting in Germanization, and immigration from German-speaking states. Most middle and higher social classes spoke German; Czech prevailed as a language of peasants, mostly illiterate. Public servants spoke primarily German, while priests needed to speak both languages.

The Czech National Revival had its roots in the 1770s and culminated in 1830-1848. Many German-speaking inhabitants – mostly labourers, petite bourgeoisie, and the Jewish population – began to claim Czech nationality. The German-speaking population also decreased due to its low population growth and emigration (Rosický 1926).

The number of Czech-speaking students gradually grew. In 1848, Czech was permitted as the second language of university lectures, and both languages were accorded equal rights.

The increasing number of professors lecturing in Czech, Czech students and Czech lectures awakened concerns about the „Czechisation“ of the university on the German side (Čedík 1982).

Therefore, the nationalist section of German academia asked the Austrian government to split the university. The Czech party did not agree because they were worried that the university would not be split equally and they would have problems with a lack of resources, staff and scientific literature. The contemporary Czech society

could not provide their university with conditions comparable to foreign universities. The Austrian government complied with the German side. On 4 April 1881 (with validity from the winter semester 1882/83), the university was split into two independent equal university colleges named *k.k. böhmische Karls-Ferdinands-Universität* (Czech university) and *k.k. Deutsch Karls-Ferdinands-Universität* (German university) by order of Emperor Franz Joseph I.

Establishing language-differentiated universities was not extraordinary in the Austrian Empire. In Zagreb, a Croatian university was established. In Innsbruck and Terst, there were efforts to establish Italian universities, and Galician universities changed into Polish. National political tensions accompanied these changes. The situation in Prague was complicated because the Prague university was seen as provincial by the Austrian government, Prague was the capital of the Czech nation, and the German university was declared the heir of the tradition of the traditional Prague university. The Czech university was regarded as the new one.

The split of the university was not seen as a lucky solution. Departments passed to the possession of the university that its professors decided to join, and the other side was forced to build their department from literally nothing. Until the end of the 19th century, the number of departments doubled, but the capacity of university buildings did not change until the first quarter of the 20th century. Temporary solutions needed to be found. For example, medical faculties took turns in faculty hospital buildings. Other departments leased private rooms. The Czech university struggled with a lack of Czech textbooks. Writing these textbooks occupied the Czech professors. The Czech university could not offer as specialised lectures as the German university did. Therefore, Czech students used to attend some specialised German lectures.

The university observatory, k.k. Sternwarte (State Observatory) in Clementinum had a unique position. It was formally a state institution and connected with the university through the tradition of appointing the Professor of Astronomy at the Universitas Carolo-Ferdinandea as the director of the State Observatory.

Since 1869, the Professor of Astronomy was Karl Hornstein (1824-1882), who decided to join the k.k. deutsche Karls-Ferdinands-Universität. There was six staff at the observatory: a director, an adjunct, two assistants, a clockmaker and a servant. The whole department passed to the German university. The department struggled with financial difficulties because the Austrian government had been neither able nor willing to support the astronomical research financially. Therefore Professor Hornstein had focused on theoretical studies of the Sun and asteroids. The previous professors, Karl Kreil (1798-1868) and Joseph Georg Böhm (1807-1868) focused almost solely on geomagnetism and meteorology. No important astronomical publications were published at their times.

Other problems emerged after reorganising faculties of both universities and the separation of natural sciences and humanities in 1920. The new faculties of science were separated from faculties of arts. In the late 1920s, many departments still resided in provisional rooms and lecture rooms, and much-needed conversion of the buildings from the 1880s was negotiated. These conversions were technically unfeasible and had to be considerably limited. The accreditation of the project by the state administration was slow and criticised by German parliament members.[1] As late as 1936, the Faculty of Arts had no sitting hall, and the dean's office resided temporarily in Clementinum.[2]

[1] National Archives (Czech Republic), Ministry of Education, kart. 1095.
[2] National Archives (Czech Republic), Ministry of Education, kart. 1095.

1.10. State Observatory

The astronomical observatory in Clementinum was founded in 1751, and its first director was Jesuit mathematician and physicist Joseph Stepling (1716-1778). Since 1752, meteorological measurements and observations have systematically been made. The Society of Jesus was abolished in 1773, and the university became secularised. A hundred years later, the tower was still in the same condition. Like his predecessor, Hornstein did not manage to establish an observatory outside Prague or reconstruct the tower. He did not even try to buy new instruments because there was no place to install them. From the 1870s, Hornstein continually ceased making astronomical observations. A meridian telescope did the only continuing observations to determine the time and check the clock.

1.11. Astronomical institutes

The first Czech professor of astronomy, B. Bečka (1853-1908), was appointed in 1883, but in 1885, he fell ill and stopped lecturing. In 1885, August Seydler was appointed the professor of both theoretical astronomy and mathematical physics. The two professorships remained interconnected until 1891, when Seydler died. The former adjunct of the German Astronomical Institute Gustav Gruss and professor of mathematics Vojtěch Šafařík were appointed Professors of Astronomy. František Koláček, who had been suggested for the chair of mathematical physics already in 1882, was appointed Professor of Mathematical Physics. Seydler carried through the

establishment of „The Astronomical Institute“ in 1887, but the institute came into existence physically only in 1889, when Seydler negotiated the rental of rooms in a villa at Letná in Prague, where a temporary observatory was built.

Both institutes started with unsatisfactory conditions, deficient or belated instruments and a few staff. While Weinek noted the improper position of the Clementinum observatory in the centre of Prague, Seydler named his new department „Astronomical Institute“ with commas and the institute published under this title for more than ten years. Like their predecessors at the undivided Prague university, none of the new directors managed to procure the establishment of an observatory outside Prague.

2. Development of astronomy

From the viewpoint of generation units and schools of thought, the first half of the 19th century in Czech lands was linear. There was only one State Observatory in the Clementinum astronomical tower with a stable staff – a director, an adjunct, two assistants and a demonstrator – and unpaid student assistants. One of these assistants was František Nušl, the future central persona of Czechoslovak interwar astronomy.

The last professor of astronomy before the split of the university was Karl Hornstein (1824-1882). His research focus was primarily determined by the circumstances and limitations of the observatory. The Clementine tower was reconstructed in 1752 and practically remained temporary. Smaller instruments could be assembled on the metal gallery of the tower's upper floor or inside the tower between the gates, which significantly reduced the scope of observation. Emperor Francis Joseph II gifted the observatory new instruments, but there was no place to install them, so they remained unpacked in boxes for many years. From the government's main point of view, the observatory's main task was to determine the time by observing the transit of celestial bodies through the local meridian.

Furthermore, it was possible to make only everyday routine observations like eclipses of celestial bodies, culmination, lunar movements, etc. Therefore, Hornstein focused on theoretical astronomy and practical observations of terrestrial magnetism and meteorological phenomena. Astronomical observations were continually limited to observations by meridian telescope for determination of exact time and adjustment of the clock. Assistants made the absolute magnetic measurements. These were very difficult and are described by Václav Rosický: *„Apart from meteorological*

observations, it was mainly subtle and quite tricky magnetic absolute observations, especially measurements of the horizontal component of magnetic intensity when it was necessary to stand motionless with one foot on a chair even in winter in the cold and observe magnet oscillations and record transits in the middle position according to the chronometer. Then there were observations, actual measurements, magnetic declinations and inclinations. From astronomical observations, only the determination of time by the transit of the Sun through the meridian telescope took place. Seydler did not frustrate his experience in all this work and sought to train us as good observers. He was a sincere and friendly soul, and he liked to share his rich experiences with us" (Rosický 1926)[3].

2.1. Astronomy at the German university

The year 1882 was the turning point for the continuity of traditional university astronomy. Professor Hornstein decided to join the German university. The professor's decision determined to which university his institute would be assigned. Therefore the German university became the temporary heir to the Prague astronomical tradition. However, Karl Hornstein died in 1882. Ladislaus Weinek, known internationally as a

[3] *"Mimo pozorování meteorologická byla to především jemná a dosti obtížná pozorování magnetická absolutní, zvláště měření horizontální složky magnetické intenzity, kdy bylo nutno i v zimě za mrazu státi nehnutě jednou nohou na židli a pozorovati kyvy magnetu a zapisovati průchody střední polohou podle chronometru. Dále to byla pozorování, vlastně měření, magnetické deklinace a inklinace. Z astronomických pozorování konalo se jen určování času pomocí průchodu Slunce poledníkem. Při všech těchto pracích Seydler neskrblil svou zkušeností a všemožně hleděl vycvičit nás na dobré pozorovatele. Byla to duše upřímná, přátelsky sdílná a ráda s námi sdílela své bohaté zkušenosti."*

pioneer of astrophotography, succeeded him in 1883. Weinek had no previous relation to the Prague university and established his own tradition in Prague.

One of Hornstein's collaborators and pupils was Gustav Gruss (1854–1922), who worked at the State Observatory from 1975 to 1977 as an unpaid student assistant and since 1881 as an adjunct. He spent nine years under Weinek's leadership and then went to the Czech university, where a professorship was vacated after August Seydler's death in 1891.

After Gruss left, Rudolf Spitaler, who had worked as an observer of the Vienna observatory, took his position. There he discovered several comets. In Prague, he soon switched focus and established the tradition of cosmic physics at the German university. In 1901, Spitaler left the observatory. He then habilitated and was appointed professor at the university and the German technical university. In 1908, he founded the Institute for Cosmic Physics.

At the State Observatory, Spitaler was succeeded by Arthur Scheller. Scheller remained at the observatory after Weinek's death in 1913 and during World War I, when the observatory worked in a restricted mode of meteorological services for the military.

From 1897 to 1900, the Vienna astronomer Egon von Oppolzer (1865-1907), son of Czech mathematician and astronomer Theodor von Oppolzer (1841-1886), worked at the State Observatory. He also lectured at the k.k. deutsche Karls-Ferdinands-Universität in these years. He was appointed Privatdozent there. In 1901, von Oppolzer was appointed the Professor of Astronomy in Innsbruck, but he cooperated with the State Observatory – for example, with Ladislaus Weinek on pole motion observations.

Another external co-worker of the German Astronomical Institute was Samuel Oppenheim (1857-1928), who lectured on celestial mechanics, mathematics, geography,

physics of solar system bodies, and history of astronomy from 1900 to 1911. In 1911, he left for the full professor of astronomy position in Vienna.

In 1917, the new professor and director of State Observatory Adalbert Prey arrived at the observatory. The following year, after the Czechoslovak Republic was established, the German university lost the State Observatory, and Scheller left for Innsbruck and took the position of extraordinary professor. Prey then worked for two years in provisional arrangement and, in the early 1920s, began building a new astronomical institute.

2.2. Astronomy at the Czech university

The Czech university had no astronomical department and observatory in the early 1880s, but the astronomy education was personally provided. August Seydler habilitated in 1881 for theoretical physics and left the university observatory before the split of the universities. Still, he was already engaged in theoretical astronomy and sought to establish an astronomy department at the Czech university.

The first attempt was the appointment of Bohumil Bečka (1853-1908), a professor of astronomy. However, in 1885 Bečka fell ill and stopped lecturing at the university.

The subsequent request for the chair of astronomy, merged with the chair of theoretical physics, was submitted in 1885. Seydler states in its preamble: *„It would be useless to prove how vital place astronomy enjoys among the exact sciences, the best proof for that being that astronomy is taught at all, even relatively small, universities; and we can boldly say that a university where this field would not be represented, is*

inappropriate to be called complete. In this case, however, it would be up to us to work to ensure that this teaching is also adequately represented at the Czech university.“[4]

In 1885, Seydler was appointed the full professor of theoretical astronomy and mathematical physics. These plans proved too extensive when no Czech university textbooks existed, many institutes did not have any background, and the tradition of Czech professional lectures was not yet established. Seydler soon began to strive for the split of the professorships, which was only achieved after Seydler died in 1891. Three successors were appointed: professors of astronomy Vojtěch Šafařík (1829-1902) and Gustav Gruss (1854-1922), and professor of mathematical physics František Koláček (1851-1913).

The establishment of the Astronomical Institute did not succeed until 1887. It was connected with negotiations with Minister Baron P. Gautsch, who *„was known for his excellent relationship with universities“* (Strouhal 1914). Gautsch visited Prague in January 1886, when he was 34 years old, inspected university institutes and even described one as a *„European scandal“* (Goll 1908). Seydler handed him a memorandum on establishing an astronomical institute on that occasion. Subsequently, in February, Seydler submitted more specific proposals to the Faculty of Arts.

Although Seydler held the position of professor for only six years and the institute was not established until 1889, he created a large part of the first Czech textbook of theoretical physics and Czech astronomical nomenclature. Seydler did not

[4] *"Bylo by zbytečno dokazovati, jakové důležité místo mezi vědami exaktnými zaujímá astronomie, nejlepší důkaz toho ten, že na všech, také na docela malých univerzitách astronomie se přednáší; a možno směle tvrditi, že vysoké učení, na němž by tato nauka zastoupena nebyla, ani nesluší nazvat úplným. Ve však ém případě teda náleželo by nám pracovati k tomu, aby tato nauka také na české univerzitě náležitě zastoupena byla . "*

train the next generation of astronomers, but he greatly influenced his generation. His textbooks on fundamentals of theoretical physics *Základové theoretické fysiky* was completed by František Koláček, and the planned textbooks on theoretical astronomy *Základové theoretické astronomie* were finished by Gustav Gruss based on Seydler's concept.

Seydler mainly published in Czech (49 papers in the Journal for the Pursuit of Mathematics and Physics, ten papers published by the Royal Bohemian Society of Sciences, four textbooks, five books, two outreach books and several other publications) and only about a sixth of his publication was in German (7 books, five papers in Astronomische Nachrichten). The low number of papers published in international journals was both influenced by the emergence of many Czech outreach magazines and journals during the culmination of the Czech National Revival and the birth of Czech science around the mid-19th century and by the situation of the CzAI, that Seydler's generation had to built for the research to begin fully.

Seydler's successor Gustav Gruss, the student of Hornstein and Weinek, took over the building of the CzAI. His focus was on theoretical astronomy, and he soon began observing variables. Because of the situation of the CUNI, which did not have any Czech textbooks, Gruss participated in creating textbook, which was not necessary at the German university, and outreach books. Apart from this, he published mainly in the German professional journal Astronomische Nachrichten, like many professional astronomers from abroad, and did not much focus on Czechoslovak outreach journals, unlike other members of the Czech professoriate. On the other hand, Gruss wrote an influential Czech outreach book in two volumes named *Z říše hvězd (From the Realm of Stars,* (Gruss 1896)*)*, whose name the journal *Říše hvězd* (*The Realm of Stars*, 1920-

1990) carries.

Since ca 1910, G. Gruss was greatly limited by his health problems, and František Nušl substituted his lectures.

In 1915, Gruss officially retired, and until 1919, the physicist Bohumil Kučera temporarily managed the institute.

In 1916, Gruss' pupil Vladimír Václav Heinrich returned from abroad and became the director of the astronomical institute in 1919. In 1925, the chair of astronomy at the Czech University was divided into theoretical and practical. The following year two new professors were appointed – V. V. Heinrich for theoretical astronomy and Fr. Nušl for practical astronomy.

František Nušl had been focused on practical astronomy and astronomical instruments since his youth. At the lower grammar school in Jindřichův Hradec, he met his classmate Bohuslav Mašek, and they built small telescopes of spectacle glass and made astronomical observations. Later, they met at the university as assistants of Professor of Physics Čeněk Strouhal and as teachers at secondary schools in Hradec Králové. They published the results of their observations in the Czech journal *Živa. W*hen they were transferred to Prague, they cooperated with the Frič brothers in the construction of the Ondřejov observatory and later worked there. Nušl thus focused mainly on the Ondřejov observatory and, due to his busy schedule, took leave from high school and later from the Czech university. He engaged mainly in supporting the community of amateur astronomers and popularising astronomy. The nature of his publishing activities is thus similar to Seydler's.

Heinrich and Nušl thus began to represent two very different approaches. They differed in the approach to the popularisation of science, which Nušl emphasised, while

Heinrich regarded it as unnecessary. While Heinrich maintained international contacts as part of his focus on the three-body problem, Nušl focused on broader cooperation in the Czech astronomical community. Both stood aside from academia. During the 1930s, disagreements escalated between Heinrich and the Faculty of Science due to organisational problems. The disputes resulted in Heinrich‘s dismissal from the position of director of the Astronomical Institute, which was then temporarily taken over by physicist V. Trkal. Echoes of this situation are still evident in the astronomical community from oral history interviews[5] and informal conversations between astronomers.

2.3. Institute for Cosmic Physics

In 1908, the Institut für kosmische Physik (Institute for Space Physics) was founded. Rudolf Spitaler became its first director. The institute resided in Liliová 16 and had a permanent staff of three: a director, an observer and a demonstrator. Spitaler’s student and future successor Leo Wenzel Pollak occupied the position of a demonstrator. The observer was Franz Löppen, replaced by Winzenz Miksch in 1914. In 1914, the institute arranged its offices in Liliová Street 16 in Prague. After the breakout of World War I, the State Observatory focused only on meteorological service for the needs of the army and scientific activities were postponed.

After World War I, Spitaler began specialising in palaeoclimatology. His book

[5] Interviews with Jiří Grygar (Czech Academy of Sciences, 14 June 2019), Pavel Mayer (Charles University, Astronomical Institute, 3 May 2017), Luboš Perek (narator’s apartment, 4 April 2017).

Das Klima des Eiszeitalters (Spitaler 1921) contributed to the discussion about the origination of Earth's glacial periods by precession and tilt of Earth's axis and changes in Earth's orbit's eccentricity. Spitaler opposed the contemporary Croll model (Croll 1875), which presumed that the decisive conditions for the formation of an ice age in the southern or northern hemisphere of the Earth are the winter solstice far from the Sun with a markedly eccentric orbit of the Earth and a minimal inclination of the Earth's axis. Spitaler adhered to the model of long cold summers and short, mild winters. Also, Brückner, Köppen a Wegener in 1925 (Wegener, Köppen 1924) marked the cold summer half of the year as crucial for the formation. The complete astronomical theory was calculated in 1941 by Milanković (Milanković 1941).

In 1929, after Spitaler retired, the chair of cosmic physic was converted to the chair of geophysics, as cosmic physics split into multiple related fields. The Institute of Cosmic Physics was formally discontinued but factually existed as the Geophysical Institute.

Spitaler's successor Leo Wenzel Pollak (1888-1964), focused on the new punch cards system of James Powers and Herman Hollerith (Kistermann 1999). In the late 1920s, he turned his attention to the amount of meteorological data from the last few decades, which could not be fully processed using existing methods. In 1927, he processed barometric data from 111 European meteorological stations from 1904 to 1913 (Pollak 1927) and, in 1928, the geomagnetic data (Pollak 1928). Pollak established the punch card network of meteorological stations in the Czechoslovak Republic, from which the data on punch cards were sent to Prague.

In March 1939, after the Nazi occupation of Prague, Pollak and his family emigrated to Ireland. Pollak then took a position in the School of Cosmic Physics at the

Dublin Institute of Advanced Studies.

3. Studies

Though Czech science was starting from scratch, German astronomers never prevailed in the number of lectures. While there was only one professor of astronomy at the German university until its dissolution in 1945, there were two periods where the Czech university had two of them – in 1891-97 and 1926-38. On the contrary, the German chair of astronomy was vacated in 1930-37 without any substitute lecturer.

The lectures on astronomy and cosmic physics at both universities are listed in Hyklová 2010.

Until the second half of the 1930s, students were divided into fields at both universities. Only their affiliation to faculties and subjects they enrolled in can be ascertained from the catalogues of students. Therefore when collecting data in the catalogues of students of Czech and German universities, I limited the sample to those who enrolled in astronomy and/or cosmic physics. Until the yearbook 1900, I researcher every annual volume. Due to the time-consuming nature of data collection and the four-year standard length of study, I viewed catalogues for every fourth academic year from 1900. I included the winter term of 1939, when the Czech universities were closed by the Nazi administration. I recorded all students who finished four years of study by this practice. The number of students who left university after three years or less is probably higher.

Thus, I obtained biographical and study data on 889 students of both universities from 1882 to 1939 who engaged in astronomy. Of there 889, 254 studied at the German university; 75 passed the state teacher qualification exams, 34 the doctoral state exams and 35 both exams, while 110 did not complete their studies. At the Czech university, of

635 students, 132 passed the doctoral state exams, 92 passed the teacher qualification exam, 36 took both exams, and 372 did not complete their studies.

Many students who engaged in astronomy focused on teacher qualifications for physics, geography and history because the topics of many lectures extended to geography and history of science, and astronomy was taught as a separate subject at grammar schools. The German Professor of Astronomy Prey engaged primarily in geography, even being a director of the Geographical Institute of the German university. German Professor of Cosmic Physics Rudolf Spitaler was a member of the state commission for teacher qualification exams.

In addition, many students who planned a career in science passed the teacher qualification exams. The number of assistant positions at university research institutes was minimal; during the whole era of the existence of dual Prague universities, there were no more than two paid assistant positions at astronomical institutes. New assistants were usually unpaid for the first two years. A secondary school teacher position provided a paid position in the state administration, from which they could be partially or wholly released for research work. For example, František Nušl was employed in this way for many years, having full leave from the teacher position and being officially assigned to the Ondřejov observatory[6].

Because the departments of German and Czech universities in Prague (two polytechnics and two universities) were often located on the same premises, the students were not physically far from the „other“ university and could study there as extraordinary students. Language, cultural and social barriers posed a far more

[6] Archive of the Charles University, fond Faculty of Science, carton 14, Inv.No. 102.

significant problem. Equality of Czech with German was largely only formal before the split of the universities, and most Czech-language professorships and departments were established only in the 1980s. The Czech national revival had been in progress for the previous century. The inhabitants of the Czech lands have polarised towards the Czechs and the Germans. Czech science constituted since the first half of the 19th century. Many scientists and researchers have presented themselves as Czech patriots. The language barrier was less permeable from the German side because many German-speaking students did not speak Czech. Czech courses were offered at the universities, but astronomy students had no interest in them.

The trend of students' enrolment at both universities would need to be examined in a much larger sample of students. The sample of astronomy and cosmic physics students includes extraordinary enrolments of regular Czech students for lectures at a German university, which did not exceed several per year. However, this data set proved too small, and the results are statistically insignificant. Extending the file to entire universities would be necessary to identify more significant trends.

Therefore, in the analysis, I focused on the influences of local significance, such as the arrivals and departures of academics to universities and establishments of observatories. I assumed that the trend of extraordinary enrolment of Czech students at a German university would be affected by recommendations of Czech academics, who were engaged in time-consuming activities to establish foundations of Czech science and did not have time for more than fundamental lectures; and the presence of internationally established scientists Ladislaus Weinek and Erwin Freundlich at the German university.

Foreign genealogies of astronomers and mathematicians *Mathematics Genealogy Project* and *Astrogen* are focused on the formative phase of a scientist's life. These could

be quantified by utilisation of data on supervisors, „de facto supervisors“ (often in Russian-speaking countries), mentors, consultants etc. from the first pages and Acknowledgments in work itself and in the data in university records of doctoral examinations and graduations (in German-speaking countries, supervisors are sometimes also promoters).

The *Mathematics Genealogy Project (MGP)* engages in astronomers only to a small extent, but its scope also includes European countries (Jackson 2007). AstroGen, which openly endorses the legacy of MGR, is the project of the Historical Astronomy Division of the American Astronomical Society and studies astronomy directly (Tenn 2016). It currently has mapped the United States and some Western European countries. Researching the dissertation is an integral part of research into astronomy education. The list of defended dissertations of the German university was partially published in Hyklová 2007.

4. Institutional conditions

4.1. State Observatory

The Astronomical Institute of the Charles-Ferdinand University was seated in *k.k. Sternwarte*, the Astronomical Tower and rooms on two floors underneath, and the director's government quarters.

From the legal viewpoint, the observatory was neither a part of a university nor an educational institution. It was an independent state institution, connected to the university only by its director, to whom a university professor was traditionally appointed. In 1919, František Nušl argued the observatory and its director are distinctly separated from the educational function of the university and, therefore, should have been neutralised like the university library (Nušl 1919). Unlike the botanical garden (Čermáková 2016), both the library and the observatory were indivisible. As the observatory had been under the jurisdiction of the former empire, it was a quasi-independent state institute.

In the 19th century, the observatory itself had no importance for practical astronomy, as light pollution and noise of the expanding city disabled any astronomical observations. In 1882, the professor of astronomy Karl Hornstein decided to join the *k.k. deutsche Karls-Ferdinands Universtät*, and the institute was transferred to the German Charles-Ferdinand University.

The university was continually trying to narrow the privileges of the observatory. To prevent that, the director of the observatory Ladislaus Weinek asked the Austrian ministry of education and culture to acknowledge these privileges and received the

decision of the Austrian government, which *„observatory is an integrating part of the German university, but its special privileges are acknowledged“*[7]. In 1886, the observatory lost the rights to direct correspondence with the Bohemian viceregency. In 1891, Weinek filed a complaint on the title of *„k. k. böhmische Sternwarte in Prag“*, under which the observatory published in *Astronomische Nachrichten*. Weinek refused the affiliation of the observatory to the k.k. deutsche Karls-Ferdinands-Universität, as it was formally an Austrian state's observatory. The vicegerency confirmed that *„in der königlichen Hauptstadt Prag existiert bisher weder eine „deutsche“ noch eine „böhmische“ Sternwarte, sondern lediglich eine k. k.-Sternwarte“ („In the royal city of Prague there is no „German“ or „Bohemian“ observatory, but only a Imperial-Royal Observatory“)*.

4.1.1. Dispute over the State Observatory

The Austro-Hungarian Monarchy dissolved into seven independent national states in autumn 1918. The new Czechoslovak Republic was established on 28 October 1918 and formally proclaimed on 29 October 1918. These political changes resulted in extensive changes in Czechoslovak university education implemented until the 1930s.

Act No. 135/1920 Coll. and n., on the relation of Prague universities, formally rectified the relationship of both Prague universities on 19 February 1920. The *Czech Charles-Ferdinand University* was renamed back to *Charles University.* The *German Charles-Ferdinand University* was to be renamed by another law. Such law was never passed, but the title *Deutsche Universität zu Prag* was used during the First Czechoslovak Republic era (1918-1938). The Czech university was formally declared

[7] *„hvězdárna je integrující součást německé university, ale že se uznávají její zvláštní privilegia“*

the legatee of the traditions of Prague university, while the German university was considered a new one. Property, which both universities still owned, was divided between them or allocated to one of them. To respect the German minority, this process was finalised in 1934. The State Observatory was an exception, as the dispute over its ownership had already been over.

At the initiative of František Nušl and J. J. Frič, a request for the takeover of the observatory was written and submitted to the National Committee through Deputy Bohuslav Vrbenský (Zíková 2002).

On 9 November 1918, the Czech Astronomical Society proposed the entrance of the State Observatory into the state administration. This proposal was based on the status of the observatory and previous statements of the Austrian-Hungarian government. For this occasion, František Nušl wrote a *Memorandum concerning the historical background, significance and the immediate consequences of the takeover of the Prague Observatory into the Czechoslovak state administration*[8]. He concludes: *„ It also implies that today when Prague is the centre of an independent state, the only one explicitly Prague observatory is undisputed property of the state. In addition, if the Austrian government used to decide on it and not the academic authorities, then the Czechoslovak government decided on it in at least the same right. Therefore, the protest of prof. Dra. A. Prey, which he attached to his signature as director of the observatory, handing over - according to the government order - the observatory to my temporary*

[8] Memorandum vzhledem k historickým podkladům, významu a nejbližším důsledkům převzetí pražské hvězdárny do státní správy československé, 1918.

administration, is not justified“ (Nušl 1919b)[9].

The State Observatory was officially taken over on 19 November 1918. Associate Professor František Nušl of the Czech university, who was appointed the temporary administrator of the observatory, and Professor Adalbert Prey of the German university signed the takeover report. Jiří Kaván accompanied Nušl. Prey entered a protest *„gegen die Übernahme der Sternwarte, da es sich um ein Institut der deutschen Universität handelt, über welches die Verfügung ausschliesslich den akademischen Behörden zusteht“*. The protest was dismissed.

The observatory was officially renamed the State Observatory of the Czechoslovak Republic. Bohuslav Zemek described the observation conditions as follows (Zemek 1920): *„not only smoke from the surrounding chimneys pollutes the air, but also sun-heated roofs disrupt the stability of temperature and refraction until late at night. In addition to these disturbing features comes into consideration even the fact that the tower itself does not stand on stable ground, but that it is often shaken by traffic on local roads*[10]*„* (Zemek 1920).

For practical purposes, the Clementinum observatory was not suitable. According to Nušl, this problem could have been solved *„without many costs, if the present old rooms were subsequently adapted into modern workrooms, in which*

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[9] *„Z toho dále vyplývá, že dnes, kdy Praha je střediskem samostatného státu, je tato výslovně jediná pražská hvězdárna nesporným majetkem tohoto státu. A jestli dříve právem o ní rozhodovala rakouská vláda a nikoli úřady akademické, pak také v novém státě aspoň stejným právem o ní rozhoduje československá vláda. Proto není oprávněn protest prof. Dra. A. Preye, jejž připojil ke svému podpisu jako ředitel hvězdárny, předávaje – dle nařízení vlády – hvězdárnu do mé zatímní správy"* (Nušl 1919b).

[10] *"nejen dým z okolních komínů znečišťuje ovzduší, ale i sluncem vyhřáté střechy ruší až do pozdních hodin nočních stabilitu temperatury a lomu paprsků. Kromě těchto rušivých vlastností přichází v úvahu ještě okolnost, že věž samotná nestojí na klidné půdě, nýbrž, že bývá místní komunikací otřásána"*

materials gained from a perfectly equipped and near Prague properly located observatory, assigned only for observation purposes, would be calculated, theoretically and literary processed“.[11]

František Nušl was appointed the first director of the State Observatory of the Czechoslovak Republic. However, he spent most of his time outside Prague at the Ondřejov observatory. Therefore in 1920, he asked his former pupil Otto Seydl to be relocated to Prague as his deputy. Seydl subsequently took the whole administration of the State Observatory, including the later attached Ondřejov observatory. In 1936, Seydl began to manage the financial issues, and when Nušl retired in 1938, Seydl became the institute's manager.

The whole inventory of the State Observatory, including instruments, teaching aids, apparats, museum, library and remaining subsidy money, were overtaken. The German Institute retained an extraordinary subsidy for furnishing workrooms to install new, more proper rooms, and access to instruments and library until given a new own institute. Prey continued living in government quarters in Clementinum until he was granted new housing. He lived in Clementinum until 1930, when he moved to Vienna.

Most of the „old” European state observatories, located in cities, were conserved in the state before astronomy research moved to the „new” modern observatories outside human settlements and continued to serve as a museum of astronomy. This is not the case with the State Observatory in Prague. This space evolved into the workspace for

[11] *"možné bez velikých nákladů, upraví-li se dosavadní staré místnosti postupnými adaptacemi v moderní pracovny, v nichž by se laboratorně, počtářsky, theoreticky a literárně zpracovával materiál získaný pozorováním na dokonale vypravené a nedaleko Prahy vhodně položené observatoři, jež by byla věnována jen účelům pozorování"*

processing the observed material from the Ondřejov observatory. In the early 1920s, the photo laboratory for processing negatives from Ondřejov was built there (Klepešta 1972).

4.1.2. The significance of the State Observatory

According to the founder of the Czech Astronomical Society, Josef Klepešta, *„ when the state took over the observatory in 1918, its significance was over, "*[12] and *„ after the introduction of the radio, the four gates of the tower were closed, and the tower stood here as an anachronism at the time of the upcoming development of astrophysics"*[13] (Klepešta 1972).

From the public's point of view, the traditional main task of the State Observatory was time service. The actual solar noon in Prague and its immediate surroundings have been determined since the middle of the 17th century utilising the Marian column in the Old Town Square and the local meridian marked by three strips of paving stones. Thus, it defined Prague time. The Marian Column stood until 1918, when it was demolished as a supposed symbol of the Habsburg monarchy.

During the 19th century, a meridian hall with a transit instrument was set up in the Clementine Tower, which enabled the exact determination of the solar noon and a subsequent calculation of the mean noon. The observations were instrumental in checking the Reifler astronomical clocks located in an unheated room, according to which the noon was announced. At the moment of noon, an assistant waved a flag from the gallery of the tower. With the increasing demands on time accuracy, it was necessary

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[12] *"když byla v roce 1918 hvězdárna převzata státem, byl již její význam skončen"*

[13] *and "po zavedení rozhlasu byla čtyři vrata věže uzavřena a věž zde stála jako anachronismus v době nastávajícího rozvoje astrofyziky"*

to transfer the exact time from the clock to the tower. For this, a stopwatch and a telephone were used.[14] From 1891 to 1926, a „noon shot“ followed, fired from a cannon at the bastion of the XIX city fortifications in Hradčany.

In the early 1920s, thanks to the proliferation of radio stations among the public, radiotelegraphic signals from transmitters on the Eiffel Tower (the time of the Paris Observatory) and Nauen (the time of the Naval Observatory in Hamburg) began to gain ground. These signals were accurate to tenths of a second.

In 1926, Radiojournal began broadcasting a time signal once a day at 22:00 on a 368 m wave in cooperation with the State Observatory (R. 1926).

The signal was controlled by a primary clock synchronised with the secondary Koska clock, adjusted according to rhythmic signals from Paris and Nauen. The synchronisation device was the work of the State Observatory director František Nušl. The primary clock was modified to transmit the time signal automatically, which was transferred by telephone line to the Strašnice radio station. The signal used the Greenwich Marker Scheme (R. 1925).

In 1940, the Protectorate authorities to Budečská Street No 6 evicted the State Observatory from Clementinum. The staff were only allowed to use the laboratory in the Clementinum cellar. The State Observatory moved to the fourth floor of an apartment building in Humboldtova (Budečská) No 6 at Vinohrady. There they worked on theoretical and historical research and processing of observations from Ondřejov. Both clocks were also moved, and the signal continued to be transmitted from this workplace to the Main Post Office and Czech Radio. As the research work required more room,

[14] Letters from Otto Seydl’s personal archive.

light and electricity, the observatory rented rooms in the Frič workshop[15].

Historical inventory and meteorological observation station remained in Clementinum. The Clementinum meteorological observations continued and were made by the staff of the State Meteorological Institute[16].

Until 1925, regular measurements of magnetic declination were performed from the „magnetka“ room. Further measurements were made impossible by constructing the reading room of the university library, which contained a lot of iron.[17]

4.2. Czech astronomical institute

August Seydler upheld the official establishment of the first Czech astronomical institute in 1887. As the institute did not exist until 1889, and even after 1889, its settings were only temporary, Seydler wrote the department's name in brackets.

He planned to locate the new university observatory in the upper parts of Bubeneč park. At the beginning of 1887, he had plans drawn up at his own expense and submitted for approval. In 1888, Seydler acquired another government funding, but the German astronomical institute also requested funding for a new observatory. The government, supposing there was no possibility of building two observatories in Prague, decided to build none. In May 1888, the plans for building a new observatory in Bubeneč were dropped.

Therefore, in 1889 Seydler negotiated a tenement of Jan Kindl's villa on

[15] Archive of the Czech Academy of Sciences, fund State Observatory.

[16] Archive of the Czech Academy of Sciences, fund State Observatory.

[17] Personal archive of Otto Seydl.

Ovenecká 80 at Letná for ten years and the building of an observation pavilion.

In 1890, the building of a temporary observatory began. The observatory was built in the garden by Seydler's blueprint. It consisted of a wooden pavilion with a 4-meter dome and two additional shelters to construct the transit instrument in the meridian and the prime vertical.

Since 1887, Seydler used all available sources for providing instruments for the observatory.

In April 1887, he obtained several instruments from Vienna's abolished k.k. court astronomical and physical cabinet, including two achromatic Dollond telescopes with 95 and 68 mm diameter lenses and 160 and 115 cm focal lengths. The devices were sent to Prague a month later and temporarily placed in Seydler's apartment in Letná.

Seydler also purchased an ocular prism, a universal spectroscope, and a polarising helioscope with a telescope from government funding.

Seydler purchased larger instruments from estate of amateur astronomer Brödel in Stontsch by Pegau in Saxony:

- Reinfelder & Hertel refractor
- Angled transit instrument (lens 54 mm, f/64 cm)
- Strasser a Rohde clock.

As the university funding was insufficient for this purchase, Seydler lent his own money (Šolc 2005).

In 1900, the lease contract for Jan Kindl's villa expired, and the institute had to move because its close neighbourhood had been primarily built up in preceding years, which worsened the observation conditions.

Initially, the building No. 796 in Královské Vinohrady[18] was leased, but the contract was recalled because of inconvenient dispositions of the building (Kovář 1983).

At the end of the year 1900, the Astronomical Institute moved to a villa at Smíchov No 635 (today Švédská street), leased from k.k. Chief Engineer Vilém Weingärtner. The building was divided into a flat for the professor, one classroom for approx ten students and rooms for collections and teaching aid. The temporary observatory was built on the backside of the garden.

In the first years of the 20th century, Čeněk Vincenc Strouhal (1850-1922) procured the construction of new buildings in the street U Karlova (today Ke Karlovu) for the scientific institutes of the Philosophical Faculty of the Czech university. However, the space for the astronomical institute and the observatory was not included because the building plan did not technically allow the observatory's construction.

In 1909, the lease of Villa Marie at Koperníkova 308, Vinohrady, was being negotiated, but there was no movement, probably due to the lease being too high.[19] The reason for searching for the new building is not stated. Still, the institute had been located in the developing industrial zone of Smíchov, and *„adversity of the Austrian government, which began to favour only the Prague Institute of German University, had manifested"*[20] and therefore, the Czech institute did not receive any money for necessary repairs of the house (Heinrich 1935). In 1917, the building and dome had no lighting. The basement was affected by mould and rat and mice infestation, and the temporary

[18] Letter from viceregendy to office of the dean of Philosophical Faculty of the Czech university, č. 165.939 z 17. 9.1900

[19] Letter from viceregendy to office of the dean of Philosophical Faculty of the Czech university, č. 161797 z 4.9.1909

[20] *"projevila nepřízeň rakouské vlády, která počala favorisovati výhradně pražský ústav university německé"*

director asked to find a new location for the institute.[21]

The institute had only two fully systemised positions of director and adjunct, which were the only professional paid positions in Czech lands. The observatory usually had one or two unpaid assistants. One assistant position was established in 1920 but was discontinued after Kaván's departure to Stará Ďala. The position of the demonstrator was not fully established until the 1930s. Due to the crisis after the Great War, the Czechoslovak government decided to stop accepting new employees for both new and vacated positions in civil services in 1924, which meant that every vacated position could be discontinued. At the same time, the private Ondřejov observatory employed seven scientists (1928) and later eight (1938); however, some of them worked as teachers or academics and were only attached to the observatory.

The precision mechanic Jiří Brejla had worked at the mechanical workshop of the institute since 1921. In the 1920s, the workshop manufactured electrical and radio station equipment, a modern impersonal micrometre, installed a Wolff camera, and constructed a Graf photometer and a new clock drive. It also reconstructed a transit instrument and installed the equatorial instrument with a concave telescope axis presented at the Brno exhibition of 1928 (Heinrich 1935).

The establishment of the new Czechoslovak Republic did not improve the situation. In 1922, the professoriate commission that discussed the future of astronomical institute stated: *„there is no hope of building a definitive astronomical institute in the near future, and further that the existing temporary rooms are relatively*

[21] Letter from B. Kučera to office of dean of Philosophical Faculty on 5 June 1917

well suited to their purpose"[22,23]. Therefore, the lease of the Švédská building was prolonged. However, at least since 1921, there had been differences between the villa's owner and university professoriate regarding house and garden services. These problems were not solved even in the 1930s when the dean wrote to Ministry for Education and National Education that due to the deficit of finance for science and research, „ it is not yet possible to design plots suitable for constructing *a new astronomical institute „*.

In addition to official delays, lack of funding for science and research was a reason for this situation during the First Republic. Requests for special grants were often rejected, payments of bills were protracted, and the government issued austerity measures. In 1924, the government decided to stop hiring new employees in the civil service, including re-filling vacancies. After each personnel change at the scientific institutes, there was an impendence that the position would be cancelled.

The situation may also have been influenced by the tense relations between the two professors of astronomy, František Nušl and Vladimír Heinrich, and the Faculty of Science.

Nušl concentrated on building the Ondřejov Observatory and was even appointed professor *„at the Ondřejov Observatory„ in 1926. Already in 1915, when Gustav Gruss retired, Nušl was asked to apply for a professorship, but at that time, he „did not want to determine"*[24]. He often applied for leave from lectures at the university to focus on the observatory. In 1937, he was asked to apply for retirement and was released from

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[22] *"není v nejbližší době naděje na vybudování definitivního ústavu astronomického, a dále, že dosavadní provisorní místnosti poměrně dobře vyhovují svému účelu"*

[23] Copy of the protocol from 14 December 1922 for the faculty.

[24] Archive of Charles University, fond Faculty of Science, carton 14, Inv.No. 102.

academic degrees and the management of the State Observatory. Since the 1920s, Nušl has focused mainly on building the observatory in Ondřejov. Still, he regularly participated in faculty meetings, and his role in solving the problems of scientific life is emphasised in the documents. Professor of Mathematics Karel Petr described Nušl in 1928*: „Whenever he saw something harmful in our scientific life, he always dared to speak out against it with a great deal of perseverance. He fought several battles, whether in his teaching position or as a member of some scientific corporation. He was not always successful, but whenever I could see it as a participant, I believed he was right"*[25] (Petr 1928).

Heinrich, who lived and worked at the Smíchov Astronomical Institute, did not participate much in the life of the astronomical community and faced protracted difficulties in the organisational and administrative affairs of the institute. In the 1920s, his relations with the faculty cooled. Organisational problems included waiting for the vacancy of a service apartment at the observatory site, which was still assigned to an assistant who no longer worked at the observatory and leased it to his brother, disputes with the building manager over the entry of strangers, and delays in renovating the building. In the 1930s,

The problems escalated considerably in the first half of the 1930s. The faculty accused Heinrich of „administrative incompetence", „neglect of popularization of science", and „illegal occupation of the apartment" (Heinrich 1935). Disputes with two

[25] *"kdykoli v našem životě vědeckém viděl něco škodlivého, měř vždy odvahu proti tomu vystoupit a to s velikou dávkou vytrvalosti. Probojoval řadu bojů, ať to již bylo v jeho postavení učitelském, anebo člena některé vědecké korporace, jíž přináleží. Neměl vždy úspěch, avšak vždy, pokud jsem to mohl jako účastník pozorovati, podle mého přesvědčení měl pravdu."*

employees emerged, which resulted in damage to the institute's property and anonymous articles in the media. The media was also involved in the disputes. In 1934, Heinrich was removed from the director position and was denied access to the building. In the following years, he unsuccessfully sued the faculty.

In 1934, when the institute was handed over to the professor of physics Viktor Trkal (1888-1956), the condition of the building was found insufficient. Uncertainties regarding the maintenance of the garden or requests for new furniture had not been resolved by that time. In addition, the dome opening and turning mechanisms were outdated and poorly functioning. The dome had to be opened from the outside, which was dangerous.

In 1936, Trkal requested repairs to the cut-out and rotating system of the dome, describing the opening at the time: *„Before observation, the dome cover must be opened sufficiently to allow observation of objects particularly close to the zenith. The existing opening equipment, dating from the 1890s, was not suitable in the first days after the dome's construction and had also been repaired several times. Despite these repairs, today's equipment is not only obsolete but completely inadequate and unacceptable for safety reasons. From inside the dome, it is not possible to obtain a sufficient roof opening, so the observer or his assistant must step out of the dome roof to a narrow sloping edge that is not and cannot be protected by a handrail; therefore, the observer must walk along this edge and move the two moving parts, so the total walk along the edge during this removal is 90 ° to the left and 90 ° to the right of the place where he stepped out of the inside of the dome. Since this manipulation is performed mainly at night under different meteorological conditions /after rain, ice, frost, etc./ the observer is put in danger of life. In the event of an accident, complicated legal disputes would*

certainly arise; however, the undersigned cannot, in these circumstances, assume responsibility for damage to the health and life of the staff of the Astronomical Institute and the students in the dome of the workers. (...) Also, the current rotating device of the dome is insufficient, primitive and nowadays completely unsatisfactory; in winter, it is often impossible to rotate the dome." [26,27]

The obsolete Zeiss refractor from collections of the Physical Institute was given to the institute in 1937 on Trkal's request and installed for practical lessons for beginners. A new observation building was built for this instrument in the garden. Trkal planned to use the large telescope to measure binaries and photometry of close binaries.

Problems with lack of space were remedied in 1938-39 when the National and University Library released the cellar rooms in the Clementinum observatory. In 1939, the dome had still not been repaired.[28]

Trkal was a theoretical physicist and, in 1937/38, served as dean of the Faculty of Science, the assistant and Privatdozent J. M. Mohr (1934-38) and assistant Z.

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[26] Letter from V. Trkal to the Ministry of Education, 10 June 1936

[27] „Před pozorováním je nutno rozevříti kryt kopule v postačující míře, aby bylo možno pozorovati objekty zvláště blízké zenitu. Dosavadní rozvírací zařízení, pocházející z let devadesátých minulého století, nevyhovovalo již v prvních dobách po postavení kopule a bylo také několikrát opravováno. Přes tyto opravy je toho zařízení dnes nejen zastaralé, nýbrž zcela nedostatečné a zdůvodů bezpečnostních nepřípustné. V vnitřka kopule nelze totiž docíliti postačujícího rozevření krytu ku výřezu kopule, takže pozorovatel nebo jeho pomocník musí vystoupiti z krytu kopule ven na není úzký skloněný okraj, jenž není a nemůže býti chráněn zábradlím; po tomto okraji musí tedy pozorovatel choditi a odsunuti obě pohyblivé části krytu, takže celková pochůzka po okraji při tomto odsunování činí 90° vlevo a 90° vpravo od místa, kde z vnitřku kopule ven vystoupil. Poněvadž tato manipulace se provádí hlavně v noci za různých meteorologických poměrů /po dešti, při námraze, velkému mrazu a pod./ je pozorovatel vysazen nebezpečí života. V případě úrazu vznikly by jistě komplikované právní spory; podepsaný nemůže však převzíti za těchto okolností odpovědnost za škody na zdraví a životě personálu astronomického ústavu a posluchačů v kopuli pracujících. (...) Rovněž dosavadní otáčecí zařízení kopule je nedostatečné, primitivní a v dnešní době naprosto nevyhovující; v zimě je častokráte nemožno kopulí otočiti. "

[28] Written urgency from the office of the presidium to the head of department 38 of the provincial office, 14 February 1939

Bochníček (1938-2002) provided, therefore, the scientific work.

4.3. Ondřejov observatory

Czech factory owner Josef Jan Frič had built the observatory of Ondřejov with the help of František Nušl in the first quarter of the 20th century.

Frič brothers were amateur astronomers who ran the precision mechanics workshop *Josef a Jan Frič – dílna pro přesnou mechaniku*, where they produced, among other things, original instruments for astronomy. Both brothers were avid amateur astronomers and soon became acquaintances with the Czech Professor of Chemistry and Astronomy Vojtěch Šafařík, who became their mentor. They constructed two instruments for him, including the refractor with Clarke lens.

Jan Frič died unexpectedly in 1897. To commemorate him, Josef decided to „build an observatory somewhere in the Czech countryside and dedicate it once to the nation as a monument to our ideal cooperation”[29].

At Frič's request, Malek of Pyskočel, son of a miller and later a clerk of the Frič plant, was looking for a suitable place in Posázaví for the construction of the observatory and found them on the hill Manda near Ondřejov. Josef renamed the hill to Žalov and named the observatory *Žalov, hvězdárna bratří Josefa a Jana Friče při universitě Karlově*[30]. The observatory also included memorabilia of Vojtěch Šafařík, who died in 1902. J. J. Frič replanted his May bush next to the central dome and had a stone stair

[29] *"vystavět hvězdárnu kdesi na českém venkově na paměť bratrovu a věnovat ji jednou národu jako pomník naší ideální spolupráce"*

[30] *"Žalov, the Charles University observatory of Frič brothers*". Žalov is a hill formerly named Mandina Hůra (abb Manda), renamed by Josef Frič to commemorate his brother Jan. "Žal" means "grief" in Czech language.

from Šafařík's private observatory built in the dome entrance.

In 1901, Josef Jan Frič's close friend František Nušl relocated to Prague, enabling closer cooperation in constructing the observatory. In 1902, the first observation station for the new invented circumzenithal was built.

After the necessary landscaping in 1905, the observatory's construction began with the construction of a study with a clock cellar, four observation houses with collapsible roofs and a residential house for the gardener.

On 1 August 1906, the first observation with circumzenithal could be performed in one of the observation houses. The day of the first observation is traditionally recognized as the day an observatory is put into operation, even though in the Ondřejov case, the first two domes for the astrograph and reflector were finished only in 1909 and 1912.

In 1913, the first radio station in Bohemia for the reception of time radio signals was launched in Ondřejov.

An astrograph was installed in the western dome in 1920. Josef Frič rebuilt Jan's original design of a simple astrograph into a double astrograph, which he then built in his workshop.

In 1922 Šafařík's telescope with a high-quality Clark object lens was installed in the central dome. After Šafařík’s death in 1902, his widow Pavlína had donated this telescope and Šafařík’s extensive library to J.J. Frič. The object lens is described and identified as the lens that has still been used at the Ondřejov observatory to study the fine structure of sunspots by Cyril Polášek (Polášek 2006).

In 1917, the civil engineer and architect Josef Záruba-Pfefferman suggested a large astrophysical pavilion with a 120cm mirror telescope with a coudé system and

siderospectroscope coelostat and laboratories for seismography, solar physics and time, and a room for a clock on the southern part of the land. As overbuilding of large areas disrupts the quiescence of air, this project was relinquished.

In 1923 a mechanical and carpentry workshop was built. Frič, however, also expanded the land belonging to the observatory. In 1914 he bought neighbouring lands and pastures. In 1926 neighbouring lands with the villa Leonora, built in 1889 by Eleonora of Erenberg, a coloratura soprano singer of the National Theater (the first representative of Mařenka in *The Bartered Bride*).

In 1920, J. J. Frič decided to lend the observatory in Ondřejov for the work of astronomers of the State Observatory. On 28 October 1928, the tenth anniversary of the establishment of the Czechoslovak Republic, Frič offered his observatory and its lands, buildings, instruments, and library for purposes of the Charles University via letter to its rector. At that time, the staff consisted of two scientists, Vladimír Guth and František Link, and several commuting students helping with astronomical calculations.

The donation was formally signed on 22 May 1933. The total value of the donated property stated in the contract is CSK 3,131,898. At the beginning of the year, the draft of the deed of gift was altered. Frič provided several conditions of the donation: independent administration of the observatory; appointment of František Nušl as its director; keeping the name *Žalov, hvězdárna bratří Josefa a Jana Friče při universitě Karlově*, and privileges for himself and his children to use the mansard workroom and the enlargement with forest nursery, where the tombstone of his wife Marie Fričová was located.

The observatory consisted of two domes, five observation buildings with collapsible roofs, three residential buildings and 6 hectares of forests and gardens. The

permanent professional staff comprises the director, three research workers and a mechanic. In addition, there was officially a four-member staff for gardening and cleaning. In times of shortage in scientific jobs, some of these positions were occupied by scientific workers.

The observatory's existence had been unknown to the public and even to the German scientists at the German Astronomical Institute until 1942. Afterwards, Werner Schaub personally enforced its occupation at the Reichsprotektor Karl Hermann Frank. As the observatory was not a part of the Charles University and only donated to „českému státu k účelu university", this action was illegal, and occupiers were aware of it.

On 18 November 1943, the Ondřejov observatory was officially occupied. With Schaub also his secretary Lore Gürich and assistant Dr. Güntzel-Linger moved to Ondřejov (Šternberk 1978). They occupied Frič's private room and study, garden house, Frič family's flat and villa Eleonora, where Nušl have had a lifetime lease. The previous tenants moved to other rooms belonging to the observatory. During the occupation, one new building was added to the observatory.

Czech employees (scientists Guth and Link, mechanic Fr. Bumba, gardener and two cleaners) could remain employed at the observatory. According to Miroslav Plavec, who used to come to the observatory as a high school student, Schaub treated Czech scientists correctly. Plavec describes him as the „only decent German" he met during the war (Plavec 1998). Šternberk's report on German activities during the occupation states: „Czech employees, allocated to the Ondřejov Observatory, (...) continued to monitor Professor Schaub's correspondence and warned the Štefánik Observatory when the German side was about to take action against it."

Schaub had the 20cm Cassegrain telescope, meridian circle and other equipment from State Observatory installed at Ondřejov. During the occupation of the observatory, Schaub published several articles on binaries, while Guth and Link focused on atmospheric absorption and lunar eclipses photometry, and Guth engaged in meteor observation.

After the breakout of the Prague Uprising, the situation at the observatory changed. Several mutual arrests between Schaub and Guth occurred. After an open argument about Schaub's claim that he was ordered to blow up the observatory, both Schaub and Link quickly left the observatory. Link went in hiding, and Schaub and his secretary Gurich drove to Prague, where they stayed for several days before being deported to Germany. Schaub's assistant Guntzel-Linger was placed under arrest by local people. According to Šternberk, *„in the revolutionary days in May, Ondřejov employees neutralized the German assistant of Professor Schaub, Dr Güntzel, who in the uniform of a German officer and armed provocatively gave orders in the town*[31]*".*[32]

During the Uprising, the Ondřejov observatory was guarded by its staff. It survived World War II and the post-war period without any damage.

In the post-war period, the observatory was a relatively isolated institute. The connection with the surroundings was provided by one company car and correspondence. There was no railway nearby, and the observatory did not connect to the telephone network (Šternberk 1945).

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[31] *„v revolučních květnových dnech zneškodnili ondřejovští zaměstnanci se zbraní v ruce v ruce německého asistenta prof. Schauba, Dra. Güntzela, který v uniformě německého důstojníka a ozbrojen provokativně udílel rozkazy v městečku"*

[32] Historical Archive of the Ondřejov Observatory, Inv. No. M324.

4.4. Stará Ďala observatory

Another oldest astronomical institute in Czechoslovakia was initially the private observatory of Baron Mikuláš Konkola-Thege (1842-1916) in Stará Ďala in Slovakia, built in 1867-71 as a modern astronomical, geophysical and meteorological workplace at the world level (Kalina 2012). It was equipped with a 4-inch refractor and later a 10-inch reflector. The observatory had nine domes, a large building for meteorological observations, a library and offices and pavilions for meteorological observations and geophysics (Šternberk 1978). Baron Konkoly-Thege donated the observatory to the state due to financial difficulties at the end of the century but remained its director. Before the end of the First World War, valuable astronomical instruments were removed from the observatory.

After the establishment of the Czechoslovak Republic, the Meteorological Observatory was handed over to the State Meteorological Institute. At the same time, Jiří Kaván took over the Astrophysical and Geomagnetic Observatory from the Astronomical Institute of the Czech University. Kaván accepted the position of director of the observatory under the promise of publishing his forthcoming publications (tables of prime numbers and numerical functions) at the expense of the observatory (*Vzpomínky B. Šternberka na začátky naší astronomie* 1978).

In 1922, Kaván bought a 60 cm Zeiss reflector. The incentive to buy is unclear; J. M. Mohr states that the purchase was promoted by Bohumil Šternberk, who then returned from his studies in Babelsberg (Mohr 1958). Šternberk himself states that it was probably at the instigation of the Ministry of Education (Šternberk 1978). The device

remained in the boxes until the arrival of Bohumil Šternberk, who had experience with large telescopes abroad. Zeiss employees and the institute's mechanic J. Souček, who later used this experience in the disassembly and construction of the König telescope for the Czech Astronomical Society in the late 1920s, carried out the construction of the telescope.

During the 1920s, the electrification of the central workplaces, the water supply system, the mechanical workshop and the equipment for charging the batteries were completed.

During the first Vienna arbitration, the observatory found itself in the Hungarian occupation zone. On October 13, it was ordered to evacuate the part of the facility acquired during the First Czechoslovak Republic to Prešov. At the beginning of November, the Czech staff also left the observatory. Šternberk was assigned to the State Observatory, E. Veselý to the State Meteorological Institute, J. Boušek and J. Štěpánek to the State Geophysical Institute.

4.5. Skalnaté Pleso observatory

After the evacuation of the observatory in Stará Ďala, the question arose about where to build a new observatory and install a 60 cm telescope. The negotiations with the Slovak government took place in Prešov. Antonín Bečvář, climatologist at the Štrbské pleso spa with experience in building private observatories in Brandýs nad Labem (Bečvář 1929) and Štrbské pleso, was invited to these negotiaitons (Šternberk 1978).

In 1941, the negotiations were successful. The new observatory was built in 1943

and had 40 rooms and two domes (Šternberk 1978).

4.6. German astronomical institute

From 1918 to 1920, the German astronomical institute consisted only of Professor Adalbert Prey. Prey acquired the six-inch Steinheil refractor from the State Observatory and bought a 27cm Sartorius telescope and Toepfer wedge photometer with artificial star and recording equipment. The instruments were temporarily installed in the garden of the Physical Institute at Viničná 4.

The situation of the German Astronomical Institute stands out, especially in comparison with the Czech University. In addition to Astronomical Institute, Prey assisted at – and for several years led – the Institute of Geography and lectured at both institutes. In contrast, there were three professorships in geography at the Czech University, and in 1926 the chair of astronomy was split into two (practical and theoretical).

The German astronomical institute acquired its observatory financed by private funding. In 1924 the German University got a donation of land in the Ore Mountains near village Tellnitz from landowner Ledeburg. An observation station for a refractor was built on this land. In the same year, assistant Josef Mrazek moved to a rented room of a private house in Tellnitz. Approximately a year later, another assistant joined him. According to correspondence from 1930, the Czechoslovak Republic rented a mansard (two rooms and an anteroom) from Mrs Marie Settmachaer for three years. After some construction work and essential equipment, both astronomers and their families moved there.

In 1929, Sudetenland factory owners founded the Vereinigung der Freunde der Sternwarte der Deutschen Universität zu Prag. Its purpose was to compensate the German Astronomical Institute for insufficient funding provided by the Czechoslovak government. The association bought a larger and more suitable land in Telnice and built a stone brick-and-mortar observatory with a cellar for magnetic phenomena observation. The observatory was equipped with instruments from Clementinum. Other instruments were bought from the financial sources of the *Society*.

At the end of the 1930s, the facility had become obsolete and required reconstruction. The roof was rotten, and collapse was imminent. The observatory lacked any connection to the electrical grid, and accumulators for illumination had to be charged in a remote village.

At the beginning of the Nazi occupation of Czechoslovakia, the German university was renamed *Deutsche Karls-Universität in Prag*, subordinated to the Reich Ministry of Education in Berlin. On 4 November 1939, it was proclaimed a Reichsuniversität.

After both E. Freundlich and G. Alter emigrated, the German Astronomical Institute was vacated. It was moved to an apartment on the 3rd floor in Lucemburská 26 at Vinohrady. The flat consisted of two cabinets, one study and a kitchen that served as a library. The porter managed correspondence.

Werner Schaub, the Associate Professor of Astronomy at the University of Berlin, was appointed the new Professor of Astronomy at the German university. He arrived in Prague in 1940 with his assistant H. Oehler, the scientific coworker of Askania workshops in Göttingen, who achieved the loan of the most modern electric photometer from Askania and 20cm Cassegrain equatorial mounted telescope from the

observatory in Kiel. These instruments were planned to be mounted in Telnice, but this was not realized as Oehler was drafted.

Due to his position in the Nazi Party, Schaub pushed through the renovation of the Telnice observatory building and the installation of an independent high voltage transformer. He also loaned an Askania photometer, a geodetic table, and a modern 1-meter meridian telescope. Other financial sources were used to purchase a new Strasser & Rohde clock and the library of the late Professor Julius Bauschinger (1860-1934) of Leipzig University (Fischer, Hibst 1983).

After WW2 ended, the observatory was abolished with the university and equipment assumed by Charles University. Mrazek lived in Telnice until he died in 1946. Vladimír Guth and František Link of the Ondřejov observatory took instruments from Telnice, a partially preserved library from Lucemburská Street and other equipment to Ondřejov in the autumn of 1945.

The Telnice observatory building stood until the 1970s when a local pioneer group used it. Later it had to be dismantled due to a bad state.

4.7. Institute for Cosmic Physics

In the 1920s, the Institute for Cosmic Physics urgently needed new rooms. Its official premises in Liliová street had been uninhabitable since 1922 when the ceiling began to sag.[33] The department moved to rooms belonging to the Institute for Physical Chemistry.[34]

[33] National Archives (Czech Republic), Ministry of Education, kart. 1095.
[34] National Archives (Czech Republic), Ministry of Education, kart. 1095.

In a suggestion from 1923, the institute required 88 square meters of room for a boardroom, library, study room, and room for assistants with kitchen, anteroom with coal box, darkroom and chamber,[35] and a platform with the free sky for demonstration and practical observations. Spitaler further expanded the requirements to two study rooms, a laboratory, chambers for staff, a small room for barometer and thermometer with Venetian blinds, and a „sehr erwünscht" living room for assistants.

According to plans from 1924, the Institute of Space Physics was to move to the extension of the northern wing of the Institute of Science in Viničná Street No. 1594-II.[36]

The Institut for Cosmic Physics was transformed into the Geophysical Institute. The chair of cosmic physics was transformed into the chair of geophysics when the professor of cosmic physics Rudolf Spitaler retired. The Geophysical Institute moved to Dittrichova No. 13.

During the Nazi occupation, the institute director, L. W. Pollak, emigrated. In 1940, Teodor Schlomka (1901-1985) from Technische Hochschule Hannover assumed the institute.

[35] National Archives (Czech Republic), Ministry of Education, kart. 1095.
[36] National Archives (Czech Republic), Ministry of Education, kart. 1095.

5. Language and textbooks

In 1848, the Austrian government had allowed Czech as the language of lectures at the Prague university. Still, during the era of Bach's Absolutism, this privilege was restricted, and in fact, Czech had never been equalized with German until the split of the university.

The first Czech lecture on science was given at the Prague Polytechnics in 1861 by Rudolf Skuherský (1828-1862), who based his demand for Czech lectures on the request of 156 of 295 enrolled students. Skuherský, like many other professors, was a parliamentarian of the Bohemian Diet and therefore had an advantageous position for advocacy of the Czech language in state networks.

German university professors seconded the coequality of Czech and German. The confrontation of German and Latin, representing new prospective and old dysfunctional „lingua franca“ of science, respectively, and the subsequent rise of German in academia took place only a few decades ago (Surman 2012). In 1863 Professor at Prague polytechnical school Karl Jelinek wrote that he *„must admit that in our faculty, in which the various elements are already together, there have not been the slightest national disputes so far, and I hope the professors are imbued with a true zeal for science and the success of the institute, that with goodwill they can easily overcome all difficulties.“* [37] (Šolcová, Šolc 1997)

The first Bohemian university to be split into German and Czech parts was

[37] *"Musím doznat, že v našem profesorském sboru, v němž pohromadě jsou již v nynější době různé elementy, nedošlo dosud k nejmenším sporům národnostním a doufám, když profesoři jsou prodchnuti pravou horlivostí pro vědy a zdar ústavu, že zdaří se hravě při dobré vůli překonat veškeré obtíže."*

Bohemian Polytechnical Institute in 1869. The Charles-Ferdinand university was split twelve years late in 1881, with the first rectors being surgeon Ewald Hering (German) and historian Václav V. Tomek (Czech). The polytechnical institute in Brno was split in the year 1899/1900. This situation was not unique in Prague; similar splits happened in the Austrian part of the Astria-Hungary Empire and Poland and Galicia.

The accompanying national political tensions were strengthened because Prague was officially proclaimed the metropolis of the Czech-language political nation. The Czech university soon became the intellectual and political centre of a nation. In contrast, most scholars viewed the German university as a minority while being viewed as a provincial Austrian university. Moreover, the German university acquired most of the equipment due to the rule that granted every institute's property to the university, which the institute's director chose.

The university library was neutralised and belonged to both universities, but there was a great disproportion between German and Czech professional literature.

As German was considered the language of modern science since the end of the eighteenth century, a tradition of German textbooks was already established. At the same time, Czech was relatively new to science. The Czech scientific literature was scarce, and textbooks had to be written.

The first university textbook on physics, *Fysika zkušebná* by Karel Václav Zenger, was published in 1865-66 in four issues. In 1879 Zenger published his lithographic physics lectures. In 1882 the six-volume project *Fysika pokusná i výkonná* by K. V. Zenger and his assistant František Frídrich Čecháč followed. Still, only the first volume on mechanics (1882, 182 pages) and five issues of the third volume on optics (1884-1890, 288 pages) were finished (Kolomý 2001). Václav Láska published the first

Czech textbook on higher geodesy in 1896 as a Czech version of his previous German textbook. Čeněk Strouhal's textbook on experimental physics was published in four volumes (Mechanics, Acoustics, Thermic, Optics) from 1901 to 1919.

5.1. First textbooks on astronomy

August Seydler contemplated the first Czech particular textbooks on theoretical physics and theoretical astronomy. Until his premature death in 1891, Seydler published two parts of his textbook *Základové theoretické fysiky (Fundamentals of theoretical physics): Mechanika (Mechanics,* 1880) and *Teorie potenciálu, gravitace, elektřina a magnetismus (Theory of potential, gravity, electricity and magnetism,* 1885). The third part, *Nauka o teple (Thermal physics)*, was finished in 1895 by Seydler's successor František Koláček.

Seydler's planned original textbook on astronomy was supposed to be comparable to his theoretical physics textbook in the depth of presentation. The breakdown in chapters was as follows: *Introduction – Preliminary knowledge, I – Basic phenomena and astronomy concepts, II – Theoretical Astronomy, III - Physical Astronomy, IV – Spherical and practical astronomy* and *V – Stellar astronomy*.

In the last years of the 19th century, Seydler's successor Gustav Gruss published the first Czech university textbook on astronomy, the two-part *Základové theoretické astronomie* (*Fundamentals of theoretical astronomy*, 1897, 1900), which had 390 pages in total. It focused on spherical trigonometry, analysis of Kepler laws, and determinations of circular, elliptic and parabolic orbits of minor planets and comets. From Seydler's work, Gruss only adapted the solution of Kepler's equation.

5.2. First outreach books on astronomy

The first outreach book on astronomy written in Czech language was *O živlech (On Elements)*, written by Antonín Hynek Gostko of Saxenthal and published in 1776 and 1791 (Klepešta 1926a). The book includes several paragraphs on astronomy: *O obloze. O hvězdách bludných a o znameních ekliptiky. O Dobropánu. O Krásopaní. O Smrtonoši. O Králomoci. O Hladoletu. O hvězdách ocasatých. O obyvatelích hvězd bludných (On heavens, On wandering stars and on signs of ecliptic, On Mercury, On Venus, On Mars, On Jupiter, On Saturn, On comets, On inhabitants of wandering stars).* In addition to the exclusive use of Old Bohemian planet names, the book contains many Czech expressions invented by the author for physical and astronomical concepts.

Základové hvězdosloví čili astronomie (*Elements of astronomy*, 1837) by František Josef Smetana, the Czech revivalist and author of Czech textbooks on physics, was intended instead as an outreach book than a textbook. Still, it laid the foundations for Czech astronomical terminology. The book was modelled after Bode's *Anleitung zur Kenntnis des gestirnten Himmels (Instruction for the Knowledge of the Starry Heavens)* (1768) (Klepešta 1937).

František Josef Studnička's *Zeměpis hvězdářský (Astronomical geography)* it was created as part of an extensive geographical file, which Czech patriot and popularizer of science Vojtěch Náprstek, former minister of culture and education Josef Jireček (1825-1888), geography teacher and amateur astronomer Jaroslav Zdeněk (1837-1923), brothers František Josef and Alois Studnička and publisher František Šimáček (1824-1885) planned together in late 1870s. The plan was never fully implemented. Studnička gradually expanded his part into a three-part series of textbooks *Všeobecný zeměpis, čili astronomická, mathematická a fysikální geografie (General geography, i.e.*

astronomical, mathematical and physical geography). It was published in 1881-83 and had 880 pages in total. The first book *Zeměpis hvězdářský (Astronomical geography)* is divided into parts *O hvězdnaté obloze, O zdánlivém pohybu hvězd, O soustavně sluneční zvlášť (On the starry sky, On the apparent motion of stars, On the solar system particularly)*. The second book *Zeměpis mathematický (Mathematical geography),* focuses entirely on geography. The third *Zeměpis fysikální (přírodnický) (Physical (natural) geography)* partially engages in meteorology – it is divided in parts *O vzdušném obalu země, O složení kůry zemské, O neorganickém povrchu Země, O tvarech organických na povrchu země (On the air cover of the earth, On the composition of the earth's crust, On the inorganic surface of the Earth, On organic shapes on the earth's surface)* (Häufler 1967, p. 75).

In 1896, Gustav Gruss wrote an extensive book *Z říše hvězd*, which would have been the most famous Czech outreach textbook until the 1930s. Gruss noted that he wrote the book following *Populäre Astronomie* (1881), the German version of Simon Newcomb's (1835-1909) *Popular Astronomy* (1878), translated by Rudolf Engelmann (1841-1888).

The journal of the Czech Astronomical Society *Říše hvězd* was named after this book.

5.3. Czech nomenclature

Since the High Middle Ages, the Czech language has used its names for known planets of the solar system: *Dobropán*, *Krasopaní*, *Smrtonoš*, *Dobropán*, and *Hladolet*. These names are etymologically connected with the Latin names, except for Venus,

which the Czech language still sees as three semantically different entities: *jitřenka* (*Morning Star*), *večernice* (*Evening Star*) and *Venuše* (planet *Venus*).

Later, in agreement with the Czech national revival purism, the name *Nebešťanka (Heavenly Woman)* was invented for the newly discovered Uranus at the beginning of the 19th century. Uranus was discovered in 1781, but its international nomenclature was not completely consolidated until the 1850s, and various names had been used, of which Uranus prevailed.

In the early 1800s, four other planets (later redefined minor planets) were discovered and named by Greek goddesses following the previously used nomenclature: Ceres (1801), Pallas (1802), Juno (1804), and Vesta (1807). The Czech variant of Ceres is Živěna or Živa, the corresponding Slavic goddess of crops. For Pallas and Juno, the Czech names Mudřena (Sapience) and Královna (Queen) were created by association, while the name Čistěna (Purity) for *Vesta* has unclear origin and context. František Josef Smetana in 1837 proposer the name *bludička* (diminutive of *bludice*, which means *planet*) for these bodies.

The situation was different at the time of the discovery of Neptune in 1846. Its Latin name was proposed in the same year and soon accepted internationally. Many languages adopted names connected with sea gods for Neptune; in the case of Czech, the name proposed was *Vodan*, which means *„inhabitant of water“,* and its source is unknown (Tabakovičová 2013).

In the late 1850s, the Czech equivalents for Latin names of newly discovered minor planets ceased to appear in Czech literature (Remeš 1945).

Antonín Hynek Gostko, in his book *O žiwlech (On elements,* 1776*),* used the medieval Czech names for the five known planets solely. In 1837, Smetana used the

international names of planets with old Czech expressions in brackets. In the mid-19th century, both names were used equally, but at the beginning of the 20th century, the international Latin names prevailed, and the Old Czech names had become „archaisms“ (Tabakovičová 2013).

6. Communities and outreach

The last third of the 19th century and the first half of the 20th are considered the golden age of association in Czech lands. The development of Czech scientific associations and institutes is described in (Niklíček, Kostlán 2010)).

Since the late 18th century, citizens had demanded association law. The legislative evolved slowly from various instructions to the first law on associations in 1843, issued by the court office decree. This law permitted association only with the consent of the state authorities, either the emperor, the associated court office or the provincial office. In 1844 another decree was added to regulate the creation of savings banks.

In the revolutionary ear 1844, the association law was among the fundamental demands of the liberal opposition against the Metternich establishment. After the revolution was defended, worker's associations were banned, and other restrictions followed. In 1849 a new law was issued, which permitted non-political association of non-productive nature only on the reporting obligation. The new law of 1852[38] returned to the practice of 1843.

On 20 October 1860, the Austrian Emperor Franz Joseph issued the October Diploma, the first step to the constitutional monarchy that allowed the establishment of voluntary citizen associations.

The definitive association law was issued in 1867[39] and was valid, with partial

[38] Act No. 153/1852 Coll., Of November 26, 1852.

[39] Act No. 134/1867 Coll., Of 15 November 1867, on association.

modification, even during the era of the Czechoslovak Republic. The citizens who wanted to found an association had to submit a written notification and articles of the association in advance to the viceregency that would return the official confirmation of the acknowledgement of the association if the articles complied with the association law. The district authorities, police commission, police directorate, and the viceregency monitored the activities of the associations. The viceregency had the right to dissolve the association if it did not follow its articles, opposed the criminal law, and interfered with legislative or executive power. The association could defend against unwanted official dissolution by appealing to the Ministry of the Interior. The political association had particular limitations; those were active during the imperial era and later were replaced by political parties that did not have those limitations. While political associations were not allowed to admit women, many non-political associations were men only by their articles. Most of the associations admitted women only after the turn of the century.

Through the association activities, people fulfilled themselves in their areas of interest, pursued mutually beneficial goals and addressed many issues that the government had not taken care of sufficiently. These issues included assistance in old age and disease, culture, education (including physical), support for the poor and the disabled, care for orphans or rights of women, workers and national minorities.

The associations varied greatly in duration, membership size and structure. Many organized cultural life and entertainment and became centres of social life in towns and villages. Czech emancipation and a feeling of threat on the German nation's side led to parallels in all areas of society. This included the scientific communities, which formed parallel Czech and German scientific associations. German scientific associations are described in (Míšková 2010).

In 1939, the occupating administration limited the associations, and many ceased to exist. In the postwar period, they temporarily renewed their activities. After the 1948 coup d'état, associations were incorporated into organizations of the National Front or dissolved under the government's pressure.

The following chapters focus on associations active in Czech lands, which had among members Bohemian astronomers and cosmic physicists.

6.1. Lotos

The association of German naturalists *Lotos* (est. 1848) was opened to individuals and institutions. Initially, the association conditioned the membership by active participation in the association's efforts, later by an annual contribution. However, German as the only negotiating language significantly influenced the composition of the membership base. Scientists of Czech nationality were usually members only for a temporary period (Těšínská 1997).

After 1895, professional sections were active within the association. Only members of the association could be members of the sections, but guests also had access to the meetings (Těšínská 1997).

The *section for astronomy and physics* was founded in 1909 by the free associations of professors and assistants from Prague German universities, which was formed in 1902 around the German university professor Samuel Oppenheim. It held meetings at the German Technical High School and the German university. After Oppenheim departed for Vienna and during the First World War, the section's activities ceased considerably (Těšínská 1997).

It was partially restored in 1922/34 as a physics section. Czech physicists V. Trkal and V. Dolejšek were also among the invited experts who lectured in the section (Těšínská 1997).

6.2. Private observatories

State support for astronomy from the Austro-Hungarian authorities was tenuous; the situation did not change much during the first republic era. The number of systemized positions for researchers was limited and tended to decline rather than grow. The number of professorships at a Czech university changed in 1926 when the chair of astronomy was split into chairs of theoretical astronomy and practical astronomy; one professorship remained at the German university until 1945.

Privatdozents and assistants did not receive any salary for the first two years of service and usually made their living by teaching at secondary schools or working in official positions. For assistants and students who helped with computations and observations, the Czech Astronomical Institute offered accommodation at the observatory.

The Faculties of Arts and later Faculties of Science at both universities focused mainly on the education of future teachers. After passing the teacher qualification exams for teaching at secondary schools, most students left the university or found work outside education and did not complete the exams. An alternative was to work for a private astronomical observatory before a vacancy appeared at any university observatory.

Private observatories had a long tradition in the Austro-Hungarian Empire; most

were associated with their owners and defunct after their deaths. As an example, I mention the observatory of Baron John Parish in Žamberk, which existed from 1841 to 1859 (Hyklová 2018a). This observatory was private and hosted individual visits, often from abroad. Parish spent winters in Prague in close contact with the Prague scientific community. His house on Malostranské náměstí thus became a place inclined to science and especially astronomy. However, after Parish's death, the observatory was closed, and the instruments sold out.

While this observatory did not bring together a community of amateur astronomers and was closed before the era of associations of amateur astronomers, others left a long tradition and helped lay the foundation for amateur and professional astronomy in Czech lands.

After the Czech Astronomical Society was founded, the establishment, equipment and programs of private observatories of the company's members were regularly reported in the magazine *Říše hvězd* (f. 1920). The owners of the observatories were thus able to use the community's facilities and gain the necessary contacts to ensure the observation and operation of the observatory.

6.2.1. Vojtěch Šafařík a bratři Fričové

The Frič brothers, who ran a workshop for fine mechanics near university professor Vojtěch Šafařík's house and had their private observatory on the roof of the workshop, built Vojtěch Šafařík's private observatory on the roof of his house in Vinohrady in 1892 (Polášek 2006). When Šafařík's health no longer allowed him to observe further, he offered the observatory's equipment for sale. After he died in 1902, the observatory was dismounted, and Šafařík's widow Pavlína donated its telescope and

library to Frič's new observatory that was under construction in Ondřejov.

Frič brothers had planned an observatory outside Prague. After Jan's sudden death in 1897, his brother Josef expedited the plans and founded the observatory near Ondřejov on the first anniversary of Jan's death. He contacted Bohuslav Mašek and František Nušl, who connected their lives with the new observatory. This observatory employed young astronomers from the university and became the official observatory of the university in 1928,

6.2.2. Observatory of Ladislav Pračka in Nižbor

Ladislav Pračka founded a private observatory in Nižbor near Beroun in 1911. It had two floors, a five-meter dome with a double telescope, a small astrograph, and a transit instrument. Pračka had a diesel generator installed, which supplied electricity to Nova Huť. The observatory existed for only a few years and then closed for financial reasons. Creditors dismantled its devices, and the Czech Astronomical Society purchased the 5,000-volume library.

6.3. Public observatory in Pardubice

The concept of public observatory first appeared in Pardubice just before the First World War, and it is associated with the person of Arthur Kraus. His private observatory was not focused on popularization but became a centre for meteor observations and joined Byrd's observation program network.

Arthur Kraus came from an aristocratic family. His brother had an influential position in the Prague viceregency. Among other things, he acquired the title of baron

for his brother’s family and the approval of the articles of the Czech Astronomical Society.

In 1895, Arthur Kraus founded an observatory on the tower of the Pardubice chateau. When he moved to Na Staré poště, he set up another observatory in 1912 called the People's Observatory. The observatory was equipped with a 16 cm telescope for parallactic mounting and a Zeiss protuberance spectroscope. It performed time service and observation of the Sun, but it was also open to the public. Kraus made public observations and provided free literature to those interested in astronomy.

The emerging Pardubice community of amateur astronomers established contacts with the Prague community, and discussions on establishing an astronomical society in Prague took place on this platform (Klepešta 1937).

After Kraus' death, the observatory closed. The instruments were bequeathed to CAS in Prague. The library was acquired by the new public observatory of the Astronomical Society in Hradec Králové and the East Bohemian Museum in Pardubice.

6.4. The Czech Astronomical Society

The Czech Astronomical Society (Česká společnost astronomická, CAS) was established during the First World War. Its future members met at educational events for the public and gave lectures in Prague and outside Prague. Debates on the establishment of an astronomical society took place mainly in Pardubice with the support of Baron Arthur Kraus. In later years, Kraus's ideas about popularizing science began to diverge from the concept of the CAS, which focused more on cities. At the same time, Kraus wanted to popularize astronomy in the countryside. Professional astronomer František

Nušl and optician Josef Jan Frič were also involved in the founding. Nušl was the temporary administrator of the State Observatory, which provided ČAS with space on the upper floor of the Clementine tower for the society's telescope and public observations.

The CAS was officially founded on December 8, 1917, in the Zenger auditorium of the CTU building on Charles Square. Approximately 50 attendees arrived, from the ranks of professional and amateur astronomers, including František Nušl, Jaroslav Štych, Josef Klepešta, Karel Anděl and Arthur Kraus. The model for the society was the French Astronomical Society, founded by Camille Flammarion in Paris in 1887.

Membership in CAS became a norm for professional astronomers. In the first years of CAS's existence, the company was officially purely amateur. Still, from the beginning, it was backed by professional astronomers and had professional ambitions represented by Josef Klepešta, Karel Anděl and Karel Novák. It was only after five years, in 1922, when František Nušl, Josef Svoboda, Bohumil Mašek, Rudolf Schneider and Otto Seydl joined CAS. Membership in CAS became a standard for professional astronomers. In 1968, Bohumil Šternberk pointed out that the university professor of astronomy V. Heinrich was not involved in CAS, which is explained by his theoretical focus (Šternberk 1967).

In 1918, CAS began publishing the *Věstník astronomický (Astronomical Bulletin)* four times a year, and since 1920 the monthly *Říše hvězd (Realm of the StarsI*, named in honour of Gruss' book*)*. The journal's content included translations of foreign articles on the news in astronomy, practical instructions for the construction of instruments and articles by professional astronomers about conference visits.

During the Nazi occupation and the closure of Czech universities, CAS

organized lectures at its public observatory on Petřín in Prague, replacing university astronomy education. The observatory was open to the public until February 1945, when German soldiers took over part of it.

During the First Republic, other CAS societies and branches were established in České Budějovice (Jihočeská astronomická společnost, 1927), Uzhhorod (Podkarpatská astronomická společnost, 1928), Bratislava (Slovenská astronomická společnost, 1927) and Hradec Králové (Astronomická společnost v Hradci Králové, 1929) (Bartoš 2019; Cholasta 2019; Polesný 2019).

These companies popularized astronomy and constructed public observatories. They arranged observations with small telescopes, professional lectures, debating evenings, meteor observations, astrophotography and compilation of professional libraries.

The majority of the astronomical societies were established as separate local associations. The first people interested in founding local CAS unions appeared in 1928 in Brno and Uzhhorod. Until then, CAS itself had focused on activities in cities.

In the case of Uzhhorod, the establishment of the department proved to be too complicated in legislation. A separate association was established under the Civil Administration of Subcarpathian Russia. All members were also members of CAS, and close cooperation between the two companies was enshrined in the articles of the society (Bartoš 2019). The activity of the Uzhhorod astronomical community slowed down considerably after the departure of several of its members from Uzhhorod. In 1930, the community disintegrated, and the Subcarpathian Astronomical Society was no longer active. The following year, it was officially disbanded.

Other astronomical communities and circles were formed in Valašské Meziříčí

(Ballner's observatory, 1929), Plzeň (astronomical department of the People's Jan Hus University, the 1930s), and Brno (scientific circle and geodesy on German technology at the end of the 19th century).

6.5. Public observatories in the Czechoslovak Republic

The network of public observatories in Czechoslovakia has been established since the late 1920s. During World War II, it played a significant role as a place of astronomical education. This role continued in the post-war period and, for ideological reasons, was supported during the socialist establishment. A great wave of enthusiasm and the establishment of public observatories took place after 1957, after the Earth's first artificial satellite launch.

Accessibility to the public and good observation conditions played an essential role in choosing a location for public observatories. During the nineteenth century, the harmful effects of light pollution in cities and the quality of observation conditions in the high mountains became apparent. At the turn of the century, the first purely research alpine observatories were established, the results of which could not compete with the observatories in and around cities. Many astronomical departments moved to those new observatories. This was also the case for the Czech and German universities; in both cases, however, their observatories needed private funding. Between 1928 and 1933, Czech astronomers gradually moved their research to the observatory of the Frič brothers on the Manda hill near Ondřejov; for the Germans, between 1924 and 1930, the association of Sudeten factory builders built an observatory near Telnice in the Ore Mountains. Astronomical research has thus moved away from the public and

popularization, and both activities seem mutually exclusive.

The public observatories represented a compromise in this regard. They were usually located outside the city centres and industrial parts, where, in addition to light pollution, there was also increased dust and noise. However, the observatories needed to be located close to the city centre to be accessible to the public. City parks and hills met such requirements.

Further compromises stemmed from the economic development of the new republic, which was affected by the post-war crisis. The construction of the observatories was financed by members of the societies, official subsidies and donations from companies and individuals negotiated by the committees and influential members of the societies. Due to the post-war crisis in the early 1920s, observatories' construction was often suspended, and the societies ran public observations in temporary arrangements. First stone observatories were completed in the 1930s. The Štefánik's Public observatory was the first to open in 1928, but its construction was not finished before the early 1930s.

In the 1930s, the observatory on the roof of the House of Culture in Tábor (1935), the observatory of the astronomical circle in Plzeň (1937), the observatory of the Southern Bohemian Astronomical Society (1937) and several smaller observatories on secondary schools (including temporary observatory of the Astronomical Society in Hradec Králové) were constructed (Klepešta 1937).

6.5.1. Štefánik Public Observatory in Prague

After its founding, CAS discussed establishing a folk observatory in Prague, but the plans got sharper outlines in 1919. In May of this year, the then 38-year-old diplomat

and astronomer Milan Rastislav Štefánik died in a plane crash. Štefánik was practically unknown in Czechoslovakia. All his scientific, military and diplomatic activity took place abroad, and on that fateful flight, he was returning to his homeland. His death shocked the Czechoslovak public, and the astronomical community decided to name the planned Prague public observatory after him. The Czech Astronomical Society established the „Fund to honour the memory of Štefánik“. The fund raised funds to purchase a 20cm Zeiss comet seeker, a 12cm and an 11cm refractor, a 95mm Heyde parallactic telescope, two clocks, a chronograph, a projector and a part of Ladislav Pračka's library.

The society was temporarily based at Wilson Station but was promised bastion No. 4 on Petřín hill. Engineer Záruba-Pfefferman drew up the first plans of the observatory. However, the observatory's construction was slowed down by the economic crisis in 1922, which resulted in an outflow of funding and the loss of promised premises. The inventory for the new observatory was temporarily stored in the Technical Museum in Hradčany when CAS had to temporarily move to the premises of the State Railways Headquarters on Hoover (now Wilson) Avenue (Klepešta 1937). The observatory's construction on the roof of the planned new building of the National Technical Museum was discussed. The public observatory with a 95mm telescope was briefly installed in artificial caves in Havlíčkovy sady (Hraše 1922), then moved to the premises of the State Observatory in the Clementinum astronomical tower. In this new location, it enjoyed great interest from the Prague public (Klepešta 1937).

The situation did not change for the better until 1926. There was a discussion in the city council about an unrelated proposal to establish a planetarium and observatory in Prague, which led to the adoption of a less costly proposal by CAS. The city's

financing of the observatory's construction and the provision of inventory and organization by CAS were agreed upon (Klepešta 1937). The subject of further negotiations was the location of the observatory, which would suit its blueprint. A suitable plot of land and a building on Petřín behind the Hunger Wall was found. Meetings on the observatory's construction were held twice a week in the State Observatory study room or Slavia Café.

The reconstruction of the building was entrusted to a member of CAS, the builder Václav Veselík. Right at the beginning, the reconstruction was complicated because several tenants inhabited the house. For legislative reasons, the company had to wait for the tenants to vacate the premises. Adaptations could thus be carried out only in the uninhabited parts of the observatory, and problems arose with the annual utilization of funds for the construction. There was no consensus in the society during the construction of the final form of the observatory. Finally, the project of the three-dome observatory was approved.

At that time, the company learned about the possibility of purchasing a double astrograph from the estate of the Viennese selenographer Rudolf König for CZK 110,000. The CAS Committee had to negotiate the financing of the purchase in a short time. The event was supported by a financial donation from the President of the Czechoslovak Republic, T. G. Masaryk. CAS addressed the City Council of Prague, banks and large private companies. The State Observatory provided staff for the transport and assembly of the instrument.

The first dome for the comet seeker was finished in 1927, and the observatory was opened to the public in 1928. It became a meeting place for amateur astronomers and the public and visiting professional astronomers abroad. The central and western

domes were not completed until 1930. Outside the observatory's main building, a meteorological station of the State Meteorological Institute and an observation house with a photographic equatorial for monitoring meteors and variable stars were built (Klepešta 1937).

The observatory's instruments were used for astronomical research; for example, in 1932, the asteroid Eros's opposition was photographed with the astrograph.

6.5.2. Astronomical Society in Hradec Králové

Astronomical Society in Hradec Králové (ASHK) was considered the most developed local astronomical society in Czechoslovakia in the 1930s (Klepešta 1937). The local astronomical community had a long-term background. From 1894 to 1901, František Nušl taught at a local secondary school, and so did Bohuslav Mašek from 1897 to 1901. Together they planned to found a private observatory in Hradec Králové.

The Astronomical Society in Hradec Králové was founded in 1929, one year after the opening of the Štefánik Observatory in Prague, with the participation of the Prague headquarters of CAS. The primary purpose of the new society was to build a new public observatory in Hradec Králové, popularise astronomy and organize regular meetings of astronomy enthusiasts. At the founding meeting, Nušl presented his experience with building the Petřín observatory and stressed the role of the community and its dynamics by presenting the case of English astronomical societies, emphasising the role of informal members meetings (Mk. 1929).

The year 1929 was very unfavourable for any cultural projects due to the global economic crisis. However, the ASHK managed to negotiate funding to purchase a Zeiss refractor with the bank of Hradec Králové in 1930 and temporarily install the refractor

on the roof of Masaryk City School (Cholasta 2019).

The first construction project of the observatory was published in 1938. The observatory was to stand in an orchard on the Piletický creek and include a lecture hall, a children's readings room, a club room, a projection room, a darkroom, and a five-meter sliding roof for the refractor and observation platform. Outside the building was to be a cylindrical panorama projector (Cholasta 2019). The project of the observatory was finally completed after World War II.

The ASHK held several public lectures every year by invited professionals from Czech scientific institutions, excursions to Czech observatories and membership meetings with lectures on news in astronomy. It maintained close contacts and cooperation with professional astronomers (especially Antonín Bečvár) and other local astronomical societies. Observations of meteor showers, which are undemanding on instrumentation, were sent to Ondřejov to Vladimír Guth. In 1936, ASHK lent the Zeiss tripled to the astronomical eclipse expedition to Japan.

6.5.3. South Bohemian Astronomical Society

The South Bohemian Astronomical Society (Jihočeská astronomická společnost, JAS) was founded in 1928 with the support of the Educational department of the South Bohemia according to the model of the Prague headquarters of the CAS.

In 1929, JAS had 280 members. At the heart of the community were teachers of Jan Valerián Jirsík Grammar school in České Budějovice: headmaster Karel Vodička and teachers Bohumil Polesný and Jaroslav Maňák (Polesný 2019). Polesný, who arrived in České Budějovice in the late 1930s, was the first member of JAS who had a university education in astronomy. The arrival of professional astronomers was very

welcome, and Polesný soon joined the committee. A significant personality of practical astronomy was an engineer and expert in astronomical optics Vilém Erhart.

First public observations were made by a new 4-inch Merz telescope in October 1928.

První veřejná pozorování byla konána novým čtyřpalcovým dalekohledem od Merze v říjnu 1928. Already in the spring of the following year, the society states that it counted ten thousand visits (Mk. 1929).

In 1930, the JAS committee negotiated with the city council of České Budělovice the provision of land in Krumlov alleys, located near the city centre but outside the centre itself and the industrial district. The land was located on a non-existent peninsula to be constructed during the Vltava and Malše confluence regulation. It would be the first Czechoslovak observatory built from nothing (Polesný 2019), not adapted from existing buildings. The observatory was included in the project of the Committee for improvement of Háječek (Komité pro zvelebení „Háječku“). Additional construction financing was obtained from membership fees and the sales of brick blocks and tickets for observations and lectures. This activity was materially provided by the publisher B. Kočí and local zincographic company Pejša a spol. The first design included a one-dome ground-floor secession-style building with a six-inch telescope and a meteorological and hydrological station (Polesný 2019; Mk. 1929). The project was to be finished in 1933.

The observatory's construction was incredibly complicated by protracted negotiations at the city council, the economic crisis, and bureaucracy. It was completed mainly due to the perseverance of the astronomical community. During the project's approval, the Club for Old Budějovice (Klub za staré Budějovice) submitted objections to the location of the building on the peninsula due to the disruption of the historic

appearance of the city. However, JAS rejected to change to location. A protracted indecent dispute followed; both parties used contacts in the city council, offices, and daily press. JAS won the dispute in the autumn of 1931 when the observatory's construction should have begun according to the original plan. However, Czechoslovakia was fully affected by the economic crisis, and the project lost a large part of its funding. In 1932-33, after negotiations between the JAS and the local Ministry of Social Welfare authorities, the observatory's construction was included in the Auxiliary Program for the Support of the Unemployed. Funding from the ministry was delayed. The JAS co-financed the construction from its popularization activities. It assisted the city in administering the Krumlov alleys, for example, by setting up public toilets in the observatory building. Despite the culminating economic crisis, JAS managed to complete and approve the observatory in 1934. It was not until 1936 that the financial situation was so favourable that JAS purchased a 30 cm Cassegrain telescope from Viktor Rolčík. The observatory was opened to the public in 1937 with a four-year delay from the original plan (Polesný 2019).

A radar station connected to the airport was located in the observatory building. During the German occupation, the entire observatory was gradually taken over by the German administration and used as an intelligence centre; scientific equipment was taken away or destroyed. JAS members thus lost the centre of the association's activities, which were limited to committee meetings at the local grammar school. Sources of astronomical education were limited to the magazine *Říše hvězd* and the practical production of mirrors under the guidance of experts. The manufactured instruments were used to observe sunspots. Community life was strongly connected with CAS, where Polesný was very involved. Therefore a processing centre for planetary observation by

amateur astronomers from all over the country was established in České Budějvovice.

At the end of the Second World War, JAS negotiated with the National Committee to take over the observatory. The first post-war year saw a successful public collection for the repair of the observatory, and in the autumn of 1946, the first post-war general meeting of the JAS took place. The founders of JAS eventually withdrew from active activities (Polesný 2019).

Rolčík's telescope, which was taken to the German Teachers' Institute during the occupation and reassembled after the reconstruction of the observatory, was then the second-largest mirror in Czechoslovakia. Therefore JAS organized a scientific program to observe the Sun, planets, and variable stars and search for asteroids with this telescope.

6.6. Vereinigung zur Verbreitung astronomischer Kentnisse

Founded on 30 May 1920 in Děčín, this society was the centre of German amateur astronomy in Bohemia and Moravia, with 66 members (Fischer, Hibst 1983). Its activities included lectures for schools and the public, given by professional astronomers from Czechoslovak Republik and Saxony.

The structure of the society was as follows (Fischer, Hibst 1983): Sektion für Sonnenbeobachtung, Sektion für Mondbeobachtung, Sektion für Planetenbeobachtung, Sekterion für Stellarbeobachtung, Meteorische Sektion, and Sektion für Allgemeine Pädagogik.

In the early 1930s, the association began cooperation with the German Ingedelia.

During the Nazi occupation era, the Reichsprotektor dissolved the society. The

communities activity ceased, but its members founded several small private observatories in the Sudetenland.

6.7. Vereinigung der Freunde der Sternwarte der deutschen Universität

The society of Sudetenland entrepreneurs was founded in mid 1920s. Many founding members were already members of the Vereinigung zur Verbreitung astronomischer Kentnisse.

At that time, a primary observation station for the German university had existed in Telnice in Krušné Hory for five years, while the Czech university had at its disposal a modern observatory with several observation and residential buildings built from private funding. The society continued funding the growing Telnice observatory (Fischer, Hibst 1983).

In 1940 the society was dissolved by the Reichsprotektor, and community activities gradually ceased.

6.8. International astronomical societies

In 1905 the American astronomer George Ellery Hale (1868-1938), the chairman of the U.S. National Academy of Sciences, initiated the meeting of seventeen leading European universities and scientific organisations in St. Louis in 1904 to discuss the establishment of an international organisation for solar research. Only the Prussian *Königlich-Preußische Akademie der Wissenschaften* declined the invitation, but several

delegates of the *Deutsche Physikalische Gesellschaft* attended the meeting. The decision to establish the *International Union for Cooperation in Solar Research* was adopted at the meeting. The Union held a congress every three years until World War One, and the activities of the Union gradually expanded into other disciplines of astrophysics. It was not accepted as a member of the *International Association of Academies* (IAA, established in 1899) until 1907, probably due to opposition from the Prussian Academy of Sciences. World War One, however, changed the situation considerably. Many international scientific organisations were dissolved, and the *International Union of Cooperation in Solar Research* virtually ceased to exist after the last pre-war congress in St. Petersburg in 1913 (Adams 1949).

After the war, the *International Research Council* was established at the initiative of the *U.S. National Research Council*, the *Académie des Sciences* based in Paris, and the *British Royal Society*, as a new umbrella international scientific organisation for the discipline, to be renamed the *International Council of Scientific Unions* in 1931. These scientific unions had both individual members and member states represented by their national scientific associations.

The *International Astronomical Union (IAU)* was one of the first institutions to be established. It directly superseded the *International Union for Cooperation in Solar Research*, the group that worked on the extensive international *Astrographic Catalogue* project and a collection of maps entitled *Carte du Ciel* (established 1887) and several other societies working in cooperative research in astronomical disciplines. The membership was open to Entente and neutral states only, but IAU changed its regulations at the first general assembly in 1922 (Hyklová 2018b).

The general assembly of the IAU was always inaugurated at the first meeting,

which was followed by dealings in interdisciplinary committees, and another general assembly was held at the end, presenting the reports from committees. The committees in each discipline covered all the essential astronomy disciplines and focused on progress with work on international projects. In the interwar period, there were around thirty committees. Their members were all influential scientists in this discipline, but congress talks were open to all participants. The committees could hire new members approved by a qualified majority, and their mandate lasted until the end of the following general assembly. This setup allowed the committees and their composition to be regularly reorganised in line with developments in the discipline (Lee 1922). The committee members kept in touch through correspondence regarding work progress on international projects between the congresses. Discussions were held, and activity reports were reviewed at committee meetings, to be subsequently translated into English and French and presented by the committee presidents at the closing general assembly of the Union. These reports were published in *Transactions of the International Astronomical Union*. A committee was entitled to request financial support for larger projects or the issue of more extensive publications. The funding was provided from the Union's budget and subsidised from government funds by the national associations representing the individual states. The administrative structure of the International Astronomical Union was simple and democratic – the executive committee consisted of the president, five vice-presidents from five different countries and the general secretary, who was also the treasurer. States voted on administrative and financial matters, and the number of their votes was based on their population. The minimum vote was assigned to states below 5 million; the maximum vote was assigned to those exceeding 20 million (Adams 1949).

The first general assembly of the IAU was held in Rome in 1922 and attended by 83 astronomers (Hyklová 2018b). This meeting helped unify the designation of astrophysical and astronomical variables and created a system of three-letter abbreviations of constellations. Between WWI and WWII, there were five more general assemblies: Cambridge1925, Leiden 1928, Cambridge (USA) 1932, Paris 1935 and Stockholm 1938. The first postwar meeting was held in 1948 in Zürich.

The Czechoslovak Republic joined the IAU during the first assembly in 1922. The membership was realised through the astronomical department of the Czechoslovak National Research Council, the member of the International Research Union (est. 1920). During the interwar period, the astronomical department included astronomers from the German university, i.e. Adalbert Prey and Rudolf Spitaler in 1928 (Šternberk 1978). The department was responsible for communication with the IAU, proposals, managing membership fees, and suggesting individual members later elected at IAU general assemblies (Hyklová 2018b).

Its next task was the development of astronomy in the Czechoslovak Republic. The department issued suggestions for responsible authorities. One of them was to found the international journal *Bulletin of the Astronomical Institutes of Czechoslovakia* in 1946 (Šternberk 1978).

6.8.1. The Astronomische Gesellschaft

The *Astronomische Gesellschaft* (AG) was founded in Heidelberg in 1863. It emerged from the need to cooperate in the laborious computations of orbits of newly discovered asteroids and distribute the tasks among various scientists. The other objectives of the AG were to hold regular professional meetings, issue publications and

maintain the scientific library.

From the beginning, it was considered an international organisation. Its meetings were held alternately in Germany and abroad, beginning with news on the society's organised activities, followed by readings of professional papers by members of the public and election of the executive board. Dealings were held in German, which was not required as the language of contributions. After World War I, when German and Austrian scientists were excluded from membership in international scientific organisations, the number of members outside Germany significantly decreased. In the mid-1930s, 50% of its chairs were German. The AG was intended to represent Germany in the IAU, but Germany never entered the IAU during the interwar period. Dozens of AG members actively engaged in the IAU as individual members. Some meetings of the AG were held immediately after the IAU's General Assemblies.

In early 1900s the AG initiated the important star catalogue *Astronomische Gesellschaft Katalog (AGK)*. AGK2 succeeded the AGK in the interwar period. The third version AGK3 has been used until today.

In 1945 the AG had to suspend its activities but was re-established in 1947 as the *Astronomische Gesellschaft in der Britischen Zone.* In 1949 the AG was fully renewed but limited to German-speaking countries.

7. Legacy

The post-war situation in Czechoslovakia exacerbated relations between the Czech and German scientific communities, which were already very tense in the interwar period. A large part of the German academic community emigrated at the beginning of the war. Only a minority remained at the German university, and proven academics from Nazi Germany took up vacancies. On November 17, 1939, thousands of students from Czech universities were deported from Prague dormitories to concentration camps after a student manifestation.

Decrees of the President of the Republic Edvard Beneš No. 122/1945 abolished the German university retroactively, effective as of November 17, 1939, as an *„institute hostile to the Czech nation“,* and all academic degrees awarded after this date were thus not recognized.

The discontinuity in the Czech academic sphere was partially „compensated“ by the opening of an extraordinary summer semester in the summer of 1945, in which a large number of students applied (e.g. at CTU, the number of enrolments in astronomy and related fields was three times higher than in ordinary years)[40]. However, most students did not complete more than three semesters.

After the coup in 1948, several thousand university students were expelled from their studies.

Astronomy and related fields have always had a high degree of academic failure at Prague universities. Approximately half of the students did not complete the essential

[40] Author’s research in catalogues of students in Czech Technival University Archive.

four-year study and subsequent teacher qualification or doctoral examination. The generation born approximately between 1915 and 1930 was significantly affected by the six-year closure of Czech universities. Nevertheless, in 1945-60, an internationally successful generation of Czech astronomers was formed. The community of amateur and professional astronomers formed in the interwar period managed to substitute the role of closed universities. Students educated in this unofficial way subsequently studied in the postwar period „fast track". Their unofficially passed exams were officially recognized.

However, the Czech astronomical community did not escape the social consequences of the war and the subsequent coup in 1948.

Driven by the first attempts by German scientists to gain employment in Czech scientific institutions, the Czech academic sphere began to take steps against the entry of members of the German scientific community.

Shortly after the May Revolution, the faculty of Charles University adopted a resolution stating that only persons who declared their Czech nationality at the latest during the 1910 census could be appointed professors. In May 1947, a decree of the Ministry of Education was issued,[41] according to which it is inadmissible to admit persons of German nationality to the state service.

In 1947, Jiří Alter, a former employee of the German Astronomical Institute who returned from emigration, applied for positions at astronomical state institutions and later for a position at the Štefánik Observatory Prague. Resistance organizations stood up for Alter, and there was an ambiguity about his national identity before the war. [42]

[41] Decree No. B-3390-1811-IV/1 of 13 May 1947

[42] Otto Seydl's estate, citation of conversation with Vl. Guth; oral history interview with Luboš Perek of 4 March 2017.

According to Otto Seydl, who opposed any entry of Alter into the Czech astronomical community, the founders of the Ondřejov observatory J. J. Frič and Fr. Nušl persistently resisted any collaboration with German astronomers, including Jiří Alter, who wanted to test his new instrument in Ondřejov in the interwar period. The dedication of the observatory to the „Czech nation“ for Charles University was also perceived primarily to prevent the recruitment of German workers, which happened around 1928 in the case of the State Meteorological Institute[43].

After the war, Alter began to study open star clusters and collaborated with Czech astronomers Ruprecht and Vanýsek on the first *Catalogue of star clusters and associations* as a private researcher. He held a similar unofficial position many years before the war when he collaborated externally with the German Astronomical Institute and did not officially become an assistant until 1933.

In the first years after the war, the astronomical community had to cope with „revolutionary cleansing“ within its ranks. In May 1945, Hubert Slouka, who was sentenced to six months in prison for extortion during the German occupation, tried to return to the service of the State Observatory. During the war, he encountered Czech resistance and, in 1941, sent blackmail letters to two of its members. His actions were soon known to the astronomical community and the public. Shortly afterwards, he was fired from a contract scientific worker position at the State Observatory. František Nušl, the former director of the State Observatory, recommended its re-admission, while the then administrator Otto Seydl strongly opposed it. [44] Slouka had an essential position in amateur astronomy: a member of the CAS committee, editor of the Star Empire and a

[43] Otto Seydl's estate.
[44] Otto Seydl's estate.

well-known astronomy populariser. After the war, he went through a cleansing procedure, which was cancelled for legal reasons. Back in 1947, Slouka sought to overturn the verdict for blackmail, claiming he was trying to raise money for his resistance group.

The Cleansing Commission also interfered with the professorship procedure of Josef Mikuláš Mohr. Before the war, Mohr was appointed associate professor in Brno, where he travelled to lecture and took leave from the University of Prague. The „Munich betrayal“ was a significant turning point in his life. *„Astronomy ceased to exist for him“*[45] , and he focused on his academic career. After the war, he tried to get a full professorship at Charles University. The commission for professor appointment was established in June 1945. In September 1945, however, Mohr was investigated by the cleansing commission because in the school year 1940/41, he sent his daughter to a German high school for eight months. Based on a proposal from the Purge Commission, the Dean reprimanded him for „his actions showed a lack of national feeling and that the actions could have aroused public outrage, especially because he was a university teacher.“ [46] At the same time, the faculty decided that the commission for Mohr's professorship would be dissolved.[47] The following year, Mohr successfully obtained a professorship in astronomy in Brno and began building the newly established astronomical institute there. He returned to Prague only in 1953 as the director of the Department of Astronomy and Meteorology (later the Department of Astronomy,

[45] *„Mnichovem – což pro něj byla obrovská rána, jako francouzomila ho zklamali – pro něj přestala astronomie existovat“.* From inteview with Pavel Mayer, Prague, Charles University, Astronomical Institute, 5 February 2015.

[46] Letter from dean’s office to J. M. Mohr, 26 September 1945, No. 1825/45

[47] Dopis závodní rady prof. Sboru, č. Jednací 1593/45, z 18.9.1945

Geophysics and Meteorology). He then remained here until his retirement in 1975.

7.1. Astronomy at the Czech Technical University

The short tradition of astronomy at the High School of Special Sciences at the Czech Technical University, founded by Jindřich Svoboda in the 1920s, was practically interrupted at the beginning of the war. Professor V. V. Stratonov, whom Svoboda brought to CTU, died in 1938, and Svoboda himself died because of imprisonment in a concentration camp in 1941. In 1945, Emil Buchar came from the Military Cartographic Institute and founded a university observatory at CTU. After the reorganization of studies at CTU in 1950, the High School of Special Sciences ceased to exist. The Faculty of Geodesy was founded, and Buchar moved to head the newly established Department of Higher Geodesy.

8. Instruments

8.1. Circumzenithal prototype (CZ0)

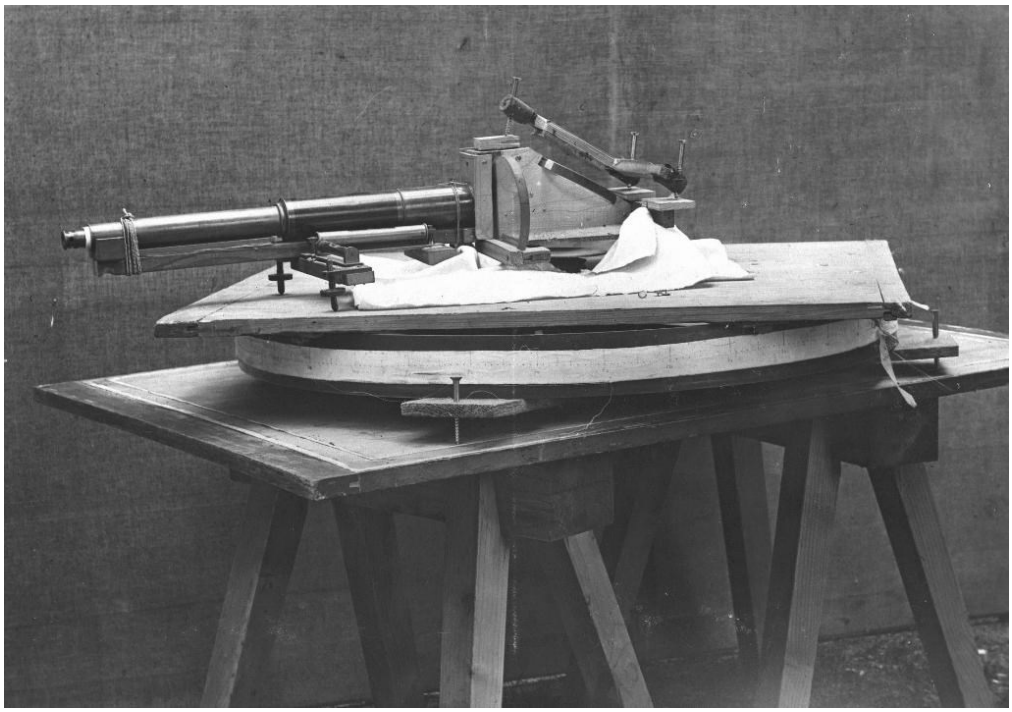
Description: Original Czech instrument of astrolabe type for determining geographic coordinates by Gauss method of equal altitudes. It uses a prism and a mercury horizon for making the doublet of reflections.

Current location:

Biography: Made in 1899 by Nušl and Frič.

Sources:

Photo:



Source: Historical Archive of the Ondřejov Observatory

8.2. Circumzenithal model 1 (CZ1)

Description: Original Czech instrument of astrolabe type for determining geographic coordinates by Gauss method of equal altitudes. It uses a prism and a mercury horizon for making the doublet of reflections.

Biography: Made 1901-2 by Josef Jan Frič workshop.

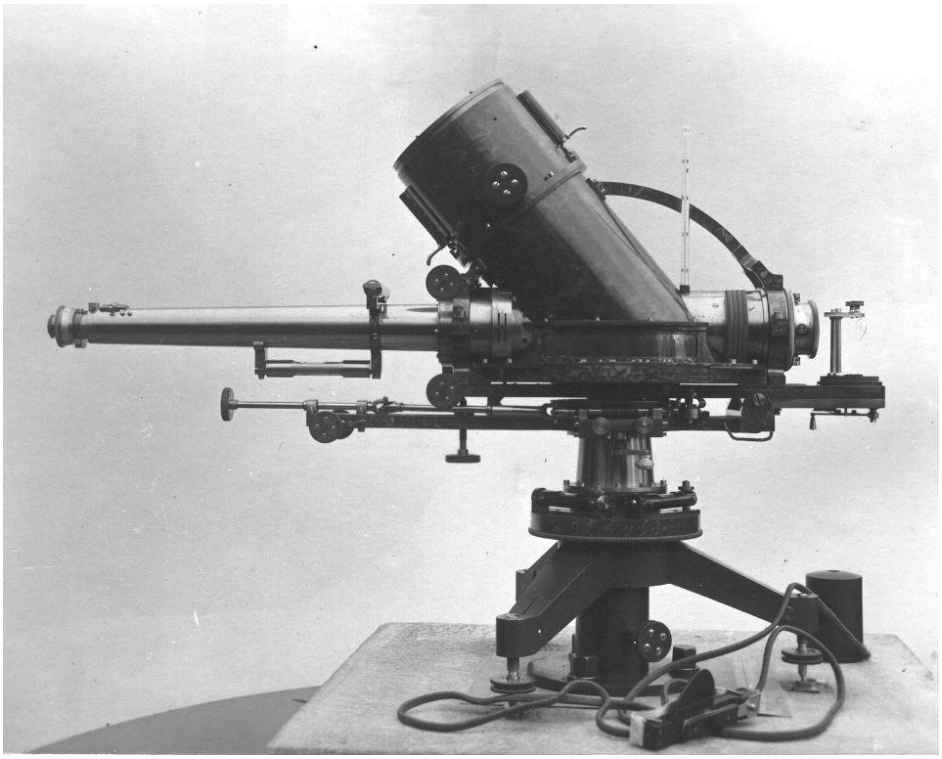
Photo:

8.3. Circumzenithal model 2 (CZ2)

Description:

Biography: Made in 1905 by Josef Jan Frič workshop.

Photo:



Source: Historical Archive of the Ondřejov Observatory

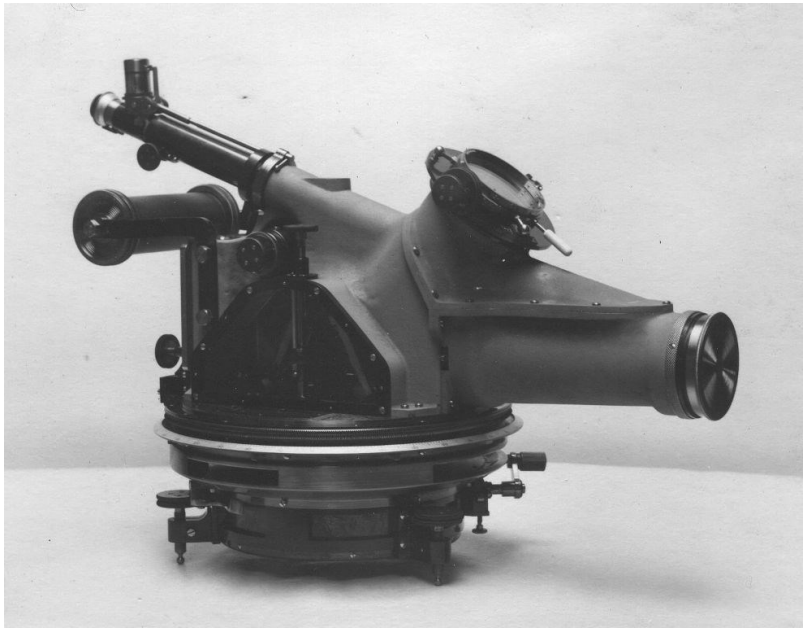
8.4. Circumzenithal model 1922 (C22)

Description: Original Czech instrument of astrolabe type for determining geographic coordinates by Gauss method of equal altitudes. Object lens diameter 60 mm, focus 690 mm, zoom 140x, mirror angle 50°. It is equipped with a doublet of wedges for increasing the number of registered time points.

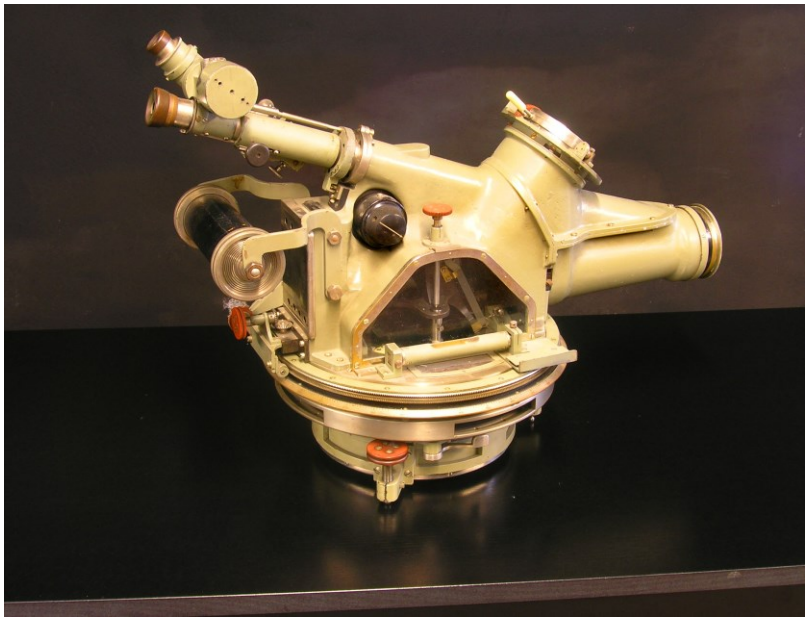
Current location:

Biography: Made in 1899 by Nušl and Frič. Used to determine coordinated geodetic points in the Czechoslovak astronomical-geodetic network in 1924-47.

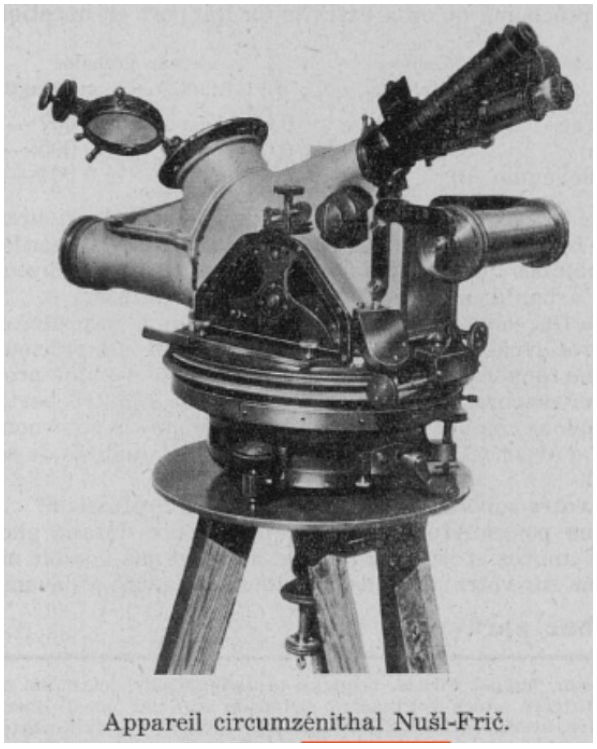
Photo:



Source: Historical Archive of the Ondřejov Observatory



Source: Pecný observatory



Source: Říše hvězd 18, 10/1937, s. 239

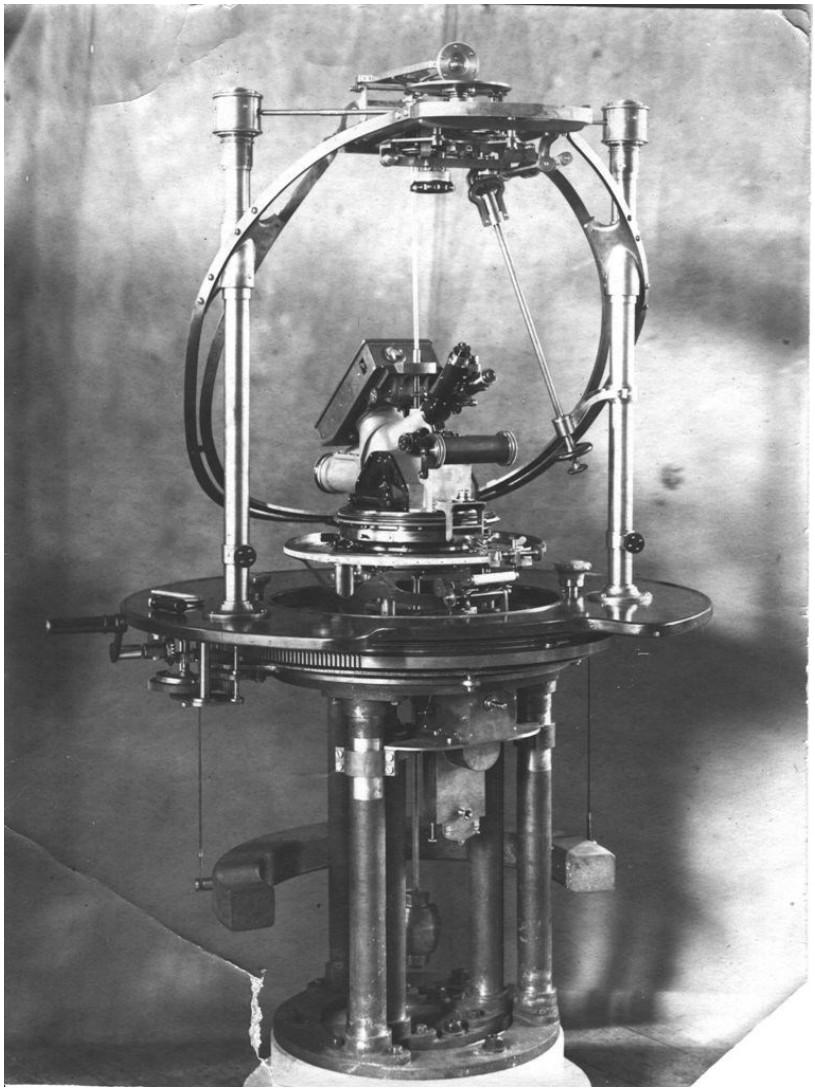
8.5. Circumzenithal model 1930 (C30)

Description: Original Czech instrument of astrolabe type for determining geographic coordinates by Gauss method of equal altitudes.

Current location:

Biography: Made in 1930.

Photo:



Source: Historical Archive of the Ondřejov Observatory

8.6. Sources on development of Nušl-Frič circumzenithal

BUCHAR, E., 1953. Sur un nouveau micromètre de l'appareil circumzénital. *Bulletin of the Astronomical Institutes of Czechoslovakia*. 1953. Vol. 4, p. 77.

NUŠL, František, 1929. *Micromètre impersonnel pour l'appareil circumzénithal*. . Prague: Académie tchéque des sciences et des arts,. Publikace universitní hvězdárny bratří Fričů v Ondřejově ;

NUŠL, František and FRIČ, Josef Jan, 1903a. *Étude sur l'appareil circumzénithal*. . Prague: L'Académie des sciences. Bulletin international de l'Académie dos sciences de Bohône. 1903.

NUŠL, František and FRIČ, Josef Jan, 1903b. *Studie o circumzenitálu*. . V Praze: Česká akademie věd.

NUŠL, František and FRIČ, Josef Jan, 1925a. Troisieme etude sur l'appareil circumzenithal. I. Sur le principe et sur les developpements possibles de l'appareil. *Publications of the Astronomical Institute of the Czechoslovak Academy of Sciences*. Online. 1925. Vol. 1. [Accessed 30 April 2017]. Available from: https://ui.adsabs.harvard.edu/#abs/1925PAICz...1....1N/abstract

NUŠL, František and FRIČ, Josef Jan, 1925b. Troisieme etude sur l'appareil circumzenithal. II. Construction de l'appareil. *Publications of the Astronomical Institute of the Czechoslovak Academy of Sciences*. Online. 1925. Vol. 2. [Accessed 30 April 2017]. Available from: https://ui.adsabs.harvard.edu/#abs/1925PAICz...2....1N/abstract

8.7. Diazenithal (DIA)

Diameter:

Focal length:

Eyepieces:

Description: Instrument for determining star passage through meridian circle using rectangular prism placed in the vertical plane and a mercury horizon.

Current location:

Biography: Made 1930 by Nušl and Frič.

Sources:

BUCHAR, E., 1976. Ein neues Modell des Diazenitals und seine Theorie. In: *IV. Internationales Kolloquium Geodätische Astronomie und Astrometrie*. Online. 1976. p. 907–910. [Accessed 11 April 2016]. Available from:

http://adsabs.harvard.edu/abs/1976gaa..conf..907B

BUCHAR, Emil, 1972. Ein kleines Modell des Diazenitals Nusl-Fric und die Ortsbestimmung. *Wissenschaftliche Zeitschrift*. January 1972. Vol. 21, no. 3, p. 597–599.

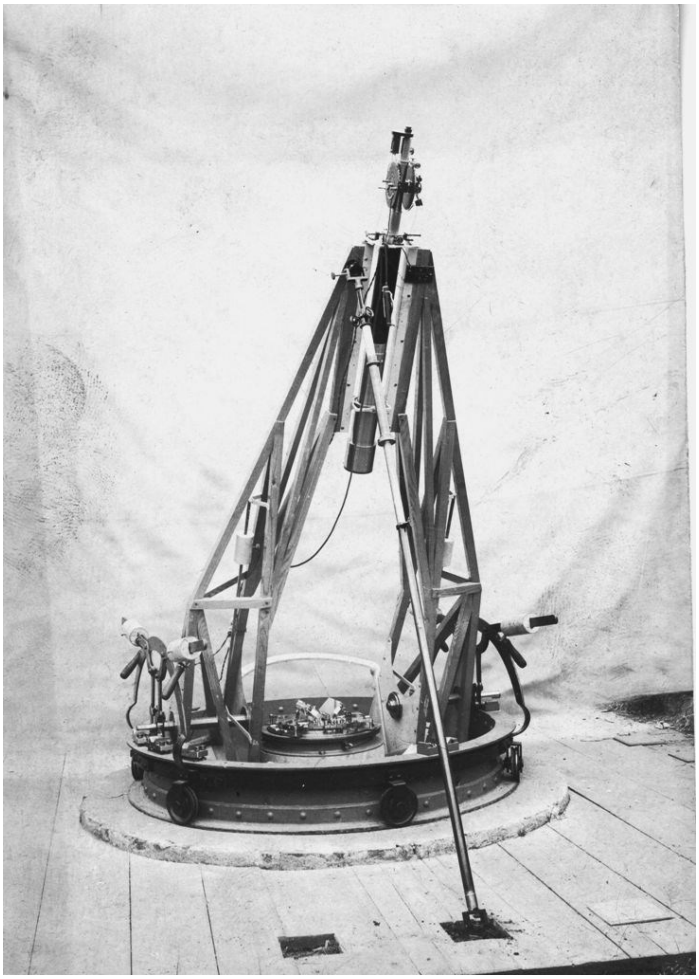
BUCHAR, Emil, 1976. A new model of the "diazenithal" and its theory. *Wissenschaftliche Zeitschrift*. January 1976. Vol. 25, p. 907–910.

NUŠL, František and FRIČ, Josef Jan, 1904. Mitteilung über das Diazenital. *Astronomische Nachrichten*. jen 1904. Vol. 166, no. 15, p. 225–228. DOI 10.1002/asna.19041661502.

NUŠL, František and FRIČ, Josef Jan, 1905. Communication About the Diazenital. *Popular Astronomy*. January 1905. Vol. 13, p. 16–19.

RAJCHL, R., 1987. The diazenithal. *Rise Hvezd*. January 1987. Vol. 68, p. 2–3.

Photo:



Source: Historical Archive of the Ondřejov Observatory

8.8. Danzer Achromatic (DA)

Diameter: 105 mm

Focal length: 1,58 m

Eyepieces: 4 pieces zoom 30-300, helioscopic eyepiece

Description: *„Achromatic from J. B. Danzera of Manchester, lens diameter 105 mm, focal length 1,58 m, metal tube, seeker, massive iron tripod 80 cm high, gross and smooth adjustments, Barlow lens for zoom enhancement, helioscopic eyepiece (diagonal planar glass), glass for solar observation, four eyepieces, zoom 30 to 300, dew shields Practical container. The instrument can carry up to zoom 450.*[48] *"*[49]

Current location:

Biography: Made in Manchester

Sources:

Šafařík's undated offer of instruments for sale, Archive of the Astronomical Institute of the Charles University

Photo:

[48] Šafařík's undated offer of instruments for sale, Archive of the Astronomical Institute of the Charles University

[49] "Achromat J. B. Danzera z Manchesteru, průměr objektivu 105mm, délka fokusu 1,58m, kovový tubus, hledač, masivní železná trojnožka vysoká 80cm, hrubé a jemné pohyby, Barlowova čočka pro zvýšení zvětšení, helioskopický okulár (diagonální rovinné sklo), skla k pozorování Slunce, 4 okuláry, zvětšení 30- až 300-násobné, rosnice. Praktická přepravka. Přístroj dobře snese zvětšení až 450-násobné. "

8.9. Hensoldt Universal Instrument (HUI)

Diameter:

Focal length:

Eyepieces:

Description: *„Hensold universal instrument, 166mm circles with covered scale, reading by four microscopes with fixed glass scale by 6", a direct excentric telescope with 36mm aperture with solar glass front of the lens. Brand new, unused*[50]*. "*[51]

Current location:

Biography: Owned by Vojtěch Šafařík, offered for purchase around 1900.

Sources:

Photo:

8.10. Bečvář's astrograph (BEA)

Diameter: parabolic 24 cm, parabolic 21 cm, cinema lens 90 mm, Sécretan refractor 5"/130 mm, Laack Dialitar pro sky mapping

Focal length:

Eyepieces:

Description: Manual gearing. *„It consisted of two parabolic mirrors, 24 and 21 cm in diameter, 130 mm Sécretanova refractor and Laack Dialitar for sky mapping and*

[50] Šafařík's undated offer of instruments for sale, Archive of the Astronomical Institute of the Charles University

[51] „*Astronomický univerzál od Hensoldta, kruhy 166mm s krytou stupnicí, odečet čtyřmi mikroskopy s pevnou skleněnou škálou po 6", přímý excentrický dalekohled o 36mm otvoru se slunečním sklem před objektivem. Zcela nový, neužívaný"*

90mm cinema lens for photographing shooting stars. (Klepešta 1937) *„It is a Newton mirror with a diameter of 8“ = 21*5 cm. the mount is elaborate; the ground body, standing on three strong steel bolts, weighs 150 kg and is supported by a special column that does not touch the ceiling. The strong clock axis had a forked end made from malleable cast iron, carrying the declination axis. On its end, the secondary telescope is mounted, refractor 5” and weight on the other side balances both this telescope concerning the clock axis and longer ends of both concerning the declination axis. Therefore it is adjustable in two mutually perpendicular directions. Subtle motion in rectascension is secured by a large cart iron wheel with 360 dents and a screw, rotated by a multi-speed gear: its dents were engraved by company Kameníček and Co from Prague. With a simple brake, this wheel connects in a crude direction by the telescope with the axis. Similarly, the movement in declination is secured; however, we invented a new simpler and much more subtle device without the screw wheel. The rod, which can be connected to the declination axis with the brake, is carried by a fine-threaded screw: you can see the knob of this screw in the picture on the right side of the fork end, just like you can see the knob of the clock axis brake on the left side. The new subtle declination movement works well for us, especially them photographing; however, it has only a limited range, about 7 °, which is sufficient. The reflector tube is made of a solid iron sheet. The upper end carries an eyepiece adapter and a device carrying a small elliptical mirror, equipped with movements in three directions for direction. There is a socket on the bottom end of the tube for a large mirror, screws for adjustment, weight and rails for insertion of apertures. The secondary telescope, also utilized as a pointer, has a Sécretan lens of 13 cm diameter, embedded in a brass centring head. Its definition is satisfactory for us. The bottom end of the tube carries an eyepiece system that can be*

removed and replaced by a photographic camera. The seeker had an object lens of 40 mm and a zoom of 6. The special instrument enables the direction of axes of both telescopes parallelly so that you can use both for observation simultaneously. Two other photographic cameras are attached to the tube of the mirror, one with an object lens 60 mm, a focal length of 64 cm, second with a 13 cm mirror, luminosity 1:3." (Bečvář 1929) *„Its mount weighs more than 300 kg, and it is still quite light compared to what is already loaded on it. These are two mirrors, of whom the lower has a mirror diameter of 210 mm and luminosity of 1:10, upper has a diameter of 240 mm and luminosity of 1:5. At the bottom, the rays coming from the mirror are angled by a small mirror to the side of the tube where a cassette of the eyepiece is located; visually, this mirror fully matches the 130 mm Sécretan refractor that we use as a pointer but surpasses it in luminosity. The upper light reflector, designed mainly for photographing nebulae and star clusters, has a cassette located directly in focus. Attached to the refractor is a wooden chamber with Laack "Dialytar" format 18x8 for photographing vast landscapes and the Milky Way, and, finally, underneath an extraordinarily luminous cinema lens with a diameter of 90 mm and focal length of 180 mm, designed for photographing of shooting stars. The telescope is installed under a dome with diameter 3 and ½ m, very easy to rotate even with ith weight 8 q from the rotating pointer"..*[52] (Bečvář 1934). It was used with photo

[52] *"Sestával ze dvou parabolických zrcadel, 24 a 21 cm v průměru, 130 mm Sécretanova refraktoru a Laackova Dialitaru pro mapování nebe a 90 mm kinoobjektivu pro snímky létavic. (Klepešta 1937) " "Je to Newtonův reflektor průměru 8" = 21*5 cm. Montáž je důkladná; základní těleso, stojící na třech silných ocelových šroubech, váží 150 kg, a je neseno zvláštním sloupem, jenž se stropu nedotýká. Silná hodinová osa je ukončena vidlicí z temperované litiny, nesoucí deklinační esu. Na jejím kcnci je upevněn vedlejší dalekohled, refraktor 5" a závaží na druhé straně vyvažuje jednak tento menší dalekohled vzhledem k ose hodinové, jednak delší konce obou vzhledem k ose deklinační. Je proto posuvné ve dvou navzájem kolmých směrech. Jemný pohyb v rektascensi obstarává velké litinové kolo s 360 zuby a šroub, otáčený převodem mnohonásobně zvolňujícím; zuby na něm vyřezala fa Kameníček a spol. v Praze. Jednoduchou brzdou spojí se toto kolo s osou po hrubém nařízení dalekohledem. Podobně byl zařízen i pohyb v deklinaci; vymyslili jsme si však zařízení nové, jednodušší a mnohem jemnější, bez šroubového*

cameras 240/1200 and 200/1600 mm.

Current location: Úpice observatory, Bečvář dome

Biography: Lens made by Lerebours et Secrétan Paris. In 1929 placed in Bečvář's private observatory in Brandýs nad Labem. In November 1937, it was installed in the smaller 4m dome of Bečvář's new observatory in Štrbské Pleso. In 1943 moved to the small dome of the newly built Skalnaté Pleso observatory. After Bečvář left, the telescope was moved to Brandýs nad Labem. In 1966, it was purchased from Bečvář's estate for the observatory in Úpice and installed in its small dome (Mlejnek 1999). Engine adjustment and coating reconstruction were made. In 2013, the Sécretan lens was cleaned and adjusted in IPP CAS, Toptec Turnov.

Sources:

BEČVÁŘ, Antonín, 1929. O naší observatoři. *Říše hvězd*. 1929. Vol. 10, no. 8, p. 149–152.

BEČVÁŘ, Antonín, 1934. Fotografujte oblohu! *Říše hvězd*. 1934. Vol. 25, no. 4,

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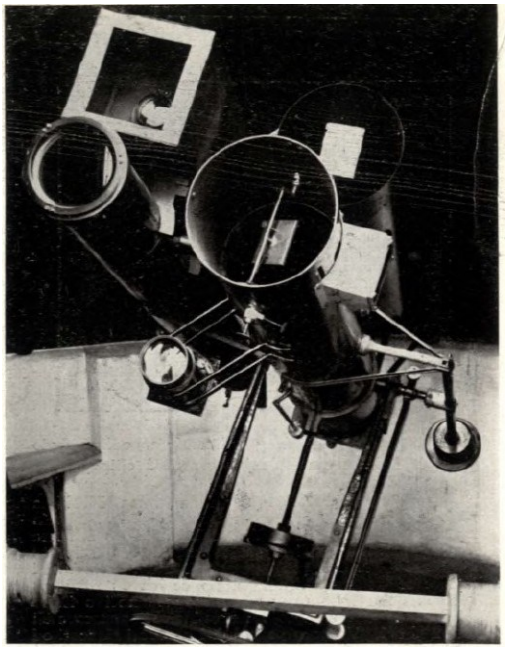
kola. Tyč, kterou je možno brzdou spojiti s deklinační osou, je tažena šroubem o jemném závitu; knoflík tohoto šroubu vidíte na obrázku na pravé straně vidlice, právě jako na levé straně je viděti knoflík brzdy na hodinové ose. Nový jemný pohyb v deklinaci se nám dobře osvědčuje, zvláště při fotografování; má ovšem jen omezený rozsah, asi 7°, který však je dostatečný. Tubus reflektoru je ze železného plechu, velmi pevný. Na horním konci nese okulárový nástavec a zařízení, nesoucí malé eliptické zrcátko, opatřené pohyby ve třech směrech pro nařízení. Na spodním konci tubu je objímka pro velké zrcadlo, šrouby k jeho nařizování, závaží a kolejnice pro zasunování clonek. Vedlejší dalekohled, sloužící také jako pointer, má Secrétanův objektiv průměru 13 cm, zasazený v mosazné, centrovací hlavici. Jeho definice nás uspokojuje. Spodní konec tubu nese okulárový systé , jejž možno vyjmouti a nahraditi fotografickou komorou. Hledač má objektiv 40 mm a 6nás. zvětšení. Zvláštní zařízení umožňuje nařiditi osy obou dalekohledů rovnoběžně, takže je lze oběma pozorovati současně. Na tubu reflektoru jsou připevněny ještě dvě fotografické komory, jedna s objektivem 60 mm, ohn. 64 cm, druhá se zrcadlem 13 cm, světelnosti 1:3." (Bečvář 1929) "Jeho montáž váží více než 300 kg a ještě je dosti lehká vzhledem k tomu, co všechno je již na ni naloženo. Jsou to hlavně dva reflektory, z nichž spodní má průměr zrcadla 210 mm a světelnost 1 : 10, horní má průměr 240 mm a světelnost 1 : 5 . U spodního jsou paprsky přicházející od zrcadla vrženy malým zrcátkem na stran u tubusu, kde je umístěna kaseta, po př. okulárový konec; visuelně vyrovná se tento reflektor plně 130 mm Secrétanovu refraktoru, jehož užíváme jako pointeru, světelností jej ovšem předčí. Horní světelný reflektor, určený hlavně pro fotografii mlhovin a hvězdokup, má kasetu umístěnu přímo v ohnisku. Na refraktoru je připevněna dřevěná komora s Laackovým »Dialytarem« formátu 18 X 18 pro snímky rozsáhlých krajin a Mléčné dráhy, a vespod konečně neobyčejně světelný kinoobjektiv o průměru 90 mm a ohnisku 180 mm, určený k fotografování létavic. Dalekohled je umístěn pod kupolí o průměru 3 1/2 m, velmi snadno i při její váze 8 q od okuláru pointeru otáčivou."

p. 65–70.

KLEPEŠTA, Josef, 1937. *Dvacet let mezi přáteli astronomie*. . Prague: Česká astronomická společnost.

MLEJNEK, Vladimír, 1999. *Vzpomínky na vznik a rozvoj hvězdárny v Úpici*. . Úpice: Hvězdárna v Úpici.

Photo:



Source: (Klepešta 1937)

8.11. Böhm's Zeiss Refractor (BZR)

Diameter: 130 mm

Focal length: 1880 mm

Eyepieces:

Description: *„Zeiss refractor (Ajp B) on a parallactic mount with a clock drive and installed in the dome; D = 130 mm, f = 1880 mm; accessory device: Zeiss filar*

micrometre."[53] (Mašek 1934)

Current location:

Biography: Installed on private observatory of lawyer Rudolf Böhm in street U studánky (today Na Hřebenkách) No 68. It was used for the observation of binaries. After Böhm's death in the post-war period, the observatory was resold (Najser 2020).

Sources:

MAŠEK, Bohuslav, 1934. *Hvězdářská ročenka na rok 1935*. . Praha: Jednota československých matematiků a fysiků.

NAJSER, Pavel, 2020. Zapomenutá hvězdárna na pražských Hřebenkách. *Astropis*. 2020. Vol. 2020, no. 1, p. 15–16.

Photo:

[53] „Zeissův refraktor (Ajp B) paralakticky montovaný, s hodinovým strojem a umístěný v kupoli; D = 130 mm, f = 1880 mm; pomocné zařízení: vláknový mikrometr Zeissův."

8.12. Clark 8-inch doublet (C8D)

Diameter: 8-inch (203mm (Polášek 2006))

Focal length: 273 cm

Eyepieces: zoom 62, 95, 145, 225, 360, 520

Description: Achromatic. *„Paralactic mount on an iron pillar with variable pole height, silver divided circles, reading by eye lupe by 1', clock drive with Bond Spring-governor, mahogany tube, seeker with diameter 54 mm, six eyepieces with zoom 92 to 850, helioscopic eyepiece (with diagonal planar glass), centring machine of H. Schroeder design. The instrument shows two brightest Uranus' moons and closely resolves binaries to distance*[54].”[55] Cyril Polášek proved the authenticity of the object lens in 1999 (Polášek 2001). Clock drive Spring-Governor.[56]

Current location: Ondřejov observatory (lens), National Technical Museum (mahogany tube), Žilina observatory (mount, metal tube, clock drive)

Biography: Made in 1858-59 by Alvan Clark for amateur astronomer Reverend William Rutter Dawes. Parallactic mount constructed by George Bassett Clark. In 1860 bought from Dawes by Nicolas Martindale in Liverpool. In 1863 installed in the dome of Clapham Common when Martindale moved. Since 1867 unused. In 1881, dismantled and stored in London. In 1888, Martindale's widow sold the instrument to Vojtěch Šafařík. In 1888, it was cleaned and adjusted by H Schroeder, renovated by the Frič

[54] Šafařík's undated offer of instruments for sale, Archive of the Astronomical Institute of the Charles University

[55] "Paralaktická montáž na železném sloupu s měnitelnou výškou pólu, stříbrné dělené kruhy, odečítání lupou na 1', hodinový stoj s Bondo-vým Spring - governorem, mahagonový tubus, hledač s průměrem 54mm, 6 okulárů (o zvětšení) 92- až 850(-násobném), helioskopický okulár (s diagonálním rovinným sklem), centrovací přístroj podle návrhu H. Schroedera(!). Přístroj ukazuje dva nejjas-nější měsíce Urana a rozliší ostře dvoj-hvězdy do vzdálenosti 0",6 ".

[56] Guthův dotazník k historickému inventáři Žalova.

brothers and assembled on the terrace of Šafařík's villa. In 1891 it was moved to the private observatory Šafařík had built on the house's roof. In 1903, the telescope was donated to the Ondřejov observatory by his widow Pavlína Šafaříková. In 1908-9, the original springing mahogany tube was replaced by steel ones in Carl Zeiss Jena, which required replacing the brass lens socket with a metric steel one. The tube was placed on the loft of the Ondřejov solar observatory building.[57] In 1922, the telescope was installed in the central dome of the Ondřejov observatory. In 1952, it was disassembled. The original Clark mahogany tube, mount and clock drive were assigned to National Technical Museum and inventoried in 1956 and deposited in the NTM depository in Invalidovna (Švejda 2018). In 1954 the lens was installed in the double solar photospheric-chromospheric telescope in the solar dome of Ondřejov. In 1962 the mount, Zeiss tube and clock drive[58] were lent and, in 1968, donated to Žilina Observatory (Švejda 2018). In 1999, VOD AV in Trutnov cleaned the lens and determined its optical properties. The mahogany tube was found in 2015 in the NTM depository in Čelákovice and renovated (Švejda 2018) for the 2021 exhibition in NTM.

Sources:

POLÁŠEK, C., 2001. The 8-inch Alvan Clark object glass at the Ondrejov Observatory. *Journal of the British Astronomical Association*. 1 June 2001. Vol. 111, p. 145–149.

POLÁŠEK, Cyril, 2006. *Jednoapůlstoletý osmipalcový objektiv Alvana Clarka hvězdárny Astronomického ústavu Akademie věd České republiky v Ondřejově u Prahy: historická astrooptická studie věnovaná 145. výročí vzniku objektivu v Bostonu, USA, i Clarkovu objevu podvojnosti 99Her*. . 3. Ondřejov: Astronomický ústav AV ČR. Scripta astronomica, 9.

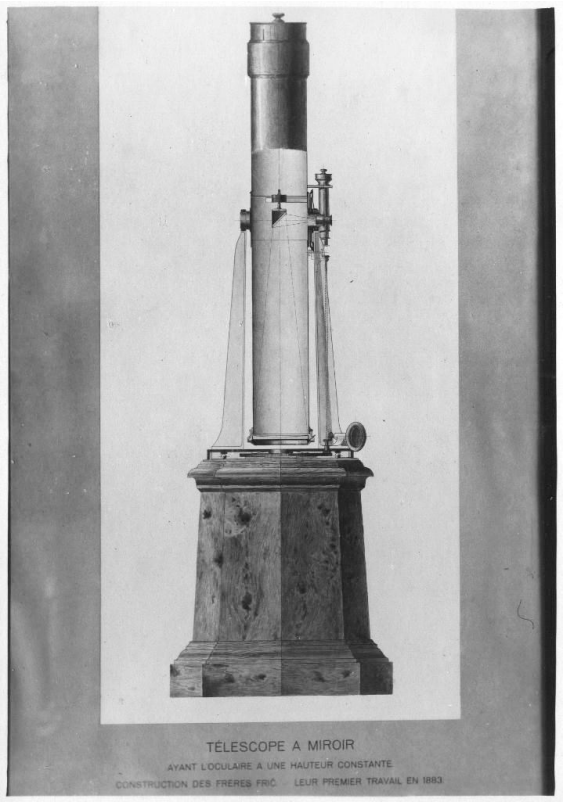
RAIL, Zdeněk, ŠRAJER, Bohdan, LÉDL, Vít, JAREŠ, Daniel, OUPICKÝ, Pavel, MELICH, Radek and MELICH, Zbyněk, 2008. Objektiv Merz 160/1790 refraktoru Hvězdárny v Úpici. In: MARKOVÁ, E. (ed.), *Člověk ve svém pozemském a*

[57] Guth's questionnaire on Žalov's historical inventory (Polášek 2006).
[58] Guth's questionnaire on Žalov's historical inventory (handwritten note) (Polášek 2006).

kosmickém prostředí. Bulletin referátů z konference. Úpice: Hvězdárna Úpice. 2008. p. 70–75. ISBN 978-80-86303-14-7.

ŠTERNBERK, Bohumil, 1939. *Über die Fehler einiger astronomischen Objektive und Spiegel*. . 1. Praha: Tiskárna "Prometheus." Publikace Pražké hvězdárny, 16.

Photo:



Source: Historical Archive of the Ondřejov Observatory

8.13. Šafařík's 8-inch reflector Clark (S8C)

Diameter:

Focal length:

Eyepieces: six eyepieces with zoom 92 to 850, helioscopic eyepiece

Description: Reflecting telescope equipped with high-quality Clark object lens (Švejda 2018). Parallactic mount on the iron pillar with variable pole height. The eyepiece was placed in the rotation axis of the tube, whose front piece is only engaged as a counterweight; therefore, the eye of the observer remains permanently in the same position. Equipped by Alvan Clark mahogany tube from 1859, later by Zeiss steel tube from 1909. Clock mechanism with Spring-governor by Bond. 54mm seeker, centring machine by H. Schroeder design.

Current location: Vojtěch Šafařík museum in Ondřejov

Biography: Assembled by Jan and Josef Frič in 1883 for Vojtěch Šafařík's experimental metal mirror. Centring machine was probably made by Frič brothers (Polášek 2006, p. 27). After his death donated by his widow to Josef Jan Frič. Since 1922 installed in the central dome of the Ondřejov observatory. It was constructed in 1998. Missing parts were constructed according to historical photos.

Sources:

POLÁŠEK, Cyril, 2006. *Jednoapůlstoletý osmipalcový objektiv Alvana Clarka hvězdárny Astronomického ústavu Akademie věd České republiky v Ondřejově u Prahy: historická astrooptická studie věnovaná 145. výročí vzniku objektivu v Bostonu, USA, i Clarkovu objevu podvojnosti 99Her*. . 3. Ondřejov: Astronomický ústav AV ČR. Scripta astronomica, 9.

ŠVEJDA, Antonín, 2018. Clarkův osmipalcový dalekohled. In: *Z dějin geodézie a kartografie*. Prague: Národní technické muzeum. p. 111–118. Rozpravy NTM, 19.

Photo:

8.14. Clark 20cm telescope (C20)

Diameter: 20 cm

Focal length:

Eyepieces:

Description:

Current location:

Biography: Installed in the central dome of the Ondřejov observatory in 1943. In the 1950s, it was disassembled.

Sources:

Photo:

8.15. Nováková's spectrohelioscope of Ďala (NSD)

Diameter:

Focal length:

Eyepieces:

Description: *„spectrohelioscope is a solar telescope, whose slit entrance is optically shifted on the part of Sun's surface by rotating prism and whose spectral lines are finely shifted in the spectral length by plane-parallel slide. This optically new rotating telescope became the initiator for constructing new horizontal spectrographs not only in Ondřejov but also in Tatras and Hurbanovo. This simple instrument allows observation of solar atmosphere dynamics and its processes. Observations are primarily taken in hydrogen line H-alpha, both in its centre and wings; thus, we can record even quickly moving phenomena far from the line's centre. But we can observe in several other lines"*[59] (Bumba 2012).

[59] „Spektrohelioskop je sluneční spektroskop, jehož vstupní štěrbina je opticky posouvána po části povrchu Slunce rotujícím hranolkem a jehož spektrální čáry jsou jemně posouvány ve spektrální

Current location:

Biography: The instrument was designed in 1938 by Bohumila Bednářová-Nováková and constructed by Viktor Rolčík. Shortly before the occupation of Stará Ďala, the instrument was disassembled and relocated to the Ondřejov observatory (Bumba 2012). After World War II, the instrument was often used for summer student practice. Later returned to Stará Ďala/Hurbanovo observatory.

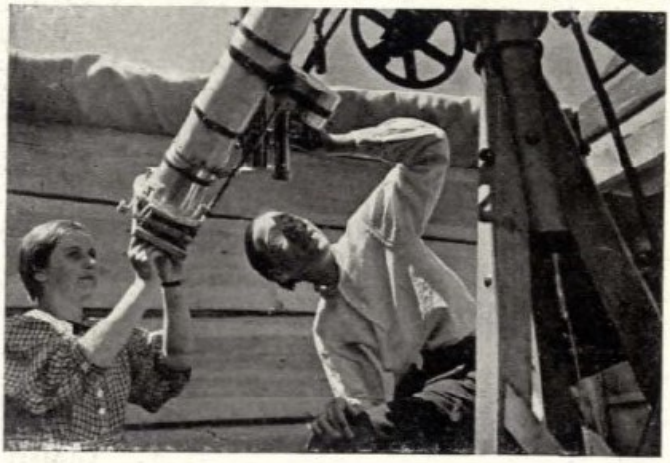
Sources:

BUMBA, Václav, 2012. *Jak se „česko-slovenský“ spektrohelioskop zasloužil o sluneční fyziku*.

KLEPEŠTA, Josef, 1937. *Dvacet let mezi přáteli astronomie*. . Prague: Česká astronomická společnost.

Photo:

délce planparalelní destičkou. Tento opticky nový otáčivý spektrograf se pak stal iniciátorem pro vybudování nových horizontálních spektrografů nejen v Ondřejově, nýbrž i v Tatrách a Hurbanově. Tento jednoduchý přístroj dovoluje pozorovat dynamiku sluneční atmosféry a procesy v ní probíhající. Většinou bývalo pozorováno ve vodíkové čáře H-alfa, a to jak v jejím středu, tak i v křídlech, takže bylo možno zachytit i velmi rychle se pohybující jevy, vzdálené od středu čáry. Ale bylo možné pozorovat i v několika dalších čarách“



Dr. B. Nováková a J. Vlček u spektrografu. Spektrograf pro bleskové spektrum byl Heydův refraktor o 120 mm objektivu ve spojení s objektivním hranolem o straně 125 mm a úhlu 45° se specielní pohyblivou kasetou. Hranol i kasetu dle návrhu Dr. Novákové zhotovil inž. Viktor Rolčík.

Source: (Klepešta 1937)

8.16. Fischer's refractor (FIR)

Diameter: vis 191 mm, photo 140 mm, reflector 310 mm

Focal length: vis 3000 mm, photo 700 mm, reflector 1550 mm

Eyepieces: zoom 70 to 650 (10 pcs)

Description*:* Grubb clock drive, mahogany tube, brass eyepiece, viewfinder 54 mm, zoom 20 (Klepešta 1924). *„Visual part: 19 cm diameter, 300 cm focal length. Photographic camera: 14 cm diameter, 70 cm focal length, Reflektor 31 cm diameter,*

focal length 155 cm"[60] (Klepešta 1937). *„On a clear night, it fathoms up to 13,5 mag stars, and its resolution of binary stars goes up to 0.5". Two correction devices for axes and azimuthal inclination enable the exact positioning of the instrument, which is equipped with circles with a 1' reading, resp. 4 time seconds, a seeker with 54mm object lens, clock drive with Grubb regulator with ancillary instruments, which completes the telescope."*[61] (Klepešta 1937)

Current location: Ďáblice observatory

Biography: Constructed by Reinfelder & Hertel in München for private observatory of Oldřich Kramář in Jičín. In 1911, during the dismantling of the observatory, it was bought by Satorim of Vienna. Then in 1923, it was bought for the private observatory of František Fischer in Podolí. In 1924, it was installed in a five-meter dome with a photo camera with a Zeiss Triplet lens. In 1934, *„we ordered from H. N. Irving, England, a 310/1550 mm parabolic mirror and aluminium tube, which can be used alternately with a long-focal camera"* [62] (Klepešta 1937). In 1968, after the observatory was dismantled, the telescope was installed in the new dome of Ďáblice observatory.

Sources:

KLEPEŠTA, Josef, 1924. Nová soukromá hvězdárna v Praze. *Říše hvězd*. 1924.

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[60] *"Visuální část: 19 cm průměr, 300 cm ohnisko. Fotograt. Komora: 14 cm průměr, 70 cm ohnisko, Reflektor 31 cm průměru, ohnisko 155 cm"*

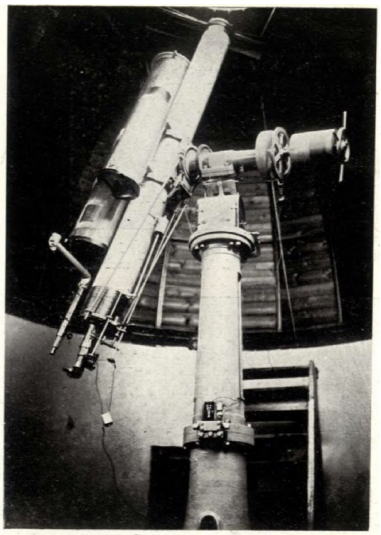
[61] *"Za jasných nocí proniká až k hvězdám 13.5 vel. a jeho rozlišovací schopnost při dělení dvojjhvězd jde za vhodných poměrů až do 0.5". Dvě korekční zařízení pro sklon os spolu s korekcemi výškovou a azimutální umožňují velmi přesné postavení stroje, jenž jest opatřen kruhy s odčítáním na 1 min. obloukovou, resp. 4 vteřiny časové, hledačem s objektivem 54 mm, hodinovým strojem s Grubb-ovým regulátorem, který s vedlejšími přístroji doplňuje dalekohled*

[62] "*objednáno u H. N. Irving Teddington v Anglii parabolické zrcadlo velikosti 310/1550 mm a hliníkový tubus, tohoto lze střídavě používati u dalekohledu s dlouhofokální komorou."*

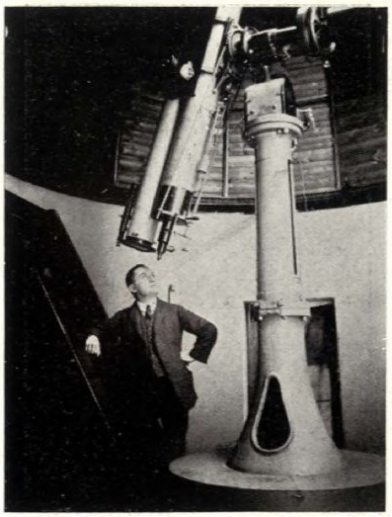
Vol. 5, no. 2, p. 33–36.

KLEPEŠTA, Josef, 1937. *Dvacet let mezi přáteli astronomie*. . Prague: Česká astronomická společnost.

Photo:



Dalekohled hvězdárny Mg. F. Fischera. Visuální část: 19 cm průměr, 300 cm ohnisko. Fotograf. komora: 14 cm průměr, 70 cm ohnisko. Reflektor 31 cm, průměru, ohnisko 155 cm.



Mg. František Fischer M. B. A. A. u svého dalekohledu s namontovaným fotografickým dalekohledem o průměru 10 cm a 300 cm ohniska.

Source: (Klepešta 1937)

8.17. Fischer Lunar Camera (FLC)

Diameter: 100 mm

Focal length: 3000 mm

Eyepieces:

Description:

Current location:

Biography: Constructed by Steinheil & Sohne in 1928 for the private observatory of František Fischer, intended for photographing lunar eclipses and lunar

observations.

Sources:

Photo:

8.18. Frič double astrograph (FDA)

Diameter: Cook triplet 204 mm, Ross-Petzval 149 mm (Klepešta 1952)

Focal length:

Eyepieces:

Description: Designed to photograph fixed stars and minor and small solar system bodies, reconstructed in the 1920s. In 1930, a rotating sector was added to photographic cameras that provided angular velocity measurements and (in the case of two-station observation) linear velocity of meteors. Equipped by original clock drive regulator designed by František Nušl.

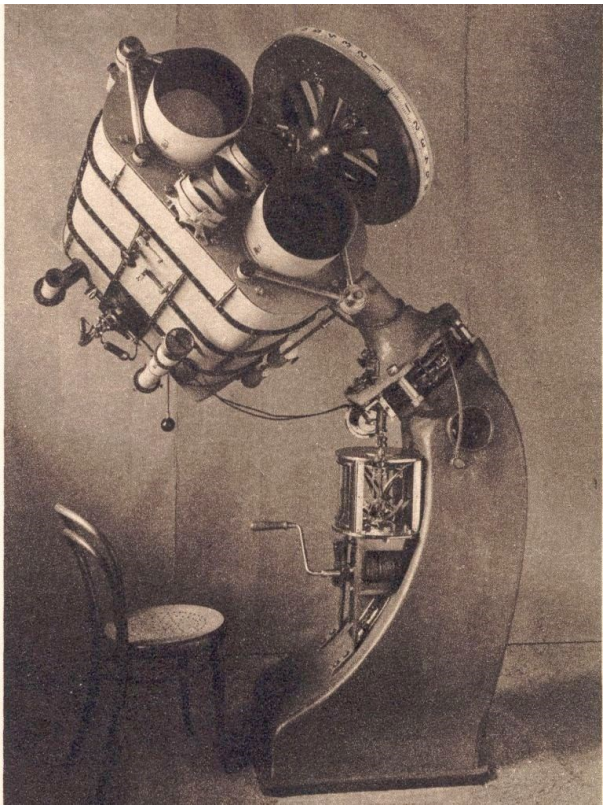
Current location: the western dome of Ondřejov observatory

Biography: Made by Frič brothers' workshop by Jan Frič's design, adapted by Josef Frič to double astrograph. In 1920 installed in the western dome of the Ondřejov observatory. On 12 September 1923, Josef Klepešta took a unique photograph of bolide near the galaxy M31 with this instrument.

Sources:

KLEPEŠTA, Josef, 1952. Vývoj astrofotografie u nás. *Říše hvězd*. May 1952. Vol. 33, no. 5, p. 114–116.

Photo:



From 1905. Source: Historical Archive of the Ondřejov Observatory.

8.19. Great Schroeder seeker (GSS)

Diameter: 115 mm

Focal length: 960 mm

Eyepieces: Huygens 3° array zoom 12, aplanatic array 1,5° zoom 23, terrestrial-pancratic zoom 40-90

Description: *„Great seeker from H. Schroeder, diameter 115 mm, focal length 0,96m, zoom 12 (Huygens eyepiece with 3° field), 23 (aplanatic field 1,5°) and terrestrial-pancreatic 40 to 90. Metal tube, high pyramidical stand, suitably easy precise*

movements, elevation and azimuth arrestment, can achieve zoom 220[63] *“*.[64]

Current location:

Biography: Designed by H. Schroeder. After Šafařík's death in 1902 donated to Ondřejov observatory by his widow Pavlína Šafaříková. *„Five years ago, Mr Jaroslav Bošek handed me for the Vojtěch Šafařík Astronomical Muzeum an accidentally found relict of its tube with sealed notice HVĚZDÁRNA ŽALOV. I do not know who damaged it and its optics. In the list from 6 Nov 1979, Guth was searching for it as missing. Schroeder seeker already served at the old observatory U Zelené žáby*[65] *”* (Polášek 2006).

Sources:

POLÁŠEK, Cyril, 2006. *Jednoapůlstoletý osmipalcový objektiv Alvana Clarka hvězdárny Astronomického ústavu Akademie věd České republiky v Ondřejově u Prahy: historická astrooptická studie věnovaná 145. výročí vzniku objektivu v Bostonu, USA, i Clarkovu objevu podvojnosti 99Her*. . 3. Ondřejov: Astronomický ústav AV ČR. Scripta astronomica, 9.

Photo:

[63] *"Velký hledač H. Schroedera, otvor 115mm, ohnisková vzdálenost 0,96m, zvětšení 12 (Huygensův okulár s polem 3°), 23 (aplanatické pole 1,5°) a pozemské-pankratické 40 až 90krát. Kovový tubus, vysoký pyramidální stojan, vhodně snadné přesné pohyby, aretace elevace, azimutu, snese ještě zvětšení 220-násobné"*

[64] Šafařík’s undated offer of instruments for sale, Archive of the Astronomical Institute of the Charles University

[65] *"Před pěti lety mi předal pan Jaroslav Boček pro Muzeum Vojtěcha Šafaříka náhodně nalezenou trosku jeho tubusu s vyraženým nápisem HVĚZDÁRNA ŽALOV. Nevím kdo a kdy jej i s optikou poničil. V níže uvedeném seznamu z 6.11.1979 jej, jako pohřešovaný, prof. Guth shání. Schroederův hledač sloužil již Observatoři U Zelené žáby - eroze historického inventáře Žalova)."*

8.20. Gruss telescope (GRT)

Diameter: 213 mm

Focal length:

Eyepieces:

Description: Heyde parallactic mount. Gravitational engine with the regulator. Photographic chamber donated by Max Wolf.

Current location: Vojtěch Šafařík museum, central dome

Biography: Made by Reinfelder & Hertel. Bought by Gustav Gruss in 1893 and installed at the university observatory of the Czech university at Švédská. After unsuccessful reconstruction in the Petřín observatory workshop, the mount and astrographic camera were reconstructed and modernised in the Ondřejov workshop in 1998-2000, partially by historical photos, and equipped with a modern stepper motor.

Sources:

Photo:

8.21. Heinrich‘s 30cm (H30)

Diameter:

Focal length:

Eyepieces:

Description: Focal ratio 1:12

Current location:

Biography: Made in 1924 by Schmidt in Germany (?). Bought by Vladimír Heinrich during the post-war depression.

Sources:

HEINRICH, Vladimír Václav, 1935. *Astronomický ústav Karlovy university a můj tak zvaný disciplinární případ. Stíny autonomie.* . Praha: self-publishing.

Photo:

8.22. Heinrich's 60cm (H60)

Diameter: 600 mm

Focal length:

Eyepieces:

Description: Glass disc. Focal ratio 1:5.

Current location: Masaryk university dome, Kraví hora observatory, Brno,

Biography: Made in the 1930s (1920s? 1924) by Schmidt for the Astronomical Institute of the Charles University. Mechanical parts were based on the wooden models and plans brought by V. V. Heinrich from the USA in 1932. Kolben a Daněk cast the adjusting pillar. It was not fully assembled until WW2 due to a lack of funds. After WW2, the mirror was given to the new Kraví Hora observatory in Brno. Mount bought from Zeiss. The mirror did not fit the mount that was sent to Ondřejov. The new mount was designed by Luboš Perek (based on Leyden 45cm telescope, adapted for a 60cm). After construction, optical defects were detected on the mirror, which Ing. Gajdůšek repaired.

Sources:

HEINRICH, Vladimír Václav, 1935. *Astronomický ústav Karlovy university a můj tak zvaný disciplinární případ. Stíny autonomie.* . Praha: self-publishing.

Photo:

8.23. Heinrich's double astrograph (H2A)

Diameter: vis 10 inch (25/26 cm), photo/UV 6 inch (17 cm)

Focal length: 310 cm

Eyepieces:

Description:

Current location:

Biography: Reconstructed from SEY by Jiří Brejla in AUUK workshop and installed in dome of Švédská observatory. Both lens were made by Zeiss (25cm in 1924, 17cm in 1925) and bought by V. V. Heinrich. The 10-inch lens was damaged after theft in 1934. In 1959, the tube was used for assembling a telescope for the central dome of the Ondřejov observatory.

Sources:

HEINRICH, Vladimír Václav, 1935. *Astronomický ústav Karlovy university a můj tak zvaný disciplinární případ. Stíny autonomie.* . Praha: self-publishing.

ŠOLC, Martin, 2005. A note to the astrographic camera of the Astronomical Institute of the K. k. Bohemian University in Prague. *Acta Universitatis Carolinae. Mathematica et Physica*. 2005. Vol. 46, no. 3, p. 239–248.

Photo:

8.24. Heinrich‘s models of 60cm telescope

Diameter: 60 cm

Focal length:

Eyepieces:

Description: Cast models for 60cm telescope of Yerkes observatory constructed by Ritchey, intended for H60.

Current location: Slaná observatory

Biography: Brought from the USA by Heinrich in 1932, adapted to Prague latitude and wrought. Due to a lack of finances stored in the basement of the dome of the Smíchov observatory. After the astronomical institute moved to new premises, the models were donated to the Petřín observatory. In the 1990s, moved to Slaný observatory.

Sources:

HEINRICH, Vladimír Václav, 1935. *Astronomický ústav Karlovy university a můj tak zvaný disciplinární případ. Stíny autonomie.* . Praha: self-publishing.

Photo:

8.25. Heyde 12cm (H12)

Diameter: 120 mm

Focal length: 1800 mm (Klepešta 1926b)

Eyepieces:

Description: Equatorial telescope with clock mechanism (Klepešta 1926b).

Current location:

Biography: „Bought from estate of the WWI victim *Mr Mokrý from*

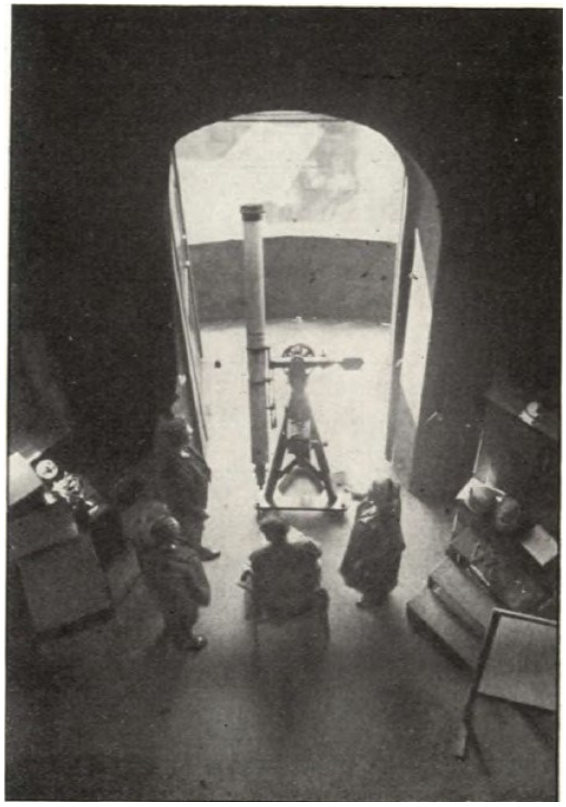
Libochovice[66]*.“* (Klepešta 1937) Bought by the *Fond k uctění památky Štefánikovy* fund. In early 1920s, installed in temporary observatory of the Czech Astronomical Society in Clementinum (Klepešta 1926b).

Sources:

KLEPEŠTA, Josef, 1937. *Dvacet let mezi přáteli astronomie*. . Prague: Česká astronomická společnost.

KLEPEŠTA, Josef, 1926. O věži staré pražské hvězdárny v Klementinu. *Říše hvězd*. 1926. Vol. 7, no. 3, p. 112–117.

Photo:



Source: (Klepešta 1937)

[66] "*Zakoupen z pozůstalosti oběti světové války, p. Mokrého v Libochovicích."*

8.26. König Double Astrograph (KDA)

Diameter: vis 180 mm; UV 210 mm; type E 170 mm

Focal length: vis 3400 mm (Klepešta 1928), UV 3430 mm[67] (Klepešta 1952); type E 3240 mm

Eyepieces:

Description: Visual part has precise micrometre from Velhartický and Pachner (Klepešta 1937). Balanced mount. *„The telescope is from Zeiss workshop and consists of two telescopes: the visual has object lens 180 mm, the second, photographic, ultraviolet, has diameter 210 mm. Both lenses had a focal length of 340 m, which follows the focal length for instruments for international mapping of the sky[68]. According to private expert reports, the instruments are of extraordinary optical quality. Images of the Moon and planets are perfect in the optical telescope. The reason for this is probably the relatively long focal length (1:19). The visual telescope is used as a pointer for the sizeable photographic lens that can take photos of scientific importance. Both telescopes are mounted on a bulky Zeiss so-called balanced mount that carries another more miniature photographic camera in the middle. The impression given by the machine is apparently massive, as the dimensions of its parts are large and the total weight is about 40 q[69].“* (Klepešta 1928) *„In the wide range of telescope accessories,*

[67] Specified by Pavel Najser, retired employee of Petřín observatory.

[68] Carte du Ciel.

[69] *"Dalekohled je z dílen Zeissových a skládá se ze dvou dalekohledů: visuální má objektiv 180 mm, druhý, fotografický, ultrafialový, má průměr 210 mm. Oba objektivy mají ohniskovou dálku 340 m, která souhlasí s ohniskovou dálkou strojů pro mezinárodní mapu nebes. Podle soukromých sdělení odborníků stroj jest neobyčejné optické jakosti. Obrazy Luny a planet jsou ve visuálním dalekohledu dokonalé. Příčinou toho patrně jest poměrně dlouhá ohnisková dálka (1:19). Dalekohledu visuálního používá se jako pointeru pro velký objektiv foto grafický, jímž lze pořizovati snímky vědecké ceny. Oba dalekohledy jsou uloženy na mohutné Zeissově, t.zv. vyvážené montáži, nesoucí uprostřed ještě jednu*

the Society has a planetary and moon camera for plates material. The author changed this cumbersome construction into a film by Exakta film camera[70]*."* (Klepešta 1942)

Current location: the central dome of Petřín observatory

Biography: Made in 1905-07 by Carl Zeiss for selenographer Rudolf König. After König's death, the Czech Astronomical Society bought the telescope from his estate. 1928 disassembled and transported to Prague. In 1930 installed in the central dome of the Petřín observatory and adapted by Vincenc Nechvíle's design. Photographed the Eros opposition in 1930. Significantly damaged during the Prague Uprising in 1945. *„Tubes, for the most part, need replacement, mount disassembling, repair and cleaning*[71]*"* (Kadavý 1945). After 1945, the photographic lens was replaced by Zeiss 20cm/300cm and used visually with the connected camera. It was refurbished in the 1960s.

Sources:

KADAVÝ, František, 1945. Těžké hodiny naší hvězdárny. *Říše hvězd*. 1945. Vol. 26, no. 1–2, p. 7–12.

KLEPEŠTA, Josef, 1928. Nový dalekohled pro Lidovou hvězdárnu. *Říše hvězd*. May 1928. Vol. 9, no. 5, p. 76–78.

KLEPEŠTA, Josef, 1937. *Dvacet let mezi přáteli astronomie*. . Prague: Česká astronomická společnost.

KLEPEŠTA, Josef, 1942. Fotografie Měsíce z hvězdárny Společnosti. *Říše hvězd*. 1942. Vol. 23, no. 6, p. 109–112.

Photo:

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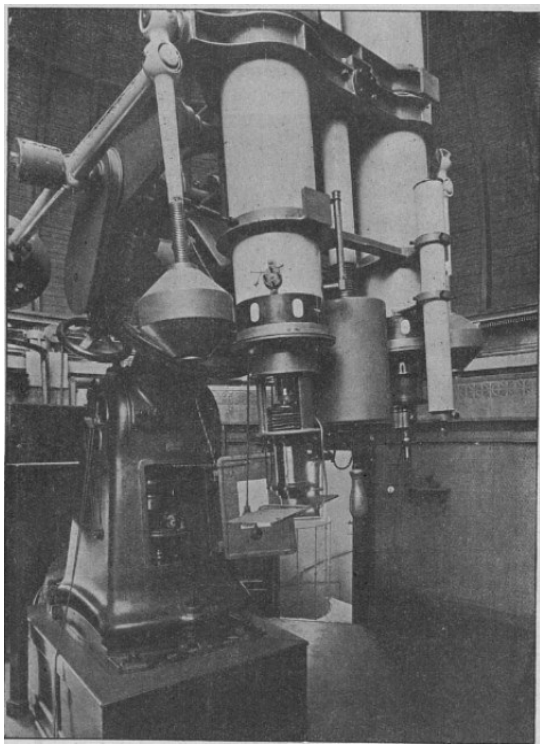
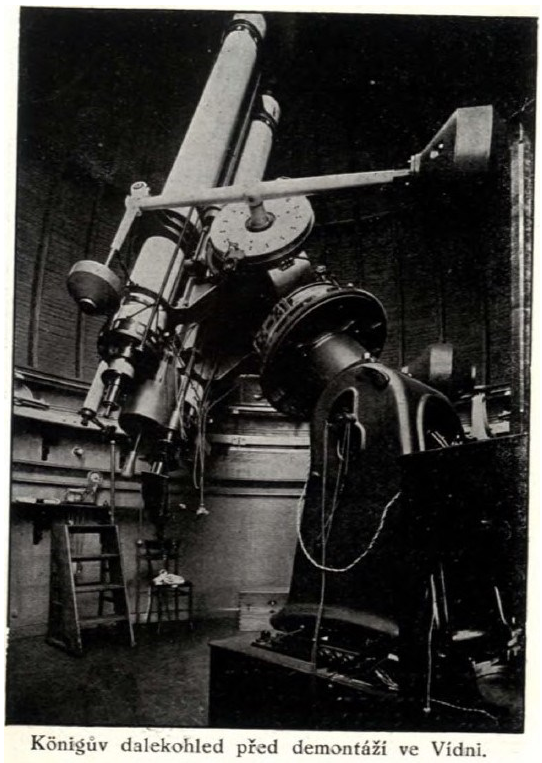
menší fotografickou komoru. Dojem, kterým stroj působí, je, jak patrno, mohutný, poněvadž rozměry jeho částí jsou veliké a úhrnná váha činí asi 40 q."

[70] *"V bohatém příslušenství k dalekohledu má Společnost planetární a měsíčnou komoru na deskový materiál. Autor tuto těžkopádnou konstrukci zaměnil moderní komorou Exaktou na kinofilm."*

[71] *"Tubusy bude nutno z větší části vyměniti, montáž rozebrat, opravit a vyčistit."*



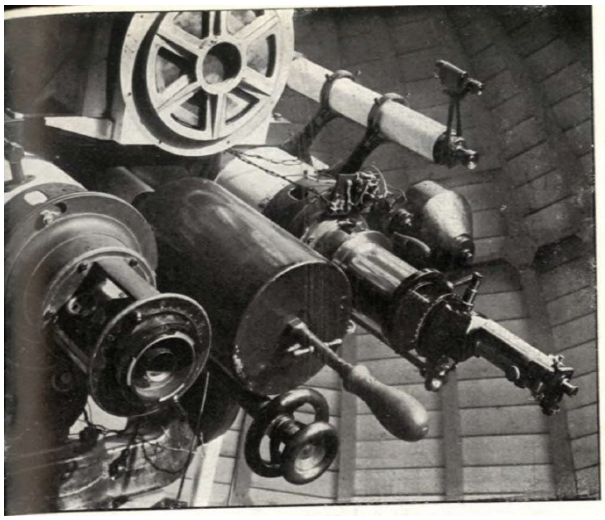
Source: Říše hvězd 18, 8/1937



Königův dalekohled před demontáží ve Vídni.

Source: KLEPEŠTA, Josef, 1937. Dvacet let mezi přáteli astronomie. Prague:

Česká astronomická společnost.



Eyepiece with protuberation telescope. Source: KLEPEŠTA, Josef, 1937. Dvacet let mezi přáteli astronomie. Prague: Česká astronomická společnost.

8.27. Kraus' Merz refractor (KMR)

Diameter: 160 mm

Focal length: 1793 mm

Eyepieces:

Description: Heyde mount.

Current location: Úpice Observatory, the central dome

Biography: Bought by Baron Arthur Kraus and installed on his private observatory in Pardubice. Acquired by the Czech Astronomical Society and installed in the western dome of Petřín observatory. Minor damage during Prague Uprising in 1945. In 1960, lent for the central dome of Úpice observatory, later donated to the observatory. In 2008, the parallactic mount was reconstructed, and the lens was cleaned and adjusted

(Rail et al. 2008).

Sources:

KADAVÝ, František, 1945. Těžké hodiny naší hvězdárny. *Říše hvězd*. 1945. Vol. 26, no. 1–2, p. 7–12.

RAIL, Zdeněk, ŠRAJER, Bohdan, LÉDL, Vít, JAREŠ, Daniel, OUPICKÝ, Pavel, MELICH, Radek and MELICH, Zbyněk, 2008. Objektiv Merz 160/1790 refraktoru Hvězdárny v Úpici. In: MARKOVÁ, E. (ed.), *Člověk ve svém pozemském a kosmickém prostředí. Bulletin referátů z konference*. Úpice: Hvězdárna Úpice. 2008. p. 70–75. ISBN 978-80-86303-14-7.

Photo:

8.28. The eight-inch telescope of Švédská (8TS)

Diameter: vis 8“

Focal length:

Eyepieces:

Description: „There [at Švédská institute] *it remains until this time an old dome building and in it, unsuitable mount (...) overloaded with a double tube with more prominent visual and smaller (!) photographic lens“*[72] (Mohr 1958).

Current location:

Biography: In the 1920s, reconstructed into a double telescope by Jiří Brejla (Heinrich 1935).

Sources:

HEINRICH, Vladimír Václav, 1935. *Astronomický ústav Karlovy university a můj tak zvaný disciplinární případ. Stíny autonomie.* . Praha: self-publishing.

MOHR, Josef Mikulaš, 1958. Čtyřicet let československé astronomie. *Říše*

[72] „*Tam* [ve Švédské] *zůstává až do dnešní doby stará stavba kopule a v ní nevyhovující montáž (...) přetížená dvojitým tubusem s větším visuálním a menším (!) fotografickým objektivem.“*

hvězd. 1958. Vol. 39, no. 10, p. 217–221.

Photo:

8.29. Parallactic telescope Merz (PTM)

Diameter:

Focal length:

Eyepieces:

Description: Parallactic mount.

Current location:

Biography: Object lens by Merz. Made in 1940. In the property of the Czech Astronomical Institute.

Sources:

Photo:

8.30. Petřín comet seeker (PCS)

Diameter: 200 mm

Focal length: 1370 mm

Eyepieces:

Description: *„It is a beautiful instrument optically very suitable for observation; however, it has the mechanism of a sort that only complies with an experienced sky observer. Namely, it has neither clock drive nor fine motion equipment, therefore*

observations, if dome with more guests, would always have some problems[73]*"* (Klepešta 1928). Vand's photometer from 1931 is described in Vand 1931.

Current location: observatory house at Petřín observatory

Biography: Made in 1921 by Carl Zeiss Jena. Bought by *Fond k uctění památky Štefánikovy* (*Fund to honour the memory of Štefánik*). In 1927, it was installed in the eastern dome of the Petřín observatory. In 1931 Vladimír Vand constructed its new photometer (Vand 1931). Today the photometer is probably located in the observatory's deposit. During the Prague Uprising in 1945, the lenses were deposited in the National Bank, but bullets penetrated the telescope's tube. After repair, the telescope was installed in the observatory house on a Zeiss mount.

Sources:

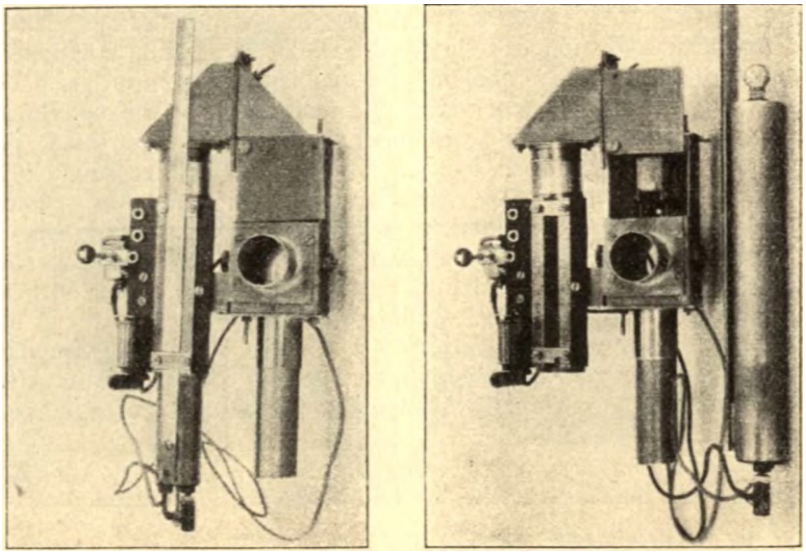
KADAVÝ, František, 1945. Těžké hodiny naší hvězdárny. *Říše hvězd*. 1945. Vol. 26, no. 1–2, p. 7–12.

KLEPEŠTA, Josef, 1928. Nový dalekohled pro Lidovou hvězdárnu. *Říše hvězd*. May 1928. Vol. 9, no. 5, p. 76–78.

VAND, Vladimír, 1931. Nový fotometr Lidové hvězdárny Štefánikovy. *Říše hvězd*. 1931. Vol. 12, no. 4, p. 65–68.

Photo:

[73] *„Je to přístroj krásný a opticky velice vhodný pro pozorování, bohužel, má mechanismus takového druhu, že vyhoví jen zkušenému pozorovateli oblohy. Nemá totiž ani hodinového stroje, ani zařízení pro jemné pohyby, takže pozorování, má-li jich býti účastno více hostů, bude míti vždy některé potíže."*



Source: (Vand 1931)

8.31. Pračka double telescope (PDT)

Diameter: vis 135 mm, UV 160 mm

Focal length:

Eyepieces:

Description: *„double telescope, consisting of component for observation with 135mm diameter, and photographic part with anastigmat with diameter 160 mm and ultraviolet glass*[74]*”* (Klepešta 1937)

Current location:

Biography:

Sources:

KLEPEŠTA, Josef, 1937. *Dvacet let mezi přáteli astronomie*. . Prague: Česká

[74] *„dvojitý dalekohled, sestávající ze složky k pozorování o průměru 135 mm, a z fotografické části s anastigmatem o průměru 160 mm ze skla ultrafialového“*

astronomická společnost.

Photo:

8.32. Prague Transit Instrument (PTI)

Diameter: 4 and 5/12 inches

Focal length: 75 inch

Eyepieces:

Description: Fraunhofer lens, *„packed in a chest for many years and intended for a new observatory. In the inventory from 1846, it is noted that it was constructed in the Vienna polytechnical institute. Fraunhofer object lens measures 4 inches 5 in diameter and has 75-inch focal length*[75]*”.* (Zemek 1920)

Current location:

Biography: Gruss and Láska employed this telescope for variable stars observations in the 1890s.

Sources:

ZEMEK, Bohuslav, 1920. Několik poznámek o přístrojích hvězdárny v Klementinu. *Říše hvězd*. 1920. Vol. 1, no. 2, p. 30–33.

Photo:

[75] *„po celou řadu let zaobalen v bedně a určen pro novou hvězdárnu. V inventáři z roku 1846 je uvedeno, že byl zhotoven ve vídeňském polytechnickém ústavě. Fraunhoferův objektiv tohoto přístroje měří 4 palce 5 čárek10) v průměru a má ohniskovou vzdálenost 75 palců“*

8.33. Prague meridian circle (PMC)

Diameter: 4 inch

Focal length: 63,5 inch

Eyepieces:

Description: „*Fraunhofer object lens measures four inches in diameter and 63 and ½ inches focal length. Director David had a centring device constructed for this object lens. A very nicely utilized vertical circle of this instrument is divided into three arc minutes and using verniers, you can read directly up to two arc seconds […]. Prof. Weinek aid os this instrument that if it has microscopes instead of verniers, the instrument, in properly equipped, could be described as excellent*[76]*"* (Zemek 1920).

Current location:

Biography: *„it was acquired already in 1828 at the instigation of Director David, remained until the year 1886 in a chest packed and unused. The same year Director Weinek had it unpacked and temporarily installed on a wooden pillar. According to director Kreil's protocol in the observatory's inventory from 1846, the instrument was originally intended for a new Prague observatory, which, however, was not built. The construction was made by Reichenbach design in the Vienna polytechnical institute*[77]*"* (Zemek 1920).

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[76] *Fraunhoferův objektiv tohoto přístroje má čtyři palce v průměru a ohniskovou vzdálenost 63 a 1/2 palců. Ředitel David dal k tomuto objektivu zříditi zařízení k centrování. Velmi pěkně zpracovaný vertikální kruh přístroje je dělený po třech obloukových minutách a lze na něm pomocí noniů přímo odečítati až na dvě obloukové vteřiny (…) Prof. Weinek vyslovil se o tomto přístroji, že kdyby měl místo noniů mikroskopy, dal by se přístroj ten, při jeho patřičném zařízeni označiti jako výtečný."*

[77] *„byl již v roce 1828 na podnět ředitele Davida pořízen, zůstal až do roku 1886 v bedně zaobalen a neupotřeben. Téhož roku dal jej ředitel Weinek rozbaliti, řádně vyčistili a prozatímně na dřevěný pilíř umístiti. Dle zápisu ředitele Kreila v inventáři hvězdárny z roku 1846 byl přístroj ten*

Sources:

ZEMEK, Bohuslav, 1920. Několik poznámek o přístrojích hvězdárny v Klementinu. *Říše hvězd*. 1920. Vol. 1, no. 2, p. 30–33.

Photo:

8.34. Rolčík Coudé reflektor (RCR)

Diameter: mirror 400 mm, lens 154 mm

Focal length: mirror 7500 mm, lens 2380 mm

Eyepieces:

Description: coudé mount

Current location: Ďáblice observatory, eastern dome

Biography: Designed by Josef Záruba-Pfefferman and constructed by Vilém Rolčík, initially intended for the Petřín observatory. It was deposited in the National Technical Museum depository. In the 1950s, installed in the eastern dome of the Ďáblice observatory. Often nicknamed „Rolčíkův chudák" („Rolčík's Wretch).

Sources:

Photo:

8.35. Rolčík Mirror Telescope (RMT)

Diameter: 300/310 mm (Rolčík 1939)

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původně určen pro novou pražskou hvězdárnu, k jejíž stavbě však nedošlo. Zhotovení jeho provedeno bylo dle Reichenbacha ve vídeňském polytechnickém ústavě."

Focal length: 4000 mm

Eyepieces:

Description: Cassegrain on the parallactic mount.

Current location: Observatory České Budějovice

Biography: Constructed by Vilém Rolčík for the observatory of South Bohemian Astronomical Society in České Budějovice in 1936-37. In 1939 during the Nazi occupation of the Czechoslovak Republic, the German military administration assumed the observatory. It moved the telescope to the German teacher's institute on the corner of Jeronýmova and Lannova streets in České Budějovice (Polesný 2019). In 1946, installed again in the České Budějovice observatory.

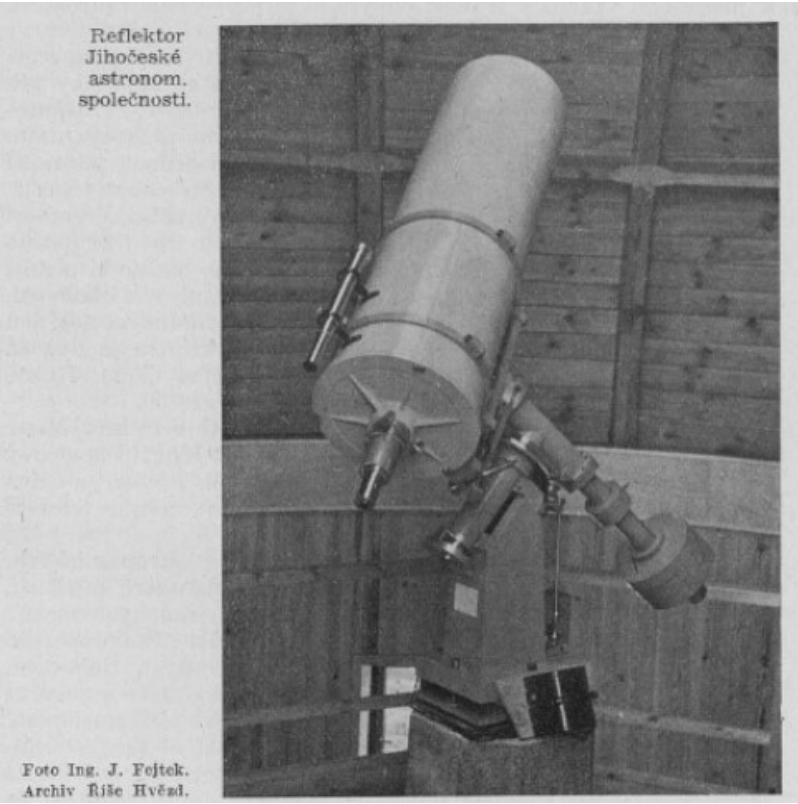
Sources:

POLESNÝ, Bohumil, 2019. Epizody z historie Jihočeské astronomické společnosti a jejích následovníků. In: BARTOŠ, Petr and KOVÁŘ, Štěpán Ivan (eds.), *Sborník semináře 90 let astronomických společností*. Sezimovo Ústí: Hvězdárna Františka Pešty. 2019. p. 14–33. ISBN 978-80-88281-14-6.

ROLČÍK, V., 1939. Reflektor se šikmými zrcadly. *Říše hvězd*. 1939. Vol. 20, no. 1, p. 13–18.

Photo:

Source: Říše hvězd 20, 01/1939



8.36. Sartorius 27cm (S27)

Diameter:

Focal length:

Eyepieces:

Description: Toepfer wedge photometer with artificial star and recording instrument.

Current location:

Biography: Bought by Adalbert Prey. From 1917 to 1920, temporarily assembled in the garden of Viničná 4.

Sources:

FISCHER, Karl A. F. and HIBST, Peter, 1983. Die deutsche Astronomie in Böhmen und Mähren in den letzten hundert Jahren. *Bohemia*. 31 December 1983. Vol. 24, no. 2, p. 275–294. DOI 10.18447/BoZ-1983-2913.

Photo:

8.37. Seydler‘s refractor (SEY)

Diameter: 217 mm; later: vis 10 inch, photo 6 inch

Focal length: 2450 ± 20 mm

Eyepieces: set of 14 orthoscopic eyepieces with zoom 30, 50, 65, 90, 130, 150, 180, 200, 270, 300, 360

Description: Heyde paralactic mount. Viewfinder with 47mm object lens.

Current location: reconstructed into H2A

Biography: Made in 1887 by Reinfelder & Hertel. In 1890 it was purchased by Seydler from the estate of amateur astronomer pastor P. Brödel (private observatory Stöntch near Pegava in Saxony). Gustav Gruss bought the astrographic camera from Max Wolf in 1892. In 1901 moved with the institute to Švédská. In the 1920s, reconstructed (including the Wolf camera) in the AUUK workshop by Jiří Brejla into HDA into astrograph with a new Zeiss lens (Heinrich 1935).

Sources:

HEINRICH, Vladimír Václav, 1935. *Astronomický ústav Karlovy university a můj tak zvaný disciplinární případ. Stíny autonomie.* . Praha: self-publishing.

ŠOLC, Martin, 2005. A note to the astrographic camera of the Astronomical Institute of the K. k. Bohemian University in Prague. *Acta Universitatis Carolinae. Mathematica et Physica*. 2005. Vol. 46, no. 3, p. 239–248.

Photo:

8.38. Schröder tube

Diameter:

Focal length:

Eyepieces:

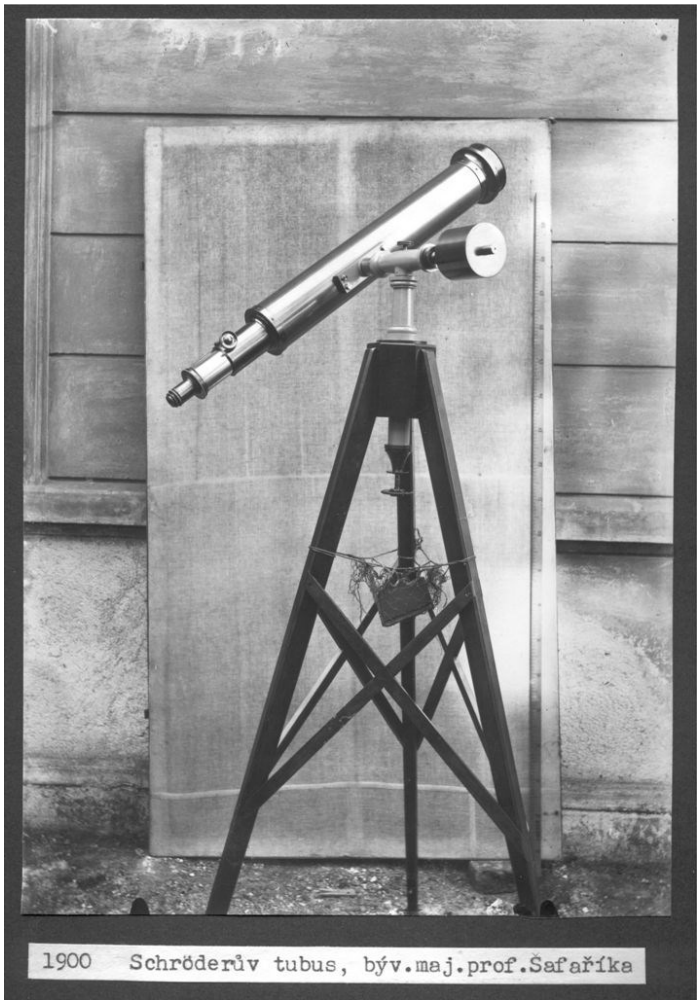
Description:

Current location:

Biography: Owned by Vojtěch Šafařík before 1900. It was installed at the Ondřejov observatory.

Sources:

Photo:



Source: Historical Archive of the Ondřejov Observatory

8.39. Schroeder Transit Instrument (STI)

Diameter:

Focal length:

Eyepieces:

Description: *„The filar net of the transit instrument has eleven fibres, and its focus is achieved by the eyepiece, whose elevator is equipped with dividing for eventual inspection and recording. The instrument's axis is steel and sits in bearings made of the*

hardest agate. A lever device with weights is used to lighten the instrument bearings and axes to avoid grinding. The instrument circle is divided by 20 arc minutes, and minutes can be read on it using verniers[78]*"* (Zemek 1920).

Current location:

Biography: Constructed by Schroeder sen & jun in Gotha (Zemek 1920). *„Made in 1804 by the Seeberg Observatory's instrument model and is four feet long. As the outdated modification was not satisfactory, director Weinek decided in 1884 to have the instrument reconstructed by mechanic G. Heyde in Dresden*[79]*"* (Zemek 1920).

Sources:

ZEMEK, Bohuslav, 1920. Několik poznámek o přístrojích hvězdárny v Klementinu. *Říše hvězd*. 1920. Vol. 1, no. 2, p. 30–33.

Photo:

8.40. Stará Ďala 60cm Zeiss (SDZ)

Diameter: 600 mm

Focal length: Newton 3300/3230 mm (Klepešta 1952), Cassegrain ca. 10 m

Eyepieces:

Description: *„Because there were no additional devices on the Stará Ďala*

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[78] *„Vláknová síťka pasážníku má jedenáct vláken a zaostření jeho docílí se pomocí okuláru, jehož výtah je opatřen dělením pro případnou kontrolu a záznamy. Osy přístroje jsou ocelové a sedí v ložiskách, zhotovených z nejtvrdšího achatu. Aby bylo pokud možno zamezeno obroušení ložisek a os přístroje, je zde užito k nadlehčování pákového zařízení se závažím. Kruh přístroje je dělený po 20 obloukových minutách a lze na něm odečítati pomocí noniů i jednotlivé minuty."*

[79] *„zhotoven v roce 1804 dle vzoru přístroje hvězdárny na Seebergu a který je čtyry stopy dlouhý. Jelikož zastaralá úprava jeho nevyhovovala, rozhodl se v roce 1884 ředitel Weinek, dáti přístroj ten mechanikem G. Heydem v Drážďanech přepracovati.*

telescope, I began with position measurements (e.g. Pluto), with photographic measurements of Finsler comet diameter and experiments, how to replace the old methods of photoelectric measurements, using an electrometer, by electric amplifiers[80]*"* (Šternberk 1978).

Current location: Ondřejov observatory

Biography: In 1922 ordered from Zeiss by Jiří Kaván[81] for Stará Ďala observatory. The instrument was not installed until the arrival of Bohumil Šternberk. In 1928 the telescope was assembled (Šternberk 1928). In 1939 it was removed from the Stará Ďala observatory, which was in the Hungary occupation zone, and sent to Prešov. In 1943 installed in the dome of the new observatory at Skalnaté Pleso. In 1978 replaced by a modern large Zeiss.

Sources:

KLEPEŠTA, Josef, 1952. Vývoj astrofotografie u nás. *Říše hvězd*. May 1952. Vol. 33, no. 5, p. 114–116.

MOHR, Josef Mikulaš, 1958. Čtyřicet let československé astronomie. *Říše hvězd*. 1958. Vol. 39, no. 10, p. 217–221.

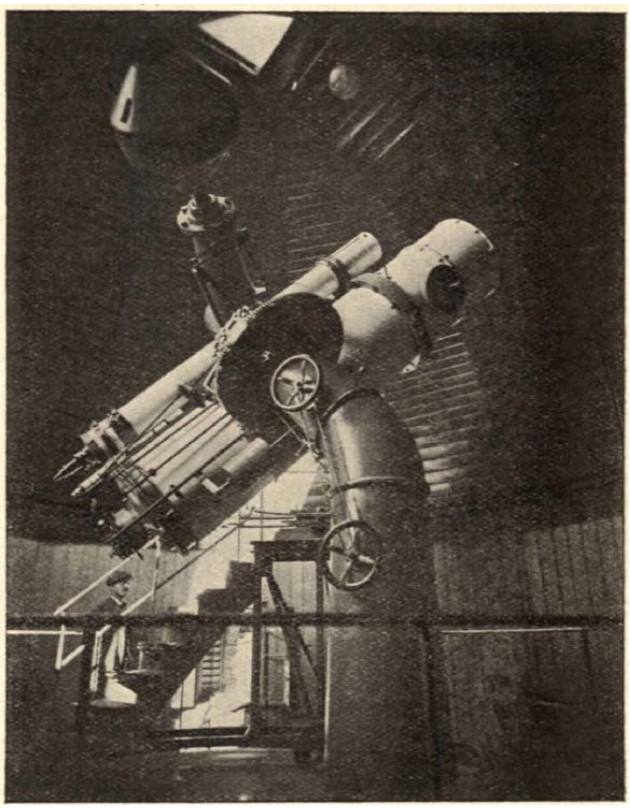
ŠTERNBERK, Bohumil, 1928. Z montování 60 cm zrcadla v Staré Ďale. *Říše hvězd*. 1928. Vol. 9, no. 7, p. 97–99.

ŠTERNBERK, Bohumil, 1978. Vzpomínky na minulost. *Říše hvězd*. 1978. Vol. 59, no. 12, p. 245–258.

Photo:

[80] *„Protože u ďalského dalekohledu nebyla žádná přídavná zařízení, začal jsem pak s pozičními měřeními (např. Pluto), s fotografickým měřením fotometrického průřezu komety Finsler a s pokusy, jak nahradit starou metodu fotoelektrických měření, používající elektrometru, elektronickými zesilovači.*

[81] According to (Mohr 1958), Bohumil Šternberk proposed the order. In (Šternberk 1978), Šternberk stated this was Jiří Kaván's idea.



Source: ŠTERNBERK, Bohumil, 1928. Z montování 60 cm zrcadla v Staré Ďale. *Říše hvězd*. 1928. Vol. 9, no. 7, p. 97–99.

8.41. Steinheil 6-inch lens (SRs6)

Diameter: 6 inch/162 mm (Zemek 1920)

Focal length: 84 inch

Eyepieces: f1.5“; f1“; f0.5“; f0.33“; f0.2“; micro 672x

Description: *„The telescope tube is equipped with the object lens with centring head, viewfinder with one-inch object lens, and has parallactic mount with crock drive. The whole instrument leans on an iron pillar with a tripod standing on the so-called azimuthal cross. The clock circle is divided into two time minutes and a declination circle in 30 arc minutes. You can read up to 4 time seconds or, more precisely, singular arc minutes using verniers. When I mentioned its modification in the main outlines, I*

still have to list the other accessories of this refractor. There are eyepieces with which we can obtain different zoom in the first place. The instrument has several eyepieces with different equivalent focal lengths: 3/2, 1, 1/2, 1/3, and 1/2 inches. Apart from there, it has one microscopic eyepiece, which which you can also obtain zoom 672[82]*"* (Zemek 1920).

Current location:

Biography: Hornstein bought the tube in 1870 parallactic stand in 1873 (Zemek 1920). In 1917 given from State Observatory to the German astronomical institute. From 1917 to 1920, it was temporarily assembled in the garden of Viničná 4. Ca. 1924 moved to Telnice observatory.

Sources:

ZEMEK, Bohuslav, 1920. Několik poznámek o přístrojích hvězdárny v Klementinu. *Říše hvězd*. 1920. Vol. 1, no. 2, p. 30–33.

Photo:

8.42. Šafařík's double telescope (SDT)

Diameter: 40 mm

Focal length:

[82] *„Tubus dalekohledu je opatřen objektivem s hlavicí k centrování, hledáčkem s objektivem jednopalcovým a má parallaktickou montáž s hodinovým strojem. Celý přístroj spočívá na železném sloupu s třínožkou, která stojí na tak zv. azimutálním kříži. Hodinový kruh je dělený po dvou časových minutách a kruh deklinační po třiceti obloukových minutách. Pomocí noniů lze na těchto odečítati 4 časové vteřiny, resp. jednotlivé obloukové minuty. Když jsem se takto zmínil v hlavních obrysech o jeho úpravě, zbývá mi ještě uvésti ostatní příslušenství tohoto refraktoru. Na prvém místě jsou to okuláry, kterými lze získati různého zvětšení. Těchto okulárů má přístroj několik o různých aequivalentních ohniskových vzdálenostech a sice: 3/2, 1, 1/2, 1/3 a 1/2 palce. Kromě těchto má též jeden mikroskopický okulár, kterým docíliti lze též zvětšení 672násobné.“*

Eyepieces:

Description:

Current location:

Biography:

Sources:

KLEPEŠTA, Josef, 1937. *Dvacet let mezi přáteli astronomie*. . Prague: Česká astronomická společnost.

Photo:

8.43. Šafařík comet seeker Dawes (SSD)

Diameter:

Focal length:

Eyepieces:

Description:

Current location: Vojtěch Šafařík museum, Ondřejov

Biography: From 1887-1992, owned by Czech Astronomical Institute. Installed at Ondřejov before 1901.

Sources:

Photo:

Source: Historical Archive of the Ondřejov Observatory

8.44. Šafařík's cardboard telescope (SCT)

Diameter:

Focal length:

Eyepieces:

Description: Refractor with focal length in centimetres.

Current location: dismantled

Biography: Made by Vojtěch Šafařík in 1865. *„I had plenty of free time to study. I immediately followed up on my practical optics from 1856 and constructed a medium-sized telescope. In the meantime, in 1858, Foucault published his epochal treatise „Sur la construction des télescopes en verre argenté", in which he designed silver-plated glass mirrors instead of earlier metal mirrors. I couldn't help myself but learn Foucault's working methods. Thanks to the kindness of Director von Littrow (+1877), I was able to get to the 5th volume of Pariser Annalen at the Vienna*

Observatory. I still keep the precious legacy, word-for-word copy of Foucalt's extensive treatise handwritten by my late wife[83]*".* [...] [Šafařík] *bequeathed his library and cardboard reflector to Dr J. J. Frič, who kept it in piety in the attic of his laboratory. The second wife, Pavlína, fulfilling her husband's legacy to Frič, finishes her letter from 14 August 1902 with these words: He bequeathed the library and carboarded telescope do Dr J. J. Frič, who kept it in piety in the attic of his observatory. The second wife, Pavlína, fulfilling Šafařík's legacy, finished the letter on 14 July 1902 with these words: „Herewith I voice the wish that this astronomical library, bearing the name of Šafařík, be preserved as a whole with objects related to his optical and photographic works, namely the reflector made by his own hands -- which my husband himself bequeathed to you verbally and in writing, as to his friend*[84]*"* (Polášek 2006). Discarded in the 1960s. *„Bellow, I mention the questionnaire of prof. Vladimír Guth from 6 November 1979. In the text on page 3 it states: „9) cardboard reflector inherited from Šafařík, (used to me) places in the attic, ? stand was seen ten years ago among clutter*[85]*"* (Polášek 2006).

Sources:

POLÁŠEK, Cyril, 2006. *Jednoapůlstoletý osmipalcový objektiv Alvana Clarka*

[83] *„Zbývalo mi dosti volného času k vlastnímu studiu. Ihned jsem navázal na svou praktickou optiku z r.1856 a zhotovil si středně veliký teleskop. Mezitím zveřejnil 1858 Foucault své epochální pojednání „Sur la construction des télescopes en verre argenté" jímž navrhl za dřívější kovová zrcadla brát postříbřená zrcadla skleněná. Nešlo mi jinak, než Foucaultovy pracovní metody si osvojit. Laskavostí ředitele von Littrowa (+1877) jsem se mohl na vídeňské hvězdárně dostat k 5. svazku Pariser Annalen. Stále střežím si drahý odkaz, doslovně pečlivě opsané rozsáhlé Foucaultovo pojednání rukou mé zesnulé ženy.*

[84] *„Vyslovuji zároveň přání, aby tato knihovna astronomická, nesouc jméno Šafaříkovo jako celek, zachována byla spolu s předměty týkajícími se optických a fotogra-fických prací jeho, jmenovitě též reflektoru vlastnoručně zhotoveného – kteréž Vám manžel můj sám ústně i písemně, jako příteli svému odkázal"*

[85] *„Níže zmiňuji dotazník prof. Vladimíra Gutha z 6. 11. 1979. V textu str.3 je v něm udáno: „9) lepenkový reflektor po Šafaříkovi, (býval) umístěn v podkroví, (jsou) ? kozlík byl viděn před 10ti lety v krámech"*

hvězdárny Astronomického ústavu Akademie věd České republiky v Ondřejově u Prahy: historická astrooptická studie věnovaná 145. výročí vzniku objektivu v Bostonu, USA, i Clarkovu objevu podvojnosti 99Her. . 3. Ondřejov: Astronomický ústav AV ČR. Scripta astronomica, 9.

Photo:

8.45. Toepfer photometer

Diameter:

Focal length:

Eyepieces:

Description: Wedge photometer with artificial star and recording equipment.

Current location:

Biography: Bought by Adalbert Prey in 1918. In 1918-20 temporarily assembled in the garden of the Physical Institute at Viničná 4.

Sources:

FISCHER, Karl A. F. and HIBST, Peter, 1983. Die deutsche Astronomie in Böhmen und Mähren in den letzten hundert Jahren. *Bohemia*. 31 December 1983. Vol. 24, no. 2, p. 275–294. DOI 10.18447/BoZ-1983-2913.

Photo:

8.46. Transit instrument with the angled telescope (TIA)

Diameter: 54 mm

Focal length: 640 mm

Eyepieces:

Description:

Current location:

Biography: Bought by Seydler from the estate of amateur astronomer pastor P. Brödel (private observatory Stöntch near Pegava in Saxony).

Sources:

Photo:

8.47. Zeiss double telescope (Z2T)

Diameter:

Focal length:

Eyepieces:

Description: Cassegrain mirror telescope 200 mm and refractor 110 mm. Mount with gravity gearing by Zeiss. It was constructed for photography.

Current location: Vojtěch Šafařík museum in Ondřejov, western dome

Biography: Made by Carl Zeiss. Moved to the Ondřejov observatory in 1943. Later disassembled. In 1996-8 was reconstructed for visual observation and installed in the western dome of the museum.

Sources:

Photo:

8.48. Zenith Telescope 20cm (ZT20)

Diameter:

Focal length:

Eyepieces:

Description: 20cm object lens with 4m focal length and mercury horizon. Photographic plate in the middle of the object lens to capture the star's image.

Current location: Ondřejov observatory

Biography:

Sources:

Photo:

8.49. 4inch refractor Reinfelder-Hertel (RH4)

Diameter: 4 inch

Focal length:

Eyepieces:

Description:

Current location:

Biography: In the 1920s, installed in the temporary Czech Astronomical Society's observatory on the highest floor of Clementinum tower (Klepešta 1926b).

Sources:

KLEPEŠTA, Josef, 1926. O věži staré pražské hvězdárny v Klementinu. *Říše hvězd*. 1926. Vol. 7, no. 3, p. 112–117.

Photo:

8.50. Zeiss 11cm

Diameter: 110 mm

Focal length: 1920 mm

Eyepieces:

Description:

Current location:

Biography: Bought in 1913 from Carl Zeiss Jena for collections of Institute of Physics of Czech university (inv.no. G 141, no.chron.inv. 2284). Eyepiece micrometre (inv.no. G 146, no.chron.inv. 2421) was bought in 1917/18. Assigned to AU UK in 1936 for beginners practice and installed between the dome and the building in Švédská. The actuator was purchased in 1936.

Sources:

Photo:

9. Astronomers

9.1. Alter Georg

Born: 13 March 1891 in Luže

Died: 30 October 1972 in Bet Yizhaq

Biography: Working initially as a journalist, Alter contributed to the history of Jewish natural science in the 17th century.

He studied astronomy in the second half of the 1920s. In 1929, he graduated and entered the Astronomische Institut of Deutsche Universität zu Prag as extern. From 1933 to 1937, he was the only research worker in the Prague department.

In 1938 during the Nazi occupation of the Czechoslovak Republic, Alter emigrated to England. Until 1945, he worked at the Norman Lockyer Observatory.

After World War 2, he returned to Prague, studying open star clusters and their relationship to the galactic system and interstellar matter absorption. He unsuccessfully tried to acquire a job at the State Observatory. In 1958 Alter, with Vladimír Vanýsek and Jaroslav Ruprecht, published the first card, *Catalogue of star clusters and associations*.

In 1965, he moved out to Bet Yizhaq in Israel.

9.2. Bečvář Antonín

Born: 10 June 1901 Stará Boleslav

Died: 10 December 1965 Brandýs nad Labem

Biography: Antonín Bečvář attended the grammar school of Brandýs nad Labem. After graduating, he studied astronomy and cosmic physics at the Faculty of

Science of Charles University from 1921 to 1924. He continued to doctoral studies, but he had to interrupt his studies due to health problems. In 1929, Bečvář and his friends built a private observatory, which became a centre for professional and amateur astronomers.

He graduated in 1934 with the degree of Doctor rerum naturalium. He took his first scientific position as a State Spa climatologist at the High Tatra Mountains in 1937 and moved his observatory there.

Since the Faculty of Natural Sciences of the Comenius University was established in 1940, Bečvář lectured astronomy there. In 1944, he became director of its newly founded Astronomical Institute. His position ceased in 1952 when the institute was included in the Department of astronomy, geophysics and meteorology under Professor Mikuláš Konček.

After the evacuation of the State Astrophysical Observatory in Stará Ďala, he initiated and supervised the building of the first alpine observatory at Skalnaté Pleso in 1941-43 and became its first director in 1943. Bečvář shapes the observatory's scientific profile: solar, comets and meteor showers research.

Bečvář discovered two comets: C/1942 C1 Whipple-Bernasconi-Kulin and C/1947 F2 Bečvář, and the Ursids meteor shower (1945).

In 1946, Bečvář started working on sky charts of his original conception. Between 1948 and 1964, Bečvář published four atlases that were the state-of-the-art star charts until 1980 and have been utilized at observatories worldwide until today.

In 1951, he was withdrawn from the observatory and retired. He returned to Brandýs nad Labem, renewed his private observatory and focused on his star charts - Atlas Eclipticalis (1958), Atlas Borealis (1962), Atlas Australis (1964) and Atlas

Galacticus (unfinished).

A crater on the far side of the Moon and minor planet 4567 Bečvář are named in his honour.

9.3. von Biela Wilhelm

Born: 19 March 1782 Rossla

Died: 18 February 1856 Venice

Biography: He was born in a prominent Protestant family that emigrated from Czech lands to Saxony after the Bohemian Revolt suppression and execution of Friedrich von Biela in 1621.

In 1802 Biela joined the Imperial Austrian Army, was raised to the rank of captain of Grenadiers and served in Napoleonic Wars in 1805 and 1809 and 1813-15. He then served in Prague in 1815-24, Josefov in 1824-26 and various other places in northern Italy. In 1832 he was appointed the commandant of Rovigo. In the 1840s, Biela retired as a major to Venice.

During his stay in Prague, Biela studied astronomy under Martin Alois David. He focused on observing comets, sunspots, planetary rotation, and the calculation of orbits of comets. He discovered the Great Comet of 1823 (C/1823 Y1) in 1823, the 3D/Biela comet in 1826 and the Great Comet of 1831 (C/1831 A1, 1830 II) in 1830. Biela first suggested the similarity of orbits of the comet of 1826, 1772 and 1805, which was proved by J. F. A. Gambart in 1826.

The minor planet 2281 Biela is named in his honour.

Primary sources:

Bibliography:

9.4. Bittner Adam

Born: 19 October 1777 Suchý Důl u Kadaně

Died: 3 September 1844 Litoměřice

Biography: Studied grammar school in Chomutov, in 1769, entered the Faculty of Arts in Prague. In 1800 he was appointed intern, and in 1801, an adjunct of the State Observatory.

From 1802 he was a substitute lecturer of arithmetics, algebra, geometry, stereometry, trigonometry and practical mathematics at the Institute of Engineering Education.

In 1805 he acquired a doctor of philosophy degree and was appointed the Professor of Practical Mathematics at the polytechnic institute. In 1825 he served as the Dean of the Philosophical Faculty. In 1837 he was appointed the Professor of Astronomy and director of the State Observatory, and subsequently, he gave up his job at the Polytechnical Institute.

9.5. Bochníček Záviš

Born: 20 April 1920 Prague

Died: 23 February 2002

Biography: In June 1936, he discovered the CP Lacertae nova by the naked eye at sixteen and became the first astronomer awarded by President Edvard Beneš personally. As a high school student, he attended the Štefánik observatory and later

entered Charles University to study astronomy.

After the closure of universities by the Nazi regime in 1939, Bochníček was deployed as a forced labourer in Germany. Due to his popularity as the discoverer of the nova, he was employed by renowned physicist G. Joos in his research laboratory at Carl Zeiss Jena and even personally met Max Planck in 1944.

After the war, Bochníček finished his studies at Charles University and began working in astronomy and astronomy outreach. Together with Hubert Slouka, he published the successful outreach book *Hvězdné večery (Starry nights)*.

In 1952, Bochníček was relocated to Slovakia. He worked at the Comenius University in Bratislava and observatory on Skalnaté Pleso. In 1956-58, he led the observatory and Astronomical Institute in Tatranská Lomnice, but he was dismissed and unemployed for a year due to cadre reasons.

After the era of space flights began, Bochníček elaborated practical methods of location and observation of both Soviet and US satellites (*Šedesát let Záviše Bochníčka* 1980).

In 1961, he was allowed to return to the Department of Astronomy, Meteorology and Geophysics of Comenius University. He remained there until his retirement in 1985. He also taught at the Faculties of Education of Comenius University and Constantine the Philosopher University in Nitra. In 1970, he co-founded and began teaching the post-secondary astronomy course of Slovak Central Observatory Hurbanovo (*Šedesát let Záviše Bochníčka* 1980).

In retirement, Bochníček became more engaged in outreach. He performed on radio and television and wrote for the press. He gave lectures all over Slovakia and went to seminars and other events in the Czech Republic.

Memberships: Czech Astronomical Society (1934 full, 1995 honorary), Slovak Astronomical Society (?), Socialist Academy of Slovakia (founding member).

Awards: first and second-degree honorary badge of Union of Czechoslovak-Soviet Friendship. The minor planet 15053 Bochníček was named in honour of his 80th birthday.

9.6. Böhm Josef Georg

Born: 27 March 1807 Rožďalovice

Died: 29 January 1868 Prague

Biography: Studied theology and science at Prague university. In 1833, he acquired the position of assistant to J. J. Von Littrow at the Vienna Observatory, later on, the observatory at Buda and then a substitute Professor of Mathematics at the University of Salzburg.

In 1939 was appointed full Professor of Mathematics and Practical Geometry at the University of Innsbruck, where he was also the secretary of the Agricultural Society in Tyrol.

In 1852 Bittner was appointed the Professor of Astronomy at the Charles-Ferdinand University and director of the State Observatory in Prague. He determined many meteorological and astronomical constants for Prague (geographical latitude, altitude) and opened astronomical observations for the public. In 1856 he sold off the collection of Prague Tychoniana.

In 1866 Bittner cooperated on the reconstruction of the Old Town Astronomical Clock.

9.7. Buchar Emil

Born: 4 August 1901 in Horní Nová Ves

Died: 20 September 1979 in Příbram

Biography: Graduated cum laude at Realschule in Nová Paka. In 1921, he entered the Faculty of Science of Charles University to study astronomy. He focused on celestial mechanics and astrodynamics. He soon became an assistant to the Astronomical Institute.

During his studies, he spent two years at the Algiers Observatory in Bouzaréah, Algeria, where he engaged in calculations of orbits of minor planets, comets and binaries. He became the first Czech astronomer to discover a minor planet, naming it 1055 Tynka in honour of his mother. On 9 December 1927, he acquired the degree of Doctor Rerum Naturalium in celestial mechanics.

In 1923, he took the position of demonstrator of the Astronomical Institute at the university. He cooperated with the mechanic Jindřich Brejla in the institute workshop. In 1927, he temporarily acquired the assistant position. At the end of 1928, he left the position.

From 1928 to 1945, B. worked in geodetic astronomy at the Military Cartographic Institute and in the Geodetic Survey in Prague (Polák 1951). He established Czechoslovak fundamental trigonometric networks and engaged in determining the geographic coordinates of trigonometric points. Buchar significantly contributed to its improvement, supplemented it with his instrument for assessing the observer error and built the large circumzenithal after WWII. Using materials from

azimuth measurements in the Czechoslovak trigonometric network, he studied the influence of measurement method on the accuracy of results and systematic and accidental errors and composed the theory of azimuth measurements.

In 1939, B. independently discovered the comet 1939 II.

During the Nazi occupation of Czechoslovakia, Buchar was relocated to the Geographical Institute of the Ministry of the Interior.

In 1945, he habilitated for geodetic astronomy at the Czech Technical University in Prague based on the extensive paper *Deflection of the Vertical and the Geoid in Czechoslovakia* (1945). He became director of the astronomical institute and successor of Jindřich Svoboda. In 1946, he was appointed the professor of higher geodesy, astronomy and geophysics at the High School of Special Sciences of the Czech Technical University in Prague. In 1948/49, he was elected dean of the faculty.

When the CTU's Astronomical Observatory was founded, Buchar became its director and held this position until his death. In 1948, he served as the High School of Special Sciences dean. After the High School of Special Sciences was dissolved in 1950, and the Faculty of Geodesy was established, Buchar became the director of the Department of Higher Geodesy, astronomy and fundamentals of geophysics. He published textbooks on geodetic astronomy in 1963.

Since the first satellite launch in 1957, Buchar worked mainly on satellite astrodynamics. In the 1960s, he was the first to derive the Earth's polar flattening from Sputnik I's and Sputnik II's movements of 1958. Later he focused on the stability of orbits of artificial satellites of the Moon, Venus and Mercury. In the late 1960s, he developed several astrometric instruments of high precision (without levels). Buchar twice worked as an expert of the Czechoslovak government delegation in the Committee

on the Peaceful Uses of Outer Space of the United Nations.

Memberships: International Astronomical Union (president of 6th Commission 1955-1961), International Astronautical Federation (corresponding 1966), Committee on Space Research (bureau and executive committee member), All-Union Astronomical and Geodetical Society of USSR Academy of Sciences (honorary, 1970), scientific college for astronomy, geophysics, geodesy and meteorology and astronautical commission of the Czechoslovak Academy of Sciences, Editorial Board of the Bulletin of the Astronomical Institutes of Czechoslovakia, Czechoslovak Society for Astronomy of the CAS (1968), Czech astronomical Society (chairman of comet section), Czechoslovak Academy of Sciences (corresponding, 1952), International Associations of Geodesy, IAG/COSPAR Commission for Satellite Geodesy, Czechoslovak National Committee of COSPAR (chair 1960).

Awards: the State Decoration for Merit in Development (1961), bronze plaque PF the Czech Academy of Sciences For Contributions to Science and Mankind (1966), Doctor of Mathematics and Physics Sciences.

The minor planet 3141 Buchar, discovered by Antonín Mrkos in 1984, was named in his honour.

9.8. David Martin Alois

Born: 8 December 1757 Dřevohryzy u Teplé

Died: 22 February 1836 Teplá

Biography: Attended the monastic grammar school at Teplá. In 1776 he entered the university in Prague, where he studied philosophy, mathematics and physics. In 1777 he acquired the magister degree in philosophy and studied theology and further

mathematics by Josef Tesánek. In 1778 he passed the Rigorosum on calculus and returned to Teplá, where he entered the Premonstratensians in 1780. He graduated with studies in science in 1783 and theology in 1785.

In 1789 David took the adjunct position of the State Observatory in Clementinum, led by Antonín Strnad. In 1790 he acquired a doctoral degree. After Strnad died in 1799, David was appointed the observatory director and astronomus regius. In 1805 he served as the Dean of the faculty and in 1816 as rector of the university.

In 1800 David attended one of the first astronomical congresses organized by F. X. von Zach, director of the observatory in Gotha.

He was elected associate (1795) and full (1800) member Royal Czech Society of Sciences. In 1806-07 and 1832, he was its chairman. He was a member of the Bavarian Royal Academy of Sciences in Munich (1809), Saxon Royal Society of Economy in Leipzig (1815), Scientific Society in Aargau (1815), Moravian-Silesian Society for Support of Agriculture, Science and Geography (1816), Society of Patriotic Museum of Czech Lands (1824), Society for Nordic Historical Studies in Denmark (1829), and corresponding member of Silesian Society for Support of Science and Industry. He was awarded the Great Golden Medal (1815) and the title of imperial-royal court councillor.

In 1833 he left his position and retired to the Teplá monastery due to ill health.

The minor planet 6385 Martindavid was named in his honour.

9.9. Dittrich Arnošt

Born: 23 July 1878 in Dubá

Died: 15 December 1959 Lomnice nad Lužnicí

Biography: In 1901, Dittrich acquired the doctoral degree based on his work *O centrifugálních jevech elektromagnetických* (*On central electromagnetic phenomena*). After graduating from the university, he entered a teaching position at a Realgymnasium in Prague II.

His initial focus was on the developing theory of relativity. Dittrich was one of the first in the Czechoslovak Republic to lecture about general relativity. In 1913, he approached astronomy and cosmic physics. In the academic year 1920/21, he habilitated for cosmic physics at Charles University. From 1929, Dittrich participated in the science's history and methodology seminar. His scientific focus shifted to using old astronomical methods in education, history of astronomy (Mayan in particular) and chronology and philosophy of science. In 1934, he was appointed the extraordinary Professor at Charles University.

In 1920, he entered the State Observatory at Stará Ďala as the deputy director. From 1927 to 1936, he was the director of the observatory.

In 1937 Dittrich he was relocated to the Ondřejov Observatory. In 1938, he retired.

Dittrich was a member of Samfundets for astronomisk historie forskning, International Astronomical Union, Astronomische Gesellschaft, Royal Bohemian Society of Sciences, Šafařík Learned Society in Bratislava, examination board for the second state exam at the Czech Technical University, Czechoslovak Astronomical

Society and Czechoslovak National Science Committee.

9.10. Doppler Christian Andreas

Born: 29 November 1803 Salzburg

Died: 17 March 1853 Venice

Biography: Born in the family of stonemasons in Salzburg. Due to ill health, he did not join the family business. Still, he studied mathematics at the Imperial & Royal Polytechnic Institute of Vienna from 1822 to 25, philosophy at the Salzburg Lyceum and further mathematics, mechanics and astronomy at the University of Vienna. In 1929 he was appointed temporary assistant to the professor of higher mathematics and mechanics, A. Burg. Between 1933 and 35, when applying for teaching positions, Doppler worked as a bookkeeper at a cotton spinning factory.

In 1835 Doppler took the position of teacher at the Technical Secondary School in Prague. From 1836 to 38, he taught part-time at the Polytechnic Institute of the Czech Estates. From 1838 to 1941, he assumed the duties of the vacant professorship in practical geometry and elementary mathematics and was formally appointed Professor in 1841.

In 1844 Doppler gave up teaching due to ill health and went on sick leave. In 1845-46 Doppler published the first ideas on the principle of change in wave frequency in relation to an observer moving relative to the wave source.

He returned to the university in 1846 and was offered the professorship of mathematics, physics and mechanics at the Academy of Mines and Forests in Banska Stiavnica. Due to political unrest in 1848, Doppler had to leave Banska Stiavnica and was appointed to the Imperial & Royal Polytechnic Institute of Vienna. In 1850 he

became the first director of the new Institute of Physics at Vienna University.

In 1852 Doppler moved to Venice, hoping that a warmer climate could improve his deteriorating health, but he died there in 1853.

Primary sources:

Bibliography:

9.11. Dusl Karel

Born: 29 May 1884 Beroun

Died: 30 November 1948 v Bratislava

Biography: Graduated a secondary school in Rakovník and then entered the Faculty of Arts of the Charles-Ferdinand University and the Czech Technical University. After passing the teacher qualification exams for mathematics and physics, Dusl taught at public Realschule in Prague-Vinohrady. In 1907, he acquired the degree of Doctor of Technology. From 1907 to 1908, he studied in Paris. Afterwards, he taught at Czech secondary schools.

In 1919, he habilitated mathematics at the Czech Technical University. In 1931 he was appointed an associate and, in 1931, full professor at the High School of Special Sciences.

In 1945 Dusl retired due to health reasons, but his health improved and in 1946, he entered the Faculty of Natural Sciences of the Comenius University in Bratislava.

9.12. Freundlich Erwin (Finlay-Freundlich Erwin)

Born: 29 May 1885 in Biebrich

Died: 24 June 1964 in Wiesbaden

Biography: Erwin Freundlich was born in the family of the director of foundry Friedrich Philipp Ernst Freundlich and Ellen Elizabeth Finlayson, who came from Scotland. He graduated from Ditheyschule grammar school in 1903. He briefly worked at the dockyard in Stettin and began a course in naval architecture at Technische Hochschule in Charlottenburg.

Due to a heart condition, he took a break in his studies. After recovery, F. entered the University of Göttingen, where he studied mathematics, physics and astronomy. He spent the winter semester of 1905/06 at the University of Leipzig. As a student of the mathematician Felix Klein (1849-1925), Freundlich wrote his dissertation on analytic function theory and acquired a doctoral degree in 1910.

On Klein's recommendation, Freundlich took the position of an assistant at the Berlin Observatory.

In 1911, F. was approached by Albert Einstein, who asked him to make accurate observations of Mercury's orbit to confirm the consequences of the general theory of relativity. Freundlich published those observations in 1913, despite opposition of the director of Berliner Sternwarte K. H. Struve (1854-1920).

As further proof of the theory of relativity, Freundlich proposed the observation of aberration of a light ray in close proximity to the Sun, which is observable only during total solar eclipses. F. planned an expedition to Feodosia on Crimea to observe the 21 August 1914 eclipse. Due to the First World War breaking out, Freundlich and members of his expedition were arrested, interned in Russia and later exchanged for captured Russian soldiers.

In 1916, Freundlich published his first book on testing the theory of relativity

Grundlagen der Einsteinschen Gravitationstheorie. In 1918, he gave up his job at Berliner Sternwarte to cooperate with Einstein full-time. F. built the solar observatory in Potsdam (later joined with the Astrophysical Observatory Potsdam), equipped with the first large telescope in Europe. In 1921, F. became its first director.

In 1920, F. was appointed as an observer of the Astrophysical Observatory in Potsdam, later promoted to the chief observer and professor of astrophysics (1922).

In the 1920s, Freundlich joined another two solar eclipse expeditions; in 1929, he finally measured the gravitational aberration, which was considerably higher than predicted. Later Freundlich attempted to find another explanation of these phenomena and was somewhat sceptical about the general theory of relativity.

In 1933, the era of National Socialism in Germany began. Soon the Civil Service Restoration Act was passed, which retired all tenured civil servants in education and justice of non-Aryan descent. Freundlich was of Jewish descent and married a Jewish woman, and in addition, they had recently become guardians of his wife's niece and nephew. He resigned his position as the solar observatory's director and emigrated to Turkey with his family. There, he joined Istanbul University, appointed as a Professor of astronomy. Freundlich founded and built a modern astronomical observatory and educated a new generation of Turkish astronomers.

In 1936, Freundlich left Turkey. He was appointed professor of astronomy at the Deutsche Universität zu Prag. In September 1938, after the Nazi occupation of Czechoslovakia began, Freundlich emigrated to the Netherlands.

He was offered the associate professorship at the University of St. Andrews in Scotland on recommendation from A. S. Eddington. Freundlich accepted British citizenship and changed his name to Finlay-Freundlich. He focused on building the

university observatory. During World War II, he taught navigation in the RAF centre in St. Andrews.

After 1945, he focused on star cluster dynamics. In 1951, he was appointed the Napier Professor of Astronomy and Director of Observatory at St. Andrews, where he supervised the construction of the 37-inch Schmidt-Cassegrain telescope. In 1955, he retired from his professorship due to university regulations but remained a temporary assistant lecturer until 1957.

In 1957, Freundlich returned to Wiesbaden. He was appointed the honorary professor at the Johannes Guttenberg-Universität Mainz.

Memberships: Kaiser-Wilhelm-Institutes für Physik Berlin (1917), Fellow of the Royal Society of Edinburgh (1941), Committee for Solar Eclipses of the International Astronomical Union, Edinburgh Mathematical Society (1939).

The crater Freundlich on the far side of the Moon is named in his honour.

9.13. Frič Jan Ludvík

Born: 1863 Paris

Died: 21 January 1897

Biography: Born as the fourth child in the family of the Czech poet, journalist and politician Josef Václav Frič, known for organized fighting on the barricades in Prague during the uprising of 1848, and Anna Kavalírová-Sázavská.

He studied chemistry at the Czech Technical University. He participated in its mechanical workshop, where he employed his talent for mechanics and soon substituted the practical lessons for students in the workshop for the ill master artisan. In spring 1882, Jan spent six weeks at the workshop of C. Bamberg in Berlin, where he entirely

manufactured two micrometre-microscopes and grounded and polished lenses for eyepieces. Jan constructed the mirror telescope for his brother Josef with three other technicians the following year. The telescope was exhibited at the assembly of the Astronomische Gesellschaft in Vienna in 1883.

From 1882 to 1887, he was the assistant of Professor of Physics Karel Zenger.

In 1884, Jan and his brother Josef Jan (1861-1945) founded a small precision mechanics workshop named *Josef a Jan Frič – dílna pro přesnou mechaniku*. They produced original measuring instruments for astronomy, geodesy, mining, and the food industry, mainly sugar factories. They presented their innovations at the industrial exhibition in Brussels in 1888. Their polarisation saccharimeter won a gold medal at the agricultural exhibition in Vienna in 1890.

In 1884-85, the Frič brothers began engaging in astrophotography using a small mirror telescope from Browning. In 1886, they won a gold medal at the photographic exhibition in Oporto for their photographic plate of Alpha Tauri on the edge of the Moon from 22 February 1885.

When expanding their business, the Frič brothers moved their workshop to Vinohrady, in the proximity of Vojtěch Šafařík's private observatory, which they frequently visited.

Jan Frič died unexpectedly of appendicitis in 1897. The observatory *Žalov, hvězdárna bratří Fričů* was named in his honour. His brother Josef also added Jan's name to his own and became known as Josef Jan Frič. The minor planet 7849 Janjosefrič is named in his and Josef's honour.

9.14. Frič Josef Jan Alexander

Born: 12 March 1861 Paris

Died: 10 September 1945

Biography: Born Josef Alexander Frič as the third child in the family of the Czech poet, journalist and politician Josef Václav Frič, known for organized fighting on the barricades in Prague during the uprising of 1848, and Anna Kavalírová-Sázavská.

He studied zoology and palaeontology at the Czech university in Prague but was interested in astronomy.

In 1884, Josef and his brother Jan Ludvík (1863-1897) founded the precision mechanics workshop *Josef a Jan Frič – dílna pro přesnou mechaniku*, where they produced original measuring instruments for astronomy, geodesy, mining and food industry, in particular sugar factories. When expanding their business, the Frič brothers moved their workshop to Vinohrady, in the proximity of Vojtěch Šafařík's private observatory, which they frequently visited.

After Jan abruptly died of appendicitis in 1897, Josef began to use the name Josef Jan Frič and, in 1898, began to build an observatory on the hill Manda near Ondřejov in brother's honour. Šafařík donated his library and handcrafted telescope. In 1901 František Nušl, Frič's close friend and co-worker on geodetic instruments, moved to Prague and considerably participated in the developing observatory.

In 1927, the Czech Technical University awarded Frič the Doctor of Technology honoris causa title. In 1931, Charles University awarded Frič the title Doctor of Natural Sciences honoris causa.

In 1928, Frič donated the observatory to the Czechoslovak Republic, which

celebrated its tenth anniversary, with the condition that the observatory would be an independent institute for Charles University.

The minor planet 7849 Janjosefrič is named after him and his brother Jan.

9.15. Gerstner František Josef

Born: 22 February 1756 Chomutov

Died: 25 June 1832 Mladějov

Biography: Studied at Jesuit grammar school in Chomutov in 1765-72 and mathematics and astronomy at the Faculty of Philosophy in Prague in 1772-77. In 1776 he passed the public exam on astronomy and in 1777 on physics.

In 1781 he shortly studied medicine at the University of Vienna and then entered the Vienna Observatory. In 1784 he was appointed the adjunct of the State Observatory in Prague. From 1787 he was accredited to substitute lectures on further mathematics at the Charles-Ferdinand University for the ill professor Tesánek. In 1789, Gerstner was appointed his successor.

In 1795 Gerstner joined the government Studienhofcommission (courtly commission for the revision of studies at public education institutions) in Vienna. From 1804, he was the director of physics and mathematics studies. He compiled guidelines for physics education at Realschule.

He suggested converting the Institute of Engineering Education in Prague into a polytechnic school in 1803 and became its director and Professor of Mechanics and Hydraulics in 1806.

In 1831 he published his three-part textbook *Handbuch der Mechanik*.

In 1810 he was promoted to knighthood for his merits. In 1811 the Emperor

appointed him the director of hydraulic structures in Czech lands. In 1832 Gerstner retired with all his allowances retained.

Primary sources:

Bibliography:

9.16. Guth Vladimír

Born: 3 February 1905 Vrchlabí

Died: 24 June 1980 Prague

Biography: Guth studied at the Faculty of Science of the UK. In 1929, he acquired the Rerum Naturalium Doctor title at the Faculty of Science of Charles University.

From 1925 to 1928, Guth worked as a scientific assistant at the Czech Technical University in Prague. In 1928, Guth took positions at the State Observatory and the observatory in Ondřejov. He focused on the dynamics of comets and meteor showers and laid the foundation of Czech research on meteors. In 1936, Guth led the solar eclipse expedition to Russia. After World War II, he was director of the Department of Astrometry and Meteorology.

On 15 October 1949, Guth habilitated for astronomy at the Masaryk University in Brno based on world *Ueber die Reduktionsmethoden der Meteorbeobachtungen* and *Určení výšek a viditelné dráhy meteoru grafickou metodou*. He lectured there in 1950-54.

Since 1951 Guth led the astronomical observatory at Skalnaté Pleso. After its affiliation with the Slovak Academy of Sciences (SAV), he became the first director of

the Astronomical Institute of the SAV.

In 1956, he returned to the Astronomical Institute of the ČSAV in Ondřejov and became director of the Interplanetary Matter Department and deputy manager of the institute (1959).

In 1962, he entered a cooperation with Charles University as an external lecturer. In 1966, he was appointed professor of astronomy.

He was chairman of the Czechoslovak Committee of Interkosmos (1966), president of the IAU Committee for meteors and meteorites (1952-58), member of IAU (1935), SAV (1953 corresponding), Royal Astronomical Society, Societé astronomique de France, Astronomische Gesellschaft, International Academy of Astronautics (1960), Czechoslovak Academy of Sciences (1962 corresponding member and chairman of collegium for astronomy, geophysics, geodesy and meteorology), Czech Astronomical Society (honorary), Slovak Astronomical Society of SAV (1959-62 chairman). He was awarded the degree of Doctor of Science (1956) and the Golden Medal of the Czechoslovak Academy of Science (?).

The minor planet 3419 is named in his honour.

9.17. Gruss Gustav

Born: 2 August 1854 in Jičín

Died: 23 September 1922 in Prague

Biography: Studied Gymnasium in Jičín and mathematics, physics and astronomy at Charles University in Prague. From 1875 to 1877, he was the assistant of the Astronomical Institute of the Charles-Ferdinand University under the direction of Karl Hornstein. After graduation in 1877, Gruss left for Vienna, where he worked as an

assistant for higher geodesy and spherical astronomy at the Technische Universität Wien from 1878-to 1879.

In 1880, he taught as a substitute at the Slavic Gymnasium in Brno.

In 1881-91, Gruss was appointed adjunct of the State observatory in Prague. During these ten years, he made important observations of latitude variations in 1889-92 and analysed measurements from 1889-92 and 1895-99.

In 1892, Gruss was appointed the extraordinary professor and director of the Astronomical Institute of the Charles-Ferdinand University as the successor of the deceased August Seydler. In 1897, he was appointed the full Professor. He had to cease lecturing in 1910 due to illness and retired in 1914.

Gruss focused on both theoretical astronomy and practical calculations of orbit determination of minor planets and comets. In 1897-99, he published an extensive textbook on theoretical astronomy, the first and, until the 1970s, the only Czech textbook in this field. Gruss also engaged in the new field of astrophysics and, in the late 1890s, observed variable stars with Václav Láska. In 1896, Gruss discovered the IC 4997 nebula concurrently with Wilhelmina Fleming at Harvard, who used the same method. He cooperated with Ernst Mach on optical research of spark shock-waves and with Bierman to determine the resistance of electric wiring.

In 1896 Gruss published the outreach book *Z říše hvězd (From the Realm of Stars)*, written according to *Newcomb-Engelman Populäre Astronomie* (first published 1881). This book became the source of astronomical knowledge for the public for several generations. The Czech Astronomical Society took up its tradition with two books *Astronomie* (1940 and 1954) and with their magazine *Říše hvězd (The Realm of Stars)* (1920-1999).

In 1897 and 1899, he published the comprehensive two-part textbook on theoretical astronomy, *Základové theoretické astronomie*, which had 390 pages. This textbook was used until 1971, when it was replaced by a new modern textbook *Základy nebeské mechaniky,* by Pavel Andrle.

Memberships: ROYAL BOHEMIAN SOCIETY OF SCIENCES (1893).

The minor planet 6516 Gruss is named in his honour.

9.18. Halaška František Ignác Kassián

Born: 10 July 1780 Budišov nad Budišovkou

Died: 12 July 1847 Stará Boleslav

Biography: He was born in family of weaver Isidor Halaška and charwoman Marie Halašková. He attended grammar school in Stará Voda and, in 1796, entered the Piarist grammar school in Kroměříž.

In 1799 he entered the Piarists. He spent his first years in the order as a teacher of mathematics and physics at Piarist grammar schools in Lipník nad Bečvou (1800), Strážnice (1801), Mikulov (1802) and Kroměříž (1803), where he studied and taught.

In 1804 he was ordained and sent to Theresian Military Academy in Vienna, where he served as assistant and later prefect from 1805-06. In 1806 was sent to Mikulov to lecture mathematics, grammar and physics at clerical grammar school.

In 1807 he acquired the degree of Doctor of Philosophy at the University of Vienna. From 1808 he taught physics at grammar schools in Mikulov and Brno, where he established an observatory.

In 1814 he was appointed professor of physics at the Charles-Ferdinand

University in Prague. He stayed there until 1833. In 1831/32, he served as rector of the university.

In 1833 he was appointed government council and referent on philosophical, technical, nautical, forestry, Bergakademie and Realschule education of the Studienhofcommission in Vienna, which was in 1849 converted into the Ministry of Culture and Education.

From 1838 until his death, he was provost of Stará Boleslav and provincial prelate of Bohemia.

His most important work is the *Elementa eclipsium quas patitur tellus* (1816), where he published a calculation of all solar eclipses from 1816 to 1860.

He was a member of the Royal Bohemian Society of Sciences (1823).

Primary sources:

Bibliography:

9.19. Heinrich Vladimír Václav

Born: 7 September 1884 in Peruc

Died: 30 May 1965 in Prague

Biography: Vladimir Vaclav Heinrich was born on 7 September 1884 in Peruc. He spent his youth in Příbram, where his father was a physician and a town physicist. From 1895 to 1903, he attended the Příbram Realschule and grammar school. After graduation, he entered the Faculty of Arts of the Czech Charles-Ferdinand University, studying mathematics and physics from 1903 to 1907. He focused on astronomy and assisted at the astronomical institute under director Gustav Gruss during his studies.

On 3 March 1908, Heinrich was awarded the degree of Doctor of Philosophy based on his dissertation *Vyšetřování o dráze planetky (617) Patrocla Jupiteru blízké (Investigation on the path of the near-Jupiter asteroid (617) Patroclus)*. In this thesis, he showed that asteroid (617) Patroclus moved close to the Lagrangian point L5 of the system Sun-Jupiter-asteroid and therefore, it approximately met one of the exceptional cases of the exact solution of the three-body problem.

Heinrich specialized in celestial mechanics and the restricted three-body problem all his life. His other favourite topic was the orbits of asteroids with varying elements due to the gravitational pull of the planets, e.g. asteroid (108) Hecuba. By today's terminology, it was the study of periodical motions in the area of stability borders and the chaotic nature of orbits.

On recommendation by G. Gruss, Heinrich spent 1908-09 on the observatory in Strasbourg under Professor E. Becker (1843-1912). There he focused on measurements of star azimuths in digression by the yet unused method of J. J. Böhm. In 1909, Heinrich studied photographic astronomy in Heidelberg and astrophotometry and theoretical astronomy in Göttingen. In 1910, he spent a few months on the Königstuhl Observatory by Max Wolf.

In 1910, he passed the state exam of teacher qualification for teaching physics and mathematics at Realschule and grammar schools. He began to teach at grammar school in Resslova Street as a substitute teacher.

In 1913, Heinrich habilitated at the Czech Charles-Ferdinand University for theoretical astronomy, based on his work *Theorie periodických pohybů typu 5/3 v asteroidickém problému tří těles* (The theory of periodic motion type 5/3 in asteroid three-body problem). In this work, Heinrich analysed the particular case of the three-

body system provided the asteroid was of low mass and angular velocities of the body and Jupiter were in the ratio of 5:3.

In 1914, Heinrich went to Strasbourg but had to abandon this stay due to the outbreak of World War I. In the same year, he proposed the determination of absolute declination of stars by measuring their azimuths in the moment of digression. International Astronomical Union later used this routine in their projects.

From 1916 Heinrich was an assistant at the Astronomical Institute of the Czech Charles-Ferdinand University, which resided at Smíchov. He focused on the observation of binaries with the 8-inch telescope. The position was probably not systemised, as lists of the observatory staff do not mention Heinrich.

In May 1919, he was appointed director of the Astronomical Institute and took over the institute from the temporary manager (B. Kučera). Then he left the job as a substitute teacher and devoted himself entirely to astronomy. Due to post-war deflation in Germany and „fast and of course risky action“ (Heinrich, 1935), he was able to buy modern optical instruments at low cost: 26cm Zeiss visual lens, 17cm Zeiss photographic lens, 60cm Schmidt reflector 1:5 a 30cm Schmidt reflector 1:12.

In 1923 he was appointed the extraordinary and, in 1926, the full professor of Spherical and Theoretical Astronomy the Charles University. He lectured on Celestial Mechanics, Introduction to Space Physics and led Training with Astronomical Instruments. However, among students and colleagues, he was known as a comic freak who involved himself in numerous personal conflicts and was far from the ideal boss (Grygar, 2000).

At the turn of the 20s and 30s, he worked on the theory of secular solutions for motions of stellar systems and planned *„according to (his) own tastes and plans to*

arrange purposefully and systematically based observations to support (his) own theory" (Heinrich, 1935). In 1932, he spent four months in the USA, where he got blueprints to reconstruct large reflectors and wooden models from Professor Struve of Yerkes Observatory. According to Heinrich's correspondence with the Ministry of Education and National Education, he paid most of the bills from his pocket.

However, in 1934, due to the escalation of organisational problems and disputes with some institution's staff and faculty members, Heinrich was dismissed from the position of Director of the Astronomical Institute and lost access to it. Considering the building of the institute his life's work, Heinrich never reconciled with the removal from the office of the Director. He filed a complaint against the decision of the faculty members and ministry to the administrative court, but he lost the case in 1937 (Kovář, 1983).

Heinrich worked at Charles University as a Professor of Astronomy and continued teaching and scientific work until 1957, when he retired.

Though Heinrich published independently, he kept lively contacts with Czech and foreign colleagues. Before and after World War II, he was an active member of the IAU, well-known as „Lord with the Rings" for his aristocratic manners and his Renaissance striking gold rings from family friend Julius Zeyer.

Memberships: IAU, Royal Czech Society of Sciences, National Research Council (chairman), Astronomical Society of Leipzig, Astronomische Gesellschaft, and Vice-Chairman of the Executive Committee of the Moravian Astronomical Union (Buchar 1944).

Awards: Doctor of Mathematical Sciences, doctor és sciences by the University of Bordeaux (Buchar 1944).

In 1956 IAU honoured him by naming a crater on the near side of the Moon after him. The asteroid (6774) Vladheinrich (discovered in 1988 at Kleť observatory) is named after him.

9.20. Hell Maximilian

Born: 15 May 1720 Štiavnické Bane

Died: 14 April 1792 Vienna

Biography: She was born in a family of the head constructor of the Štiavnica Mountains system of water reservoirs, Matthias Cornelius Hell.

In 1738 he entered the Society of Jesus and, after novitiate, was sent to Vienna, where he studied philosophy. In 1744 he studied mathematics and astronomy and was an assistant to the director of the Vienna Observatory Josef Franz. He spent a year in Klausenburg, teaching at the Jesuit college and building an observatory. Then he returned to Vienna, graduated in theology in 1751 and was ordained priest in 1752.

From 1752 to 1955, he was a professor of mechanics at Klausenberg.

In 1755 he was appointed the first director of the first Vienna Observatory, founded in the same year to utilize instruments gifted to the university by Empress Maria Theresa and constructed on the roof of the Vienna University.

In 1769 Hell observed the transit of Venus in Norway and used the results to calculate the most accurate value of the Earth-Sun distance.

He published the *Ephemerides astronomicæ ad meridianem Vindobonensem* annually from 1757.

Primary sources:

Bibliography:

9.21. Horák Zdeněk

Born: 6 October 1989 Prague

Died: 19 February 1987

Biography: From 1917 to 1920, he studied at the Faculty of Arts of the Czech university. After graduation in 1920, he took the position of assistant of professor Suchý of the Physical Institute of the Business School of the Czech Technical University (CTU). After Suchý died in 1921, Horák went to the Astronomical Institute of the Czech Technical University under the leadership of Professor Svoboda. In 1923, he acquired the Doctor rerum naturalium title. Since 1929 he lectured at the university.

In 1930, Horák became Associate Professor of Theoretical Physics at the CTU. In 1935, he took a position at the Physical Institute of the School of Mechanical and Electrical Engineering of CTU.

In 1945, H. was appointed Professor of Physics at the CTU. From 1954 to 1977, he was director of the Department of Physics. In 1966, he became the head of the physics advisory board at CTU.

Awards: honorary title DrSc. (1955)

9.22. Hornstein Karl

Born: 7 August 1824 Brno

Died: 22 December 1882

Biography: Studied at the Vienna University from 1840. Assistant at the Vienna University observatory in 1843-47.

In 1847-48 Hornstein worked as a temporary Adjunct at the Krakow Observatory but left after introducing Polish as the second language of education at the Krakow University.

In 1848 he worked as a substitute teacher at the Akademisches Gymnasium in Vienna. In 1949, he returned to the Vienna observatory as an assistant and acquired the degree of Philosophiae Doctor. In 1850 he habilitated as Privatdozent of further mathematics at the Vienna University, and in 1851, he was appointed the adjunct of its observatory.

In 1862 he was appointed the Professor of Mathematics at the University of Graz.

In 1863 Hornstein was appointed the Professor of Mathematics at the Charles-Ferdinand University in Prague. In 1868 he became the director of the State Observatory, and in 1869, the Professor of Astronomy.

He focused on the rotation of the Sun and the determination of orbits of comets (1847 I). The astronomy of his Clementinum era was only theoretical. The only practical observations were meteorological. He began measurements of ozone concentration in the air by iodine papers.

Memberships: *Kaiserliche Akademie der Wissenschaften in Wien*

(corresponding, 1857), *Verein zur Verbreitung naturwissenschaftlicher Kenntnisse in Wien* (co-founder, 1860).

The minor planet 6712 Hornstein is named in his honour.

Sources:

Ottův slovník naučný, B. XI, pp. 632-633.

ÖBL 1815-1950, Bd. 2 (Lfg. 10, 1959), P. 425

Poggendorff (J. C.), Biographisch-literarisches Handwörterbuch zur Geschichte der exacten Wissenschaften (Leipzig 1859, J. Ambr. Barth, gr. 8°.) P. 1142.

9.23. Hujer Karel

Born: 18 September 1902 Železný Brod

Died: 10 June 1988

Biography: Born as the ninth child in a family of horticulturists. Attended the Realschule in Turnov and studied astrophysics and philosophy of exact sciences at Charles University.

In 1920, he was invited to the Camille Flammarion observatory. From 1924 to 1925, he studied at the Imperial College of the University of London under Albert Fowler and Herbert Dingle, attending lectures of Sir Arthur Eddington and Sir James Jeans. In 1925, he was one of six Czech students invited to visit English universities. In 1926, Hujer came to the Yerkes Observatory at the University of Chicago, acquiring a scholarship for graduate work. He continued his studies at Charles University in Prague and received a Doctorate of Science in 1932 with a specialization in astrophysics, astronomy and philosophy of exact sciences. He spent the next year at various observatories worldwide and a further six months researching the astronomy of pre-

Columbian civilizations in Mexico. In 1934, he studied the history of Hindu astronomy and gave lectures at various universities in India. In 1936, Hujer joined the first Czechoslovak Solar Eclipse Expedition to the island of Hokkaido in Japan. In 1937, Hujer went to California and Peru, where he studied Inca astronomy.

After Munich Pact was signed in 1938, Hujer decided to remain in the USA. In 1939, he married an American woman Harriet Hunt. He took a professorship at various universities.

In 1946, he was invited to take charge of Clarence T. Jones Observatory of the University of Chattanooga and Guerry Professorship of astronomy and physics. In the post-war period, Hujer visited Czechoslovakia and lectured at various universities and colleges.

He was one of eight Americans invited to participate in the World Peace Meeting in memory of Mahatma Gandhi.

In 1973, he retired from his position at the University of Tennessee.

Memberships: American Association for the Advancement of Science (Fellow), Royal Astronomical Society of London

Awards: Guerry Professor Emeritus (1973)

9.24. Kaván Jiří

Born: 3 February 1877 in Prague

Died: 30 March 1933 in Prague

Biography: Kaván studied mathematics and physics at the Faculty of Arts of the

Czech Charles-Ferdinand University. In 1901, he became an assistant at the Astronomical Institute. His primary duties were practical observations. He also observed sunspots and sent the results to Professor Wolfer in Zurich.

In 1902, he acquired the degree of Doctor of Philosophy. From 1902 to 1909, he worked at the Astronomical Institute as an adjunct of director Gustav Gruss and taught at a secondary school. Since 1918 he engaged in the takeover of the State Observatory from the German Charles-Ferdinand University by the new Czechoslovak Republic (Seydl 1933).

In 1919, he was delegated to take over the Graf Konkoly's observatory (later State Astrophysical Observatory in Stará Ďala) in Stará Ďala from the Hungarian government. From 1919 to 1928, Kaván was its director.

In 1928, he was relocated to the Star Observatory in Prague. He then focused on his work in mathematics. He mane calculation for the Ondřejov Observatory and published the extensive tables of integer factorization *Tabulky úplného rozkladu v prvočinitele všech čísel do 256 000*.

Kaván was a skilled organist. He played at various Prague churches.

He was a member of the astronomy department of the Czechoslovak National Research Committee of the International Astronomical Union and a librarian of The Union of Czech Mathematicians and Physicists.

9.25. Kopal Zdeněk

Born: 4 April 1914 Litomyšl

Died: 23 June 1993 Wilmslow, Cheshire

Biography: Zdeněk Kopal was born in Litomyšl in the family of historian of literature Josef Kopal (1883-1966) and Ludmila nee Lelková (1884–1973). The family soon moved to his maternal grandparents in Jičín, in 1919 back to Litomyšl and in 1923 to Prague.

At 14, he constructed his first telescope and began visiting the Štefánik Observatory. At 15, Kopal joined the Czech Astronomical Society and observed variable stars at Štefánik Observatory. The following year he became the chair of the Variable Stars Section of the CAS.

In June 1933, he graduated from grammar school in Smíchov and entered the Faculty of Science of Charles University in Prague. In 1935, he attended the IAU General Assembly in Paris and became a member. In 1936, he joined the solar eclipse expedition to Japan. In 1937, Kopal acquired the Denis scholarship at Cambridge under A. S. Eddington (1882–1944). In 1937, he received a doctoral degree summa cum laude.

In 1938, Kopal took the research fellow position at Harvard Observatory under H. Shapley (1885-1972). In the same year, he married Alena Müldnerová. After Mnichov Agreement was passed, the couple decided to stay in the USA.

From 1940 to 1946, he was a research associate at Harvard. He focused analysis on light curves of eclipsing binaries and their Fourier transformation. Later he determined the shape of binaries is not round but describable by Roche's equipotential surface.

Since 1942, Kopal cooperated with the Massachusetts Institute of Technology (MIT), where he taught celestial navigation to naval officers and edited gunnery tables for the navy. He was appointed associate professor In 1947 and extraordinary professor of numerical analysis at MIT in 1948.

In 1947 Kopal was offered the position of head of the Astronomical Institute of the Charles University, but these plans ceased after the 1948 Czechoslovak coup d'état.

In 1951, Kopal was appointed professor of numerical analysis at MIT and head of the newly founded astronomy department at Victoria University in Manchester. He remained in this position until retirement in 1981.

In 1955, Kopal published his extensive monograph Numerical Analysis.

In 1958, Kopal entered a cooperation with NASA and Jet Propulsion Laboratories. From 1959 he led the NASA lunar mapping project. Kopal then engaged in detailed lunar topography connected to the Apollo program and established the Manchester Lunar Programme.

Kopal founded three journals: *Icarus* (1962), *Moon Journal* (1969), now *Earth, Moon and Planets*) and *Astrophysics and Space Science* (1969).

Memberships: IAU Commission 42 for Photometric Double Stars (chairman 1948-55) (Richards et al. 2015), Czech Astronomical Society (honorary 1967), Academy of Athens (foreign member 1976), astronomical societies in Liverpool, Salford and Manchester.

Awards: doctor honoris causa from universities in Patras, Greece (1974) and Kraków (1974), Golden Medal of Czechoslovak Academy of Science (1968), Silver Medal of Charles University (1991), honorary freeman of municipalities of Delphi (1978) and Litomyšl (1991). The annual ceremonial Kopal Memorial Lecture has been awarded by the Manchester Astronomical Society and Czech Astronomical Society (since 2007). The minor planet 2628 Kopal is named in his honour.

9.26. Kraus Arthur

Born: 1 August 1854

Died: 1930

Biography: Born in the Pardubice post office head postmaster Josef Kraus family, the younger brother of viceregent of the Kingdom of Bohemia Alfred Kraus. Alfred, being childless, solicited an extension of his title of baron for his brother's family. Arthur, therefore, became the heir of the title. His income enabled him to engage fully in his interests. He owned one of the first radio stations in Austria-Hungary and the first motorcycle in Pardubice; he was interested in astronomy, amateur photography, bicycling and tennis. Since 1895, he ran a simple observatory on the highest floor of Pardubice castle tower.

Kraus focused on astronomy outreach. Before World War I, he built a „public" observatory in his house Na staré poště and made it accessible to the public and schools. The observatory was equipped with a 6-inch telescope on a parallactic mount. Since 1913, Kraus systematically observed solar protuberations. Under pen name Carchecius, Kraus wrote booklets *Létavice a povětroně* (*Shooting stars and aerolites*, Pardubice 1918) a *Pozorování Slunce* (*Observations of the Sun*, Pardubice 1919).

Thanks to his status and influence, Kraus was able to procure the founding of the Czech Astronomical Society in 1917.

9.27. Kreil Karl

Born: 4 November 1798 Ried

Died: 21 December 1862 Vienna

Biography: Studied at the Stiftsgymnasium Kremsmünster from 1810 to 19, helping with astronomical and meteorological observations at the local observatory. In 1819 K. began studying law at the University of Vienna, but in 1923 he adverted to mathematics, physics and astronomy.

In 1927 he entered the Observatory of Vienna as an assistant of J. J. Von Littrow. In 1831 he took the adjunct position at the La Brera Astronomical Observatory in Milan.

In 1838 he was transferred to Prague as an adjunct of the State Observatory in Prague. In 1845 he was appointed the director. Kreil was the first in Bohemia to organize regular observation of Earth magnetism. He was responsible for developing meteorological observations, improving magnetism measuring instruments, and constructing self-recording instruments.

Kreil proposed the establishment of a central station for geophysical observations in Austria to the Vienna Academy of Sciences. In 1951, he took the position of the first director of the Central Institution for Meteorology and Earth Magnetism in Vienna and was appointed Professor of Physics at Vienna University.

He was a member of the *Akademie der Wissenschaften in Wien* (1847) and awarded the *Knight's Cross of the Order of Francis Joseph*. From 1841 he published the almanac *Magnetische und meteorologische Beobachtungen zu Prag*.

The minor planet 6597 Kreil and the Kreilplatz in Vienna-Döbling are named in his honour.

9.28. Láska Václav

Born: 24 August 1862 Prague

Died: 27 July 1943 Řevnice u Prahy

Biography: Born in the family of builder Václav Láska. Both his parents came from Jičín District. He attended a Czech primary school for four years. Afterwards, his father sent him to a boys' seminary in Bohosudov, where young Václav attended five grades of German Gymnasium. He finished secondary school and studied at the German Gymnasium at Prague Malá Strana. After graduation in 1883, he entered the Faculty of Arts of the German Charles-Ferdinand University and enrolled in Mathematics and Physics.

In the period between assistants Rosický and Suchomel leaving the State observatory in 1884 and the appointment of new assistants, Láska and other students substituted for them. He participated in all observations and reductions and stayed as a volunteer. In the following two years, he published many papers with the results of his meteorological observations.

Láska was also interested in geodesy and attended lectures of Professor Karel Kořistka (1825-1906) at the Czech Technical University as an extraordinary student for one year.

He got the degree of philosophiae doctor on 19 December 1887. His dissertation *Die Theorie der linearen partiellen Differentialgleichungen in ihrer historischen Entwickelung* was the first of his works on history of science.

In 1890, he habilitated at the Czech Technical University on higher geodesy, cartography and photogrammetry. He was appointed the assistant of the Astronomical Institute of the Czech Charles-Ferdinand University. He participated in calculating orbits of minor planets 146 Asporina and 275 Sapientia, led by August Seydler (1848-1891). After Seydler's death, Láska continued working on orbit determinations under the

direction of Gustav Gruss. Láska and Gruss began observing stellar spectra and variable stars in the 1890s after they had a camera mounted on the telescope. He wrote three geodesy textbooks, two in the Czech language and a mathematics textbook in German. He significantly contributed to the refinement of the Prague State Observatory's geographic position.

In October 1895, Láska left Prague as no academic position was available. He was offered the extraordinary professorship of higher geodesy and spherical astronomy and director of astronomical and seismographic observatories at the Lviv Polytechnic National University. In December, he took over the university observatory and seismological observatory. On 19 December 1898, he was appointed extraordinary Professor. In 1897, he habilitated at the University of Lviv.

During his Lviv stay, Láska became the authority on geodesy and a pioneer in seismology. He formulated many fundamental laws of tectonics and geotectonics. He was offered a professorship in Swiss Freiberg and invited to lecture in the U.S.A. He was an officer of the Central Institution for Meteorology and Geodynamics in Vienna and co-operator of Archiv für Photogrammetrie. He was the delegate of the Austria-Hungary Empire, the first international meeting on seismology in Strasbourg in 1901.

In April 1911, Láska was appointed the Professor of Applied Mathematics at the Faculty of Arts of the Czech Charles-Ferdinand University. In 1919, he became director of the new department of applied mathematics of mathematics seminar. After the Czechoslovak Republic was established in 1918, Láska participated in the organisation of geodetic, cartographic and statistic institutes and geophysical research, various commissions and ministry meetings. In 1922-25, he built the Geophysical Institute of Charles University, the central institute for Czech geophysical research. This institute

later became the Institute of Geophysics of the Czechoslovak Academy of Sciences and the Department of Geophysics at Charles University.

In 1932 Láska retired but significantly participated in preparing the Statistical Atlas of the Czechoslovak Republic (published 1935).

The minor planet 7441 was named Láska in his honour.

Memberships: Sociéte Belge d'Astronomie (1904)

9.29. Link František

Born: 15 August 1906 in Brno

Died: 23 September 1984 in Paris

Biography: Studied at the Faculty of Science of the Masaryk University in Brno. In 1930, he acquired the degree of doctor rerum naturalium and went to Prague. He was teaching at a secondary school, where he got a partial leave of absence, and since 1939 full leave of absence to work at the Ondřejov observatory. In 1943, he was transferred to Ondřejov as a research institute inspector.

In 1936, he habilitated in astronomy at the Faculty of Science at Charles University. He led the astronomy practicum and lectured on astrophysics.

In the 1930s, Link worked with Vladimír Guth at Ondřejov on atmospheric absorption measurements from the solar eclipse expedition to Pic-du-Midi observatory in the Pyrenees. They took photographs of stellar spectra with two spectrometers and scaled the photographs for stellar temperature measurements. They made photometry of lunar eclipses, experimented with artificial meteors, and did preliminary measurements of twilight photos from the Pulkovo observatory. Link calculated the aerospatial dioptric

tables.

During World War II, Link established the Computative Section of the Czech Astronomical Society. From 1941, he systematically observed the Sun and worked with Guth determination of its colour indication.

After 1945 Link led the department of solar physics. From 1948, he was the Director of the Observatory. After the controversy with the young new generation of astronomers in 1952, Link resigned, and Bohumil Šternberk (1897-1973) became the new Director.

At the end of the 1940s, Link focused on lunar eclipse photometry, regular observation of sunspot activity, ionosphere research, photometry of twilight phenomena and tracing ultra-short wave atmospherics. In 1947, he founded and directed the *Bulletin of the Astronomical Institutes of Czechoslovakia*.

In 1951, Link and Zdeněk Ceplecha began researching the interaction of meteors and the mesosphere. Meteors were photographed systematically from two stations 40 km from each other. Later a system of 30 large view cameras with 180 mm focus. In the 1960s, the Czechoslovak fireball network was developed.

Link's foci were lunar eclipse photometry and ionosphere research. From the 1930s, he corresponded with French astronomers and enforced cooperation in the atmosphere research field by stratosphere balloons. He also made use of meteoric dust collected from jet fighters. Thanks to the complex structure of observation programs, Link achieved many discoveries and international acknowledgement in the fields of meteors and the Sun-Earth relationship.

In 1970, he emigrated to France, where he worked at the Institut d'Astrophysique in Paris until the end of his life.

The minor planer 3550 Link is named in his honour.

9.30. Littrow Karl Ludwig Edler von

Born: 13 March 1781 Horšovský Týn

Died: 30 November 1840 Vienna

Biography: Born in the family of Czech merchant Anton Lyttroff. From 1798 to 1803, he studied law at Charles University and theology, philosophy and medicine at all four faculties without promotion. From 1803 he was the private tutor of count J. Renard in Silesia and Vienna and studied autodidactically mathematics and astronomy.

In 1807 Littrow was appointed professor of astronomy at the University of Krakow. After Austria-Hungary lost Krakow in the Napoleonic wars in 1809, Littrow took the position of the Kazan Imperial University, where he established the university observatory in 1810.

From 1816 to 1819, Littrow was co-director of the new observatory at Buda.

In 1819 he was appointed professor of astronomy at the University of Vienna and director of the first Vienna Observatory. In 1834-37 he was chairman of Lehrkanzel für höhere Mathematik in Vienna.

Littrow is known for the inventions of Littrow projection (1833), Littrow prism, Littrow mount and Littrow configuration.

In 1837 he was ennobled with the title Edler von Littrow. The crater Littrow on the near side of the Moon is named in his honour.

Primary sources:

Bibliography:

9.31. Lucerna Roman

Born: 7 November 1877 Semlin

Died: 1945 Prague

Biography: Graduated from the University of Vienna in 1904. In 1931, he habilitated on geography at the Deutsche Universität zu Prag in 1931. Lectured on climatology in 1939. He left the university in 1939.

9.32. Mašek Bohuslav

Born: 1 December 1868 Hradec Králové

Died: 29 August 1955 Prague

Biography: Born into a family of a secondary school Czech language teacher. After his father relocated to Jindřichův Hradec, in the lower class grammar school, Bohuslav met František Nušl, with whom he built their first telescopes and made astronomical observations. After moving back to Prague, Mašek studied in an upper-class grammar school.

At the Prague university, Mašek worked as an assistant to professor Čeněk Strouhal from 1888 to 1893. After acquiring teacher qualification in 1892, he taught as a substitute in Prague and Plzeň.

In 1897, he relocated to grammar school in Hradec Králové. There he resumed cooperation with František Nušl, publishing their observations in *Živa*.

In 1901, he was relocated to a Realschule in Prague. He joined advance workings for the new observatory in Ondřejov and later worked there.

After 1918, Mašek took a job at the State Observatory. As the institute had no observatory, Mašek accepted an invitation by J. J. Frič to take the position of vice director of the Ondřejov observatory.

He established and edited the annual *Hvězdářská ročenka (Astronomical Almanac)* in 1921-40, was one of the first editors of *Říše hvězd* and interpreter of scientific literature, i.e. Newcomb's *Astronomy for Everybody*, Stratonov's *Astronomy,* and Jeans's *The New Background of Science* and *Universe around us* (Nušl 1939).

In 1940, Mašek retired.

Memberships: The British Astronomical Association (delegate of State Observatory).

9.33. Mohr Josef Mikuláš

Born: 29 November 1901 Praha-Vršovice

Died: 16 December 1979 Frýdlant

Biography: Mohr spent his youth in Jihlava and Telč. In 1919, he graduated from the grammar Realschule. He studied mechanical engineering at the Czech Technical University for one year. He then changed to the Faculty of Science of Charles University and studied astronomy, mathematics and physics from 1920 to 1923.

From 1923 to 1925, he studied at Sorbonne as a tutee of H. A. Deslandres (1853-1948) and A. Pérot (1863-1925) and worked at the Paris-Meudon Observatory led by Deslandres. Mohr focused on spectroscopy and published four papers in Comptes

Rendus. After returning to Prague in 1925, Mohr defended his dissertation *O polovém efektu čar barya, neodymu a vápníku viditelného spektra* (*On the polar effect of visual barium, neodymium and calcium lines*) and acquired the degree of Rerum naturalium doctor on experimental physics and astronomy.

Because of no vacated berth for him in Czechoslovak astronomical institutes, Mohr went on squad drill and in 1927 entered the French state observatory Al Bouzareah in Algeria as assistant of prof. Gonnessiat. After a year, Mohr returned to Prague and acquired the demonstrator and unpaid assistant position at the Astronomical Institute of Charles University. In 1928, he left and entered the Faculty of Medicine of Comenius University in Bratislava as an assistant of V. Teissler at the Institute of Physics. He stayed there for five years, spending a part of 1930 at Leiden Observatory and 1931 at Kapteyn Observatory in Groningen.

In 1931 Mohr published the paper *Sur le courant d'etoiles Ursa Major*. He extended the number of its stars from 28 to 96. This publication became a resource for later studies in this field.

In 1932-34, Mohr habilitated for astronomy at the Faculty of Science of the Charles University based on his habilitation thesis, *The rotational space motions of stars*, which he had written using data obtained at foreign observatories in 1931.[86] Czech Academy of Science and Art had acknowledged its extended Czech version. In 1934 Mohr acquired the unpaid and, in 1935, paid assistant of the Astronomical Institute of Charles University.

In the 1930s, Mohr's most essential papers in stellar astronomy were published.

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Mohr focused on dispersal velocities of nearest stars. According to contemporary Campbell's theory, these stars were dispersing with a velocity of about 4 kmps in all directions, which was affected by the K-term. In his analysis, Mohr determined the K-term in radial velocities to be smaller, oscillating around 1 kmps and has two components - gravitational Einstein's and dynamic. In later analysis, Mohr reached smaller values and, as the first astronomer, expressed the hypothesis that K-term in fact does not exist. In 1937, Mohr published results of his research on proper motions of stars in Kapteyn Selected Areas to mag 16 in a paper *On the question of the possible rotation of the local cluster*. This paper proved the non-existence of contemporarily presumed subrotation of stars near the solar system.

In 1938, Mohr derived the new system of equations to solve the problem of determining the distance of the Sun from the centre of the Galaxy. In the paper *On the distance of the galactic centre,* there are still four unknown quantities, but by approximation, Mohr reached the limit of 10 kpcs.

After 1938, his scientific activities ceased[87], and he focused on teaching at the university. He lectured at both Charles University in Prague and Masaryk University in Brno, where he was proposed extraordinary professor and supervised the publication of his students. During the Nazi occupation, he worked with V. Guth, Fr. Link and B. Šternberk on the first edition of the outreach book *Astronomie*.

In 1938, Mohr was proposed as an extraordinary professor of astronomy[88] at Masaryk University. However, he had not acquired the title until 1946. In Brno, he

[87] From inteview with Pavel Mayer, Prague, Charles University, Astronomical Institute, 5 February 2015.

[88] Fond PrF 13 inv c 91

established the university astronomical institute.

In 1953, he returned to Prague to the Faculty of Mathematics and Physics as the Department of Astronomy and Meteorology director, where he remained until his retirement in 1975.

In retirement, he still worked as the editor in chief of the Říše hvězd magazine.

The minor planet 2971 Mohr is named in his honour.

9.34. Nechvíle Vincenc

Born: 20 March 1890

Died: 5 July 1964

Biography: In 1913, Nechvíle passed the qualification exam for teaching mathematics and physics at secondary schools and became an assistant at the Czech university observatory. In 1918, he took his Philosophiae doctor degree.

In 1920, Nechvíle began teaching at the Czechoslovak business academy in Prague and took the position of research worker at the Ondřejov observatory. He spent 1922-24 at the Paris observatory, where he exposed 22 plates of the same parts of the sky and by the same instrument as the Henry brothers in 1889-90, to study the proper motions of stars with a blink comparator.

In Paris, Nechvíle began to cooperate with J. W. Ritchey in California on calculations for the Ritchey-Chrétien telescope. In 1927 was awarded the Lalande Prize of Paris Academie des sciences.

Focusing on optics as his second field of research, he entered graduate studies at Institut d'Optique théoretique at appliqué in Paris in 1927. In June 1928, he acquired the

degree Docteur es sciences mathématiques, in October 1928 the degree ingénieur opticien.

Nechvíle returned to Prague in 1928 with the obtained plates to process and entered the State Observatory. From 1930, he lectured at the Faculty of Science of Charles University.

In 1931, he participated in the international observation project of minor planet Eros opposition and negotiated at the Leyden IAU general assembly. He measured Eros' positions with the telescope of Štefánik Observatory in Prague-Petřín. In the following years, Nechvíle revised the measurements and calculations of the minor planet's position for definitive orbit determination. His other research fields were solar and lunar parallax and calculation of velocity ellipsoid for proper motions of stars. In the late 30s, Nechvíle revised the definitive orbit determination of the Hassel comet (1939) and worked on its diameter of nuclei and coma determination.

In 1934-36, Nechvíle habilitated on astrophysics at the Faculty of Natural Science of the Charles University on basis of habilitation thesis *Théorie photométrique des éclipses de Lune* (published in *Bulletin astronomique de l'Observatoire de Paris*). He was appointed Privatdozent in November 1936. In the summer of 1939, he was appointed an extraordinary professor, but the appointment was not confirmed until the closure of Czech universities on 17 November 1939.

In 1938, Nechvíle acquired systemized position as State Observatory. When Otto Seydl was withdrawn from the Director of State Observatory position in 1942, Nechvíle became its manager. In the early 1940s, he began to focus on the apparent motion of stars and the determination of characteristic exponents for the periodic solution to the restricted three-body problem.

After 1945, Nechvíle was deputy director of the State Observatory and focused on definitive reduction of photographic observations of minor planet Eros, calculations of the proper motion of stars and orbit determination of the Finsler comet (1939).

After 1948, Nechvíle reduced his scientific activities due to health reasons but continued lecturing at Charles University.

Memberships: IAU (vice-president 1934; commission 24 for star parallaxes, commission 9 for optical instruments, commission 33 for stellar statistics, commission 34 solar parallax), Societé astronomique de France, Czechoslovak National Committee.

The minor planet (2936) Nechvíle and a street in Prague are named in his honour.

9.35. Nováková-Bednářová Bohumila

Born: 7 February 1904 Přistoupim u Českého Brodu

Died: 23 August 1985 Praha

Biography: She graduated from the Faculty of Science in 1926 and began working at Petřín observatory, which she co-founded.

She spent the years 1927-28 at the Arcetri observatory. There she gained her first experience with spectrohelioscopy.

In 1936, she joined the expedition to observe the solar eclipse at the Ural.

From 1936-38, she worked at the Stará Ďala observatory, where she constructed the first spectrohelioscope in Czechoslovakia and focused on researching solar rotation and solar spectrum.

After the evacuation of Stará Ďala, she worked at the Ondřejov observatory in

1938-40. During World War II, she was not allowed to work and had to stay at home. Afterwards, she returned to science.

In 1952, she was the founding member of the Geophysical Institute of the Czechoslovak Academy of Science. She shifted her focus to geophysics, particularly the relationship between geomagnetic fields and solar activity. She became one of the first solar observers who referred to the connection between magnetic storms and the disappearance of filaments.

9.36. Nušl František

Born: 3 December 1867 in Jindřichův Hradec

Died: 17 September 1951 in Prague

Biography: František Nušl was born in a family of whitesmiths. In 1879 to 1888, he attended the Gymnasium in Jindřichův Hradec. At that time, he underwent eye surgery for strabismus, which was unsuccessful. Nušl had to stop school and repeat the third grade; From then, he had blindness in his left eye.

During his studies at the Gymnasium, Nušl was influenced by his teachers of mathematics and physics, Schnöbl and Steinhauser, who organized evening classes and taught observation of celestial phenomena. Nušl made his first simple refractor telescope in his father's workshop, which he used to observe the Venus transit of 1882. He obtained an astronomical almanac for Vienna, observed occultations of stars by Moon and successfully calculated time deviation due to the different longitudes of Vienna and Jindřichův Hradec.

After he graduated in 1888, he enrolled on mathematics and physics at the Czech

Charles-Ferdinand University. At the beginning of the academic year 1889-90, his teacher August Seydler offered him the position of research assistant and accommodation at the Astronomical Institute. Nušl's job was the practical observation, mainly by transit instruments, and calculation of minor planets' orbits determination. He elaborated an essay about the effects of temperature and barometric pressure on the motion-work of the astronomical institute clock.

After finishing triennium in 1892-94, Nušl was an assistant to Professor Strouhal at the Institute of Physics. In 1893 Nušl passed the teacher qualification exams and in 1894 went to Hradec Králové to teach mathematics and physics as a substitute teacher and From 1897 as a teacher at Realschule. In 1901 to 1909, he taught at Realschule in Prague-Karlín. This relocation enabled broader cooperation with J. J. Frič (1861-1945), owner of precision mechanics workshop.

Nušl soon engaged in outreach science. He lectured on astronomy and wrote articles for various magazines and scientific journals. On school holidays, he focused on practical astronomy and astronomical instruments. In 1899, he worked with Professor Otto Knopf (1856-1945) at the Jena observatory.

At the turn of the century, Nušl began constructing an instrument that determines geographic latitude and longitude by the Gauss method.[89] He replaced the then used pair of scales with mercury horizon to acquire independence of measurement result on the measuring instrument constants. He published his results in paper *O novém hranolovém stroji ku pozorování stálých výšek* in 1901. Further refinement and construction of the new instrument brought Nušl to cooperation and a lifelong friendship with J. J. Frič.

[89] Gaussovou metodou stejných výšek

Nušl and Frič published subsequent development of the prism instrument that they named circumzenithal. Nušl constructed two more instruments based on mercury horizon and two specular planes: radiozenithal and diazenithal. To eliminate the observer error, they constructed an impersonal micrometre. In 1937 they presented the circumzenithal at *Exposition Internationale des Arts et Techniques dans la Vie Moderne* in Paris 1937 and acquired a golden medal. The instrument accuracy was up to 30 metres. It was used and experimented with by Czechoslovak Army. Still, its practical use was relatively small due to the international political situation, and due to rapid technological development in navigation, the instrument soon became obsolete.

This work brought Nušl and Frič to research on refraction anomalies and publication of hypothesis of refraction anomaly with more prolonged period and size of one arc second in paper *První studie o refrakčních anomáliích*. Other scientists soon confirmed the findings.

Nušl's relocation to Prague in 1901 enabled broader cooperation with Frič on the construction of his private observatory near Ondřejov village. In 1902, they built the first observation station for the first circumzenithal.

In 1905 Nušl acquired the degree of doctor of philosophy based on a dissertation on the inventor of lightning conductor *Prokop Diviš: Vylíčení jeho života a zásluh vědeckých (Prokop Diviš: A portrayal of his life and scientific merits)* (1899)

In 1905 he habilitated in practical astronomy and geometric optics at the Czech Charles-Ferdinand University. In 1908, he was appointed Professor of Mathematics at the Czech Technical University.

From 1910, he substituted for the ill Professor of Astronomy Gustav Gruss in practical astronomy lectures and practice. In 1925, the chair of astronomy was converted

to two chairs: theoretical astronomy and practical astronomy. Nušl was subsequently appointed the Professor of Practical Astronomy in 1926.

After the establishment of the independent Czechoslovak Republic, Nušl was appointed the administrator of the State Observatory in Clementinum. He began actively attending international conferences. In 1928, he organized the International Union for Geography and Geodesy meeting in Prague.

In 1938, Nušl was retired from both academia and the State Observatory. He continued living in Ondřejov No 60.

Nušl was the central persona of Czech professional and amateur astronomy community events. He was also an active guide of sea scouts, chorus singer of Prague choir Hlahol, and Maffia[90] member during World War I and Revolutionary National Assembly.

The minor planet 3425 Nušl, a crater on the far side of the Moon and the observatory of Jindřichův Hradec are named in his honour. The Czech astronomical society awarded the Nušl Price from 1938 to 1949 and renewed it in 1999.

Memberships: The Union of Czech Mathematicians And Physicists, Royal Bohemian Society of Sciences, Czech Academy of Sciences and Arts, International Astronomical Union (vice-president 1928-35, Czechoslovak National Committee delegate), Czech Astronomical Society (founder 1917, chair 1922-48, honorary chair), International Union of Geodesy and Geophysics (vice-president), Astronomische Gesellschaft.

[90] Centre of the First Czechoslovak Resistance.

Sources: (Jaroš 1951)

Portrait: ŘH 23/1942, No 10

9.37. Oppenheim Samuel

Born: 19 November 1857 in Brušperk

Died: 15 August 1928 in Vienna

Biography: Studied the secondary school in Těšín, then from 1875, mathematics, physics and astronomy at the University of Vienna. After military service on the Bosnia campaign, he passed the qualification exam for teaching in 1880 and undertook his probation year in Vienna. In 1881-87, he began observations at the Vienna Observatory (1882 guest, 1883 eléve, 1884 assistant). In 1884, he was awarded the degree of Doctor of Philosophy on basis of his work „*Über eine neue Integration der Differentialgleichungen der Planetenbewegung"*. From 1888, Oppenheim also worked as an observer at the private observatory of brewer Moriz von Kuffner (1854-1939) in Vienna. In 1889, he habilitated in theoretical astronomy at Vienna University.

In 1896, Oppenheim moved to Hostinné, where he taught astronomy at a grammar school.

In 1899, he went to Karlín near Prague, where he taught at a Realschule.

His venia legendi was renewed at the German Charles-Ferdinand University in 1900. In 1902, he was appointed the Titular ao. Professor.

In 1911, he was appointed professor at Vienna University and left Prague.

Memberships: Osterr. Akad. D. Wiss. (corresponding, 1921), Lotos (member 1899, substitute committee member 1903-04, committee member 1905-11, founding member and chairman of astronomical-physics section 1909-11, honorary 1912).

9.38. Oppolzer, Theodor von

Born: 26 October 1841 Prague

Died: 26 December 1886 Vienna

Biography: Born in the family of Johann von Oppolzer, a professor of medicine at universities in Prague, Leipzig and Vienna. He attended Piarist grammar school, graduated in 1850, and entered Vienna's university. By his parents' wishes, he studied medicine and astronomy. In 1865 he acquired the degree of Doctor of Medicine. In the same year, he married Coelestine Mautner von Markhof (1845-1923).

In 1862 he built a private observatory with a 7-inch refractor, one of the most prominent instruments in the contemporary Austrian-Hungarian Empire, in Josephstadt. He published more than seventy papers on orbit determination and ephemerids of minor planets and comets based partly on his observation. In 1868 he participated in the Austrian expedition to Aden to observe a solar eclipse, and in 1874 he observed the transit of Venus in Romania. He observed the transits of Mercury in 1868 and 1878 in his private observatory in Vienna.

Even though Oppolzer did not have a doctorate in philosophy and habilitation thesis, he habilitated for astronomy and higher geodesy at the University of Vienna in 1866. Based on his further work on orbit determination, he was appointed associate professor (1870) of astronomy and geodesy. He was promoted to titular full professor in

1875 and full Professor in 1878.

In 1870s von Oppolzer adverted to astronomical geodesy. He became comissioner of Europäische Gradmessung (1872) and chairman of k. k. Gradmessungsbüro.

In 1885 von Oppolzer presented his *Canon der Finsternisse*, which compiles solar and lunar eclipses from 1207 BC until 2161 AD and earned him international acknowledgement. Von Oppolzer spent the next two years revising it, and it was published posthumously in 1887.

He represented Austrian Empire at international meetings. In 1871 he was awarded doctorate honoris causa by Leiden University. In 1875 he was appointed the court councillor and, in 1886, elected the vice-president of the International Geodetic Association at the meeting of Internationale Erdmessung in Berlin. In 1884 he was awarded the French Legion of Honour.

The crater Oppolzer on the near side of the Moon and minor planet 1492 Oppolzer are named in his honour. His son Egon founded the astronomical observatory at Innsbruck. Asteroids 237 Coelestiona, 153 Hilda and 228 Agathe are named after his wife and daughters.

Memberships: Imperial Academy of Sciences of Vienna (1869 corresponding, 1882 full), Royal Astronomical Society (1874), French Academy of Sciences (1879), Bayerischen Akademie der Wissenschaften (1879), US National Academy of Sciences (1883), and Leopoldina (1885).

Primary sources:

Bibliography:

9.39. Pantoflíček Jaroslav

Born: 25 March 1875 Telč

Died: 10 January 1951 Telč

Biography: In 1892, after graduating cum laude at the Realgymnasium in Telč, he began studying at the Department of Civil Engineering of Czech Technical University in Prague. He passed the first state exam in 1894 and the second in 1900.

In 1897-98, he worked at the construction office Kepka a Čenský, then as a design engineer in a bridge-production plant in 1898. In 1898 to 1900, he worked as an assistant to the Chair of Water and Tunnel Engineering and Building Engineering Encyclopaedia at Czech Technical University.

In 1900-01, he worked as an engineer for the Plenkner Company in Prague. From 1901 to 1910, he worked as an engineer for the state construction service of Bohemia. His focus was sewerage of rivers Vltava and Labe and later river regulation.

From 1904 to 1905 and 1908-10, he substituted for Professor František Novotný (1864-1918) in the parallel lectures on higher and practical geodesy at Czech Technical University. In 1906, he was awarded the degree of Doctor of Technology based on his dissertation *Nová metoda počtu vyrovnávacího (New method of compensatory calculus)*.

In 1909, he habilitated at Czech Technical University, was appointed Privatdozent of Higher Geodesy, and established independent lectures on cartography. He began to focus on photogrammetry, concurring with professors Kořistka and Novotný. He developed the method of time-based photogrammetry to measure small movements and deformations. He ran the mechanical workshop of geodetic instruments, where he designed a special chamber for anthropological research.

In 1910, he was appointed extraordinary Professor of Higher and Practical Geodesy and Cartography and began to lecture with Professor Novotný. After Novotný died in 1918, he was given the directorship of the Department of Geodesy. In 1919, he was appointed full professor.

In 1913, he got the qualification of civil construction engineer and, in 1914, civil field surveyor.

During World War I, Pantoflíček was a member of Maffia, to which he provided reports on railways and weaponry. After 1918 he was appointed a member of the Czechoslovak delegation to the Paris Peace Conference, and in 1919, he organized and led the department of cartography. He prepared 102 maps and cartograms to inform the conference on the conditions of the new republic and negotiate its borders. Some of these maps were published. Having got to know the French military cartographic institute, he participated in the constitution of the Czech Military Cartographic Institute.

In 1919, he was appointed Professor of Practical and Higher Geodesy and Cartography.

Since 1920, Pantoflíček was a member of the state commission for geodesy and geophysics (later committee), and in 1922, he was sent as a delegate to the first general assembly of IUGG in Rome in 1922.

In 1935, the Atlas of the Czechoslovak Republic was published. Pantoflíček was its editor in chief. The work took nearly 14 years and 170 specialised workers to finish.

After World War II and the reopening of Czech colleges in 1945, he returned to lecturing but retired in 1946 and remained an examiner of practical geodesy until 1948.

Memberships: Royal Bohemian Society of Sciences (1924 associate, 1939 full), Czechoslovak National Science Committee (1924), Société Astronomique de France

(1926), IUGG (Commission for the Measurement of the Meridian from the Arctic Ocean to the Mediterranean Sea, 1934), International Society for Photogrammetry (1910), Masaryk Workers' Academy (member of scientific committee, president 1932-35, secretary of president 1929-32 and 1939-38).

Awards: Légion d'honneur (1928), Czechoslovak Revolution Medal.

9.40. Pollak Leo Wenzel

Born: 23 September 1888 in Prague

Died: 24 November 1964 in Dublin

Biography: He was born in the family of an editor. Studied cosmic physics at the German Charles-Ferdinand University from 1906 to 1910 as a pupil of Rudolf Spitaler.

Since autumn 1911, he worked at the Institute for Cosmic Physics (1911-1920 demonstrator, 1920-1929 assistant). In 1912, he defended his dissertation *Die Dauer und die Intensität des Sonnenscheins auf dem Donnersberge bei Mileschau* and began teaching at a girls' grammar school in Prague.

In 1922, Pollak habilitated at the German university. He soon focused on computation methods in climatology, including eliminating multiplying multi-digit number errors and searching for periodicity in data. In 1926, he published *Rechentafeln fü Harmonischem Analyse*.

In 1927, Pollak proposed using punch-card systems by James Powers and Herman Hollerith. In the same year, he published the first results in *Verwendung statistischer Maschinen in der Klimatologie.*

In 1927, Pollak was appointed an extraordinary Professor. After the retirement of Rudolf Spitaler in 1929, Pollak succeeded him as full professor of geophysics and director of Meteorological Observatory at Milešovka and the Geophysikalisches Institut (successor of Institut für kosmische Physik). In the academic year 1935/36, he was elected Dean of the Faculty of Science.

In April 1939, during the Nazi occupation of the Czechoslovak Republic, Pollak and his family emigrated to Ireland.

He soon continued his research. From 1939 to 1947, he worked as the Senior Meteorological Officer of the Irish State Meteorological Office. Then he was appointed the Senior Professor at the School of Cosmic Physics of the Institute of Advanced Studies in Dublin.

In 1955, Pollak organised the first symposium on condensation nuclei. He established the Dublin school of ice nuclei.

Pollak was member of the International Commission of Snow (Union Géodésique et Géophysique Internationale), Comité national Tchécoslovaque de Géodésie et Géophysique (Conseil national Tchécoslovaque des Recherches Prague), Czechoslovak Statistical Society (full), Österreichische Gesellschaft für Meteorologie in Vienna (corresponding and full), Lotos (committee member 1911-20, deputy of astronomical-physics section 1911-13, librarian 1911-16, secretary 1914-16).

9.41. Pračka Ladislav

Born: 27 March 1877 Malá Čermná

Died: 9 December 1922 Stratov

Biography: Studied at Czech university from 1895 to 1900. After graduating, he took the position of a substitute teacher at a secondary school at Valašské Meziříčí.

In 1904, he began working on his dissertation under Gustav Gruss and Vincenc Strouhal. After studying in Berlin and working in Potsdam, Pračka finished the dissertation and acquired the Doctor of Philosophy degree in 1905.

In 1905, he took the position of an observer at the private observatory of Karl Remeis in Bamberg. He focused on the observation of variables by spectrograph of his design. From 1908, he processed the Prague observation of variables by Vojtěch Šafařík, which he acquired from the Moscow University. He published them in 1909.

From 1910, he was a permanent referent of the *Astronomischer Jahresbericht*. From 1912, he participated on the *A.G. Katalog der veranderlichen Sterne*. He also cooperated with Recheninstitut Berlin.

From 1909-to 1911, Pračka returned to Nižbor and built his private observatory with a 5m dome and Merz refractor. Pračka equipped the building with a powerful diesel plant to provide electricity to the neighbourhood of Nová Huť. He overestimated his financial competence and soon had to sell the observatory and house.

In 1912, Pračka habilitated at the VUT Brno.

In 1914, he was called to arms in World War I. He was discharged due to ill health in 1916. Pračka and his family lived in Prague from 1916 to 1918 and then moved to Starov by Volyně, where Pračka died in 1922.

He is also known for publishing an appeal to establish a Czech astronomical society in *Živa* in 1913, arguing that there are similar societies abroad.

Memberships: Astronomische Gesellschaft, Royal Bohemian Society of Sciences (1913)

9.42. Prey Adalbert

Born: 16 October 1873 in Vienna

Died: 22 December 1949 in Vienna

Biography: Adalbert Johann Maria Prey was born in the Tirolean family of Judge Sigmund Prey and Ludovica Maria Julia Ruschitzka. He attended grammar school in Vienna from 1884-to 1992.

From 1892-to 1896, Prey studied mathematics, physics, and astronomy at Vienna under Samuel Oppenheim. In 1896, he acquired the degree of Doctor of Philosophy on basis of dissertation *Über Gestalt und Lage der Milchstraße*.

In 1896, Prey took the position of an assistant at a university observatory in Wien, where his responsibilities were the observation of pole motion and time service. In 1897, he passed the qualification exam for teaching mathematics and physics. He spent the year 1898 in military service. In 1899, he joined an expedition to observe Leonides in India.

After returning, he was appointed Adjunct of the Grandmessungbüro in 1900, where he worked until 1909. He studied at the Technische Hochschule from 1900 to 1901.[91] From 1902 he was a member of the Austrian grading bureau Commission.

In 1902, he habilitated for astronomy at the University of Vienna and in 1906 for astronomy and higher geodesy at the Technische Hochschule.

In 1909, he was invited to Innsbruck as the titular ao. Professor der Astronomie

[91] Personalakten des Prey Prof. Astronomie Wien Band I von 1938, R 4901-20261 Prey

(Lehrkanzel für Astronomie in Innsbruck) and director of observatory, in 1911 he was appointed full Professor. In 1910, he married Mathilde Lieb. Their children Siegmund and Irmgard were born in 1912 and 1916, respectively. During World War I, he was drafted.

In 1917, Prey was appointed the full Professor of Astronomy at the Deutsche Karls-Ferdinands Universität and director of the State Observatory. In 1923/24, he served as Dean of the Faculty of Natural Arts. From 1924 to 1926, he was also leading the Geographical Institute.

He focused entirely on theoretical astronomy, leading the research on the determination of the existence of a third body in the binary system 70 Ophiuchi.

In 1930, Prey left Prague for Wien, where he was appointed full Professor for Theoretical Astronomy as the successor of his tutor Samuel Oppenheim. He became examination commissioner for insurance (1931) and Realschule graduates (1934).

In 1939, he was retired and appointed the honorary Professor but continued giving lectures and substituting for the director of the observatory during World War II and the postwar period. In 1949, he published a textbook on spherical astronomy.

Memberships: Lotos (1934 corresponding), Austrian Academy of Sciences (1929[92] corresponding, 1930 domestic, 1935 full, 1945-49 secretary of math.-natur. Section), Astronomische Gesellschaft, German Geophysical Society, Austrian Mathematical Society, International Society for Photogrammetry and Remote Sensing, president of the Austrian Committee for International Geodetic Survey.

The system 70 Ophiuchi/Prey's Stern and minor planet 6157 Prey are named in

[92] 1924 in **R 4901-20261 Prey**

his honour.

9.43. Rajchl Rostislav

Born: 1 January 1910

Died: 1987

Biography: Worked at the university Astronomical Institute from 1929 to 1932 as a demonstrator, from 1932 as an assistant. In 1934, he acquired the rerum naturalium doctor degree and passed the state exam on mathematical statistics and actuarial mathematics.

Due to a lack of positions in astronomy, he worked in the former ministry of national defence outreach service until 1940, when he relocated to the Ondřejov observatory. In the same year, he got married.

In 1942, Rajchl was arrested for his activity in the Resistance and sent to the concentration camp Zwittau for six years.

9.44. Rosický Václav

Born: 28 October 1850 Prague

Died: 8 February 1926 Nechvalice u Sedlčan

Biography: After graduating from the Piarist grammar school in Prague, Rosický entered Prague university in 1872. In 1877 he acquired the Doctor of Philosophy degree, and in 1878 he passed the teacher qualification exams for Physics and Mathematics.

He was the assistant of Ernst Mach at the Physical Institute in 1874-78 and assistant of the State Observatory in 1878-84.

From 1884, he taught at a grammar school in Prague Old Town.

9.45. Schaub Werner

Born: 27 April 1901 Ferndorf

Died: 14 September 1959 Ferndorf

Biography: He was born in Ferndorf, Siegen, Germany, in the family of the factory owner Oscar Schaub. He attended schools in Kreuztal and Hamm, where he graduated in 1920. Afterwards, he studied astronomy, mathematics and theoretical physics at Bonn and München; he also shortly studied engineering at Technische Hochschule of Hannover. In April 1927, he entered the Bonn University Observatory as an extraordinary assistant to Professor Küstner. In June of the same year, he was promoted Doctor of Philosophy following his dissertation *Die Polhöhe von Bonn und das Dektinationssystem der Bonn P. G. C*.

Then he focused on determination of solar parallax by radial velocities. He published the results in Veröffentlichungen des Astronomisches Institute der Universität Bonn in 1930. He also participated on observation for the Katalog der Astronomischen Gesellschaft.

In 1930, he took the position of the second assistant at the observatory of Leipzig University under Professor Josef Hopmann (1890-1975). He remained until 1936, but in 1935, he took a vacation from this position to work at the Askania factory as a research worker.

In 1936, Schaub took the position of an observer at the Copernicus Institut in Berlin, which was vacated when extraordinary Professor Otto Neugebauer (1899-1990) was removed from office after refusing to sign the oath of loyalty to Hitler in 1933. Schaub was awarded the title of Dr. Phil. habilitatius on the basis of *Spektralphotometrische Untersuchungen an Zeta Aurigae. I. Kurzperiodische Änderungen der Helligkeit und des Gradientes* in 1936. Schaub constructed the spectrograph of the Berlin observatory and began focusing on spectral analysis. From 1936 to 1939, he processed the measurements of FK3 catalogue star positions and proper motions near the north and south poles. From 1937, he was the Associate Professor of Astronomy at the University of Berlin. In 1938-39, Schaub was entrusted with publishing the Berlin astronomical almanac (formerly published in Kiel) with the help of a full assistant, arithmetician, civil servant and designer.

After the beginning of World War II, Schaub was drafted into Wehrmacht. Shortly after, he fell ill and healed in Berlin military hospital. In September 1939, he was appointed the director of Astronomische Institut and Professor of Astronomy at the Deutsche Universität zu Prag.

Schaub came to Prague in November 1939 and assumed the institute from its receiver in January 1940. In 1943, he obtained the occupation order for the observatory in Ondřejov, and he relocated there in 1944. During his stay in Prague, Schaub wrote several papers on binaries and an unpublished textbook on spherical astronomy.

In May 1945, during the Prague Uprising, Schaub left the observatory after several arguments with Czech subordinates. The U.S. Army later arrested him. He managed to get away from prison, and by August 1945, he reached Ferndorf. For the following 13 years, he was not officially employed. He gave lectures at the local

astronomical society and built a small observatory.

In 1950, he published *Vorlesungen über sphärische Astronomie* that focus on coordinate systems. In 1958, Schaub got an extraordinary civil service position a year before his death.

9.46. Scheller Arthur

Born: 3 May 1876 Prostějov

Died: 23 September 1929 Innsbruck

Biography: Arthur Scheller was born in the family of a director of the Realschule in Prostějov. He attended the grammar schools in Olomouc and Brno. In 1893 entered the Faculty of Arts of the German Charles-Ferdinand University and studied mathematics, physics and astronomy. In 1899, he defended his dissertation *Definitive Bahnbestimmung des Kometen 1845 II (de Vico)* and was promoted Doctor of Philosophy.

In 1897, he was appointed assistant of the State Observatory in Prague. From 1898 to 1902, he worked as a scientific labourer at the Hamburg Observatory.

Scheller returned to State Observatory Prague as an Adjunct in 1902. In 1909, he habilitated for astrophysics at the university based on his work *Rotationsdauer der Sonne*. In 1912 and 1913, he travelled to the Lesina (today Hvar) island to obtain photographic observations. After Professor Weinek died in 1913, Scheller was in charge of the Astronomical institute and observatory for seven terms until 1917.

In 1918, Scheller was appointed extraordinary professor at the University of Innsbruck as the successor of Adalbert Prey, who became a full professor in Prague. In

1925, Scheller was appointed full professor.

From 1920, Scheller suffered from eye disease; therefore, he retired in 1929.

9.47. Seydl Otto

Born: 5 May 1884 Merklín u Přeštic

Died: 15 February 1959

Biography: He was born in the family of master builder Emanuel Seydl. He attended the primary school and Realschule in Přeštice, and Volksschule in Plzeň. He graduated in 1903. From 1903 to 1904, he studied at Czech Technical University, in 1904-07 at the Faculty of Arts of the Czech Charles-Ferdinand-University. In 1908, he passed the qualification exams for teaching Physics and Mathematics at secondary schools; in 1913, he extended his teaching qualification with merchant arithmetic for business academies.

From 1909 to 1920, he taught at Czech Business Academy in České Budějovice. After World War I broke out, Seydl was mobilized in 1915, but being a teacher, he eventually did not enlist and returned to České Budějovice.

At the beginning of 1921, he was assigned to the State Observatory by its manager František Nušl. Seydl attended to the time service and regular meteorological and magnetic observations. He gradually began to lead the library, exchange scientific publications and almost the whole administration. He substituted Nušl, who spent most of the working week at the Ondřejov observatory. From 1936, Seydl was responsible for

the financial administration of the Ondřejov observatory.[93]

In the first years of the new Czechoslovak Republic, a law change was passed, enabling Seydl to be admitted to Rigorosum as a Realschule graduate. Seydl studies astronomy as the Faculty of Science of Charles University for two terms. In 1924, he was awarded the title of Doctor rerum naturalium on the basis of dissertation *Rozdělení stálic velikosti 6,5 a jasnějších katalogu Harvard Revised Photometry v soustavě souřadnic galaktických* supervised by Václav Láska. He then focused on stellar statistics and promoted galactic coordinates, in which he published two atlases.

In 1930, Seydl organized the archive of the State Observatory in Clementinum, which dated back to 1775, and began to focus on the history of Czechoslovak astronomy, mainly the first century of existence of the State Observatory (founded in 1751). Seydl's bibliography numbers about twenty publications only on the history of State Observatory and shows his extensive and precise research of primary sources.

After Nušl's retirement in 1938, Seydl was appointed manager of the State Observatory. During the Nazi occupation of the Czechoslovak Republic, Seydl was labelled a „politically undesirable“ person and deposed but remained an observatory employee (Šternberk 1959).[94] After World War II, Seydl returned to his previous position. In 1947, he was appointed the director.[95] In 1948 Seydl, „reaching the age limit“, was mandatorily retired[96] and removed from public life, even though he simultaneously acquired the state and national reliability certificate.[97]

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[93] Pozůstalost Otty Seydla.

[94] Seydlův syn Otto Seydl, který v roce 1939 začal studovat na ČVUT, byl 17. 11. 1939 zatčen gestapem a do 11. 1. 1940 vězněn v koncentračním táboře Sachsenhausen.

[95] Pozůstalost Otty Seydla.

[96] Pozůstalost Otty Seydla.

[97] Pozůstalost Otty Seydla, Osvědčení Obvodní rady pro Prahu XII ze 14. 6. 1948

His sixtieth birthday was announced by an article (Šternberk 1944) in the Czech astronomical community magazine *Říše hvězd*, but there was no mention of his next anniversary. Only *Meteorologické zprávy* mentioned his birthday.

Otto Seydl continued his scientific work; he attended the State Observatory library and archive[98] and published several papers on the history of science. In 1952, he was asked to outline the history of astronomy in the Czech lands for an official report for the Czechoslovak Academy of Sciences foundation committee and invited to the working group to study the history of technology at the historical department of the Czechoslovak-Soviet Institute. From 1955-to 58, he was employed at the Hydrometeorological Institute in Prague.[99]

All his life, he was interested in science outreach. From 1926-to 34, he was the editor of *Říše hvězd*. He translated many scientific papers and books into Czech.

Next to astronomy, he was a musician - he played violin at string quartet - and a devoted member of Freemasonry.

Memberships: The History of Science Society, Royal Bohemian Society of Sciences (associate member 1938), International Astronomical Union, Académie Internationale d'Histoire des Sciences (corresponding).

9.48. Seydler August

Born: 1 June 1849 in Žamberk

Died: 22 July 1891 in Prague

[98] Pozůstalost Otty Seydla.
[99] Pozůstalost Otty Seydla.

Biography: He was born Augustin Jan Bedřich Seydler, the youngest of four children of the Financial Guard Inspector Jan N. Seydler and his wife Antonie, née Suková. One year after August was born, his father was relocated to Prague, and the whole family moved with him. August attended school there and went to Piarist Gymnasium in New Town Prague, where forty years ago, Franz Ignatz Cassian Hallaschka had built the second Prague observatory. In 1867 S. graduated cum laude, entered the Faculty of Arts of Charles University and studied mathematics and physics. He also learned French, Italian and English.

In the academic year 1868/69, he worked at the physical laboratory of Professor Ernst Mach (1838-1916). In the following year, he joined Professor Karl Hornstein (1824-84) at the State Observatory in Clementinum. After graduating from the triennium, he acquired the assistant position at the observatory for the next two years. He remained there until 1882, from 1872, as an Adjunct.

In 1867, Seydler joined the Union of Czech Mathematicians, which was then a student association. In 1868, he was elected to the Union's executive. S. also lectured in the renowned American Ladies Club of Vojta Náprstek (1826-1894) and, in 1871, published in the journal of the German scientific association Lotos on the expected Venus transit.

In 1870, S. published a new method for minor planets orbit determination *Nový způsob, kterým lze vypočítati dráhy oběžnic* in its first *Zprávy*. This method did not spread widely, as it is more suitable for today's computers than for the logarithmic calculations standard of that time.

At the State Observatory, S. made most magnetic and meteorological observations. He revised and processed many meteorological data from 1860-66 and

elaborated supplementary tables for the Prague observatory *Astronomische Hilfstafeln für die Prager Sternwarte I. Abtheilung*.

During his assistantship at the State Observatory Seydler acquired the degree of philosophiae doctor on 6 December 1871. His dissertation *Beobachtungen über einige Sätze der Wärmelehre* focused on thermals.

In 1872, Seydler habilitated for mathematical physics at the Charles-Ferdinand University on basis of works O *některých větách mechanické teorie tepla, Nový způsob, jak lze vypočítati dráhy oběžnic* and *Několik pojednání astronomických*. He was one of the first academics who lectured in Czech language. Seydler created the Czech terminology for theoretic astronomy and wrote two extensive textbooks on theoretical physics *Základové theoretické fysiky I* and *II* (1880, 1885 respectively).

In 1876, S. married Anna Weyrová (1855-1884), daughter of František Weyr. The family lived in villa Osvěta with family of T. G. Masaryk. Together with Masaryk, Seydler found scientific engagement in the debate on the manuscripts of Dvůr Králové and Zelená Hora. S. provided mathematical evidence against their authenticity.

In 1881, Seydler was appointed the Extraordinary Professor of Theoretical Physics and left the observatory. After splitting the university in 1882, Seydler went to the Czech Charles-Ferdinand University. In 1885, he was appointed the full professor of mathematical physics and theoretical astronomy. Seydler made efforts to establish a department of astronomy with its observatory and to split his professorship.

In 1884 Seydler published *New forms of the integrals of the two and three-body problem* and later extended the problem to four bodies (Seydler 1884a; 1884b). In 1888, S. published his method of solving the Kepler problem suitable for logarithmic computations.

Along with his students, Seydler computed the orbits of many minor planets, including 106 Dione, 266 Aline, 281 Lucretia, 146 Asporina and 275 Sapientia, and the final determinations of three comets, including 1870 I and 1890 II.

From the 1870s, Seydler had suffered from tuberculosis and from the late 1880s spent a part of every year on treatment.

Memberships: Union of Czech Mathematicians and Physicists (honorary, 1884), Royal Bohemian Society of Sciences (associate 1880, full 1890), Czech Academy of Sciences, Literature and Arts, category II (1890), Lotos (full 1873-79), Kaiserlich Leopoldinisch-Carolinische Akademie der Naturforscher, Astronomischen Gesellschaft zu Leipzig, and many patriotic and philanthropic associations. The minor planer 6586 was named Seydler in his honour.

9.49. Slouka Hubert

Born: 6 February 1903 Brno

Died: 14 September 1973 Prague

Biography: After graduating from Charles University, he worked at the Astronomical Institute of the Charles University from 1928-29 as a demonstrator, in 1929-31 temporary assistant, 1931-35 as an assistant. In 1935, he acquired a doctoral degree. He got married the same year. In 1931, he was awarded the degree of doctor rerum naturalium.

In 1935, he took a position at the State Observatory in Prague. During World War II, S. served time in prison for blackmail. After the war, S. went to trial for collaboration with the Nazi regime, which made him a controversial persona among the

astronomy community.

After World War II, Slouka focused on astronomy outreach and became a talented lecturer and author. In 1945, he co-established the Czech Astronomical Society in Valašské Meziříčí 1945.

From 1948, he was editor of *Říše hvězd*, but during political changes of the 1950s, he was removed from editorship in 1953 and the draft committee in 1954.

In the 1950s, he played a significant role in building the new Prague-Ďáblice Observatory and acquiring its first telescope. Later he established courses for demonstrators at both Ďáblice and Petřín observatories. He also co-initiated the joining of Ďáblice and Petřín observatories in 1969.

He was well known for outreach books on astronomy, of which most popular were *Pohledy do nebe* and *Zářící vesmír*, and for co-authorship of the exhibition Kepler and Prague (Kepler a Praha) in 1971. He was awarded the medal issued for the 400th anniversary of Johannes Kepler's birth for this contribution.

After retirement, he worked at the Ďáblice Observatory until his illness and death.

The minor planet 3423 Slouka is named in his honour.

9.50. Spitaler Rudolf Ferdinand

Born: 7 January 1865 Bleiberg

Died: 19 October 1946 Lübthern

Biography: After graduating the grammar school in Villach (Graz), he entered Vienna University in 1879. He acquired the doctoral degree in 1884 on the basis of the

dissertation *Die Warmeverteilung auf der Erdoberfläche* (*Distribution of heat on the surface of Earth*).

From 1884 to 1892, Spitaler worked at the Vienna Observatory. With its 27-inch refractor, Spitaler discovered several comets (including 1890 VII alias 113P/Spitaler), 55 galaxies and nine star clusters and began to engage in astrophotography.

From 1893 to 1901, Spitaler worked as an Adjunct at the Prague State Observatory in Clementinum. He participated in the international project on pole height measurements and began focusing on the new field of astrophysics, including the properties of planets and interstellar matter.

In 1895, Spitaler habilitated for cosmic physics at the German Charles-Ferdinand University. In 1901, he habilitated in meteorology and climatology; in 1908, he was appointed full professor. In 1908, he established the Institut für kosmische Physik and became its director. In 1916/17, he served as the Dean of the Faculty of Arts.

In 1895 to 1901, Spitaler was guest lecturer at the Deutsche Technische Hochschule in Prag. In 1908, he was appointed the honorary associate professor of climatology and meteorology.

In the early 1900s, Spitaler led the scientific committee for building a meteorological observatory at Milešovka. The observatory was finished in 1904. On 1 January 1905, Spitaler inaugurated its continuous meteorological observations. S. was actively involved in creating the network of meteorological stations and central institutes (i.e. in Washington, London, Paris and St. Petersburg) that collected, processed and published data on observed phenomena.

Spitaler's book *Das Klima des Eiszeitalters* (Spitaler 1921) contributed to the discussion about the origination of Earth's glacial periods. The discussion resulted in the

theory of Milanković cycles.

In 1929 Spitaler retired but continued to publish on climatology and geophysics, including the influence of air fluctuation on the Earth axis, distribution of air temperature and pressure and causation of glacial periods.

After the war, Spitaler was expulsed from Czechoslovakia and died in 1946 in the Soviet occupation zone.

Memberships: Staatsprüfungskommission für das Lehramt an land- und forstwirtschaftlichen Schulen (German section), Deutschen Gesellschaft der Wissenschaften und Künste für die Tschechoslowakische Republik, Lotos (committee member 1900-13, deputy chairman 1903-09, chairman 1910-12), Gesellschaft für Erdkunde zu Berlin (corresponding), Zentralanstalt für Meteorologie und Geodynamik in Vienna (corresponding), Astronomische Gesellschaft, Deutsche Geophysikalische Gesellschaft.

9.51. Studnička František Josef

Born: 27 June 1836 in Janov

Died: 21 February 1903

Biography: František Josef Studnička (1836-1903) was an essential personality of the Czech patriotic scholar community in the second half of the 19th century.

Studnička went to grammar school in Jindřichův Hradec and then, in 1857, entered the Philosophical Faculty of Vienna University. He acquired both qualifications for teaching physics and mathematics in German and the Doctor of Philosophy title in 1861.

Afterwards, he returned to Janov and worked as a private teacher for the following year. In 1862, he was appointed substitute teacher at a German grammar school in České Budějovice.

In 1864, Studnička was released from the teaching position and considered applying for a university position in Prague. He won the Associate Professorship of Higher Mathematics and Analytical Mechaniccompetition at Prague Polytechnic Institute. Studnička substituted for ill Professor G. Skřivan until 1866 when Skřivan died, and Studnička was appointed the full professor of Mathematics. When The Polytechnic Institute in Prague was split in 1869, Studnička joined the Czech Polytechnic Institute. He worked there until 1871 and served as dean three times.

In 1871, Studnička transferred to the bilingual Charles-Ferdinand University for the recently vacated position of Professor of Mathematics. The university split in 1882, and Studnička joined the Czech Charles-Ferdinand University. He was elected the first Dean of the Faculty of Arts only five weeks later. In 1888/89, he served as rector.

At the university, Studnička was opposed by the younger generation of Czech academics for his concept of natural science education, which prioritised thorough basic knowledge of mathematics and physics, which meant there was a shortage of time for specialised parts of these fields. This was probably one of the reasons why Studnička's focus shifted towards astronomy and outside the university.

Outreach science was Studnička's interest from his studies in Vienna when he worked as an editor in the *Dunaj* almanac and wrote his first outreach science article. When Studnička taught in České Budějovice, he gave a series of outreach lectures and wrote articles on science for regional magazines. In Prague, he became an active member of many Czech scientific associations and the community around Vojta

Náprstek, interested in education and culture. Studnička often gave public lectures for these societies. Some of these lectures were later published. In 1878, he published the *Astronomical Dialogues for Leisure (Zábavy hvězdářské)*. One copy was given to his close friend Vojtěch Náprstek with a personal dedication. Studnička had literary ambitions as well; his most well-known fiction is satire sci-fi *Hvězdomír Blankytný of Moon* (*Luňan Hvězdomír Blankytný*), published in 1892 under the pseudonym Pravomil Čech. Studnička published critical editions of manuscripts on astrology by the famous Danish astronomer Tycho Brahe (1546-1601), who spent his last years in Prague; and other manuscripts from University Library were then accredited to Brahe. Studnička also helped organise the dignified celebration of Brahe's 400th death anniversary and initiated a search for his tomb in the Church of Our Lady before Týn and its exploration and examination of Brahe's remains by Professor Matiegka.

Studnička was also interested in women's education; in the early 1860s, his two essential articles that advocated women's rights to higher education were published in Budweiser Kreisblatt. The establishment of the American Ladies Club followed his first public lecture on astronomy for the female audience. He played a significant role in establishing Minerva (1890), the first Czech grammar school for women.

Studnička retired in 1903 due to deteriorating health and eyesight.

In his memory, the minor planer 5552 discovered in 1982 by Czech astronomer A. Mrkos at the Kleť Observatory was named „Studnička“.

Memberships: Imperial Geographical Society in Vienna (1860), The Union Of Czech Mathematicians And Physicists (honorary, 1870), Royal Bohemian Society Of Sciences (1871), Société Royale des Sciences de Liege (corresponding, 1880), Czech Academy for Sciences, Literature and Art (1890), Deutsche Mathematiker-Vereinigung,

Société mathematique de France (foreign), Circolo matematico di Palermo, Moscow Mathematical Society at the Moscow University (active), International Association for Promoting the Study of Quaternions and Allied Systems of Mathematics for Austria-Hungary (secretary), Museum of Czech Kingdom.

9.52. Stratonov Vševolod Viktorovič

Born: 1869 Odessa

Died: 6 July 1938 Prague

Biography: Born in the family of a classical grammar school principal, he studied at grammar school in Yekaterinodar and graduated cum laude. Then he entered the Faculty of Science of Odessa University. He graduated with a gold medal and doctoral degree. His dissertation „Transit Circle and determination of geographic coordinates“.

From 1891 to 1892, he worked at the Odessa University Astronomical Observatory from 1893 to 1895 at the astrophysical laboratory of the Pulkovo Astronomical Observatory. In 1895, he came to the Tashkent Astronomical Observatory, where he stayed until 1905. He led the local astrophysical laboratory and astrophotography, including solar faculae movements and sun rotation. Stratonov discovered that the layers of the solar atmosphere had different rotation laws, and solar faculae systematically moved around meridians. He did the first distribution of telescopic stars in the southern hemisphere and determined the local start cluster that included the Sun. He studied the dark regions of the Milky Way galaxy and determined it was caused by absorption in interstellar dust. He discovered several nebulae and

participated in military geodetic research.

In 1905, an eye disease forced Stratonov to leave astronomical research. He took the job of associate director at the tsarist directorate, which included the direction of a district inhabited by Caucasian highlanders. He organised the polytechnic universities of Tbilisi and taught astronomy at local girls' school. From 1911, he had been the head of the State Bank of the Russian Empire. After the revolution and disestablishment of the State Bank in 1917, Stratonov was awarded a full professorship at the Moscow State University and returned to astronomy research and education.

In 1920, Stratonov founded the Main State Astrophysical Observatory, planning to establish a network of branch astrophysical observatories from Odessa meridian to Vladivostok meridian. He also controlled the establishment of the new Turkestan People's University, being its Dean of the Faculty of Science and an honorary member of the Faculty of Medicine. From 1918-to 20, Stratonov was a scientific counsellor at the national commissariat of education. He led the scientific publishing house for the whole of Soviet Russia. From 1919 to 1922, he was head of the department of mathematics and physics of the Moscow State Library. From 1920 to 1922, he overlooked the meteorological and hydrometric ameliorative research in fourteen Upper Volga Region districts.

After organising a strike at the Moscow State University, Stratonov was forced to emigrate from USSR on his expenditure in 1922. He left by one of the *Philosophers' ships*. For a short time, he settled in Berlin, where he and his colleagues founded the Russian Scientific Institute, intended for both scientific research and education. Stratonov was engaged as the dean of its research department.

In 1924, Stratonov moved to Prague, invited by prof. Novgorodcev. In 1924, he

began lecturing at the Czech Technical University and the new Russian National University of Prague. From 1936, he lectured at the Faculty of Nature of Charles University. Apart from these engagements, Stratonov gave public lectures in Prague (incl. *Zbraslav Fridays*) and other regions of the Czechoslovak Republic and was invited abroad. From 1905 he focused on writing astronomy outreach; his most famous and appreciated books published in Russia were *The Sun* (*Solntse*, 1909) and *Stars* (*Zvezdy*, 1918). In 1927, Stratonov published the first edition of *Astronomy* (*Astronomie*). Two years later, its German translation was published.

In 1938, he acquired the extraordinary professorship of descriptive and practical astronomy at the Czech Technical University.

9.53. Svoboda Jindřich

Born: 13 July 1884 Volyně

Died: 12 May 1941 Prague

Biography: Svoboda graduated from the grammar school in Písek and entered the Faculty of Arts of the Czech Charles-Ferdinand University.

Svoboda acquired a degree of Doctor of Philosophy in 1908 based on work *Bahnelemente des Planeten 1906/601*.

He shortly taught at a grammar school and soon became assistant of František Nušl at the Czech Technical University, but mostly worked at the observatory of the Frič brothers.

In 1911 he habilitated in astronomy. In 1912 he was appointed extraordinary and, in 1924, full professor of mathematics and astronomy. He served three times as dean of

the High School of Special Sciences of the Czech Technical University, in the academic year 1935/36 as rector of the university.

In 1921 he married Jiřina Joštová.

Svoboda published two essential university textbooks: *Sférická astronomie* (*Spherical astronomy*, 1924) and *Optika geometrická* (*Geometrical optics*, 1930). His astronomical instruments won diplomas at international exhibitions in Paris in 1935 and 1937.

After the Nazi occupation of Czechoslovakia, Svoboda and his wife joined the resistance and were arrested in June 1940. After being released from prison, Svoboda fell sick and died shortly after.

Svoboda was member of Astronomische Gesellschaft (honorary), Société astronomique de France (honorary),

Awarded the degree of Officier of the Ordre national de la Légion d'honneur

The minor planet 2559 Svoboda is named in his honour.

9.54. Šafařík Vojtěch

Born: 26 October 1829 Novi Sad

Died: 2 July 1902 Prague

Biography: Czech chemist and astronomer. In 1882, he was appointed the first Professor of Chemistry at the Czech university. In the late 1880s, he began focusing on astronomy. He influenced Josef and Jan Frič, who built his private observatory.

A crater on the far side of the Moon and minor planet 8336 Šafařík are named in his honour.

9.55. Šafaříková Paulina

Born: 11 April 1836 Prague

Died: 30 March 1920 Prague

Biography: Born Paulina Králová in the family of a secondary school teacher of Latin and Greek, Andreas Král and Vincentie Kallinová. As a woman in the mid-19th century, she could not attend a secondary school and was taught by her father and self-taught. She spent her youth in Jindřichův Hradec with her grandparents and then moved to Prague to care for her parents. After their deaths, she took the position of librarian and interpreter at the American Ladies Clubs.

After marrying university professor of chemistry Vojtěch Šafařík in 1880, Paula bought a block of houses at Vinohrady and established a private observatory. The couple were dedicated amateur astronomers who made their instruments.

After Vojtěch's death, she donated his instruments and library to the observatory of the Frič brothers.

She was a founding member of the Czech Astronomical Society in 1917.

9.56. Smetana Josef František

Born: 11 March 1801 Svinišťany

Died: 18 February 1861 Plzeň

Biography: Born in a gardener’s family, he was a cousin of composer Bedřich Smetana. Studied at a grammar school in Hradec Králové, then entered the Faculty of

Arts of the Charles-Ferdinand University in 1919. In 1823 he entered the Order of Canons Regular of Prémontré. In 1826 he graduated in theology and was ordained to be a priest. From 1828 to 1929, he studied Physics at the University of Vienna.

In 1829-31 he was a chaplain in Úterý u Bezdružic. In 1831 he was teaching physics and Czech at grammar school in Plzeň. He engaged in patriotic activities, founded a Czech public library and lectured at Sunday technical school for artisans.

Simultaneously he studied astronomy, history and philology in Prague. In 1834 he acquired a doctoral degree at the Prague university and passed the teacher qualification exams.

In his book *Základové hvězdosloví čili astronomie* (*The Fundamentals of astronomy*, 1837), he laid the foundations for future Czech astronomical terminology. He was considered the most distinctive Czech national revivalist of his time.

Primary sources:

Bibliography:

9.57. Stepling Joseph

Born: 29 June 1716 Regensburg

Died: 11 July 1778 Prague

Biography: Attended Society of Jesus school and private lessons. In 1733 he entered the Society of Jesus and began studies in Olomouc, Kłodzko and Prague. In 1743 he graduated in theology.

After consecration, Stepling lectured physics and mathematics and was appointed professor of geometry and calculus in 1748, but left the position because of

refusing to teach Aristotelian physics.

In 1751 Stepling became the first director of the newly built modern observatory in Clementinum built on his instigation and began the Clemetinum meteorological observations. In 1752 he was appointed director of studies in mathematics and experimental physics.

After reforms of education in 1753 that enabled teaching modern physics, Stepling returned to the position of director of mathematics and physics studies.

After the Society of Jesus dissolution in 1773, Stepling stayed at the university and led the observatory as Astronomius Regius. In 1777 he left the position of the director of the observatory.

In 1770 Stepling co-founded the Czech Learned Society.

Primary sources:

Vydra, S.: Vita Josephi Stepling. 1778.

Kolomý, R.: Josef Stepling - matematik, fyzik a astronom. Matematika a fyzika ve škole. 9 (1978-79), str. 293-296.

Jáchym, F.: Josef Stepling a jeho doba. Matematika, fyzika, informatika. 7 (1997-98), str. 631-633.

9.58. Strnad Antonín

Born: 10 August 1746 Náchod

Died: 23 September 1799 Sazená u Velvar

Biography: Studied at grammar school in Hradec Králové and entered the

Society of Jesus in 1763. After the dissolution of the Society of Jesus in 1773 left the Church and focused entirely on mathematics and physics. In 1774 he was appointed the State Observatory adjunct, and in 1778, the Professor of Mathematics and Physics at the Charles-Ferdinand University. In 1781 he became the director of the observatory and Professor of Astronomy. In 1792 he served as the Dean of the philosophical faculty and in 1795 as the rector of the university.

In 1775 Strnad began regular meteorological observations in the Clementinum. Until this year, the measurements were irregular. He designed and participated in the reconstruction of the Prague Astronomical Clock in 1787-91.

In the Czech National Revival era, Strnad publicly claimed Czech nationality, and he was the secretary of the Czech Learned Society. Strahov Monastery bought his library.

9.59. Štefánik Milan Rastislav

Born: 21 June 1880 Košariská

Died: 4 May 1919 Ivánka pri Dunaji

Biography: In 1899–1901, he studied at the Czech Technical University, but soon continued at Charles University in Prague. He studied in 1901–1904 at the Astronomical Institute. In 1904, Štefánik came to Paris with a recommendation letter for Jules Janssen and began working at the Meudon Observatory. In the following years, he made several climbs to Janssen's Observatory on Mount Blanc, which were physically challenging and took many days. His main task was making observations of the Sun. From 1905 he participated in solar eclipse expeditions. Together with Russian

astronomer Alexis Hansky, he improved the spectrohelioscope. Štefánik stayed at the Meudon observatory until Janssen's death in 1907.

In 1910, when Halley's comet approached Earth, Štefánik was sent to Tahiti by Bureau des longitudes and Bureau central météorologique to observe the Halley comet transit[100] in May 1910 and took meteorological observations as well. Then he stayed at Vavau island until the solar eclipse of 28 April 1911 and built an observatory there. As Tahiti was a French colony and France planned to organize a system of radio stations in this area, Štefánik received his first diplomatic assignment to earn the island of Florian from the Equador government for French administration. In 1913 Štefánik came to Ecuador, helped with the improvement of the Quito observatory, and built the system of meteorological and télégraphie sans fil stations in Ecuador. The project was not finished due to political changes in France and the outbreak of the First World War.

Štefánik, as a French citizen, joined a regiment, and his career as an astronomer was temporarily suspended. His military career began with training at the Air Force School in Chartres in 1915 and reconnaissance flights in Serbia. Since 1916, Stefanik organized the Czechoslovak legions on the French and Italian fronts. Štefánik rose quickly in rank until he became general of Air Forces. In 1915 Štefánik joined the Czechoslovak resistance in Paris. By 1916, he was one of the most important members. Together with the future first President of Czechoslovakia, Tomáš Garrigue Masaryk, and the future second President of Czechoslovakia, Edvard Beneš, Štefánik co-founded the Czechoslovak National Council that later became the basis of the new Czechoslovak government. In 1916-17, Štefánik established the Czechoslovak army in Russia and the

[100] Comet cores are too small for any comet transit to be observable.

USA (Rajchl 2013). After the war, Štefánik's political status and future were unclear. He was appointed the Minister of Warfare in the first provisional government of the new republic. His ministerial influence gradually declined, as his agenda was oriented abroad and closely related to Czechoslovak legions. In 1919, Štefánik was returning to Czechoslovakia when his aeroplane crashed on landing, resulting in Štefánik's death. In his homeland, Štefánik was virtually unknown (Rajchl 2013), and his unexpected death made him a newly discovered national hero, resulting in many memorials and statues in Czechoslovakia. His memorial statues still stand in Bratislava, Paris-Meudon observatory and Prague-Petřín observatory.

Memberships: International Union for Cooperation in Solar Research (1905), Société Astronomique de France, Institut de France

Awards: Prix Jules Janssen (1907). The minor planet 3571 Milanštefánik, one square in Paris, and the Prague-Petřín observatory are named in his honour.

9.60. Šternberk Bohumil

Born: 12 January 1897 in Chrudim

Died: 24 March 1983 in Prague

Biography: Interested in astronomy since attending Realgymnasium in Chrudim, which had its small telescope. After graduating in 1916, Š. studied at the Czech university in Prague. After two semesters in 1917, he was drafted and had to stop out until 1918.

From 1918, Šternberk worked at the Astronomical Institute of Charles University (1918 aid, 1919 auxiliary, 1921 assistant). In 1921-23 he studied at the Humboldt University of Berlin and worked at the Berlin-Babelsberg Observatory under Professor

Paul Guthnick, and studied at the Friedrich Wilhelm University.

Returning to Prague in 1923, Šternberk continued working as an assistant at the Astronomical Institute of Charles University. He focused on variable stars and the construction of astronomical instruments, including plans to reconstruct a refractor telescope into a double astrograph. He acquired his doctoral degree in 1924. His dissertation focused on modern methods of photographic photometry and colourimetry.

In 1927 Šternberk married and was dismissed from his position. He shortly worked at Ondřejov observatory as an unpaid assistant of František Nušl. In the same year was transferred to the State Astrophysical and Meteorological Observatory in Stará Ďala, where his main objectives were modernising the observatory, organising the scientific research and building the 60cm refractor. In 1930 he took the first European photograph of Pluto after its discovery. From 1936 Šternberk was the director of the observatory.

In 1938 the observatory had to be evacuated from Hungary's occupation zone to Prešov. Šternberk managed to save the new instruments. These were later used on observatories in Ondřejov (spectroscope) and Skalnaté pleso (60cm Zeiss).

During World War II, Šternberk worked at the State Observatory in Prague and organised cycles of specialised lectures on physics, which substituted the function of the Czech universities closed down by Nazis.

After World War II, Šternberk focused on establishing the Department of Astronomical Chronometry of the State Observatory. After the Czechoslovak Academy of Sciences was founded, he became director of the Laboratory of Chronometry in 1953 (formerly a department of State Observatory) and the first director of the Astronomical Institute of the CSAV. During his directorship, the institute was included in the

international time service network, and the 2m telescope and a computer centre were built.

He resigned from the director position in 1968 when he was 71 but led the Laboratory for time measurements until 1973 when he retired.

Between 1946 and 1970, he led the Czechoslovak national astronomy committee, which connected Czechoslovak astronomy with the International Astronomical Union, of which he was a member from 1928 and deputy chairman from 1958 to 64. He notably contributed to the arrangement of the 1967 IAU General Assembly in Prague.

In 1943-48, he was the *Říše hvězd* editor in chief, and from 1954, the editor in chief of the *Bulletin of the Astronomical Institutes of Czechoslovakia*.

Memberships: Royal Astronomical Society (associate 1968), Czech Astronomical Society (Honorary), All-Union Astronomical and Geodetic Society of the USSR, International Chronometric Society.

The minor planer 9008 is named Bohšternberk in his honour.

9.61. Štych Jaroslav

Born: 13 November 1881

Died: 4 January 1941

Biography: Štych began popularising astronomy in 1910, during the peak of astronomy outreach responding to the panic before the approach of the Halley comet. Afterwards, he continued in science outreach lectures and other activities. In 1913 he founded the Association of Socialist Monists, and in 1914, a monthly monist periodical. Both these activities were discontinued after World War I outbreak.

From 1915 Štych led astronomical courses and, with other coworkers, laid the foundation for the Czech Astronomical Society, which was founded in 1917. Štych became its first secretary and later its deputy chairman.

9.62. Tesánek Jan

Born: 9 December 1728 Brandýs nad Labem

Died: 22 June 1788 Prague

Biography: Entered the Society of Jesus in 1745. He studied mathematics, physics and astronomy at the Clementinum Jesuit College as Joseph Stepling's disciple. After his studies in the philosophical faculty, he taught at Latin schools for three years and then studied theology. After ordination, he was appointed a professor of physics at Charles-Ferdinand University. Then he was transferred to Olomouc as a mathematics teacher but was transferred back to Prague and named professor of further mathematics thanks to Stepling. After the dissolution of the Society of Jesus in 1773, Tesánek was allowed to stay at the university. In 1778 he was named director of mathematics and physics studies.

Primary sources:

Bibliography:

9.63. Triesnecker Franz von Paula

Born: 2 April 1745 Kirchberg am Wagram

Died: 29 January 1817 Vienna

Biography: Son of farmer and wine merchant Leopold Driesen Ecker and his wife Elisabeth, born Dusl. He entered the Society of Jesus in 1761 at the age of sixteen. He studied philosophy in Vienna in 1765-66 and mathematics and languages in Trnava in 1767-68. He taught mathematics at Trnava, Krems an der Donau, and Linz at Jesuit colleges. In 1771 he began studies of theology in Vienna. After the suppression of the Society in 1773, he completed studies in Graz and was ordained in 1774. In 1775 he acquired the title of Doctor of Philosophy.

In 1780 Triesnecker was appointed the assistant of the director of the Vienna observatory Maximilian Hell. In 1792 after Hell's death, he became the director and editor of the *Ephemerides astronomicæ ad meridianem Vindobonensem.*

Triesnecker was the foreign member of the Akademie der Wissenschaften zu Göttingen (1794).

The crater Triesnecker on the near side of the Moon is named after him.

Primary sources:

Bibliography:

9.64. Weinek Ladislaus

Born: 13 February 1848 in Ofen

Died: 12 November 1913 in Prague

Biography: Ladislaus Weinek was born on 13 February 1848 in Ofen (present-day Budapest) as a fourth child of Josef and Johanna Weinek (born Throner, countess von Trauttmansdorf). His father worked as a public servant at the Hungarian Ministry of

Culture and Education. After four years of primary school, Ladislaus entered a grammar school in Budapest and finished it in 1865 with excellent results.

Acquiring a scholarship from the Hungarian ministry of education, he studied mathematics, physics and astronomy at the University of Vienna from 1865 to 1869. He was strongly influenced by the director of Vienna observatory Karl Ludwig von Littrow's lectures, and he decided to focus on astronomy. For a short time, Weinek worked as a private teacher in the family of count H. Wilczek in Eröskürt near Gödöllö. In 1870 he graduated from the Vienna University and began working at the University of Berlin observatory under director Wilhelm Foerster (1832-1921).

Weinek spent less than a year at the University of Berlin, and in 1871 he entered the Leipzig University. There he attended lectures about stellar astronomy by Professor of Astronomy Carl Christian Brahms (1830-1881), spherical astronomy, measure instruments and telescopes by observer Rudolf Engelmann (1841-1888), and astrophysics by Karl Friedrich Zöllner (1834-1882). Frequent visits to astronomers, geodesists and meteorologists provided Weinek with thought and contacts.

In 1873 Weinek joined the expedition to photograph the transit of Venus across the Sun in December 1874. It was an essential observation for the solar parallax determination, which was simultaneously done by 62 expeditions worldwide.[101] There were five German expeditions, and all German observatories were involved in preparations. The preparation itself had been underway from 1869. The German observation stations were located in Isfahan (present-day Iran), Tschifu (China), Mauritius, Kerguelen Islands and the Auckland Islands.

[101] The first of the 19th century pair of transit (the second taking place in 1882) that was fully visible from India, China, Japan, north-east Asia, Australia and islands in Indian Ocean.

Weinek was initially the deputy leader of the observation station in Schwerin led by Friedrich Paschen (1804-1873). From 1873 to 74, Weinek worked at the Schwerin research photographic laboratories. However, he was called on the expedition to the Kerguelen Islands as a deputy leader and observer. This expedition was led by Dr Carl Boergen (1843-1909). The station at the Kerguelen Islands in the south part of the Indian Ocean was the southernmost one. There the transit of Venus was visible only for a short time after the sunrise. Boergen, Weinek, and four other members of the expedition (third astronomer, physician, photographer, and mechanic) with all their equipment sailed out on 21 June 1874 by the military corvette Gazelle, for which the transportations of this expedition was only one of its several tasks. After several stopovers – including the visit of the Royal Observatory in Cape Town (present-day South African Astronomical Observatory), where they met some other expeditions, including the private lord James Lindsay expedition – Gazelle finally reached the Kerguelen Islands on 26 October 1874.

The transit took place on 9 December under clear weather, and the expedition had the chance to observe it for more than three hours. There were two English expeditions apart from German, and all the scientists cooperated. Weinek used a six-inch refractor for observation and exposed 61 photographic plates by a photographic telescope in the meantime. After fulfilling other scientific tasks, the expedition left the islands at the turn of January and February 1875, and Weinek returned to Berlin in March.

Though he still had not graduated, he entered the observatory of the University of Leipzig as the leading observer. The observatory was then led by Karl Christian Bruhns (1830-1881), who had been the director and Professor of Astronomy since 1860 when the observatory was newly constructed. Weinek cooperated and made friends with

Bruhns as well as with his colleague Karl Friedrich Zöllner.

At the Leipzig Observatory, Weinek worked with the large meridian telescope and made very accurate and detail-oriented sketches of Mars, other planets, and comets. His drawings of Mars and zodiacal light were published in 1875. In autumn of the same year, Weinek and Vienna observer Gustav von Steeb measured the longitude difference between Leipzig and the new Vienna observatory. Because the Leipzig observatory was appointed to process the results of the 1874 Venus transit in observations, Bruhns handed all the measurements and calculations over to Weinek. These meant several years of work, and Weinek got seven students as auxiliaries.

In 1877 Weinek was accepted as a member of the Astronomische Gesellschaft, which meant that he published in the prestigious Astronomische Nachrichten and Vierteljahrsschrift der Astronomischen Gesellschaft regularly until the end of his career.

Weinek sent his graduation request to the philosophical faculty of the Friedrich Schiller University Jena in February 1879. His dissertation titled *Ueber Brennweiten- und Focusdifferenz-Bestimmung beim Photoheliographen* had only 23 pages, but considering the importance and extent of Weinek's previous scientific activities, the dean Carl Fortlage (1806-1881) supported it and entrusted Ernst Abbe (1840-1905) with the review. At the beginning of the year 1880, Weinek graduated in absentia.

During his stay at the Leipzig observatory from 1887 to 1883, Weinek published seven articles and one book. Their topics were observations, astronomical instruments and sky photographing. Weinek's friend, the astrophysicist Karl Friedrich Zöllner, published Weinek's sketches of Jupiter and comets at his expense. Some others were published in periodicals Illustrierten Zeitung and Gartenlaube.

In June 1881, Bruhns died. Weinek stood as one of the candidates for the new

director, but in 1882 the committee for choosing the new director and Professor of Astronomy chose Heinrich Bruns (1848-1919). Bruns and Weinek had had disagreements about methods and rate of work, and pressure from the side of the new director made Weinek leave the observatory in June of the same year.

He spent the next year at the private observatory of Baron Basilius von Engelhardt in Dresden. There he observed the second transit of Venus with 12-inch Grubb refractor and described it in the article *Beobachtung des Venusdurchganges vom 6. Dezember 1882 zu Dresden* (*Astronomische Nachrichten* 105, 1883).

He also stayed in Gohlis near Leipzig at the private observatory of August Auerbach, a friend of Bruhns and Zöllner. He received an offer of a Professorship of Astronomy at the German university and directorship of the State Observatory on 1 October 1883 from the Ministry of Education and Culture in Vienna.

Weinek did not feel good in Prague society with its characteristically tense relationship between the Czech and German population. He rarely participated in the social life of Prague Germans. During his life in Prague, he kept in touch with his co-workers from the observatory, with which he had good relationships (Münzel 2001). They included, for example, Gustav Gruss, the future director of the Czech Astronomical Institute of the k.k. böhmische Karls-Ferdinands-Universität, and Václav Rosický, with whom Weinek cooperated even after he left and was working at a grammar school in Prague.

Weinek and Gruss observed occasional celestial phenomena like stars occultation, transit of heavenly bodies and moon disc edges through the meridian, planets and comets. Weinek regularly published his work in Astronomische Nachrichten and Publications of the Astronomical Society of the Pacific. Results of the observation

are published in the series of articles *Astronomische Beobachtungen an der k. k. Sternwarte zu Prag*, which Weinek regularly wrote for Astronomische Nachrichten.

On 20 November 1885, Weinek took the first photo of a meteor in the world.

As for the lecture activity, in the first decade, Weinek specialized in astronomical instruments, Sun and Moon eclipses, and calculations of orbits of planets and comets. In the 1890s, he started to lead practical lectures on astronomical observations. Occasionally he lectured on Earth axis movements (precession, nutation), aberration, binary stars, pole movements and transits of planets across the Sun. His long-time co-worker Arthur Scheller describes him in [4] as the talented and favourite teacher favouring graphical solutions to spherical astronomy tasks.

At the beginning of the 1890s, Weinek started to publish maps of the Moon drawn by photographs from the Lick Observatory made by its 36-inch refractor with 92 cm objective diameter, the largest telescope in the world. Weinek distinguished several new craters and ridges on the Moon's surface.

In 1897 he published the first band of photographic Moon atlas. Until 1900 he published nine other bands. This publication was the first of this kind in the world and had 200 pages in total.

Apart from astronomical observations, Weinek made meteorological and magnetic measurements. Out of 38 of his observation bands, 29 focus on meteorology and magnetism, 8 contain astronomical observations, and 1 focuses on the astronomical clock in Clementinum.

Weinek suggested and coordinated cooperation with observatories in Potsdam, Berlin and Strasbourg when observing geomagnetic phenomena (especially declination, inclination and horizontal component of magnetic intensity). Essential was his

cooperation on measurements of pole height organized by the director of Bonn observatory Friedrich Küstner. Their measurements from 1889 confirmed that Earth's rotational axis is moving in the body of Earth. Since then, this quasiperiodic pole movement has been continuously observed on many IERS (International Earth Rotation and Reference Systems Service) stations.

Ladislaus Weinek died on 12 November 1913 in Prague, shortly after the 30th anniversary of his work at the State Observatory and a German university.

A crater on the near side of the Moon and 7114 Weinek is named in his honour.

9.65. Zenger Karel Václav

Born: 17 December 1830 Chomutov

Died: 1908

Biography: Born into a family of a military surgeon. After attending grammar schools at Německý Brod (now Havlíčkův Brod) and Lesser Town of Prague, he entered the Philosophical Faculty in Prague in 1846. He continued at the Faculty of Law in 1848, but in 1949 he focused on mathematics and physics and became the personal assistant of Czech physicist František Adam Petřina (1799–1855). From 1850 to 1851, he participated in scientific work at the State Observatory. In 1852 Zenger graduated from the Faculty of Law. In 1853 he acquired teacher qualifications for mathematics and physics at the Faculty of Philosophy.

From 1853-61 he taught at a public grammar school at Banská Bystrica and then went to Vienna to habilitate at the Vienna Imperial and Royal Polytechnic Institute. However, in 1862 he was transferred to Prague. There he became the first Privatdozent

at the Czech Polytechnical School in 1862. In 1864 he was appointed the Professor of Physics, and in 1869 during the split of the polytechnical school, he went to the Czech Polytechnic School. Zenger stayed there until his retirement in 1900. In 1868-96 he was elected the dean seven times, and in 1872-73, the fourth rector of the Czech Polytechnic School.

Zenger published more than 340 papers in foreign journals and gave many outreach lectures. In 1868-66 Zenger published the first part of his textbook, *Fysika zkušební*. In 1879 Zenger's lectures on physics were published as lithographed textbooks. In 1882 Zenger and his assistant F. B. Ćecháč began publishing *Fysika pokusná a výkonná,* planned as sexpartite, but only the first book and a part of the second book were published.

Zenger invented many original appliances, including the symmetrical lightning rod introduced at the British Association for the Advancement in Edinburgh meeting in 1871. He participated in many international scientific meetings and became court advisor in 1901.

Memberships: Lotos (full), British Astronomical Association, Astronomical Society of the Pacific, Société Astronomique de France, Société internationale des Electriciens, British Association for the Advancement of Science (member of the committee for research an improvement of lightning rods), Royal Bohemian Society of Sciences (associate), Czech Academy for Sciences, Literature and Art (1891), Association of Architects and Engineers in the Czech Kingdom (chairman, honorary member), Society for encouraging industry in the Czech lands.

Awards: doctor honoris causa at the Czech Technical University

Primary sources:

9.66. Zeno Franciscus

Born: 6 January 1734 Olomouc

Died: 14 June 1781 Prague

Biography: Professor of Further Mathematics and Grammatic at the Charles-Ferdinand University in 1766-72.

Manager of the State Observatory after the dissolution of the Society of Jesus in 1773. The second director of the Clementinum observatory from 1777 to 1781. He bought many astronomical instruments at his own expense. He was interested in geology and palaeontology.

References

ADAMS, Walter S, 1949. The history of the International Astronomical Union. *Publications of the Astronomical Society of the Pacific*. 1 únor 1949. Vol. 61, no. 358, pp. 5–12. DOI 10.1086/126108.

ARGELANDER, Friedrich Wilhelm August, 1903. Bonner Durchmusterung des nordlichen Himmels. *Eds Marcus and Weber's Verlag*. 1 leden 1903. pp. 0. ADS Bibcode: 1903BD....C.....0A

BARTOŠ, Petr, 2019. Podkarpatská astronomická společnost v Užhorodě. In: BARTOŠ, Petr a KOVÁŘ, Štěpán Ivan (ed.), *90 let astronomických společností*. Sezimovo Ústí: Hvězdárna Františka Pešty. 2019. pp. 6–11. ISBN 978-80-88281-13-9.

BATTEN, A. H., 1991. Argelander and the Bonner Durchmusterung. *Journal of the Royal Astronomical Society of Canada*. 1 únor 1991. Vol. 85, pp. 43. ADS Bibcode: 1991JRASC..85...43B

BEČVÁŘ, Antonín, 1929. O naší observatoři. *Říše hvězd*. 1929. Vol. 10, no. 8, pp. 149–152.

BEČVÁŘ, Antonín, 1934. Fotografujte oblohu! *Říše hvězd*. 1934. Vol. 25, no. 4, pp. 65–70.

BESSEL, F. W., 1838. On the parallax of 61 Cygni. *Monthly Notices of the Royal Astronomical Society*. 1 listopad 1838. Vol. 4, pp. 152–161. DOI 10.1093/mnras/4.17.152. ADS Bibcode: 1838MNRAS...4..152B

BESSEL, Friedrich Wilhelm, 1838. Bestimmung der Entfernung des 61sten Sterns des Schwans. *Astronomische Nachrichten*. 1 prosinec 1838. Vol. 16, pp. 65. DOI 10.1002/asna.18390160502. ADS Bibcode: 1838AN.....16...65B

BUCHAR, Emil, 1944. K šedesátce prof. Dr. V. V. Heinricha. *Říše hvězd*. 1 září 1944. Vol. 25, no. 7, pp. 136--139.

BUMBA, Václav, 2012. *Jak se „česko-slovenský" spektrohelioskop zasloužil o sluneční fyziku*.

CROLL, James, 1875. *Climate and Time in their Geological Relations: A Theory of Secular Changes of the Earth's Climate*. 1. London: Daldy, Tsbister & Co.

ČEDÍK, Miloslav, 1982. Národnostní otázka a rozdělení pražské univerzity. *Acta Universitatis Carolinae Historia Universitatis Carolinae Pragensis*. 1982. Vol. 22, no. 1, pp. 15–25.

ČERMÁKOVÁ, Lucie, 2016. Nová, hezká, německá a česká: dělení pražské univerzitní botanické zahrady (1882-1898). *Dějiny věd a techniky*. 2016. Vol. 49, no. 2, pp. 61–86. container-title: Dějiny věd a technikyji

FISCHER, Karl A. F. a HIBST, Peter, 1983. Die deutsche Astronomie in Böhmen und Mähren in den letzten hundert Jahren. *Bohemia*. 31 prosinec 1983. Vol. 24, no. 2, pp. 275–294. DOI 10.18447/BoZ-1983-2913.

GINGRICH, Curvin H., 1943. Popular Astronomy-The first fifty years. *Popular Astronomy*. 1943. Vol. 51, pp. 1.

GOLL, Jaroslav, 1908. *Rozdělení pražské University Karlo-Ferdinandovy roku 1882 a počátek samostatné university české*. online. Prague: Nákl. Klubu historického. [Viděno 31 březen 2021]. Získáno z: http://archive.org/details/rozdelenprazsk00goll1875294

GORDIN, Michael D. a TAMPAKIS, Kostas, 2015. Introduction: The languages of scientists. *History of Science*. 1 prosinec 2015. Vol. 53, no. 4, pp. 365–377. DOI 10.1177/0073275315597614.

GRUSS, Gustav, 1896. *Z říše hvězd: Astronomie pro širší kruhy*. Praha: Bursík a Kohout.

HÄUFLER, Vlastislav, 1967. *Dějiny geografie na Universitě Karlově 1348-1967: Geschichte der Geographie an der Karls-Universität*. Prague: Univerzita Karlova.

HEINRICH, Vladimír Václav, 1935. *Astronomický ústav Karlovy university a můj tak zvaný disciplinární případ. Stíny autonomie.* Praha: self-publishing.

HRAŠE, Josef, 1922. Prozatímní hvězdárna české astronomické společnosti. *Říše hvězd*. 1922. Vol. 3, no. 5, pp. 83–84.

HYKLOVÁ, Petra, 2007. *Disertační práce z astronomie, obhájené na německé Karlo-Ferdinandově univerzitě a na Deutsche Universität in Prag v letech*. Univerzita Karlova v Praze. Citation Key: Hyklova2007

HYKLOVÁ, Petra, 2010. *Astronomický výzkum na Karlově univerzitě v Praze od roku 1882 do současnosti*. Univerzita Karlova v Praze. Citation Key: Hyklova2010

HYKLOVÁ, Petra, 2018a. The observatory in Senftenberg (Bohemia), built by John Parish (1774–1858) after his exodus from Altona. In: WOLFSCHMIDT, Gudrun (ed.), *Astronomie im Ostseeraum. Proceedings der Tagung des Arbeitskreises Astronomiegeschichte in der Astronomischen Gesellschaft in Kiel 2015.* Hamburg: tredition. 2018. pp. 167–192. 38. ISBN 978-3-7345-5290-8. Citation Key: Hyklova2016

HYKLOVÁ, Petra, 2018b. The Presence of Czech Astronomers at International Conferences. In: DVOŘÁČKOVÁ, Věra a FRANC, Martin (ed.), *Science overcoming borders*. Prague: Masarykův ústav a Archiv AV ČR. pp. 123–144. ISBN 978-80-87782-87-3.

CHOLASTA, Martin, 2019. Astronomická společnost v Hradci Králové. In: BARTOŠ, Petr a KOVÁŘ, Štěpán Ivan (ed.), *Sborník semináře 90 let astronomických společností*. Sezimovo Ústí: Hvězdárna Františka Pešty. 2019. pp. 44–56. ISBN 978-80-88281-14-6.

JACKSON, Allyn, 2007. A Labor of Love: The Mathematics Genealogy Project. *Notices of the American Mathematical Society*. 2007. Vol. 57, no. 8, pp. 1002–1003.

JAROŠ, Václav, 1951. Nad rovem prof. Dr Františka Nušla. *Říše hvězd*. 1951. Vol. 22, no. 9, pp. 195–196.

KADAVÝ, František, 1945. Těžké hodiny naší hvězdárny. *Říše hvězd*. 1945. Vol. 26, no. 1–2, pp. 7–12.

KALINA, Martin, 2012. Matematika a fyzika na Slovensku, JČMF a JSMF. *Pokroky matematiky, fyziky a astronomie*. 2012. Vol. 57, no. 1, pp. 3–11.

KAPTEYN, J. C., 1904. Remarks on the determination of the number and mean parallax of stars of different magnitude and the absorption of light in space. *The Astronomical Journal*. 1 srpen 1904. Vol. 24, pp. 115–122. DOI 10.1086/103590.

KAPTEYN, J. C., 1922. First Attempt at a Theory of the Arrangement and Motion of the Sidereal System. *The Astrophysical Journal*. 1 květen 1922. Vol. 55, pp. 302. DOI 10.1086/142670.

KERR, Roy P., 1963. Gravitational Field of a Spinning Mass as an Example of Algebraically Special Metrics. *Physical Review Letters*. 1 září 1963. Vol. 11, pp. 237–238. DOI 10.1103/PhysRevLett.11.237.

KISTERMANN, Friedrich W., 1999. Leo Wenzel Pollak (1888-1964): Czechoslovakian pioneer in scientific data processing. *IEEE Annals of the History of Computing*. 1999. Vol. 21, no. 4, pp. 62–68. DOI 10.1109/85.801534.

KLEPEŠTA, Josef, 1924. Nová soukromá hvězdárna v Praze. *Říše hvězd*. 1924. Vol. 5, no. 2, pp. 33–36.

KLEPEŠTA, Josef, 1926a. Český populární výklad o nebi před stopadesáti lety. *Říše hvězd*. 1926. Vol. 7, no. 3, pp. 117–118.

KLEPEŠTA, Josef, 1926b. O věži staré pražské hvězdárny v Klementinu. *Říše hvězd*. 1926. Vol. 7, no. 3, pp. 112–117.

KLEPEŠTA, Josef, 1928. Nový dalekohled pro Lidovou hvězdárnu. *Říše hvězd*. květen 1928. Vol. 9, no. 5, pp. 76–78.

KLEPEŠTA, Josef, 1937. *Dvacet let mezi přáteli astronomie*. Prague: Česká astronomická společnost.

KLEPEŠTA, Josef, 1942. Fotografie Měsíce z hvězdárny Společnosti. *Říše hvězd*. 1942. Vol. 23, no. 6, pp. 109–112.

KLEPEŠTA, Josef, 1952. Vývoj astrofotografie u nás. *Říše hvězd*. květen 1952. Vol. 33, no. 5, pp. 114–116.

KLEPEŠTA, Josef, 1972. Věž staré pražské hvězdárny. *Říše hvězd*. 1972. Vol. 53, no. 12, pp. 226–227.

KOLOMÝ, Rudolf, 2001. Významná osobnost naší fyziky 19. století: Prof. Karel Václav Zenger (1830–1908) (170 let od narození vynikajícího experimentátora). *Pokroky matematiky, fyziky a astronomie*. 2001. Vol. 46, no. 2, pp. 144–158.

KOVÁŘ, Luboš, 1983. *Dějiny Astronomického ústavu Karlovy university v letech 1889-1939*. online. Universita Karlova v Praze. [Viděno 29 únor 2016]. Získáno z: http://astro.mff.cuni.cz/historie/default.htm#defaultse7.html

LEE, O. J., 1922. Second Meeting of the International Astronomical Union in Rome, may 2-10, 1922, with Plates Xxvi-Xxviii. *Popular Astronomy*. 1922. Vol. 30, pp. 453.

LEVI-CIVITA, Memoria di T., 1916. Nozione di parallelismo in una varietà qualunque e conseguente specificazione geometrica della curvatura riemanniana. *Rendiconti del Circolo Matematico di Palermo (1884-1940)*. 1 prosinec 1916. Vol. 42, no. 1, pp. 173–204. DOI 10.1007/BF03014898.

MAŠEK, Bohuslav, 1934. *Hvězdářská ročenka na rok 1935*. Praha: Jednota československých matematiků a fysiků.

MILANKOVIĆ, Milutin, 1941. *Kanon der Erdbestrahlung und seine Anwendung auf das Eiszeitenproblem*. Belgrade: Mihaila Ćurčića. Royal Serbian Academy special publications ; v. 132. Section of Mathematical and Natural Sciences ; v. 33. Oversize QB531 .M553 1941q

MÍŠKOVÁ, Alena, 2010. Německé mimouniverzitní instituce v Čechách. In: *Bohemia docta : k historickým kořenům vědy v českých zemích*. Prague: Academia. pp. 234–257.

MK., 1929. Jihočeská astronomická společnost. *Říše hvězd*. květen 1929. Vol. 10, no. 5, pp. 102–103.

MLEJNEK, Vladimír, 1999. *Vzpomínky na vznik a rozvoj hvězdárny v Úpici*. Úpice: Hvězdárna v Úpici.

MOHR, Josef Mikulaš, 1958. Čtyřicet let československé astronomie. *Říše hvězd*. 1958. Vol. 39, no. 10, pp. 217–221.

MÜNZEL, Gisela, 2001. Ladislaus Weinek (1848-1913). *Beiträge zur Astronomiegeschichte*. 2001. Vol. 4, pp. 127–166.

NAJSER, Pavel, 2020. Zapomenutá hvězdárna na pražských Hřebenkách. *Astropis*. 2020. Vol. 2020, no. 1, pp. 15–16.

NIKLÍČEK, Ladislav a KOSTLÁN, Antonín, 2010. Vývoj českých vědeckých institucí a spolků do 80. let 19. století a návrh Akademie věd J. E. Purkyně. In: *Bohemia docta : k historickým kořenům vědy v českých zemích*. Prague: Academia. pp. 145--175.

NUŠL, František, 1919. Pražská hvězdárna v Klementinu. *Věstník České astronomické společnosti*. 1919. No. 6–7, pp. 2–6.

NUŠL, František, 1939. Prof. Dr. Bohuslav Mašek. *Říše hvězd*. 1 leden 1939. Vol. 20, no. 1, pp. 12–13.

PETR, Karel, 1928. František Nušl [šedesátiletý]. *Časopis pro pěstování matematiky a fysiky*. 1928. Vol. 57, no. 2, pp. 73,73a,74-80.

PICKERING, E. C., 1883. A plan for securing observations of the variable stars. *The Observatory*. 1 únor 1883. Vol. 6, pp. 46–51.

PLAVEC, Miroslav, 1998. Ondřejovská hvězdárna za druhé světové války. In: *Ondřejovská hvězdárna 1898-1998. Sborník o české a moravské astronomii uspořádaný ke 100. výročí*

Ondřejovské hvězdárny a 650. výročí University Karlovy. Prague: Astronomický ústav AV ČR. pp. 130–134.

POLÁK, Bedřich, 1951. K padesátinám profesora D r Emila Buchara. *Říše hvězd*. 1951. Vol. 32, no. 7, pp. 158–159.

POLÁŠEK, C., 2001. The 8-inch Alvan Clark object glass at the Ondrejov Observatory. *Journal of the British Astronomical Association*. 1 červen 2001. Vol. 111, pp. 145–149.

POLÁŠEK, Cyril, 2006. *Jednoapůlstoletý osmipalcový objektiv Alvana Clarka hvězdárny Astronomického ústavu Akademie věd České republiky v Ondřejově u Prahy: historická astrooptická studie věnovaná 145. výročí vzniku objektivu v Bostonu, USA, i Clarkovu objevu podvojnosti 99Her*. 3. Ondřejov: Astronomický ústav AV ČR. Scripta astronomica, 9.

POLESNÝ, Bohumil, 2019. Epizody z historie Jihočeské astronomické společnosti a jejích následovníků. In: BARTOŠ, Petr a KOVÁŘ, Štěpán Ivan (ed.), *Sborník semináře 90 let astronomických společností*. Sezimovo Ústí: Hvězdárna Františka Pešty. 2019. pp. 14–33. ISBN 978-80-88281-14-6.

POLLAK, Leo Wenzel, 1927. Charakteristika der Luftdruckfrequenzkurven und verallgemeinerte Isobaren in Europa. In: *Prager Geophysikalische Studien*. Prague: Statistisches Staatsamt. pp. 58. 1.

POLLAK, Leo Wenzel, 1928. Das Periodogramm der internationalen erdmagnetischen Charakterzahlen. *Zeitschrift für Geophysik*. 1928. Vol. 4, pp. 289–304.

R., 1925. Časový signál v československém rozhlase. *Říše hvězd*. 1925. Vol. 6, no. 7–10, pp. 162–162.

R., 1926. Časový rozhlas v naší republice. *Říše hvězd*. 1926. Vol. 7, no. 1–2, pp. 27–28.

RAIL, Zdeněk, ŠRAJER, Bohdan, LÉDL, Vít, JAREŠ, Daniel, OUPICKÝ, Pavel, MELICH, Radek a MELICH, Zbyněk, 2008. Objektiv Merz 160/1790 refraktoru Hvězdárny v Úpici. In: MARKOVÁ, E. (ed.), *Člověk ve svém pozemském a kosmickém prostředí. Bulletin referátů z konference*. Úpice: Hvězdárna Úpice. 2008. pp. 70–75. ISBN 978-80-86303-14-7.

RAJCHL, Rostislav, 2013. Milan Rastislav Štefánik, astronom, voják a diplomat. *Pokroky matematiky, fyziky a astronomie*. 2013. Vol. 58, no. 1, pp. 50–62.

REMEŠ, M., 1945. České hvězdářské názvy. *Říše hvězd*. 1945. Vol. 26, no. 5–6, pp. 108--109.

RICHARDS, Mercedes T., PRIBULLA, Theodor, RIBAS, Ignasi, BRADSTREET, David H., DRESCHSEL, Horst, MACERONI, Carla, MIKOLAJEWSKA, Joanna, MUNARI, Ulisse, PRSA, Andrej, SCHARFE, Colin, SOUTHWORTH, John a TRIMBLE, Virginia, 2015. DIVISION G COMMISSION 42: CLOSE BINARY STARS. *Proceedings of the International Astronomical Union*. 2015. Vol. 11, no. T29A, pp. 474–489. DOI 10.1017/S1743921316000922.

ROLČÍK, V., 1939. Reflektor se šikmými zrcadly. *Říše hvězd*. 1939. Vol. 20, no. 1, pp. 13–18.

ROSICKÝ, Václav, 1926. Vzpomínky z pražské hvězdárny. *Říše hvězd*. 1926. Vol. 7, no. 01–02, pp. 12–16.

SEYDL, Otto, 1933. Dr. Jiří Kaván. *Říše hvězd*. květen 1933. Vol. 14, no. 5, pp. 95–95.

SEYDLER, August, 1884a. *O integrování některých rovnic vyskytujících se v problemu tří těles*. Prague: Královská česká společnost nauk.

SEYDLER, August, 1884b. *Über einige neue Formen der Integrale des Zwei- und Dreikörperproblems*. Wien: Gerold. Sitzungsberichte der Kaiserl. Akademie der Wissenschaften.

SCHWARZSCHILD, Karl, 1916. Über das Gravitationsfeld einer Kugel aus inkompressibler Flüssigkeit nach der Einsteinschen Theorie. *Sitzungsberichte der Königlich Preussischen Akademie der Wissenschaften zu Berlin, Phys.-Math. Klasse, 424-434 (1916)*. online. 1 březen 1916. [Viděno 31 březen 2021]. Získáno z: http://adsabs.harvard.edu/abs/1916skpa.conf..424S

SMITH, Horace A., 1980. Popular Astronomy Magazine and the Development of Variable Star Observing in the United States. *Journal of the American Association of Variable Star Observers (JAAVSO)*. 1 říjen 1980. Vol. 9, pp. 40–42.

SPITALER, Rudolf, 1921. *Das Klima des Eiszeitalters*. Prag: Selbstverlag.

STROUHAL, Čeněk, 1914. *Fysikální ústav české university Karlo-Ferdinandské v Praze*. Praha: nákl. vlast.

SURMAN, Jan Jakub, 2012. *Habsburg Universities 1848-1918. Biography of a Space*. Universitat Wien.

Šedesát let Záviše Bochníčka, 1980. *Říše hvězd*. Vol. 61, no. 4, pp. 82–82.

ŠOLC, Martin, 2005. A note to the astrographic camera of the Astronomical Institute of the K. k. Bohemian University in Prague. *Acta Universitatis Carolinae. Mathematica et Physica*. 2005. Vol. 46, no. 3, pp. 239–248.

ŠOLCOVÁ, Alena a ŠOLC, Martin, 1997. Profesor August Seydler, astronom, fyzik a humanista. *Pokroky matematiky, fyziky a astronomie*. 1997. Vol. 42, no. 4, pp. 188–209.

ŠTERNBERK, Bohumil, 1928. Z montování 60 cm zrcadla v Staré Ďale. *Říše hvězd*. 1928. Vol. 9, no. 7, pp. 97–99.

ŠTERNBERK, Bohumil, 1944. K šedesátinám Dra Otty Seydla. *Říše hvězd*. 1944. Vol. 25, no. 5, pp. 93–95.

ŠTERNBERK, Bohumil, 1945. Budoucnost díla Fričova. *Říše hvězd*. 1945. Vol. 26, no. 7–8, pp. 126–129.

ŠTERNBERK, Bohumil, 1959. Dr. Otto Seydl zemřel. *Říše hvězd*. 1959. Vol. 40, no. 4, pp. 73–75.

ŠTERNBERK, Bohumil, 1967. Padesát let čs. astronomické společnosti. *Říše hvězd*. 1967. Vol. 48, no. 12, pp. 225–230.

ŠTERNBERK, Bohumil, 1978. Vzpomínky na minulost. *Říše hvězd*. 1978. Vol. 59, no. 12, pp. 245–258.

ŠVEJDA, Antonín, 2018. Clarkův osmipalcový dalekohled. In: *Z dějin geodézie a kartografie*. Prague: Národní technické muzeum. pp. 111–118. Rozpravy NTM, 19.

TABAKOVIČOVÁ, Michaela, 2013. *České názvy planet*. Brno: Masarykova univerzita.

TENN, Joseph S., 2016. Introducing AstroGen: The Astronomy Genealogy Project. *Journal of Astronomical History and Heritage*. 28 prosinec 2016. Vol. 19, pp. 298–304. arXiv: 1612.08908

TĚŠÍNSKÁ, Emilie, 1997. Fyzikální vědy v pražském německém přírodovědném spolku „Lotos". *Pokroky matematiky, fyziky a astronomie*. 1997. Vol. 42, no. 1, pp. 35–47.

VAND, Vladimír, 1931. Nový fotometr Lidové hvězdárny Štefánikovy. *Říše hvězd*. 1931. Vol. 12, no. 4, pp. 65–68.

Vzpomínky B. Šternberka na začátky naší astronomie, 1978. *Vesmír*. Vol. 57, no. 10, pp. 311–314.

WEGENER, Wladimir a KÖPPEN, Alfred, 1924. *Die Klimate der geologischen Vorzeit*. online. Stuttgart, Germany: Schweizerbart Science Publishers. Získáno z: http://www.schweizerbart.de//publications/detail/artno/001192401/Koppen_Wegener_Die_Klimate_der_geologi

ZEMEK, Bohuslav, 1920. Několik poznámek o přístrojích hvězdárny v Klementinu. *Říše hvězd*. 1920. Vol. 1, no. 2, pp. 30–33.

ZÍKOVÁ, Heny, 2002. Jak šel čas v ČAS. *Kosmické rozhledy*. 2002. No. 3, pp. 20–21.

List of Shortcuts

ADB	Allgemeine Deutsche Biographie
AN	Astronomische Nachrichten
BDCL	Biographical Dictionary of the Czech Lands
BLKO	Biographisches Lexikon des Kaiserthums Oesterreich
CAS	Czech Astronomical Society
CTU	Czech Technical University in Prague (1920-present) Imperial and Royal Czech Technical High School in Prague (1879-1920) Czech Polytechnic Institute (1869-1879) Polytechnic Institute of the Czech Estates (1806-1869) Institute of Engineering Education (1707-1806)
CUNI	Charles University (1348-1654, 1920-1990, 2016-present) Charles University in Prague (1990-2016) Czech Charles-Ferdinand University (1882-1920) Charles-Ferdinand University (1654-1882)
CzAI	Astronomical Institute of the Czech university
DeAI	Astronomical Institute of the German university
DTU	German Technical High School Prague (1918-1945) Imperial and Royal German Technical High School in Prague (1879-1918) German Polytechnic Institute (1869-1879)
DUP	German University in Prague/ Deutsche Karls-Universität in Prag (1939-1945) German University in Prague/ Deutsche Universität Prag (1920-1939) German Charles-Ferdinand University (1882-1920)
IAU	International Astronomical Union
NDB	Neue deutsche Biografie

OBL	Österreichisches Biographisches Lexikon 1815–1950
ŘH	Říše hvězd

Appendixes

Appendix 1. Collective biography of students of astronomy

Appendix 2. Map of students of astronomy

Appendix 3. Bibliography of Czech professional astronomers from Prague universities