

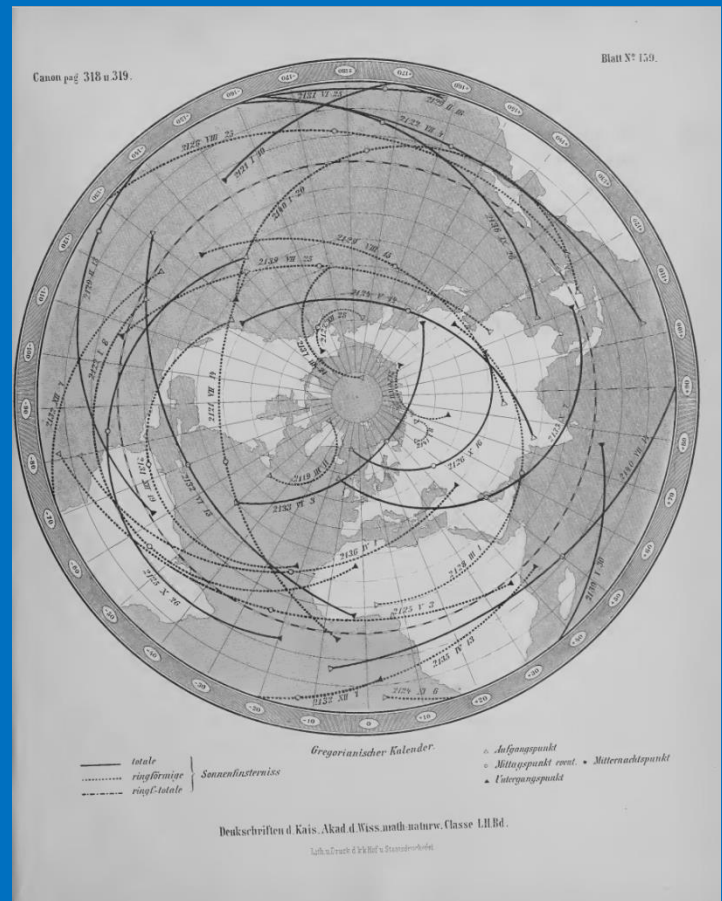
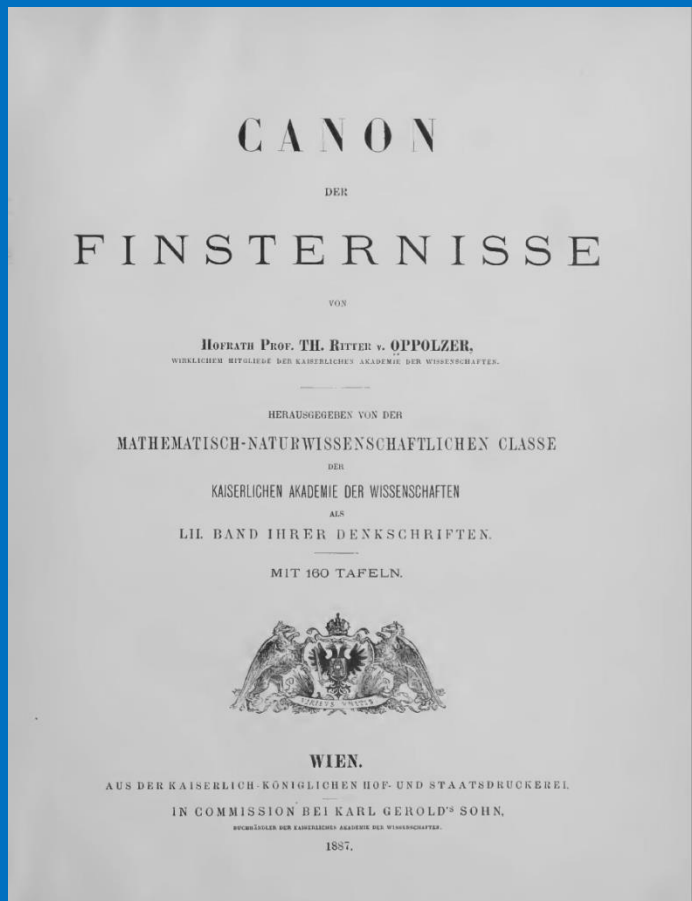
# First solar eclipse canons and Franz Ignatz Cassian Hallaschka

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IOTA-ES, Czech Astronomical Society



Theodor Ritter v Oppolzer (26.10.1841 Prague – 26.12.1886 Vienna)  
**Canon der Finsternisse**, Denkschriften der Kaiserlichen Akademie der  
 Wissenschaften 52, Wien (1887) + 10 other computers  
 solar/lunar eclipses years –1207 and +2161, reprinted 1962



Mahler E. : **Die zentralen Sonnenfinsternisse des 20. Jahrhunderts**, Denkschriften der Kaiserlichen Akademie der Wissenschaften 49, Wien (1885)

Ginzel, Friedrich Karl : **Spezieller Kanon der Sonnen- und Mondfinsternisse, für das Ländergebiet der klassischen Altertumwissenschaften und den Zeitraum von 900 vor Chr. bis 600 nach Chr.**, Berlin (1899).

Schröter J. : **Spezieller Kanon der zentralen Sonnen- und Mondfinsternisse, welche innerhalb des Zeitraums von 600 bis 1800 n. Chr. in Europa sichtbar waren**, Kristiania (1923)

Neugebauer P. : **Spezieller Kanon der Sonnenfinsternisse für Vorderasien und Aegypten für die Zeit von 900 v Chr. bis 4200 v Ch.**, Ergänzungsheft, Astronomische Nachrichten 8, 4, Kiel (1931)



Meeus J., Grosjean, C.C., and Vanderleen W. : **Canon of Solar Eclipses**, Pergamon Press, Oxford (1966)  
years +1898 to +2510

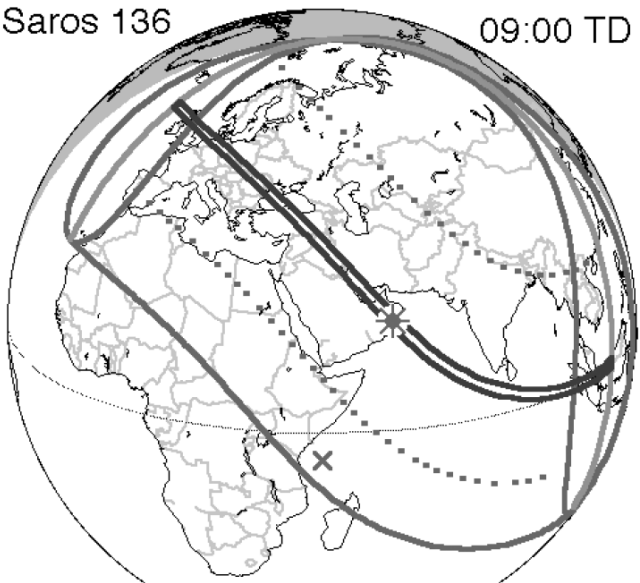
Meeus .J, Mucke, H. : **Canon of Solar Eclipses: –2003 to +2526**, Astronomisches Büro, Vienna (1983)  
10 774 solar eclipses

Stephenson, F.R., Houlden, M.A. : **Atlas of Historical Eclipse Maps, East Asia 1500BC—AD 1900**, Cambridge University Press, Cambridge/New York (1986)

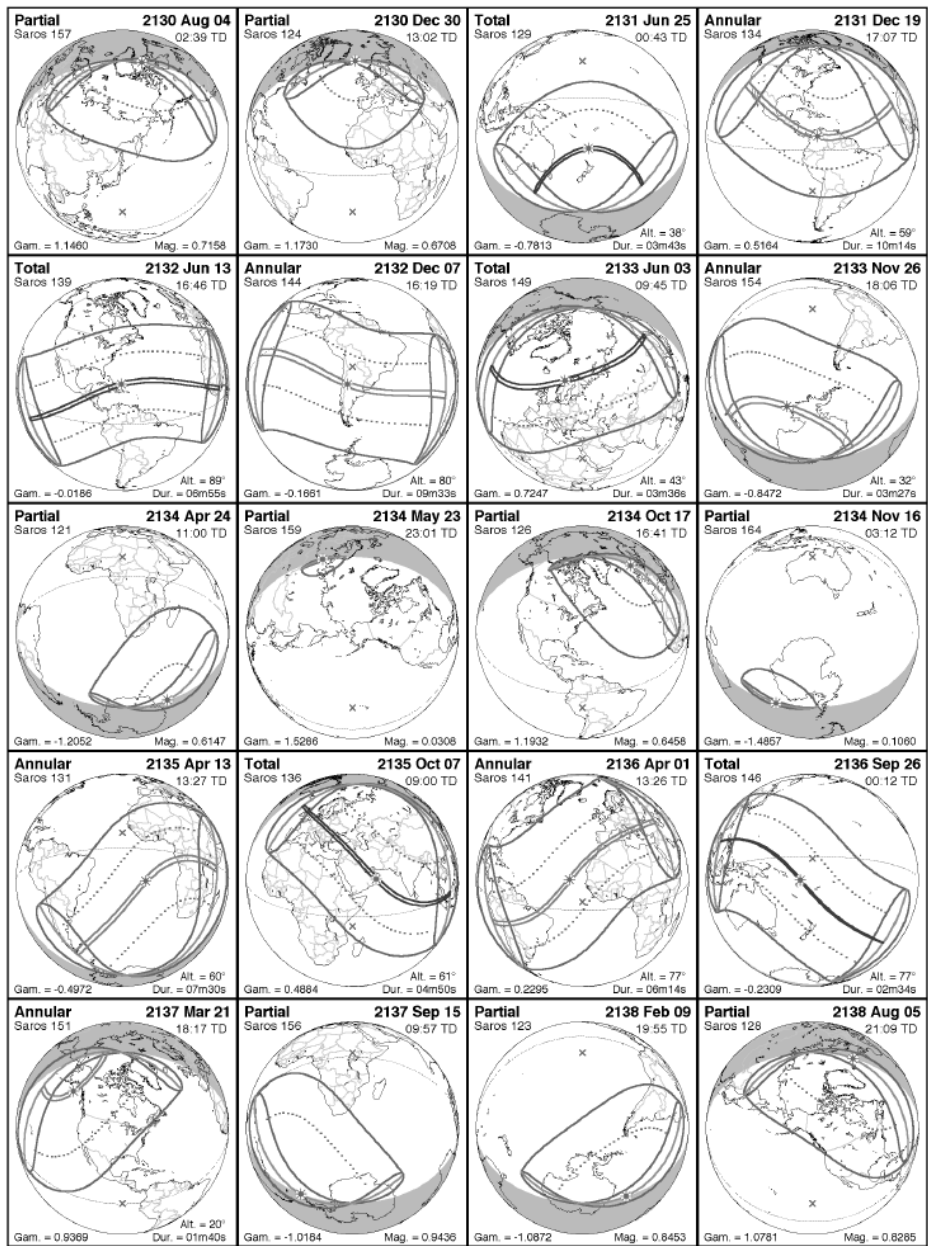
Fred Espenak, Jean Meeus : **Five Millennium Canon of Solar Eclipses: -1999 to +3000** (NASA/TP-2006-214141) + catalog  
11 898 solar eclipses  
<https://eclipse.gsfc.nasa.gov/SEpubs/5MCSE.html>



**Total** **2135 Oct 07**  
 Saros 136 09:00 TD



Alt. = 61°  
 Gam. = 0.4884 Dur. = 04m50s



$\Delta T = 277$  s [= 00h05m]

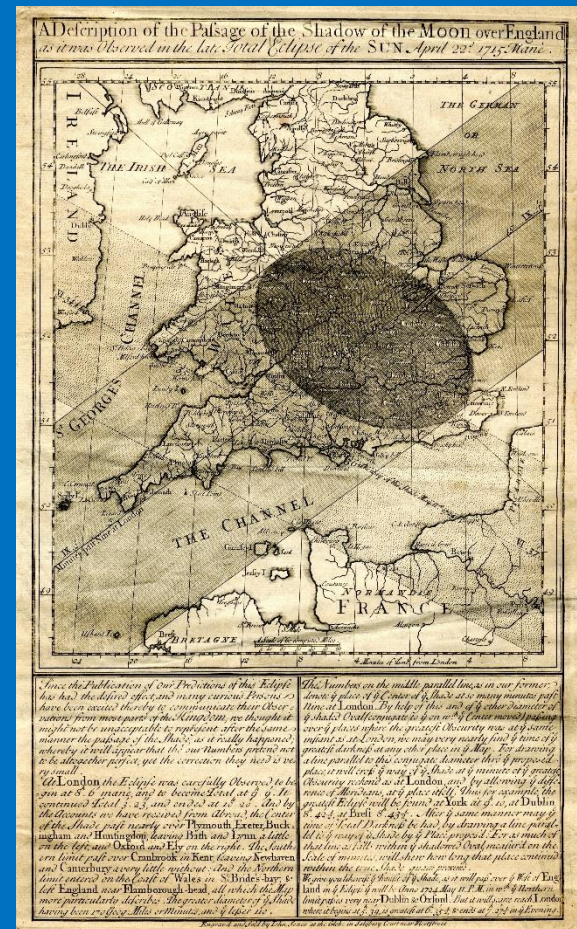
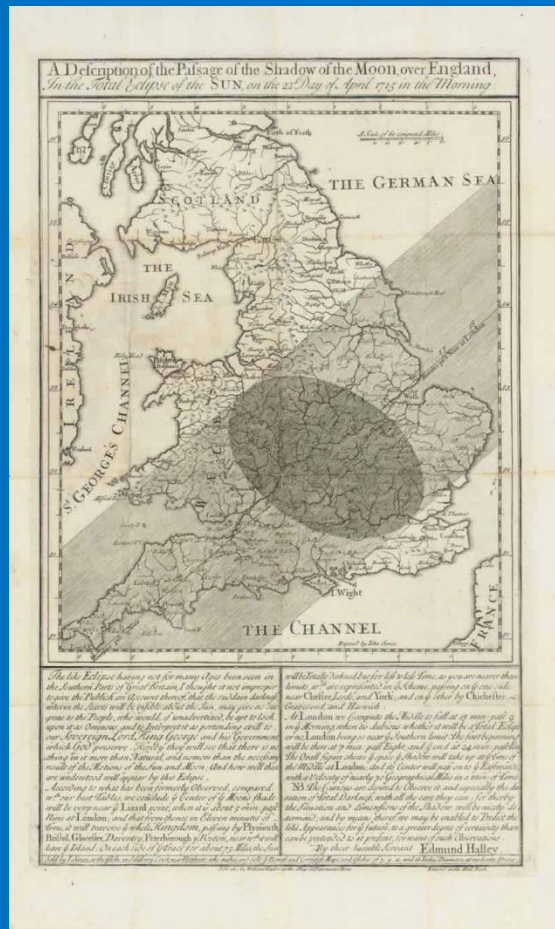
std.err. =  $\pm 73$  s [=  $\pm 0.3^\circ$ ]

Plate 491



First “reliable” solar eclipse calculations - after Rudolphine tables by J.Kepler and mainly after Newton’s Principia and fitting Moon position observations with theory

Predictions in form of pamphlets/broadsides (single-page prints) – famous Halley 1715 and 1724 eclipses



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Astronomical almanacs **Connaisance des Temps** (1679; 1801-ASE 28.8.1802), **The Nautical Almanac and Astronomical Ephemeris** (1765; 1833-TSE 30.11.1834) had for many years only short textual descriptions of solar eclipses with no (path) charts given.

**Astronomisches Jahrbuch** (1774, 1775-ASE 26.8.1775)

1770 – **l'Art de verifier les dates des faits historiques, des chartes, des chroniques et autres anciens monuments** – part named **Chronologie des éclipses, visibles en Europe, en Asie & dans partie de l'Afrique, connue des Romains** (table of eclipses) prepared by Alexandre Guy Pingré (1711-1796) covering years 1->1900 use eclipses for verification of historical events  
1818 edition du Vaucel 1901->2000  
1834 edition no eclipses at all

1787 – Pingré - **Chronologie des éclipses de Soleil & de Lune qui ont été visibles sur Terre, depuis le Pole boréal, jusque vers l'Équateur, durant les dix siècles qui ont précédé l'Ère chrétienne** (years -999->0) = continuation







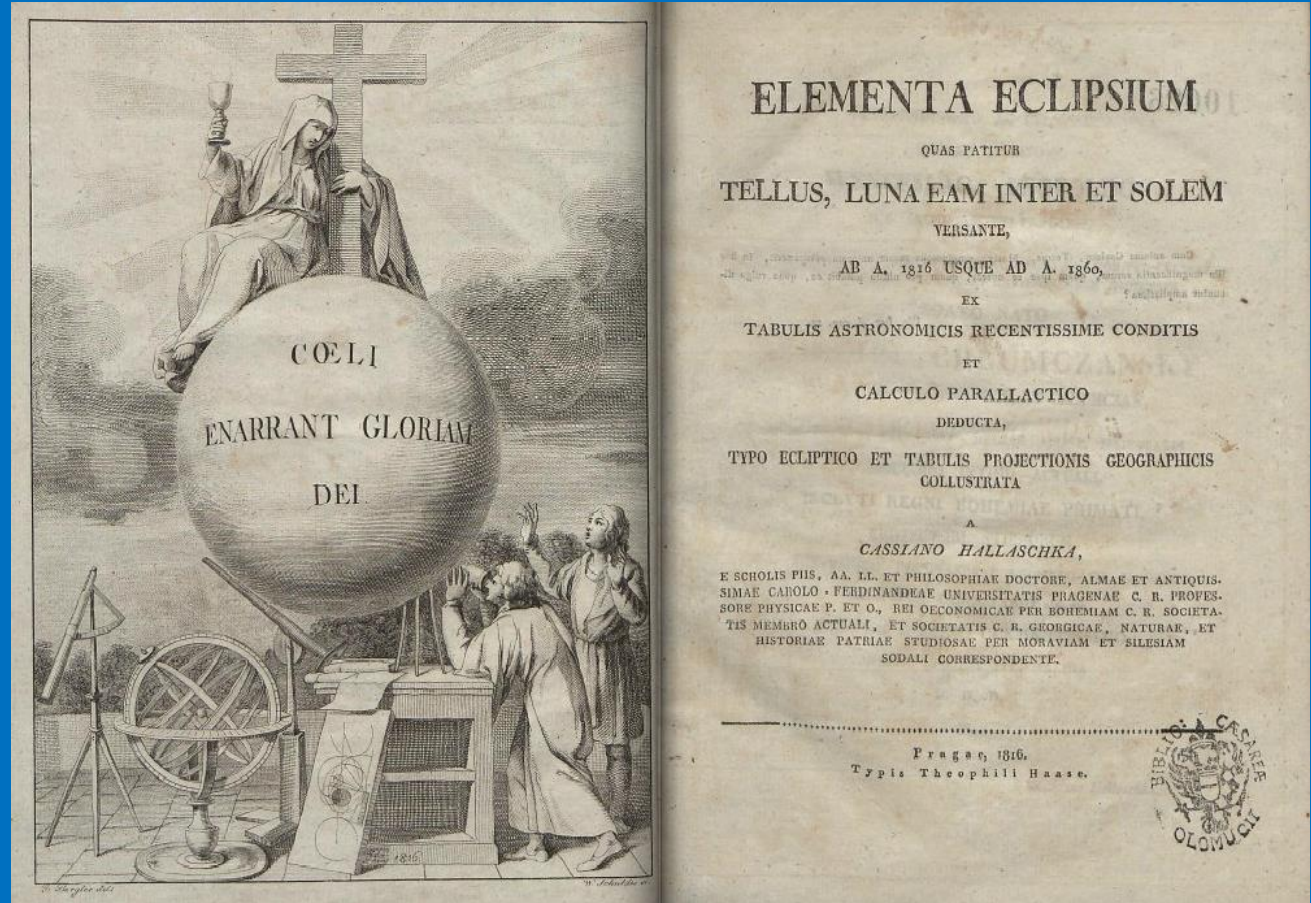
Various methods for calculation of global and local circumstances, either in numerical or graphical form (Du Sejour, Monteiro, Goudin, Hansen, Delambre, Wolf, Mayer, Euler, Lalande, T. Mayer, Lagrange, Lexell, Cagnoli, Gerstner, Kluegel, Bohnenberger, Wurm etc.)

Friedrich Wilhelm Bessel - Beiträge zur Theorie der Finsternisse und den Berechnungs-Methoden derselben (Astronomische Nachrichten No.151+152 pp. 121-144, 1829)

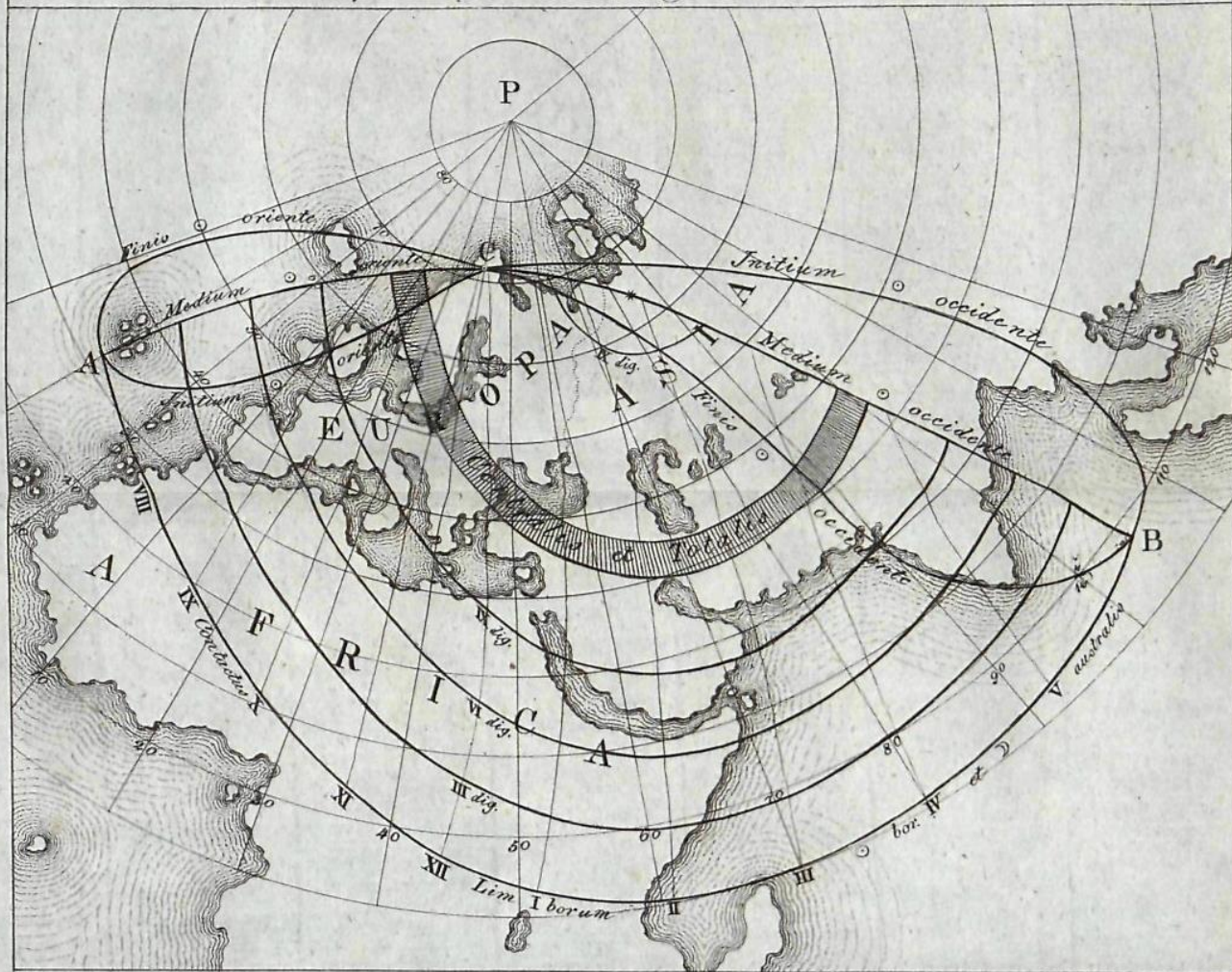


ELEMENTA ECLIPSIUM QUAS PATITUR TELLUS, LUNA EAM INTER ET SOLEM  
VERSANTE AB A. 1816 USQUE AD A. 1860 EX TABULIS ASTRONOMICIS  
RECENTISSIME CONDITIS ET CALCULO PARALLELACTUS DEDUCTA, TYPO  
ECLIPTICO ET TABULIS PROJECTIONIS GEOGRAPHICUS COLLUSTRATA (1816)

(Elements of eclipses ... from 1816 to 1860 based on the newest astronomical  
tables ... with geographic maps) - Heavens declare the glory of the god



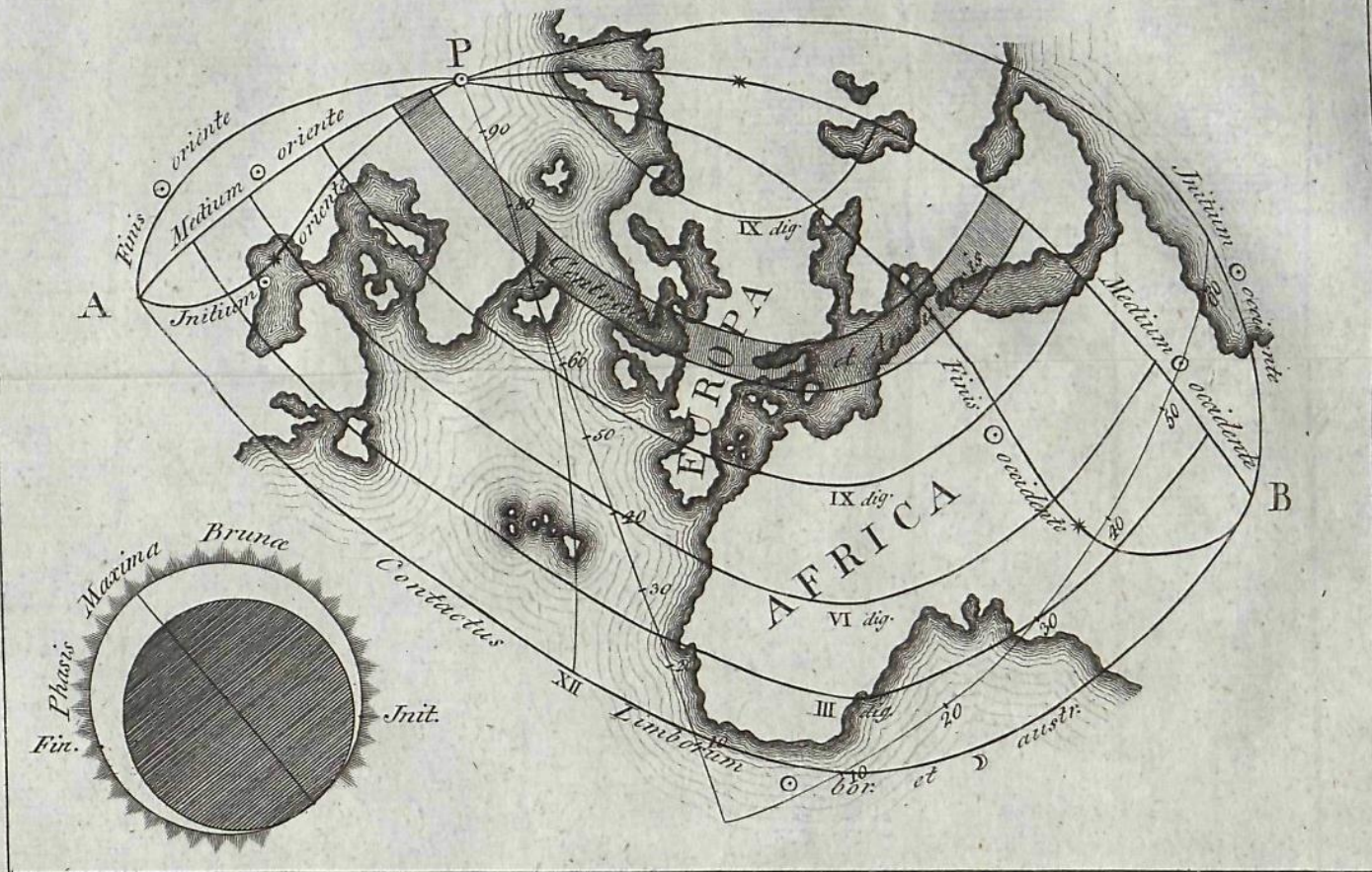
*Occultatio Solis per Lunam die 19 Novembris 1816. Fig. 6.*



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*Occultatio Solis per Lunam diei 7. Septembris 1820. Fig. 19.*

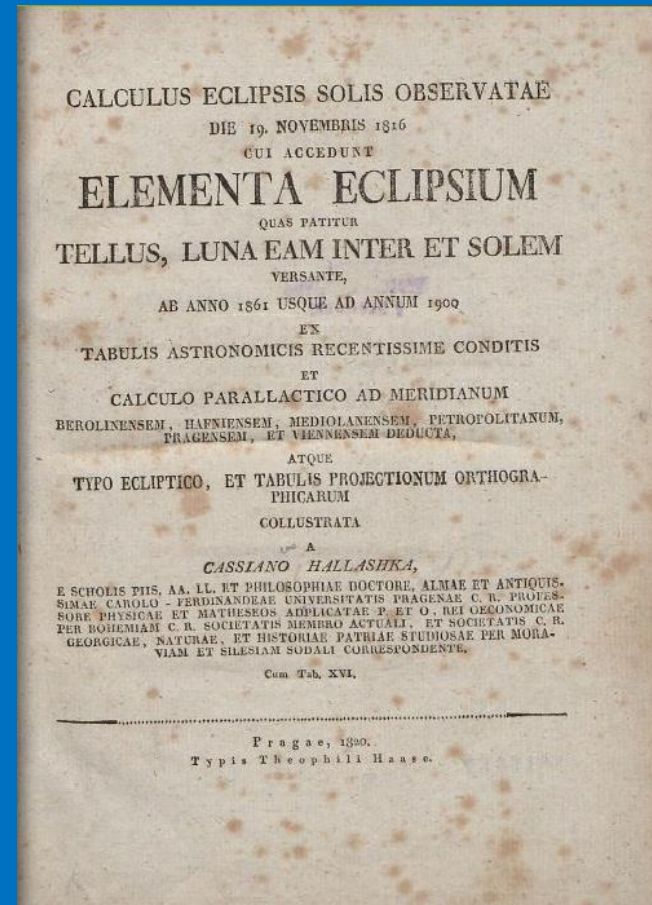


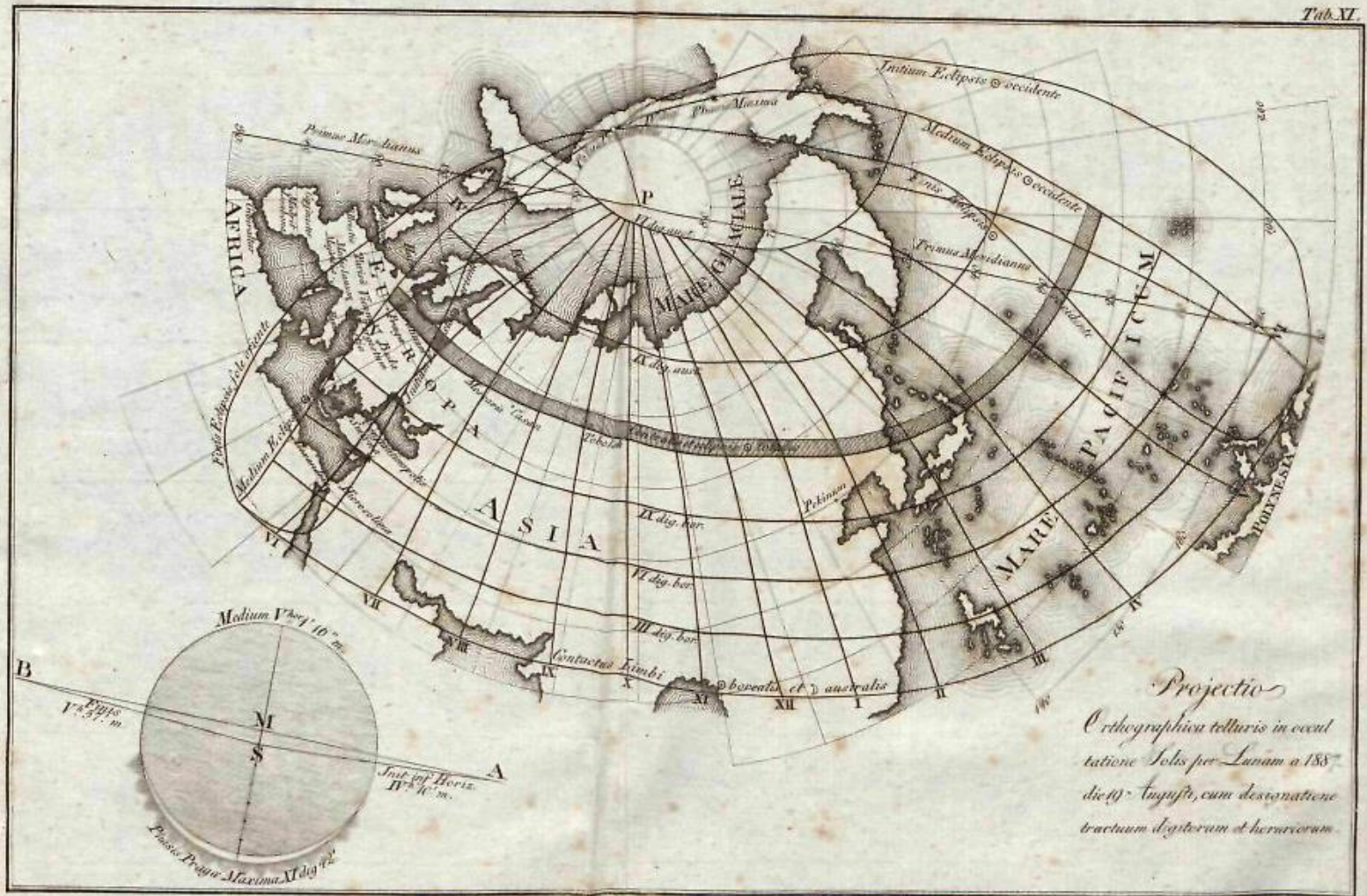
ESOP X

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CALCULUS ECLIPSIS SOLIS OBSERVATAE DIE 19. NOVEMBRIS 1816 CUI ACCEDUNT ELEMENTA ECLIPSIIUM QUAS PATITUR TELLUS, LUNA EAM INTER ET SOLEM VERSANTE, AB ANNO 1861 USQUE AD ANNUM 1900 EX TABULIS ASTRONOMICIS RECENTISSIME CONDITIS ET CALCULO PARALACTICO AD MERIDIANUM BEROLINENSEM, HAFNIENSEM, MEDIOLANENSEM, PETROPOLITANUM, PRAGENSEM, ET VIENNENSEM DEDUCTA, ATQUE TYPO ECLIPTICO, ET TABULIS PROJECTIONUM ORTHOGRAPHICARUM COLLUSTRATA (1820)

Berlin, Copenhagen, Milan,  
St.Petersburg, Prague, Vienna





*Projectio  
Orthographica telluris in occultatione Solis per Lunam a 188 die 10 Augusti, cum designatione tractuum digitorum et hincrorum*

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Author - CASSIANO HALLASCHKA

Developed his own method of prediction as combination of numerical calculations and graphical solution (basic idea is very close to the method only few years later brought to perfection by Bessel).

In the first volume (1816) – all principal elements and times for 13 eclipses were calculated for Moravian capital - Brno (Brünn) where calculations were done and maps show on insets the eclipsed Sun as visible from Brno (but in text were included basic tabular data for Berlin, Budapest, Prague, Vienna and Lvov).

Second volume (1820) was more ‘international’ giving local circumstances for Berlin, Copenhagen, Milan, St.Petersburg, Prague and Vienna of 15 eclipses, but maps show on insets the eclipses as visible from Prague only (he lived there).

Both works were positively reviewed in Berliner Astronomische Jahrbuch and highly valued by Johann Bode, although they were in fact incomplete. But they were the first canons of solar eclipses with geographical maps.



latin CASSIANO HALLASCHKA – full name Franz Ignaz Cassian Hallaschka

\* July 10th, 1780 (Budišov nad Budišovkou = Bautz)

+ July 12th, 1847 (Praha = Prague)

1790 — entered 'basic' school in Stará Voda (Altwasser), Moravia, later studied at Strážnice (Strassnitz), Mikulov (Nikolsburg) and Kroměříž (Kremsier)

20.10.1799 — entered the Piarists, the Catholic educational order ("Clerici regulares scholarum piarum")

1801-1803 — teacher of mathematics and physics at secondary schools in Strážnice, Mikulov and Kromeříž

1804 — lecturer at the Theresianum Academy in Vienna, praefect of this school

24.10.1807 — "philosophiae doctor"





1808-1814 — back to Moravia as professor of physics and mathematics at the piaristic colleges in Mikulov (Nikolsberg) and Brno (Brünn). Private observatory.

1814-1832 — Prague (Herrengasse = Panská ulice No.856, Nové Město), professor of physics of Prague University, private observatory on the roof

1832 — Chancellor of the Prague University ("rector magnificus")

1833/34 — Chancellor of the Vienna University ("rector magnificus") member of the governmental high commission for education (Regierungsrath und Referent bei der Studienhofcommission) thus responsible for philosophical, technical, nautical university studies and education at technical high schools, mining and forest academies.

He substantially improved physics teaching in the Austrian monarchy, initiated and supported the creation of "Cabinets of Physics" in schools and accented demonstration of experiments.



1832 — member of Königliche böhmische Gesselschaft der Wissenschaften  
(later Academy of Sciences)

1838 — probost in Stará Boleslav (Altbunzlau) and landespraelat of Bohemia

1844 — councillor at the imperial court

July 12, 1847 — died in Prague after return from Karlovy Vary (Karlsbad) aged  
67 and is buried in Stará Boleslav

Franciscus Cassianus  
Hallaschka

Praep. Vetero Boleslaviensis et Praelatus  
Bohemiae infulatus, natus 10. Julii 1780  
denatus die 12. Julii 1847  
In te Domine speravi, non confundar in  
aeternum





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Extensive observations of solar/lunar eclipses, Jupiter's moons events, comets, occultations, sunspot observations (during Dalton minimum 1814+1816), meteorology (long runs in Brno and Prague), ...

experimental physics, optics, thermodynamics, electricity, geology and magnetism

geographical coordinates (with Martin Alois David (1757-1836) – 4th director of Klementinum Observatory 1799-1836)

27 printed works – textbook Handbuch der Naturlehre (3 vols, 1824-25)

Numerous articles in Bode's Berliner Astronomische Jahrbuch, Schumachers's Astronomische Nachrichten, Zach's Monatliche Korrespondenz, Effemeridi Astronomici di Milano, Hesperus, Abhandlungen ...

Extensive letter exchange with Bessel, Bode and other astronomers of his time



He was a „bright personality of unusual charm and diplomatic capabilities“ as was noted by his contemporaries and his career speaks for this.

1780 – 238 years

1816 – 202 years

1820 – 198 years

1847 – 171 years

No ‘round’ celebration, but anyway – he and his work should be noted

