Mathematics and Physics in Prague

of Slowly Fading Baroque

Joseph Stepling (1716 – 1778)

the Founder of the Prague Observatory

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Introduction

- **Great change in the education of exact sciences in the Jesuit Academy in Prague in the 18th Century.**

- The conceptual shift from the Aristotelian Science to the Newtonian Science was influenced by **Joseph Stepling**.

- It was he who played a central role in the change of the **Jesuit educational curriculum.**

- 1750

Mathematical Sciences in the Jesuit Curriculum

- 1586 Ratio studiorum
- Ch. Clavius, Collegio Romano
- The recovery of ancient mathematical sources
- Aristotle standards for a demonstrative science

- A crucial problem – syllogism
- Aristotle held the syllogism to be the ideal and most powerful reasoning tool.

Stepling as Precursor of Modern Logic

- Leibniz and Wolf ideas
- He transposed Aristotelian logic into formulas, thus becoming an early precursor of modern logic.

Clementinum

Klementinum (*Clementinum*) was originally constructed by Jesuits as a college for students .

It was founded 1556 with help of the king Ferdinand I. (Habsburg).

There Gymnasium, Ferdinand´s Academy, later connected with the University, library, printing house, pharmacy with laboratory, hospital and two churches were settled here.

From the year 1622 the library of all colleges of the University is in the area and from 1751 *Astronomical Tower* - observatory - to the first years of 20th century only one significant observatory in the Czech Kingdom.
With astronomy are connected meteorological observations.

Joseph Stepling (1716 – 1778)

- * 1716, June, 29, Regensburg
- + 1778, July, 11, Prague

- His father Heinrich Wilhelm Steplin (sic!) from Westfallen was the secretary of the Emperor Embassy there.
- After death of his father Stepling as a child came to Prague with his mother Blandina (who was native of the Bohemia).

Joseph Stepling was born in Regensburg, June 29, 1716

Education

- Joseph Stepling was educated by private teachers, then attended Jesuit Latin School in Prague closed the Castle (Lesser Town , today Malá Strana, a part of Prague closed the river Vltava)
- Then attended in the Jesuit College in Prague but due to his weak constitution he could not join to the Jesuit Order.
  The teachers led him to mathematical studies. The Jesuit teacher Sykora gave **Euclid's Elements** to his hands.
- Stepling - 16 years old – firstly observed and with great precision documented the eclipse of Moon (the lunar eclipse on 1733, May, 28th). He used the tables of French astronomer **Philippe de la Hire** (1640 – 1718). The same year he managed to join the Jesuit Order as new young member in BRNO (Brünn).
- Then OLOMOUC (Olmütz), where he studied philosophy, from 1735 to 1738
- and continued his studies in Graz.
- He was not satisfied with lectures on Aristotle and he started to read mathematical literature ***Wolf*'s, *Sturm*'s textbooks and physical papers** and studied them with details.
- From Olomouc (Olmütz) he came to KLADSKO (Glatz) and to SVÍDNICE (Schweidnitz) as teacher.
- Before 1743 Stepling began to study theology in Prague, he taught mathematics and physics at various Jesuit schools.

Lunar Eclipse, 1733

- **Joseph Stepling, S.J.** 1716-1778 at the age of 17 calculated with great accuracy the 1733 lunar eclipse.

- Later Leonhard Euler was among his long list of correspondents.

Foundation of the Observatory

1751 - Observatory

The „Mathematical Tower“ was built i 1721 as for beautiful view around Prague Towns.

Stepling changed in into a real observatory.

He bought instruments for observations and measuring and

He brought up to the latest scintific standard.

Since 1752 he began collecting systematic and regular records of air, pressure, temperature and precipitation, which were published later.

Clocks in the Clementinum

Johannes Klein (1684 – 1762)

Project of Stepling

in *Exercitationes geometrico – analyticae* , 1751

Clocks in the Clementinum

Experiments with electricity

- 1745
- He installed electricity a 800 m long chain
- Great interest in Jesuit knowledge of public

Stepling and the Empress

- The Empress Maria Theresa appointed him director of the faculty of philosophy at Prague as part of the reform of higher education in 1752.
- He was very interested in cultivating the exact sciences and founded a society for the study of science modeled on the Royal Society of London. Many of the findings of the this society were published.
- At his death Maria Theresa ordered a monument to be erected in his honor in the library at the University of Prague.

His Scientific Life

- Joseph Stepling made first steps to Newtonian Physics.
- He founded the seminar for students and colleagues. They solved problems of calculus (I. Newton and G. W. Leibniz, etc.) there.
- Impact on the education of exact sciences at the Prague University.
- All his papers are in Latin language and later were translated to German by his pupil Anton Strnad, later the director of observatory.

New Mathematical Hall, Clementinum

From Stepling's papers:

- *Eclipsis Lunae totalis Pragae anno 1748 observatae*, Pragae 1748.

- ***Exercitationes geometrico-analyticae** de ungulis aliisque frustris cylindrorum, quorum bases sunt sectiones conicae infinitorum generu,* Pragae 1751, 4°.; nova editio Dresdae 1760.

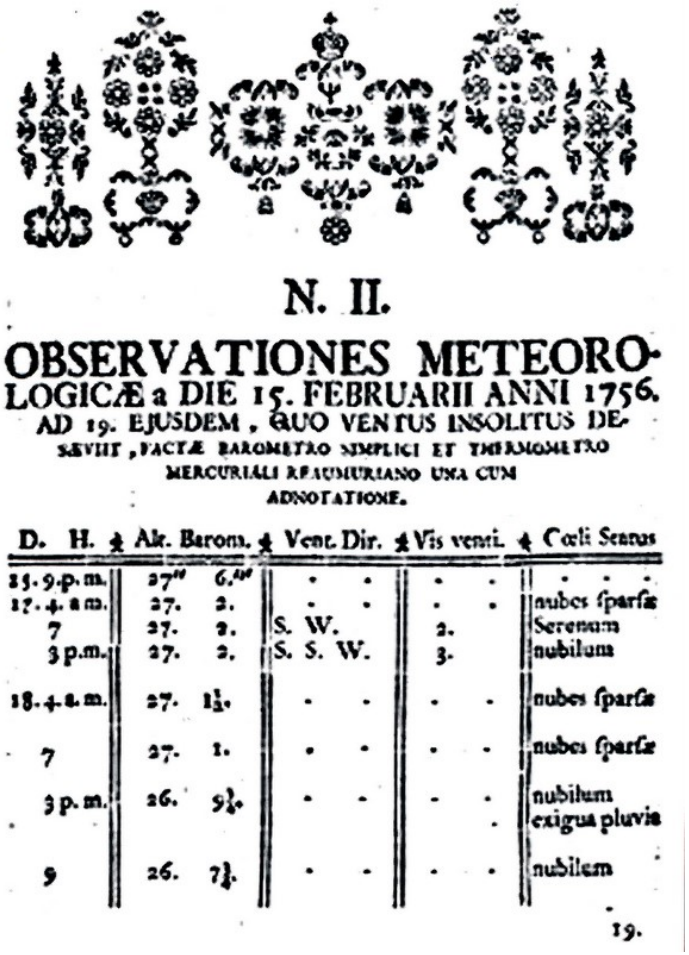
- ***Differentiarum minimarum quantitatum variantium calculus directus vulgo differentialis,* Pragae 1764, 4°.**

Applied Maths

In 1748 Stepling determined the geographical lenght of Prague for the new map of Germany. In 1751 the observatory in the Jesuit College in the Clementinum was founded.

He studied the aberation of light of stars, and the electricity.

Meteorological Observations



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OBSERVATIONES METEORO-
LOGICÆ a DIE 15. FEBRUARII ANNI 1756.
AD 19. EJUSDEM, QUO VENTUS INSOLITUS DE-
SEVIIT, FACTÆ BAROMETRO SIMPLICI ET THERMOMETRO
MERCURIALI REAUMURIANO UNA CUM
ADNOTATIONE.

D.	H.	Alt. Barom.	Vent. Dir.	Vis venti.	Cœli Status
15.	9. p. m.	27″ 6.‴	. .	. .	. . .
17.	4. a m.	27. 2.	. .	. .	nubes ſparſæ
	7	27. 2.	S. W.	2.	Serenum
	3 p.m.	27. 2.	S. S. W.	3.	nubilum
18.	4. a. m.	27. 1½.	. .	. .	nubes ſparſæ
	7	27. 1.	. .	. .	nubes ſparſæ
	3 p. m.	26. 9½.	. .	. .	nubilum exigua pluvia
	9	26. 7¾.	. .	. .	nubilum

19.

- In 1752 he started the regular meteorological observations.

Measuring of Time

Stepling‘s correspondence

- His correspondence with European mathematicians and astronomers:

  Maximilian Hell,
  Franz Huberti,
  Jean-Antoine Nollet,
  Ruder J. Boscowich,
  Nicolas-Louis de Lacaille,
  Christian Wolf,
  Leonhard Euler, etc.,

- is important for the studium of mathematical knowledge of this time.

Stepling as University Teacher during Last Years

- He remained at the University after the dissolution of the Jesuit order in 1773.
- He often visited new Scientist Club (not so far of Clementinum) in today Karlova Str. – reading journals
- His respect was permanent.
- Professorship for pupils Stanislav Vydra – Elementary Mathematics

  and Joannes Tessanek (Czech Newton) – Higher Mathematics

Clementinum

His pupils

- He also influenced many his successors, among them Joannes Tesanek („Czech Newton“), Stanislaw Wydra (the professor of mathematics) , Anton Strnad (the professor of astronomy), Alois M. David (the director of observatory), Bernard Bolzano (the mathematician), Franz Joseph Gerstner (the professor of higher mathematics and the founder of Czech Technical University).

Memorial tablets

- The name of Joseph Stepling
  is possible to find between
  72 significant names for history of science and culture
  under the windows
  of the National Museum in Prague.

National Museum in Prague