Some Historical Point of View on Electricity at Slovak Region

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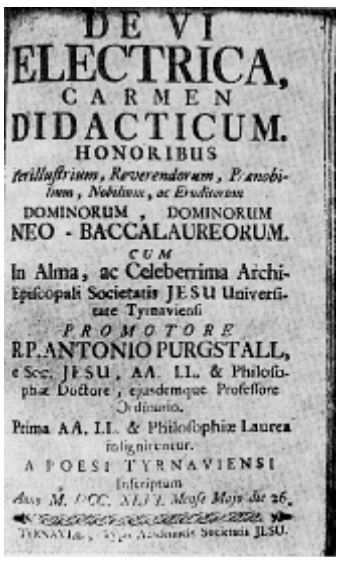
ABSTRACT: The interest in electricity was marked in Slovakia as well. Remarkably, we can distinguish between antefranklin and postfranklin period. I have mentioned some very important persons for Slovakia in the reminiscences of the development of the electricity in Slovakia until the half of the 19th century.

In 18th century there was a big interest in electric phenomena in the whole world. Two circumstances changed the originally amusing nature of experiments in the field of electricity in the second half of century: discovery of so called Leyden bottle and atmospheric electricity. It was possible to concentrate bigger amount of charge in the Leyden bottle and so to raise big sparks. Then it was easier to find out affinity between an electric spark and a lightning. Richman's tragic death in the year 1753 showed that a new strong weapon was invented. The invention of the lightning conductor made Franklin very popular and represented a fast spread of his inventions.

The interest in electricity was marked in Slovakia as well. First remarks were dated back to the beginning of the 18th century but they did not have scientific nature. The sparks were connected with minerals and lightning with meteors. Remarkably, we can distinguish between antefranklin and postfranklin period.

Antefranklin period

is marked with the works of DANIEL FISHER. He was born on 1695 in Kežmarok. He worked there as a general practitioner and as an active investigator/research-worker. In spite of the fact that most of his works are devoted to medicine, his works from physics are known as well: *Elemnnta physicae auctore D. Fisher, De calore atmospherice* from the 20´s and his work *About lightning, thundering, and stroke of lightning* published in Latin language in the year 1717. His understanding what can cause lightning, was based on the affirmation that the lightning could be made out of the chemical reaction. Even if there is an indication of endeavour in scientific research, he saw in a prayer only one possibility of the protection before a lightning. He belongs among first scientists in Slovakia who tried to „give" the collective nature and planning in the field of nature sciences, He died in 1746.


DE VI
ELECTRICA,
CARMEN
DIDACTICUM.
HONORIBUS
illuſtrium, Reverendorum, Plurimorum, Nobilium, ac Eruditorum
DOMINORUM, DOMINORUM
NEO - BACCALAUREORUM.
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In Alma, ac Celeberrima Archi-Epiſcopali Societatis JESU Univerſitate Tyrnaviensi
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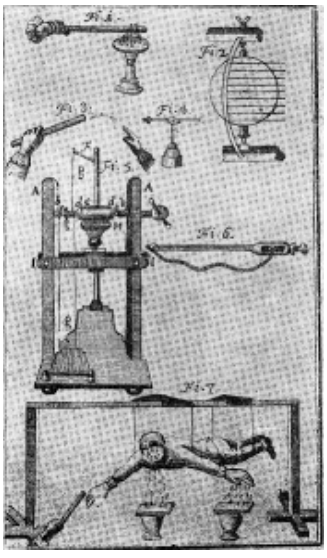

Fig. 1a,b

Before the year 1751 the question on electricity appears only sporadically. Only one important work from this period is a rhymed composition by J. PURGINU (1719-1748) (Fig.1a,b) from the year 1746 with the title *De vi electica carmen didactum* (instructive poem on electric power). The author came from Trnava and he studied theology. The work consists of three parts: in first one he studied the electricity originating from friction, in the second part he spoke about the „delivered" electricity - about conductors and the last one is about light and fire of electric elements. This discourse is considered to be the first about electricity in Slovakia.

Postfranklin period

The Leyden bottle and Franklin's experiments with atmospheric electricity speeded up an experimental activity in the field of physics in Slovakia. But there was no interest from the side of the government which had an unfavourable effect on this fact.

One of the first author, influenced by Italian scholar G. B. BECCARIA, was A. HORÁNYI. He published his work *De artificiali electrisimo ex Benaimini Franklini theoria* in Rome in 1756. In his work Horányi explains basic electric phenomena. He did not deal with atmospheric electricity but it is dedicated to electric steam and existence of electric atmosphere. He distinguished between two kinds of electricity: positive and negative which is founded by theoretical explanation. He made an analysis of Leyden's bottle and he „defended" Franklin's experiments. He submitted an analysis of the four elements from the point of view of the electricity. Air is an insulator, water is conductor, fire supports spreading of electricity and earth is conductor.

The Slovak B. BUCSÁNYI (1793-1796) was much deeply devoted to this question, he provided with wider experiences in the field of physics and evidence about the original interesting opinions in his work *About lightning and thundering as phenomena of electricity* published in 1757. He was born in Zvolen, he studied in Gottingen and lived in Hamburg. He wrote some works from algebra and works about atmospheric electricity. M. Bucsányi spoke about an electric liquid, analysed characteristic features of an electric spark in order to be able to be compared it with a lightning. in his work he argued against some various superstitions and folk idle talks connecting with lightning and thundering, he explained and launched new notion *radius electricus* and described how should good lightning conductor look like.

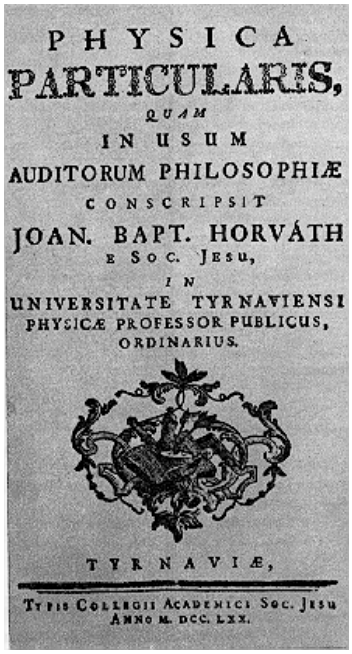
PHYSICA
PARTICULARIS,
QUAM
IN USUM
AUDITORUM PHILOSOPHIÆ
CONSCRIPSIT
JOAN. BAPT. HORVÁTH
E Soc. Jesu,
IN
UNIVERSITATE TYRNAVIENSI
PHYSICÆ PROFESSOR PUBLICUS,
ORDINARIUS.
TYRNAVIÆ,
Typis Collegii Academici Soc. Jesu
Anno M. DCC. LXX.

Fig. 2

Makó and Radics contributed most importantly by their works to the „promotion" (build-up) of electricity in Slovakia. In their similar works, as far as content concerns, *Set of physical sciences that for the needs of the students were written by* and *scinces of physics for the needs of students* from the year 1766 are dedicated, inter alia, the problem of connection between fire and electricity and they stated even if there were some similarities, they could not be identical. In that period the book of Makó could be considered as the most progressive.

J. Horváth (1732-1799) belonged to the most important authors of the physics textbooks in nowadays Slovakia in 18th century. He worked at the Trnava University as a professor. His two textbooks *Physica generalis* and *Physica particularis* (Fig. 2) were published in the years 1767 and 1770. The sixth chapter deals with electricity, that is connected with Makó's

work as far as opinions is concerned but however it dealt with „favourite“ medical electricity he described Volt's electrophor and condenser (condensator).

Another author dealing with electricity was LEOPOLD SCAFFRATH (1734-1808). In his dissertation work *About atmospheric electricity and protection of buildings before the stroke of lightning* published in 1778 he described a real stroke of lightning and he recommended specific protection before a lightning. He was one of the few researchers who were able to apply theoretical knowledge to specific practical problems. L. Schaffarath was born in Bratislava, he belonged to piarists, studied in pisa, worked in Budapest.

At the end of the list of the works from the field of electrostatics is the work of an amateur J: VALENTINI, priest from Kláštor pod Znievom. In his work *Exercitatio electrica* published in 1810 he described 31 experiments, most of them were simple and one part out of them was dedicated to electricity experiments which he did carry out himself.

Period of galvanism

In 19th century a big attention was paid to galvanism, which became much interesting than for example Franklin's experiments. A. TOMCSÁNYI (1755-1831) reacted as a first person on this problem in his monograph *Disertatio de theoria phaenomenorum electricitatis galvanianae* (Fig.3) containing 355 pages and published in 1809. In his work he studied, inter alia, animal electricity and noteworthy is the fact, that he mentioned the chemical effect of the current.


ADAMI TOMTSÁNYI
DISSERTATIO
DE
THEORIA
PHAENOMENORUM
ELECTRICITATIS GALVANIANAE
BUDAE,
TYPIS REGIAE UNIVERSITAT. HUNGARICAE

Fig. 3

Extensively modest but very interesting is the work by A. FUCHS published in 1856 about the behaviour of the (water) jet in the electric field.

The very important person of the Slovak history of physics, even though not so known in the world, is Š. A. JEDLÍK (1800-1895). He was a lecturer of physics and agriculture at Bratislava Academy. It is known about him that he invented so called principle of dynamo (Fig.4) six years earlier than Siemens, maybe it was 20 years earlier. In the year 1828 he constructed small movable magnet for electric experiments which in an essence was an electromotor. The social conditions in the Habsburgs monarchy did not create for him conditions for his professional development, publishing and „promoting“ of scientific knowledge, which he gained through his own experimental activity. In the course of years 1840-1850 belonged the equipment for cutting of very fine optical grids to the most important inventions. After 1850 he intensively dealt with finding of ideal current resource respectively voltage. He dealt with improvement of galvanic cells. Very special is Jedlík's unipolar dynamo, in which the polarity of magnetic field had been changing by every turn/speed and so the one-stream current was generated.

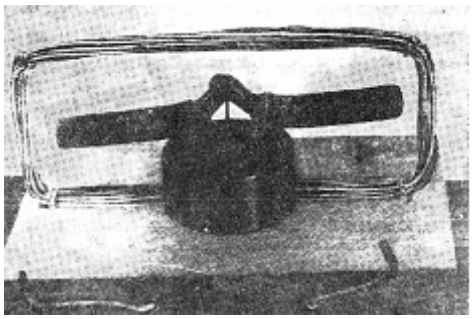

Fig. 4

I have mentioned some very important persons for Slovakia in the reminiscences of the development of he electricity in Slovakia until the half of the 19th century. I did not

mentioned some other like e.g. Hell, Frohlich, Jaslinský, Kemplen, Pankl because their important works in the field of physics did not concern electricity.

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