

Ph.D. Theses

Zoltán Király

HISTORY OF COMPUTING IN HUNGARY UNTIL THE APPEARANCE OF THE FIRST ELECTRIC COMPUTER

**BUDAPEST UNIVERSITY OF TECHNOLOGY AND ECONOMICS
FACULTY OF ECONOMIC AND SOCIAL SCIENCES**

Doctors' school for History of Technics, Engineering and Sciences
Program for History of Technics and Engineering

Program leader: József Németh, Dr., C Sc.
Consultant: Zoltán Galántai, Dr.

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1. Research subject

Elaboration of the history of computing science in Hungary from the development of counting-, calculating- and computing as well as data processing means until the appearance of the first electronic computers.

2. Preliminaries to the research

I profess and believe that those failing to know the history of their lines neither are familiar with their lines indeed! As a teacher teaching electronic data processing, I has been engaged with teaching of subject matters of computing science type and the history of computing science for more than 15 years. I imparted my knowledge not only of general and specific information technology and computer technology to my students at the various faculties of the Dunaújváros College but also I made attempt to make them acquainted with the history of these fair trades. I have also been teaching the history of computing science for 5 years as a facultative subject matter. I have been strived for — unfortunately with few success — that our technical students are also allowed to learn subject matters in the history of technics similarly to the students of engineering teacher line that learn history of pedagogy or the students of economy that learn history of economy. Unfortunately, the technical higher education fails to deem this knowledge competitive, therefore it cannot be preferred. At the same time, an increased interest on the part of our students can be experienced.

The majority of students in information technology in the higher educational institutions of Hungary have the possibility of registering for subject matters in the history of computing science (information technology). Within the scope of the usually one-semester subject matter, the students are able to get acquainted with the universal history of computing science. At best, the names of a few Hungarian scientists are also mentioned during these lectures.

The number of computing scientists and historians that organize courses is increasing. While enriching their knowledge by studying foreign professional literature, they make attempt to impart their knowledge acquired in this way. They can obtain some assistance from the limited Hungarian literature- The majority of Hungarian papers, however, deals only with a short period of the computing science or offers a full universal survey only in a general outline. With the appearance of new media, it

is perhaps the Internet that became the largest and the most comprehensive information source of both the universal and the Hungarian history of computing.

At the Budapest University of Technology and Economics, I started my research relating to the history of computing in Hungary in 2003. The research of the history of calculating devices and the computing in Hungary started only in the recent years.

Although the early calculating devices and devices supporting the calculation and computing were also known earlier, these became parts of the history of a technical tool on the appearance and propagation of computers. It is only during the recent one or two years that an effort to consider the prehistoric history of computers an integral part of the history of computation is formulated.

3. Justification of the selected theme, subject matter of theses

My objective is to elaborate the history of computing in Hungary from the development of the counting-, calculating-, computing and data processing means up to the appearance of the first electronic computers.

With a few exceptions, the works treating the history of computing in Hungary regard the sixties as a starting point. The books and web pages describing the pre-electronic era discuss only the history of the universal computing science, while mentioning hardly ever the — as they think — single Hungarian factory that produces mechanical calculators. During my research tasks, a multi-colour interesting world was presented to my sight in which a number of counting, calculating and computing means were used by our forefathers. For data storage and data recording, diversified methods were used. Automates that were simpler at the beginning and became more complicated later were produced. All these methods and means prepared the way for the process that resulted in the appearance of the programmable automates in the 20th century that are suitable to be used for calculating and computing and are collectively called computers. At the same time, this multi-coloured (mechanical and analogue) world that includes an incredible diversity remained hidden before the students attending lectures on the history of computing. I make attempt to present this world by means of my theses and to show how ingenious solutions can be found by the human brain find to implement some — while dry — mathematical problems.

4. Methods of the research

During the research work, the methods used were as follows:

- processing of the domestic and international bibliography,
- searching for, analysis and study of material remains related to the research, that can be found in both Hungary and abroad,
- searching for archive data and original documents and their processing,
- processing of daily news, periodicals, weekly publications,
- processing of the relevant professional literature,
- processing of patent documents,
- searching for leaflets^{etc} relating to the subject (catalogues, price lists, instruction manuals, product information etc.)⁴ and their study,
- review of materials to be found on CDs and the Internet and their processing.

Gathering information from the domestic and international professional literature according to the subject of theses aimed at revealing the issues as follows:

- What are the scopes deemed by the professional literature to be classified into the field of computing science?
- What kind of means and methods are recognized by the professional literature as those having led to the development of computing science and computers?
- Who are the Hungarian personages considered by the Hungarian and international literature significant (or less significant) characters in the history of computing?
- What kind of effect had the early means of counting-, calculating-, computing- and data storage on the development of society and the technical culture?
- What are the means that had an influence on the development of computing science in Hungary?

During the elaboration of the subject, I studied the professional literature published in Hungarian and foreign — primarily English and German — language published during the last two decades. It shall be noted that the books, periodicals or conference papers of Hungarian language dealing with the history of computing give primarily a general view. For the most part, the professional literature dealing with the Hungarian computing science discusses the history of electronic computers that have appeared from the early sixties.

The analysis and processing of material remains and collections related to the research that can be found in both Hungary and abroad aimed at searching for the means originated from ideas and patents other than Hungarian ones and produced in a country other than Hungary, however, used in Hungary. I also searched for means that were produced in either Hungary or abroad based on Hungarian patents. For the research, I used the computing history collection in Szeged, the computing history collection and archive of studies of the Hungarian Technical and Transport Museum as well as the materials of a number of village museums, regional history museums and school museums (e.g. in Ópusztaszer, Ercsi, Nagytótfalu etc.), museums of national significance (National Pedagogic Library and Museum, Hungarian Museum of Natural Sciences, Hungarian National Museum, Budapest History Museum etc.).

The collections of schools and universities are especially worth of mentioning together with the private collections that, while often far exceeding those of the above museums, preserve the ancient calculating means. The slide-rule collection of János Budai; the collection of the Karádi Informatikai Kft.; the computing history exhibition of László Kutor, dr. arranged at the Budapest Technical College, János Neumann faculty; collection of calculators arranged at the Károly Eszterházy College in Eger and, last but not least my own collection were of great help to me.

By means of studying archive data, I gathered information for Hungarian means and manufacturers and I made the partial items of information found in the professional literature more accurate. During the data collection and systematization, I relied basically on the sources of City Archive of Budapest and the National Archive of Kassa; while the researchers' curiosity oriented me towards other archives as well. I did not find instruments, however, documented directly as archive materials between the documents of the Archive of Tolna County Local Authority, Archive of Fejér County, Archive of the National Pedagogic Library and Museum, Archive of Hungary's Central Statistics Office, Archive of Losonc except leaflets, periodicals and statistical data.

From among the daily news, printed matters published weekly or monthly, I processed primarily the articles of newspapers dealing with the manufacture of computers in Hungary, together with the printed matters that included advertisements for calculating means. The advertisements and notices represent the quantity, quality and sometimes the price and way of utilization of the calculating means in use. Several daily news offered information on firms producing calculating means and on inventors. In relation to the manufacture of calculators, I obtained information primarily from the newspapers published in Hungarian in Northern Hungary in addition to the insignificant information obtained from archives.

Processing of the professional literature related to the subject matter. The books dealing with the history of computing can offer a number of starting points for the research, while containing, however, not too much data on the application of calculating means and automates. Information can be often found in books and lecture notes that deal with other branches and disciplines. The means and books of several lines obviously belong to the scope of computing history. The lecture notes for cash-register operators and geometers, the school-books in mathematics, operating instructions of slide-ruler can be well used for compiling the history.

There are also, however, trades and sciences that may cause surprise at a first hearing; in fact, who would have thought that even the fancy leather goods makers, photographers, librarians or physicians use complicated data storage and calculating devices, the operating instruction and parameters of

which are included in the professional literature made especially for them; therefore, they can have significance in respect of our research.

In the history of computing in Hungary, the patents applied for by the Hungarian inventors and those applied for by foreign inventors and firms the results of which were utilized by Hungarian firms manufacturing machines and component parts played a significant part. The contemporary patent descriptions included not only the technical descriptions but also often published personal data on the inventor and anticipated the fields of application of the machines.

The farther going back to the past the longer are the odds to find less and less utilizable literature. The blank areas originating from partial information, incomplete literature or simply the lack of literature can often be made colourful by means of data obtained from leaflets. The catalogues, price lists and spreadsheets include not only the type and price of calculating devices but often its material, accuracy or capacity as well. The bills and product information sheets can supply information on the branches of some firms, their dimensions or, possibly, their managers. These materials, however, are available only sparsely, often without catalogizing in the archive of leaflets in several large libraries and private investigators. The data obtained from them can only be used subject proper criticism of sources; in fact, even their accurate date of origin is unknown for the most part.

Sources in printed form can be obtained by using materials stored on CDs or downloaded from the web pages of Internet. Searching in the materials of collections is more successful if digitized pictures and catalogues are available. Materials in a number of collections can only be visited virtually; they are ready, however, to supply information on certain items in their collection. Even a significant part of the professional literature can be obtained in the form of electronic book on the Internet. It shall be noted that a large number of works — often of summary character — in the history of computing available on the Internet can only be used subject to strong criticism. During my work, I utilized the electronic books, materials of collections, electronic periodicals and the web-pages of universities and scientific associations principally of German and English languages.

In the theses, I described the above listed sources in detail. At the same time, it is important to mention that the research failures also bear some information. It might come to light with high probability that means with insufficient data were produced in a small quantity or were of less popularity.

5. Structure of the theses

Presentation of a segment in the domestic history of computing and enclosing in into the frame of a paper did not appeared to be a simple task. Having the means and historical disciplines falling within the history of computing determined, I excluded those that do not relate closely to the subject to be discussed. I present the counting-, calculating-, computing- and data storage means in the order or appearance by ages together with the relevant investors, inventions and their manufacturers, as well as firms marketing the means. The majority of these means and ideas have preliminaries in the universal history of computing that, with the view of a detailed and thorough discussion, could not be omitted. Therefore, their brief description is also included here.

The history of technics has always paid great attention to the description of personal and professional career of the inventors and scientists. Presentation of the biography of Hungarian scientists (or of Hungarian origin) mentioned in this paper is still waiting for. Although I found information on many of them, yet, I could not undertake to present their biography with scientific particularity. As the detailed biography could have distorted the character of this paper, therefore I decided to include only the most important data.

In the paper, I also paid attention to the effect exerted by the means on the environment as well as on the technical and everyday culture. The simplicity and accuracy in the use the means and their portability determined their popularity. Some of important inventions, however, did not meet with the desired success. They were lost or driven out by other ideas and more marketable means. In spite of this, their significance cannot be neglected. In my paper, I also made attempt to present inventions of this kind.

My paper follows a time schedule and a logic sequence, with the time history of several individual means embedded.

It is not aimed at processing the complete history of computing in Hungary in this paper; for this, neither the scope of paper nor the available research material could offer the proper framework. In my work, I placed the emphasis on the areas that have been not presented so far.

6. Theses

The new scientific results of my paper are summarized as follows:

1. It is the first processing of scholarly character relating to the early history of computing that distinguishes the often confused terms of counting, calculating, computing and the associated counting-, calculating-, computing means according to their part they play in the history of computing. By means of means mostly following each other in a chronological order, operations of counting first, (and) then, calculating and, finally (also) computing could be performed. It is the means and automates performing more and more complicated and diverse operations as well as calculating and computing procedures that led to the development of computers.
2. Based of my research results, it can be shown that a number of means were available to both the average persons (businessmen, students, peasants, craftsmen, workers etc.) and scientist for the purpose of performing their simple or more complicated calculations prior to the appearance of the electronic computers¹. The diversity was resulted not only from performing more and more special calculations but also from the need of obtaining the results more quickly and more accurately, together with the need for portability of the calculating means. (The diversity can often be resulted from the lack of money or instrument; see slide-rules made of paper or the calculator of Zolnay). For the same operation with the same accuracy, several means were made and equipment that were not marketed in large masses.
3. Those listed in the above item also prove that the constructive brain searches for solution not only for unsolved problems; instead, it also searches for new ways where these solutions already exist. Increase in the quickness, accuracy, by chance the simplicity are not absolutely considered the criteria of seeking ways.
4. With my paper, I would like to contribute to the picture that the Hungarian science made its mark in the history of computing not only with the appearance of electronic computers. Far prior to the appearance of the computers, unknown and famous Hungarian inventors invented, used and manufactured calculating means, logic means and automates. The Hungarian science and technics had the knowledge of and used the calculating means popularized in Europe from times of old. The Hungarian inventors also contributed to the development of the universal computing science.
5. A number of means fall within the field of the history of computing not mentioned either in the domestic or the foreign professional literature. These mains played the same part in the development of the computers as the well published known equipment. Their occurrence in Hungary can also be found; or even, there are also ones that can be considered Hungarian peculiarity.
6. Mechanical calculating means were not only imported but also manufactured in Hungary; or even, certain types of equipment were exported in a large quantity. The ratio of export and import was largely dependent on the political and economical situation and the type of equipment as well.
7. The Hungarian scientists also participate in the utilization and improvement of foreign patents. Certain inventions were used by foreign manufacturers in large quantities. Although the majority of inventions might be seemed insignificant, especially if it is used to complete the tasks of a machine already in function, yet, it can be significant if it increases its value of use, thus, its market significance.

¹ In order to simplify the formulation, the term calculation is used instead of counting, calculating and computing —while a single term meaning all the notion. Instead of counting, calculating and computing means, the term of computing means will be used.

8. In Hungary, research projects have been always in progress in relation to the up-to date computing means or data storage means or automates, even if in secret during certain periods. There are only few equipment and technical objects in the field of computing science that have not been produced in Hungary. The projects made based on the international literature often by using foreign assistance were improved by the Hungarian scientific society and the Hungarian inventors. By means of smaller and larger modifications their use was simplified and made more accurate or more economic.

7. Publications published in the subject matter of theses

Lectures in foreign language published in international conference publications

1. 2004 márc. 18-19. microCAD 2004 International Scientific Conference
Bölcsészettudomány szekció
Calculating Devices in Hungary Between the Turn of the Century and the 2nd World War (7 oldal; 91-97)
2. 2005. márc. 7-11 Yuinfo 2005 Kopaonik
A New Prehistoric Image on the History of Computer Technology
(4 oldal; CD mellékleten; elérés: zbornik radova/primerjena informatika)
3. 2005 márc. 10-11. microCAD 2005 International Scientific Conference; Bölcsészettudomány szekció
Hundred Years Old Computer Technological Achievements in the Modern Engineering Practice (8 oldal; 47-54)
4. 2005. aug. 14-20. 5th International Conference of PhD Dtudents
The Forgotten History, or the Period of Mechanical Computing in Hungary (8 oldal 115-122)
5. 2005. aug. 14-20. 5th International Conference of PhD Dtudents
Poster Presentations
Calculating Devices in Hungary before the 2nd World War
(8 oldal; 307-314)

Articles published in Hungarian periodicals

1. 2004/6 GÉP A gépipari Tudományos Egyesület Műszaki Folyóirata LV. Évfolyam
Hogyan számolt a XX. századi mérnök a számítógépek megjelenése előtt (2 oldal; 23-24 oldalak)
Elektronikusan elérhető: <http://gep-ujtag.fw.hu>
2. 2006/1 MA:HOLNAP Életminőség a digitális korban Az ember feje nem káptalan... (3 oldal; 19-21 oldalak)

Conference lectures in Hungarian language

1. 2001. aug. 23-25. Főiskolák Matematika, Fizika, Technika Oktatóinak XXV. Országos konferenciája
Hogyan népszerűsíti az informatika az angol nyelvet
Társszerző: Ósz Rita (1 oldal 111.)
2. 2001. október 24-27. I. Országos Neveléstudományi konferencia
Miért nem tud még mindig megfelelni a magyar neveléstudomány az informatikai kihívásoknak? Társszerző: Ósz Rita;
Dr. Fercsik János (1 oldal 292)
3. 2002 október 21-22. Multimédia az oktatásban
Mit üzen a múlt? (3 oldal; 123-125)

4. 2003 márc. 20-22. V. Dunaújvárosi Nyelvvizsgáztatási és Alkalmazott Nyelvészeti Konferencia
A mesterséges beszéd évszázadai (4 oldal; 50-53)
5. 2003. november 27 E-learning alkalmazások a hazai felsőoktatásban országos konferencia
Az elfeledett tudomány mentsvára (4 oldal; 107-110)
6. 2005 aug. 24-26. Informatika a felsőoktatásban
Informatika történeti szekció
Táblázatok a számítástechnika történetében
(1 oldal; 83. o. CD melléklet)
7. 2008. aug 28. Ami kimaradt a Magyarországi számítástechnika történetéből Informatika a felsőoktatásban (5 oldal CD melléklet)
8. 2009. márc. 29 Számítástechnika őstörténete; Informatika Történeti Fórum
(<http://sites.google.com/site/tortenlem/Home>)

Students' seminar conference

1. 2002 november 12. BMGE Tudományos diákköri konferencia Ph.D. hallgatók Technika-, Mérnök- és Tudománytörténeti szekciója
A számítások elektronizálásának kezdetei Magyarországon
(4 oldal)
2. 2003 nov. 11. PH.D hallgatók Technika-, Mérnök- és Tudománytörténeti II. szekciója
A magyarországi számítástechnika kezdetei

Publications in the field of electronics

1. 2002 www.scitech.mtesz.hu
Az abakusztól a notebookig (keresőprogram: www.google.co.hu kulcskifejezés. „abakusztól a notebookig”) (8 site)
2. 2009 <http://sites.google.com/site/tortenlem/Home>
A számítástechnika őstörténete (27 slide)
3. 2009 <https://inf-moodle.duf.hu/>
Számítástechnika története DUFAN-IN-004
Oktatási anyag

College lecture notes

In the introduction and in certain chapters of the lecture notes listed below, I discuss some issues falling within the subject matter of the theses.

1. 1999. Kiadó: Dunaújvárosi Főiskola Kiadói Hivatala
Szövegszerkesztés a Microsoft Word Programmal Példatár
(147 oldal)
2. 2004. Dunaújvárosi Főiskola Kiadói Hivatala
Szövegszerkesztés példatár társszerző: Ósz Rita (87 oldal)
3. 2005. Dunaújvárosi Főiskola Kiadói Hivatala
Táblázatkezelés példatár társszerző: Ósz Rita (83 oldal)
4. 2005 Dunaújvárosi Főiskola Kiadói Hivatala Adatbázis-kezelés példatár (158 oldal)