

Czech technology (20th cent.) as compared to the world development

Práce z dějin techniky a přírodních věd

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Jaroslav Folta: Vývoj výpočetní techniky (Development of computer technology). Práce z dějin techniky a přírodních věd, Vol. 5, 2005, 128 pp. Czech & English summary.

The volume gives an overview of the development of computer technology from the late 1930th through period of construction of large mainframe machines and follows not only the main trends in the USA, Great Britain and Germany, but also in East European and Asian countries. Particular attention is paid to computer languages, Internet, miniaturization, and pocket calculators. Development in the Czech Lands is shown in context with the world trends, starting with Svoboda's and Vanda's efforts directed towards the anti-artillery aiming devices shortly before the WWII. It is followed by Svoboda's activities in the USA during the war and his merits in the foundation of "The Laboratory of Mathematical Machines" (later Research Institute) after the war. The first Czechoslovak computers SAPO and EPOS, as well as a basis for further development of the computer technology, were created in the latter establishment. Development of so called "unified system of electronic computers" (JSEP) within the COMECON was completed with the EC 1027 prototype in Czechoslovakia at the beginning of the 1990s.

Pavel Drábek & Jiří Hanzlíček: Farmacie ve dvacátém století (Pharmacy in the 20th century).

Práce z dějin techniky a přírodních věd, Vol. 6, 2005, 148 pp. Czech & English summary.

The volume summarizes very briefly development of pharmacy in the 20th century. It is divided into several chapters, according to the milestones in the social development: 1918, 1938, 1949, 1959, 1989. Outlines of the world progress are given for individual years, in context with the results of the Czechoslovak pharmacy. Accounts on research, production plants, pharmaceutical societies, international congresses, and formation of new pharmacopoeias are given in more detail. The work is completed with list of abbreviations, extensive name index, list of literature, surveys of both international and Czech pharmaceutical journals and journals dealing with the pharmacy development and surveys of codices valid both in the world (at the beginning of the 20th century) and in Czechoslovakia (in the 20th century). Tables show development of the Czech pharmaceutical society, anaesthetics, barbiturates, vitamins, sulphonamides, antibiotics, benzodiazepines, and natural substances.

Polovodičová doba v Československu (Semiconductor age in Czechoslovakia). J.

Cetkovský and J. Folta (eds.). Práce z dějin techniky a přírodních věd, Vol. 7, 2005, 150 pp. Czech & English summary.

The volume is a free continuation of the "Development of the computing technology" (vol. 5, 2005), as it is focused on the computer components basis. The beginning of the semiconductor age is connected with the invention of transistor (in 1948), and continues ten years later by the first design of the integrated circuit (chip) by Kilby and Noyce. The Czechs Trousil and Tauc received Czechoslovak National Prizes (in 1952 and 1955) for preparing pure germanium and for technology of preparation of semiconductors and semiconductor monocrystals, respectively, which shows that further development of semiconductors in Czechoslovakia was not much delayed. This development was marked with embargo and in Czechoslovakia played a key role several branches of the "Tesla – Research Institute of Communication Engineering" (Tesla – VÚST). As a result of a very good theoretical basis, Czechoslovakia gained a prominent position among the COMECON countries. Nevertheless, in COMECON countries there was a lack of successful integration of the research and production, common within the companies in the USA, Great Britain, Germany, Japan and some other West European countries.

Zbrojní technika v Československu ve 20. století (Weaponry in Czechoslovakia in the 20th century). L. Popelínský and J. Folta (eds.). Práce z dějin techniky a přírodních věd, Vol. 8, 2005, 310 pp. Czech & English summary.

Armament production and weaponry have played a very important, though not always positive role in the development of Czechoslovakia. This study gives a first well-arranged review of the development of the Czechoslovak weaponry starting with the foundation of the Czechoslovak Republic, taking into account also contributions of the Czech inventors and industry to the armament of the Austria-Hungary before the WWI. The work is arranged in context with the important milestones in the social development on the Czechoslovak territory and according to the weapon systems: small-bore weapons, artillery and mortar weapons, ammunition and explosives, rocket weapons, instrumental technique for fire arms, armored technique, engineer technique, and chemical corps equipment. A very high quality of the equipment such as

BREN machine gun, LT-38 light tank, SEMTEX plastic explosive, Ramona, Tamara and Vera radar systems, applications of the Soviet T54 tank to various engineer equipment, and T 72 M tank, deserve stressing. Also, an interesting comparison with analogous weapons used in other countries is shown.

Továrny strojírenské techniky v 19. a 20. století (Machine-tool industry in the Czech Lands in the 19th and 20th centuries). M. Hořejš a J. Folta (eds.). Práce z dějin techniky a přírodních věd, Vol. 9, 2005, 350 pp. Czech & English summary.

The TOS trust ("Továrny obráběcích strojů" – Machine-tools Plants) has ranked, since the middle of the 20th century, among the largest combines in Czechoslovakia. Its specialized works were spread over many places both in the Czech Republic and Slovakia. A special attention is paid to the TOS Works Hostivař, formed from the former Podhájsky's and Kameníček's factories and its history is followed until the establishment of a new CETOS company. History of several other factories is covered, such as TOS Holoubkov (since 1840), up to the new privatization after 1990. The TOS Works Vrchlabí was formed from the survivals of the war industry and oriented itself eventually on the hydraulic machinery (HYTOS). The ŽĎAS Works Žďár nad Sázavou was built in a region with no tradition of the machine-tool industry in the early 1950s; nevertheless, its products, such as fine and medium rolling mills, presses, machine hammers, machines for iron scrap processing and other forming machines, were exported to many countries. The TOS Works Svitavy arose from several smaller factories in 1948 and eventually became a modern enterprise producing drilling machines replace parts for wheel tractors, machines for maintenance of the railway superstructure, wood-working machines, grinding machines, etc. In the second half of the 20th century, implements for machine tools and forming machines were produced in a number of plants, some of them being associated in the NÁŘADÍ Prague Concern (part of the company "Továrny strojírenské techniky" (TST)): SOMET Teplice, ZPS Gottwaldov, TOS Čelákovice, CARBORUNDUM Benátky. Several other works were active outside the concern: ZBROJOVKA Vsetín, SONP Kladno, KINEX Bytča, ZBROJOVKA Brno, PRAMET Šumperk, ŠKODA Plzeň. An important role played here also "Výzkumný ústav obráběcích strojů a obrábění" (VÚOSO - Research Institute of Machine Tools and Machining). The volume is framed by a chapter dealing with the development of organizing forms of the Czechoslovak machines-tools and forming-machine industry on one side and by a chapter devoted to the development of the programmed (NC and CNC) machining in the 20th century on the other side.

Paměti a vzpomínky jako historický pramen (Memories and recollections as a historical source). M. Sekyrková (ed.). Práce z dějin techniky a přírodních věd, Vol. 10, 2006, 400 pp. English summary. ISBN 80-7037-152-8

The volume is focused on evaluation of narrative sources in the Czech archives. In addition to general methodological papers, it deals also with so called "Klepl Collection" in the National Technical Museum, dating back to the 1950s. The latter contains memories of craftsmen, industrialists and tradesmen, covering period from the old Austrian state to the middle of the 20th century, as well as some later complements. Another part of the publication is devoted to various special narrative sources including prominent personalities in science and technology.

Josef Maršálek: Vývoj motorových letadel a vrtulníků (Development of aircraft and helicopters in the 20th century). J. Folta (ed.). Práce z dějin techniky a přírodních věd, Vol. 11, 2006, 200 pp. English summary. ISBN 80-7037-152-8

The world development of the engine-powered aircraft and helicopters started at the beginning of the 20th century and this process affected all branches of machine engineering and other fields of industry. Although the idea of a helicopter dates back to Leonardo da Vinci, the real development starts during WWI. The development was accelerated at the end of the 1930s and mainly after WWII, due to the more efficient engines. Publication is completed by pictures of main types of planes from individual epochs of development. These cover all kinds of planes, both military and civil ones, including the monstrous airliners. The remarkable progress regarding achieving supersonic speeds is discussed as well. In the Czech Lands, mainly light sport and training machines were developed, which proved to be successful also in the world. As for the helicopters, the USA and the Mil's design office in the former Soviet Union played a leading role. A very successful series of the Czech helicopters HC-2, which achieved some records at that time, was unfortunately broken by a decision of the COMECON.

Vývoj biotechnologie a průmyslové chemie (Development biotechnology and industrial chemistry). J. Folta (ed.). Práce z dějin techniky a přírodních věd, Vol. 12, 2006, 144 pp. English summary. ISBN 80-7037-156-0

The first part of the volume (by Bohumil Sikyta) deals with the contributions of the Czech Lands to the modern development of biotechnologies, which start basically with the "antibiotic age". The Czech scientists (I. Honl and J. Bukovský) discovered antimicrobial effects of *pyocyanase* as early as the end of the 19th century. During WW2 (1944), the *Czech penicilin – Mykoin BF 510* was developed in the Fragner factory in Dolní Měcholupy. Author gives accounts of development and fabrication of antibiotics such as chlorotetracycline and mucidin (the latter was subject to patent protection in 1965 and the authors V. Musílek and M. Vondráček received National Prize in 1975), of amino acids (lysine), ergot alkaloids (Scrinci's discovery of ergotism in the 1730s and studies of J. Kybal in the 1970s), and of immobilization of biocatalysts (patent in 1962). In the years 1970-1990, also small biotechnological plants were established – by the collective farms in particular – which were active in production

of biogas (Třeboň, Dublovice, Hustopeče), bacterial fertilizers (Strančice), milk cultures and probiotics (Hustopeče), pheromones (Práče), insecticides (Slušovice, Blatnička), in use of explantate cultures (Tuřany), etc. The Czech scientists and engineers have contributed also to the development of equipment, such as bioreactors and fermentors. Also, history of the Czech collections of microorganisms is shown (F. Král, 1890). Special chapter deals with "Lysenkism", in both the USSR and the Czech Lands, including concomitant problems of immunological tolerance (discovered in parallel by M. Hašek and P. Medawar, however, only the latter was awarded the Nobel Prize).

Trends in the industrial chemistry in the world and in the Czech Lands are discussed in the second part of the publication (by Ivana Lorencová). This concerns chemical products, main industrial plants, as well as institutions organizing research. Wider social and technological stimuli are indicated, influencing significantly development of chemical industry. Also, territorial features are shown, regarding Germany, England, France, smaller countries, those with a delayed development and expansion of American companies into the other countries. The study is divided into several phases – from the late 19th century up to 1914, WWI, interwar period, WWII, afterwar period up to 1973 (oil crises), and from 1970s up to the end of millennium – and is completed by an extensive list of references.

Některé trendy v energetice 20. století (Some trends in power engineering in the 20th century). Práce z dějin techniky a přírodních věd, Vol. 13, 2005, 108 pp. English summary. ISBN 80-7037-158-7

The first part of the volume (by Daniel Mayer) surveys the world development of the electric rotary machines, taking into account contributions of the Czech inventors and scientists. The paper starts with the genesis of the electromechanical systems and with development of physical principles of DC machines (Franklin's and Faraday's experiments, Barlow wheel, etc.). It continues, step by step, with the development of DC and AC rotary machines. Formation of the Czech electrical industry, development of the synchronous, DC and asynchronous machines and comparison with the situation in developed countries of the world is subject of the last chapter. Heating industry in the world and in the Czech Lands is discussed in the second study (by Josef Vlach). At the end of the 19th century, both in the world and in the Czech Lands appeared the first central heat supplying at some social and public institutions and the heating plants were built in some factories as well. Professor List initiated building a heating plant in Brno (1930), which belonged to the most modern plants on the international scale. Similarly, the Prague-Holešovice heating plant was at the world top and became the pattern for building other heating plants in the world. A central project of regional heat-supplying nets was established in Czechoslovakia later, eg. only in the region of Czech Lands were located 38 itself. The heating system of a total length of 70 km – connecting an old Mělník power station with several heating plants (Třeboradice, Malešice, Michle) and supplying some of the Prague districts – is one representative example.

Technická zařízení vědy v 2. polovině 20. století (Scientific Equipment in the Second Half of the 20th Century). I. Janovský and J. Folta (eds.). Práce z dějin techniky a přírodních věd, Vol. 14, 308 pp. English summaries. ISBN 80-7037-158-7

The 10th publication of the series edited within the frame of the research project "Czech technology (20th cent.) as compared to the world development" begins with the paper by Armin Delong, dealing with the main phases of the important field of the scientific instruments – construction of electron microscopes. The latter started in an establishment of the former Czechoslovak Academy of Sciences in cooperation with the Tesla Brno-comp. and created conditions for further development and production of electron microscopes, as well as for abroad international cooperation, represented today by the Delong-Instruments company. Boris Valníček – a long-standing Czechoslovak coordinator of the INTERCOSMOS Programme – discusses in the following paper peripeteia of promoting the Czechoslovak participation in the programme and some of the successes, e.g. series of the Czechoslovak MAGION satellites and oriented platform for observation of Halley Comet. The next three papers are devoted to the equipment used in nuclear research in Czechoslovakia, which was intensely developed in the second half of the 1950s. Jaroslav Kula surveys development of the field of instruments for detection and measurement of ionizing radiation, starting in 1951, when a special Laboratory in Tesla-Elektronik enterprise was established. He deals also with instruments for applications of radioisotopes in medicine and industry, for control of nuclear reactors, element microanalysis, as well as for localizing explosives in luggage. A free continuation of the latter paper is study by Olga Nováková, dealing with instrumentation for nuclear medicine in the Czech Lands, both of the domestic and foreign provenances. Miroslav Vognar gives a detailed account on the history of the Prague Microtron Laboratory and its circular microtrons, including collaboration with the Joint Institute for Nuclear Research (JINR) in Dubna, from the second half of the 1970s up to the beginning of the 21st century. The last two papers deal with electronics. Karel Tomek surveys research of the modern semiconductor materials in Czechoslovakia and Jiří Cetkovský discusses situation in electrotechnical industry in Japan, China and Indo-Chinese Lands, in the last decade of the 20th century.

Contributions of all authors are appropriately illustrated with photographs.

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