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**Technology Transfer—
History of Electrical Engineering in Korea**

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Abstract

This paper is a discussion for the Panel on Technology Transfer (TT) and an introduction of history of electrical engineering in Korea.

1. Introduction

This paper concerned a discussion on the historical study of technology in engineering education presented by Arakawa Fumio's paper on the Technology Transfer (TT)---Past, Present & Future presented at ICEE'99 in Hong Kong. The author discussed focusing on; 1) importance of historical study of technology in engineering education, 2) organizing international cooperation to foster TT. In addition to this, recent activities on the historical study of technology and present status of electrical engineering societies in Korea were briefly introduced.

2. History of Technology as Engineering Science

2.1 Historical Study on Technology

From the point of view of technological development this century is The Electrical Century, and the present Electrical, Electronic and Information technologies promise to change human life more swiftly and more radically than any of its predecessors. About 2500 years ago, Confucius said, 'Study the past, if you would divine the future.' Even if this is apocryphal quotation, the precept holds so well. The purpose of any historical study is to interpret the developments and activities of the human beings. Studying the history of technology has the importance as almost the same as that of history as a whole. History of technology has its own discipline with all essential elements needed to foster cultural understanding and to enjoy the pursuit of knowledge.

2.2 Study of History for Engineers

"*The historical education of technology as an engineering science*" proposed by Arakawa Fumio at ICEE'99 is the first step of successful TT, and is so highly recommended as a method of fostering engineering education. Present situation seems to be not so pessimistic to offering the history of technology course in the engineering college.

Developing the course material and teaching method of history of technology by the engineer is not so easy, and may need cooperative work with both historians of technology and conventional historians. In retrospection the study and teaching of history, little attention has been paid to the history of technology in comparison with political, economic, military, and scientific history in most of countries including Korea. The history of technology is also neglected in comparison with history of science. For example, Morse, Bell, Edison, Fleming (J.A), Steinmetz, Turing, von Neumann, Shockley and many scientists and engineers greatly contributed to the development of The Electrical Century. But their achievements could not usually be found in the history textbooks. Their great contributions to the lives of their contemporaries as well as the man of present days had the more long-lasting influence on the man rather than the unimportance that make up the pages of the history textbooks. In Korea there are a few universities which have lectures on the history of electrical engineering or similar course, due to the lack of understanding on the course and of educational materials including textbook. To achieve successful study of technology history as an engineering science, everyone who belongs to both the academy and the industry should be aware of the necessity of its introduction to their study and teaching of history of technology. We have to be alerted by the argument of the leading group of engineer's that the 21st century engineering education should be oriented more to the humanities.

3. International Cooperation

3.1 Technology Transfer Center

To promote historical study of technology, international cooperation through technology transfer is ultimately desirable. Appropriate TT will provide a way for markets to move potentially valuable intellectual property to the place where it can be done at the most. One of these activities, regional TT center to act as “Promoter” between donors and receptors in the Asia-Pacific countries could be considered with the join of IEEE History Center, SHOT and other professional societies in other areas. As a preliminary action, history committee should be organized within major institutes of electrical engineering of these attending countries in response to the ICEE activities on TT.

3.2 Historical Perspective

Regarding to the TT among the East-Asian countries such as China, Japan and Korea, they had plenty of historical experiences from the early times. Science and technology have been exchanged and transferred through travels, government envoys, trades, and war by the seas and continent between countries. Sixteenth century onwards, Western missionaries worked as envoys of Western medieval science and technology to China and Japan directly, and Korea indirectly. International cooperation and mutual understanding of cultural factors have played an important role on TT.

4. History of Electrical Engineering in Korea

4.1 Overview

Early History of Electro-Technology in Korea began first electric lighting in the *Kyongbok palace* installed by Edison Lamp Company on March 6, 1887. Today there are twenty-one electrical, electronic and information science related societies in Korea which have their origins of Choson Industrial Technology Association (CITA) founded 1946 in the midst of chaos and euphoria after the Independence from Japanese annexation in 1945. Two major institutes were established following the CITA: The Institute of Electric Communication Engineers (now The Institute of Electronics Engineers of Korea, IEEK, over 20,000 members) was inaugurated on November 26, 1946. The Choson Institute of Electrical Engineers (now Korean Institute of Electrical Engineers, KIEE, over 8,5000 members) was inaugurated in July 9, 1947.

4.2 History of Electrical Engineering in Korea

- 1) Embryonic Period, (1876 – 1910): New knowledge of electricity introduced from China and Japan after opening of ports to Japan and Western countries. Electric lighting of Kyongbok and Changdok Palaces by Edison Lamp Company of United States was advanced two years before Mikado Palace of Japan and Forbidden City of China. In this period electricity business began by establishing Seoul Electric Company and Korean American Electric Company
- 2) Japanese Annexation Period, (1910 – 1945): Monopoly of electric distribution business by Japanese and establishing of Japanese electric company. Carrying electric power resources examination and development projects initiated by Power Company and government.
- 3) Reconstruction Period, (1945 –1961): Reception of electric power plants and facilities from Japanese government. Breakdown of the electric facilities during the Korean War and reconstruction started. Development of energy resources and long-term planning. Three companies shared electric business.
- 4) Developing and Maturing Period, (1961 – 1981): Birth of integrated electric power company. The government initiated Four times electric energy resources development programs. Construction of nuclear power plants. Expansion and modernization of electricity supply facilities. Transformation of 110volts system to 220 volts upgrading. Electrification of agricultural and fishery village including islands and mountainous areas. Whole-time distributions were achieved. Training systems of electrical engineers and technicians within electrical industries were launched. Modern computerized management systems were introduced.
- 5) Stabilizing Period, (1982 – Present)
 - Reform the electricity business: birth of Korean Electric Power Company (KEPCO).
 - Long-term electric resources development program and alternative energy resources. Opening of nuclear power plants as main energy source and gas, LNG, coal, petroleum plants as minor supplying system. Domestic R&D, construction, operation systems achieved. Modernization and extension of facilities, improving service systems.

4.3 Present Power Plant Capacity (as year 1998)

	(Unit: 10.000Kw)	(%)
Nuclear:	1,202	27.3

Coal:	1,410	25.9
LNG:	1,222	27.8
Petroleum:	520	11.9
Hydraulic:	312	7.1
Total:	4,396	100

Resources

Historical materials were collected and published by Korean Electric Power Company (KEPCO) as *One Hundred Years History of Electricity in Korea 1887-1987* in 1989. And also the two major academic societies in the Electro-technology in Korea, The Korean Institute of Electrical Engineers (KIEE) and Institute of Electronics Engineers of Korea (IEEK) celebrated their Fifty Years Anniversary and published *Fifty Years History of KIEE* and *Fifty Years of IEEK*.

5. History of Technology

5.1 Overview

Korean Society of History of Science (1960-) and Korean Society of Traditional Science and Technology (1993-) were major societies for the study of technology in Korea. Recently several leading scientists, engineers, historians, astronomers, archivists, curators and others from various fields who are interested in the history study on technology organized a unified professional society on the history of technology and industry. The Research Center for the History of Technology of Konkuk University patronized with the inauguration of the new society named Korean Society for the History of Technology and Industry (KSoHTI). Its aim is to promote scholarly study of history of industry and technology including preserving documents and artifacts of the Korean history of technology and to fostering interest in technological development and its relations with society and culture. It was inaugurated on November 12, 1999, and we hope to have close cooperation with overseas societies for successful activities.

5.2 Resources on the history of technology

1) Museum

There are nation-wide network of seventeen National Museums, and National Science Museum (1990-) running by the Governmental Ministry of Science and Technology. Their collections are mostly related to industrial archaeology and technology. *Chamsori* Gramophone & Audio Science Museum has historical collections related to Thomas Edison and Electro-technology.

2) Academic Research

Several universities offer courses on the history of science, not but on the history of technology. Their research activities are not so widely recognized. The Research Center for the Korean History of Technology of Konkuk University was founded in 1993 to promote historical study of technology and society. It is only the academy-based research institution in Korea. The center carried out several projects on the medieval science and technology of Korea. Among them King Sejong's automatic water clock and major scientific instruments at fifteenth century were reconstructed under the government contracts. On-going project is the scientific and technological knowledge transfer and exchange from and to China and Japan during the 17th to the 19th centuries supported by the Korea Research Foundation (KRF) from 1998. The center now keeps cooperative relations with major research institutions such as Institute of Natural Science, Academia Sinica in Beijing, Needham Research Institute in Cambridge, U.K. and others. Those who want to have relations are always welcome.

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