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# Projects and Activities of the IPSJ Computer History Committee

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**Abstract.** IPSJ (Information Processing Society of Japan), which was launched in 1960, formed the Computer History Committee in 1970 in order to record the early history of Japanese computers. The Committee has continued its activities, publishing history related books, maintaining the Virtual Computer Museum web pages, editing articles about old computers and technologies, etc. Recently, it started another mission, searching and nominating the Information Processing Technology Heritages. The present paper surveys the Committee's long time loci in a concise way.

**Keywords:** early computers in Japan, Virtual Computer Museum web page, oral history, Information Processing Technology Heritage.

## 1 Introduction

“An early computer was very much a thing”, scribed Professor Maurice Wilkes of Cambridge University at the beginning of his book [1]. Yes indeed! In fact, computers have been very much things until recently when people began carrying personal computers with no idea about the inside of their machines.

Early computers were real excitement for researchers, developers, even for users employing computers for their number crunching. In those good old days, the computers were physically very imposing. The arrays of vacuum tubes were registers directly in the engineers' sight. Mystically twinkling patterns on the cathode ray tubes incarnated the program loops. Irregular sounds of relay contacts helped locate program bugs. Architecture models of computers were implemented in exactly the same form. These are now merely folklore.

In order for young students to share the excitement of this dawn of computers, a number of activities are conducted on a worldwide scale. Here in Japan, Professor Ryota Suekane (1925-1987) started the Computer History Committee in IPSJ (Information Processing Society of Japan) in 1970 aiming to collect records of the development activities of early Japanese computers. The Committee stopped work once this original goal was fulfilled. Years later, Professor Shigeru Takahashi (1921-2005) reconvened the Computer History Committee, with the primary goal to edit “*The History of Japanese Computers*,” which was published in 1985.

Since that time, the Computer History Committee continually maintained their activities in many dimensions, wishing to transfer the precise historical record of what

took place in this country for newcomers in the information processing field. The purpose of this short article is to report on our 40 years of work.

## **2 The History of Japanese Computers Series**

The first volume of the series covered the material up to 1960, when computer research emerged in universities, laboratories, as well as in a few industries. This volume included a number of parts. In one part, pioneering works were introduced; for instance, switching theory in mid 1930's by Akira Nakajima, who worked with NEC, the first generation computers like FUJIC (vacuum tubes, Fuji Photo Industry), parametron computer PC-1 [2], vacuum tube computer TAC (both at the University of Tokyo) and others are explained. Programming technologies of those days are the subjects of another part.

Following that, the second volume, "*The History of Japanese Computer Development*" was published in 1998 covering the era from 1960 to 1980. As a matter of course, it included many more commercial computers than the first volume. At the time of publication, the first volume was completely sold out. Accordingly, a compact disc containing the contents of the first volume was included in the second for the readers' convenience.

The Committee is now in the midst of editing of the third volume, to be published in 2010, commemorating the jubilee of the Society. The third volume covers facts of time span 1980 to 2000. Among newly added topics are, for example, word processors, computer networks and the Internet. This volume is likely to become much thicker than its predecessors.

## **3 The First Transactions**

Much earlier than these books, on the occasion of the 10th anniversary, IPSJ and the first Computer History Committee planned to have a series of interviews of the computer pioneers, to be included in the national historical archives, in order that those precious achievements would not become vapour. The interviews came out in the form of 10 articles and appeared in the IPSJ Magazine from 1974 to 1978. Topics and authors with volumes and numbers are: FUJIC (B. Okazaki, **15**, 8), PC-1 (E. Goto, **16**, 1), MUSASINO-1 (K. Takashima, **16**, 2), ETL Mark III and IV (S. Takahashi, **17**, 2), ETL Mark I and II (Y. Komamiya, **17**, 6), NEC (H. Kaneda, **17**, 9), TAC (K. Murata, **18**, 3), Fujitsu (T. Matsuyama, **18**, 7), Oki (N. Sugiura, **19**, 5), and Hitachi (T. Uraki, **19**, 8).

## **4 The Virtual Computer Museum**

In the early 1990's, Professor S. Takahashi suggested opening a Virtual Computer Museum on the Internet. The intent was to design new web pages showing many of

the computers, peripherals, mini and personal computers, and so on, with photographs and precise descriptions.

In all, eleven categories for the Computer sections were provided. Those categories were: Early Computers, Mainframes, Supercomputers, Office Computers, Minicomputers, Workstations, Personal Computers, Japanese Word Processors, Other Computers, Peripheral Equipments, and Operating Systems. If we peruse the Early Computer web pages, there are the chronological lists, and early works by Ryoichi Yazu, who developed his mechanical calculator in 1902, by Torajiro Omoto, who started a manufacturing and marketing company for mechanical calculators as early as 1923, etc. Both Japanese and English pages were prepared. The web pages were continually kept updated and were enhanced by the addition of new items found since the initial release.

How many items are there in the Virtual Computer Museum? I counted the lines of the index and got an answer. About 950 items are included in the web site in all. (See <http://museum.ipsj.or.jp/en/>)

There are also other web pages for computer pioneers who endeavoured to realize the practical computer world. About sixty or so people were chosen from the indices of the above mentioned books of history as computer pioneers, and their prominent works in the computer field were uploaded to the web pages, both in Japanese and in English. If the pioneer was still alive, the text was written by the pioneer himself, otherwise, one of the disciples or colleagues was asked to contribute.

## **5 The Oral History Interviews**

One urgent mission for the Committee is the oral history collection, i.e., the actual words spoken by each of the computer pioneers. In fact, less than half of the computer pioneers are still alive today. Sadly, some of those are already too aged to participate in interviews. The oral history subcommittee selects three to five candidates each year, makes arrangements for the interview, and listens to and records the story. Up to now, about 30 pioneers have already been interviewed.

As expected, the hardest part of this activity is in editing into the final form. Therefore, many records are still in the editing queue.

## **6 “My Poetry and Truth,” Pioneers Reminiscences**

The number of interviewers for the oral history project averages about five. Only limited members are allowed to join. On the other hand, the story told by a pioneer often tends to be quite interesting, and worth being listened to, and which, if possible, should be heard by a wider audience. From these observations, the Committee proposed to have special sessions at the Annual Congress of the Society. On each occasion, a couple of pioneers are given slots to lecture on the works of their younger days.

Following the autobiography by Johann Wolfgang von Goethe, “*From My Life: Poetry and Truth*” (in German, “*Aus meinem Leben: Dichtung und Wahrheit*”), the session was titled as “*My Poetry and Truth*”.

In 2008, the lecturers were Professors S. Noguchi and M. Nagao; in 2009, Professors K. Mori and K. Ikeda gave talks. We will have this session for a third time in March 2010 when ISPJ holds the Congress. The talks by Professor S. Mizutani and Honorable Chairman Mr. T. Yamamoto of Fujitsu Ltd. are now on the program.

## **7 The Information Processing Technology Heritages and Satellite Museums**

Besides the Virtual Computer Museum, the Committee has long yearned to have a real museum, somewhat like the Computer History Museum in Mountain View, California.

Recent computers are too tiny to see the computing mechanism. On the contrary, ancient machines were very much instructive for studying architectures, memory elements etc. Therefore, those machines are quite precious for preserving information technology culture.

On the other hand, old machines have disappeared so fast. When those machines ceased operation, they were instantly turned to useless debris, and it is quite natural for the administrators of machines to throw them away to use the area for modern successors.

While planning to open the real computer museum, the Committee suddenly realized the need to collect the machines to display. Famous machines were disappearing from sight too quickly; and therefore throwing them out should be stopped as urgently and as soon as possible.

The conclusion by the Committee is to select valuable machines as Information Processing Technology Heritages, issuing certificates and ask the administrators not throw away these machines. The selection of heritage machines started in 2008. On March 2, 2009, the first set of heritage computers, or hardware parts, were nominated.

Soon after the nomination ceremony, the Committee restarted the selection of new heritage machines for the fiscal year 2009. The list of heritages and satellite museums will be announced in March 2010.

### **7.1 Information Processing Technology Heritages**

The Information Processing Technology Heritages nominated for the year 2008 are as follows:

- Analogue Calculator for Simultaneous Equations of Order 9 (see the later section)
- ETL Mark II (relay computer at the Electro Technical Laboratory)
- ETL Mark IV Plug-in Packages and a Magnetic Drum
- FACOM128B (relay computer still in working condition, Fujitsu make)
- FUJIC (vacuum tube computer)
- H-8564 Magnetic Disk Drive

- HITAC 10 (one of the popular minicomputers)
  - HITAC 5020 (mainframe developed by Hitachi)
  - JW-10 (the first Japanese word processor, Toshiba)
  - Jido Soroban (automatic abacus invented by Ryoichi Yazu in 1902. see the later section)
  - Kawaguchi Style Electric Tabulation Machine and Turtle-shape Perforator (see the later section)
  - MARS-1 (Japan National Railways seat reservation machine)
  - MUSASINO-1B (parametron computer, Nippon Telegraph and Telephone)
  - NEAC Series 2200 Model 50
  - NEAC-2203
  - OKITAC-4300C
  - OKITYPER-2000
  - Osaka University Vacuum Tube Computer (one of 3 vacuum tube computers)
  - PC-9801 (personal computer by NEC)
  - Parametron (logical component invented by E. Goto in 1954)
  - SENAC-1 (NEAC-1102, parametron computer by NEC)
  - TOSBAC-3400
  - Tiger Calculator No.59 (mechanical calculator made in 1923. see the later section)
- (See <http://museum.ipsj.or.jp/en/heritage/index.html>)

## 7.2 The Satellite Museums of the Historical Computers

Similarly, the Committee chose two institutions known to possess many historical computers as the satellite museums of the future, and also a real computer museum which will become the central office.

Satellite Museums are:

- KCG Computer Museum, Kyoto Computer Gakuin (institute)
- The Nishimura Computer Collection (personal collection of Professor H. Nishimura)

(See <http://museum.ipsj.or.jp/en/satellite/index.html>)

## 8 Articles and Series Appeared in the IPSJ Magazines

IPSJ publishes the Magazine for members of the Society monthly. From time to time, the editorial board plans to publish historical materials.

As mentioned, the first series were about early machines contributed by the members of the projects. Other special issues or series will be mentioned below.

## 8.1 Special Issue of “Less Known Computers”

In 1970's and 80's, many novel architectures were suggested, investigated and implemented such as Lisp machines, data-flow computers, and inference machines for the New Generation Computer Project (the Fifth Generation Computer). Because the number of first generation computers was small, and because they were seen as curiosities, there were the opportunities for them to be described fully, except for the commercial machines. Thus, the special issue was edited to publicize the idiosyncratic computers which would have been otherwise forgotten. The special issue “*Less Known Computers*” appeared in February 2002.

Only the names of these computers and authors are listed here: HITAC 2010 (S. Takahashi, T. Uraki), QA-1 (S. Tomita), Lisp machine and Prolog machine of Kobe University (Y. Kaneda et al), PACS (C. Hoshino), ELIS (Y. Hibino), EVLIS machine (H. Yasui), FLATS (T. Soma), FACOM  $\alpha$  (H. Hayashi), SIGMA-1 (K. Hiraki), PIE (H. Tanaka), EM-4 (S. Sakai) and SM-1 (T. Yuasa).

The pdf's of those articles maybe obtained from the Virtual Museum web site.

## 8.2 “The Trail of Information Processing Technology in Japan” series

In October 2002, a new series of the computer history related articles started. The series tried to include much wider topics. The summary of titles and authors are as follows:

- *Advances in Kanji/Japanese Processing Technologies: Input/Output Method in the Early Stage* (T. Uraki)
- *Advances in Kanji/Japanese Processing Technologies: Kana-Kanji Transfer Technology* (R. Kobayashi)
- *Advances in Kanji/Japanese Processing Technologies: The Birth and Brief History of the Japanese Wordprocessor* (S. Amano, K. Mori)
- *Advances in Kanji/Japanese Processing Technologies: Standardization of Coded Kanji Set* (K. Shibano)
- *Japanese Semiconductor Technologies for Computers* (Y. Tarui)
- *History of Design Automation in Japan* (A. Yamada)
- *Rise and Fall of Plug-Compatible Mainframe (1-3)* (S. Takahashi)
- *Advance of Computer R&D at NTT* (I. Toda, T. Matsunaga)
- *History and Deployment of the Information Technology Standardization Activity in the Information Processing Society of Japan* (A. Tojo)
- *The Seven Dwarfs and Japanese Computer Makers (1-2)* (S. Takahashi)
- *MITI (Ministry of International Trade and Industry) and Japanese Computer Makers* (S. Takahashi)
- *Topics on the Japanese Processing Technologies: The Stories of Japanese Processing, JEF and OASYS* (Y. Kanda)
- *Topics on the Japanese Processing Technologies: A History of Japanese Information Retrieval Technologies* (H. Fujisawa, H. Kinukawa)
- *Topics on the Japanese Processing Technologies: Development of Japanese Processing - BUNGOU, JIPS, M Method Input System* (H. Itoh)

These 17 articles were contributed and appeared on the Magazine from October 2002 until January 2004. The pdf's of those articles are placed on the Virtual Museum web pages.

### **8.3 Anatomy of Heritage Computers**

Of twenty three nominated heritage machines and hardware parts, the older items are naturally analogue and/or mechanical. It is beyond our understanding to know how they really worked.

Taking this opportunity, the Magazine of the Society started a more or less short series of articles to analyze those unfamiliar computers. The first article was devoted to the analogue simultaneous linear equations solver, that is presently displayed at the National Science Museum.

This is the only surviving machine of the family. The original machine was constructed at MIT around 1936 by John B. Wilbur based on the ingenious idea of William Tomson far back in 1878.

In the next article, the pinwheel mechanism and related technologies of the Tiger Brand mechanical calculator developed in 1923 in Japan were described.

The third article discussed the Kawaguchi style tabulation machine, which is displayed at the Statistical Research and Training Institute, Statistics Bureau. In one sense, the machine is similar to the Hollerith tabulator. However, Ichitaro Kawaguchi installed various unique ideas to his machine. For instance, it has card bins to catch the falling cards from the sensor station placed on the top of the towery box.

The last article of the series will treat Yazu's mechanical calculator. Although the adder employs the standard Odhner type mechanism, the pin action of Yazu's machine is unexpected, moving left and right to engage and disengage with the wheels. In place of the multiplier register, it has the reverse rotating rod to decrease the multiplier from the product register.

The Committee hopes that, through these articles, the unique and interesting aspects of these historical machines may be exposed to the wider computer society.

The current series consists of four articles altogether, of which the first one appeared in September 2009. The last article will come out in March 2010.

## **9 Demos and Symposia**

In this section, historical events which occurred outside of the Committee, but inside of the Society are summarized.

Taking the opportunity presented by the IPSJ Annual Congress, demonstrations of the old machines were held twice. The demo area was in a corner of the Congress and a small number of the old heroic machines or their components were displayed. Unfortunately, old computers were, needless to say, gigantic, and hard to transport. So sometimes only a picture panel was shown instead. They were quite enough to give the audience a feel of the deep impact and impression of these classic relics.

IPSJ operates a long sequence of Programming Symposia; in fact the first symposium was held in January 1960, shortly before the founding of IPSJ. These



regular symposia are held in January with no restrictions on the topics. On the other hand, in summer, minor but intensive symposia are held on specific subjects.

In one special symposium, papers concentrated on computer history were solicited. The contributed papers can be seen on the Virtual Computer Museum web pages.

At its 40th symposium, Professor S. Okoma was invited as the guest speaker. Being one of the computer historians, he gave a talk on the current status of computer history research.

## **10 Conclusion**

IPSJ has many committees under its umbrella. Most of them are research oriented. Members are relatively young. On the other hand, although there might be computer history research, the goal of the Computer History Committee, with senior constituents, is not in research but in keeping computer history alive. The Committee consumes most of its energy collecting and recording the long range of computer history. We edited a series of books on computer history, uploaded web pages for the Virtual Computer Museum, collected oral history interviews, planned special tracks at the Society's Congress for pioneering works, and published relevant articles in the IPSJ magazines.

Last, but absolutely not least, our central mission is to establish real computer museum in the near future, ever overcoming many hard obstacles. Although their realization is far from assured, every slight possibility has to be pursued.

The real computer history museum is not yet here. Nevertheless the large number of accesses to our Virtual Computer Museum web pages encourages the Committee, because so many people indicate their interest in the history of computers. The Computer History Committee makes up its mind anew to pursue the dreams for the real museum.

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