

Restoration of Japanese Academic Libraries and Development of Library and Information Science: The Contributions of Shigenori Baba

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Abstract

World War II essentially destroyed the Japanese social system. The academic world also suffered great losses. One of the officials who worked for academic reconstruction was Shigenori Baba (1909–1993). Born of a wealthy family in Tokyo, Baba enjoyed reading classics and learning foreign languages. He was interested in Christianity and was baptized in his youth. Baba majored in electrical engineering in college with studies in physics, and he worked as a researcher for the Furukawa financial combine, where he produced a large number of scientific abstracts. As his achievement was recognized by the government, he began to work, in the last stage of the war, for a governmental organization that controlled all scientific information. After the war Baba worked for the Ministry of Education, where his achievements were extensive: developing a union catalog, founding district library conferences, improving university librarians' status, making dictionaries of technical terms, and introducing the idea of documentation to university libraries. An academic as well as a government executive official, Baba was sent to Europe to study documentation, which led to his theory of documentation based extensively on mathematics. As a professor for the National College of Library Science, Baba's major accomplishments were bibliographical analysis by quantitative methods that became the present bibliometrics; his unique bibliographical equation; the "Union Index"; transliteration of non-Roman scripts; and dictionaries of technical terms in eight languages, including Czech entries.

Introduction

Shigenori Baba, who passed away in 1993, contributed greatly to the reconstruction of Japan's academic libraries and the revival of its devastated postwar world of learning. Baba's special achievement, among others, is the development of library and information science through the theory and practices of documentation. As the author of 21 books and more than 130 papers, Baba's

collection of books, records of meetings of the committees he took part in, letters, and research notes are plentiful. Now, as most of the material has been classified, I wish to show some of Baba's achievements over fifty years.

Educational Background

Shigenori Baba was born in 1909 to a wealthy family of a banker, descended from a dignitary of the Tokugawa shogunate in the Edo era. His father was a learned man and wanted his children to be highly educated. They were taught English and French privately by Cambridge-educated and other scholarly teachers. It was common for boys from former samurai families to learn Chinese classics, so Baba's father invited Dr. Shionoya, a reputed scholar of Chinese classics, to teach his son. As a boy Baba took an interest in many academic fields, including classic literature from both the East and the West and natural science. He was also interested in Christianity and was baptized at age fifteen at the Fujimicho Presbyterian Church in Tokyo by the Reverend Masahisa Uemura, the founder of the church and a well-known theologian.

Baba chose archaeology as his major and entered Waseda University, expecting to study under Shigeyasu Tokunaga, who was then a prominent archaeologist. However, the great stock market crash in 1929 interrupted his studies. Because his father's bank was in financial difficulties, Baba was forced to choose a more practical field of study. He transferred to the faculty of electrical engineering where a fellow Christian at the

church, Tadaoki Yamamoto, was teaching. Later Baba married Yamamoto's second daughter. As he was fond of mathematics and physics, he found no difficulty in studying electrical engineering. In his graduation thesis he focused on what is known as frequency increase and wrote it in German under the guidance of F. Niethammer of Vienna University.

Showing a talent for learning foreign languages, which was partly because of his constant visits to the Christian church, Baba became well versed in European languages, including Greek and Latin. It was also easy for him to write papers in German. He was interested in languages around the world and later engaged in the transliteration of Asian languages. It was quite natural that he preferred basic theoretical study rather than practical electrical engineering. Because Baba did not know much about how electricity was used in actual sites, his professors suggested on-the-job training for several years and advised him to join the Furukawa Electric Company, a member of the Furukawa financial combine.

The First Steps

Baba joined Furukawa in 1934, where he was assigned much practical work even though he was posted as a researcher. There he recognized how important it was to have theoretical knowledge to cope with actual problems and to verify the theory by reading electrical literature from many parts of the world. These efforts increased his electrical engineering knowledge so much that he was more informed than most scientists. Even professors asked him for advice based on his knowledge.

There was a library at Furukawa, but there was no provision of information service. Baba wanted to set up a question-answering system there. He made use of sections A and B of *Science Abstracts*, which he had been accustomed to doing while a student, as well as primary journals. He initiated an in-house abstracting service: a card catalog of bibliographic data with abstracts of relevant literatures that grew day by day. He also analyzed the types of columns that made up each journal, such as *Archiv für Elektrotechnik*, *Electrotecnica*, *Elektrotechnik und Maschinenbau*, *Elektrotechnische Zeitschrift*, *Journal of the Institution of Electrical Engineers*, *Revue Générale de l'Électricité*, and so on.

His card catalog was well organized; items were arranged according to subject fields and types of literature, making it easy for him to compile his "Bibliography of Literatures on Electric Wires and Cables" and distribute it to all the research sections.

During his ten years at Furukawa he had made 75,000 abstracts from books, papers, patents, and technical reports (Baba, 1977, pp. 4–5). This number is even larger than the 3,380 abstracts and 920 book reviews completed by Wilhelm Ostwald over a seventeen-year period (Satoh, 1987). Later in his life Baba told me that he had read Ostwald's books carefully. These two had a great deal in common. When Ostwald heard that scientists often found such work as writing textbooks, abstracts, and book reviews troublesome, he wrote that textbooks should be written by the first-class scientists and that scientists would neglect their duty if they avoided what seemed to give them trouble. One of the great pleasures of Shigenori Baba was to give his knowledge to those who needed it (Baba, 1977, pp. 6–7). At Furukawa he worked as a researcher, but he cultivated his ability as a documentalist, even though the word documentation was not well known at the time.

War Assignment

Baba's work of making high-quality bibliographies and guides to the scientific literatures attracted considerable attention from government officials. When Japan went to war, the government needed to control all science and technology to keep productivity high. Baba was asked to work as a science officer for the Board of Technology in 1943, when the war situation became even worse. His first task was to categorize research papers for scientific mobilization. Here again, abstracting services were essential to the final judgment for selection, and Universal Decimal Classification (UDC) class numbers were assigned to each item on the eighty-column punched card. The UDC was privately translated from the French edition published in Belgium in 1939. The work was essentially a private directory of scientists in Japan for the use of government officials.

When the Japanese surrendered in 1945, the whole nation fell into ruin.

Executive Official

In 1945 the thirty-six-year-old Baba began work with the Ministry of Education. From this post he began his twenty-year effort to restore the Japanese academic library system.

Baba believed that literature was the foundation of research and that research was the basis of national power. Hantaro Nagaoka, the world-famous physicist and one of Baba's acquaintances, said, "The post-war restoration begins with study and learning. I want to have the lit-

erature in Japan reorganized and a union catalog made so that everyone may use it" (Baba, 1977, p. 10). The work was much more difficult than expected.

Sociologist Chie Nakane (1978) observes that Japanese society is vertically divided as is the academic society of universities. There are not enough contacts among large and small libraries even within one university, still less with libraries of other universities. A library conference was founded in the late 1920s as a liaison organization, but the conference was divided vertically into two bodies: one for the imperial universities and one for private universities. These circumstances made it difficult to produce a union catalog to connect all the libraries, although in 1931 the Science Council had tried building a union catalog of scientific magazines.

Just after the war ended, the shortages of personnel, writing paper, pens, and funds made the work even more difficult. The biggest problem, however, was to find the right balance between the policy of the Japanese government and that of the occupation forces. The occupation forces aimed to dissolve the Japanese military and to build a democratic social system. For information sources their plan was to replace the old Imperial Library with a National Diet Library like the U.S. Library of Congress and to transfer the task of making the union catalog from the Ministry of Education to the newly built Diet Library. Baba thought that the union catalog was indispensable to the policymaking of the ministry and insisted that the union catalog should belong not to the Diet Library, which is a legislative organ, but to the ministry, which is an administrative one (Baba, 1977, p. 10).

Professor Akira Nemoto (personal communication, 23 May 1997) of Tokyo University, who recently investigated GHQ documents told me that Baba's name was often mentioned in them. Baba had a heated dispute with Robert Downs and other officials of the Occupation Forces GHQ over this issue. The union catalog, while he was away from Japan, was placed under the control of the Diet Library. But now it is maintained by the National Center for Science Information Systems of the Ministry of Education.

Baba was able to organize all the Japanese universities into ten district groups. Each district had its main library equipped with a microcopy machine, which was valuable at the time when copying apparatus was not in common use. Each district started a journal that made it possible to exchange opinions among the members. The journal carried contributed papers regularly, which

gradually improved the status of the library personnel in society. What was important was that every university, regardless of national, private, prefectural, or municipal status, could join the district library conferences. Since the tendency in Japanese culture is to regard something made by a national authority as higher than something made by a private institution, this development was unusual.

Library workers were not highly respected in the academic world, and no rules or standards to employ them had been established. To work for a library of a national university, applicants needed to take the civil service examination. Baba negotiated with the National Personnel Authority about the matter and gained a new category of library science in the examination to select the top-level executive officials.

For academic restoration, Baba organized the Branch Council for Technical Terms in the Ministry of Education and invited leading scholars of each field to standardize the technical terms. Like Ostwald, he believed that the world of study and learning must be furnished with standardization. (He later lamented that this opportunity of standardization once brought about serious antagonism among several Buddhist denominations while they were discussing one word in the field of religion.) Thus far, twenty-seven dictionaries of technical terms have been published, including a dictionary of library science, in which Baba played a big role (Ministry of Education, 1958); the revised edition appeared in 1997.

Study in Europe and Education in Japan

Baba's twenty-year tenure at the Ministry of Education was greatly enriched by his one year of documentation study in Europe. In 1952 he received a six-month UNESCO fellowship, and the ministry added an additional six months of study time. In Japan the term *documentation* was unknown, and yet this was what Baba had been doing. He visited the Netherlands, Belgium, France, Switzerland, West Germany, Denmark, Finland, Sweden, England, and Spain. Among the fellow researchers and friends with whom he enjoyed long-time friendship were Frits Donker Duyvis of the International Federation for Information and Documentation, Julien Cain of the Bibliothèque Nationale, Paule Salvan, Otto Frank, Hanns Eppelsheimer, Frank Francis of the British Museum, and Jose M. Albareda Herrera. He also had good relationships with Ralph Shaw and Foster Mohrhardt of the Library of the U.S. Department of Agriculture,

George Bonn of the University of Illinois, and Vivian Edmiston. These Americans, who were sent to Japan by U.S. government agencies, recognized Baba's ability to resolve difficult matters.

In Europe, Baba visited historic libraries and documentation facilities and worked out a detailed plan for his theory of documentation. He understood that universal philanthropy forms the basis of documentation, which shows each nation's strength. In this sense he insisted that documentation be done by natives. The word *documentation* was soon to be replaced by such words as *information science* or *informatics*. Baba, however, continued to use the term, apparently feeling that it carried a sense of European culture.

After his study in Europe the level of Japanese libraries and information science seemed quite low to Baba. He thought that Japanese libraries and information science were primarily oriented toward public libraries rather than research libraries, which were badly needed to meet researchers' demands. This led him to plan documentation workshops in all the districts in which he had organized library conferences. These workshops stressed the concepts, theories, and technical skills of documentation.

After twenty-three years' service to the government he was invited to become a professor at the National College of Library Science in 1965, where he lectured and trained many librarians who now form the backbone of local libraries throughout the country. In 1971 the college began a Documentation and Information Science course; it was the outcome of his long-term efforts, and Baba was appointed the head of the new course.

Contributions to Library and Information Science

Baba called the field of his study *literoscience* (Baba, 1971a), but he also insisted on the use of the term *documentation* in the course. His students published a 272-page book of his collected papers to commemorate his retirement (Baba, 1977). The first half of the book contained an interview with him, and eleven papers of his own selection made up the rest. He wanted these eleven papers classified into the following three parts.

Part 1: Basic Concept of Documentation

- 1) Essays on documentation, in Japanese, September and October 1962.

Part 2: From Collection of Information to Collection Building

- 2) Quantitative method of selecting literature, in Japanese, May 1958.

- 3) Several facts pertaining to Literostructure: from the viewpoint of comparative scientific material, comparative library science (including comparative studies in cataloging and catalogs, etc.), and library linguistics, in Japanese, March 1967.
- 4) An aspect regarding quantification method for selection of bibliographic vessels, in English, 1965.
- 5) Fundamental theory of bibliographical structure for collection development, in Japanese, February 1971.
- 6) Unchanged and transformed contents in the higher-ordered literature columns of learned periodicals, in Japanese, June 1971.
- 7) Literature science (Literoscience)—Literometrics as its quantitative base—an example from the subject "cataloging and catalog," in Japanese, March 1975.

Part 3: Bibliostructoanalysis and Union Indexing

- 8) Fundamental theory of comparative bibliographical science, with special reference to bibliographical materials, in Japanese, March 1973.
- 9) Bibliographical science for documentation activities: fundamental theory of comparative science, especially regarding bibliographical characteristics of bibliographical materials, in Japanese, 1972.
- 10) Indexing of (subject) indexes: union indexing and index, in Japanese, March 1969.
- 11) Union index of books in the field of library automation published in the United Kingdom and the United States, in Japanese, October 1974.

Baba put literoscience and its outcomes into shape and tried to make a theory of it. His papers were written in a crabbed Japanese style that was greatly influenced by Chinese classics. Thus his papers were often criticized as too difficult to understand, too abstract, and sometimes impractical.

Nonetheless, his method of study has three characteristics. First, he had a quantitative method, as shown in his papers in part 2. He already had reached the idea of core journals (a kind of *Kernliteratur* in his German), using early citation analysis techniques. These methods are known as bibliometrics today. Reading his papers closely reveals uncommon concepts, including segregation and scattering. Second, his idea of "bibliographical equation" is unique. He analyzes the structure of literature thoroughly as a research object. He notes literature as $N = D + L + B + I + \Xi$.

He calls D a "bibliographical identifier" in which d_1 is, for instance, the author's name, d_2 is the title of a book, . . . so $D = D_1 + D_2 + D_3 + \dots + D_i$. L is a "semantifier" and l is made from many semantic factors, so $L = l_1 + l_2 + l_3 + \dots + l_i$. B is a "bibliographical

referencier.” I is a “bibliographical indexer,” and Ξ equals “collatifier” in which tables, diagrams, and graphs in a literature are included. Finally, Baba (1971a) notes a general equation of literature as:

$$N_{o_1 e_1 k_1 \alpha_1} = D_{o_1 e_1 k_1 \alpha_1} + L_{o_1 e_1 k_1 \alpha_1} + B_{o_1 e_1 k_1 \alpha_1} + I_{o_1 e_1 k_1 \alpha_1} + \Xi_{o_1 e_1 k_1 \alpha_1}$$

(o = order; e = element; k = kind; α = viewpoint)

With this basic equation he considered fundamental theories of selection of literature, bibliographical participation, and so on. The bibliographical equation is the ultimate goal of his methodology.

Third, he maintained a sophisticated card catalog. Baba took notes on books he read on 3×5 cards. On each card he wrote what he knew and its source and linked related items based on his analysis. He did not hesitate to write down his sources, though he had a good memory. Among the enormous collection of cards he left, there are substitute cards cut during the postwar years from used paper. His card catalog could be compared with Ostwald’s “Kartothek.” We may call it hypertext today.

The method of analyzing and synthesizing knowledge grew to become the “Union Index.” He published a bulky work of 657 pages as an index to books in the field of documentation written in English (Baba, 1970). The book is the fruit of a labor of love. He analyzed the content of some sixty books in the field, made detailed indexes to them, added citation links and related terms among them, and finally unified them in one volume. This index represents an amazing amount of work, since it was all done manually using cards.

Transliteration and Polyglot Dictionaries

Finally, his contribution to the study of languages must be acknowledged. Baba published a 433-page book on the transliteration of non-Roman characters into Roman characters (Baba, 1968). The book gave transliterated alphabetic lists of some 150 non-Roman languages, based on International Standardization Organization principles, and was supplemented for the first time with Japanese equivalents to Bulgarian, Czech, and Greek characters. He continued to publish papers on the transliteration of Indian, Indonesian, Finno-Ugrian, Baltic, and other languages (Baba, 1971b, 1973, 1975a, 1975b).

An interesting work that combines Baba’s study of languages with bibliostucture analysis appeared in 1961 (Baba, 1961). This bibliography was a useful guide to those who could not read Russian publications, which became of great significance in the fields of science and technology. It was an annotated bibliography of 122 pages, but the structured annotation under each source

gave such guidance as the method of service (i.e., translation, abstract, index, or others), the type of column that offered the service, the languages used, the publishing country, coverage of Russian literature, and so on. The bibliography listed various sources from twenty countries.

After his retirement in 1977, Baba kept compiling a set of polyglot dictionaries in the field of library and information science. Tens of thousands of cards were being prepared, which covered in total English, German, Dutch, French, Spanish, Italian, Danish, Finnish, Swedish, Norwegian, Russian, Czech, Polish, Rumanian, Bulgarian, Hungarian, Serbo-Croatian, Albanian, Greek, and Japanese technical terms. He completed a notebook of terminology with Czech entries, each of which had English, French, German, Russian, Polish, Spanish, and Japanese equivalents. While he was negotiating for its publication, Baba died of a heart attack at the age of 84 early in 1993. A draft of the terminology was left open on his desk.

Conclusion

He was a man of vigor throughout his life. In his later years, however, his arms suffered from tendonitis caused by lifting card catalog trays, which contained hundreds of thousands of cards. Shigenori Baba, who worked as a documentalist, science officer, executive official, educator, lexicographer, linguist, and above all, philanthropist, accomplished valuable works. From his lectures and writings we can see his vision of documentation as standardization in technical aspects on the one hand and universal philanthropy in spiritual aspect on the other.

Acknowledgments

I am grateful to Keiichi Kawamura, librarian of Dokkyo University School of Medicine, for his kind and thoughtful assistance in preparing the manuscript.

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