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# Contents

Foreword	viii
Preface	ix
Acknowledgments	x
Contributors	xi

## History and Historiography of Science Information Systems

Overview of the History of Science Information Systems	3
<i>Michael Buckland</i>	
Funding a Revolution	8
<i>Thomas P. Hughes</i>	
Fax to Facts: Cold Fusion and the History of Science Information	14
<i>Bruce V. Lewenstein</i>	
Shaping Biomedicine as an Information Science	27
<i>Timothy Lenoir</i>	
Secret Scientific Communities: Classification and Scientific Communication in the DOE and DoD	46
<i>Robert W. Seidel</i>	

## Science and Scientific Information Systems

The Role of the Scientific Paper in Science Information Systems	63
<i>Bernd Frohmann</i>	
The Game of the Name: Nomenclatural Instability in the History of Botanical Informatics	74
<i>Geoffrey C. Bowker</i>	
Common Names: Cooperative Access to Databased Natural History Information	84
<i>Bernadette G. Callery</i>	
The Evolution of the Secondary Literature in Chemistry	94
<i>Helen Schofield</i>	
The History of Managing Technical Information at DuPont	107
<i>Florence H. Kvalnes</i>	

## Building Information Retrieval Systems for Science

Development of an Information Retrieval System Based on Superimposed Coding	117
<i>James M. Cretsos</i>	
The Evolution of Citation Indexing—From Computer Printout to the <i>Web of Science</i>	124
<i>Jacqueline Trolley and Jill O'Neill</i>	

<a href="#">The Creation of the <i>Science Citation Index</i></a>	127
<hr/>	
<i>Paul Wouters</i>	
<b>Information Retrieval in Science: The Professional Aspects</b>	
<a href="#">Wilhelm Ostwald, the “Brücke” (Bridge), and Connections to Other Bibliographic Activities at the Beginning of the Twentieth Century</a>	139
<hr/>	
<i>Thomas Hapke</i>	
<a href="#">Ralph Shaw and the Rapid Selector</a>	148
<hr/>	
<i>Jana Varlejs</i>	
<a href="#">The Information Wars: Two Cultures and the Conflict in Information Retrieval, 1945–1999</a>	156
<hr/>	
<i>Mark D. Bowles</i>	
<b>Information Retrieval in Science: The Technical Aspects</b>	
<a href="#">Examples of Early Nonconventional Technical Information Systems</a>	169
<hr/>	
<i>Madeline M. Henderson</i>	
<a href="#">Microfilm Technology and Information Systems</a>	177
<hr/>	
<i>Susan A. Cady</i>	
<a href="#">Mechanical Indexing: A Personal Remembrance</a>	187
<hr/>	
<i>Herbert Ohlman</i>	
<b>Science and Information: Some National Perspectives</b>	
<a href="#">Soviet Scientific and Technical Information System: Its Principles, Development, Accomplishments, and Defects</a>	195
<hr/>	
<i>Ruggero Giliarevskii</i>	
<a href="#">The Soviet Overseas Information Empire and the Implications of Its Disintegration</a>	206
<hr/>	
<i>Pamela Spence Richards</i>	
<a href="#">Restoration of Japanese Academic Libraries and Development of Library and Information Science: The Contributions of Shigenori Baba</a>	215
<hr/>	
<i>Takashi Satoh</i>	
<b>History Reviewed and Revisited</b>	
<a href="#">History Review: The Development of Information Science in the United States</a>	223
<hr/>	
<i>Robert M. Hayes</i>	
<a href="#">On the Shoulders of Giants</a>	237
<hr/>	
<i>Eugene Garfield</i>	
<a href="#">Pioneers’ Reminiscences</a>	252
<hr/>	

# Wilhelm Ostwald, the “Brücke” (Bridge), and Connections to Other Bibliographic Activities at the Beginning of the Twentieth Century

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*Thomas Hapke*

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## Abstract

This paper gives a summary of the activities of the German chemist and Nobel laureate Wilhelm Ostwald (1853–1932) in the area of scholarly information, communication, and publication at the beginning of the twentieth century. In 1911 Ostwald, with others, founded the “Brücke” (Bridge), an organization with aims similar to those of the famous Institut International de Bibliographie in Brussels. The paper looks at connections to other institutions and individuals in the area of documentation and “information science,” especially in Germany, for example, the Institut für Techno-Bibliographie and the German librarian Julius Hanauer, one of the German promoters of the Universal Decimal Classification.

## Introduction

On 29 November 1915 Morris L. Cooke, a prominent follower of Frederick W. Taylor, who had died a few months before, wrote a letter to the German chemist and Nobel laureate Wilhelm Ostwald:

Our organization [Frederick Taylor Co-operators, Chestnut Hill, Philadelphia] is planning, so far as at all possible, to take Mr. Taylor’s place in promulgating in this country and abroad matters, which will interest scientific management men wherever they may be. I feel that we know all too little about your work about “Die Brücke,” and any other line of activity of the same general character.” (Berlin-Brandenburgische Akademie der Wissenschaften [BBAW] Ostwald papers, No. 3470)

The last sentence remains true today for Wilhelm Ostwald in the history of scientific information and communication. In 1911 Ostwald, with others, had founded

the “Brücke” (Bridge), an organization with aims similar to those of the famous Institut International de Bibliographie in Brussels. Although he also published his ideas and work on the organization of scientific publications in English journals (Ostwald, 1913; Ostwald, 1914) and was mentioned in some contemporary papers (for example by Homer, 1912; Bugge, 1925) and bibliographies (Schneider, 1923), Ostwald remained an outsider to the areas of librarianship and documentation in Germany and abroad.

In the last quarter of this century one finds a few papers published in English, which perhaps change this picture slightly (Holt, 1977; Bonitz, 1980; Satoh, 1987), but much research remains. For a recent German paper, see Hapke (1997). Ostwald’s activities in the area of scientific organization gained more recognition in East Germany, the former German Democratic Republic, for example, Lewandrowski (1979) and Bonitz (1979). Based on research on selected Ostwald papers found in the Akademie-Archiv of the Berlin-Brandenburgische Akademie der Wissenschaften as well as on Ostwald’s published works, this paper summarizes the activities of Wilhelm Ostwald in the area of scholarly information, communication, and publication at the beginning of the twentieth century. In addition, this paper shows some of the connections of Ostwald and the Bridge to institutions or individuals in the bibliographic movement at the beginning of this century to make clear that there was a “bridge,” however small, between the Bridge and others (Satoh, 1987, p. 18).

On the one hand, Ostwald's work was a product of the situation in Germany at the turn of the century (Johnson, 1990); on the other hand, it was related to numerous worldwide movements before World War I: internationalism (Lyons, 1963; Crawford, 1992); energetics (Hakfoort, 1992); Taylorism (Burchardt, 1977); encyclopedism, which culminated afterward in the ideas of H. G. Wells (1938); and last but not least, the library and documentation movement (Schneiders, 1982). Today you find a rebirth of some of his ideas together with the developments of hypermedia systems and the World Wide Web (Rayward, 1994, 1997; Buckland & Plaunt, 1997).

Wilhelm Ostwald, born in 1853 in Riga, Latvia, was one of the founders and organizers of physical chemistry at the end of the nineteenth century. In recognition of his role in the chemical profession, in 1887, he was appointed to the only chair of physical chemistry in Germany, at Leipzig; the other candidates withdrew in favor of Ostwald. On the basis of thermodynamics and positivism, he developed his energetics (Leegwater, 1986), which he extended to his philosophy of nature (Naturphilosophie). His so-called "energetic imperative," "Do not waste energy, but convert it into a more useful form" (Holt, 1970, p. 388) was an important foundation for his later efforts with regard to the organization of scholarly work. He resigned from his chair in Leipzig in 1906 to devote more time to philosophy and monism as well as to the international organization of scientific work and to the development of his color theory. In 1909 he received the Nobel Prize in chemistry in recognition of his work on catalysis and for his investigations into the fundamental principles governing equilibria and rates of reaction. Ostwald died in Leipzig in 1932. For a more detailed biography see Rodnyj and Solov'ev (1977) and also Hiebert and Körber (1978) and Fleck (1993). For Ostwald's influence on the history of physical chemistry see Servos (1990). In Ostwald's autobiography (1926–27) he mentioned a number of his organizational efforts in scientific work.

Ostwald's ideas about how science works seem to be modern in one sense (see, e.g., Krohn & Küppers, 1989). He said, for example, on the occasion of the opening ceremony of Jacques Loeb's biological laboratory in Berkeley, "Science is an organism which strives constantly for self preservation and development. It is therefore provided with organs of regulation, by which that which is useful is preserved and that which is harmful suppressed" (Ostwald, 1903b, p. 19, English original). In

another sense his ideas of the sciences as a pyramid-shaped building with "Kulturwissenschaft," his name for sociology, on the top, one subject standing on the foundations of the one below (Ostwald, 1929), were typical of his time, representative of positivism and scientism.

Both his views on science and his activities in scientific publication formed the foundation for Ostwald's efforts to organize scientific publication and communication.

## Ostwald's Activities in Scientific Publication

### *Textbooks*

In his *Lehrbuch der allgemeinen Chemie* (1885–87), the first textbook on physical chemistry, Ostwald succeeded in reviewing the state of the art and collecting the scattered papers on the subject of physical chemistry, to which little attention had been paid. Later Ostwald stressed the advantages of combining reading such an encyclopedic compilation with browsing in original sources to find new problems (Ostwald, 1903a, pp. 13–14). His ability to follow this regimen was one reason for his great success as a scholar in Leipzig, where he founded his own research school.

### *Establishing Scientific Journals*

Consistent with his emphasis on the original sources of scientific work, in 1887 Ostwald and the Dutch chemist Jacobus H. van't Hoff founded the *Zeitschrift für physikalische Chemie*, the first periodical in physical chemistry (Hapke, 1990; Pohle, 1998). In his view, the problems of publishing physical chemistry papers in "normal" chemical periodicals as well as the difficulty of gaining widespread dissemination of such papers were now solved. From the beginning the enterprise was a fully commercial periodical based on international collaboration. As such, the title page of the first volume lists many collaborators from abroad. The *Zeitschrift* attracted all scientists interested in physical chemistry, who found in the journal not only original papers but also reviews and abstracts of other important works in physical chemistry, both books and papers, from other journals.

In 1894 Ostwald was also engaged in founding the *Zeitschrift für Elektrochemie*. In the new century he was the editor of many more periodicals in his new areas of interest, Naturphilosophie, monism and color theory: the *Annalen der Naturphilosophie* (1.1901/02–11.1912/13; 14.1919/21), *Das monistische Jahrhundert: Zeitschrift für wissenschaftliche Weltanschauung und Kulturpolitik*

(1.1912/13–4.1915), and *Die Farbe: Sammelchrift für alle Zweige der Farbkunde* (1.1921–44.1926).

#### *Publication of the Klassiker*

Since 1889 Ostwald had been editing his *Klassiker der exakten Wissenschaften*, original scientific works republished for easy access as separate volumes (Dunsch, 1989). He wanted to counterbalance the growing quantity of journal literature with his selection of papers of lasting importance. In his autobiography Ostwald said that the editing of the *Klassiker* was the “germ for the much later ideas on the technical organization of science” (Ostwald, 1926–27, p. 56). With the same concern to give greater access to high-quality scientific achievement, Ostwald translated into German the work of the American physicist, Josiah Willard Gibbs, whose papers had only been published in an inaccessible small journal, the *Transactions of the Connecticut Academy of Sciences*, unknown in Europe.

#### *Handbook* (Handbuch der allgemeinen Chemie)

Ostwald’s encyclopedic *Handbuch der allgemeinen Chemie* was intended to have an international character. Ostwald solicited participation by Frederick Donnan and William Ramsay (British), Arthur A. Noyes (American), Svante Arrhenius (Swedish), and Philippe A. Guye (French). Before the war only volume 2 by Ramsay and G. Rudorf about the noble gases was published. After the war some further volumes were published but without the planned international participation. Ostwald’s book *Die chemische Literatur und die Organisation der Wissenschaft* (1919), the first volume of the *Handbuch*, was set in type in 1914 but not printed until 1919. It summarized Ostwald’s ideas on the organization of scientific publication and communication (Sato, 1987). It was probably the first book on chemical literature, although it was not really a literature guide (Mellon, 1982 p. 245).

### **The “Brücke” (Bridge)—The World Brain**

#### *Background: Ostwald’s Organizational and International Experience*

In 1908 Ostwald wrote, “Everyone who is active in science in any way appreciates the fact that the task of comprehensively organizing scientific reporting or abstracting is a necessity which constantly grows more urgent. Now more than ever this need presents an international aspect and requires the cooperation of various countries”

(Ostwald, 1955, p. 374; Ostwald, 1910a, p. 591). Ostwald also pointed out the problem of language and proposed the use of a synthetic auxiliary language as a medium for international communication. (He had been engaged in artificial languages since the beginning of the century.)

Crawford (1992) described the time from 1900 to 1914 as the golden age of internationalism. Ostwald personally participated in many international ventures, especially efforts to set up international networks of various kinds: He was born at the edge of Europe in Latvia; in a sense he was himself an international immigrant to the intellectual heartland. He organized the international development of modern physical chemistry. In 1911 he took part in the foundation of the International Association of Chemical Societies. In 1905 he was the first German exchange professor with the United States. With Emil Fischer and Walther Nernst, he tried to call into being a German Imperial Chemical Institute, the *Chemische Reichsanstalt* (Johnson, 1990).

#### *Foundation of the Bridge*

Ostwald’s efforts in scientific publication and his international efforts led to the foundation in 1911 of *Die Brücke, Internationales Institut zur Organisierung der geistigen Arbeit* (The Bridge, International Institute for the Organization of Intellectual Work) by Wilhelm Ostwald, Karl Bühner, and Adolf Saager (Hapke, 1997).

Karl Wilhelm Bühner and Adolf Saager (1911) published the book *Die Organisierung der geistigen Arbeit durch die Brücke* (The organization of intellectual work through the Bridge). Ostwald’s gift of his Nobel prize money made possible the formal opening of the institution, the Bridge, on 11 June 1911.

Because of his international contacts many intellectuals from abroad became members of the Bridge, including the Swedish chemist, Svante Arrhenius; the American industrialist, Andrew Carnegie; the English physicist, Ernest Rutherford; the Swedish writer, Selma Lagerloef; the French mathematician, Henri Poincaré; the Austrian Nobel laureates for peace, Bertha von Suttner and Alfred H. Fried; the Belgian industrialist, Ernest Solvay; the American zoologist and bibliographer, Herbert Haviland Field; and Paul Otlet, a founder of the *Institut de Bibliographie* in Brussels in 1895.

The term *Gehirn der Welt* (world brain), which Ostwald (1912) claimed the new organization would create, was probably taken from a little book by Alfred H. Fried (1908), which gives a contemporary view of

internationalism. Ostwald referred to this book in his periodical *Annalen der Naturphilosophie* (1910b, 9, 194–195), when reviewing the popular serial *Aus Natur und Geisteswelt* published by Teubner. In Fried's little book mention was made of a 1907 article by Friedrich Naumann, "Das Gehirn der Menschheit" (Fried, 1908, p. 28). Like several other members of the Bridge, Naumann was also a member of the German Werkbund.

#### *Prehistory of the Bridge:*

##### *The "Internationale Monogesellschaft"*

Of the Bridge's two other founders, more is known about Karl Wilhelm Bühler than about Adolf Saager. Bühler was born on 1 June 1861, in Bibern (Kanton Schaffhausen, Switzerland) and probably died during or shortly after World War I. He was an editor in Switzerland and moved to Munich in 1908. He founded a so-called Internationale Monogesellschaft in Winterthur as a stock corporation on 27 November 1905 (clipping from an unknown newspaper in Stadtbibliothek Winterthur, Switzerland). The aim of this enterprise was to raise the artistic level of contemporary advertising. One way to accomplish this was the publication of "Monos," little cards or leaflets in a standardized format (Bühler, 1906, backcover). Monos were something like the many *Reklamebilder* (advertising picture-cards) then in circulation in Germany, e.g., from the companies of Stollwerk or Liebig (Selig, 1997).

The "Mono-System" was planned so that the individual monos would complement each other and, collectively, form a well-designed, comprehensive encyclopedia. "The picture side usually contained advertising. The reverse contained a brief statement ('monograph'—that is the reason for the term Mono) explaining the content of the picture, with carefully written advertising slogans of the firms involved in the system" (Das Mono, 1944, p. 253). A box of Monos has survived at the Stadtbibliothek in Winterthur.

According to Ostwald (1926–27, vol. 3, p. 289) Saager was only Bühler's "friend by chance" ("zufälliger Bekannter"). Born in 1879, he studied science and completed a doctoral dissertation in chemistry at Heidelberg in 1902. Later he was active as a writer in Ansbach and in Munich. He wrote a short popular book on chemistry, a city guide about Ansbach, and biographies of Henry Ford, Graf von Zeppelin, and Benito Mussolini. It is probable that he was responsible for the connection with the publisher of most of the Bridge papers, the Seybold'sche Sortimentsbuchhandlung (Seyerlein, 1991). On 31 August 1949 he died in Lugano.

#### *Aims*

"Die Brücke is planned as a central station, where any question which may be raised with respect to any field of intellectual work whatever finds either direct answer or else indirect, in the sense that the inquirer is advised as to the place where he can obtain sufficient information" (Ostwald, 1913, p. 6, English original).

The Bridge was supposed to be the information office for the information offices, a "bridge" between the "islands" where all other institutions—associations, societies, libraries, museums, companies, and individuals—"were working for culture and civilization" (Die Brücke, 1910–1911). The organization of intellectual work was intended to occur "automatically" through the general introduction of standardized means of communication—the monographic principle, standardized formats, and uniform indexing (*Registraturvermerke*) for all publications. The following facilities were planned: a collection of addresses, a *Brückenarchiv* as a "comprehensive, illustrated world encyclopedia on sheets of standardized formats," which should contain a world dictionary and a world museum catalog; a *Brückenmuseum*, and a head office and *Hochschule* (college) for organization. "Close cooperation" with the Institut Internationale de Bibliographie in Brussels was also planned.

"Within the last few years successful efforts have been made in America to introduce the idea of scientific management in all sorts of fields, so that we may expect with confidence to find there a responsive audience when we speak of the organization and systematization of the world's intellectual work" (Ostwald, 1913, p. 6). Here Ostwald referred to the work of Frederick Winslow Taylor. According to Burchardt (1977), Ostwald's philosophy influenced the reception of Taylorism in Germany, visible in the citations of Ostwald's work in the German edition of *The Principles of Scientific Management* (Taylor, 1919).

#### *Standardization of Paper Formats and the Monographic Principle*

Ostwald proposed new standardized formats for all publications. Among the promised advantages of standardizing paper sizes were saving space in desks, bookcases, and libraries; the resultant standardization of printing machines; reduction in the price of publications; as well as the increased feasibility of assembling personal compilations of published materials. One of the Bridge's booklets, *Raumnot und Weltformat* (Bühler & Saager, 1912b), described how a large number of volumes could be shelved in relatively small rooms if their formats were standardized.

In his book about chemical literature (Ostwald, 1919), Ostwald summarized many of the aims of the Bridge and predicted new publication formats. The periodical will be split into separate papers because no scientist wants to read the whole periodical. Ostwald's "Prinzip der unabhängigen Handhabung des einzelnen Stückes" (Principle of the independent use of the individual piece) (Ostwald, 1919, p. 96) was already applied by Ostwald in the publication of his *Klassiker der exakten Wissenschaften*. The principle spoke to "the need to split up scientific communications into very small component parts, which could then at an appropriate instant be built up in any combination and in accordance with the changes that occur with the passage of time in a given area of knowledge" (Bonitz, 1980, p. 29). Paul Otlet had developed similar ideas in 1903 for which he later, in 1918, used the term *monographic principle*.

Ostwald's utopian handbook of the future was intended to be "completely up-to-date at all times" (Ostwald, 1919, p. 93). It is a predecessor of today's loose-leaf collections, which in the future will probably be implemented through electronic publishing. Ostwald also applied the principles of the Bridge to his special subject, chemistry, by proposing the foundation of an International Institute for Chemistry (Ostwald, 1914), planned more or less as a "small Bridge."

### *Influence of Advertising*

According to Rayward, "It is possible that Otlet's use of the term [monographic principle] derives from his involvement in *Die Brücke*" (1994, p. 238). Since the Monos connected with the origins of the Bridge and the Monos were advertising pieces, then one of the important principles of Otlet's contribution to information science may well have originated, at least terminologically, in advertising.

Another interesting connection of the Bridge to advertising was the participation of many members in the Deutsche Werkbund, including Georg Kerschensteiner, Peter Behrens, and Hermann Muthesius (Campbell, 1981, pp. 172–173). One of the most important aims of the Werkbund was to connect art, arts and crafts, and industrial design, which in turn would have some influence on advertising. For the connection of Wilhelm Ostwald to the Werkbund after World War I, see Schirren (1998).

### *Further Activities*

The Bridge published more than twenty leaflets about its aims and activities, and in 1913 the Bridge began its

own periodical, the *Brückenzeitung*, edited by Wilhelm Ostwald, Wilhelm Exner, and Karl Wilhelm Bührer. By July 1912, the Bridge had 361 members (BBAW Ostwald papers, No. 3470, Letter of Bührer to Ostwald of 7 July 1912), and the first annual meeting took place in Munich, 28–29 March 1913 (Erste Jahresversammlung, 1913; Première Assemblée, 1913). The Bridge was also involved in exhibitions, for example, in the Bayerische Gewerbeschau in Munich in 1912. It published a list of the world's largest libraries and a translation into German of an excerpt of the decimal classification tables with an index (Bührer & Saager, 1912a).

By 1914 about DM 100,000 or two-thirds of Ostwald's Nobel Prize money was spent. Lack of other funding and organizational problems with Bührer (Ostwald, 1926–27, Vol. 3, pp. 303–306) forced the Bridge to close in 1914. After World War I, Ostwald received a letter from Frank Richard Behrens (Letter of Behrens to Ostwald of BBAW Ostwald papers No. 3470, 1 May 1920), representing an organization called the Bridge in Berlin. It seems there was an attempt to reorganize the Bridge, and Ostwald was asked to become an honorary member.

## Connections to Other Bibliographic Activities

### *Institut International de Bibliographie*

In the area of connections and reciprocal influences between Bührer, Ostwald, Otlet, and the Institut International de Bibliographie (IIB), much research remains to be done. (Further research on the connections between these activities and those of Paul Otlet and the Institut International de Bibliographie in Brussels will be possible when the Otlet Papers in the Mundaneum in Mons become accessible.) According to Schneiders (1982, p. 89), the first contact between the Internationale Monogesellschaft and Otlet was in October 1908. Otlet responded enthusiastically to the aims of the Monogesellschaft. They went together well with his universal classification. Using decimal notation on the Mono cards seemed a good way to popularize the decimal classification.

Bührer and Saager (1911) mentioned in the introduction (p. viii) of their programmatic book that there existed an arrangement from 1 May 1911, between the IIB and the Bridge concerning 1) the suitable division of labor between the two (the more scientific part for the IIB, the more practical for the Bridge); 2) the *Weltformate*, a definite scientific scale of size for books and publications; 3) the *äussere Form der Registraturvermerke*, a note on the back cover or inside every book



that describes the book, similar to the cataloging-in-publications data now seen in U.S. publications today; and 4) the *Ehrenpräsident* (honorary president) of the Bridge, who would be the *Generalsekretär* (secretary general) of the IIB.

Some differences must have arisen between Otlet and the Bridge. Bühner wrote in a letter to Ostwald on 8 October 1912, that "Hr. Chavannes aus Lausanne," who wanted to found a branch of the Bridge in Switzerland, "formed an alliance with Mr. Otlet." "It would obviously be preferable to me if you take hold of the scepter, because through this a tighter rein can be kept on Mr. Otlet" (BBAW Ostwald papers No. 3470).

The first direct contact between Otlet and Ostwald was probably at the World Congress of International Associations in May 1910. Otlet was one of the Secretaries General of the Congress, while Ostwald and Ernest Solvay were co-chairmen of a section on standardization (Rayward, 1975, p. 180). The personal connection between Ostwald and Otlet may well have been slight, as evidenced by Ostwald's brief mention in his autobiography of Otlet merely as a member of the Bridge (Ostwald, 1926–27, Vol. 3, p. 299).

A postcard from Fried to Ostwald (BBAW Ostwald papers, No. 828, 1 December 1911) points to other interrelations between the international movements before World War I. "I want to call your attention to the new novel *Der Menschheit Hochgedanken* by Baroness Suttner describing a congress of man's outstanding thinkers, which an American multimillionaire decided to hold every year in Luzern. This is an idea that you have already dealt with as Lafontaine just reported to me a few days ago." This novel by Bertha von Suttner contains biographies of the participants at the conference, including a biographical sketch of a man with many of Ostwald's characteristics (Suttner, 1911, p. 166).

#### *Institut für Techno-Bibliographie*

Hermann Beck's Institut für Techno-Bibliographie, founded in 1908 (Behrends, 1995, pp. 19–28), is another example of a German organization participating in the bibliographic movements at the beginning of this century. The institute attempted to organize and summarize all forms of technical literature. The names of Beck and Ostwald were also written below an *Aufruf zur Gründung eines deutschen Archivs der Weltliteratur* (Appeal for the establishment of a German archive of the world's literature, 1912), which is reprinted in facsimile in Behrends's book about the history of documentation in Germany until the end of World War II (1995, pp. 231–234).

Hermann Beck was born on 25 August 1879 in Mülheim an der Ruhr. He studied mechanical engineering and social sciences in Dresden, Berlin, and Heidelberg. His publications show his close relationship to social democracy. After World War I, Beck was active in trying to organize the further development of his *Deutsche Archiv der Weltliteratur* using cards for abstracts (Beck, 1919).

In 1905 Beck had already established the Internationales Institut für Sozial-Bibliographie. This institute published the *Bibliographie der Sozialwissenschaften* and the periodical *Kritische Blätter für die gesamten Sozialwissenschaften*, edited by Beck. In this periodical there are several papers by Beck (e.g., Beck, 1907) and others (e.g., Hanauer, 1908) about the contemporary bibliographic movement. The Institut für Techno-Bibliographie was organized in the same way as the Institut für Sozial-Bibliographie. Both intended to combine a subject-oriented central library, a bibliographic card index, an information agency, a bureau of translation, a clipping service, and a bookseller with international coverage (Beck, 1909, p. 113). Beck was also the editor of the periodicals *Technik und Wirtschaft* (Technology and Economy) (1.1908–37.1944, 11-9) and *Dokumente des Fortschritts* (Documents of Progress) (1.1907/08–11.1918, 3), both of which carried some bibliographic items as well.

In a letter to Ostwald, Beck called himself Ostwald's disciple and follower ("*Schüler und Jünger*") (BBAW Ostwald papers, No. 149, 5 January 1910). In a 27 November 1911 letter Beck enclosed a "Memorial on the Bridge" in which he proposed the union and cooperation of the two enterprises, his Deutsches Archiv der Weltliteratur and Ostwald's Bridge (*Denkschrift betr. ein Zusammengehen des "Deutschen Archivs der Weltliteratur" und des Bibliographischen Zentral-Verlags G.m.b.H., beide in Berlin, mit der "Brücke" in München*) (Beck, 1911). In his memorial Beck also criticized the statutes and the aims of the Bridge. He questioned its requiring by its statutes a very far-reaching connection with the Dewey System and the IIB. For the reception of the IIB and UDC (Universal Decimal System) in Germany see Naetebus (1909), Eichler (1896), and Hanauer (1908 and 1928). Hanauer and Naetebus were the only German participants at the Conférence de Bibliographie in Brussels in 1908. Another important enterprise in bibliography in Germany around the turn of the century was participation in the International Catalog of Scientific Literature (Brodmann, 1901; Tautz, 1903). In the end the cross-purposes of the Bridge and Beck's organizations may be the reason that Beck's plans for coopera-

tion never became reality. On 6 July 1912 Bühner reported to Ostwald that "Beck is supposed to have caused a lot of dubious situations" (BBAW Ostwald papers, No. 3470).

#### *Connection of Wilhelm Ostwald to Julius Hanauer*

The correspondence of Ostwald (BBAW) contains more than thirty letters between him and Julius Hanauer, from the year 1895 until 1932, the year of Ostwald's death. The activities of both men in the areas of organization, standardization, and classification are mirrored in these letters.

Julius Hanauer, born 21 September 1872, in Mannheim, studied physics, mathematics and chemistry. After 1896 he worked for four years in industry. He acted as a co-founder of Hermann Beck's Internationales Institut für Sozial-Bibliographie. Between 1908 and 1910 he worked with Otlet at the Institut International de Bibliographie in Brussels. After World War I he was librarian at the Literarisches Bureau of the Allgemeine Elektrizitäts-Gesellschaft in Berlin. He was called "the Saint Francis of the UDC" in Germany (Björkbom, 1978, p. 104). For the role of Hanauer in promoting the development of the UDC in Germany, see also Wimmer (1985). In 1935 he was retired and living in Frankfurt. He died during World War II.

Only seven letters from Hanauer to Ostwald, of the thirty-six kept in the BBAW (Ostwald papers, No. 1072), date from before World War I. In a letter from Brussels (3 March 1912) Hanauer asked Ostwald for printed papers of the Bridge, and he wrote, "As far as I am in a position to judge on this matter, I do not believe, that intellectual work can be organized against the intentions of librarians." Although working for some years in Brussels, Hanauer expressed in the same letter a reservation about Otlet: "I want to be present at the harvest after years of sowing. However I must reject working together with Mr. Otlet."

The meeting of minds between Ostwald and Hanauer is also demonstrated in Hanauer's letter to Ostwald around spring 1920 (the date is unclear). Hanauer wrote about Ostwald's book *Das grosse Elixier* (1920), "My secretary, to whom I had given your book *The Great Elixier* to read, said: 'This is exactly the same as what you say.'"

#### **Conclusion: Wilhelm Ostwald as a Predecessor of Information Science**

Being aware of the information problem at the beginning of the twentieth century and looking for alternatives to the scientific journal or for improved means of scientific communication in general, Ostwald and his

fellow activists opened a discussion that now at the end of this century continues in the day of the Internet and the proliferation of electronic journals.

The activities of Ostwald and the Bridge concerning the organization of scientific publication and communication had little influence on the scientific community or on the librarians' community in the early decades of this century or after. Ostwald, after his retirement in 1906 and after his support for energetics and monism, was an outsider to the scientific community, even though he had received the Nobel Prize in 1909. Similarly, Ostwald had no close contact with the librarian scene, with the exception of Hanauer, who was himself an outsider because of his support of the decimal classification.

Nevertheless, Ostwald can be seen as a predecessor of information science. Ostwald predicted the arrival of the information specialist as a consequence of the growing division of scientific work. "Therefore, it is ever more necessary for the news service in science, which has been organized up to now in periodicals, annual reports, and similar literary aids, to be built up in such a way that it will be managed by co-workers who are more skillful because specially trained" (Ostwald, 1909, p. 175).

This paper tries to give a picture of the interrelations of a part of the international bibliographic movement before and after World War I. The many similarities between such men as Ostwald, Beck, and Otlet testifies to the existence of a "bibliographic movement" at the beginning of this century. This movement was noticed in Germany, but it only very slowly changed the thinking about the importance of technical and scientific literature in the minds of German librarians, who were mainly trained in the humanities.

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