Mundaneum

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Architectures of Global Knowledge: The Mundaneum and the World Wide Web

The Mundaneum, a series of museums, was meant to promote international understanding. The concept was conceived by Paul Otlet (1868-1944), an information theorist and librarian, who commissioned Le Corbusier to design a 'cité mondiale', an institution for all the world's knowledge. Charles van der Heuvel discusses how Otlet's thinking about distributive networks resonates in Tim Berners-Lee's World Wide Web.

On 14 November 1908 Paul Otlet (1868-1944), a Belgian pioneer of knowledge organization, took the floor in the Maison du Livre in Brussels and presented to the assembled public his vision of the future of the book. In his lecture, La function et les transformation du livre, Otlet stated that the most important transformations would not take place in the book itself, but in substitutes for it. The technological development that would effect the most radical change of the book was wireless: '[...] the principle of transmission at a distance, without limitations of place and direction – of waves that can translate sounds or images indiscriminately.' In the same lecture Otlet spoke of 'a universal network that would permit the dissemination of knowledge without limitation.'[1] Otlet was referring to contemporary experiments with electromagnetic waves that later resulted in Marconi's 'wireless' radio contact across the Atlantic, but which was first studied from an optical (not a communication) point of view with the goal to make the invisible visible. Although television and radio as we know it today still had to be invented, Otlet's vision of the dissemination of knowledge by sound and image waves through a 'universal network' might be seen as a very early anticipation of the Internet.

In Weaving the Web (1999) Tim Berners-Lee, inventor of the World Wide Web, describes its history as a technological development combining the Internet with hypertext in software: 'The task left to me was to marry them together.'[2] Of course the infrastructure and protocols Tim Berners-Lee and others invented to run the World Wide Web as an application on the Internet could not be foreseen in Otlet's day. Yet the Internet and hypertext, both of which so drastically changed our Information Society's architecture of knowledge, were already developed as concepts between
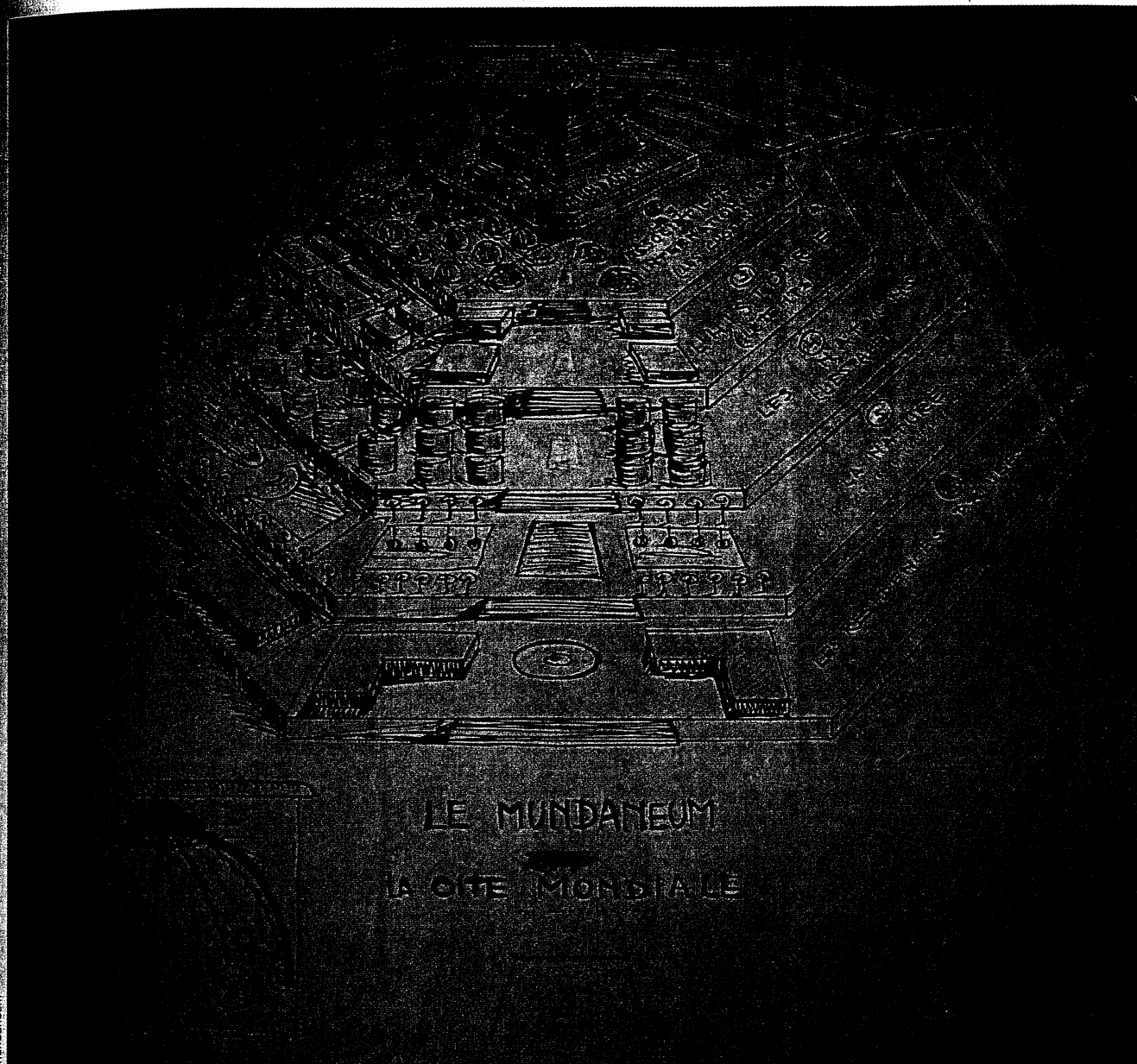
LE MUNDANEUM
LA CITÉ MONDIALE

Fig. 1

the end of the nineteenth and the first half of the twentieth centuries.

Paul Otlet was a central figure in a group of European scholars that included Wilhelm Ostwald (1853-1932), Patrick Geddes (1854-1932) and Otto Neurath (1882-1944) who sought new ways to organize and disseminate knowledge on a global level in order to facilitate world peace and create a more civilized, universal society. One of their common interests was architecture. They not only thought about creating knowledge buildings, but also used architecture as a metaphor for the organization, transformation and globalization of knowledge. This interest in architecture can perhaps be illustrated best by looking at Paul Otlet's plans for the construction of a 'Mundaneum' to house a World Library, World Museum, World Archive, World University and a World Headquarters for International Organizations in one building. The Mundaneum was

not just a project for a real building, but also an architectural metaphor of knowledge organization and dissemination on a global level. In his 1935 book entitled Monde: Essai d'universalisme Otlet wrote that the Mundaneum is 'an idea, an institution, a method, a material body of work, a building and a network.'[3] Since the Mundaneum was both a material and a virtual construction (fig. 1), both a building and a network of knowledge organization and dissemination, it might be interesting to take a closer look at its architecture in relation to the World Wide Web.

Strategies to embody the world's knowledge
By the end of the nineteenth century Otlet had developed a set of strategies to embody the world's knowledge. As was typical for Otlet, he organized and envisioned such activities in both institutions and buildings. In 1910, the year of the first World Congress of International

Associations in Brussels, Otlet, together with the Nobel Peace Prize Winner Henri La Fontaine (1854-1943), conceived the Palais Mondial project which was designed to bring together all their initiatives for knowledge organization on a global level (a Universal Bibliographical Catalog, an International Library, an International museum, an International University and a Central Service for International Associations) under one roof.[4] The 1919 Treaty of Versailles set up the League of Nations and Otlet was able to establish the Palais Mondial in a more permanent world center in the Parc du Cinquantenaire in Brussels, now named the Mundaneum (Rayward, 1990, 3-4).[5] When it was decided to situate the League of Nations in Geneva in 1920, Otlet began searching anew for an ideal location. In 1927 he was able to commission Le Corbusier (1887-1965) with his plans for a Mundaneum in Geneva. A year later Le Corbusier presented his designs for a quarter with conference, documentation and university buildings.[6] The focal point of the plan was the Musée Mondial (World Museum) built in the form of a ziggurat. Visitors would walk through a spiral winding down from the top showing human production, visual documentation of scientific work and natural (geographical) context. This collaboration with Le Corbusier, albeit unsuccessful in the end, can hardly be called coincidence, but was based on parallel views of architecture and knowledge organization.

The Architecture of Ideas

In his Traité de Documentation (1934) Otlet wrote: 'The character of the book, being an 'architecture of ideas', of intellectual data, requires consideration of the enormous revolution architecture itself has experienced in our day.'[7] Otlet pled for a study of modern architecture in order to conceptualize the construction and production of intellectual data as part of knowledge organization. In Vers une architecture, Le Corbusier formulated the naked fact in architecture as the materialization of an idea.[8] In short, he used terms of knowledge organization to define architecture.

Long before his cooperation with Le Corbusier, Otlet had started his search for 'facts' as the basis element of knowledge. In his essay Un peu de bibliographie (1891-1892), Otlet pled for a systematic recording of facts, statistical data and interpretations.[9] The ideal, from this point of view, would be to examine each article or chapter of a book and collect separately on cards whatever was new.[10] In Le livre dans les sciences (1913), Otlet describes the book as any form in which 'thoughts' and 'ideas' were registered including journals, photographs, diagrams, schemas, phonogram disks and films.[11] Otlet was exploring the essence of different formats of knowledge production that might substitute for the book. The book was nothing more than a container of ideas that might be conveyed equally well more efficiently.

This process of intellectual production in various formats and media needed to be organized and streamlined. Given the enormous quantity of sources, Otlet was interested in the use of machines and technologies to handle this growing flow of information. Possibly for that reason he used the knowledge factory as a metaphor to design this intellectual production process. He depicted his 'Laboratorium Mundaneum' as an

enormous grinder in which different sources of information (books, journals, periodicals, statistics, etc.) would be pulverized and sifted. The result, according to a note on the drawing, is 'the purest matter useful for civilization extracted from mountains of documents'.[12] The products ('elements') of this mechanical process of extracting documents would then be sorted in an orderly way into different knowledge-classes which were pulled by the locomotive of the Classification decimale universelle, Otlet's adaption of Melvil Dewey's Decimal Classification. This application of splitting and recombining parts of documents led to new, non-linear combinations of ideas constituting new information comparable (but not identical) to hypertext.

Architectures of Action: distributed networks

This splitting of various multi-media documents conveyed into basic elements or facts was not just aimed at reorganizing knowledge, but would allow scientists to work together. In 1912 Otlet, together with Patrick Geddes in Edinburgh, prepared an Encyclopedia Synthetica Schematica, a visual encyclopedia in the form of charts and diagrams to be compiled by an international group of scientists under their guidance. This process of collaborative image editing would eventually lead to finding the 'facts' of information, the cornerstones of a civilized society (fig. 2).[13] This intellectual cooperation to create a visual encyclopedia was part of a more comprehensive knowledge network. This network was to consist of a hierarchical chain of buildings and institutions linking individual with a universal society (fig. 3).[14]

LE SCHEMA ET LA RÉALITÉ

SCHEMA   RÉALITÉ

Fig. 2
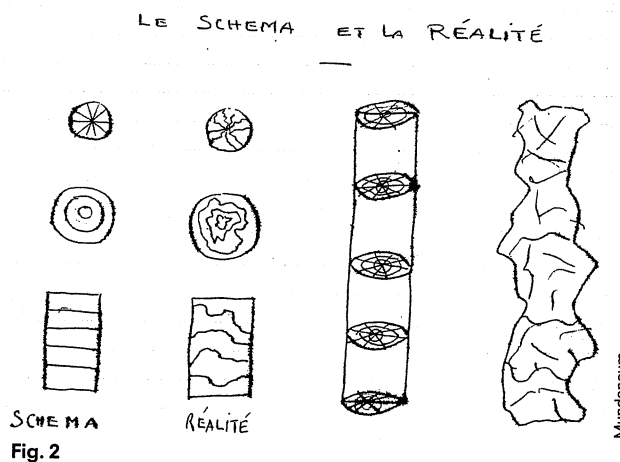
Although Otlet continued piecing together ideas for similar institutionalized forms for the rest of his life, he had long speculated about other, more immaterial ways to exchange knowledge globally. In his Traité de documentation (1934) Otlet suggested the use of the telephone, tele-photography and radio-telephotography for communication between scientists dispersed at conferences all over the world.[15] In his unpublished Encyclopedia Universalis Mundaneum Otlet visualized this teleconferencing idea in combination with other media such as the gramophone, film, radio and television. This multimedia telecommunications device was to be based on the cable to transmit sound and

SPECIES MUNDANEUM

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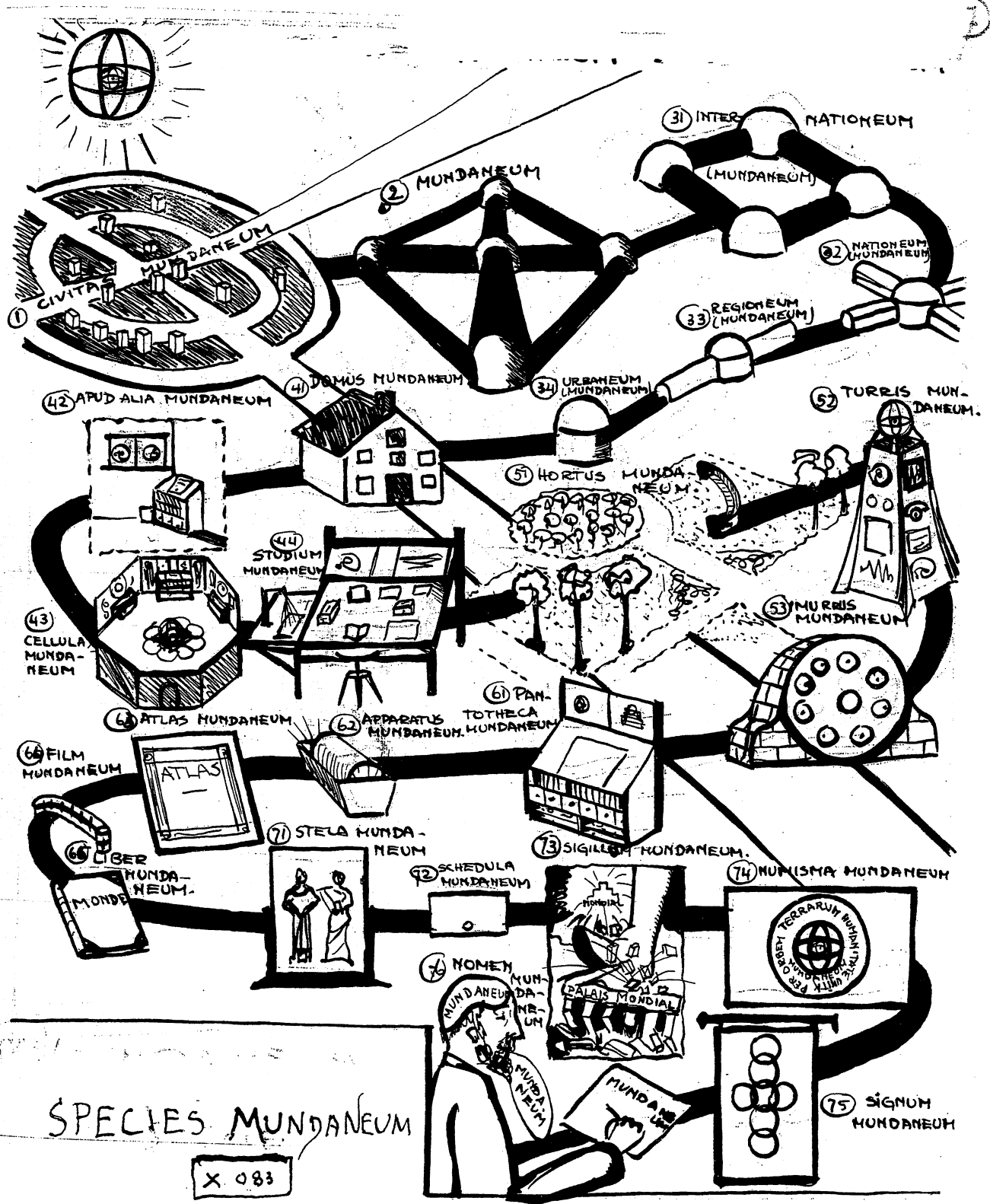
LES FORMES OU LES TYPES DU MUNDANEUM
A
UNIR EN RÉSEAU

DOC. N° 8504

image (fig. 4).[16] However one of the last sketches Otlet drew of the Mundaneum, dated 13 August 1943, shows a wireless variant. This version of the building was equipped with an aerial for the transmission of radio and television signals, allowing people all over the world to participate in the creation of universal knowledge.[17] The sketch is a visualization of what Otlet wrote in <u>Monde</u> (1935):
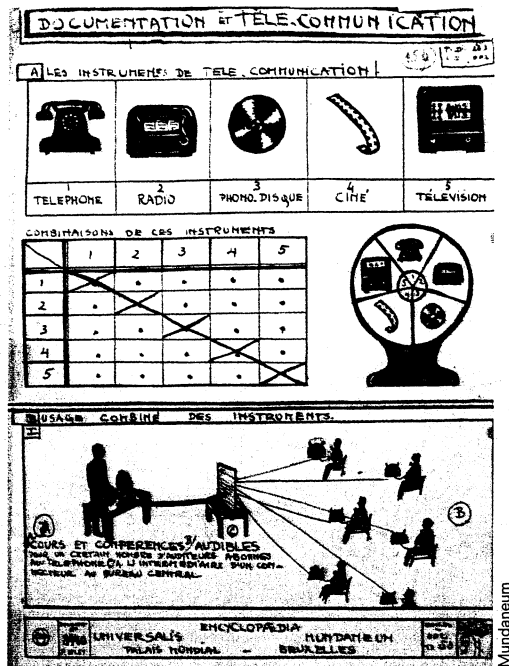

Fig. 4

An instrumention acting across distance which would combine at the same time radio, x-rays, cinema, and microscopic photography. All the things of the universe and all those created by man would be registered from afar as they were produced. Thus the moving image of the world would be established – its memory, its true duplicate. From afar anyone would be able to read the passage, expanded or limited to the desired subject, that could be projected on his individual screen. Thus, in his armchair anyone would be able to contemplate the whole of creation or particular parts of it.[18]

This is an astonishing image when one contemplates Tim Berners-Lee's statement: 'My original vision for a universal web was an armchair to help people to do things in the web of real life'.[19]

Architectures of Global Knowledge and the World Wide Web

It would be wrong to read Otlet's visions of distributed knowledge production as similar to Berners-Lee's views of the World Wide Web. Otlet's architectures of a global knowledge organization are hierarchical and centralized. Tim Berners-Lee's original design for the World Wide Web is non-hierarchical and decentralized. Berners-Lee discussed this problem in relation to the Semantic Web. In 1998 he wrote:

The Semantic Web is what we will get if we perform the same globalization process to Knowledge Representation that the Web initially did to Hypertext. We remove the centralized concepts of absolute truth, total knowledge, and total provability, and see what we can do with limited knowledge.[20]

Yet despite these differences there are at least two good reasons to compare Otlet's visions with the architectures of the World Wide Web. The first is a discrepancy between Berners-Lee's statements on the design of the Semantic Web and his visualizations of it. If we look at the visualization of the Semantic Web Architecture's 'stack pattern' adopted by the W3C, we recognize a similar pyramidal structure of components as Otlet had designed. Despite Berners-Lee's recommendation to remove centralized concepts of absolute 'truth' from the design schemes for the Semantic Web, it might be argued that this 'stack pattern' contains positivist elements comparable to Otlet's knowledge representations. Berners-Lee's image shows a hierarchy of concepts with 'trust' and 'proof' at the top.[21]

A second reason to compare Otlet's knowledge architectures with the World Wide Web are recent developments to control its codes which might effect its architecture. Berners-Lee and the W3C designed the WWW as an application running on a (value free) network open to everyone: ordinary individuals, scholars, public organizations and companies, non-commercial and commercial entities. It was designed to allow people to share knowledge in a 'universal space', to link local material globally and to cross social boundaries.[22] In his <u>Code and Other Laws of Cyberspace</u> (1999) Stanford University law professor Lawrence Lessig predicted however that its architecture would become quite the opposite of what it was. 'Left to itself [that is without the government regulating the code, not its architecture], cyberspace will become a perfect tool of control'.[23] Albert-László Barabási, a leading expert in the new science of networks, states in <u>Linked</u> (2003) that the true architecture of the Web (in his view self-organizing and hierarchical at the same time) enforces more limitations to our behavior and visibility on the Web than government or industry could ever achieve by tinkering with code.[24] This means that although we are able to shape the Web architecture to a certain extent by changing the visible code, for the greater part it will be shaped by user links, creating new hierarchies. This is also the lesson of Otlet's last sketch for the Mundaneum (1943). The wireless transmission of images and sounds implies that his classification system of control would be bypassed by users and producers in his distributed network linked to the Mundaneum and in the end change its knowledge architecture. Like libraries, architectures of knowledge and knowledge architectures can be designed autonomously to a certain extent, but in the end will be shaped more and more by its users.[25]

1   Paul Otlet, <u>La function et les transformations du Livre</u>. Résumé de la conférence faite à la Maison du Livre 14 November 1908, Bruxelles (Musée du Livre 11) 1909, p. 29.

2   Tim Berners-Lee, <u>Weaving the Web. The Past, Present and Future of the World Wide Web by its inventor Tim Berners-Lee with Mark Fischetti</u>, London (Orion Business) 1999, p. 7.

3   Paul Otlet, Monde, essai d'universalisme: connaissance du
     monde, sentiment du monde, action organisée et plan du monde,
     Bruxelles (Editiones Mundaneum/D.van Keerberghen & Fils)
     1935, pp. 448-452. W.B. Rayward, 'Knowledge Organization
     and a New World Polity: the Rise and the Fall and the Rise of the
     Ideas of Paul Otlet', Transnational associations/Associations
     transnationales: la revue de l'Union des associations inter-
     nationales, numéro spécial 1–2, 2003 (L'oeuvre de Paul Otlet)
     pp. 4–15.

4   W.B. Rayward, The Universe of Information. The Work of
     Paul Otlet for Documentation and International Organization.
     Moscow (VINITI) 1975. Idem, International Organisation and
     Dissemination of Knowledge. Selected Essays of Paul Otlet,
     (Translated and edited with an introduction by W. Boyd Rayward).
     Amsterdam/New York/Oxford/Tokyo (Elsevier) 1990.

5   W.B. Rayward (1990), pp. 3-4.

6   G. Gresleri, Cité Mondiale, Andersen, Hébrard, Otlet,
     Le Corbusier, Venezia (Marsilio) 1982; Catherine Courtiau,
     'La Cité International, 1927–1931'. In: Le Corbusier à Genève
     1922–1932, Projets et réalisation, Lausanne 1987; Jean-François
     Payot.Fueg, 'Ordo ab chaos. Classer est le plus haute opération
     de l'esprit', Transnational associations/Associations trans-
     nationales: la revue de l'Union des associations internationales,
     numéro spécial 1–2, 2003 (L'oeuvre de Paul Otlet) pp. 29–35.

7   Paul Otlet, Traité de documentation: le livre sur le livre: théorie
     et pratique, Bruxelles (Editiones Mundaneum, Palais Mondial)
     1934, p. 100.

8   Le Corbusier, Towards a New Architecture, London (The Archi-
     tectural Press) 1976, p. 28 Original title Vers Une Architecture,
     Paris (Crès) 1923.

9   Paul Otlet, 'Un peu de bibliografie', Palais, Organe des Con-
     férences du Jeune Barreau de Belgique. 1891-1892, pp. 254-271
     [English translation W.B. Rayward (1990) pp. 11-24]. See also,
     B. Frohmann, 'The Role of Facts in Paul Otlet's Modernist Project
     of Documentation' in W.B. Rayward [ed.] European Modernism
     and the Information Society, London (Ashgate Publishers) 2008,
     chapter 4, pp. 75-88.

10   W.B. Rayward (1990) p. 17.

11   Paul Otlet, Le livre dans les sciences, Conférence faite à la
     maison du Livre par M. Paul Otlet. Bruxelles (Musée du Livre)
     1913, pp. 25–26.

12   Mons Mundaneum, EUM farde 88 Varia-Laboratorium
     Mundaneum Document 8694

13   Mons, Mundaneum, EUM II Thèmes 1 Méthodologie 2 système
     d'organisation Mundaneum EUM boite 2-farde 8.

14   Mons Mundaneum, EUM II Thèmes 2 Documentation A.
     Atlas 1 Version finale, boite 3 farde 14 document 8504.
     See further, Rayward, o.c. [note3], pp. 6–7.

15   O.c. [note 7] pp. 236-237.

16   Mundaneum EUM II Thèmes 2 Documentation A. Atlas 1 Version
     finale boite 3 farde 14. no. 8439.

17   Mons Mundaneum, EUM III Mundaneum F. Cité Mondiale 3
     Calques boite 14 farde 120, p. 136.

18   Paul Otlet. O.c. [note 3] p. 391 [Translation W.B. Rayward
     (1990) p. 1]

19   O.c. [note2], p. 178

20   Tim Berners-Lee, Design Issues 'What the semantic web
     can represent' , paragraph: 'Knowledge Representation goes
     global', http://www.w3.org/DesignIssues/RDFnot.html [last
     modified 17 Sept. 1998]: See further Tim Berners-Lee: Design
     Issues ' Preface: Architectural and philosophical points',
     http://www.w3.org/DesignIssues/Preface.html [updated 6 Jan.
     1999] and Tim Berners-Lee (1998): 'The World Wide Web

     and the <<Web of Life>>', http://www.w3.org/People/Berners-
     Lee/UU.html

21   This visualization of the Semantic Web Architecture was
     presented by Berners-Lee at XML in 2000 in Vienna:
     www.dajobe.org/talks/sw-vienna/slide10.html

22   O.c. [note 2] pp. 176-177.

23   L. Lessig, Code and other Laws of Cyberspace, New York
     (Basic Books) 1999, p. 6.

24   A-L. Barabási,, Linked. How everything is connected to everything
     else and what it means for business, Science, and Everyday Life,
     London (Plume-Penguin group) 2003, p. 175.

25   This article is an abridged and adapted version of the contribution
     by the author: C. van den Heuvel, 'Building Society, Constructing
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Otlet: Documentation and Telecommunication, Mundaneum