Internationalist Utopias of Visual Education: The Graphic and Scenographic Transformation of the Universal Encyclopaedia in the Work of Paul Otlet, Patrick Geddes, and Otto Neurath

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During the interwar period, the encyclopaedia became a popular educative instrument for demonstrating knowledge. Within the field of cultural internationalism, the pioneer of documentation Paul Otlet redefined the encyclopaedia as a documentary product or as we would say today a "multi-media" product. This article discusses the exchange of ideas between Otlet, Patrick Geddes and Otto Neurath and shows how the graphic and scenographic demonstration of encyclopaedic knowledge at the beginning of the twentieth century applied the values of scientific universalism to programs of international education and cultural reform.

Paul Otlet (1868–1944) was a Belgian intellectual, a utopian internationalist and a visionary theorist of the field of information science. His work is a milestone in the history of information science since he launched the concept of "documentation," a field that evolved out of bibliography and developed into information science.[1] Otlet defined documentation as the whole of the proper means of passing on, communicating, and distribut-

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1. Two biographies of Paul Otlet have been published, by W. Boyd Rayward (1975) and Françoise Levie (2006).

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ing information. Otlet was a convinced apostle of the idea of universalism as the title of one of his seminal books, *Monde. Essai d'Universalisme,* illustrates. This was the outcome of a course of fifteen lessons, entitled "L'universalisme, doctrine philosophique et économie mondiale," that he gave from 1919 until 1933 at the Institut des Hautes Études de Belgique (Université Nouvelle) in Brussels. Otlet had already given several lectures at the Institute from 1909 till 1911, and started his course in 1919 in the section V of social, political, economic and juridical sciences. The title of the course changed almost every year (Despy-Meyer 1976). In 1926 Otlet wrote to his friend Patrick Geddes that he continued "to work on an account of Universalism on which I have consecrated four years of courses at the Institut des Hautes Etudes. But I still hesitate to publish it. [. . .] I have edited many parts and above all, I have established the schemas. About these we must talk."[2]

Otlet started his career in 1890 after his law studies in the office of "le maître des maîtres" Edmond Picard (1836–1924). Picard demanded Otlet undertake a bibliography of jurisprudence, for which he collaborated with, among others, Henri La Fontaine (1854–1943). Henri La Fontaine was a Belgian senator, president of the International Peace Bureau (1907–1943) and winner of the Nobel Prize for Peace in 1913. Otlet and Henri La Fontaine would become lifelong colleagues and friends. In 1893 they founded the *Office International de Bibliographie et d'Informations Sociologiques* in Brussels out of the bibliographical section of the *Société des Sciences Sociales et Politiques* (SESP) and in 1895 they found their *Office international de Bibliography* (OIB) and *Institut International de Bibliographie* (IIB). Through the OIB and IIB they made intensive propaganda for their *Universal Decimal Classification* or UDC-system for bibliography and documentation, and for the adoption of the standard American index card (7,5 x 12,5 cm) in libraries all over Europe. In 1907 Otlet, La Fontaine and Cyrille Van Overbergh founded the *Office International des Associations Internationales,* an umbrella organization for the international organizations which had their main office in Brussels. On the occasion of a world congress in 1910 in Brussels they developed this institution into the *Union of International Associations* (UIA). The UIA posed the problem of the international coordination of intellectual work and as such was one of the first platforms in history for discussing the politics of science on an international scale. In 1913 a second world congress of the UIA was held in

2. ". . . Je travaille toujours a un exposé de l'Universalisme auquel j'ai consacré quatre années de cours à l'Institut des Hautes Etudes. Mais j'hésite encore à publier. [. . .] Mais j'ai rédigé quantité de parties et surtout j'en ai établi les schémas. C'est de la que nous devons parler." Paul Otlet, letter to *Patrick Geddes,* National Library of Scotland Patrick Geddes Papers Ms 10564 Nr. 101 (1926.12.09).

Brussels and Ghent. During the same year Otlet, Emile Vinck (1870–1950) and Paul Saintenoy (1862–1952) founded the *Union Internationale des Villes (International Union of Local Authorities).*

Otlet's intellectual culture was mainly rooted in the intellectual tradition of the French positivism of Claude-Henri de Saint-Simon (1760–1825) and August Comte (1798–1857), the British synthetic philosophy of Herbert Spencer (1820–1903) and the German cosmopolitism following from Kant (1724–1804). Otlet chose to stay an independent intellectual and never did take sides within a particular political party. This allowed him to collaborate with a liberal reformist such as Ernest Solvay (1838–1922) and a socialist like Emile Vandervelde (1866–1938) at the time of the *Institut des Sciences Sociales* in Brussels, and with a catholic such as Cyrille Van Overbergh (1866–1959) for the establishment of a documentation office related to the Belgian Expansion under king Leopold II (1965–1909).

Today, Otlet is a well-known figure in the history of information science and is often made trendy by journalists who depict him in presentist terms as the forgotten forefather of search engines such as Google or the World Wide Web.[3] Indeed, Otlet did describe the utopian dream of what he called the *Universal Network of Documentation.* This would consist of a network of documentation offices stretching out around the globe that would make all knowledge accessible to the entire world. The information network he imagined, however, unlike the WWW, was centralized in a huge centre, which he called the Mundaneum, a sort of huge 'database' where all knowledge would be assembled, processed, and distributed. Flowing from his belief in universalism, Otlet believed that the distribution of universal knowledge would generate a universal culture. The utopian character of Otlet's work has incited fascination as well as satire in historical studies as well as in his own time. In the same way as Edward Hall remarked of Thomas More, it is often not entirely clear whether Otlet should be called a foolish wise man, or a wise foolish man (Holinshed 1577, p. 793).

Otlet's utopian universalism should be situated within the field of "cultural internationalism" in the decades before and after the First World War. As Akira Iriye has called it, "cultural internationalism" added another layer to other forms of internationalism such as legal, economic, pacifist, scientific and political internationalism. It was based on the idea that:

3. "Le Mundaneum. Google de Papier" by Jean-Michel Dijan (Dijan 2009) or "The Web Time Forgot" by Alex Wright (Wright 2008) are two examples of recent articles that mythologize Otlet in this sense. See also the blog of Alex Wright on Paul Otlet: http://www.boxesandarrows.com/view/forgotten_forefather_paul_otlet

> A more peaceful world order could develop not just through the drafting of legal documents, the establishment of international courts, or engagement in unrestricted commerce, but through the efforts of individuals and organizations across national boundaries to promote better understanding and to cooperate in collaborative enterprises. (1997, p. 27)

Cultural internationalism increased interest in cross-cultural understanding and in the mutual exchange of knowledge. In the attempt to organize intellectual work on an international scale, Otlet collaborated with intellectuals such as Wilhelm Ostwald (1853–1932) in Germany, Alfred Hermann Fried (1864–1921) in Austria, or René Worms (1869–1926) and Charles Richet (1850–1935) in France. In 1937 at the World Congress of Universal Documentation in Paris (sponsored in part by the International Institute of Intellectual Cooperation of the League of Nations), Otlet met Herbert George Wells (1866–1946) whose work Otlet had read with great interest and who was himself inspired by the British section of the documentation movement with whom Otlet collaborated intensively (Rayward 2008). All these men were engaged in organizing "international life" and aimed at establishing a world civilisation or a new "world order" that would bring an enduring world peace.

One of the instruments rediscovered by cultural internationalists was the encyclopaedia. The encyclopaedic format, not so much as an inventory of knowledge, but as an *educational* instrument appealed to them as it could convey in a comprehensible overview the history and different constituent cultures of the world civilization. As truly "universal" undertakings these encyclopaedias would avoid the traditional nationalist perspectives on science and culture and would instead be based on universal "facts." They would provide an educational tool for the general public that was scientific, universal, and peace-promoting. A notable example during the interwar period were the three encyclopaedias published by H. G. Wells—*The Outline of History* (1920), *The Science of Life* (1930) and *The Work, Wealth and Happiness of Mankind* (1931)—which he hoped would contribute to the re-education of humanity and lift mankind to a higher plane of awareness. Many other intellectuals and educators started similar encyclopaedic projects that were intended to speed up the advent of a world civilisation.[4]

Paul Otlet's encyclopaedia should be situated on the same wavelength

4. Examples are *Pictured Knowledge* by Marshall Hughes; *Book of Knowledge. The children's encyclopedia* by the Grolier Society; *Changing Civilization in the Modern World* by Rugg Harold; *Brief History of the world with special reference to social and economic conditions* by George Willis Botsford.



Figure 1. Picture of the Documentary Encyclopaedia of Otlet and La Fontaine before World War I
L'Encyclopedie documentaire (état anterieur) (n.d.)
Mundaneum (MDN), *International Museum* (IM), scan nr. Mundaneum_A400096

as these educative encyclopaedic projects. What singles out the project of Otlet is his vision of the encyclopaedia as a documentary product or as we would say today a "multi-media" product. Otlet's encyclopaedic project essentially begins in 1903 when he developed the concept of documentation. With the notion of documentation, Otlet abandoned the book as the privileged medium for the dissemination of ideas and asserted instead the importance of the multiplicity and possible combination of textual and visual media.

Instead of seeing all the existing media as different registers of knowledge, he considered them as documentary embodiments of a single encyclopaedic body of knowledge. At first sight, Otlet's Documentary Encyclopaedia (1907) seems to take another step in the modernisation of the encyclopaedia, away from the traditional concept of surveying the complete body of knowledge and instead constructing an archive of multiple media. But as his career developed Otlet became more and more committed to the possibilities of the visual demonstration of the order of knowledge and gradually explored the encyclopaedias' educational potential. Thus for Paul Otlet the encyclopaedia was not a storehouse of knowledge

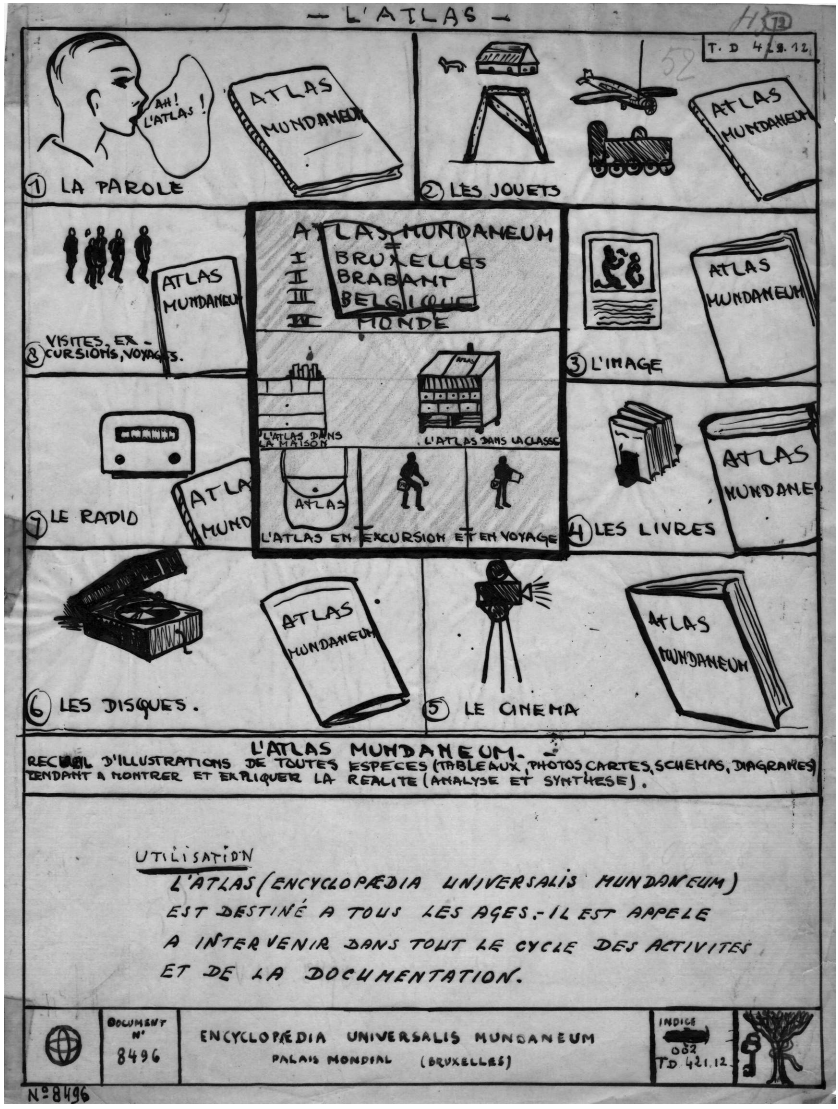

Figure 2. Illustration showing the Atlas Mundaneum as a mobile 'multi-media' format that includes speech, toys, images, books, cinema, audio, radio, and even excursions. Furthermore, the illustration mentions that the atlas is intended for all ages and for all fields of knowledge.
Paul Otlet, *L'Atlas* (n.d.)
MDN, EUM, Box 8, Farde EUM73, doc nr. 8496

consulted for specific queries but rather a manual for coaching people in acquiring general knowledge.

His growing concern about the popularisation and democratisation of knowledge brought him to found an encyclopaedic museum in 1910 in association with Henri La Fontaine: the International Museum at the Palais du Cinquantenaire in Brussels. Its cultural mission was to make the general public aware of the unity of knowledge and the unity of the world through visual means. Starting from the conclusion that one image tells more than a thousand words, Otlet explored the possibilities of the use of images in a program of visual education. The International Museum included "collections of objects, to the extent that they are sources of information and study," "explanatory notes and illustrative charts," photographic reproductions of "specific models used for natural history," as well as works of art (Otlet 1920, translated in Rayward 1990, p. 197). The result was a spatial encyclopaedia set up in such a way as "to visualize" and synthesize what is known. Images in Otlet's view had the capacity to synthesize knowledge: he considered the "visualization of ideas" as the key stage in the sequence of documentation, exposition and education (Otlet 1926, p. 1; see also Figure 15).

This article will trace the efforts of Otlet to redefine the encyclopaedia as a graphic and scenographic construct. Otlet's work on a visual and spatial encyclopaedia will be compared with the work of Patrick Geddes (1854–1932) and Otto Neurath (1882–1945) with both of whom he collaborated on several occasions. The kinship of the ideas of Otlet and Geddes within the framework of urban history has been explored by Pieter Uyttenhove (1985, 1986, and 1987) and more recently by Pierre Chabard (2008a, 2008b). Chabard has compared the regional scope of Geddes's Outlook Tower with the global scope of Otlet's Mundaneum. The relationship between Otlet and Otto Neurath has been first explored by Nader Vossoughian (2003). On the basis of the correspondence between Otlet and Neurath, Vossoughian has shown that Neurath's theory and practice took an internationalist turn through the influence of Otlet (2004, 2008a, 2008b). Another study which is closely related to the approach of this article is the last chapter of the unpublished doctoral thesis of Gert Morreel (2006) which studies successively, however not comparatively, the encyclopaedic conception of H. G. Wells, Neurath, and Otlet. Concerning Otlet, Morreel rephrases his main achievements in the field of international bibliography and concludes that Otlet's thinking is captured within a contradiction between the systematization of his bibliographic project and his desire for a sense of the whole as proclaimed in his book *Monde.* Concerning Neurath, Morreel focuses on Neurath's project for an *International Encyclopedia of Unified Science* and his historical epistemolog-

ical understanding of the encyclopaedia. Charles van den Heuvel (2008a, 2008b) has also noted the connections between Otlet, Geddes, and Neurath. After looking at some of the plates of Otlet's Universal Encyclopaedia, he has related Otlet's visualizations to Tim Berners-Lee's ideas of a semantic web.

Through a study of mainly unexplored visual materials of and correspondence between Otlet, Geddes, and Neurath, this article complements and assembles previous research by Rayward, Uyttenhove, van den Heuvel, and Morreel, and deepens research of Chabard and Vossoughian mentioned above. Special attention will be given to how the visual culture of the encyclopaedia is bound up with the history of media and with discourse on science museums. In a broader sense, this article aims to contribute to research on the production of scientific atlases and the distribution of scientific images in the history, philosophy and sociology of science that has become familiar since the 1980s. Some studies that have marked this new field of research include: Fyfe and Law (1988), Latour and de Noblet (1985), Lynch and Woolgar (1990), and Daston and Galison (1992). The first classic studies on scientific imagery date from the late 1970s by Rudwick (1976), Edgerton (1975), and Ferguson (1978). Before the 1970s art historians generally neglected scientific illustrations while historians of science and technology neglected scientific imagery because they held that its origins lay in art and not in science (Topper 1996). This analysis of the imagery of Otlet, Geddes, and Neurath considers visualization as an essential part of science studies and therefore continues the questioning of the demarcation between science and art as performed in the studies mentioned above.

The International Museum and the Education Movement

In 1862, Richard Owen (1804–1892), director of the Natural History department in the British Museum, stressed that the education of the public is the most elevated task of a public museum (Visser 2005). Another museum reformer, the zoologist George Brown Goode (1851–1896), director of the U.S. National Museum in Washington D.C, stated that the primary task of the public museum is to be a "people's museum," a museum that educates the public. The challenge was to bring history to life, to restore the modernity of the museum by making it again a museum relevant to its own day. Instead of cabinets crammed with objects, the new museum should be filled with ideas (Visser 2005). The evolutionary theory as formulated by Charles Darwin (1809–1882) in 1859—and the translation of this theory in a wider social sphere by, for example, Huxley and Spencer—gave an impetus to a new educational arrangement of the visitor's pathway through many natural history and anthropology museums (Bennett 1995,

p. 186). The layout of the walkway and of well-selected specimens followed the steps of the classificatory arrangement in evolutionary series. Throughout his trajectory, the visitor was educated into the temporal order of the evolutionary classification scheme (Bennett 1995, p. 167).

By 1900 educational ideas such as those of Owen, Goode, and others inspired changes in many sorts of natural history museums and other public museums world wide. Yet, in Europe opposition to their model of mass education and the popularization of scientific knowledge remained strong. Many traditional curators thought that the new sensationalist methods of presentation deformed scientific truth and corrupted the scientific dignity of research. Within the Belgian context, for example, the curators of the Royal Museum of Natural History in Brussels opposed the new pedagogism. Its curator Édouard Dupont and his successor Gustave Gilson deemed the scientific and pedagogic imperative as incommensurable and continued a museum policy focused on the discovery of new knowledge (Nys 2008, p. 114). However, as Liesbet Nys indicates, other reformers in Belgium introduced the educational ideas that inspired many natural history museums of its time and did seek new educational modes of display. Among those, Nys mentions Charles Buls's initiative in 1890 for a *Palais du Peuple*—a scientific museum for the education of the people to be built in the Parc du Cinquantenaire—and an exhibition on the social life in Belgium in the seventeenth century set up by Cyrille Van Overbergh. The latter was organized on the occasion of the world exhibition in 1910 in the Palais du Cinquantenaire which was to become the location for the International Museum that Paul Otlet sought to develop from the exhibits at the same world's fair.

Otlet and Van Overbergh were already well acquainted since 1906 when both men had collaborated as part of a commission to draw up a preliminary programme for the construction of a national intellectual centre on the Mont des Arts in Brussels by order of King Leopold II. Van Overbergh, as the chairman, and Paul Otlet, as the secretary of this commission, had jointly put forward the proposition to build a World Museum, a Science Museum, and a Social Museum on the Mont des Arts (De Meulder 1994, 156). The creation of the International Museum in 1910 may be regarded as the actual realisation of the provisional plans of 1906 for a World Museum. Noteworthy, one of the most important exhibitions at the world's fair in 1910 that served as the basis for the International Museum was the one set up in relation to the World Congress of International Associations organized by Otlet, La Fontaine, and Van Overbergh.

In creating the International Museum, Paul Otlet was alive to the educational imperatives and visual methods for disseminating knowledge to the public but applied them to the encyclopaedic museum. Otlet did not

want to make an encyclopaedic museum that was simply a massive storehouse of documentation instead, he wanted to transform the vast collection of what he had assembled and conceptualised as a documentary encyclopaedia into an educational display of ideas, a set of easily comprehensible bits of information. In order to do this, the International Museum drew on visual approaches from all sorts of museum types. It was at once "a geographical and historical museum, a scientific and teaching museum, a commercial and social museum, and a museum of civilisation and culture"[5] (Otlet and Le Corbusier 1928, p. 10). But the most important model on which the International Museum was based was that of the universal exhibitions (Van Wesemael 2001). The International Museum had the ambition to be a permanent universal exhibition in miniature.

The International Museum in Brussels gave a didactic overview of the World in three sections. The history section of the museum ran through thirty centuries, from the Egyptians through modern times, outlining the different stages of human development and its successive civilizations in an evolutionist scheme.

The national or geographical section attributed a room to each nation of the world. It dealt with different nations such as Italy, Spain, France, Japan, and Poland. For the formation of this section of the museum, an appeal was made to the different governments of these nations. They were asked to donate the exhibits they had prepared for the Universal Exhibition or to develop similar but more permanent and complete national exhibits for the museum.

The last section, the international or scientific section of the museum, surveyed the state of affairs in the different sciences. It was intended to provide an encyclopaedic overview of the different scientific fields and branches of activity. This section was elaborated with the collaboration of the Union of International Associations (UIA) and its international association members who were asked to organize an educational presentation of their work and their objects of research.

The challenge that Paul Otlet posed for visual education in museums was his attempt to determine the extent to which the entire universe of information could be reduced to its most essential ideas in a visual manner. Starting from the entire storehouse of information, the method of visualization should produce as much insight as possible while requiring the smallest amount of effort on the part of the visitor. For Otlet, the museum

5. "Établi à toute fin, on doit y trouver combinés dans les cadres de ses sections, toutes internationales, les éléments essentiels d'un Musée géographique et historique, d'un Musée des sciences et de l'enseignement, d'un Musée commercial et social, d'un Musée de la civilisation et de la culture."



Figure 3. Picture of the Room of Poland at the International Museum, Brussels
Paul Otlet, *Salle de Pologne. N°259. N°260*
MDN, MI, scan nr. Mundaneum_A400102.jpg

was a form of mediation that could surpass the book and the traditional classroom with a teacher in its educational potential:

> The teacher by himself is insufficient; the book on its own is insufficient. The teacher and the book by themselves are also insufficient. We must complete their action by a new instrument; the museographic representation revealing through the synthetic frameworks of its arrangement, the types that are most able to provide on demand "a particular or panoramic vision of the entire world and what it contains."[6] (Otlet 1926, 28)

6. "Le maître à lui seul est insuffisant, le livre à lui seul est insuffisant. Le maître et le livre à eux seuls sont insuffisants aussi. Il faut compléter leur action par celle d'une instrumentation nouvelle; la représentation muséographique montrant dans les cadres synthétiques de sa classification, les types les plus caractéristiques capables de donner, comme il est demandé, «une vision particulière ou panoramique du vaste monde et de ce qu'il contient»."



Figure 4. Picture of the Room of Microphotography at the International Museum, Brussels
MDN, MI, scan nr. Mundaneum_A400131

In line with the new education movement, the International Museum assigned a fundamental role to observation and sense impressions in the education of children. Referring to the contemporary innovators in the field of education—such as Clapadère, Ferrière, Decroly, William James, Dewey, Montessori and Dayton—Otlet gave account in his writings of the importance of action, of manual work and the activity of playing as formulated in the renewed field of children's education (Otlet 1926, p. 20). Referring to Fouillée, Otlet thought that education should be oriented towards the individual as well as to society at large (Otlet 1926, p. 6). Education now concerned the entire society—all classes and all ages. According to Otlet, this was evident in the emergence of new forms of education such as technical, specialized and adult education. Due to this, the childlike character of the International Museum was not only the result of the popularisation of knowledge for the general public, but also of the aim of reaching the different ages.

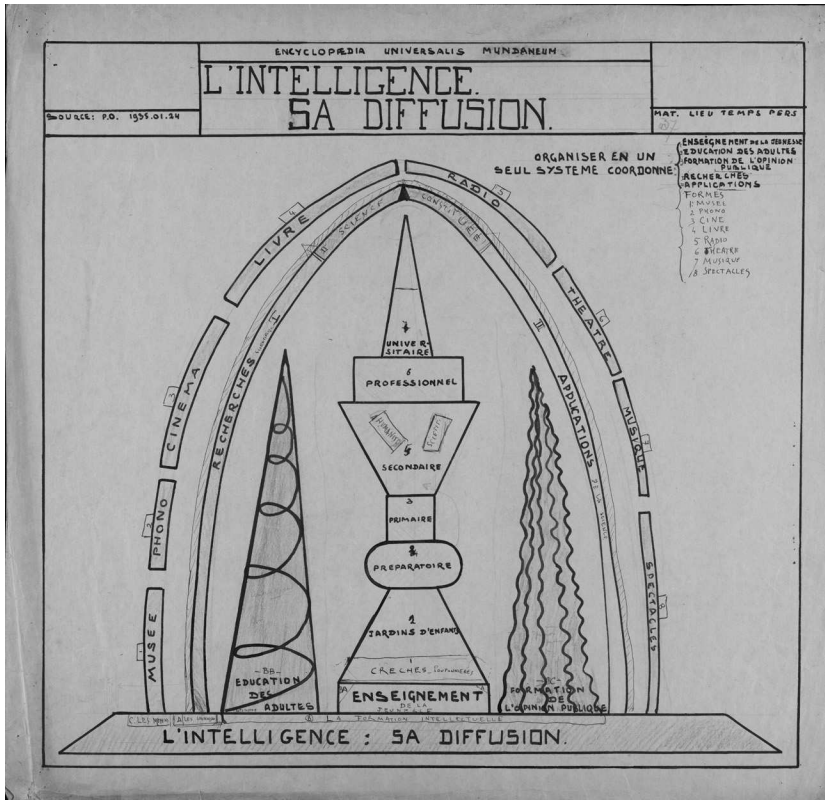

Figure 5. Image explaining how knowledge is distributed through educational institutions and educational media
Paul Otlet, *L'intelligence. Sa diffusion.* (1935.01.24)
MDN, AFF, scan nr. MUND-xxxxxx12_2008_0001_MA

Revisiting the Encyclopaedic Museum as a Synthetic Memory Machine

Otlet's rethinking of the encyclopaedic museum was much influenced by the work of the biologist, sociologist, and town planner Patrick Geddes.[7] In fact, Otlet's campaign in Brussels in 1910 to get a museum off the ground by preserving parts of the World Exhibition was a repetition of a similar attempt by Geddes in 1900. On the occasion of the Universal Ex-

7. For a biography of Geddes, see the work of Amelia Dorothy Defries (1927), Philip Boardman (1978) and Meller (1990).

hibition in Paris, Geddes had sought in vain to convince several nations to turn their pavilion along the rue des Nations in a permanent museum. The Kensington Museum and the Commercial Museum of Philadelphia were cases of museums born out of universal exhibitions, and Geddes hoped to achieve the same in order to realize what he called an "Index Museum." For Geddes, an index museum was a graphical encyclopaedia which unfolded itself as a museum space. The Universal Exhibition in Paris was according to Geddes such an Index Museum actually realised in the rough, although he thought the order had to be revised from the standpoint of evolutionist theories (Geddes [1902] 1989, p. 67). Of course, such an Index Museum of the largest scale was the ultimate dream, but Geddes had started by installing a more humble prototypical version of the index museum in the highest gallery of the Trocadéro in Paris (Ponte and Levine 1989). The exhibition set up by Geddes gave an overview of world geography. While the visitors strolled along the exhibition they could look down on that index museum in the large (or the world in miniature) which was the Universal Exhibition. During the event Geddes organized lectures and seminars, among others by Henri Bergson, Charles Gide and . . . Paul Otlet (Vidler 2003). Here Geddes and Otlet discovered their shared passion for classification and the encyclopaedia. Although Geddes was familiar with organizing encyclopaedias from his work for the Chambers Encyclopaedia and the Encyclopaedia Britannica, he showed great interest in how Otlet was rethinking the encyclopaedia as a work of documentation. And while Otlet was at that time still mainly occupied with bibliography, here new paths opened to him which would lead him ten years later to found his own encyclopaedic museum on the basis of his classification system for documentation.

Classification was also the basis of Geddes's definition of what an index museum was. In a manuscript called "Museums, actual and possible" (1902), Geddes defined the index museum:

> To construct an Index Museum then, as distinguished from the ordinary congeries of minor museum galleries, which may be each of itself intelligible, but not upon any single plan nor upon plans clearly related, is a problem strictly analogous to the planning of an Encyclopaedia—in fact, it *is* planning an Encyclopaedia. [. . .] This is no doubt difficult to realise; since most important and most difficult of all, the plan, the order must be no longer alphabetical or empirical, but rational; that is, in conformity at once with reason, truth, observation, with philosophy and with the order of nature. (Geddes [1902] 1989, p. 66)

The index museum is not specialised in one particular subject but has an encyclopaedic breath that asks for an all-encompassing order or plan. Geddes had borrowed the term "index museum" from the famous palaeontologist Richard Owen who coined it to describe his conception of a museum of natural history (Ponte 1989, pp. 57–58). Geddes, who was first a biologist and student of Huxley, applied the term "index museum" to Huxley's ideas of type-series and the classification schemes used in natural history museums (Meller 1990, pp. 3, 38–39). For Geddes an index museum was not limited to natural history but was directed at the world at large. As a classification scheme or rational order, Geddes took the classification of the sciences and arts by Comte and Spencer as his starting point. Spencer's classification of the sciences and especially his concept of evolution would provide, according to Geddes, the ideal basis for the organisation of an index museum; "for here is the abstract theory of museum-curating" (Geddes [1902] 1989, pp. 66–67).

But besides being a methodically classified museum or "Encyclopaedia Methodica," the index museum was also essentially an "Encyclopaedia Graphica":

> That is we may think of it as an Encyclopaedia of which the articles may be imagined printed separately, and with their illustration and maps condensed and displayed as an orderly series of labels; labels to which specimens are then as far as possible supplied; so that over and above the description, the image, the interpretation of the thing, you can see the thing itself in reality, if possible, or in reproduction or model as the case may be. (Geddes [1902] 1989, p. 65)

Geddes arrived at considering a museum as a graphical encyclopaedia from the conviction that a museum should avoid being merely a pavilion for admiring fancy artefacts, and that instead museums should engage the present state of affairs, train and inform its visitors, and make individual study possible. Again Geddes was inspired by the exhibitions on natural history set up by Brown Goode, who presented a collection "with things and diagrams instead of words, 'with specimens instead of types'" (Geddes [1902] 1989, p. 66).

Otlet was putting Geddes's idea of an Index Museum to work in his International Museum by extending his own work on the Documentary Encyclopaedia into a spatial lay-out. Their shared vision led to the formulation in 1912 of a scheme to produce an *Encylopedia Synthetica Schematica.* Although the project of such an encyclopaedia didn't get further than a mission statement, the project expressed their mutual interest in the visualization of knowledge or, as the subtitle indicated, in "Materials for the elaboration of a method and synthesis with the aid of schemes and dia-

grams, published through an international and interscientific collaboration."[8] For this project, Geddes thought of involving Victor Branford and Paul Reclus (1858–1941)—nephew of the geographer Elisée Reclus (1830–1905) and son of the anthropologist Elie Reclus (1827–1904)—also known by his alias "Georges Guyou":

> I will see Branford, my best fellow worker, and his brother the mathematician and maybe two or three other friends, more or less in the same movement, and who can collaborate more or less towards our exhibition of graphics. It seems to me that we will have then (and maybe in a not unreasonable time) a collection of graphics to articulate as preliminary sketches of the Encylopedia Synthetica Schematica! Let me remind you also that Paul Reclus is an expert in schematic cartographic ideas. He has even proposed to me to work together on a great historical map—and I believe—I am even convinced—that you will find in him a loyal and capable fellow work in this kind of studies.[9]

Geddes and Otlet shared a commitment to visual education and since 1900 they corresponded regularly on the graphical language of schemata and diagrams. In 1903 Otlet wrote to Geddes that he and La Fontaine had "the desire to cooperate very actively" with Geddes's work and that the IIB would engage in extracting the quintessence of the existing scientific publications and take as its second task "the popularization of scientific data."[10] This entailed the educative task to "keep the general public informed in a constant and easily accessible manner of the current state of the latest discoveries."[11] And tying in with the interest of Geddes in visual education, Otlet added: "It is here that we would find the diagrammatic

8. Original subtitle of the *Encylopedia Synthetica Schematica* was: "Matériaux pour l'élaboration d'une méthode et d'une synthèse à l'aide de schémas et de diagrammes, publiés par une collaboration interscientifique et international sous la direction de Patrick Geddes et Paul Otlet. October 1912". Paul Otlet and Patrick Geddes, *Encyclopedia Synthetica Schematica,* MDN EUM 1 Farde 4. Orbis Encyclopaedia Synthetica. Note (1912.10).

9. Patrick Geddes, letter to *Paul Otlet,* MDN EUM 1 Farde 4. Orbis Encyclopaedia Synthetica (1912.09.21).

10. "Nous avons le désir de coopérer très activement à votre travail."

"Une institution permanente s'occuperait utilement de [. . .] la *vulgarisation* des données scientifiques." Paul Otlet, letter to *Patrick Geddes,* National Library of Scotland Patrick Geddes Papers Ms 10564 Nr. 40 (1903.10.31).

11. "il consisterait simplement à compléter ce qui manque et surtout à tenir le grand public au courant d'une manière constante et facilement accessible, de l'état actuel et récent des dernières découvertes." Paul Otlet, letter to *Patrick Geddes,* National Library of Scotland Patrick Geddes Papers Ms 10564 Nr. 40 (1903.10.31).

and synthetic procedures, which you justly take to heart, and that would take their place [in] the services of information and documentation which I ask for in my work."[12] Indeed, Geddes's commitment to "the visual" parallels Otlet's preoccupation to synthesize and popularize scientific data. According to Geddes, graphic more than verbal presentments had the capacity to synthesize: "[. . .] I find it difficult to imagine any class of ideas which does not appear to my mind to lend itself more vividly to graphic than to verbal presentment. I would even claim that this graphic method can be applied to psychology, even to philosophy itself" (Geddes [1902] 1989, p. 65).

Geddes's commitment to the visual is evident in his obsession with what he called "thinking machines." The thinking machines of Geddes often took the shape of folded pieces of paper. He labelled the various pieces with concepts and then unfolded them in a kind of origami style to show unexpected relationships between the concepts. Geddes's personal papers are covered with diagrammatic grids which—analogous to the folding of pieces of paper—are filled in with concepts. This visual form of structuring the relations between concepts is derived from the tradition of logic machines which ranges from the "ars magna" of Ramon Llull (1232–1315) to the "ars combinatoria" of Gottfried Leibniz (1646–1716). The *Notation of Life,* also called *Chart of Life* (1927) is one of Geddes's most complex thinking machines and forms the basis of his essay *Civics: as Applied Sociology* (1906) (Meller 1979). As Volker Welter explains, the matrix synthesizes Geddes's theory of urban sociology in two formulas (Welter 2002, p. 32).

The first formula is inscribed in the upper left diagonal of the dynamic grid through the notions "place," "work," and "folk." It symbolizes his theory, adapted from Le Play's "place, work, family," about the interaction between man and his environment. The second formula—"acts," "facts," "thoughts," and "deeds"—unfolds by mirroring the upper left square four times anticlockwise. These four steps synthesize his methodology for the improvement of the human condition (Welter 2002, pp. 26–53). The swastika, according to Geddes the Celtic symbol for life, creates a spiral movement showing how human life is a dynamic process, constantly improving its environment (Glikson 2002, p. 215). By combining these two formulas in the form of a dynamic grid, the *Notation of Life* is very similar to the rotating paper circles of Ramon Lull. The Lullian circles are a series

12. "Ici auraient leur place les procédés diagrammatiques et synthétiques, que vous avez si justement à cœur, les services de renseignements et de documentation que je demande dans mon étude." Paul Otlet, letter to *Patrick Geddes,* National Library of Scotland Patrick Geddes Papers Ms 10564 Nr. 40 (1903.10.31).

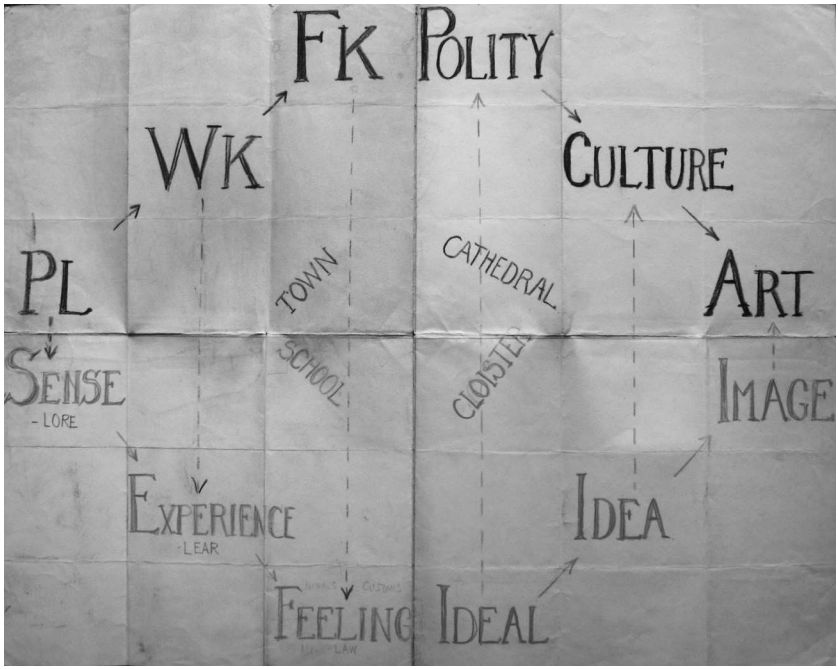

Figure 6. The Thinking Machine 'The Charting of Life' by Patrick Geddes in a simplified version
MDN, EUM 10

of circumscribed circles which aid to study the combination of essential "truths" (or symbols referring to these "truths") through the movement of rotation (Gardner 1982). Like the grid of Geddes, the Lullian circles systematize complex relations between notions in a dynamic scheme of rotation.

Like Geddes, Otlet cherished the medieval art of memory: "The 12th century," he wrote to Geddes, "possessed methods which the moderns ignore, because they do not worry about arriving at a common truth." We must find, he said, "a method of discussion that will allow us to arrive at synthetic conclusions."[13] Synthesis was the goal and method of schemes and diagrams: "Synthesis is the comparison of the general data of all the

13. "Il faut aussi instaurer une méthode de discussion pour arriver à des conclusions synthétiques. Les 'XIIe siècle' avait des méthodes que nos modernes ignorent, n'ayant pas le même souci d'arriver à une commune vérité." Paul Otlet, letter to *Patrick Geddes,* National Library of Scotland Patrick Geddes Papers Ms 10564 Nr. 121 (1929.01.07).

sciences. Its purpose is to constitute the whole of knowledge into a general system which corresponds in the most precise way to reality."[14] Synthesis involved reducing the number of ideas to the most essential ones and making them systematically coherent. Like the thinking machines of Geddes, the synthetic method enabled the representation of the complexity of scientific questions in a schematised manner: "It seems that the scheme and the diagram, through a formulation of principles, could become a graphical language allowing the expression of general or abstract ideas."[15]

A "Cosmorama" or World Museum in Geneva

Thinking machines were not only able to order and visualize complex ideas on paper. They could be as well the model of the museum itself. In fact, Geddes conceived the index museum as a huge encyclopaedic thinking machine, bringing together different orders and visual schemes in one unity. Geddes had already started to develop this idea of a three-dimensional thinking machine or index museum when he acquired in 1892 a towering building in Edinburgh which he had renamed the "Outlook Tower." The building was situated on the top of the Castle Hill, the main historical street in Edinburgh formed by a knife-edge; a building that dated from the 17th century. The tower was formerly known as "Short's Observatory." Its previous owner, an optician, had equipped it with a roof terrace and camera obscura looking down on the valley of Edinburgh (Ward 1973). Geddes, who was much occupied at that time with slum improvement, kept its original function as an optical device literally and metaphorically. He transformed the popular observatory into an urban, geographical, and sociological observatory and civic museum (Chabard 2008a, p. 183). The Outlook Tower displayed a permanent exhibition on Edinburgh and its region. The course of the exhibition started at the top of the building with a panoramic view of the complex urban fabric of Edinburgh. Subsequently, the museum turned the complexity of the city into a didactic graphic survey, raising the visitor's consciousness through his own vision. In a historical and geographical analysis, the city of Edinburgh was brought to life and it was the task of the visitor to discover his own place in the evolution of the city. As the visitor descended from floor to floor, he would be initiated into the relationships between

14. "La synthèse est la comparaison des données générale de toutes les sciences. Elle a pour but de constituer l'ensemble des connaissances en un système général qui corresponde le plus exactement à la réalité." Paul Otlet, letter to *Patrick Geddes,* National Library of Scotland Patrick Geddes Papers Ms 10564 Nr. 95 (1924.08.20).

15. Paul Otlet and Patrick Geddes, *Note about Encyclopedia Synthetica Schematica,* MDN EUM 1 Farde 4. Orbis Encyclopaedia Synthetica. Note (1912.09.17).

Edinburgh and Scotland and the rest of the world. The exhibition ended with a room on the ground floor that zoomed out to the global scale. Two gigantic scale models of a globe provided the end point of the widening of the visitor's outlook from the local to a universal spatio-temporal gaze.[16]

As Philip Mairet mentions in his biographical account of Geddes, the Outlook Tower was an "index museum to the universe" seen from the point of Edinburgh (Mairet 1979). As an index museum or universal museum it gathered a diversity of scientific approaches into one graphic and methodologically ordered encyclopaedia about the city of Edinburgh and beyond. The five storeys of the building classified and ordered the spatial, temporal, and spiritual dimensions of the world at different scales of understanding. But as an index, the Outlook Tower started from the perspective of the inhabitant of Edinburgh, showing his city in history and indicating its future. The visitor was guided from a view of Edinburgh to a view of the universe, from a panorama on the visible city towards an outlook on the invisible world of universal knowledge. In line with Geddes's regionalism, the encyclopaedic vision as embodied by the Outlook Tower was rooted in the local. It extended the visitor's own field of vision with an outlook on the region of Edinburgh and the rest of the world.

In his International Museum, Otlet took over the concept of the index museum as instantiated in the Outlook Tower, but dropped Geddes's orientation towards the local. The International Museum was an index museum pure and simple, a "cosmorama" or panorama of the world. This difference between Otlet and Geddes also implied a different orientation in their education model. Geddes felt very strongly about "citizenship" as the latest moral stage of the evolutionary process (Meller 1990, p. 90). The Outlook Tower was a civic museum representing the city as its living counterpart, as a living museum of which the individual visitor was a vital constituent. In *Cities in Evolution* (1915) Geddes stated that the environmental education of the citizen was crucial because it ensured the continuous realisation of community life from history into the present and beyond (Ward 1973). If Geddes's Outlook Tower dealt with "citizenship," the International Museum of Otlet dealt with "world citizenship." As Otlet wrote to Geddes, "I take your English expression 'Civic college' and I develop it."[17] But instead of a civic survey, Otlet undertook a mondial survey of universal knowledge elaborated in one encyclopaedic tour of a hundred rooms. The International Museum was an instrument that assisted the vis-

16. See Pierre Chabard's article (2001) for a clear-cut disambiguation of the meaning of "outlook" in the work Geddes.

17. Paul Otlet, letter to *Patrick Geddes,* National Library of Scotland Patrick Geddes Papers Ms 10564 Nr. 60 (1923.02.18).

itor in learning how to see things universally and impregnated him or her with the redeeming promise of a universal civilization.

A crucial reference for understanding Otlet's cosmic vision was the work of the French geographer Elisée Reclus. Otlet read Reclus's *L'Homme et la Terre* (1905) attentively and was acquainted with Reclus in the milieu of the *Institut des Hautes Etudes* and the *Université Nouvelle* in Brussels. The latter had split off in 1894 from the *Université Libre de Bruxelles* because of the "Incident Reclus," involving the university repudiating a teaching agreement with Reclus because of his anarchist background.[18] Patrick Geddes also had fruitful relations with Elisée Reclus, as well as with his nephew and collaborator Paul Reclus, who worked with Geddes on a survey of Edinburgh from 1896 till 1903 (Chabard 2008a, p. 207). Elisée Reclus made a relief map of Scotland for Geddes, exchanged resources, and proposed that his geographical institute would become affiliated with the Outlook Tower.[19]

Geddes's Outlook Tower and Otlet's International Museum were influenced by Reclus's project to construct a huge globe that would serve as a planetarium for the universal exhibition in Paris in 1900. Reclus had started its preparations in 1895 when he already was a professor of geography at the *Université Nouvelle* in Brussels. Being an anarchist and Communard, the globe stood for the unity of the world and for human fraternity. In line with his social and geopolitical approach to geography that characterizes his three major works *La Terre, la Nouvelle Géographie universelle,* and *L'Homme et la Terre,* the planetarium would be a moral symbol of the political unity of the world and of anti-ethnocentrism. At an underlying stratum, the globe demonstrated the anarchist utopia of an ideal society preceded by the unity of nature (Alavoine-Muller 2003; Meller 1990, p. 104). Unlike traditional planetariums which simulate the complex "motions of the heavens" on the interior sphere, Reclus's globe would be like the Earth itself a convex terrestrial globe, made on the scale 1/100,000, slowly rotating on a spindle and covered with a relief in plas-

18. In a letter to Geddes, Otlet mentions that he teaches at the "Ancienne Université Nouvelle" of Elisée Reclus and Guillaume De Greef. Furthermore, many pages of quotes from *L'Homme et La Terre* can be found in the archives of Paul Otlet in Mons [Paul Otlet, letter to *Patrick Geddes,* National Library of Scotland Patrick Geddes Papers Ms 10564 Nr. 96 (1925.01.10)].

19. "Mr. Elisée Réclus offers to send his bibliography of any geographical subject, and to act as an information bureau for it, suggesting that the Outlook Tower and the Geographical Institute in Brussels should be affiliated, and mutually take advantage of each others resources." Elisée Reclus, letter to *Patrick Geddes,* National Library of Scotland Patrick Geddes Papers Ms 10564 Nr. 47 (1905.[12].06).

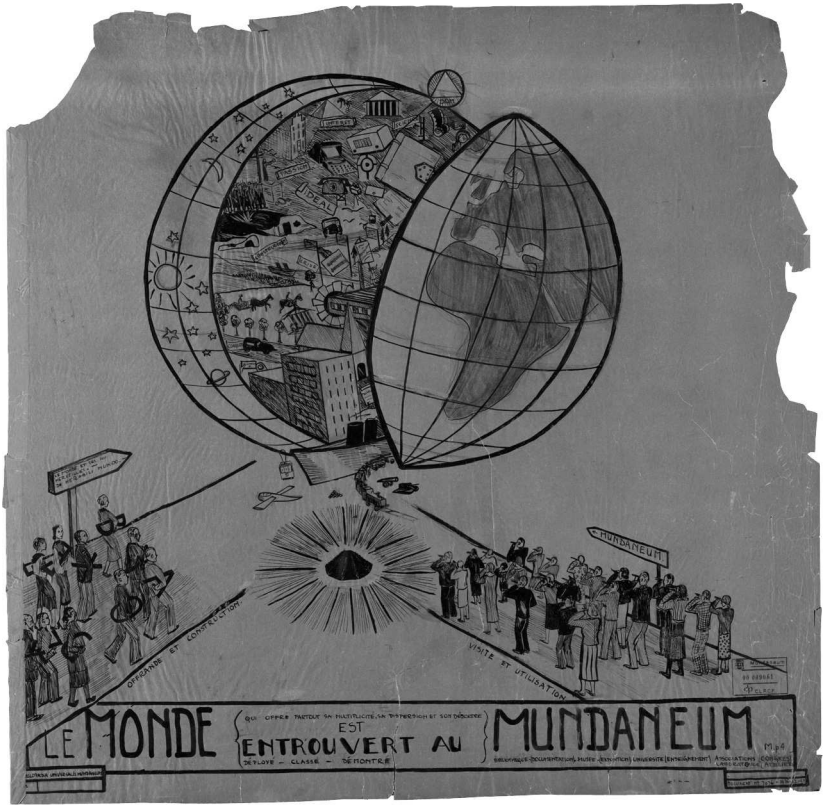

Figure 7. Paul Otlet, *Le Monde en son ensemble* (1936)
MDN, AFF, scan nr. MUND-00009061_2008_0001_MA

ter articulating the relief of the continents and the oceans. As the drawings (1897–1898) by Louis Bonnier show, the central globe would be enclosed and supported by a convex metal skeleton. The space between the external construction and the internal globe would be filled by a large helix of 24 spires, moving the visitor's eye around the rotating globe. On the internal part of the envelope, following the spiral movement, an exhibition on the history and geology of the earth would complement the spectacular voyage of the visitor around the globe.

Like Reclus's globe, Otlet conceived the International Museum as a tour around the world. Like the utopian experiment of Reclus, Otlet wanted to teach people how to look at the world. In the image *Le Monde en*

son ensemble (1936) Otlet expresses his encyclopaedic desire to arrive at the apex of the pyramid, to reach that point where all knowledge can be grasped from one point of view.

The world is represented as a sphere split in two halves. One half is covered with a map of the earth, the other half with a celestial map. In between the two halves we see an accumulation of things, ranging from a steamship, an army, and a telephone to abstract notions such as "God," "passion," or "crisis." The world is presented in its multiplicity and complexity, as a non-classified miscellany of "hundred and one miracles." Under the globe a pyramidal shape sheds light on the chaos. It symbolizes the International Museum or by extension the Mundaneum, that device or institution imagined by Otlet that will enable us "to comprehend the world," "to grasp its data and to act on them." On the left people bring letters in order to deploy, classify, and demonstrate the chaos of objects. On the right visitors and users discover the secret order of things conquered by the human intellect by looking at the pyramid through a periscope.

Otlet's world was not a world of artefacts but a world of facts or ideas. It "mapped" the cosmos of ideas and described the territory of factual knowledge. As in traditional cosmography, Otlet's "atlas" gave the human observer access to a disembodied eye of science located outside the cosmos (Cosgrove 2008, pp. 38–39). The international museum was not a geographical atlas but an atlas of knowledge; it did not give a geographical account of space but a "geographical" account of knowledge. Otlet's globe was not positioned in the three-dimensional Euclidian space but in a three-dimensional semantic space.

A major question for Otlet was how to turn the three-fold dimensions of the universe—object, time, and space—into a real "idearium" or museum of ideas (Otlet and Le Corbusier 1928, p. 10). In the rectangular hall in the Palais du Cinquantenaire, these three dimensions corresponded to three different clusters of rooms. But Otlet hoped to build a new museum in Geneva of which the architecture would express the structure of the World Museum, as well as other buildings that would host the other institutions that he had founded throughout his life. Around 1925 Otlet had published a text about the "Mundaneum" which was to be "a Monument, devoted to intelligence, which should be, altogether and on a world basis, a World Museum, a World Library, a World University, worked out by the Union of International Associations" (Otlet [1925], p. 3). At the same time Otlet had already drawn schematic plans of a building complex that hosted this programme.

But Otlet would only arrive at highly detailed architectural plans of the

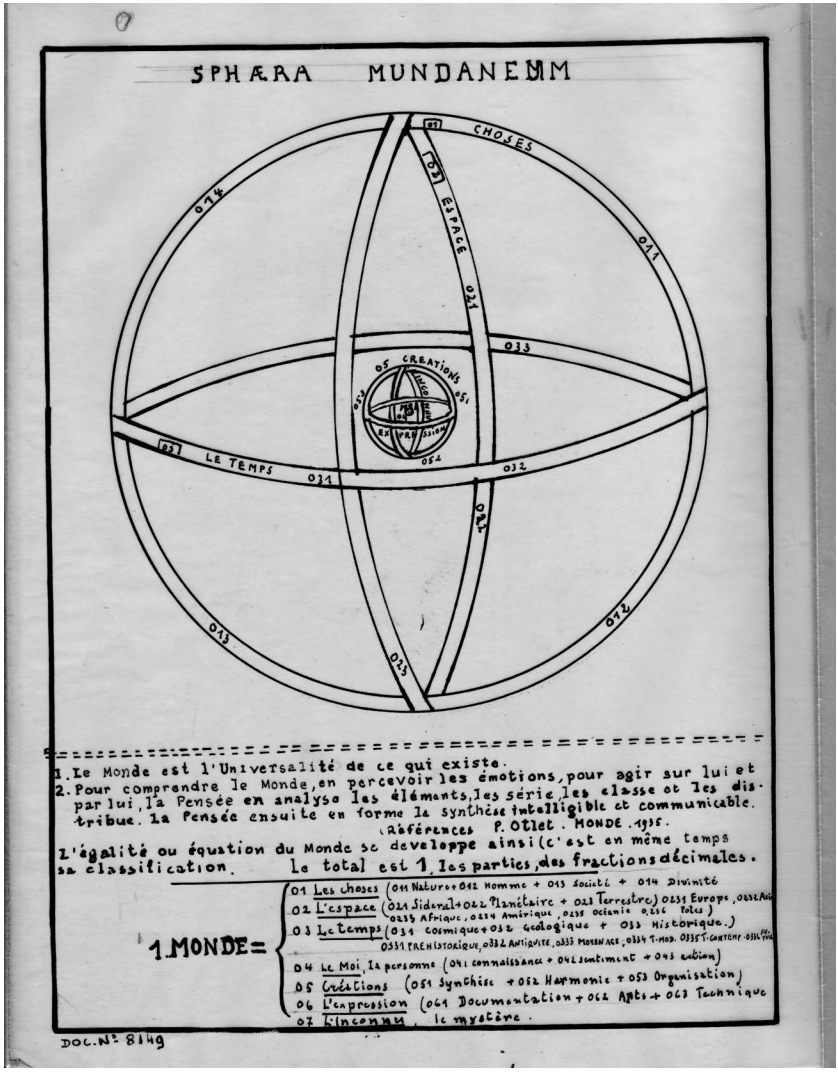

Figure 8. Schema by Otlet of the ontological dimensions of the world
Paul Otlet, *Sphaera Mundaneum* (n.d.)
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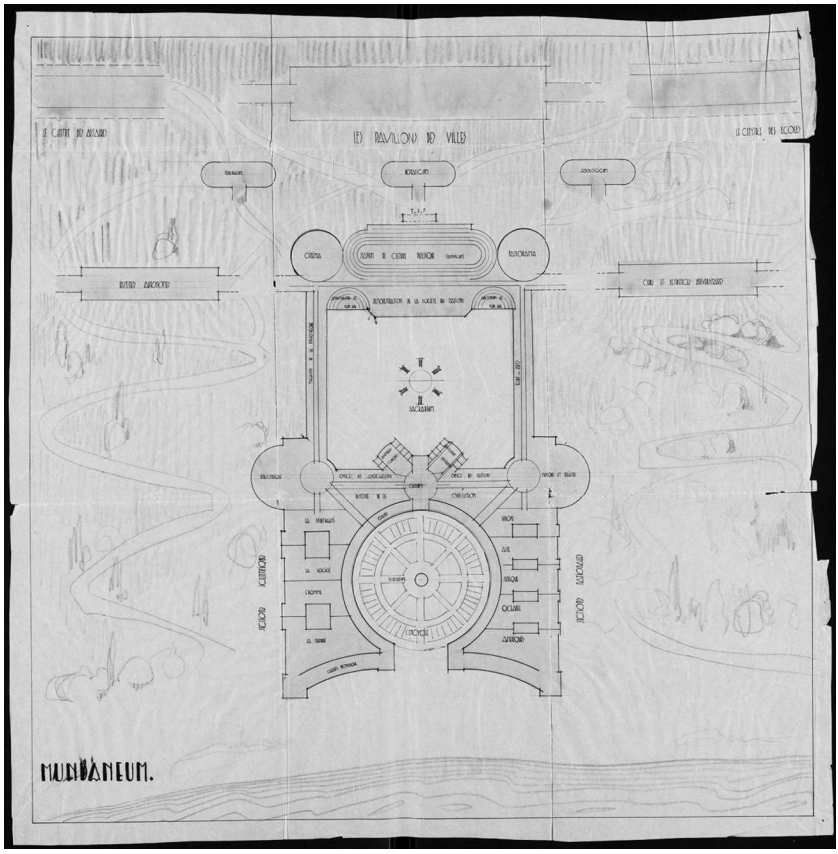

Figure 9. Schematic plan of the Mundaneum, situated at the Belgian coast between Wenduine and De Haan
Paul Otlet, *Mundaneum* (1927)
MDN, AFF, scan nr. MUND-xxxxxx76_2008_0001_MA

Mundaneum through the help of Le Corbusier. Le Corbusier had been introduced to Otlet through Blaise Cendrars in 1922 (Vidler 2003, p. 170). Around the time of the competition for a palace of the League of Nations in Geneva (1926), Otlet asked Le Corbusier—who afterwards was annoyed by his loss of the competition—to elaborate his schematic plans of the Mundaneum into a concrete architectural project situated on a sloping tableland between the Alps next to Geneva, between the Petit Saconnex, the Grand Saconnex, and Pregny. Otlet warned Le Corbusier that "[i]n the

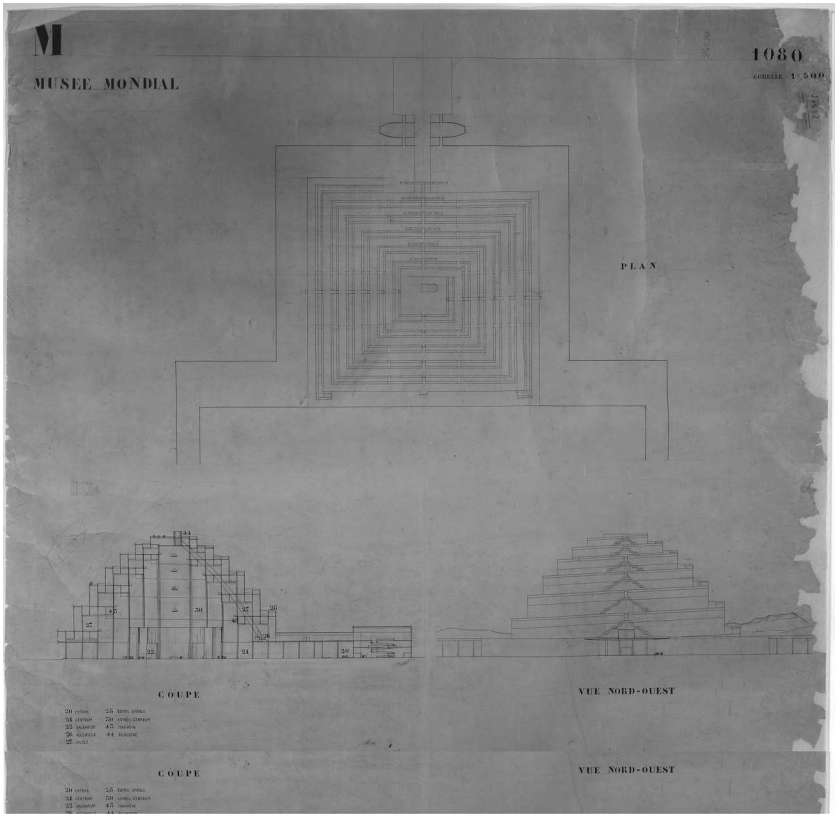

Figure 10. Le Corbusier, *Musée Mondial* (1929)
FLC, doc nr. 24510

present state of things, there is no certainty at all whether the Mundaneum will be built in Geneva," but he reassured him that "its success was largely reassured," if only through propaganda in journals and exhibitions.[20] In 1928 Le Corbusier agreed to Otlet's proposal. From the start, Otlet presented the assignment to Le Corbusier as the solving of a schematic riddle. Le Corbusier solved the puzzle of the Mundaneum by creating an architectural composition of three-dimensional organizational

20. "Dans l'état actuel des choses, il y a nulle certitude que le Mundaneum puisse s'élever à Genève, bien que des probabilités et des espoirs de succès soient largement assurés." Paul Otlet, letter to *Le Corbusier,* FLC F1-14 Nr. 98 (1928.04.02).

forms (sphere, cylinder, pyramid, cube). Le Corbusier conceived the Mundaneum as a spiral with overlapping slopes, transformed into a rectangular pyramid (Gresleri and Matteoni 1982, p. 151).

The cone gave the World Museum the image of a mountain of wisdom, resonating with the peaks of Mont Blanc. The pyramid was chosen for its mythical evocation of civilisation, as the symbol of the development of science and the elevation of Humanity. The World Museum also reminds one of Étienne-Louis Boullée's *Project for a "sunken" pyramid* (1780) or, more apt, his *Cenotaph for Newton* (1784). Le Corbusier's design orchestrated the visit to the museum from the moment visitors arrive at the car park. Leaving their cars behind, the visitors start a long pilgrimage towards the top of the pyramid. After they climb the slope of 2500 meters, ascending through seven levels, they are rewarded with a panorama of the Alps, much like Geddes's view of Edinburgh on the roof of the Outlook Tower. Again as in the case of the Outlook Tower, the visitor enters the museum from the top (Vidler 2003). Along the spiral, the triadic organisation of the Geddesian thinking machine—work, place, and folk—unfolds in the form of Otlet's three-dimensional classification scheme—"l'œuvre, le lieu, le temps." Synchronised as in a cathedral divided in three naves, the visitor walks through an encyclopaedic narration of Man in time and space. In line with Otlet's universalist belief, the spiral dissolves the historical and spatial development of knowledge in an eternal present. The spiral expresses the history of scientific progress, having only the galaxies of space and the fiction of the future as its limit.

Le Corbusier's introduction of the figure of the conical spiral transforms Otlet's tri-axial spherical model of the universe in a single linear trajectory. More precisely, this move of the master architect transforms the spherical form of the planetarium into an infinitely expanding panorama. The traditional circular form of the panorama is made continuously expandable in a downward movement (Vidler 2003). It is here that Le Corbusier's lyricism about the spiral coincides with the functional mechanism of the exhibition (Le Corbusier [1930] 1960, p. 219). By stretching the diorama or panorama as an endless street, sufficient space is given to encompass the World (Encyclopaedia) in all its complexity. As in Reclus's Hollow Globe project, a spiralling panorama exposes the world as conquered by human intellect. However, compared to Reclus's project, the World Museum only keeps the informative exhibition and omits Reclus's physical model of the terrestrial globe from the helix, leaving instead a dark void of 224 pillars on the inside of the pyramid. At the heart of the World Museum, in between the forest of columns supporting the descending ramp, we find a "Sacrarium" instead of a globe, a sort of Pantheon of Humanity devoted to the most important geniuses of Humankind. The

World Museum encircles, exposes, and surveys the universe of thought produced by the human mind. Once the visitor has left the museum spiral of information and has arrived at the ground floor, he finds Reclus's terrestrial globe in front of the World Museum. Reclus's planetarium (with the celestial sky on the inside) is the finishing point of the educational trajectory. Inside the globe, the visitor astounded by the starry sky of the universe, in Le Corbusier's words, says to himself: "This is our domain . . . , until now at least"[21] (Otlet and Le Corbusier 1928, p. 39). Le Corbusier's description of the sky as the limit of human knowledge is similar to the evolutionist objective of progress evoked by the protagonist John Cabal in the final scene of H. G. Wells's movie *Things to Come* (1936): "And if we're no more than animals, we must snatch each little scrap of happiness, and live, and suffer, and pass, mattering no more than all the other animals do or have done. It is this, or that. All the universe or nothing. Which shall it be, Passworthy? Which shall it be?"

Neurath and the Nuovo Orbis Pictus

Otlet hoped to convince the League of Nations, and especially the International Bureau of Education (IBE) and other related educational institutions about the importance of erecting the World Museum according to Le Corbusier's design in Geneva. Without doubt, Geneva was the capital of international education of this time. It was the seat of the IBE, the Institute Jean-Jacques Rousseau and the League of Nations (Sylvester 2002). The IBE was founded in 1925 in Geneva by three pioneers in the field of education: Edouard Claparède (1873–1940), Adolphe Ferrière (1879–1960), and Pierre Bovet (1878–1965). The IBE was a primary agent of international education and served as a mediator between the New Education Movement and the League of Nations. In September 1927 the Palais Mondial and the International Bureau of Education (IBE) founded jointly the *Commission Internationale du Matériel Didactique* [International Committee of Didactic Material] (Otlet and Oderfeld 1929). Otlet was happy to report to Geddes that they could count a new connection to their club of like-minded institutions (including the Palais Mondial, the Outlook Tower, the *Collège des Ecossais* in Montpellier, the *Le Play House* in London, and the *Sociological Institute* in Bombay), namely the *Maison Internationale* in Geneva. The Polish Anne Oderfeld was the contact person and collaborator of Otlet at the *Maison Internationale.*[22] After a conference of 6 April 1928 at the Palais Mondial the *International Committee of Didactic Material*

21. "'Tel est notre domaine . . . , jusqu'à présent du moins', se dit-il."

22. Paul Otlet, letter to *Patrick Geddes,* National Library of Scotland Patrick Geddes Papers Ms10631 Nr. 124 (1929.06.08).

decided to develop an *Atlas de la Civilisation universelle.* Unlike the English word "atlas," the French word "atlas" is not just a volume of geographic maps, but also of images, reproductions of paintings and other graphic documents that is joined to a work to make it more comprehensible. Paul Otlet and Anne Oderfeld worked out a method and a concept for such an "atlas" about the world civilisation (Otlet and Oderfeld 1929). The idea of the universal atlas had arisen out of a movement in the educational field to create a uniform international history textbook. In 1923 this idea led to the setting up of a *Sub-Committee on the International Text-Book of History* by the *International Committee on International Cooperation* of the League of Nations. Because the difficulties of agreeing on a common European textbook were essentially insuperable, the sub-committee had adopted a pragmatic approach that attempted to identify and change only the parts of national textbooks containing expressions that offended other nations (Sylvester 2002). Nevertheless, the more general idea remained important to the New Education Movement and the IBE. Otlet and Oderfeld's suggestion of an international Atlas of Civilisation in effect moved the discussion of preparing an international history textbook to how to create something analogous albeit in a visual form.

From 25 July till 5 August 1929 the *World Federation of Education Associations* (WFEA) organized a congress in Geneva and in association with the conference an exhibition on the theme of "education for international peace" that was open to the public. The WFEA had been founded in 1923 through the efforts of a group of leading American educators in the *National Education Association* and included nation-wide organizations and individual institutions or associations. Otlet participated in the WFEA exhibition of 1929 with a presentation on his Atlas of Civilisation. Apparently a reporter from the *New York Times* was impressed by this, which he described as "graphic charts of the comprehensive and objective 'atlas of civilization'" (Streit 1929). Otlet's presentation at the exhibition involved the display of large educational plates (64 × 67 cm) that would serve at the same time as plates of the proposed atlas of civilisation and as wall charts to hang on the walls of an exhibition or a class room. The use of wall charts had become popular in the field of education between 1870 and 1920. At the turn of the century, wall charts were used at different levels of education and covered a wide range of themes (Bucchi 2006). Otlet picked up the concept of "didactic educational cabinets" of wall charts used in class rooms and transformed them in standardised "muséothèques" of encyclopaedic knowledge (Otlet 1926, p. 1).

It is not unlikely that Otlet's use of wall charts was a result of his collaboration with Ovide Decroly (1871–1932), a well-known Belgian peda-

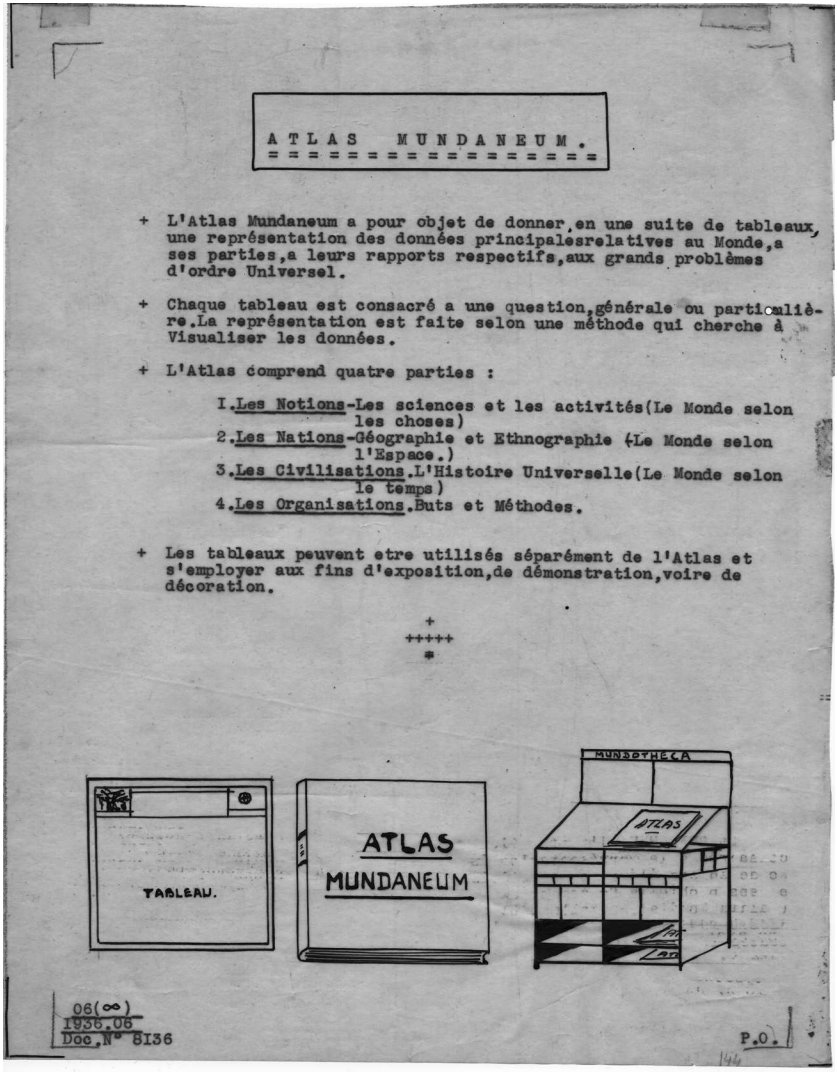

Figure 11. Illustration showing how the Atlas as conceived by Otlet was a collection of visualizations of scientific data that could be assembled in one volume or hung separately in an exhibition.
Paul Otlet, *Atlas Mundaneum* (1936)
MDN, EUM, box 1, Farde 3, doc nr. 8136

gogue and psychologist, who helped Otlet to reshape his International Museum around 1926 according to the latest educational insights.[23]

Early in July 1929, during the preparation phase for the exhibition of the WFEA, Otlet first met another exhibitor, Otto Neurath, a member of the influential Vienna Circle of logical positivists. In a letter dated 6 July 1929, Neurath expressed his thanks to Otlet for guiding him around in his museum in Brussels, and he wrote to his new friend that his "pursuit of comprehensive international plans" had made a profound impression on him. Furthermore, Neurath suggested that "[i]t would do me great pleasure if you would consider that what we will display in Geneva as a welcome contribution to your plans."[24] In Geneva Neurath exhibited some of the plates that had been prepared for his *Gesellschaft und Wirtschaftsmuseum* (Museum of Society and Economy) in Vienna, of which he was director. Neurath and his associates had struggled to find a way of representing social data in a visual, simplified form for exhibits in the Museum of Society and Economy (Neurath 1933). He believed that people didn't pay much attention to statistical tables because of the complicated way in which they were presented. To overcome this problem, the staff of the Museum of Society and Economy had compiled a repertory of pictograms as the basis for innovative displays of pictorial statistics that would become known as the "Vienna Method of Pictorial Statistics," renamed in 1935 the International System of Typographic Picture Education (ISOTYPE). The mission of the Vienna Method according to Vossoughian was to make transparent "the structural mechanisms of the particular social order" and to foster "social awareness and collective accountability" (Vossoughian 2004, p. 138). To do this the Museum of Society and Economy was influenced by the visual clarity that had been achieved in the most effective advertisements. For Neurath modern man had become so accustomed to receiving optical stimulation through advertisements, for example, that it seemed obvious to him that workers would understand easily the techniques of visualization of social facts that had been developed in the Museum of Society and Economy.

At the congress in 1929, the WFEA in Geneva passed a resolution "calling for the preparation of a manual on world history to be used in the schools of all nations" (Streit 1929). Arising from this, a commission

23. "J'ai été heureux de l'adhésion de M. le Dr. Decroly, qui a grande réputation dans le monde de l'enseignement. . . ." Paul Otlet, letter to *Patrick Geddes,* National Library of Scotland Patrick Geddes Papers Ms10631 Nr. 110 (1926.05.08).

24. "Grosse Freude hätte ich, wenn Sie das, was wir in Genf zeigen, als erwünschten Beitrag zu Ihren Plänen ansehen würden." Otto Neurath, letter to *Paul Otlet,* MDN EUM 1 Farde 4. Orbis Encyclopaedia Synthetica (1929.07.06).

put forward by the WFEA and directed by Ferdinand Maurette (1876–1937), commissioned Otlet and Otto Neurath on 31 July 1929 to create "Weltkultur-Atlasses."[25] To help in the production of such an atlas of universal civilisation based on "cosmopolitan images" the two men founded a research institute, the *Orbis Institute.* This consisted of an *Orbis Institute* in Brussels (at the Palais Mondial) and an *Orbis Institute* in Vienna (at the Museum of Society and Economy).[26] In connection with the name "Orbis Institute," Otlet and Neurath also named the atlas of civilisation the *Nuovo Orbis Pictus* (NOP). That name referred to the pictorial encyclopaedia *Orbis Sensualium Pictus* (1658) published by Johann Amos Comenius (1592–1670)—the father of modern education—which had had a profound influence on the use of visual techniques for children's education (Michel 1992). The *Orbis Sensualium Pictus* of Comenius inspired the work for the NOP in the way Comenius had developed visual tools for communicating transcendental ideas (for instance pictures of the soul, of the Trinity, etc.). (Neurath 1945; Nemeth and Stadler, p. 273). Building on Comenius's ideals, the NOP aimed at using visual techniques to present the history of civilisation.

Under the terms of the protocol that the two men signed in October 1929, the Museum of Society and Economy undertook to design and produce the atlas as well as to construct the exhibits. The Palais Mondial on the other hand would build a comprehensive collection of graphic and textual material which the Museum of Society and Economy would redesign according to the Vienna model. The Palais Mondial would also undertake the responsibility for distributing copies of the atlas to museums worldwide. Neurath regularly asked for material to be sent from the Palais Mondial that the Museum of Society and Economy could work on and Neurath and Otlet exchanged small photos of the objects in their museums.[27] In the summer of 1932, Neurath even proposed to send a French-speaking delegate to the Palais Mondial to work on the material that was there. In their individual work and publications this exchange of material has left its traces. Otlet reproduced for example the image, *The Growth of Mankind,* as *La croissance de l'humanité* in his own unpublished and

25. Paul Otlet and Otto Neurath, *"Novus Orbis Pictus" NOP, Bruessel-Genf-Wien. Protokoll,* MDN EUM 1 Farde 4. Orbis Encyclopaedia Synthetica. Note (1929.10.11).

26. A protocol about the collaboration was signed on 11 October 1929. Paul Otlet, letter to *Otto Neurath,* MDN EUM 1 Farde 4. Orbis Encyclopaedia Synthetica. numéros 150–164 Nr. 236 (1929.10.17).

27. Otto Neurath, letter to *Paul Otlet,* MDN EUM 1 Farde 4. Orbis Encyclopaedia Synthetica (1930.07.19); Otto Neurath, letter to *Paul Otlet,* MDN EUM 1 Farde 4. Orbis Encyclopaedia Synthetica (1929.10.25).



Figure 12. Neurath redesigned this image of Otlet for one of his articles (see Haller and Kinross 1991, 250)
Paul Otlet, *La vie est devenue internationale 1930.*
Source: MDN, AFF, scan nr. MUND-00010483_2008_0001_MA

unfinished encyclopaedia on which he worked during the 1930s: the *Enyclopaedia Universalis Mundaneum* (EUM). In his turn in a 1933 article on "Die Museen der Zukunft" [The museums of the future], Neurath copied an image made by Otlet in 1930 for a world map to indicate the origin of the food on the breakfast table.

On a regular basis Otlet passed Neurath new references about museums and visual encyclopaedias which came close to what they were trying to do.[28] Through their collaboration Neurath's career would become more in-

28. A few of the references mentioned in the correspondence are: Z. Khanzadian, *Atlas de Géographie Économique de Syrie et du Liban,* Paris: L. Bertalot (1926); *Atlas du Monde*

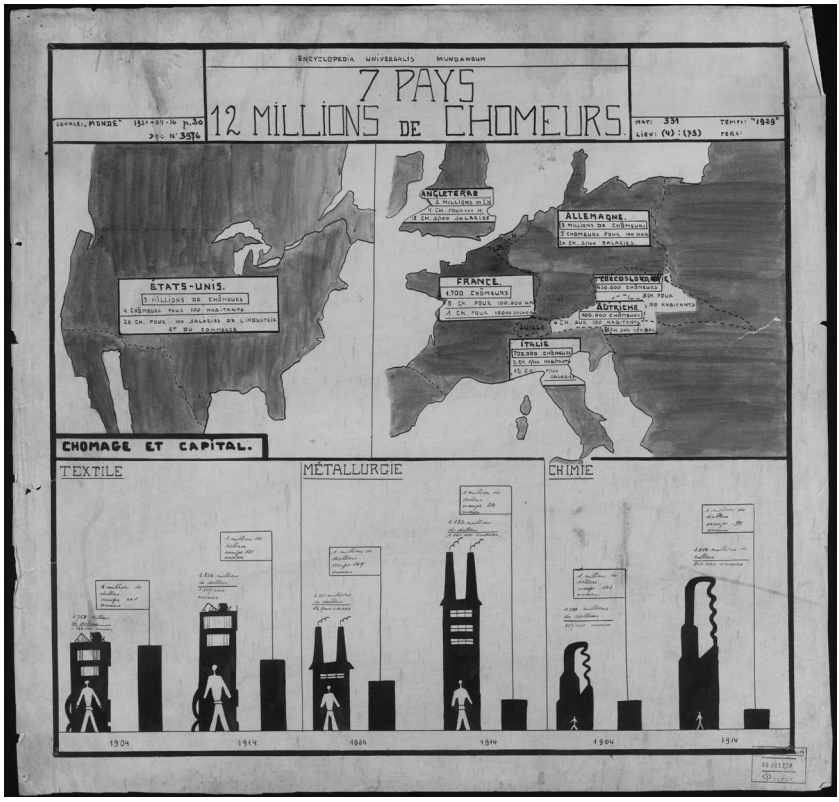

Figure 13. Paul Otlet, 7 *Pays 12 Millions de Chômeurs* (1929)
Source: MDN, AFF, doc nr. 3976, scan nr. Mundaneum-batch-3-041

ternational. Conversely, through the collaboration with Neurath, Otlet pushed forward his earlier research with Geddes on the "tabulation" and schematization of social facts, modernising his graphics.[29] If around 1930 Otlet still made the mistake of representing size of quantities through the

Catholique by R. Karl Street; *Pictured Knowledge* by Marshall Hughes Cie; *Book of Knowledge. The children's encyclopedia* by the Grolier Society; *Changing Civilization in the Modern World* by Rugg Harold; *Brief History of the world with special reference to social and economic conditions* by George Willis Botsford.

29. "Une œuvre centrale serait la constitution de l'*atlas de la civilisation universelle:* la tabulation et la schématisation des données relatives à la Société." Paul Otlet, letter to *Patrick Geddes,* National Library of Scotland Patrick Geddes Papers Ms 10564 Nr. 130 (1930.07.15).

bigness of icons instead of numbers of standardised icons, later he used only the Vienna method.

Besides his collaboration with Otlet, Neurath carried on his own work and published his atlas *Gesellschaft und Wirtschaft* in 1930.[30] The atlas consisted of a hundred plates, which were drawn and colored according to the innovating modernist esthetic of the Vienna Method, and thirty sheets of text. Otlet did not collaborate actively on this project, however in 1929 Neurath sent his "Verehter Co-Dictateur" Otlet the work-in-progress and asked Otlet for comments, possible additions, and references to books and maps that might help in its elaboration. He also asked Otlet to send the characteristic chronograms, photos, and "quantograms" ("Mengenbilder") which he had seen in the Palais Mondial.[31] When the atlas was published, Otlet was enthusiastic: "To appreciate this method of visualization it is sufficient to ask oneself the question: which idea would you have of the same data on the world, if one had to undertake the effort of reading the text on the pages 101 to 130 without first *seeing* the plates 1 to 100?"[32] Otlet also commented that following the publication of the atlas the next step should be to provide an image of the whole world ("Bild der ganze Welt"), to provide a "complete representation (visualization)" that also included a research on the museological display.[33]

Museum Copies and the Network Mundaneum

Besides the intellectual exchange on the idea of a visual encyclopaedia, many ideas were spawned on the idea of a network of museums. Otlet's phantasm about microphotographic atlases of which the pages could be enlarged at the moment of reading set a train of thought in motion (Otlet 1906). Another of Otlet's concoctions was the idea of a mobile museum or a mobile Mundaneum. He referred to an example of a recent travelling exposition in Canada set up in moving trains. This brought him to the idea that "[t]he diffusion of the idea of the Mundaneum by means of an 'automobile' tour would be interesting."[34] Replying to Otlet's proposition, Neurath replied that he also had often considered a "Wandermuseum with

30. Otto Neurath, letter to *Paul Otlet,* MDN EUM 1 Farde 4. Orbis Encyclopaedia Synthetica (1929.10.14).

31. Otto Neurath, letter to *Paul Otlet,* MDN EUM 1 Farde 4. Orbis Encyclopaedia Synthetica (1929.10.24).

32. Paul Otlet, *Bulletin Mundaneum Orbis Wien. Journal n°18,* MDN EUM 1 Farde 4. Orbis Encyclopaedia Synthetica. 191–193 Note (1931.03.03).

33. Paul Otlet, letter to *Otto Neurath,* MDN EUM 1 Farde 4. Orbis Encyclopaedia Synthetica (1929.11.06).

34. Paul Otlet, *Ad. Mundaneum. Wien. Journal N°5 (N°39 à N°47),* MDN EUM 1 Farde 4. Orbis Encyclopaedia Synthetica. 191–193 Note 5942 (1929.11.07).

car"—a sort of mobile drive-in cinema—equipped with a projector that would project the images in great format on short distance."[35] Neurath had held his first travelling exhibition in 1927, consisting of free-standing panels, each provided with its own lamps. The panels were adaptable to each room as they could be folded (Vossoughian 2004, p. 158). After this production of standardized museum displays, Neurath imagined museums that were serially produced as copies using the Fordist assembly-line production methods. In 1931, Neurath stated that "to speak of the museum of the future is like speaking of the automobile of the future. Automobiles are manufactured in series and not produced one by one in a smithy" (Vossoughian 2004, p. 197). Copying museums would augment not only the mobility but also the communicativeness on an international scale. In this respect, museum copies resembled copies of books—an idea Neurath got from Otlet:

> It was the same at one time with books: some famous manuscript entered into a collection, a unique treasure; but today, there are ten thousand reproductions of the same manuscript. In the future, museums will be manufactured, exactly as books are today. This basic proposal to produce copies of museums in standard series has often been expounded, particularly by Paul Otlet of the Palais Mondial in Brussels. (Neurath 1933, p. 458)

The discussion with Neurath on a permanently travelling "Orbis-Eisenbahn-Museum" stimulated Otlet to push on his earlier research with Geddes on the idea of cooperation between associated museums.[36] While the atlas retained the mobility and reproducibility of the book, once it arrived at one of the associated centres it was easily convertible in a museum room. As Otlet wrote to Geddes:

> The plates of the Atlas will permit an easy establishment of "rooms or museums of civilisation" everywhere. We need a Mundaneum in miniature in all centres of education. [. . .] We can reproduce the plates by heliograph copies (white print—sic). Thus it will be possible, with only one duplicate copy of the Palais Mondial, and a hundred centres, to provide a rotation: every ten days the replacement of a room. Within three years a small centre will be able to

35. Otto Neurath, letter to *Paul Otlet,* MDN EUM 1 Farde 4. Orbis Encyclopaedia Synthetica (1929.11.13).

36. "Une œuvre centrale serait la constitution de l'*atlas de la civilisation universelle:* la tabulation et la schématisation des données relatives à la Société." Paul Otlet, letter to *Patrick Geddes,* National Library of Scotland Patrick Geddes Papers Ms 10564 Nr. 130 (1930.07.15).

> pass before the visitor's eyes the hundred rooms of the "Palais Mondiales" [World Palaces]. With this Network Mundaneum, we will have a firm basis of distribution: a means to spread the fundamental ideas.[37]

The process of "white print" copying led Otlet and Geddes to discuss the idea of forming "a white line through the World."[38] Although "its realisation would be long in coming," Otlet told Geddes he was working "on formulating and launching the idea of 'the Link of Mundaneums.'"[39] "Let us push forward the idea of the Link 'The White Link.'"[40]

Seeking for a practical realisation of this idea, Neurath and Otlet negotiated with a handful of people to become part of the "Mundaneum chain." Within such a network of "Institutions-Museums" or "chambres-musées" [museum-rooms], a "Mundaneum exhibition" could then be kept in a permanent state of mobility, travelling from country to country while perfecting and enriching itself by borrowing from several collections.[41] A good "Mundaneum-tactics" according to Neurath, was "that wherever it is possible, we must try to convince municipal local museums, school museums, social museums, country and royal museums to host a Mundaneum section."[42] In addition Neurath imagined some slogans for the campaign, like "Every city its Mundaneum! The Mundaneum as general educational

37. "1° Les planches de l'Atlas permettront l'établissement facile de 'chambre ou musées de la civilisation' partout. Il faut un Mundaneum en miniature dans tous les centres d'enseignement. [. . .] On peut reproduire les planches par les copies héliographiques (white print) Alors il serait possible, avec un seul double du Palais Mondial, et cent centres de présenter un roulement (itinérant): chaque dizaine de jour renouvellement de la salle. En 3 ans un tout petit centre aurait pu voir défiler sous ses yeux les cent salles du Palais Mondiales.

2° Avec ce Réseau de Mundaneum, nous aurions une base de diffusion sure: moyen de répandre les idées fondamentales." Ibid., letter.

38. "Etablir le *'LINK'* des organisations affiliées et formant 'through the World a white line.'" Paul Otlet, letter to *Patrick Geddes,* National Library of Scotland Patrick Geddes Papers Ms 10564 Nr. 121 (1929.01.07).

39. "Je travaille au Link des Mundaneums et à la Cité Mondiale. Je travaille à formuler et lancer l'idée même si la réalisation devrait se faire attendre." Paul Otlet, letter to *Patrick Geddes,* National Library of Scotland Patrick Geddes Papers Ms 10564 Nr. 127 (1930.05.18).

40. Paul Otlet, letter to *Patrick Geddes,* National Library of Scotland Patrick Geddes Papers Ms 10564 Nr. 126 (1929.09.09).

41. Paul Otlet, letter to *Otto Neurath,* MDN EUM 1 Farde 4. Orbis Encyclopaedia Synthetica (1930.06.27); Paul Otlet, *Bulletin Mundaneum-Orbis-Vienne. Journal N° 17–30 Juillet 1930. Notules N° 160 à 181,* EUM 1 Farde 4. Orbis Encyclopaedia Synthetica. 191–193 Note 6146. 226–229 (1930.08.13).

42. Otto Neurath, letter to *Paul Otlet,* MDN EUM 1 Farde 4. Orbis Encyclopaedia Synthetica (1929.10.25).

instrument! The current order of life in a state of change! Where do we come from? Where do we go to?"[43]

In the early thirties, Neurath more than Otlet was able to establish several associations and spin-offs of his own company in Moscow, Berlin, Amsterdam, New York, The Hague, and London. Although Neurath found the name "Mundaneum" to be inappropriate as a trademark because it "sounds heavy and broad," by 1934 he was delighted to use the name with Otlet's blessing. The *Vienna Mundaneum* [Mundaneum Wien] became the central institution that oversaw the other branches and the international travelling exhibitions commissioned by the Museum of Society and Economy. The *Vienna Mundaneum* took care that the vocabulary of some thousands of symbols and the grammar of the Vienna Method was used consistently in the different braches. Neurath had learned that this centralization proved necessary: "Experience has shown that few artists have the ability to submerge their personality and pleasure in creation as to serve solely in the capacity of objective informant for the learner" (Neurath 1933, p. 463).

Despite a decade of correspondence, the practical achievement of the Atlas of Civilisation never came to fruition. A last attempt for the creation of a common atlas-exhibition was made in 1935. Although the Palais Mondial had been closed by the Belgian government in June 1934, Otlet had continued his work on his own atlases both in the great and small formats. Through negotiations, Neurath and Otlet agreed to collaborate on setting up an atlas-exhibition at the 1935 World Exhibition in Brussels that year.[44] Otlet would send materials on international cooperation throughout history, which Neurath would then have assistants worked on.[45] Financial problems and other preoccupations seemed to have obstructed a realisation of the atlas. Neurath and Otlet kept contact until 1940 when Neurath was forced to flee to England after the Nazi invasion in the Netherlands. Although Otlet and Neurath kept on friendly terms with each other, their collaboration cooled down in the second half of the 1930s and both men continued on their own individual path.

In September 1935 Neurath presented his plan in Paris to edit a huge encyclopaedia: the *International Encyclopedia of Unified Science.* Like the French *Encyclopédie* (which consisted of 17 volumes of text and 11 volumes of images), Neurath's encyclopaedia would contain 26 volumes of text (each containing 10 monographs) and 10 volumes of plates, the latter of

43. Ibid.

44. Paul Otlet, letter to *Otto Neurath,* MDN EUM 1 Farde 4. Orbis Encyclopaedia Synthetica (1934.12.20).

45. Otto Neurath, letter to *Paul Otlet,* MDN EUM 1 Farde 4. Orbis Encyclopaedia Synthetica (1934.12.19).

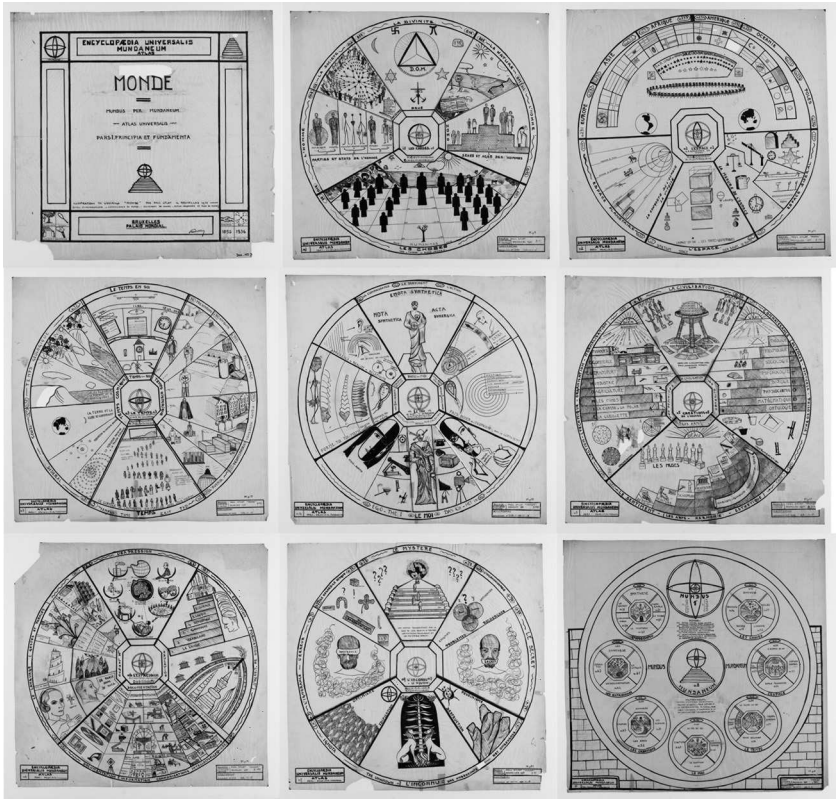

Figure 14. Seven circles of the Atlas Monde
Paul Otlet, *Atlas Monde* (1936)
MDN, AFF, scan nr. Mundaneum_032; Mundaneum_034; Mundaneum_036; Mundaneum_038; Mundaneum_040; Mundaneum_042; Mundaneum_044; Mundaneum_046; Mundaneum_049

course all executed in ISOTYPE. But only a couple of volumes were actually published. Because of the political crises that gave rise to the Second World War, the first monographs of the Encyclopaedia eventually were published in 1938 in the United States by the University of Chicago Press.

Like Neurath, Otlet was becoming increasingly preoccupied with his own particular work. In 1934 he published the *Traité de Documentation* and in 1935 *Monde,* two monumental works of its kind. He also continued with the creation of atlases which were a part of the unpublished and unfinished *Enyclopaedia Universalis Mundaneum* (EUM). The most in-

triguing part of the atlas—which he started to draw in 1936 and kept reworking—was the series of images that visually expressed the ideas of his seminal book *Monde.* The atlas, *Monde,* makes clear some fundamental motives that underpinned Otlet's theory of knowledge organisation and the encyclopaedia. The atlas represents the unity and totality of knowledge by means of a series of seven circles which Otlet imagined as "synthetic introductions" or covers of the chapters of the EUM that he had been working on since the late 1920s.

Similar to the initiation in theosophist or freemasonry circles in spiritual symbolism, the circles initiate its readers into the quasi-religious symbols of the great universal truths. The circles in their turn refer to the Greek etymological roots of the term "encyclopaedia"; "enkyklios paideia" (De Rijk 1965). The first half "enkyklios" denotes circularity (or cyclicality) and refers to the belief in the unity of knowledge. The second part "paideia" denotes a voyage covering all the different stages. The combination of the two terms "enkyklios" and "paideia" then points to the idea that if an individual completes the "circular path" or the path that runs the full circle of the disciplines, he is fully educated to engage with the subject of philosophy which uses all the other disciplines to arrive at an overview of knowledge.

Although Otlet and Neurath shared many opinions on issues such as international cooperation, the unity of science, and popular education, an epistemological comparison between Otlet's *Enyclopaedia Universalis Mundaneum* and Neurath's *International Encyclopedia of Unified Science* shows remarkable differences in their encyclopaedic models. Both Otlet and Neurath followed an imperative of encyclopaedic unity in which scientific laws connect with each other and in which the natural sciences and the humanities are integrated in a general framework that serves society. However, Neurath followed a weaker and more dynamical systematisation from below while Otlet was after a more authorative integration from above (Cat 2010). Neurath held that the system of knowledge was not based on secure and stable empirical foundations. For Otlet on the other hand, the system of knowledge is firmly based on documents, those embodiments and institutionalised forms of knowledge which science has at its disposal. The Encyclopaedia and its visual summary, the Atlas, is only one step in the pyramidal construction of the ultimate synthesis that Otlet seeks to create: from the multitude of books, statements and linguistic combinations one moves to the general truths that can provide the basis for a universal civilisation.

Neurath dismissed such an ideal of pyramidism and considered the system builder to be a born liar. For Neurath science did not function as a system and he believed that a complete philosophical system was impossi-

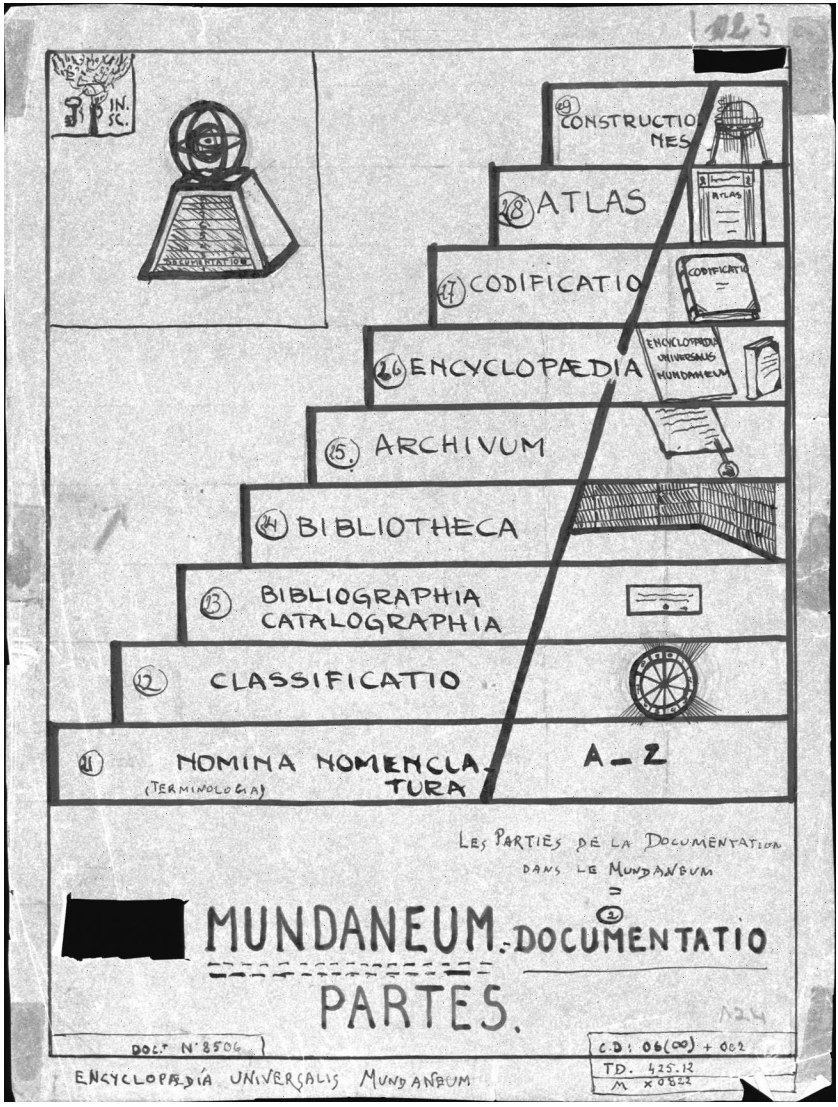

Figure 15. The pyramidal system of Otlet's documentary project
Paul Otlet, *Mundaneum. Documentatio Partes*
MDN, EUM, doc nr. 8506, scan nr. Mundaneum_A400176

ble (Cartwright and Uebel 1996, p. 46). The encyclopaedia was not a total synthesis "on the basis of a prior and independent philosophy" but a *continuous* work of synthesis for which the special sciences themselves "supply their own synthesizing glue" (Neurath 1937). Otlet on the other hand believed in a systematisation of the sciences and in philosophy as "the synthesis of syntheses." Although Otlet acknowledged that philosophy can no longer comprehend all sciences, he was convinced that it was still capable of making a framework to "[. . .] comprehend and explain all knowledge" (Otlet 1935, p. 354). The longing for a philosophic or synthetic viewpoint was apparent in Otlet's encyclopaedism. The passage from plurality to unity and the abstraction from the many to the one could be achieved by a synthetic method that reduces the mass of information to a set of principles, as Otlet said in his letter to Geddes in 1924 (see note 14). Otlet's pyramidal encyclopaedism is reminiscent of Plato's philosophical overview, Comte's positioning of the sociologist at the apex of the sciences and Bergson's intuition: "A great pyramid should be constructed. At the top are to be found Thinkers, Sociologists and great Artists. But the top must be joined to the base where the masses are found, and the bases must have control of a path to the top"[46] (Otlet 1926, p. 10).

Despite these differences, Otlet's and Neurath's epistemology was very similar when it came to the issue of visual education and the format of the visual encyclopaedia. Otlet considered the elaboration of an "atlas" as a work of visual synthesis, as a method to synthesize the plurality of data to illustrate the most important general notions. The atlas *Monde* is the ultimate example of such a visual synthesis. Like a geometric mandala or theatre of memory, the seven pedagogical circles are crammed with icons charged with multiple meanings. Within the process of visualization the many is reduced to the essential, general truths. The circles are supposed to continue to function as an inventory of all that exists and to provide the essential steppingstones that will lead the reader to the philosophical panorama of all knowledge. Like the World Museum designed by Le Corbusier, the encyclopaedic circles guide the reader to the apex of the pyramid where all knowledge can be grasped from one enlightened point of view.

When it came to visual education, Neurath followed a holistic and synthetic model not dissimilar from Otlet's integration and synthesis of knowledge. Like Otlet, Neurath considered that the distillation of the essential facts was the crucial preoccupation of visual education. A good

46. "Une immense pyramide est à construire. Au sommet y travaillent Penseurs, Sociologues et grands Artistes. Le sommet doit rejoindre la base où s'agitent les masses, mais la base aussi doit être disposée de manière qu'elle puisse rejoindre le sommet."

teacher, according to Neurath, is he who knows what to leave out, what is superfluous, and what is essential (Cat 2010). But at this point, Neurath made a distinction between popularization and humanisation. Humanisation, according to Neurath, was a mode of explanation which proceeded "from the simplest to the most complicated," while popularisation translates "from the complicated to the simple" (Neurath and Cohen 1973, pp. 231–232). Visual education, according to Neurath, should be humanized and not be simplified. By using a democratic and neutral visual language, Neurath hoped to eliminate the specialization and exclusiveness of knowledge. Visualisation transcends the local contingencies of knowledge. With his research on ISOTYPE, Neurath sought a universal form of communication that was able to reach the entire world population of which only a small part is lettered. Like Otlet, he considered visual education to be essentially an international and general form of education that had an immediate impact on the social and political structures. Ideas involve ideals, science supports politics, and therefore scientific education cannot be separated from social-political ends. By mobilizing the visual technology of the commercial advertisement for educational purposes, both Otlet and Neurath sought to transform scientific or social facts into propaganda for a world citizenship.

Conclusion

The atlases of Otlet, Geddes and Neurath assimilated technological changes to visual media, structural transformations in pedagogical thought, trends in the philosophy of science and the emergence of a new form of international politics that included a politics of education. For the three of them visual education was the direct application of science to society. Presenting themselves simultaneously as sociologists and social reformers, they used visual media to bridge the gap between science and society, between the values of universal science and the emergence of a world society. Otlet visualized the general truths of science in the hope of encouraging the internationalization of the predominant national frameworks of culture; Geddes set out to make a graphic survey of encyclopaedic knowledge to aid the evolution of a community towards a greater civic consciousness; and in a Marxist fashion Neurath sought to make the masses attentive to social facts in a visual language reminiscent of the mass-media. In their graphic or scenographic demonstration of encyclopaedic knowledge the social-political programme of science was made explicit. Through the intermediation of presentation and representation, they transformed scientific "truths" into messages of cultural reform.

This well-considered re-designing of the encyclopaedia into an atlas-exhibition links up with the notion of "remediation." Remediation is a

key concept in the recent studies on new media. Bolter and Gushin define remediation as the representation of one medium in another (Bolter and Grusin 1998, p. 45). The term refers to the opening page of *Understanding Media* (1964), where Marshall McLuhan remarks that "the 'content' of any medium is always another medium" (McLuhan and Gordon [1964] 1994, p. 19). One medium borrows, substitutes, or incorporates itself in another medium. Although authors of the new media studies argue that remediation is a defining characteristic of the new digital media, they indicate that in history media are "continually commenting on, reproducing and replacing each other, and this process is integral to media. Media need each other in order to function as media at all" (Bolter and Grusin 1998, p. 55). Remediation, as its Latin roots "remederi"—that means "to heal"—indicate, is about the reformation of one medium by another. We assume that new media offer an improvement to their predecessors. So called "new media" implicitly hold the promise that their content will be communicated in a more immediate or transparent manner than older media. The World Wide Web and e-books for example promise a digital culture that will give a more rapid and democratic access to information, commerce, and decision-making processes than in the pre-WWW epoch.

The domain of science does not evade this reformative character of its visual media. Traditionally, scientific visualizations are required to be honest and faithful representations of scientific data. Corresponding to the rigor of scientific investigation, scientific image-making should express observations with a minimum of interpretation. But the process of visualization and thus of remediation, of employing media that are non-verbal and more "visual," is not only about the accurate representation of information but also about the reformation of a mode of seeing. As Daston and Galison (2007) have shown in their analysis of scientific atlases, atlases show *how* things should be described, depicted, or seen in a scientific manner. They guide the viewer in how the objects of science look and how they should be looked at. In their utopian experiments in the creation of encyclopaedic atlases Paul Otlet, Patrick Geddes, and Otto Neurath wanted to teach people how to look at the world. In their mixed media format of the atlas-exhibition, they taught the viewer not so much universal truths but a universalist mode of vision.

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