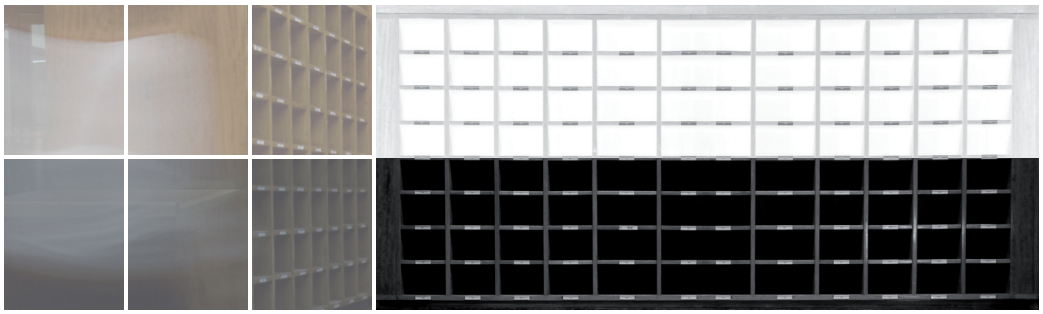


INTERDISCIPLINARY
CONFERENCE
GHENT UNIVERSITY
14 - 17 MAY 2008

ANALOGOUS SPACES

Architecture and the Space of Information, Intellect and Action

Analogous Spaces refers to the fact that every science or knowledge, every thought, every memory, every action creates its own space and that these spaces are organised according to a similar structure or architecture.

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Conference Reader

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CALL FOR PAPERS

The International Conference on Analogous Spaces interrogates the analogy between spaces in which knowledge is preserved, organized, transferred or activated. Although these spaces may differ in material, virtual, or operational ways, there are resemblances if one examines their 'structure,' 'form' and 'architecture'. How do these spaces co-exist and interrelate?
The conference seeks papers on the following types of spaces:

- *architecture and elements of the built environment* (museums, libraries and archives, warehouses, ministries, administrative towns, world capitals, physical infrastructure, functionalist urbanism, etc.);
- *information storage and data processing* (databases, information retrieval, data mining, conceptual maps, scholarly communication, search engines, etc.);
- *the architecture of "the book"* (contents and layout of atlases, scientific and scholarly treatises, encyclopedias, guides, manuals, children's books etc.);
- *organizational schemes and diagrams* (organigrams, functional diagrams, visual language, interfaces, artificial intelligence, taxonomies, classification systems, itineraries, etc.).

Conference papers should examine analogical relationships between these types of spaces by investigating how they produce, accumulate, order, conserve, distribute, classify, and use knowledge.
The conference will be organized around three main themes:

1. The first theme explores spatial analogies in terms of social and intellectual networks. What are the geographic relationships and/or technological affordances that support or inhibit the development of such networks? What constrains their development and effectiveness and how do different kinds of network models help in understanding their formation, evolution and dissolution.
2. The second theme deals with the space of knowledge and memory. How can we compare the encyclopedia and the museum, the book and the library, the diagram and the database? How do they use architecture to structure knowledge and how is architecture used as a metaphor of memory?
3. The third theme explores the space required for speed, action and decision making. In modernity, fast and effective action generates its own space of organization, intelligence and feedback. What does this space look like, and what are the different ways in which it can be represented?

The Paul Otlet Case Study > The conference considers Paul Otlet (Brussels 1868-Brussels 1944), Belgian intellectual, utopian internationalist and visionary theorist about knowledge organization**,** as a stepping stone. The life and work of Otlet are an inspiring case study, however they certainly do not delimit the issues addressed in this colloquium. Otlet, together with Henri La Fontaine, developed the Universal Decimal Classification system for bibliography and documentation, and founded the International Institute for Bibliography and the Union of International Associations. He and La Fontaine were also influential in the movement that led to the creation of the League of Nations. Otlet was also the co-founder of the Union Internationale des Villes. In the field of architecture he is especially known for his collaboration with Le Corbusier in creating plans for a Mundaneum or an international centre for information, education and science in Geneva. He was also a leading figure in the architectural design and urban planning of a model seaside community at Westend before World War I. All of his endeavours aimed at the international development and centralization of scientific and cultural networks.

Session Themes

1. Spaces of Intellectual Networks > Papers in this session of the conference will examine theoretical and historical perspectives on intellectual networks. The focus is on (but not limited to) the early twentieth century when European intellectuals such as Paul Otlet, Edmond Picard, Emile Vinck, René Worms, Patrick Geddes, Wilhelm Ostwald, Otto Neurath and Le Corbusier not only participated in, but also founded and developed different (trans)national networks. How are we to capture the dimensions and interconnections of the networks in which figures such as these were involved? And how do other intellectual and cultural networks centered in different nations function in terms of cooperation or competition? How can we map or describe the space of these networks which was often physically operationalized by the creation of institutions and associations, scholarly journals or bibliographical services, conferences, lecture series, and (world) exhibitions, but which also had an informal, interpersonal dimension? What was the impact of geographical scale on the development of these networks (local, national, transnational, international)? How were they influenced by changing technologies of communication (rail networks, the telephone, the telegraph, postal services, periodical publications, news bulletin, etc.)? How did individuals position themselves within these networks? Papers may utilize new conceptual tools to help us understand the modern physical and organizational spaces of intellectual networks, and authors are encouraged to include more recent theories of network analysis and social transformation stimulated by the virtual and online technologies of information.

2. Space of Knowledge and Memory > Papers in this session of the conference will examine spatial analogies related to the architecture of accumulation (archives, warehouses, etc.), the document as a space of knowledge (books, objects, images, documents, statistical data, etc.) and the space of memory (libraries, museums, databases, records, etc.). The museum can be considered as an atlas or an encyclopedia. The space of the library is organized in part by systems for the classification and arrangement of documents. The space of the book is like that of a library where knowledge, texts and images are differentially situated and interrelated physically by conceptual structures (indexes, lists of figures, tables of contents, footnotes, bibliographies, and so on). The architecture of databases is made comprehensible by means of diagrams. Architecture can be used in all of these cases both as a means of and a metaphor for storing and making information accessible. As a means, architecture expresses the function of an archive: the structuring, putting and holding of things in place and providing routes of access to and between them. But buildings and towns are also metaphors for information space, as reflected in, for example, Castells's concept of the informational city, information highways, and modern notions as information architecture or website architecture. Moreover, architecture, the city, information, and even philosophical texts and psychological theories have been represented in spatial terms by maps, guides, diagrams, classification and index systems, etc. How do requirements for the storage, management and accessibility of knowledge produce their own spaces? How are these spaces represented? What has been the impact of the development of artificial memory sciences and computer technology on the art and discipline of architecture itself?

3. Space of Action and Decision Making > The third session addresses the space of action, speed and decision making in the city. In order to govern the city or to make decisions on urban processes, procedures or mechanisms that guide these decision processes are needed. Not only are these processes themselves subjected to permanent managerial controls, but so are the different data networks on which they are based, such as those for water, electricity, telephony, traffic, meteorology, sewage, roads, land ownership, police, etc. To develop these networks with high precision, to legitimate choices in town planning practice or to develop effective urban planning policy, information and data must be gathered from different places, practices, institutions and disciplines. The descriptive tradition of the survey in the history of town planning for example, illustrates the importance of accumulating documented evidence. Its aim is not only to amass extensive knowledge about the city, but to synthesize and

organize it in a goal-oriented way in order to be able to take action. The speed of information processing becomes a strategic dimension of decision making. Government bodies and administrative institutions look for ever more rapid and effective monitoring tools and expert systems. The papers in this session will deal with such questions as: How do these systems influence the organizational, legislative, bureaucratic and political structures responsible for city planning? How is this space of action and decision making supported, organized and represented?

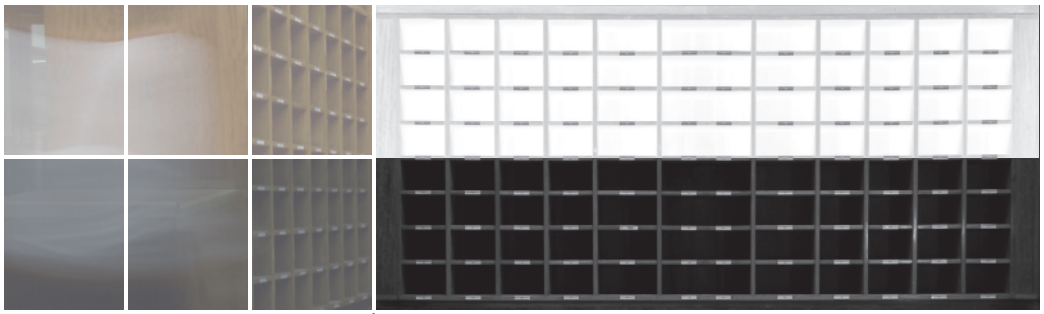
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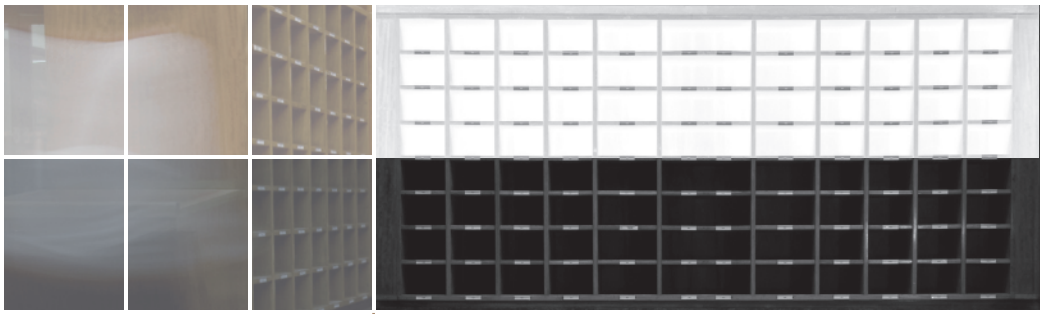
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PAPERS



Space of Intellectual Networks

Thursday 15 MAY

Papers Session 1 & 2

The first theme explores spatial analogies in terms of social and intellectual networks. What are the geographic relationships and/or technological affordances that support or inhibit the development of such networks? What constrains their development and effectiveness and how do different kinds of network models help in understanding their formation, evolution and dissolution.

Files and Books. Paul Otlet and the Beginnings of the International Institute of Administrative Sciences (IIAS-IISA) at Brussels

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Abstract. – **In its beginnings Paul Otlet played an important rôle in international administrative exchange which is explained with respect to his interventions at the first and second international congresses of administrative sciences 1910 and 1923 in Brussels. With his varied interests and functions, especially at the Brussels 'Palais Mondial', Otlet also was in charge of a now disappeared 'International Museum of Public Administration' which resulted from a Spanish donation during the first congress. From outside, French diplomats remarked in the early 1920s already a sort of 'inflation' of universal concepts at high costs coming from Otlet. In administrative sciences, he lost importance when in the early 1930s the 'International Institute of Administrative Sciences' was established due to a Swiss initiative. Finally, Otlet's achievements and shortcomings are discussed with respect to bibliographical documentation and administrative action.**

Keywords – Bibliographical Documentation, Public Administration, Administrative Sciences, Belgium, Spain, France, Switzerland, Analogous Spaces Conference

I. The First International Congress of Administrative Sciences at the Brussels World Exhibition of 1910

More or less exactly one hundred years ago, in April 1908, the Kingdom of Belgium officially invited participants to attend the first "International Congress of Administrative Sciences" that was to take place in close connection with the planned Brussels World Exhibition of 1910. In that 'call-for-papers' eighteen senior officials and university teachers from Belgium were responsible for a programme scheduled in four sections: the first was local government, followed by intermediate administrations, central government, and lastly the wide field of documentation in administration.

The organisers took as their point of departure that at the end of the 19th century public administrations, especially on the local-government level, had been confronted with until then unknown, structurally new tasks. They so reflected the growth of important public services for all citizens in that period, like the railways, post and telegraphs, social insurance programs and especially local social policies in urbanizing societies. The congress tried to establish a new field of scholarly reflection, the "administrative sciences". Especially, the results of the famous Dresden 'Städteausstellung' (Exhibition on Urban Politics and Town Planning) of 1903 [1] should be evaluated in a broader and more international context at the Brussels World Exhibition of 1910.

Administrative sciences were considered as more than one science, and they included applied sciences as well as theoretical reflection, from their very beginnings. The congress theme was described on the one side as the whole of knowledge with respect to services, organisation, personnel and action of public administrations, and on the other side as the most practical methods to be deployed by them. To take part at the Brussels congress should therefore be attractive to the scholar as well as to the practitioner. The general aim of the congress was to provide an opportunity for participants to examine practical knowledge brought together from all countries and to discuss the differences in their everyday administrative action. Such an eminently practical approach meant that all political, philosophical and religious questions should strictly be excluded from being discussed in depth by the internal rules of the congress [2].

The participants of the 1910 Brussels congress agreed on some general conclusions. They strongly opted for local autonomy and for autonomous institutions on an intermediary level of administration, below the ministries. With regard to central government their focus was not a general one and mainly the status of public servants had been discussed. In the field of administrative practices the use of shorthand and of all kinds of modern (at the period) office machines were proposed, and the tricky question of the classification of administrative papers and the relation between current and historical archives was discussed. Central questions of the techniques to organize an administration's knowledge about itself arose when in section IV on 'administrative documentation' the use of index cards ('fiches mobiles') was proposed instead of bound registers – and this was the section, which was co-chaired by a Belgian civil servant and by Paul Otlet (1868 – 1944), figuring here as General Secretary of the International Institute of Bibliography in Brussels. So the world of books and libraries had an impact to that of files and administrations [3].

National 'Study groups' who were to reflect the questions of administrative documentation in each country were proposed for future common efforts in the practical field of administrative sciences as applied sciences, which developed to the later 'national sections' in the International Institute of Administrative Sciences / Institut International des Sciences Administratives [4]. This was a major step to decentralized

organisation which is the only realistic approach to begin an international cooperation. As a complementary element a Permanent Commission for International Congresses in Administrative Sciences ('Commission permanente des congrés internationaux des sciences administratives') was elected by the Brussels congress in 1910; it had members from 22 states.

In fact, this Permanent Commission became the predecessor of IIAS-IISA which was officially founded in 1930 only. The commission's acting President was the former Belgian minister of Industry and Work, Gerard Cooreman (1852 – 1926); the two honorary presidents were the Spanish Prime Minister Canalejas and the Mayor of Brussels, Adolphe Max (1869 – 1939, Bourgmestre 1909 - 1939). The European members of the Permanent Commission came from Austria-Hungary, Belgium, France, Greece, Italy, Luxemburg, the Netherlands, Portugal, Rumania, Russia, Spain, Sweden, and Switzerland. They were joined by representatives from Bolivia, Brazil, Chile, Ecuador, and the United States of America, and from the Ottoman Empire, Persia, China, and Japan. Spain (five) and Belgium (four) were the only countries to be represented by more than one person, whereas the German Empire and the United Kingdom were not present at all – although both countries had been strongholds of local government, a central topic at the Brussels congress. Contrary to Austria-Hungary which was present with an important delegation [5], the German government had refused any official participation because in its view the area of administrative sciences was far too broad and the different countries' administrations were not comparable at all [6]. The organisational centre of the new Permanent Commission was its 'Secrétariat permanent' which was composed of M. Nerinckx, professor at Louvain University, and the Belgian high administrators Paul de Vuyst and Pien [7].

II. Otlet's Rôle in the Brussels "Musée Administratif International" and in Administrative Documentation

The 1910 Brussels congress left a 'material substrate' of administrative documentation as well. The Spanish government under the liberal Prime Minister José Canalejas y Mendez (1854 – 1912), who came in person to Brussels, hosted in the Spanish Pavilion of the World Exhibition an exposition concerning a documentation of its administrative work [8]. On behalf of Spain, Juan Conde de Torre-Velez officially donated this complete collection of Spanish administrative documents from all ministries as 'Sala de España' (Spanish Room) to Belgium [9] as base for an 'International Museum of Public Administration' which would be organized in a permanent form in close cooperation with the Otlet's International Institute of Bibliography. So he became, in some way, even a museum's director [10].

Because of this special role of Spain in the first congress the second international congress was originally planned to be held in Madrid in 1915 [11]. After the outbreak of the First World War this congress had to be postponed until 1923 and was for practical reasons held once again in Brussels. Henri Fayol (1841 – 1925), the father of modern management sciences in France, was as vice-president a leading member in the Permanent Commission. He opened the congress with an important general paper on administrative doctrine in the state ('La doctrine administrative dans l'État') which widened his own reflections to the field of public administration [12]. Paul Otlet chaired - as already in 1910 - the fourth section of the congress on administrative documentation. Meanwhile he had also become Secretary General of the umbrella organisation of international organisations in belgium ("Œuvre des Associations Internationales"), which also had been founded at the occasion of the Brussels World exhibition 1910. As general rapporteur he strongly supported in 'his' section standardisation and rationalisation in public administration following ideas proposed by Fayol, Frederick W. Taylor (1856 – 1915) and the Belgian industrialist Ernest Solvay (1838 - 19229.

And it was Otlet who in 1923 for the first time proposed that the congresses should develop into a regular organisation, or, as he said, into an international association which focuses on the general interests at the different levels (local, regional, central, and international) of public administration ('une association internationale ayant pour objet les interêts généraux aux divers degrées (communaux, régionaux, centraux, internationaux') [13]. Accordingly, his fourth section opted in its conclusions for a real international association with continuous efforts ('une véritable association internationale à travail continu') concentrated on university teachers and administrative practitioners as well [14]. However, this first initiative to found an IIAS-like organisation, initiated by Otlet, was not successful. One reason may have been the Polish government's attempt to find support to ensure that the seat of this association would be in Poland [15].

The wide international context of the proposed new organisation is especially important. After the First World War the International Museum of Public Administration became part of the "Palais Mondial", also directed by Otlet. This was to be an international organisation of intellectual labour. It should combine Otlet's path-breaking ideas in the field of a rational documentation of knowledge [16] and the idea of a "Société des Nations" (League of Nations) as it had been conceived by Otlet together with his friend and compatriot Henri-Marie La Fontaine (1854-1943), a socialist politician, outstanding leader of the international peace movement, and winner of the Nobel Peace Prize in 1913 [17]. Count Torre-Vélez joined that group after the first Brussels congress and propagated Otlet's idea of a "Société des Nations" in Spain [18] and again at the Brussels congress in 1923, where he explicitly attributed the authorship of the concept to Otlet and not to President Wilson [19].

The "Palais Mondial" and its permanent collection was provisionally housed in the left wing of the "Palais du Cinquantenaire" in Brussels. Otlet planned – inter alia with Le Corbusier – a "Cité Internationale Permanente" or "Cité Mondiale" to be constructed at the next (1930) Brussels World Exhibition [20]. However, already before the 1923 congress, difficulties arose with the Belgian government about the use of the 'Palais Mondial' site, since it had become clear that the new League of Nations would stay in Geneva and not establish itself in Brussels. Deceived, Otlet seriously thought of transferring the International Museum of Public Administration away from Brussels and Belgium to Switzerland, the Netherlands, Italy or even the United States [21]. The gap between Otlet's seemingly utopian concepts and reality grew and grew…

On the other hand, the Permanent Commission received as early as 1922, in the context of the second Brussels congress,

the first subsidies from governments, and soon a standard amount of 50 francs-or per million inhabitants was proposed [22]. The first of the de-central national committees proposed by Otlet before the First World War seems to have been set up in Spain [23], soon followed by Belgium, Czechoslovakia, France, Great Britain, Romania, and the United States, thus completing the Permanent Commission as central international organisation. In 1925 on behalf of the Kingdom of Belgium [24], its diplomats proposed officially the establishment of national sections, which were supposed to take part in a forthcoming new review [25]. Following the third congress held in Paris (1927), this "Revue des Sciences Administratives" was founded in 1928 jointly by three international organisations seated in Brussels: the "Union Internationale des Villes" (International Union of Local Authorities) in collaboration with the Permanent Commission and Otlet's "Institut International de Bibliographie". At that time the Permanent Commission had funds of no more than 70.000 Belgian Francs per year, but spent no less than 67.000 for the new "Revue des Sciences Administratives". For its survival it had obviously to broaden its financial basis, but this was difficult at the period.

III. A View from Outside: The Reluctant Attitude of French Diplomats at Brussels towards Otlet's Projects

Otlet's manifold activities gave rise to their assessment as being no more than pure activism, without any serious importance. Among those contemporaries regarding his work very reluctantly we find the French ambassadors to Belgium, Pierre de Margerie holding that office from 1919 to 1922, and his successor Maurice Herbette from 1922 to 1929. Their negative image reflected their conversations with Belgian scholars, but also the content of Belgian press articles. Otlet's non-diplomatic language let him declare that the decision for Geneva as seat of the Leage of Nations was a mistake, and his prolific use of 'universal' ("mondial") to almost all of is activities lead de Margerie to remark the 'totally illusoric and even sometime childish character' ("caractère tout-à-fait illusoire et meme parfois un peu enfantin") of Otlet's and La Fontaine's initiatives.

And de Margerie made the point that Otlet has 'ingeniously reduced the whole of science to files and index cards' ("a ingénieusement réduit en fiches et en dossiers la science universelle") [26]. In fact, Otlet proudly informed foreign ambassadors at Brussels in 1926, that there were now 25.000 objects in the museum, 1 million documents in a documentary encyclopedia, and more than 13 million index-cards in the "Répertoire Bibliographique Universel" – all paid for with no more than 75.000 Francs per year [27].

IV. Achievements and Shortcomings of Otlet's Contribution to Administrative Sciences

The process of institution-building which formed IIAS proper began, however, not in Belgium or in Spain, but in Switzerland and was closely associated with the person of Oskar Leimgruber (1886 - 1976, later President of IIAS). With the coming of Leimgruber, who was then Vice-Chancellor of the Swiss Federation and the second highest public servant in his country, Otlet's role in the organisation of international exchanges in andministrative sciences vanished.

Preparing the fourth congress of administrative sciences in Madrid (1930), shortly after the Spanish dictator Miguel Primo de Rivera had resigned, Leimgruber as official Swiss delegate developed his plan to transform the existing ad-hoc organisation of the Permanent Commission into a more stable 'International Institute of Administrative Sciences and Practice'. His far reaching institutional reform proposals were adopted unanimously by the Madrid Congress on 22 October 1930 [28]. The Belgian government had been quite active with regard to the future institute's seat in this country. Finally, the statutes and the slightly different name 'International Institute of Administrative Sciences' were decided during a meeting held in Brussels (October 1931) and approved formally by Arrêté Royal of 20 January 1932 [29].

So Otlet lost his influence in international administrative sciences in the late 1920s and early 1930. It cannot be seen from the discussions in later congresses that bibliographical documentation in Otlet's manner had been helpful to administrations and administrative sciences. What, then, were the main achievements and shortcomings of his approach?

Otlet's foremost importance was in his idea that administrative sciences needed an international focus, connected with his intensive organizational and networking skills which helped a lot in the early years of international administrative exchange. Otled also thought that administrative sciences were to be fostered by systematic bibliographical records of the international production of knowledge in the field. But in systemizing Otlet did not read the books, so to say. That meant: the content of the different contributions was not important in his bibliographical concept which in the reality of the 1920s or 1930 was rather similar to a library's online catalogue than to the content provided by Google. His intervention in the first congress in Brussels 1910 showed already clearly this kind of structural shortcoming: When he let the attendance in his section opt for a system of index cards instead of bound registers, he had no knowledge at all of national administrative cultures and their different and subtle ways of handling written information - which make the international cooperation of archives so difficult. Public administrations act and decide in specific and unique situations, whereas scientific literature stores knowledge for a more general use. Files are different from books, and their content is essential for action. With his systematic-bibliographical bias Otlet did not realize that.

Acknowledgments

The main problem of my work on this subject has been the almost complete lack of written sources up to 1945 at the IIAS Brussels headquarters – due to the fact that after the occupation of Belgium in 1940, National-Socialist Germany closed the Institute in 1941 and sent the entire IIAS library and files to Berlin in 1942 [30]. A reconstruction of the Institute's history and activities is therefore heavily dependent on the material to be found elsewhere in "secondary traditions", especially in the Central Archives of neutral Switzerland and within the channels of German diplomacy. So I am greatly indebted to the many archivists who were very active in helping me to carry out my research and wish to express my thanks to all of them.

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[4] See www.iiasiisa.be (10.04.2008). For the Institute's history in general see Fisch, Stefan: Origins and History of the International Institute of Administrative Sciences from its Beginnings to its Reconstruction After World War II (1910 - 1944/47), in: Duggett, Michael / Rugge, Fabio (eds.): IIAS / IISA. Administration & service 1930 - 2005 -, Amsterdam 2005, p. 35-60, which is in parts the base for this contribution.

[5] Austria-Hungary sent 46 participants, a delegation comparable in size only to the French and Russian ones; the Austrian Ministry of the Interior at Vienna alone sent a delegation of no less than five high officials to Brussels; the congress report contains no less than 48 pages with the names of participants, Comptes rendus (note [3]).

[6] Historical report (von Bargen), 15 May 1932; Political Archives of the Federal Foreign Office Berlin, R 43180; it should be mentioned that in 1910 the German government refused in general to participate in any international congress during the world exhibition, Staatssekretär Auswärtiges Amt to Staatssekretär Reichsamt des Inneren, 7 May 1910, Bundesarchiv Berlin-Lichterfelde, R 901, vol. 607.

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[8] Premier Congrès International des Sciences Administratives Bruxelles 1910. Participation du Gouvernement Espagnol. Catalogue Général de la Documentation Administrative, Bruxelles 1910, préface p.10-11.

[9] In his biography of 1931 this is regarded as 'a triumph which fostered our prestige', which has to be seen in the context Spain's opening towards Europe which was pushed by the famous "generación de '98" after the defeat in the Spanish-American War of 1898; see Biographie de son Excellence le Comte de Torre-Vélez, appendice I to: Institut International des Sciences Administratives Bruxelles / Section Nationale d'Espagne: Compte-Rendu du IVe Congrès Madrid 1930 octobre, Madrid 1931, p. 183-195, here p. 189.

[10] Whether the Mundaneum at Mons in Belgium, an institution decicated to Otlet's work and holding many of his personal papers (see http://www.mundaneum.be (10.04.2008)), conserves elements of this 'International Museum of Public Administration' has still to be found out; e-mail of Mme. Manfroid of the Mundaneum archives to the Author, 03.03.2008.

[11] Commission permanente des congrès internationaux des sciences administratives: Second Congrès International des Sciences Administratives Madrid 1915, Bruxelles 1913 (printed invitation).

[12] Fayol, Henri: La doctrine administrative dans l'État, in: Deuxième Congrès International des Sciences Administratives de Bruxelles 1923 sous le Haut Patronage de S. M. Le Roi des Belges. [fasc. VI :] Comptes rendus des séances du congrès, Bruxelles 1923, p. A 14-A 34; Fayol, Henri: Annexe: Résumé de la doctrine administrative, ibid., P. A 38-55. Here he applied his main work (Fayol, Henri: Administration industrielle et générale. Prévoyance, organisation, commandement, coordination, contrôle, Paris 1917) to the field of public administration; his contribution has been re-published in the Institute's review, see International Review of Administrative Sciences (1966). – Although Fayol died in the same year one finds his printed signature on the invitation of 10 November 1926 for the third congress at Paris; Swiss Federal Archives Bern, E 2001 C - 3, vol. 115.

[13] Otlet, Paul: Rapport Général, in: Deuxième Congrès 1923 (note [12]), [fasc. IV :] Section IV : Documentation – Administration Internationale, Bruxelles 1923, part IV-1-18, p. 1-95, esp. p. 9 (rationalisation movement), 51-52 (taylorism), 61 (index cards with mention of the results of the 1910 congress) and 95 (proposal for future organisation). – The so-called 'systematic' pagination in the congress papers of 1923 provided an obviously confusing result, however.

[14] Séance du 14 septembre, après-midi [et Voeu de la IVème section], in: Deuxième Congrès 1923 [fasc. VI] (note [12]), part IV, p. 16-26, here p. 22.

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[17] For these ideas should be consulted Paul Otlet: Sur l'établissement en Belgique du Siège de la Société des Nations, brochure of 1919 – to be found in the papers of Cooreman, president of the first congress in 1910 at the Katholieke Universiteit Leuven; Mark Demeyer / Henk de Smaele : Inventaris van het archief van Minister van Staat Gerard Cooreman, 1852 – 1962 [sic, he died in 1926], p. 33, nr. 3.6.9. (also online as http://kadoc.kuleuven.be/db/inv/150.pdf (10.04.2008).

[18] Biographie du Conte de Torre-Vélez (note [9]), p. 190-193.

[19] Juan Conte de Torre-Vélez: Discours d'inauguration, in : Compte-Rendu du IVe Congrès 1930 (note [9]), p. 30-51, here p. 33.

[20] Le Palais Mondial et l'Union des Associations Internationales, in: Deuxième Congrès 1923 [fasc. IV] (note [12]), part IV-18, p. 1-4.

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[22] Commission Permanente des congrès des sciences administratives, printed leaflet, janvier 1924; Swiss Federal Archives Bern, E 2001 C - 3 vol. 115.

[23] Sección de España de la Comisión permanente internacional de ciencias administrativas: Problemas Administrativos tratados en el Segundo Congreso Internacional de Ciencias Administrativas Bruselas 1923, Madrid 1924.

[24] At that time Max-Léo Gérard (1879 – 1955), secretary to Albert I, King of Belgians, became a member of the Permanent Commission.

[25] See for instance Légation de Belgique to Département politique fédéral, 18.5.1925; Swiss Federal Archives Bern, E 2001 C - 3, vol. 115.

[26] French ambassador Bruxelles (de Margerie) to Ministry for Foreign Affairs Paris, 24.06.1922 and 22.8.1922; Nantes, Centre des Archives diplomatiques, Ambassade Bruxelles, B 137, sous-dossier Union des Associations Internationales.

[27] Circular letter from Otlet on behalf of "Union des Associations Internationales" to foreign ambassadors, 14.10.1926, Nantes, Centre des Archives diplomatiques, Ambassade Bruxelles, B 141, sous-dossier Union des Associations Internationales.

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The Nietzsche Archive in Weimar

– Building the Architecture for the Perceptive

Ole W. Fischer*

Abstract - **Reading Friedrich Nietzsche's work was the starting point for Henry van de Velde in his artistic work in the 1880s. His change-over to the applied arts and architecture in the 1890s and subsequent appointment to the Court of Weimar in 1901 coincided with a substantial series of works dedicated to Nietzsche, which van de Velde continued in Holland during the period between the wars and which were one of his most important works until the memoirs written in post-war Switzerland. The focus of my research is the correlation of radical philosophy, aesthetic thought and artistic production. By confronting the aesthetic concepts of Friedrich Nietzsche with the artistic and theoretic work of Henry van de Velde my recherché exemplifies the process of acquiring philosophic concepts and positions to produce meaning and significance in art, design and architecture as a strategy of the avant-gardes of the 20th century. The focus of this conference paper is put on the translational process from philosophical text to abstract image design, as a special case of an analogous space. The analysis and interpretation of a historic point of a crisis of language and traditional art in early modernity, where the distrust against language, moral and convention was put forward by the philosopher Friedrich Nietzsche, and was answered by his reader Henry van de Velde with the artistic concept of *"transcription ornementale"*, which opened the field for formal experimentation of an abstract as well as a philosophical informed design process. A cross reading of van de Velde's own writings with the philosophic notions from Nietzsche on art and architecture and the interpretation of one of van de Veldes mayor works dedicated to Nietzsche – the Nietzsche Archive in Weimar (1902-03) – give an exemplification of the concept of programmatic architecture, adapted by van de Velde from late-romantic music theory of Franz Liszt and Richard Wagner.**

Keywords **– Philosophy, Henry van de Velde, Friedrich Nietzsche, Archiv**

In early January 1889, the German philosopher Friedrich Nietzsche (1844-1900), a professor of philology of the University Basel in early retirement, sent several obscure letters to his friends and colleagues from Torino signed "Dionysos", "Nietzsche Caesar" or "The Crucified."[1] When his alarmed friend Franz Overbeck arrived in Torino from Basel on January 8th he found Nietzsche already unaware of himself, so that he decided to take Nietzsche back with him to Basel's asylum, the first station of an eleven and a half year twilight in madness. After Nietzsche's breakdown his manuscripts as well as his letters and parts of his library remained in Torino and scattered at other places of his unsteady life between cheap tenancy in Italian cities, alpine villages, friends in Basel and family in Naumburg. With the ebbing hope for Nietzsche's mental recovery, the question arose of what to do with his literary remains, especially since the last months of his conscious life were extraordinary productive.

Nietzsche's mother was overburdened with Nietzsche's home care and, as a pastor's widow, she was repelled by the radical writings of her son, but she gave her acknowledgement to Franz Overbeck and Heinrich Köselitz (alias Peter Gast), Nietzsche's former student and secretary, to act as literary executers. In 1893, after her final return from a failed anti-Semitic colony experiment in Paraguay, where she lost her husband, wealth and mission, Friedrich Nietzsche's sister Elisabeth Förster immediately took over the self-declared legacy as representative of Nietzsche's interests and seized his literary remains.[2] She carried together his manuscripts, struggled with the publisher for the proof sheets with his annotations, asked all his correspondence partners for a return or copy of his letters and collected his library and private papers. In 1894 Elisabeth Förster-Nietzsche, the name she used from then on, was able to open the "Nietzsche-Archive" on the first floor of her mother's house in the small city of Naumburg – with the dooming philosopher upstairs. Soon her literary circles, afternoon teas, piano soirées and other social activities interfered with the care for the sick brother, and Elisabeth chose to move to Weimar, to participate in the social life of the Grand Duke's court and profit from the glorious heritage of Friedrich Schiller and Johann Wolfgang Goethe – the emblems of German Classic literature and poetry. In spring of 1896 a grant by Meta von Salis, a writer friend of Nietzsche, provided Elisabeth with a villa on top of the hills overlooking Weimar, because the death of their mother made it necessary to re-unify archive and care for the mad philosopher-brother under the same roof: Nietzsche himself was transported in a special train cabin from Naumburg to Weimar at night. In the meantime Elisabeth Förster-Nietzsche had started twice an edition of Nietzsche's works: although she was in charge of copy rights of the published works and had managed to collect almost all the literary remains, she disassociated several times from the editors she had engaged: first she fired Köselitz, who had been working as an editor since 1893. Then she hired and fired Fritz Kögel, Rudolf Steiner – the later founder of Anthroposophy – as well as Ernst and August Honeffer within a few years. Finally, in 1898, it was Heinrich Köselitz again, the only one able to read Nietzsche's cryptic handwriting, who came back and helped her to start the edition project of the 20 volumes "Complete Works", which was not finished

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before 1913.[3] This "Großoktaveausgabe" together with the following soft cover edition, Nietzsche's choices and collected letters were a big success, translated soon into French, English and many other languages, and were the basis of "Nietzsche" as the cultural phenomenon we are still infected with today.[4] However, the Nietzsche-Archive remained a private institution, or more precisely: a one-woman-property, which brought unfortunate side effects to the publishing policy: Elisabeth Förster-Nietzsche held back Nietzsche's finished, but unpublished autobiographical book *ecce homo*,[5] manipulated several of his letters, and compiled his so called master piece "Will to Power" from fragments of various sketchbooks of Nietzsche – with the uncritical help of her editors. In addition she vindicated her own image of her brother with a series of biographies.[6] This met criticism right from the beginning by former friends of Nietzsche like Overbeck, by former editors and employees of Förster-Nietzsche as well as other Nietzsche experts, but Elisabeth recognized a strong leap of faith by almost all public intellectuals of her time. And she still held hand on her brother, the "fallen eagle" and most important "piece" in her collection, whom she used to show to "special guests" of the archive. With the example of Cosima Wagner as high priestess of the Wagner cult in Bayreuth in mind, she cultivated her role of devoted sister, wise woman and hostess of a cultural circle in Weimar, and with the help of the patron Count Harry Kessler the archive soon turned into a center of early modern avant-gardes.

Elisabeth understood the importance of art and media in modern society (as well as the new laws on copyright) and so she monopolized the production of Nietzsche portraits, sculptures and photographs by various artists. In fact, she made only use of photographs of her brother from the time before his breakdown, whereas she preferred paintings, etchings and sculptures of the sick philosopher with a prophetic notion, and finally, with the help of Kessler, she succeeded in finding with Hans Olde and Max Klinger the corresponding artists who were able to fulfill her claim and represent Nietzsche between intimate martyr and heroic prophet. Elisabeth handed out pieces and fragments of Nietzsche's writings to several of the new art and literature magazines, which were emerging around the turn of the century in Berlin, Vienna, Darmstadt, Frankfurt, Munich and Leipzig. These publications helped to connect the philosophy of Nietzsche with the new aesthetic movement, and to raise the demand for Nietzsche's works. The increase of income through donations and royalties made it possible for Elisabeth not only to pay for transcribing, correcting and editing Nietzsche's works, but also to enjoy bourgeois comfort. Already in 1898 she started to make alterations of the villa "Silberblick" (gleam of silver), which de facto still belonged to Meta von Salis, and Elisabeth's actions led directly to a break of this friendship. After the death of Nietzsche in August 1900, it became obvious, that she was in need of a new attraction for her archive: an interior design by the style reformer Henry van de Velde!

The Flemish painter, autodidactic designer and architect van de Velde was recognized as an early enthusiastic follower of the "philosopher with the hammer" and, after he had his break-through as "inventor" in Germany of art nouveau at the exhibition of Dresden in 1896, his star began to shine over the same circles that were interested in Nietzsche's "New Man." In spring 1901 he gave a lecture series about the theoretic foundation of the "New Style" in the famous salon of Cornelia Richter in Berlin, and Count Kessler introduced him at one of his soupées to Elisabeth Förster-Nietzsche. She in turn invited van de Velde and Kessler on a *pèlerinage* to Nietzsche's tomb in the small village of Röcken on August 25th 1901 – the first anniversary of his death. Van de Velde, who was in search for a new field of activity, after he had left behind the idea of a new guild society with the bankruptcy of his arts-and-crafts workshops in Berlin and Brussels in 1900, became immediately interested in the plan to reform the applied arts production in the grand duchy of Weimar. Förster-Nietzsche had in mind to re-animate the idea of a cultural Weimar movement: after the "golden age" with the poets Schiller and Goethe, the "silver age" with the composer and virtuoso Franz Liszt, she imagined a "New Weimar" of arts, architecture and life reform with the help of van de Velde under the banner of Nietzsche's philosophy. To reinforce her diplomatic maneuvers for his appointment at court, in fall 1901, she charged van de Velde with the modification and alteration of the villa "Silberblick". At the same time this building transformation was an expression of the new autonomy Elisabeth Förster-Nietzsche had gained by taking over the ownership of the archival villa that year. Van de Velde on the other hand, who had found in Nietzsche's writings in the early 1890s a fundamental critique to expose bourgeois culture and reject academic artistic production, which led finally to his "mission" of renewing applied arts and architecture, welcomed the commission to remodel the archive as a chance to combine his interests in aesthetic reform and the New Style with an homage to "his" philosopher.

Furthermore, the design of the Nietzsche-Archive became an exemplary case study of van de Velde's concept of "ornamental transcription" or, with other words, a piece of programmatic art. Van de Velde was aware of this concept of referring to external thoughts of philosophy or literature with internal means of the discipline formulated in late romantic music theory by Richard Wagner and Franz Liszt. He applied those ideas on applied art, architecture, furniture and book design. Programmatic art was meant to disarm the latent intellectual distrust put forward against music (and architecture) by the aesthetic systems of German idealistic philosophy of Kant, Hegel or Schelling, who preferred the conceptualized artwork of poetry and philosophy. They disregarded music (and architecture) as meaningless entertainment or emotional expression, and therefore as inferior arts. According to Wagner, music is able to refer to an external "program" by the title of the work, an explanatory theoretic text of the composer (where the name "program" is taken from), and a significant way of structuring the abstract material into themes or so-called leitmotifs. Wagner goes on to explain, that Beethoven consciously transgressed the canonic symphonic form with the vocal finale of his Symphony No. 9 in order to transcend and express highest emotion: the celebration of joy of a liberated mankind. Beethoven's finale was for Wagner the rebirth of the "*Gesamtkunstwerk*" (synthesis of arts) of ancient Greek tragedy. Van de Velde adopted this idea of synthesis of arts interpenetrating all aspects of life. But even more relevant for van de Velde's aesthetic thought was the rejection of mimicry and imitation in the concept of programmatic art, providing a possibility to inform an abstract object with philosophic meaning beyond application of symbolic ornament or

classical tectonic language. Nietzsche, who had reflected on Wagner, Schopenhauer and the metaphysics of music in his early writings, proposed yet another important motive of non-figural representation: he suggested the identity of internal and external worlds, a resemblance of character and whole of the post-Christian thinker with his built environment, which reformulates the pre-Socratic idea of *physis* as an organic unity of spirit and matter, of surface and content, of inside and outside, or what Nietzsche called the "architecture for the perceptive":

„Architecture for the perceptive. – There is and probably will be a need to perceive what our great cities lack above all: still, wide extensive places for reflection; places with tall, spacious, lengthy colonnades for inclement or unduly sunny weather where no traffic noise or street cries are able to penetrate, and where a refined sensibility would forbid even a priest to pray aloud: buildings and locations that express as a whole the sublimity of stepping aside to take thought for oneself. The time has passed when the Church possessed the monopoly for reflection; when the vita contemplativa primarily had to be a vita religiosa; and yet that is the idea expressed in everything the Church has built. I do not know how we could ever content ourselves with Her buildings, even stripped of their ecclesiastical function; they speak far too emotive and too constrained a language, as the houses of God and as the showplaces of an intercourse with another world, for us as godless people to think our own thoughts in them. We want to have ourselves translated into stones and plants; we want to have ourselves to stroll in, when we take a turn into those porticoes and gardens."[7]

For the "Nietzsche-Archive" van de Velde operated with a series of artistic manipulations that can be read as "programmatic:" he improved the unsatisfactory entrance of the house by adding a street-facing portico to the simple cubic building. To mark its status as a public institution, he labeled the new entrance with the inscription "Nietzsche-Archive" carved in stone in broad roman letters. This gesture did not quite correspond to the status of a private villa, but had to be understood in the context of programmatic art as the "title" of this work. For building the new portico van de Velde continued to use the materiality of brick and stucco of the existing structure, but rather than resembling the logic of wall and opening of the original's Neo-Renaissance, the new street façade is a compositional play of surfaces and proportions. This anthropomorphic positioning of openings can be directly connected to Nietzsche's idea of physiognomic expression, as in the "architecture for the perceptive." The excessive height of the entrance door in dark oak serves as part of this geometric frame, but for the approaching guest it offers another enigma: instead of a door handle there is a set of sculptural brazen handholds with labyrinth ornamentation. This might reflect on the unclear status of the house between shrine and villa, between literary archive and last domicile of the philosopher, but at the same time it structured the proportion of power of inside and outside: the arriving guest had to request for access. In addition, van de Velde noted in an earlier version of his memoirs to the chapter of "The Nietzsche-Archive and the New Weimar", that he had intended to give the archive an appearance "more solemn and monumental like a »Schatzkammer« [treasure chamber]"[8] – the leitmotif of this work.

Once inside, after a flight of stairs, there is a dark entrance hall. A crystalline lamp[9] over the doorway illuminates cloakrooms with a series of brass coat hooks, which work as joint between capitalist chaos outside and synthesis of art inside, constructing a new society of "Nietzscheans". A few steps to the right a double door opened to the "treasure" of the archive: the library with "His" books and manuscripts. This oblong room, a merging of two smaller rooms, has a rather low ceiling for its size. Since van de Velde could not easily change the height within an existing house, he chose a repetitive vertical structure as "organic ribs" to arrange the walls and virtually elevate and carry the white plafond. These planks hold the shelves for books, but integrated openings – with movable window grilles to prohibit unwanted visitors – as well as other furniture, even a chamber piano. The color palette of this room ranges from natural red beech [*blood-beech*], to fraise-colored plush and intensive red curtains, heightened by white stucco and brass details, only contrasted by grayish-blue carpet – the room as a whole was meant to invoke the atmosphere of an alpenglow[10] of Nietzsche's Zarathustra. Van de Velde put another "title" reference inside his work, this time in form of the initial of the philosopher's name: a brass *N* in a circle is embedded above the tiled stove. Nietzsche himself, apart from his books on the shelves and his manuscripts in the cupboards, is "present" in a life-size marble *stele* by Max Klinger. The only object in the room not designed by van de Velde is this *stele*, which rests on a platform against a surface of colored glass illuminated by evening light.

But why did van de Velde deliberately blur the status of the main room between private salon and sacred temple, literary archive and intimate library? – The answer might be found in the program of the "New Weimar" and its direct rivalry with the cult of Goethe, manifest in the conversion of Goethe's house in Weimar to a national museum in 1885 as well as the new Goethe-Schiller-Archives, built in 1896. The Nietzsche-Archive had to stand against the comparison with the palazzo of the thinker, poet and minister with its exquisite classical interiors and artwork. Goethe had brought back the idea of the humanist *studiolo* from his Italian Journey (1786-87) and remodeled his house into a personal microcosm: the succession of salons, dining hall, study chamber, scientific collection, garden and library were read as an ideal portrait of the educated bourgeois. Van de Veldes strategy of staging a mood of authenticity, a plausible, but retroactive *studiolo* for the dead philosopher was extraordinary successful. For Nietzsche, who had never consciously understood that he had vegetated four years in Weimar, van de Velde created a physiologic resemblance of architecture and philosophy and constructing an organic atmosphere for "the perceptive" with a synthetic work of art in his new style: the interiors of the Nietzsche-Archive (and van de Velde's book illustrations) soon became synonymous with "Nietzsche design", providing evidence of the modernity and superiority of "his" philosopher.

Epilogue:

After WWII the Nietzsche-Archive was closed down, because of its associations with the Nazi regime, manifest in an unfinished neoclassicist "Nietzsche memorial hall" next to the archival villa from 1938. Nietzsche's manuscripts and books were confiscated by the East German authorities, together with the literary remains of Elisabeth Förster-Nietzsche, and transferred to the socialist predecessor of the

Weimar Classics Foundation, the *Nationale Forschungs- und Gedenkstätte (der Deutschen Klassik)* Weimar. Since Georg Lukás had denounced Nietzsche's philosophy as proto-fascism,[11] there was almost no opportunity for serious research on archival stocks of Nietzsche in East Germany. The building of the archival building was "hidden" by the new owners, the inscription destroyed, the villa modified and reused as a seminar building and guesthouse of the socialist "National Research and Memorial Place in Weimar."[12]

In the 1960s, the Italian philosopher Giorgio Colli and the Italian philologist Mazzino Montinari started their project of a new critical edition of Nietzsche's works. An ideological re-evaluation of art nouveau and early modernism in 1960s and 70s opened the frame for a renovation of the archive building as well as its interior, which was begun in 1984, already five years before the fall of the wall, and remained unfinished until 1991 in the re-united Germany.

Today the Nietzsche-Archive is a museum of the national Weimar Classics Foundation and therefore it is open to the public, but the manuscripts are stored in the Goethe-Schiller-Archives. Friedrich Nietzsche's as well as his sister's books belong to the Anna Amalia Library of the same Weimar Classics Foundation in Weimar, and only accessible for institutional research. After all and with the irony of history, the private archive of the philosopher's sister was united with its national rival and Nietzsche's original writings became even part of the world's cultural heritage,[13] but not in the sense imagined: the Nietzsche-Archive is an archive with empty shelves.

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3 Friedrich Nietzsche, *Nietzsche's Werke [Großoktav-Ausgabe]*, Leipzig: Naumann [1899-1909]; Leipzig: Kröner [1909ff]; in fact as late as 1926 the last volume – an index of the previous 19 volumes of works and fragments – was published; for the first English edition confer to: Friedrich Nietzsche, *The complete works of Friedrich Nietzsche*, ed. by Dr. Oscar Levy, Edinburgh and London: T. N. Foulis, 1909-.

4 the *Weimarer Nietzsche Bibliography* of 2002 counted over 22'000 publications that deal with Nietzsche (deadline in 1998)!

5 *Ecce homo*, finished by Nietzsche in 1888, but remained unpublished until 1908, since Elisabeth was worried about several offensive paragraphs, that would strengthen voices that interpreted Nietzsche's work altogether as "sick"; in addition there were several paragraphs where Nietzsche explicitly criticized his sister and mother.

6 Elisabeth Förster-Nietzsche, *Das Leben Friedrich Nietzsche's. 2 Bände*, Leipzig: Naumann, [1. Band; 1. Abteilung] 1895, [1. Band; 2. Abteilung] 1897, [2. Band] 1904; Elisabeth Förster-Nietzsche, *Der junge Nietzsche*, Leipzig: Kröner, 1912; Elisabeth Förster-Nietzsche, *Der einsame Nietzsche*, Leipzig: Kröner, 1914; Elisabeth Förster-Nietzsche, *Wagner und Nietzsche zur Zeit ihrer Freundschaft*, München: Müller, 1915; Elisabeth Förster-Nietzsche, *Friedrich Nietzsche und die Frauen seiner Zeit*, München: C. H. Beck, 1935; the inaccuracy of the edition of the Nietzsche-Archive was obvious, but there was no better edition until 1967 with: *Friedrich Nietzsche Werke. Kritische Gesamtausgabe*, by Giorgi Colli and Mazzino Montinari; still, the final transcription and edition of the handwritten fragments remained unfinished up to today – 107 years after the death of Nietzsche.

7 Friedrich Nietzsche, *Die fröhliche Wissenschaft, Buch 4, § 280, Kritische Studienausgabe [KSA]. Band 3*, Giorgi Colli/Mazzino Montinari (eds.), Berlin/New York: Walter de Gruyter, 1988, p. 524-525.

8 Henry van de Velde, *manuscript* in: Bibliothèque Royal, Brussels, *Archives Henry van de Velde, FS X 1-2*, p. 414: „solennel et monumental d'une »Schatzkammer«", citation after: Henry van de Velde, *Récit de ma vie. II*, Anne van Loo/Fabrice van de Kerckhove (eds.), Brussels/Paris: Versa/Flammarion, 1995, p. 155, annotation 1.

9 This essay is not the place to go into a detailed analysis of the crystal as metaphoric motive in Nietzsche's *Zarathustra* and its effects on expressionist architects like Paul Scheerbart and Bruno Taut.

10 a reddish glow seen near sunset or sunrise on the summits of mountains

11 Georg Lukács, *Der deutsche Faschismus und Nietzsche*, Paris: C.A.L.P.O. 1945; Georg Lukács, *Die Zerstörung der Vernunft*, Berlin: Aufbau-Verlag, 1954.

12 affected by this alteration was the second floor of the Nietzsche-Archive with the „private" chambers of Elisabeth Förster-Nietzsche and the death room of Friedrich Nietzsche, which were destroyed at that time, but which were not touched by van de Velde's alteration in 1902-03; some of the furniture remained in the depot of the Goethe National Museum in Weimar.

13 The Goethe-Schiller-Archives in Weimar are part of the UNESCO program "Memory of the World" since 2001.

Analogous Spaces: Pre-conference (preliminary) version

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Artists' Periodicals: designing idealist spaces of cultural production and exchange[1]

Introduction

I preface this essay by pointing first to the introduction of the artists' periodical, *The Century Guild Hobby Horse* (fig 1) -- a periodical that will be returned to later in this essay:

> By this Periodical, to be published Quarterly, the Century Guild of Artists seeks to express its thought on subjects bearing upon art, as they rise before the public mind.
>
> It will contain Illustrations, Poems, and Essays, for the most part bearing signatures.
>
> In most cases contributors will be of those practically engaged in art.
>
> Every care will be taken to ensure the Artistic character of the Periodical by maintaining Originality of Thought and by making Thorough all workmanship involved in its production.

There are several points here I would like to highlight that will be returned to in this essay: this is a periodical about art by artists (and for art one may read here "the fine and applied arts and artists"); it will it contains artistic (illustrations, poems) and analytic (essays) works; and, it will be a periodical of "Artistic Character": that is it will maintain 1) "Originality of Thought" and 2) "Thorough … workmanship involved in its production".

Cultural production of this kind, that is the artists' periodical, it is relevant to note, can work both within and across historical periods. While I will focus on the former, we the reader/viewers considering such publications today, are doing so in a completely changed context than the one in which and for which they were originally produced. Today we view such periodicals, perhaps somewhat nostalgically, with 21st century eyes and with the internet as our benchmark in respect to our expectations concerning means of communication. In this essay, however, I will consider how such serial publications operated in the late nineteenth century with some of the newest print technologies being applied and within a system where distribution was through book dealers and by post, which thanks to new transportation technologies and infrastructure, perhaps surprisingly

[1] I am grateful to the Social Sciences and Humanities Research Council of Canada for funding this project and to my graduate student, Mirela Duculescu, for bibliographical research assistance.

from our point of view, seldom took more than a day, especially between the large European centers. This was a modern communication medium functioning within a rich arena of print culture.

Artists and designers in the late nineteenth century were turning to book production as a means of exploring and disseminating their work and theories. This included, in some cases, the founding of art periodicals with "art" being used here in the broad sense of the word -- that is to refer to visual and literary arts and to both the Fine and the Applied Arts. Just as Robert Filliou would write in the 1960s on the importance of recognizing artistic activities as being part of a wider network, "la Fête Permanente" (Eternal Network)[2], turn-of-the-century artists and designers were looking to ways of extending artistic connections and modes of communication. The importance of network analysis as an aspect of studying periodicals plays an important role in the increasing recent scholarship on periodicals that is coming to be known as "Periodical Studies". One of the authors who has contributed to this area of enquiry, Remieg Aerts has, in "The Periodical as Cultural Factor and as Historical Source"[3], conceptualized the periodical spatially. Identifying the key role periodicals have played in the communication of culture and, with a nod toward Habermassian theories of the public sphere, Aerts speaks of them using terms such as "communicatieruimte" (space for communication) and "a public sphere of thought and information exchange".

With the idea of the periodical being a space where meaning is produced and disseminated, I intend to explore the late nineteenth/early twentieth-century Art Periodical and, in particular, the sector within this category that was conceived and designed by artists and artistic communities. Using a case study and focusing, in particular, on those dealing in part or whole with the applied and decorative arts, I will consider in what ways the periodical functions as a space for communication but also as a space for community building and for artistic experimentation.

Underpinning the enquiry will be the premise that the periodical is not an inert "container" of ideas but that it is, in itself, a site where knowledge is actively produced -- that is, it is constructive rather than merely passive or reflective and that its very materiality, that is its physical form as a design object, played a central role in this. Industrialization, and advances in current print technology in particular, enhanced, facilitated and made more affordable the production and distribution in serial form of such material production. Artists' periodicals, conceptualized "architecturally", that is spatially and structurally, provide an important means of examining the periodical as a space in which knowledge was 1) preserved (this is the most usual way of examining artists' periodicals today; as historical documents, sources or records -- and indeed they did, along with art periodicals in general, play a role in the development of the nascent

[2] Artists' periodicals in the Post World War II period have recently been the subject of a conference session at the College Art Association in New York organized by Stephen Perkins. ("Artists' Periodicals: 1945-1990)". Perkins has examined the importance of Filliou within this and other contexts.

[3] Remieg Aerts, "Het tijdschrift als culturele factor en als historische bron", *Groniek* 3: 135, 1996, 170-182, 173.

discipline of Art History in the nineteenth century); but also as a space in which knowledge is 2) organized, 3) transferred or 4) activated.

The period under consideration is one characterized in the art world by tensions arising from the widespread notion of an isolated artistic genius that valorized a model of artistic production that was largely elitist and anti-social coming up against a strong, often radicalized image of an engaged artist – one who was of and for the people.[4] This latter aspect is often related to idealist and utopian conceptions of cultural production. Tensions between these conflicting notions of artistic production play out in the periodical, by nature community building rather than isolationist.

In relation to the three themes of this conference, the subject of this paper, in part, fits within the theme of "Spaces of Intellectual Networks" but, also deals with that of "Space of Knowledge and Memory". The art periodical, in its serialized bringing together of information and imagery, may be related to the archive as well as to the museum and, at times, to the art dealership. It is appropriate, in fact, to speak of it as related to an "architecture of accumulation", as well as a "space of knowledge" and "of memory".

This paper presents a very specific aspect of research done in relation to a larger project, on which I am currently working, that investigates artists' representations of self and of their role within society. At the heart of the subject are questions surrounding artistic identity and the construction of genius. Focusing on the widely used and sometimes overlapping images of the artist as a spiritual figure on the one hand and as a social revolutionary on the other, I examine fine and applied artists' visual and textual representations of themselves and of other artists, especially in the context of late nineteenth-century Holland. Included in the materials analyzed are literal and non-literal self-portraits and portraits, artists' correspondence and, of particular relevance to the current paper, artists' periodicals. In this latter genre of visual communication, it is a collective artist's image that is presented, one that may be called a corporate identity in the original (rather than business-related) meaning of the word.

Here, then, I explore the role of the art periodical in constructing and communicating notions of artist-hood and in establishing networks of communities within which to operate. Connected to these ideas will be the question of how this genre served as an artistic work in its own right. Considering these aspects of the project, then, has meant examining the artists' periodical as a repository of ideas but, moreover, as an example of a community-building form of artistic networking, and one that functions according to specific structural codes.

[4] I have explored the notion of the socially engaged artist particularly in the context of Dutch and Belgian periodicals in "Labour, Nature and the Decorative: Representations of the Socially Engaged Artist in Late Nineteenth-Century Dutch and Belgian Art Periodicals", *Commitment and Imagination. Changing perceptions of the social question*, in the series Groningen Studies in Cultural Change, Leuven: Peeters, (in press).

The Late Nineteenth-Century Private Press Movement: Background

The late nineteenth century was a golden age of high quality publishing. The private press movement was, to a large degree initiated in England, and most notably in the context of utopian socialist Arts and Crafts theories. These theories outlined the need for the improved quality of design of goods (including but by no means confined to that related to publishing) which, theoretically, should be produced with joy and should, ultimately, be accessible to all for the betterment of all. Johanna Drucker and Emily McVarish, in their new survey *Graphic Design History: A Critical Guide* (to be published in 2009 by Prentice Hall, an early copy of which landed on my desk earlier this year) describe this situation in respect to artist's periodicals:

> To spread the principles that inspired Arts and Crafts workshops, artists produced their own publications. Although often short-lived, these journals helped internationalize aesthetic movements. Artists and writers took control of every practical aspect of these publications, seeking handmade paper and collaborating with printers through every phase of production. These artist-initiated ventures were virtually unprecedented. Their integration of graphic design, aesthetic program and imaginative art offered a new model of independent expression.[5]

Drucker and McVarish go on to refer to the publishing context in which artists' periodicals and other publications related to the private press movement arose, stating

> Distribution networks that had been established for commercial and popular press publications brought these artistic journals into public view in kiosks and bookstores. Despite their alternative sensibility, artistic journals thus benefited from the mass cultural infrastructure. In turn the design sensibilities of these independent publications were taken up by trade journals and even commercial magazines.[6]

In relation to the current investigation a number of concerns related to this historical background warrant closer examination.

Book Design: a Holistic Endeavour

Before turning to a short case study of an artists' periodical, I would like to theoretically underpin this discussion with an example of the kind of "analogous spaces" central to this discusiion: that is, the analogy between architecture and book design.

T.J. Cobden-Sanderson, writing in *Ecce Mundus: Industrial Ideals and the Book Beautiful*, published in 1902, clearly articulated the concept of "The Book Beautiful" which centers on the principle of carefully attending to all components of book design in order to arrive at a unified whole. In his concluding section devoted to this entitled "The Book Beautiful as a Whole", Cobden-Sanderson outlines the following

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[5] Johanna Drucker and Emily McVarish, *Graphic Design History: A Critical Guide*, Upper Saddle River, New Jersey, 2009 (instructor's copy), 165.

[6] Drucker and McVarish, 166.

> … if the Book Beautiful may be beautiful by virtue of its writing or printing or illustration, it may also be beautiful, be even more beautiful, by the whole, the consummate BOOK BEAUTIFUL. Here the idea to be communicated by the book comes first, as the thing of supreme importance. Then comes in attendance upon it, striving for the love of the idea to be itself beautiful, the written or printed page, the decorated or decorative letters, the pictures, set amid the text, and finally the binding, holding the whole in its strong grip and for very love again itself becoming beautiful because in company with the idea.
>
> This is the supreme Book Beautiful or Ideal Book, a dream, a symbol of the infinitely beautiful in which all things of beauty do ultimately merge.[7]

Cobden-Sanderson is summing up a philosophy surrounding the fine press movement that had gained currency within the Arts and Crafts movement in the previous two decades (that is the last two decades of the nineteenth century) that underpins and is largely transferable to the discussion of artists' periodicals at hand. It is a set of ideas most widely associated with the work and writings of William Morris and his early mentor in fine printing, Emery Walker. Morris and Walker, in their essay entitled "Printing", turn to works of fine printing from the fifteenth century and earlier as examples that could serve as models to current nineteenth-century book production. They do this as a response to the practice they see around them of the mindlessly churning out of high quantity, low quality publications. Calling for a return to the beauty and integrated design programme they found in works done according to older, pre-industrial methods, Morris and Walker point to the importance of being attentive to *all* constitutive aspects of book design (including the quality of type face, spacing of lines and words, overall page layout, ornamentation and illustrations), concluding their essay with the following words:

> … granted well-designed type, due spacing of the lines and words, and proper position of the page on the paper, all books might be at least comely and well-looking: and if to these good qualities were added really beautiful ornament and pictures, printed books might once again illustrate to the full … that a work of utility might be also a work of art, if we cared to make it so.[8]

The specific importance of typography and high quality paper in book design, had been most specifically articulated by Walker who, in his lecture to the Arts and Crafts Exhibition Society in 1888 expressed these ideas in a way that would capture the imagination of Morris and lead him to focus on this area of design in his own practice.

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[7] T.J. Cobden-Sanderson, *Ecce Mundus: Industrial Ideals and the Book Beautiful*, 1902; facsimile edtion, New York & London, Garland Pub., 1977, unpaginated.

[8] William Morris and Emery Walker, "Printing", *Arts and Crafts Essays by Members of the Arts and Crafts Exhibition Society*, with a Preface by William Morris, New York, Charles Scribner's and Sons, 1893, 111-133; facsimile edition, New York & London, Garland Pub., 1977, 133.

Walker, notably, employed an architectural analogy in relation to book design in his lecture.

> Type and paper may be said to be to a printed book, what stone or bricks and mortar are to architecture. They are the essentials, without which there can be no book in the one case, and no architecture, in the other.[9]

Walker and Morris continue with this analogy of masonry in relation to the placement of the words on the page about which they explain that, as in the laying of bricks, "in good printing the spaces between the words should be a near as possible equal" but also that their placement should not cause "ugly meandering white lines or 'rivers' in the page".[10]

The Kelmscott Chaucer: Book Designer as "Architect and *Magister Lapicida";* the book *"a little like a pocket cathedral"*

William Morris' ideas concerning book design, and indeed concerning design in general, culminated in his Kelmscott edition of Chaucer's *Canterbury Tales* (fig 2) which he produced in close collaboration with the artist and designer of its illustrations, Edward Burne-Jones. As Gordon Fraser has pointed out in his book *William Morris, Edward Burne-Jones and the Kelmscott Chaucer*, Morris was resolute in his insistence that the publication would be both book and work of art; that it would stand, in Fraser's words, "as a demonstration of his principles as a designer, his insistence upon good materials, upon the importance of manual skills and of careful and proud workmanship".[11] More to the point in relation to the present discussion, it is important to note that the project was conceptualized, similar to Walker's ideas, *architecturally.* This point is made by Fraser, who states that both Morris and Burne-Jones "thought of the Chaucer in architectural terms", and underlines this with quotations by Burne-Jones in the first of which the artist states that the book, when done, would be "a little like a pocket cathedral". Burne-Jones also states that his part in the project (that is as producer of the illustrations) is "that of the carver of images at Amiens" while he categorizes Morris' role as that of "Architect and Magister Lapicida".[12] In this evocation of the role of the Architect, the context of the Gothic period and sacred form of the cathedral are closely intertwined within the analogy.

Morris, himself, also employed this architectural analogy, writing the following:

> A book quite unornamented can look actually and positively beautiful, and not merely un-ugly, if it be, so to say, architecturally good …. Now, then, let us see what this architectural arrangement claims of us. First, the pages must be clear and easy to read; which they can hardly be unless, secondly,

[9] Quoted by Colin Franklin in Emery Walker: Some Light on His Theories of Printing and on His Relations with William Morris and Cobden-Sanderson, Cambridge, 1973, 10.
[10] Morris and Walker, "Printing", 127.
[11] Gordon Fraser, *William Morris, Edward Burne-Jones and the Kelmscott Chaucer*, London, 1982, 36.
[12] Gordon Fraser, *William Morris, Edward Burne-Jones and the Kelmscott Chaucer*, London, 1982, 36. 113 (notes 19, 20).

> the type is well designed; and thirdly, whether the margins be small or big, they must be in due proportion to the page of the letter.[13]

Significantly, these analogies drawn between architecture and book design are all *structural* in nature, that is, they have to do with the components that make up the physical, tangible object. That is not to say that content was deemed unimportant. High quality content was a given, a starting point. Its materialization, however, something often seen as inconsequential or separate from it, was crucial according to those involved in the fine press movement, and something that needed careful rethinking in light of new industrial techniques that caused the flooding of the market with, in Morris's words, "ugly" goods.

The Century Guild Hobby Horse: a case study

In respect to early periodicals being produced by and for those actively involved in the Arts and Crafts Movement, as well as by those related to late nineteenth-century design movements developing on continental Europe loosely grouped under the rubrique "Art Nouveau", *The Century Guild Hobby Horse* (fig 3), introduced at the outset of this essay, was seminal. It may also be considered, in many respects, to be representative. The journal, which appeared as a quarterly between 1886 and 1893 and was preceded by the publication of a trial issue in 1884, was the mouthpiece of the Arts and Crafts Century Guild. Julie Codell, who has discussed this periodical in *Victorian Periodicals Review*, has pointed out that, at a cost of two shillings and sixpence,[14] it was not inexpensive compared to popular periodicals less attentive to quality publishing.

The Hobby Horse is examined here as an early example of an artists' periodical committed to the principles that came to characterize the Fine Press movement. Emery Walker supervised its production and the Chiswick Press, where he worked, printed it. A single edition of the journal, produced on 31 x 23 centimeter paper, was generally about 40 pages in length. The paper was rag, the binding good quality and the ink rich and dark. The typography was clear and crisp, the text set on a page with wide margins. The latest innovations in print technology were, in some cases, used, as with the photogravure reproductions which appeared throughout.[15]

The image for the cover page, based on a woodcut illustration designed by Selwyn Image, was emblematic of the Century Guild itself, a group of designers who embraced arts and crafts ideas of turning to pre-industrial models such as mediaeval guilds as a solution to the aesthetic and social problems they saw around them even while making limited use of new technology to facilitate their design production including the publication of this journal. Setting up a community or "guild" of like-minded artists and

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[13] Roderick Cave, *The Private Press*, second edition, New York and London, R.R. Bowker Co., 1983, 112. Cave states that this address was given to the Bibliographical Society but does not provide a date or further information about the lecture or occasion.

[14] This is considerably more expensive than other popular periodicals of the day according to Julie Codell who cites *The Cornhill* and *MacMillan's* each costing one pence. Julie M. Codell, "The Century Guild Hobby Horse, 1884 - 1894", *Victorian Periodicals Review*, XVI: 2, 1893, 43 -53, 43.

[15] Codell itemizes some of the kinds of art work reproduced within the journals pages with this technique. Codell, 43.

artisans allowed the members to maintain individual ideas and approaches to their artistic production while at the same time belonging to a community of individuals with like minded goals when it came to 1) producing high quality art and design products, minimally relying on industrial methods and 2) considering the fine and applied arts (craft) to be equally worthy, breaking down the hierarchy of the arts found within academic art circles.

The cover image identified the optimism and self-conscious alignment of this group with the notion of a dawning of a new age, and in doing so would create a kind of visual language that would be taken up by numerous artists' groups, particularly in continental Europe, seeking to distance themselves from academic artistic discourses and ally themselves with some of the theories of a socially engaged art that embraced the applied arts which they associated with the Arts and Crafts theory coming from England. In this image, out of the thorny, snake-infested undergrowth (being corrupt, nineteenth-century society) arises, strong and tall, a tree (that is, the new art movement). The knights on horseback and the shield are clear reminders of the romanticized mediaeval, craft-based models with which the Century Guild identified. The fact that the image is based on a woodcut, a pre-industrialized printing technique, is significant. It also introduces one of the most difficult challenges facing members of groups such as the Century Guild: that is, maintaining the integrity and high quality found in craft production in a form of production that would not lead to exclusivity through accompanying high cost (incurred both in terms of human and material resources); and making limited and judicious use of new industrialized methods to achieve these ends.

The Hobby Horse, as an organ for the Century Guild, held a crucial role in allowing members (as well as a small number of others invited to contribute) to have an opportunity to express and exchange their ideas both with each other and beyond their own circles and to do so in text, in image and in the combination of all design components (including but not limited to text and image) that went to make up the publication as a work of art. In this way, it functioned to present ideas, images and graphic design. It was, then, a form of communication that functioned to network amongst themselves and to convey information about themselves to others. In this latter respect, the artists' periodical served the purpose of constructing both individual and corporate artistic identities, and ones over which the artists' themselves had a great deal of control. These are important differences with other art periodicals of the day -- ones not produced by artists themselves.

The first editor of *The Century Guild Hobby Horse*, Arthur Mackmurdo, was a trained architect who had written on Christopher Wren's church architecture and was involved in the preservation of architecture; he was also a friend of both John Ruskin and William Morris and shared many ideas with both. Mackmurdo discussed the role of *The Hobby Horse* in relation to the Guild in an article in its inaugural edition entitled "The Guild's Flag Unfurling."[16] In this essay, he spoke of the sense of community that the Guild provided for the members that would be conveyed and fostered by the periodical:

[16] This essay appeared in the trial issue published in 1884. Arthur H. Mackmurdo,"The Guild Flag's Unfurling", *The Century Guild Hobby Horse*, April 1884, 2 - 13.

> … the Guild - an union by which we each anticipate having better chance of success in the exercise of our especial arts. As without resigning a jot of our individuality, we receive by virtue of this incorporation, the support of the whole in larger spirit influence and multiplied power of material help.[17]

Mackmurdo speaks of the periodical being a "manifestation of this common kinship" as well as a representation of a loose set of artistic ideas held by Guild members. These ideas , in themselves, are not as socially oriented as much early Arts and Crafts theory, but rather, set out symbolist-related ideas concerning the importance of non-naturalistic modes of representation, that is, of conveying the idea or symbol behind something, rather than focusing on its material aspect; it is a call for a subjective approach and for the individual artist/designer's personal conviction to govern form and representation. The communal or cooperative component is found in the coming together of the members within the Guild itself during meetings and other activities; this aspect is eptimized in the journal -- by definition a collective activity in which members are, during the production phase, brought together as editors, illustrators, writers, typography and lay-out designers and printers (indeed with individuals usually wearing well more than one of these hats -- as the division of labour was itself a subject of critique). In the reception or reading of the journal, Guild members were once again connected with each other as well as to others beyond the group.

It should be noted that *The Hobby Horse*, in a short section at the back of the issues, provides information on where work by members of the Century Guild may be seen (and purchased). This brings up another aspect related to this kind of publication. While the purpose was not solely or even primarily one of marketing (indeed members held up an overly commercialized approach as being one of the main problems in existing design), there is no doubt that the periodical was intended, in addition to its other functions, to serve as a marketing tool. Although the commercialization of the art world was loudly deplored, and the importance of marketing largely understated by this and numerous other artists' groups of the day, this aspect is present to greater and lesser extents in the cases of almost all artists' periodicals of the period. It is always of relevance, when examining these publications, to consider the producers as well as the readers (in this case to a considerable degree overlapping) of these journals. It is also important to note their multiple (stated and non-stated) purposes: art object; information source and educational tool; design model; and promotional "catalogue".

The Century Guild Hobby Horse, maintained a primarily English focus, in spite of including some material about non-English subjects. By the 1890s, however, with works such as *The Studio*, the international communication possibilities began to be much more prominent. Not only was the outlook of the periodical more international, it also gained a much more international distribution.

[17] Mackmurdo,"The Guild Flag's Unfurling, 2-3.

The Studio: a brief comparison

The Studio (figure 4), a periodical published in London that began in 1893 (lasting until 1963), will be looked at here only briefly and in comparison to *The Century Guild Hobby Horse*. In many ways it brought to fruition Arts and Crafts aspirations set out only tentatively in *The Century Guild Hobby Horse.* Belonging to no single artists' group, *The Studio* nonetheless served as an outlet to many artists and designers, continuing the focus on the applied arts and serving in its early years as a voice for both Arts and Crafts and Art Nouveau ideas (which in spite of the two separate terms are not always as discrete as the traditional terminology suggests).

As the cover reproduced, designed by Aubrey Beardsley, shows, the full title of the journal was *The Studio. An Illustrated Magazine of Fine and Applied Art*. It was a monthly publication that cost six pence, making it much more affordable than *The Century Guild Hobby Horse*. The paper and ink were not of as high quality and an important component that facilitated the lower price was the inclusion of advertisements (fig 5), here one for Newman artists' supplies and another for E. Knight's book on interior design Taste and Economy in Decoration and Furniture. The periodical (fig 6), while not lavishly produced in respect to *The Hobby Horse*, nonetheless was attentive to many fine press ideas governing careful layout and incorporation of illustrations, the use of a large capital letter in paragraph introduction and clear, legible typography. The content, as seen here, was also attentive to new ideas in graphic design and printing.

Querying the Architectural Analogy: Space and Community

Returning now to the conception of book design in relation to the architectural analogies either explicitly drawn or implicitly present in this form of design, it is my intention to return to the specific way(s) this analogy functioned. By alluding to published works in comparison to architecture, there are a number of ideas raised. The first has to do with the notion of the Unity of the Arts that, taken together with and sometimes conflated with the Wagnerian idea of the *Gesamtkunstwerk* (that is an art form/production in which all art forms are united), was often related to architecture which was commonly held up as the logical place where all art forms could and indeed should come together. The idea of the published artifact being able to fulfill the same role suggested in the architecture/book design analogy is crucial. While Music, as one of the Arts and an important part of the notion of a *Gesamtkunstwerk*, especially as applied to architecture, is missing from the early publications of *The Century Guild Hobby Horse* examined here, it is often present in later artists' periodicals, usually in the form of illustrated musical scores.

Secondly the very spatial nature of architecture, that is, the idea that architecture creates space and, in effect, is a *container*, one that shifts and is enlivened through that which is put within it is crucial. In other words, it is not just the structure of the edifice itself, nor those material aspects which are inside it including other art and applied art forms, but also the people or communities who make use of the structure that make it into a whole.

There are also, however, characteristics specific to book design that differentiate it from architecture even while the analogy is applied. These characteristics relate to the increased potential for communication and for networking or community building found

specifically with the periodical in contra-distinction to a piece of architecture. An example is the notion of portability (the "pocket cathedral" spoken of earlier). A book or an issue of a periodical is something that can be carried around, shown to others or disseminated by post. In addition to this, it may also be produced in multiples and at a relatively affordable price. While all of these points apply both to book and serial publications, in respect to the periodical, the subject of this enquiry, versus the book, is added the *increased* importance of the notion of affordability and wide dissemination possibilities and with them the ideas of education, marketing and, arguably most importantly, the possibilities for ongoing communication and community building.

"THE CENTURY GUILD HOBBY HORSE."

By this Periodical, to be published Quarterly, the Century Guild of Artists seeks to express its thought on subjects bearing upon art, as they rise before the public mind.

It will contain Illustrations, Poems, and Essays, for the most part bearing signatures.

In most cases contributors will be of those practically engaged in art.

Every care will be taken to ensure the Artistic character of the Periodical by maintaining Originality of Thought and by making Thorough all workmanship involved in its production.

All communications to be addressed to the Editor, care of

KEGAN PAUL, TRENCH AND CO.

To be had of all Booksellers.

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Figure 1.


HERE BEGINNETH THE TALES OF CANTER-
BURY AND FIRST THE PROLOGUE THEREOF
WHAN THAT Aprille with his shoures soote
The droghte of March hath perced to the roote,
And bathed every veyne in swich licour,
Of which vertu engendred is the flour;
Whan Zephirus eek with his swete breeth
Inspired hath in every holt and heeth
The tendre croppes, and the yonge sonne
Hath in the Ram his halfe cours yronne,
And smale foweles maken melodye,
That slepen al the nyght with open eye,
So priketh hem nature in hir corages;
Thanne longen folk to goon on pilgrimages,
And palmeres for to seken straunge stronds,
To ferne halwes, kowthe in sondry londes;
And specially, from every shires ende
Of Engelond, to Caunterbury they wende,
The hooly blisful martir for to seke,
That hem hath holpen whan that they were seeke.
BIFIL that in that seson on a day,
In Southwerk at the Tabard as I lay,
Redy to wenden on my pilgrym-
age
To Caunterbury with ful devout
corage,
At nyght were come into that hostelrye
Wel nyne and twenty in a compaignye,
Of sondry folk, by aventure yfalle
In felaweshipe, and pilgrimes were they alle,
That toward Caunterbury wolden ryde.

Figure 2.

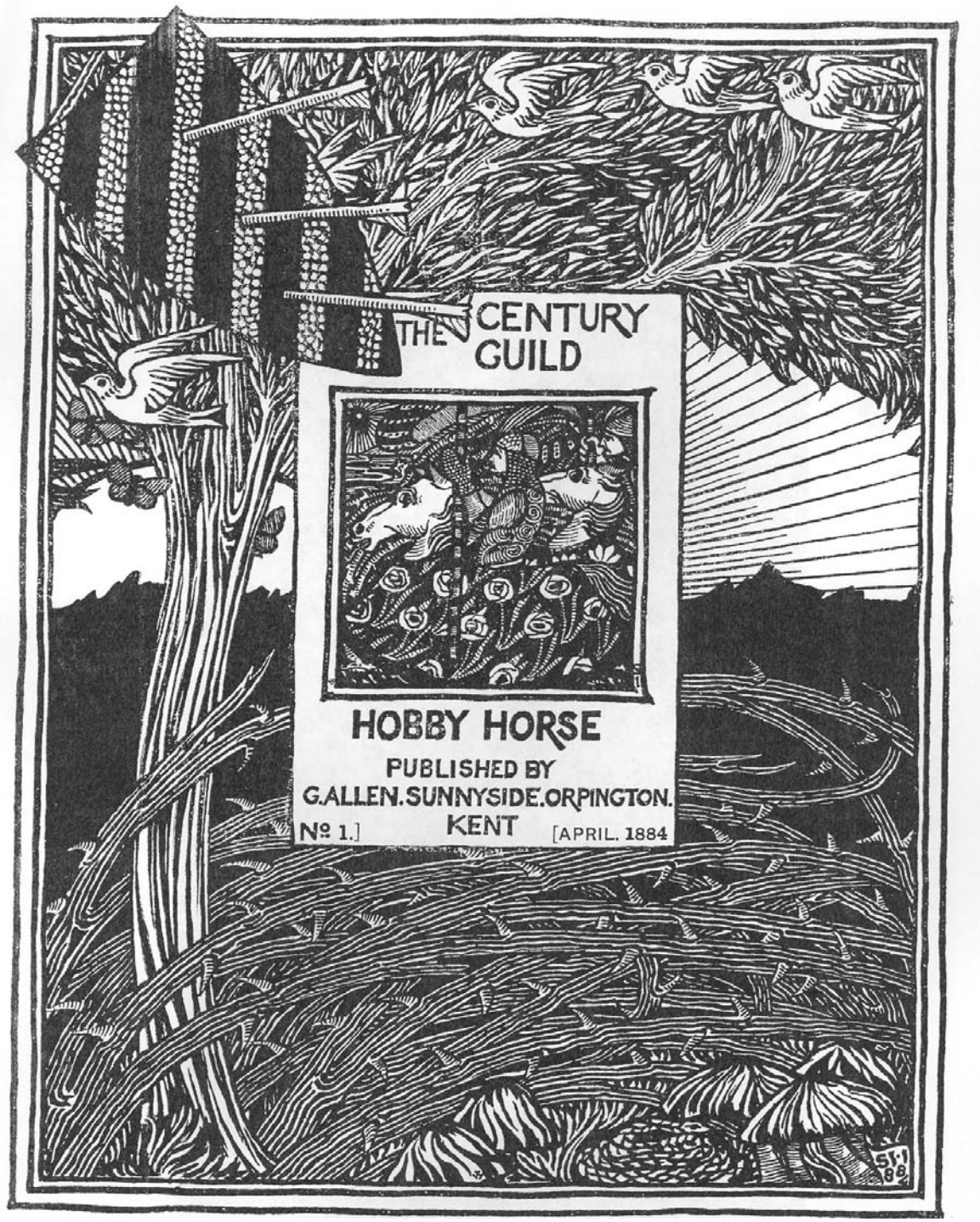

THE CENTURY GUILD
HOBBY HORSE
PUBLISHED BY
G.ALLEN.SUNNYSIDE.ORPINGTON.
KENT
No 1.]
[APRIL. 1884

Figure 3.

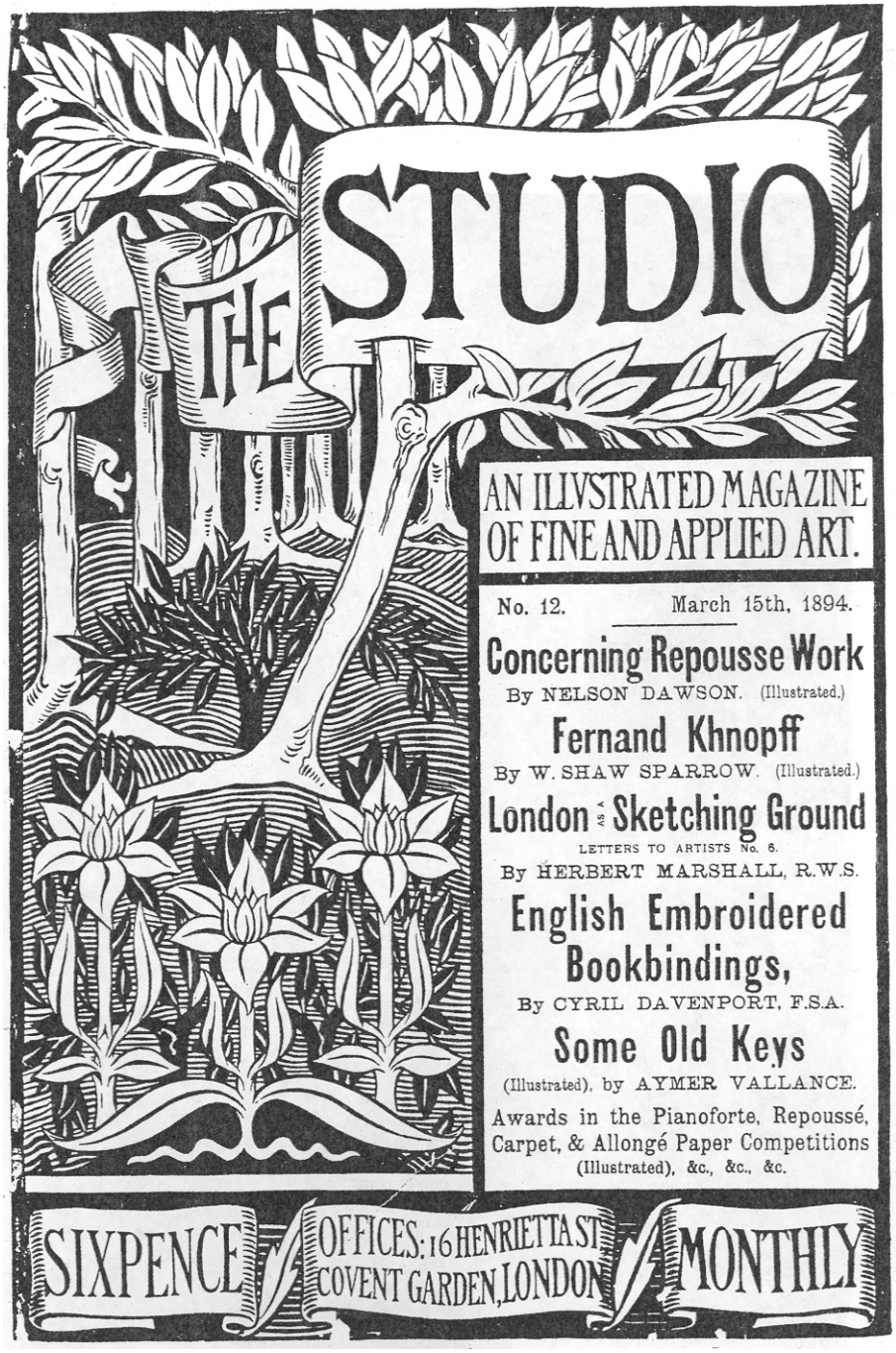
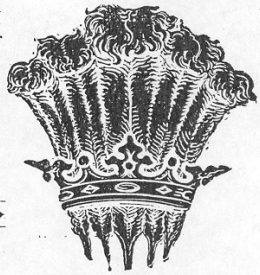

THE STUDIO
AN ILLVSTRATED MAGAZINE OF FINE AND APPLIED ART.
No. 12. March 15th, 1894.
Concerning Repousse Work
By NELSON DAWSON. (Illustrated.)
Fernand Khnopff
By W. SHAW SPARROW. (Illustrated.)
London as a Sketching Ground
LETTERS TO ARTISTS No. 6.
By HERBERT MARSHALL, R.W.S.
English Embroidered Bookbindings,
By CYRIL DAVENPORT, F.S.A.
Some Old Keys
(Illustrated), by AYMER VALLANCE.
Awards in the Pianoforte, Repoussé, Carpet, & Allongé Paper Competitions
(Illustrated), &c., &c., &c.
SIXPENCE
OFFICES: 16 HENRIETTA ST COVENT GARDEN, LONDON
MONTHLY

Figure 4.

The New English Art Club: Exhibition at Newcastle-upon-Tyne. Now open.
The New Gallery: Regent Street.
6th Summer Exhibition. Open until August 12.
The Dudley Gallery Art Society: Summer Exhibition. Closed.
The Fine Art Society: Bond Street.
"Japan," Mr. Alfred Parsons, Hugh Thomson's "The Ballad of Beau Brocade." Open.
The Dowdeswell Galleries: New Bond Street.
Pictures by Early British Painters, including nearly 20 Works by George Morland.
Arthur Tooth's Galleries: The Haymarket.
Annual Summer Exhibition. Now open.
McLean's Galleries: The Haymarket.
29th Annual Exhibition. Now open.
The French Gallery: 120 Pall Mall. Now open.
Derby Corporation Art Gallery:
Receiving days, Sept. 6 to 11. London agent: S. Bourlet, 17 Nassau Street.
Manchester Art Gallery:
Receiving day for London works, Aug. 12.
The Borough of Dudley Art Gallery:
Receiving days, Aug. 24 to 30. London agent: S. Bourlet, 17 Nassau Street.
Royal Society of Artists: Birmingham.
Receiving days, Aug. 9, 10, 11. Will open the end of August.
Devon & Cornwall Exhibition of Paintings: 70 George Street, Plymouth. Now open.
Royal Cambrian Academy of Arts: Exhibition at Plas Mawr. Now open.
The Royal Aquarium: The R.A. "crowded out." Open daily to August 19.
Crystal Palace Exhibition: Now open.
The Guildhall Art Gallery. Open daily.
Chicago Exhibition. Now open.
Continental Gallery: New Bond Street. French Artists' Exhibition.
Walker Art Gallery: Liverpool. Twenty-third Autumn Exhibition. Pictures to be delivered through Messrs. Dicksee & Co., to reach the Gallery from August 7 to 9, inclusive. Will open Sept. 4.

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III

Figure 5.

It is a widely accepted opinion that in the future a more general use of silken fabrics is assured. Should this forecast prove correct, the permanent revival of the Spitalfields industry would seem to depend entirely upon the intelligence and discre-



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tion shown by the English producing and distributing firms in the selection of appropriate designs. Our weavers are capable; our mechanical appliances efficient. On these grounds we are, perhaps, more than the equals of our Continental competitors. The ultimate solution of the problem appears, therefore, to rest upon comparative artistic merit, and if British-made silks excel in this, they must command success. The converse is equally true. This may be more readily realised by remembering that, however rich and perfect in technical qualities a silken fabric may be, if it fail in colour and design it does not fulfil the essential object of its creation; even were the cost of two competing materials equal, preference would be given to a technically inferior material, which secured the more important essentials of superior beauty and harmony in design and colour.

A patriotic and discriminating few already insist on the advantages of English-made silks; it rests with the English designers, manufacturers, and distributors to convince the many they can secure equal intrinsic value and better design and colour in silks of English manufacture. Then will the sumptuous and dainty creations of the Spitalfields looms once more become a permanent and important source of national benefit and legitimate pride.

LIBERTY.

DESIGNING FOR BOOK-PLATES; WITH SOME RECENT EXAMPLES.

To a collector of "Ex-Libris" it seems barely possible that the term book-plate could be taken to denote an illustration to a book; yet the limitation of the compound word to "a name-label which denotes ownership" is obviously but the usage of a comparatively small body of book-collectors. The technical phrase "Ex-Libris" is even more vague in its literal sense, and as an example of a peculiarly barbarous adaptation of Latin, used now as a singular noun, now as a plural, and sometimes as an adjective, is indefensible, even if the questionable choice of "Ex" for "E" be pardoned; in spite of its acceptation by Continental and English specialists, the expression is ugly and inexact. It is too late, however, to quarrel with the word, since the thing it suggests is definite enough. Not only are book-plates already extant in large numbers; it is said one English collection numbers nearly 100,000 varieties; but the fashion for making new ones is spreading rapidly. The cult of the collector is popular, and many who own but a few books are



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proud to insert therein a specially designed label, which bears a legend as grandiloquent as if a mighty library were its home. Ex Libris Societies

in London and Berlin have raised the fad to an accepted position; and in



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France, Germany, Sweden, the United States, and Great Britain, monographs in bulky tomes, pamphlets, and magazine articles, are accumulating to fill pages of bibliography.

That the artistic level of the mass of plates is high cannot be said. A few, indeed, ancient and modern, are worthy of consideration; a large number are interesting either by association, or from their fanciful conceits; but the majority are either tame heraldic emblazonments, or feeble devices of mean design, poorly executed.

As the cheapness of photo-engraved blocks has brought book-plates within the reach of every one, their preparation may soon become a recognised branch of design. Hitherto, except in a few cases where draughtsmen of note have executed a book-plate for a gift to a personal friend, they display little more than the skill of the average mechanic. The splendid exceptions which occur from the time of Albert Dürer to that of Mr. C. W. Sherborn are but isolated instances, which only serve to emphasise the poverty of the rest. There is no reason, however, why the subject should be deemed beneath the attention of pen-draughtsmen. Many wealthy book-collectors are willing to pay for designs at least as much as a publisher would give for similar work; and the book-plate itself, although but a trivial thing, has some relation to scholarship, which dignifies and raises it to a higher place than is usually accorded to mere commercial decoration in black and white.

The habit of making any sketch serve for a book-plate, by the addition (usually upon a scroll or cartouche) of its owner's name, common as it is, cannot be defended. A picture, however dainty or clever, is but cheapened by its frequent occurrence; besides, the decorative quality which should distinguish such a label is absent, as a rule, in an ordinary picture. The essentials of the non-armorial book-plate seem to be, first, that the device be in itself a suitable decoration for its intended position; next, that its subject is distinctly relevant to its purpose; and also, that it is individual both in its motive and in the way it denotes its owner's position or tastes. Furthermore, it should show his name clearly legible, and whatever motto or legend it bears should be strictly in keeping with its theme.

So far, we have touched chiefly the choice of subject, which is less important, at least from one point of view, than its treatment. A book-plate should not be a mere picture. To say that decoration should at least be decorative is a truism that, obvious though it appears, is constantly ignored.



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It is clearly essential that in heraldic plates decorative treatment should be invariably adopted; yet we find the motives, which a glance at old German plates, or the illustrations to Foster's

Figure 6.

Social networks in Agrippa and Semantic Web technology

Raf Guns*

Abstract - **Agrippa is the database and catalogue of the Archive and Museum of Flemish Cultural Life. Based on ISAD(G) and ISAAR(CPF), it stores most information as a set of relations between entities (archival material, persons and organizations). It is shown how and why this hybrid network can be converted to RDF, the basis of the Semantic Web. Advantages include automated checking against an ontology and deriving 'secondary' networks that are specifically suited to answering specific questions with the help of the SPARQL query language.**

This methodology is illustrated with one particular subnetwork of Agrippa, based on correspondence (letters) between persons and/or organizations. It is shown how this subnetwork's topology can be adequately described using a modified 'corona model'. We present proof that the subnetwork forms a small-world network and that the dialogue-like nature of correspondence has a profound influence on the resulting network's characteristics.

Keywords - **social network analysis, Semantic Web, RDF, correspondence**

I. Introduction

Many social, biological and physical systems are arranged in a 'virtual space' as a network. Examples include food chain networks, the electricity network, and networks of mutual acquaintance. While these examples are at first sight very different, all of them can be described using the same set of primitives: in particular, each network or *graph* consists of *nodes* or vertices, connected by *links* or edges. Some networks are inherently *directed*, i.e. their links can only be traversed in one direction (e.g., *x* eats *y*), other networks are *undirected* (e.g., *x* has co-authored with *y*).

Graph theory [14] is a branch of mathematics which studies networks on an abstract level. In this paper, we will treat 'graph' and 'network' as synonyms. During recent years, input from such diverse scientific disciplines as physics, citation analysis, computer science and sociology have greatly expanded our knowledge and understanding of network types and properties (see [28] for an overview). In particular, many real-world networks, including the examples give above, turn out to share an amazing number of non-trivial properties.

In the present paper, we study the spatial and structural properties of a particular intellectual network, primarily based on letters. Letters are historically the most reliable method of communication between geographically disparate people. As such, they served an important role of creating and maintaining contact, transferring specific knowledge etc. For reasons detailed below, we use Semantic Web technology for the actual implementation. We specifically sought answers to the following questions:

1. How can Semantic Web technology be used to gain greater insight into complex intellectual networks, specifically the network of Flemish intellectual and cultural life stored by Agrippa?
2. How can the letters in Agrippa be modelled and researched as a network?
3. What are the spatial and structural features of this correspondence network?

The paper is organized as follows. Section II introduces the network's broader context and especially the Agrippa database. In section III, we briefly explain and illustrate the origin, objectives and technologies of the Semantic Web. These technologies are used to formally model, represent, store and manipulate Agrippa as a semantic network, as explained in sections IV and V. The spatial and structural properties of this semantic network are presented in section VI. Finally, section VII contains the main conclusions and outlines some ideas for further research.

II. The AMVC Letterenhuis and Agrippa

The *AMVC Letterenhuis*, located in Antwerp, is the Archive and Museum of Flemish Cultural Life.[1] It collects archival materials on Flemish cultural and intellectual life between 1750 and the present. This collection includes archives of institutions, writers and artists, and contains manuscripts, documentation, portraits, poster material etc. Especially the letter collection is renowned. As reflected in its name, the AMVC Letterenhuis serves a dual role; it aims to be an archive as well as a museum.

Due to its extensive collection, the AMVC Letterenhuis had an obvious need to thoroughly register and index its collection [37]. For a long time, all materials were to be found via the so-called 'Klapper op het bezit', a printed inventory of keywords (names, funds…). During the 1980s, it was decided that this inventory should be automated. The first system only lasted a few years, but the year 1993 saw the start of a new automatic inventory system called Agrippa.

Up until today, *Agrippa* remains the database and catalogue of the AMVC Letterenhuis. It is developed in close cooperation with Anet, the library automation team of the University of Antwerp, and is based on the Brocade library software [30]. Agrippa's second incarnation, Agrippa 2, is currently nearing completion ([35], [38]). Based on international archival standards such as ISAD(G) [16] and

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[1] http://museum.antwerpen.be/amvc_letterenhuis/index_eng.html

ISAAR(CPF) [17], it contains a wealth of information about both the archived materials and the socio-cultural actors – persons and corporate bodies or institutions, in total about 55,000 – that have created them. Agrippa also contains about 5,000 images of posters, portraits and photos. Agrippa 2 can be queried through a web interface at http://anet.ua.ac.be/agrippa (currently only in Dutch).

Most information in Agrippa is stored as a set of relations between entities, for instance between a painter and a painting. In the Agrippa web interface, these relations form hyperlinks, as can be seen in Figure 1. Very often, these are one-to-many relations (e.g., one painter, many paintings); these links lead to an intermediary result set page (e.g., all paintings by a particular painter).

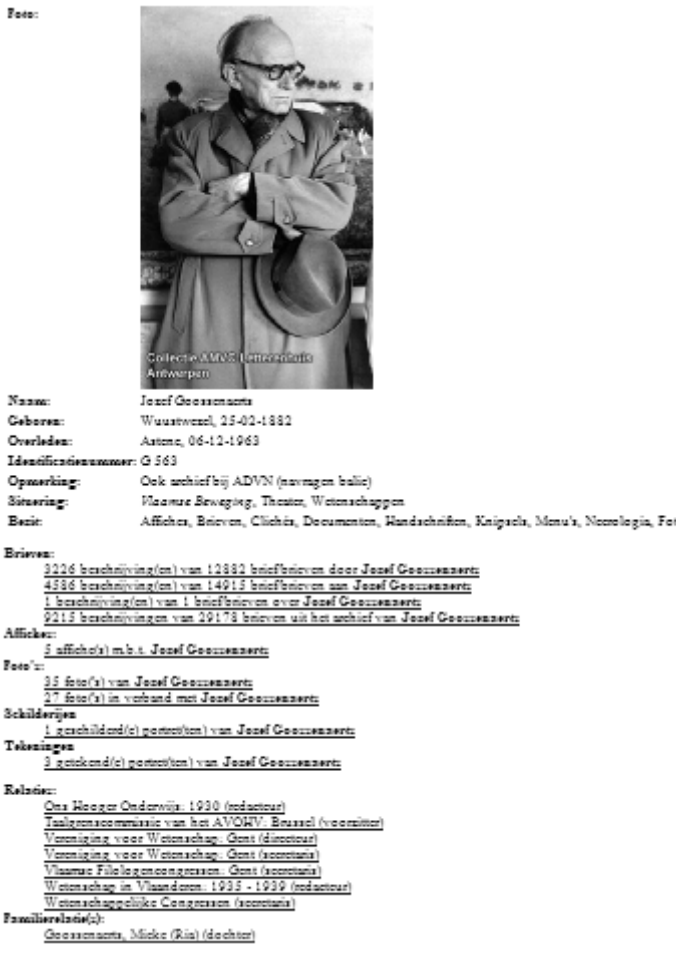


Figure 1. Example Agrippa result page (for Jozef Goossenaerts), including picture, metadata and hyperlinks to related archival materials, persons and institutions.

III. SEMANTIC WEB AND SEMANTIC NETWORKS

Arguably one of the most profound 20th-century changes to the way people consume, produce and exchange information has been caused by the introduction of the World Wide Web around 1990. Originally intended as an information system for efficiently exchanging scientific information, the World Wide Web has grown leaps and bounds into its current form: a gigantic web of interlinked documents, containing information – and disinformation – about virtually any imaginable subject (see [1] for an historical overview).

More recently, the idea began to spread that the documents on the WWW are less interesting than the actual information they contain. A logical next step for the World Wide Web is thus creating a *web of interlinked data* [2]. While work on this *Semantic Web* already started in the 1990s, it became really well-known with the publication of a famous article in *Scientific American* [3].

The Semantic Web is an extension of the current web that aims to make web information machine-processable. At its basis is a simple data model called Resource Description Framework or RDF [22]. RDF describes relations between 'things' (*resources*), each of which is unambiguously identified by a URI, in RDF statements or triples. These consist of a subject and an object, and a predicate that links them. A collection of RDF statements results in an RDF graph.[2] Figure 2 shows a simple example of an RDF graph. It asserts that there exists an entity with the name "Tim Berners-Lee" and the homepage http://www.w3.org/People/Berners-Lee/, which was created by itself.

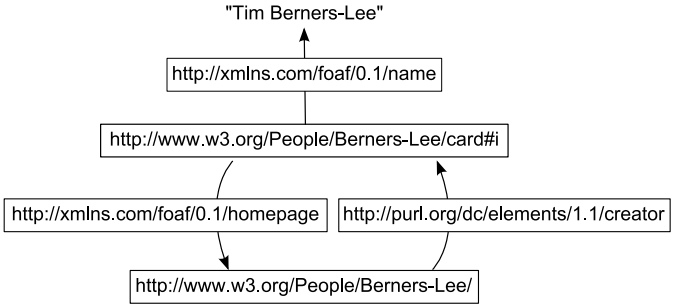


Figure 2. Example RDF graph.

On top of RDF, there exist several other layers, occupied with ontology, querying and inference. According to a famous definition, "[a]n ontology is an explicit specification of a conceptualization" [15], i.e. it explicitly specifies which entities are modelled and what relations (can) exist between them. On the Semantic Web, ontologies are written in RDF Schema [6] and/or the more expressive ontology language OWL [24].

For the sake of brevity, we will use the term 'semantic technology' to refer to RDF, RDF Schema, OWL and related technologies (even though 'semantic' is arguably a misnomer, as argued by [12]). Semantic technology is particularly interesting and useful for modelling hybrid networks, i.e. networks that contain more than one node type, more than one link type or both. The term 'semantic network' will be used for hybrid networks that are modelled with semantic technology. Thus, the Semantic Web is basically a large-scale distributed semantic network (or a network of semantic networks).

A concrete example is the Flink system [25], which uses semantic technology to model and aggregate how all kinds of items – publications, websites, correspondence, conference submissions, mailing lists – can influence social networks between scientists.

IV. AGRIPPA AS A SEMANTIC NETWORK

As discussed in section II, entities in Agrippa are to a significant degree described by the relations that exist between them and other entities. One particular entity may have *several*

[2] This is in itself not really new: similar hybrid network systems, such as KL-ONE, have been studied in AI long before the advent of the Semantic Web.

kinds of relations with *several kinds of other entities*. In other words, Agrippa actually forms a kind of hybrid network and thus lends itself well to description in RDF. In this section, we describe why and how we converted Agrippa to RDF.

A. Advantages

The current Agrippa database in use is not based on semantic technology but works well. Why would one want to convert its data to RDF? We outline the main advantages.

First, RDF is a well-defined and well-implemented standard, which can only help interoperability. Using RDF would make it easier to import new data, publish data on the Web in a reusable manner, and exchange data with other systems, such as the Linking Open Data community project [30].

Second, Agrippa as an RDF graph can be checked and validated against an ontology. Data in Agrippa come from a variety of sources: they have been converted from previous systems (manually or automatically) or have been some time in the past by one of the employees. This is obviously prone to errors, – we have indeed discovered a wide range of errors and inconsistencies, simply by checking the resultant RDF graph against the ontology (see section B below).

Third, the use of semantic technology is also interesting on a very practical level. Given the great deal of attention the Semantic Web has attracted in the field of computer science, it can boast an impressive array of tools and instruments, such as the extensive Jena[3] framework. This makes it a very attractive choice for many kinds of network studies. These tools make it easier to browse, search and manipulate our RDF data.

Finally, research into several aspects of the same complex system does not require the manual construction of different networks. Instead, we can create one 'master' or 'primary' RDF graph that contains all our data. From there, it is rather easy to extract specific parts from it, to derive other graphs etc. The actual technique is based on SPARQL and is further explained in section C.

B. The Agrippa ontology

The Agrippa database contains an *implicit ontology*, which was made explicit by modelling it as an OWL ontology.[4] This was done with the help of the Protégé ontology editor.[5] All entities in Agrippa – be they paraphernalia, organizations or people – are part of one of the Agrippa classes. The ontology also specifies and restricts which relations are possible between which classes. For instance, family relations can only exist between two people and not between, say, a person and an organization.

Figure 3 illustrates the class hierarchy of the Agrippa ontology (subclasses of `WorkOfArt` are not shown). There are three main classes – `Product`, `Agent` and `Context` –, each of which inherits from the generic class `owl:Thing`. Generally speaking, `Agent`s are entities that can contribute to the creation of `Product`s, items that are stored in the AMVC Letterenhuis. There are many kinds of contributions; these examples show <subject, predicate, object> of some contribution types:

```
<Person, illustratorOf, Manuscript>
<Agent, printerOf, Poster>
<Person, artistOf, WorkOfArt>
```

Each of these also has an inverse property (`illustratedBy`, `printedBy`, `craftedBy`).

In some cases, there are relations that involve more than two participants. These are modelled with the help of a `Context` class, following the example of [34]. An affiliation, for instance, involves a `Person`, an `Organization` and the `Person`'s function in the `Organization`. Therefore, the `AffiliationContext` class has three properties: `hasAffiliator`, `hasAffiliatee` and `hasFunction`.

Each class has certain properties, most of which are optional. There are three types of properties.

- *datatype properties*: have a 'literal' value, such as a string or date value. Examples are `name`, `history` and `registrationNumber`.
- *object properties*: express a relation between objects, for instance between a `Person` and a `Sculpture` or between two `Organization`s.
- *annotation properties*: meta-properties. We use three of them:
  1. `exampleUsage`: gives an example of how a property is used;
  2. `exampleURL`: refers to a URL as a 'live' example of a property's use;
  3. `originalEquivalent`: gives the Agrippa name of the class or property.

The Protégé ontology editor itself also uses some predefined annotation properties. Comments about classes or properties can be added with `rdfs:comment`. Version information and 'TODO' items are indicated with `owl:versionInfo`.

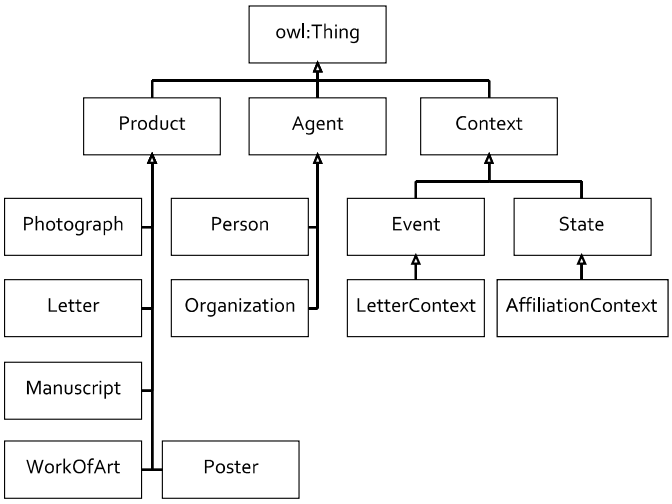


Figure 3. Class hierarchy for the Agrippa OWL ontology.

Some classes and properties are of course very similar to those in other ontologies. We specifically mention the FOAF ontology [7], which contains classes like `foaf:Agent`, `foaf:Person` and `foaf:Organization`. The equivalence between these and our own `Agent`, `Person` and `Organization` classes has been established with the `owl:equivalentClass` relation. In the future, we most likely will also add equivalence relations to some Dublin Core [18] properties, like `dc:title` or `dc:contributor`.

OWL is also used in the ontology to express reciprocality – e.g., if `authorOf(A,B)` then `authoredBy(B,A)` – and

[3] http://jena.sourceforge.net/
[4] Full documentation is available at http://users.telenet.be/rguns/agrippadoc/.
[5] http://protege.stanford.edu/

undirectedness – e.g., iff `familyRelatedTo(A,B)` then `familyRelatedTo(B,A)`.

C. Storage and querying

Semantic Web data can be stored in many different ways: as a (set of) RDF document(s); in a 'classic' relational database; or in a *triple store*, a dedicated RDF database. Some well-known triple stores are: Mulgara,[6] Sesame,[7] AllegroGraph,[8] and Jena's persistent storage.[9] Currently, triple store performance may still be a problem when one wants to store and query a large amount of RDF data; a preliminary analysis and comparison can be found in [32].

Each storage approach has its own set of advantages and disadvantages. One of the advantages of triple stores is that they can be queried with a query language like SPARQL [33]. On a basic level, SPARQL somewhat resembles the well-known SQL query language, used for relational databases. Suppose we want to know what organization(s) the writer Louis-Paul Boon worked for. The following SPARQL query returns a simple table of results:

```
PREFIX agrippa:
   <http://anet.ua.ac.be/agrippa#>
SELECT ?organizationName
WHERE {
   ?organization agrippa:name
                          ?organizationName .
   ?affiliation agrippa:hasAffiliator
                                ?organization .
   ?affiliation agrippa:hasAffiliatee
                                      ?person .
   ?person agrippa:name    "Boon_Louis-Paul" .
}
```

This type of query, the `SELECT` query, returns a table. Another query, type, the `CONSTRUCT` query, returns a new RDF graph. This allows us to *extract* a specific part or parts of a large and complex RDF graph, as illustrated in Figure 4. A `CONSTRUCT` query that is roughly equivalent to the `SELECT` query given above, is:

```
PREFIX agrippa:
   <http://anet.ua.ac.be/agrippa#>
CONSTRUCT {
   ?person agrippa:affiliatedWith
                                ?organization .
   ?organization agrippa:name
                          ?organizationName .
}
WHERE {
   ?organization agrippa:name
                          ?organizationName .
   ?affiliation agrippa:hasAffiliator
                                ?organization .
   ?affiliation agrippa:hasAffiliatee
                                      ?person .
   ?person agrippa:name "Boon_Louis-Paul" .

}
```

[6] http://www.mulgara.org/
[7] http://www.openrdf.org/
[8] http://agraph.franz.com/
[9] http://jena.sourceforge.net/DB/

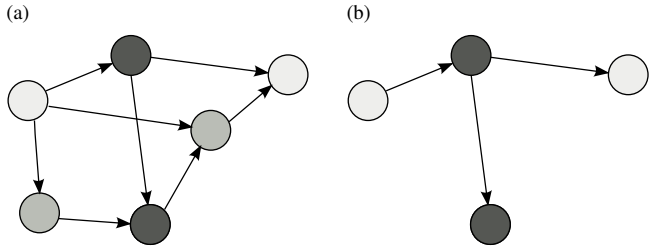


Figure 4. Example of an extraction query. (a) primary network, (b) secondary network after application of an extraction query.

If we know that the combination of a set of RDF statements mean that a new (not yet specified) statement is true, we can construct an *extraction and combination* query, the result of which may contain completely new statements, as illustrated in Figure 5. The following is an example taken from Agrippa:

```
PREFIX agrippa:
   <http://anet.ua.ac.be/agrippa#>
PREFIX agrippaExt: <urn:agrippaExt#>
CONSTRUCT {
    ?lettGrp agrippa:hasLetterWriter ?sender .
    ?lettGrp agrippa:hasRecipient ?recipient .
    ?lettGrp agrippaExt:hasWeight ?weight .
}
WHERE {
    ?letter agrippa:hasLetterWriter ?sender .
    ?letter agrippa:hasRecipient ?recipient .
}
GROUP BY ?sender ?recipient (count(*) as
                                    ?weight)
```

This query does the following. Each letter in Agrippa is expressed as a `LetterContext` that connects its sender and recipient. If sender *S* sends *n* letters to recipient *R*, there are *n* different `LetterContexts` in the primary RDF graph. This query simply groups all letters from *S* to *R* into one entity – a group of letters – and assigns it the weight *n*. This weight is important: a larger amount of letters may indicate closer acquaintance or friendship between *S* and *R*.

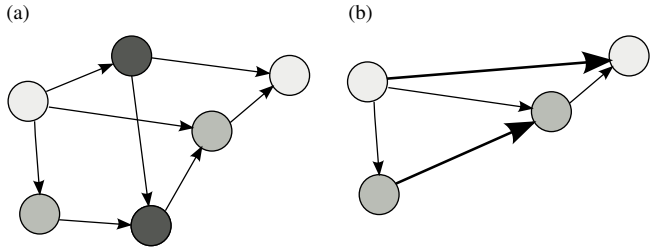


Figure 5. Example of an extraction and combination query. (a) primary network, (b) secondary network after application of an extraction and combination query. Bigger arrows represent new links not present in the original network.

V. A NETWORK OF LETTERS

The AMVC Letterenhuis is famous for its extensive collection of letters. Loosely following the definition in [23], a letter is a document that:

1. creates or maintains contact between two or more agents;
2. is meant to be sent or handed to the recipient(s);
3. is initially not intended to be made public.

This excludes public letters as well as fictional letters in a novella. The first two criteria imply the network-like nature of letters: each letter can be considered a social and intellectual link between the sender(s) and the recipient(s).

A. Construction

The data set was extracted from Agrippa in a custom XML format and has the basic information on 237,062 letters:

- unique identifier;
- author(s);
- recipient(s);
- date;
- if the author or recipient sent or received a letter as part of their affiliation to an organization (e.g. as the secretary of a magazine), this information is included as well.

Other information about these letters (such as language or formal description) is not yet included, because it is not consistently present in Agrippa. Note though that, should we later on decide to incorporate other factors (e.g. to investigate the role of language barriers), these are already present in the OWL ontology described in section IV.B and can be added straightforwardly.

The majority of these letters have been written between 1900 and 1970 (see Figure 6). Most likely, a large quantity of letters that were written before 1900 are simply lost or destroyed. It seems fair to assume that personal archives and the letters in it are usually transferred to the AMVC Letterenhuis after the archive owner's death, which explains the sharp decline after 1970, – many letter recipients are simply still alive and keep the letters themselves.

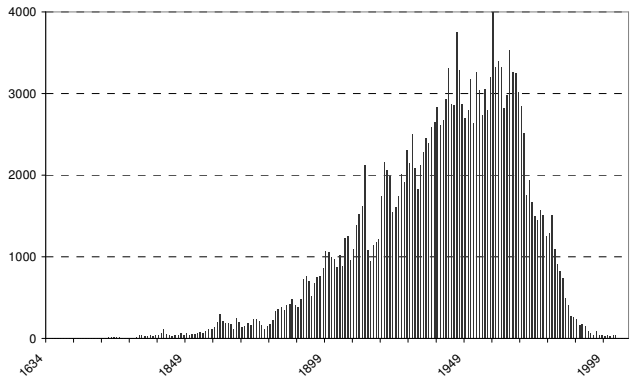


Figure 6. Distribution of letters over time.

The data set was converted to RDF with XSLT [9]. The conversion is syntactic as well as 'semantic'. 'Semantic conversion' refers to conversion from the implicit Agrippa ontology to the explicit ontology described in section IV.B. The most important difference is that some relations must be defined in terms of `Context` classes: `LetterContext`s and `AffiliationContext`s.

B. One network, many networks

While the diversity of our letter network is much smaller than of Agrippa as a whole, it can still be considered a primary network, from which several secondary networks can be derived. These secondary networks in their turn are well fit to be scrutinized with the usual set of SNA tools. Secondary networks that can be derived include:

- an affiliation network:
  `<Person, function, Organization>`
- a co-recipient network, similar to co-citation [36]:
  `<Agent, coRecipientOf, Agent>`
- a co-sender network, similar to bibliographic coupling [19]:
  `<Agent, coSenderOf, Agent>`
- an unweighted sender–recipient network:
  `<Agent, letter, Agent>`
- a weighted sender–recipient network:
  `<Agent, numberOfLetters, Agent>`

For the remainder of this article, we will use the last example, a weighted sender–recipient network, that was derived using the SPARQL methodology described in section IV.C. The resultant network was studied with the help of Pajek [10] and NetworkX.[10]

The network contains 40,914 nodes, which are connected by 103,860 weighted links. Each node represents an `Agent`, either a `Person` or a `Person` affiliated to an `Organization`. Each link represents a set of all letters from source node to target node; the link weight is the amount of letters sent from source to target.

There are 39 loops in the network. These are most probably due to data input errors, rather than actually representing an `Agent` sending a letter to itself.

Ignoring the direction, a node in this network is connected by 5.08 (= 2 × 103,860 / 40,914) links on average. The real numbers are, however, very different from the average: some nodes have many more incident links, some less, as will be discussed in section VI.B.

VI. Spatial and Structural Features

Network visualization is an excellent tool for gaining an intuitive insight into the network's spatial organization. Some excellent visualization algorithms exist for this specific purpose (e.g. [11], [19]). However, a network of 40,914 nodes and 103,860 links is virtually impossible to visualize. In this section, we discuss several spatial and structural features that may help us gain insight into the network's structure.

Before we turn to the description of these features, we first briefly introduce some necessary network terminology. Networks can be divided into components. Informally, a component is a maximal subnetwork in which we can traverse from any node to any other through a *path*. In a *weakly connected component* (WCC), any link direction is neglected. In a *strongly connected component* (SCC), one must follow the link direction. Figure 7 illustrates the difference: the network consists of one WCC but two SCCs, which are marked in gray.

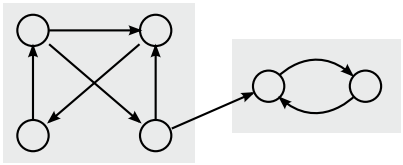


Figure 7. Network consisting of one WCC and two SCCs (marked in gray).

A. Bow-tie and corona model

In 2000, Andrei Broder and colleagues [8] introduced a fascinating abstract model of the World Wide Web's graph structure, based on a large amount of data. This model, depicted in Figure 8, superficially resembles a bow-tie and has hence become known as the *bow-tie model*. The essence of the

[10] https://networkx.lanl.gov/

bow-tie model is based on determining the SCCs in the network.

Each SCC is associated with an IN component and an OUT component. The IN component is the set of nodes that can reach the SCC but are not reachable from the SCC. The OUT component is the set of nodes that are reachable from the SCC but that cannot reach the SCC themselves.

The largest SCC – which is typically an order of magnitude bigger than the rest – forms the 'knot' of the bow-tie with the IN and OUT components the bows of the bow-tie. As shown in Figure 8, there are also 'tendrils' connected to IN and OUT that cannot reach the SCC, and 'tubes' that connect IN and OUT but that are not connected to the SCC. Taken together, SCC, IN, OUT, tendrils and tubes form one giant WCC. All other WCCs belong to the 'disconnected components'.

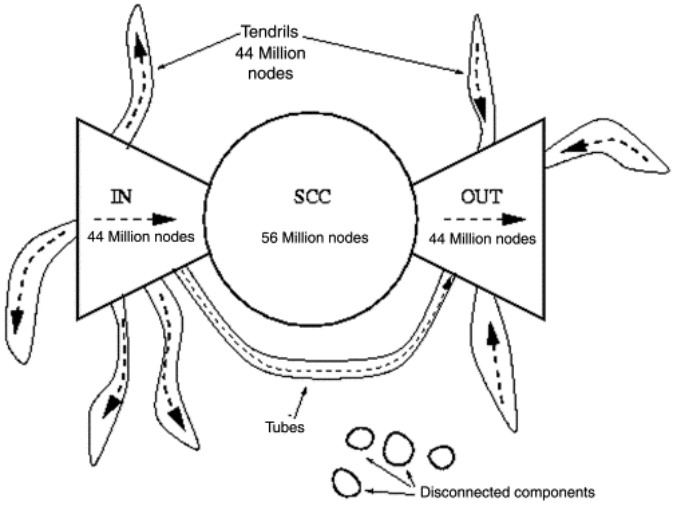


Figure 8. Bow-tie model of the Web. Illustration taken from Broder et al. (2000) [8].

The bow-tie model is quite useful and similar structures have since been discovered in several other types of networks as well, such as metabolic networks [41]. Nevertheless, it inadequately reflects the reality of the different components. Björneborn ([4], [5]) suggests a modification of the bow-tie model, named the *corona model* (Figure 9). The main advantage of the corona model over the bow-tie model is that it also clearly shows direct links from IN to OUT (top of Figure 9), which are not shown in the bow-tie model. Note also that this model explicitly distinguishes between IN-tendrils (connected to IN) and OUT-tendrils (connected to OUT).

To model our network as accurately as possible, we have adopted the corona model with some very minor modifications, depicted in Figure 10. For each component, its absolute and relative size are given.

- In the centre is the largest SCC (*LSCC*; 24% of all nodes). All other SCCs are very small (4 nodes or less).
- *In* (45%) and *Out* (25%) are the same as in the bow-tie model and the original corona model. To stress that only In and Out are 'directly' connected to the LSCC, they form a ring around the LSCC. At the outside of this ring, we find Tendrils and Tube.
- Björneborn writes: "An interesting observation is that a Tube-node not necessarily functions as an intermediary node on a directed link path between the IN and OUT components" [4]. We, on the other hand, only consider those nodes part of the *Tube* that have a path from In to Out. The set of nodes that are part of an undirected link path but not of a directed link path is considered a small separate structure, the Semi-Tube. In a way, the Semi-Tube is more akin to the Tendrils than to the Tube: it can, in fact, be considered an In-Tendril as well as an Out-Tendril.
- Quite amazingly, only 1% of all nodes are not part of the largest WCC. This illustrates the viability of basing our model on the largest SCC and WCC.

LSCC, In and Out have significantly more nodes than the other components. Their number of links is much higher as well, which is obvious from Table 1: together, they account for more than 98% of all links in the network!

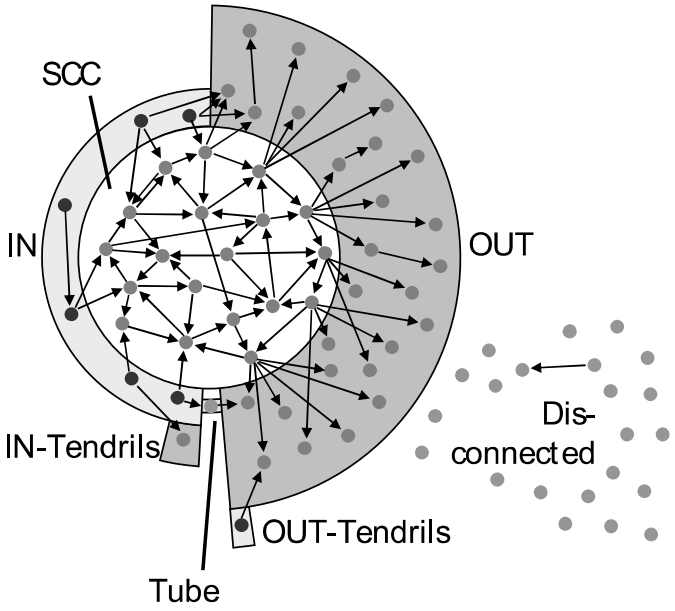


Figure 9. Corona model of the Web. Illustration based on Björneborn (2006) [5].

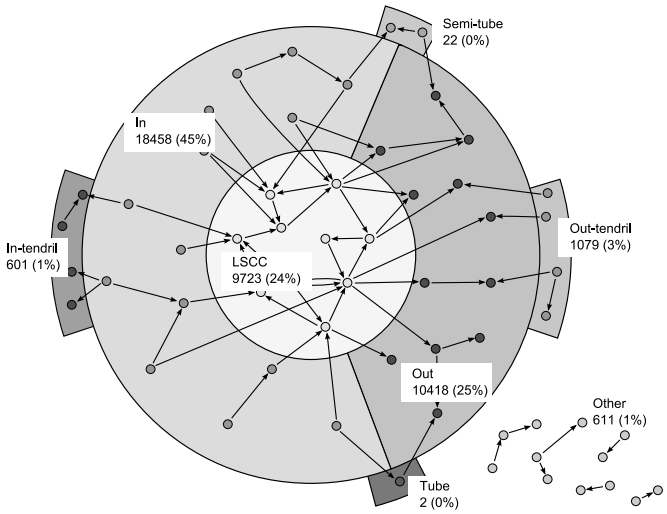


Figure 10. Modified corona model.

Table 1. Number of links from component in row to component in column. Legend: (S-)T = Tube and Semi-Tube; I-T = In-Tendril; O-T = Out-Tendril.

	LSCC	In	Out	(S-)T	I-T	O-T	Other
LSCC	167261	0	19041	0	0	0	0
In	49335	644	1037	25	799	0	0
Out	0	0	396	0	0	0	0
(S-)T	0	0	11	27	0	0	0
I-T	0	0	0	0	130	0	0
O-T	0	0	1590	0	0	67	0
Other	0	0	0	0	0	0	538
	216596	644	22076	45	929	67	538

B. Centrality and small-world effect

'Centrality' and 'importance' are complex notions that can mean different things to different people. Within a network, several types of centrality have been developed. Three of the best-known are (see [39] for formulæ):

- *degree centrality* refers to the number of nodes a particular node is connected to, – in a directed network, one may distinguish between in-degree (links *to*) and out-degree (links *from*);
- *betweenness centrality* measures how important a particular node is to establish short pathways between other nodes;
- *closeness centrality* refers to the speed with which information can spread from a particular node to other nodes in the network.

Both degree and betweenness centrality are highly skewed in our network. The top-10 of in-degree centrality, out-degree centrality and betweenness centrality, shown in Table 2, seem to have many nodes in common. While some correlation between degree centrality and betweenness centrality is perhaps to be expected, the correlation between high in-degree and high out-degree (or between 'authorities' and 'hubs', see [21]) is less straightforward. Nevertheless, this is no coincidence: in-degree centrality and out-degree centrality of all 40,914 vertices are significantly correlated (Pearson correlation coefficient $r = 0.724$).

The explanation for this correlation is probably to be found in the social, dialogue-like nature of correspondence: receiving a letter is an implicit – sometimes explicit – invitation to send a reply to its writer. Therefore, diligent letter-writers (out-degree) like Jozef Goossenaerts are also more likely to receive a larger amount of letters (in-degree), causing a moderate correlation between in-degree centrality and out-degree centrality.

Closeness centrality is more evenly distributed. If there exist one or more paths between two nodes, their shortest path is typically very short (3.49 on average). This suggests that the network is actually a small-world network ([26], [27], [40]), a network in which one can travel in very few steps between any pair of connected nodes. Even the diameter (the longest of all shortest paths in the network) is only 11. The diameter runs from Gaston Geens to Madelon Baas-Waldorp. In fact, there are 30 different shortest paths from Geens to Baas-Waldorp, running through 33 nodes (including source and target). One might expect the diameter to run from In through LSCC to Out, but surprisingly, the first 32 vertices are all part of LSCC, with only the target vertex in Out and no vertices in In!

Table 2. Top-10 of in-degree centrality, out-degree centrality and betweenness centrality.

	In-degree	Out-degree	Betweenness
1	Goossenaerts Jozef	Goossenaerts Jozef	Goossenaerts Jozef
2	Baekelmans Lode	Cauwelaert, van Frans	Baekelmans Lode
3	Muls Jozef	Muls Jozef	Cauwelaert, van Frans
4	Streuvels Stijn	Baekelmans Lode	Muls Jozef
5	Seuphor Michel	Michiels Ivo (Nieuw Vlaams Tijdschrift)	Seuphor Michel
6	Daisne Johan	Opsomer Isidoor	Huysmans Camille (Internationaal Socialistisch Bureau)
7	Dietsche Warande en Belfort	Cornette Arthur Henry	Bom, de Emmanuel
8	-	Seuphor Michel	Daisne Johan
9	Huysmans Camille (Internationaal Socialistisch Bureau)	Bom, de Emmanuel	Streuvels Stijn
10	Cauwelaert, van Frans	Huysmans Camille (Internationaal Socialistisch Bureau)	Opsomer Isidoor

More evidence for the small-world effect comes from the *clustering coefficient*, which quantifies to what extent a node and its neighbours form a densely connected cluster. For the entire network, the clustering coefficient $C = 0.0686$, which is relatively low, but still significantly higher than $C = 0.0002$ for a random network of the same size. If we take only the largest weakly connected component into account, then $C = 0.1156$. This again confirms the small-world effect [40].

C. The effect of mutual links

We already established that letters tend to form mutual links. In a series of computer-based simulations, we tried to establish the effect of mutual links on the network structure. These simulations suggest that mutual links may cause the LSCC to grow faster. Faster growth of the LSCC makes it more likely to 'absorb' smaller SCCs and therefore causes a faster decline in the number of SCCs.

Indeed, adding random new mutual links scores consistently better than adding random new links – irrespective of whether they are mutual or not – on at least two fronts:

- the number of SCCs decreases faster for mutual links;
- the size of the LSCC increases faster for mutual links.

This is one example of how a simple real-world characteristic, the dialogue-like nature of correspondence, may have a profound effect on the resulting network topology.

VII. Conclusions

In this paper, we discussed the use of semantic technology for analyzing a social and intellectual network. It was shown how RDF is well suited to this task and the advantages it entails. It allows automatic validation of the semantic network against an ontology. Moreover, the use of SPARQL is an elegant way of extracting and combining information contained within the 'primary' network.

These principles were illustrated, taking (the letter network of) Agrippa as an example. It was shown how its OWL ontology was created and how SPARQL could be used to extract (and combine) information from it.

Subsequently, we discussed several spatial and structural features of this network of letters. A modification of the corona model was introduced, that accounts quite well for the vast majority of the network's nodes and links. The short average path length and the relatively high clustering coefficient prove that this network is a small-world network. An unexpected and therefore interesting observation was the fact that the diameter solely consists of nodes in the LSCC, apart from its target.

Due to the dialogue-like nature of correspondence, we found a significant correlation between in-degree centrality and out-degree centrality. Computer-based simulations suggest that this may also cause the LSCC to grow noticeably faster.

In future research, we hope to expand upon these results and involve the other parts of Agrippa as well (e.g. collaboration of `Persons` on one `Manuscript`). These can be studied as separate secondary networks; even more fascinating would be studying the interplay of the different relation types. We believe that semantic technology would be exceptionally well fit for this kind of research.

Finally, one issue that should be kept in mind is that all results here are based on archival material as it is kept in the AMVC Letterenhuis. While its collection is large, there is still the danger of bias and over- or under-representation of some agents' importance. Adding data from other archives and documentation centres would thus be very welcome as well.

Acknowledgements

I thank prof. Richard Philips for providing me with the Agrippa data and prof. Ronald Rousseau for useful comments and advice on many issues regarding this research.

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EXTENDED ABSTRACT[1]
THE TRANSNATIONAL AS NATIONAL SPACE: INTELLECTUAL COOPERATION AND CONCEPTS OF NATIONHOOD, 1905-1939

In the second half of the nineteenth century, international congresses and associations emerged as popular fora for intellectual networks, helping to create transnational spaces where knowledge could be shared, developed and disseminated.[2] By coming together at a congress, participants temporarily became members of transnational communities which – depending on the type of event – defined themselves in academic, professional or political terms.[3] However, such gatherings were also marked by an underlying tension between transnational and national factors: after all, delegates frequently participated as representatives of national associations, and the mechanics and culture of these congresses meant that they were stages where 'nationhood' could be projected.

My paper examines the interrelation of 'transnational' and 'national' spaces and contemplates how the two frequently sustained one another.[4] It does so through a consideration of 'internationalism' in one specific historical context, namely Belgium in the twentieth century. In this period, the term 'internationalism' described a variety of different phenomena, ranging from scientific congresses and transnational political campaigns to new schemes for world order.[5] The Kingdom of Belgium was an important site for such endeavours: as examples one may cite the Brussels-based Secretariat of the Second International, large-scale events such as the Word Economic Congress in Mons (1905) or the '*Quinzaines*' of International Associations in Brussels during the inter-war years, as well as countless professional and academic congresses that coincided with World Exhibitions in Brussels, Ghent, Antwerp and Liège.[6] On

[1] This is merely an extended abstract. A full version is available upon request.
[2] See for instance Francis S. Lyons, *Internationalism in Europe, 1815-1914* (Leiden, 1963) and Anne Rasmussen, 'L'Internationale scientifique 1890-1914', PhD thesis EHESS (Paris, 1995). Cf. contemporary publications such as the *Annuaire de la Vie internationale* (Brussels, 1909/1910) or Alfred Fried, *Das internationale Leben der Gegenwart* (Leipzig, 1908).
[3] See for instance the exploration of such phenomena in Christoph Charle, Jürgen Schriewer and Peter Wagner (ed.), *Transnational Intellectual Networks. Forms of Academic Knowledge and the Search for Cultural Identities* (Frankfurt and New York, 2004).
[4] My paper uses the terms 'transnational space' rather than '*international* space' to highlight that national boundaries could partly be transcended. At the same time, the question of whether many of these spaces ultimately remained 'inter-national' is one of the paper's underlying themes.
[5] For a similar definition of 'internationalism', cf. Martin Geyer and Johannes Paulmann, *The Mechanics of Internationalism. Culture, Society and Politics from the 1840s to the First World War* (Oxford, 2001).
[6] Cf. Brigitte Schroeder-Gudehus, *Les fastes du progrès. Les guide des Expositions universelles 1851-1992* (Paris, 1992) for the numbers of congresses held during some of Belgium's major exhibitions.

each of these occasions, Belgian cities became places where transnational networks materialised. However, the hosting of such events also fed into a national discourse: turning one's country into a centre for transnational encounters could offer a form of prestige and thus act as a counter-weight to 'small nation' status. In this respect, the Belgian case is not dissimilar from the Swiss and Dutch ones – after all, the latter two were also small neutral states that were located between 'great powers' and emerged as centres of internationalism.[7]

My paper highlights these ambiguities by considering ideas of *Belgicité* in the endeavours of the Belgian internationalists Paul Otlet and Henri La Fontaine.[8] Both were leading protagonists of transnational intellectual cooperation through their involvement in a number of projects: as co-founders of the International Institute of Bibliography (1894) they launched important efforts for the standardisation of bibliographic practices, and through their Union of International Associations (1910), they sought to coordinate the efforts of different international groupings. Furthermore, during the interwar years, Otlet's and La Fontaine's commitment to the organisation of intellectual relations was reflected in campaigns for the creation of new transnational spaces such as the *Palais Mondial* and the *Cité Mondiale*.

However, despite their internationalism, the thought and action of Otlet and La Fontaine also had a clear 'national' dimension: the two Belgians were embedded in the cultural and political life of their home country and utilised national networks for their different projects. Moreover, they presented their endeavours in ways which reconciled the latter with a more general discourse on Belgian nationhood and evoked prominent elements of national imagery in this context.[9] One example of this was the way in which they portrayed their country as an ideal international meeting place, thus adding investing their country's geographic location and its multilingual features with a particular meaning. In this respect, their work highlights how national and transnational conceptions fed into one another, and how 'nationalism' and 'internationalism' were often experienced as compatible and complementary forces.

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[7] In this context, Madeleine Herren has discussed the promotion of internationalism as an alternative foreign policy in Belgium, Switzerland and the Netherlands: Madeleine Herren, *Hintertüren zur Macht. Internationalismus und modernisierungsorientierte Außenpolitik in Belgien, der Schweiz und den USA, 1865-1914* (Munich, 2000).

[8] Cf. Boyd Rayward, *The Universe of Information. The Work of Paul Otlet for Documentation and International Organisation* (Moscow, 1975); Françoise Levie, *L'homme qui voulait classer le monde* (Paris, 2006) ; Mundaneum, *Henri La Fontaine, un prix Nobel de la Paix 1854-1944. Trace(s) d'une vie* (Mons, 2002).

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Making visible social networks. Representation, space and diagrams in Social Network Analysis

Stefano Perna*, Marianna Marra**, Pasquale Napolitano***

Abstract - **Aim of this paper is to describe, from a theoretical point of view, the main spatial and representational schemata rising in the field of Social Network Analysis (SNA).**

One of the theoretical assumptions which drive our work consists in revealing that the very use of concepts like "mapping", "flux" or "network" implies a view of social relationship based on "spatialized" or "topologic" schemata which can be represented by specific visual techniques and languages. Starting from these assumptions, the paper will analyze these issues in two steps: first it describes the rising and the diffusion of some representational models in the field of SNA; second, it considers these representational and spatial models from the point of view of a visual representation and communication theory.

Keywords **– Social Network, Space, Representation, Diagram**

I. INTRODUCTION

The concept of "network" has been repeatedly invoked during the last hundred years in different fields as physics, biology, linguistics, anthropology, sociology and cognitive sciences.

Our contribution intends to expose primarily a specific analysis methodology for studying social networks and their implications: Social Network Analysis (SNA). Then we highlight how it entails precise representational and spatial patterns.

One of the goals which drive our work consists in revealing that the very use of concepts like "mapping", "flux" or "network" and that of specific visual techniques and languages, implies a view of social relationship that entails "spatialized" or "topological" schemata.

II. SOCIAL NETWORK ANALYSIS. A BRIEF OVERVIEW

SNA is an interdisciplinary methodology developed by sociologists in collaboration with mathematics, statistics which made it an attractive tool for other disciplines like economy and engineering.

The first significant contributions in this field is by researchers of the School of Manchester. Thanks to their reflections "network" is discussed, for the first time, as an analytical concept to which apply the mathematical theory of graphs.

SNA is based on an assumption of the importance of relationships among interacting nodes. It is a way to capture the interconnections of the networks .

According to Pryke (2004), SNA is "a set of tools for mapping important knowledge relationship between people or department". According to this approach, the main goals of social research are " to trace vertical and lateral information flows , identify sources and goals, to look for constrain above resourses" (Wellman, 1997), improve flows of knowledge, found lack of connection, understand the nature of social ties and the degree of their intensity (Kilduff – Tsai, 2003).

The object of analysis is always a network of nodes and interconnections

Nodes can be individuals or entire organizations. The world, in fact, according to this approach is seen as composed of network rather than groups. SNA appears the best methodology to understand the links and interconnections that keep alive the network and through which the actors share information and knowledge.

Given that structured social relationships are a more powerful mean of sociological explanation than the personal attributes of the members of a group, the SNA method is a useful tool to gauge relations and the structure of the network links in question and its tangible and intangible attributes.

In fact, the SNA allows first to make an analysis of the structure *making it visible* and understandable through the *form* that the analysis assumes using mathematical theory of graphs.

And, consequently, to analyze the nature and intensity of communication that flows through the network, allowing the researchers to understand what are the most significant information circulating among the nodes of the network.

The most interesting aspect of SNA, here, is the ability to produce as a final output a "map" of the network wich includes informal, tacit and not otherwise formalized (and therefore unknown to the same members of the network) relations.

With the visualization of the positions of nodes and the direction of the links we can get a great number of precise information which can be summarized in the following concepts:

- **density**: the measure of the connectedness in a network. It can be defined as the actual number of ties in a network, expressed as a proportion of the maximum possible number of ties;
- **centrality**: A node can be central when it has the higher number of ties with other nodes. *Local* centrality considers only direct ties, while *global* centrality considers also indirect ties;
- **betweenness**: measures the extent to which a particular node lies "between" the various nodes in a network. Even

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if a node has few ties it can be play san important intermediary role;

- **centralization**: describes the extent to which the connectedness is organized around particular focal nodes.

III. REPRESENTATION AND THE ROLE OF IMAGES IN SNA

Starting from this brief overview it can be noticed that ideas like "map" and "graph" – that are essentially "visual" ideas – play a central role in this research field.

It is no coincidence that academic publications in SNA are almost always accompanied by images intending to show connections and characteristics of studied network.

In fact, according to Freeman (2000), from the beginning of SNA, visual images have played a key role in the field. "Images of social networks have provided investigators with new insights about network structures and have helped them to comunicate those insight to others".

Freeman classifies five different phases in the creation of visualizations for social networks. These are: (1) Hand-drawn images beginning in the 1930's. The effectiveness of these visuals depended heavily on the artistic skill and insight of the creator. (2) The 1950's introduced computational procedures such as classification into the drawings. (3) In the1970's, the availability of the computer brought automatic machine drawn visuals. (4) In the 1980's, the advent of the personal computer allowed for the creation of graphs on the monitor screen and in color. (5) In the 1990's the world wide web (WWW) and the browser created a new environment for display.

The first person recognized for drawing sociograms was Jacob L. Moreno in the 1930's. He developed a set of rules for creating sociograms. Moreno is credited with: drawing directed graphs, using color to draw multi-graphs, varying shapes of nodes to denote different characteristics of members in the graph, and using the location of the node as a valuable marker for understanding the structure in the network.

From Moreno's work to the actual proliferation of social network visualization on the web (an exhaustive overview can be found on visualcomplexity.com and infosthetics.com) a huge number of increasingly sophisticated and technologically advanced graphs were produced to analyze and explain aspects of social networks otherwise difficult to identify.

What interests us is highlighting that images in this case do not work only as representative forms or simple "illustrations" of pre-formed concepts.

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Figure 1. Moreno's Graph of Friendship Choices Among Fourth Graders, 1934 (from Freeman, 2000)

They are an integral part of research, real heuristic instruments that are crucial for the completion of the survey. In fact, apart from being a visual output through which communicate the results of a search, mapping and visualizing the network is a key moment of discovery of the structural characteristics of the network itself, as the distribution of its nodes and the density and quality of internal and external links that make it up.

Rather, often happens that it is precisely the time of "visualization" of the data collected during the early stages of research to make explicit social network configuration, giving it a visible form through a strategy of "spazialization" based on the topological properties of images.

Representational techniques like the "graph" or the "map" are essential for understanding and describing the existence and the development process of social networks. These visual devices implicitly rely on schematic models that use "space" like a "cognitive filter" to discover and depict the structures of phenomena which have no direct perceivable aspect.

According to Martin Dodge (2004), well-known cybergeographer and virtual cartographer, the process of spatialization, where a spatial, map-like structure is applied to data where no inherent or obvious one exists, can provide an

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Figure 2. *The structure of adolescent romantic and sexual networks,* Bearman PS, Moody J, Stovel K. - Institute for Social and

Economic Research and Policy - Columbia University (from www.visualcomplexity.com)

interpretable structure to large databases of abstract information. In essence, “maps and spatializations exploit the mind’s ability to more readily see complex relationships in images, providing a clear understanding of a phenomena, reducing search time, and revealing relationships that may otherwise not been noticed”.

When we are dealing with complex reality not directly perceivable by the eye or an optical instrument - as it is precisely the case of concept like “social networks”- is always required a form of information “mapping”, namely the introduction of some principle of spatial organization that allows to make perceptible the data set itself.

IV. The concept of “diagram”

But what spatial and "representational models" are implicitly involved in the type of images used by the social network analysis, how they work, and why those specific images rather than others?

Visual representation studies teach us that figures like “graphs”, “trees” and “maps” are a special kind of images; their use is not limited to an "objective" or "neutral" representation of a given reality but is deeply involved in the process itself of creation of what is represented (Anceschi, 1992; Massironi, 1982).

According to Botta, the visual display of information is not intended to create a simple visual metaphor of a given phenomenon, but rather to represent data through the adoption of a conventional schematic model that helps to define the phenomenon itself (Botta, 2006).

There is a concept that clarifies the nature of these visual devices and their operational logic.

This is the concept of "diagram", as has been developed by American philosopher and semiologist Charles S. Peirce, who named it "relational icon".

The idea of diagram provides us with a powerful interpretational model of the role of that peculiar images that spazialize on a representational plan heterogeneous series of information and relations.

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sono necessari per visualizzare quest'immagine.

Figure 3. *Visualizing the Processing Flickr group,* Andreas Koberle, 2007 (from www.visualcomplexity.com)

Peirce divides an overall class of «Icons» into three sub-divisions: «Image,» «Diagram,» and «Metaphor». Maps, graphs, sociograms ecc., in terms of this analysis, would be diagrams, not reproducing the “simple qualities” of their referents, but representing “the relations” of the parts of one thing by “analogous relations” in their own parts.

The Diagram not only represents the related correlates, but also—and much more definitely—represents the relations between them. For Peirce, the pure Diagram is merely designed to represent and to render intelligible the form of relation: «Consequently, Diagrams are restricted to the representation of a certain class of relations; namely, those that are intelligible». (Peirce, 1955)

Another element of analysis is provided by the rereading of the peircean concept of diagram made by the French philosopher Gilles Deleuze.

He theorized the “diagram” not as a simple "reproductive" form but as a "abstract machine" able to "produce his object", creating new vision, concepts and models of knowledge and reality. Although Deleuze admits his indebtedness to Peirce, he rejects the iconic status that Peirce assigned to the diagram, since it tends to conceive the diagram simply as a “copy” or graphic representation of intelligible relations or coordinates. Deleuze, rather, prefers to assign to the diagram a much more strongly creative or genetic role: “the diagrammatic or abstract machine does not function to represent, even something real, but rather constructs a real that is yet to come, a new type of reality.” (Deleuze, 1986)

Then, to the communicative power of these graphs, we must add the fact that the diagrams can be proposed as real "machines to see and to think", flexible instruments designed to be accurate and "general" at the same time.

The effectiveness of the diagram is largely in his ability to articulate different size and quantity, thus developing new, or even unforeseen, explanatory features (as is often the case in SNA, where viewing a graph often shows unexpected configurations and structures).

V. Conclusions

Going back to where we starter - the role of images and spazializaion procedures in the study of social networks - we can now make some final considerations.

Diagrams offer theoretical models built upon spatial topology rather than the formal rules of mathematics or linguistic grammar. Lines and arrows display a functional relation between terms. And the overall structure offers a series of choices and constraints. Reading a diagram, the viewer asks: What does this line mean in terms of the larger structure? What part of the argument does this shape represent? Why is this term included and why is it positioned here? By answering these questions, readers think through a diagram to build theoretical expressions.

Diagrammatic thought infact may take problems or concepts without specific spatial configurations (as in the case of “social” interactions and networks) and represent them as a spatial argument. Interacting with the diagrammatic representation will provoke new insight and suggest alternative solutions as the reader elaborates the meaning of its structure and relations. Reading a diagram produces new discoveries, and formalizes a specific expression. Thus, diagrams both provide a means of discovery and formalize

expression. Indeed, the thinking through of a diagram is precisely what formalizes the discovery.

On these elements is based the intrinsic relationship that can be found between the concept of "social network" and the diagramatic visual device – the graph – adopted by SNA.

The "space" that the diagram draws on paper or on a screen is a topological and relational space that do not try to “portray the social" in a naturalistic way, but a space that arranges itself in an “analogous” way to the "social space" that researchers want to describe. Diagrams and diagrammatic reasoning are therefore the most appropriate to describe unspoken or implicit social configurations, such as informal networks, precisely because of their “analogic” ability to use spatial relationships to express that configurations on a different plane

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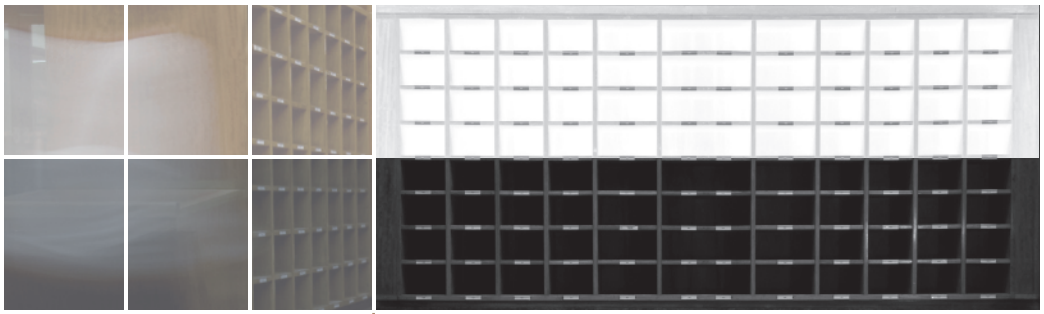
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Space of Knowledge and Memory

Friday 16 MAY

Papers Session 3a, 3b & 4

The second theme deals with the space of knowledge and memory. How can we compare the encyclopedia and the museum, the book and the library, the diagram and the database? How do they use architecture to structure knowledge and how is architecture used as a metaphor of memory?

From Text to Theatre

An Architectural Reading of Heinrich Khunrath's *Amphitheatrum Sapientiae Aeternae* (1595).

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Firm is the foundation of your Theatre and it will endure,
As long as the Macrocosm, as long as the Microcosm.
Johannes Seussius.

Three decades ago, cultural theorist Walter Ong drew attention to the abundant use of the word 'theatre' in titles of books published during the second half of the sixteenth century.[1] In a footnote, Ong noted that he had 'accumulated, incidentally, a collection of several dozen such titles: theatres of botany, of chemistry, of celestial wisdom, of universal nature, of peace, of consumption (diseases), of God's judgments, of hydrotechnic machines, of politics, of poetry, etc.'[2] Ong considered these titles indicative of an epistemological shift in European culture where the accumulation of knowledge in printed form could no longer be managed orally but visually.[3] Ong described the cultural change as one whereby 'an older primary oral world is dying out (…) and a new visual-verbal world is gaining credibility'.[4] The medium of print facilitated the visual storage and retrieval of knowledge considerably but also grew into psychologically almost unmanageable proportions.[5] The management of the textual store of knowledge came to rely on spatial models such as the theatre to remain, in some sense, psychologically intelligible. But did the printed 'theatres' only do so metaphorically, through a figurative use of speech, or did the books in question also perform as theatres in some material way? This question remained partly unanswered in Ong's studies because he sought to understand the printed 'theatres' as texts, rather than as what they claim to be: theatres. Building on insights provided by more recent studies by scholars such as Julie Stone Peters

[1] Walter J. Ong, 'Typographic Rhapsody: Ravisius Textor, Zwinger, and Shakespeare', Walter J. Ong, *Interfaces of the Word: Studies in the Evolution of Consciousness and Culture* (Ithaca and London: Cornell University Press, 1977), pp. 147–88.
[2] Ong, 'Typographic Rhapsody', p. 174.
[3] Ong, 'Typographic Rhapsody', p. 172.
[4] Ong, 'Typographic Rhapsody', p. 166.
[5] Ong, 'Typographic Rhapsody', p. 163.

this paper tries to answer the question for a specific case by examining a work that has the word 'amphitheatre' in its title, which was relatively uncommon.[6]

In 1595 the German hermetic philosopher, mystic and alchemist Heinrich Khunrath (1560–1605) issued a large, oblong book called *Amphitheatrum Sapientiae Aeternae* (*The Amphitheatre of Eternal Wisdom*) [figs. 1 to 6].[7] Today, only four extant copies are known to be in existence.[8] Khurnath describes the book as a 'theoretical and practical Work (*OPVS theore¯tikon kai praktikon*) adorned with four Theosophical figures skilfully engraved in copper with Regal form.' These four theosophical figures are presented on two double spreads, in the shape of a giant pair of spectacles. Each plate, measuring approximately 42.5x48cm, is hand-coloured and highlighted with touches of silver and gold [figs. 4 and 5]. Khunrath's name is inscribed on the plates as their 'inventor' and Paullus van der Doort, an artist from Antwerp, as their engraver. In the Epilogue at the end of the book, Khunrath expresses the hope that those who have 'wisely contemplated the Amphitheatrical spectacles of TRUE WISDOM' may understand and imitate them.[9] The figures have drawn much attention for their curious combination of text and image, most notably the fourth and most famous figure representing Khunrath himself in the act of prayer before an altar inside a stately hall, which is divided in an 'Oratory' on the left and a 'Laboratory' on the right [fig. 7]. An inscription in the engraving 'H. F. Vriese pinxit' indicates that the engraving was made after a painting (now lost) by the Dutch architect Hans Vredeman de Vries (1527–1606) who lived in Hamburg at the time and who is perhaps best known for his architectural fantasies (in the form of palaces, gardens, ornaments) and treatises on perspective [fig. 8].[10]

The four figures are preceded by a title-page [fig. 3] set in a circle and a 24 page Prologue consisting of 306 short scriptural extracts from the Solomonic sayings of the Old Testament Book of Proverbs and the Apocrypha's Book of Wisdom [fig. 6]. Each extract is given in two different translations and commentaries printed side by side in symmetrical fashion.[11] Khunrath intended to include one axiom for each day of the year, but it was not until four years after Khunrath's death in 1609 that Erasmus Wolfart, whom Khunrath entrusted with

[6] See Julie Stone Peters, *Theatre of the Book, 1480-1880: Print, Text, and Performance in Europe* (Oxford: Oxford University Press, 2000).
[7] Henricus Khunrath, *Totique, celestis exercitus spiritualis, militiae, proximo su fideli, et sibimetipsi, naturae atque arti, Amphitheatrum Sapientiae aeternae, solius verae* ([Hamburg], 1595).
[8] In Wisconsin, Basle, Darmstadt and Rostock. This paper is based on a study of the Basle copy.
[9] Forshaw, *Ora et Labora*, p. 278.
[10] See Heiner Borggrefe, Thomas Fusenig and Barbara Uppenkamp, *Hans Vredeman de Vries und die Renaissance im Norden* (München: Hirmer, 2002).
[11] The translation on the left is quoting Jerome's Vulgate Bible; on the right is Khunrath's own Latin translation from the Greek *Septuagint* and Hebrew *Hagiographia*.

the task of completing the work, published a complete version with 365 verses.[12] Seven rectangular figures including a portrait of the author engraved by Johan Diricks van Campen and dated 1602 were added to this posthumous edition [figs. 9 to15]. In a Prefatory Inscription dated from 1604, Khunrath writes that the work is 'recently revised and AMPHITHEATRICALLY constructed (*instructum*) with FOUR circular, and other hieroglyphic FIGURES, skilfully engraved in copper, for the purpose of raising up and defending, with all its might, TRUTH (…).[13] Due to the reduction in size of the 1609 Folio edition, the original circular figures were reproduced without the surrounding texts, which were instead reprinted separately in the book as commentaries, leading to a different lay-out of the work [fig. 13].

Khunrath's *Amphitheatre* has received much attention in recent years from scholars in the field of art history, literature and cultural studies who all consider the *Amphitheatre* to be a major work of alchemical literature.[14] Much scholarly effort has been made to understand Khunrath's highly idiosyncratic text, which has been characterised as anticipating, if anything, the modern literary experiments of James Joyce's *Finnegan's Wake*. Two Ph.D. theses have been devoted to Khunrath's work, one of which, by Peter Forshaw, includes a full English translation of the text of the 1609 edition. Little effort has been made, however, to understand the analogy with the amphitheatre suggested by the title. Rather than trying to establish its significance as text, this paper seeks to understand how the book performs as theatre. Why did Khunrath call his book an 'Amphitheatre'?

In *The Rosicrucian Enlightenment*, cultural historian Frances Yates claims that 'Except in the title the word "Amphitheatre" does not occur in the work, and one can only suppose that Khunrath may have had in mind in this title some thought of an occult memory system through which he was visually presenting his ideas.'[15] Yates' statement that the word 'Amphitheatre' does not occur in the rest of the work is not true. In fact, Khunrath keeps referring to the book as 'this Amphitheatre' throughout the text. It is true, however, that Khurnath does little to explain the title. Yates' suggestion that the book performs as some kind of memory theatre finds some indirect support from cultural historian Julie Stone Peters

[12] See, for an extensive account of this history Umberto Eco, *Lo Strano Caso della Hanau 1609* (Milan: Bompiani, 1989) and Urszula Szulakowska, *The Alchemy of Light: Geometry and Optics in Late Renaissance Alchemical Illustration* (Leiden: Brill, 2000).
[13] Forshaw, *Ora et Labora*, p. 31.
[14] See Peter Jonathan Forshaw, *Ora et Labora: Alchemy, Magic, and Cabala in Heinrich Khunrath's Amphitheatrum Sapientiae Aeternae (1609)* (Doctoral Thesis: Birckbeck, University College London, 2003); Urszula Szulakowska, *The Alchemy of Light: Geometry and Optics in Late Renaissance Alchemical Illustration* (Leiden: Brill, 2000); Ralf Töllner, *Der undendliche Kommentar: Untersuchungen zu vier ausgewählten Kupferstichen aus Heinrich Khunraths "Amphitheatrum Sapientiae Aeternae Solius Verae (Hanau 1609)* (Ammersbek bei Hamburg: Verlag an der Lottbek Jensen, 1991).
[15] Frances A. Yates, *The Rosicrucian Enlightenment* (London and New York: Routledge, 2002), p. 51.

who argues that the book served as a concrete memory space just as real architectural spaces did.

> Both theatre and printed book were vehicles of artificial memory: mechanisms for visualizing images interacting in space; structures for mapping objects of knowledge onto a fixed set of vertical and horizontal planes. This shared conceptual work was reflected in the metaphoric interchangeability of book and theatre.[16]

According to Peters, books 'reinvigorated the etymological sense of the word theatre as a "seeing place", both transferring this into the sphere of the book and drawing on its currency there'.[17] Little is known about how the *Amphitheatre* was read or 'viewed'. Forshaw cites evidence according to which the 'theosopher should rise daily before dawn, read one of the pages of the *Amphitheatre*, meditate on one of the verses in its Prologue, then devote himself to study between breakfast and one in the afternoon, each time preceded by prayer'.[18] Regarding the circular figures, cultural historian Urszula Szulakowska has suggested that they may have been viewed using mirrors and lenses, even if it seems more likely that the engravings were in fact meant to act *like* mirrors and lenses.[19]

Yet, some form of active participation seems to be required to produce the 'Amphitheatrical spectacles' Khunrath speaks of. The author of an encomium to Khunrath's *Amphitheatre*, Theophilus Aretius, sees the role of the reader in this 'wonder-working Theatre' not as that of an 'an idle spectator, / But truly a Playwright, and Actor, / A most intimate guest; not one forever rambling about the place.'[20] The author of a dedicatory poem, Johannes Seussius, writes the following:

> He who wishes to descry (*specularier*) the WORLD beyond every world,
> And who is busy to know himself besides,
> There is no need for him to go to the ruined Theatres of the ancients,
> Or to new ones, rendered vain with their spectacles.
> Rather let him set aside the impure world, and set himself aside,
> And flee troublesome obscurities.
> Let him take a seat, oh Khunrath, in your Theatre,

[16] Julie Stone Peters, 'Theater and Book in the History of Memory: Materializing Mnemosyne in the Age of Print', *Modern Philology* (2004), v. 102, n. 2, pp. 179–206, p. 190.
[17] Peters, 'Theatre and Book in the History of Memory', p. 190.
[18] Forshaw, *Ora et Labora*, p. 275.
[19] Szulakowska, *The Alchemy of Light*, pp. 134–7.
[20] Forshaw, *Ora et Labora*, p. 43.

With the good spark of ether leading the way.
Where divine Wisdom shows with a mirror of Emerald
What the Macrocosm does, what the Microcosm might.[21]

There is no evidence suggesting that Khunrath himself ever rambled about in 'ruined Theatres of the ancients' or visited any modern (amphi)theatres, such as the ones erected in London for the purpose of staging plays and other spectacles or the one erected in Padua (and somewhat later Leiden) for the purpose of anatomical dissection and teaching [figs. 17 and 18]. As far as we know Khunrath travelled no further than Basle in southern direction. Yet, here, in Basle, where Khunrath obtained his doctorate in medicine in 1588,[22] he may have heard or read about the amphitheatres of ancient Rome and their construction through the work of the physician and polymath Theodor Zwinger the Elder (1533–1588), whom Forshaw mentions as one of the most likely candidates to have been Khunrath's tutor at Basle.[23] Zwinger had travelled to Italy, had seen the 'ruined Theatres of the ancients' and studied medicine at Padua's famous university and may have witnessed anatomical dissections performed by Andreas Vesalius.[24] Zwinger was among the first to use the word theatre in the title of a published work: the *Theatrum Vitae Humanae*, or *Theatre of Human Life*, an early modern encyclopaedia, which was first published in Basle in two large Folios in 1565.[25] In the preface to the work, Zwinger draws a parallel between the ancient amphitheatres where actors (*histriones*) represent the drama of human life. He explains, as Ong notes, that the twenty volumes of the Theatre are in fact 'twenty scenes'.[26] What is more interesting is that Zwinger saw his task of ordering the collected material as that of an architect. In the second edition of the *Theatre*, published in 1571, Zwinger created a separate section in the Preface, called Proscenium – in reference to the space in front of the scene in the classical theatre – titled 'DE ARCHITECTIS HVIVS OPERIS' ('OF THE ARCHITECTS OF THIS WORK'), where Zwinger pays special tribute to his step-father Conrad Lycosthenes (Wolffhardt), whom he accredits with having done most of the collecting.[27] Zwinger himself 'endowed with life', as he puts it, the 'immature fruit of Lycosthenes' and 'transformed it into the shape (*species*, 'outward

[21] Forshaw, *Ora et Labora*, v. 2, pp. 43–5.
[22] See for a more detailed biography James Brown Craven, *Doctor Heinrich Khunrath: A Study in Mystical Alchemy* (Glasgow: Adam McLean, 1997); see also Forshaw, *Ora et Labora*, p. 16.
[23] Forshaw, *Ora et Labora*, pp. 9–10. Forshaw further suggests that Khunrath's editor, Erasmus Wolfart was possible related to Zwinger, whose stepfather was the philosopher, theologian, alchemist and Basle professor of grammar and dialectic Conrad Wolffhart, Alias Lycosthenes (1518–1561).
[24] For a biographical account of Zwinger, see Johannes Kircher, *Theodor Zwinger und seine Zeitgenossen: Episode aus dem Ringen der Basler Ärzte um die Grundlehren der Medizin im Zeitalter des Barocks* (Basel: Verlag von Helbing & Lichtenhahn, 1956).
[25] Theodor Zwinger, *Theatrum Vitae Humanae* (Basle: per Ioan. Oporinum, Ambrosium et Aurelium Frobenios fraters, 1565).
[26] Ong, *Typographic Rhapsody*, p. 174.
[27] Theodor Zwinger, *Theatrum Vitae Humanae* (Basel: ex officina Frobeniana, 1571), p. 28. I wish to thank Lesley Boatwright for the translation from the Latin.

appearance') which you see'.[28] He further laments the lack of time remaining 'to draw this great Theatre into the shape of a Theatridium – a thing which many people demand, and the spirit also bids – in imitation of the Geometrists, who draw together the working of the Universe into a tiny globe (…).'[29]

To understand the geometrical basis of the theatre, Khunrath may have consulted the second edition of Walter Rivius' *Vitruvius Teutsch*, the German translation of the *Ten Books on Architecture* by the Roman architect Vitruvius, which was published in Basle in 1575.[30] The translator Rivius (Ryff) was not an architect but a practising physician, like Khunrath, which may attest to the popularity of classical architecture in the medically oriented humanist circles in Basle. In Chapter 6 of Book V, Vitruvius describes the design of Roman theatres and Greek amphitheatres, which are based on the same geometrical principle.[31]

> This is how to make the configuration of the theatre itself. Whatever the size of the lower perimeter, locate a centre point and draw a circle around it, and in this circle draw four triangles with equal sides and at equal intervals. These should just touch the circumference of the circle. By these same triangles, astrologers calculate the harmonies of the stars of the twelve heavenly signs in musical terms.[32]

Vitruvius' description of is that of a cosmological diagram, where all the constructive sightlines converge in a point that cannot, in fact, be occupied by a spectator.[33] The position corresponding to this abstract viewpoint exists, as it were, somewhere up in the air. But what is this viewpoint? It is the viewpoint of the compass. According to Vitruvius, it is 'the technique of compass and rule, which enables the on-site layout of the plan as well as the placement of set-squares, levels, and lines.'[34] Khunrath, who, like Vredeman de Vries, is portrayed holding a pair of compasses in his right hand, employed the instrument to draw his *Amphitheatre* [figs. 15 and 16]. Khunrath's *Amphitheatre* thus reinvigorates in book form the classical and theoretical construction described by Vitruvius, whose ideal viewpoint can only be occupied by a reader who is at one and the same time spectator, actor and playwright.

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[28] Zwinger, *Theatrum Vitae Humanae*, pp. 28–29.
[29] Zwinger, *Theatrum Vitae Humanae,* pp. 27–8.
[30] Vitruvius Teutsch was first published in Nurnberg in 1548. The book may have been of interest to alchemists as it included a description of the design of a distillation aparatus.
[31] Vitruvius, *Ten Books on Architecture*; Translation by Ingrid D. Rowland, Commentary and Illustrations by Thomas Noble Howe; with additional Commentary by Ingrid D. Rowland and Michael J. Dewar (Cambridge: Cambridge University Press, 1999), pp. 68–70.
[32] Vitruvius, *Ten Books on Architecture*, pp. 68–9.
[33] All efforts by architects such as Sebastiano Serlio to reconstruct the classical theatre (in accordance with Vitruvian principles) are characterized by an attempt to reconcile this abstract viewpoint with an embodied viewpoint from the perspective of a privileged member of the audience.
[34] Vitruvius, *Ten Books on Architecture,* p. 22.

The *Amphitheatre* drawing that accompanies this paper presents an attempt to render the 'constructed-ness' of Khurnath's *Amphitheatre*, using a pair of compasses [fig. 19]. One can think of this drawing in analogical terms as a 'translation' – not in the medium of language but in the medium of architecture.[35] In the same way that a literary translation, such as the one produced by Forshaw, makes Khunrath's work intelligible as text, this drawing makes Khunrath's work intelligible as theatre. Any textual material (verbal and visual) has been omitted from the drawing. Instead, the drawing draws forth the material and mechanical properties, which define the Khunrath's *Amphitheatre* as 'amphitheatre'. In terms of materials, the drawing uses, apart from paper, leather, water colours and copperleaf, in reference to the material on which the original plates were drawn. In terms of mechanics, the rigid plates hinge on a central axis and contain moveable parts, which allow the circular text to be separated from the image. The model is sited in the astronomical observatory on the main campus of University College London, in order to create 'a place for seeing' (*theatron*) 'from all sides' (*amphi*). A marble pattern is painted or projected on the encircling wall, while the wooden structure of the *Amphitheatre* itself is stained with paint, in reference to some of the decorative techniques employed in the design of theatres and the finishing of books. The marbled wall has the same function as the marbled endpapers in some of the 1609 editions of the *Amphitheatre*: to bracket off a fictional space, like a threshold between the Microcosm and the Macrocosm [fig. 14].

Seen from an architectural point of view, it is becoming clear that the research methodologies traditionally associated with literary and bibliographical studies are largely inadequate to address the more specifically architectural aspects of Khunrath's *Amphitheatre*. The book is, after all, a volume. As a translation, the drawing manifests not what cultural theorist Walter Benjamin would call an 'essential kinship between languages' (i.e. between English and Latin), but an essential kinship between modes of (architectural) production.[36] The nature of this kinship between modes of production is essentially mechanical and is both embodied and emblematized in the handling of a pair of compasses, as Khunrath's portrait suggests. Not coincidentally, Khurnath saw himself in the last instance as a 'Mechanic': the prayer on the title-page of his *Amphitheatre* begins with the words: 'You, LORD, have made me a Theologian, Lawyer, Doctor, Natural Philosopher, Governor, Scholastic, Mechanic, etc.'[37]

[35] See, for the notion of translation in architecture, Robin Evans, *Translations from Drawing to Building and Other Essays* (London: Architectural Association, 1997).
[36] Walter Benjamin, 'The Task of the Translator', Benjamin, *Selected Writings Volume 1*, pp. 253–63, p. 254.
[37] See Forshaw, *Ora et Labora*, v. 1, p. 272.

Khunrath's *Amphitheatre* was a work in progress, whose significance, in architectural terms, lies in its quality as *pro*ject rather than as *ob*ject. To think of Khunrath's *Amphitheatre* as a project rather than as an object challenges the old and traditional notion of 'work' as defined by literary critic Roland Barthes in his famous essay *From Work to Text*, to which the title of this paper refers.[38] In his essay, Barthes famously defined the work as an object that 'can be held in the hand', while the Text is 'held in language', cutting across the work or several works.[39] For Barthes, the literary notion of work (*oeuvre*) was inextricably bound up with the figure of the author standing behind it as its creator. The work, as he said, 'closes on a signified' and cut him off from engaging with it in any productive way. Barthes defined the Text, by contrast, as open-ended and as something which can '*only be experienced in an activity of production*'.[40] The Text 'asks of the reader a practical collaboration'.[41] But what does Khunrath's *Amphitheatrum* do? It also asks of the reader a practical collaboration, but not as text. The *Amphitheatre*, we might argue, is a *work* that can only be experienced in an activity of production (in the sense of a theatrical production), whether through a concrete material reworking of the 1595 edition as the editor Wolfart did, or in the form of binding the text with the plates according to individual tastes as many readers of the 1609 edition did. We seem to have forgotten how to engage with works that ask of the reader to materially re-work them. This paper is not advocating a simple return to the notion of work, for the work is now conceived differently. Barthes spoke of a traditional notion of the work conceived, as he put it, 'in a, so to speak, Newtonian way'.[42] A Newtonian conception of the work defines the work in terms of solid 'bodies' in space. Khunrath's *Amphitheatre* challenges this 'Newtonian' conception of work both historically and theoretically: first because Khunrath's *Amphitheatre* predates Newton and, second, because the *Amphitheatre* does not 'act' like an object in space. As a material construction, Khurnath's *Amphitheatre*, like any built amphitheatre, escapes the category of objects and joins the category of machines, cosmological instruments and other mechanical devices, which, since the time of Vitruvius, were designed for the production of spectacles.[43]

[38] Roland Barthes, 'From Work to Text', Roland Barthes, *Image, Music, Text: Essays selected and translated by Stephen Heath* (London: Fontana Press, 1977), pp. 155–64.
[39] Barthes, 'From Work to Text', p. 157.
[40] Barthes, 'From Work to Text', p. 157.
[41] Barthes, 'From Work to Text', p. 163.
[42] Barthes, 'From Work to Text', p. 156.
[43] Vitruvius refers to theatrical machinery in his tenth and last book of the *Ten Books on Architecture*, which he considered to be the 'crown' on his work.

Fig. 1. Heinrich Khunrath, *Amphitheatrum Sapientiae Aeternae* (Hamburg, 1595). Copy Öffentliche Bibliothek Universität Basel.



Fig. 2. Front cover of Khunrath's *Amphitheatrum* (1595).



Fig. 3. Title-page of Khunrath's *Amphitheatrum* (1595).



Fig. 4. The first two circular figures in Khunrath's *Amphitheatrum* (1595).



Fig. 5. The second two circular figures in Khunrath's *Amphitheatrum* (1595).

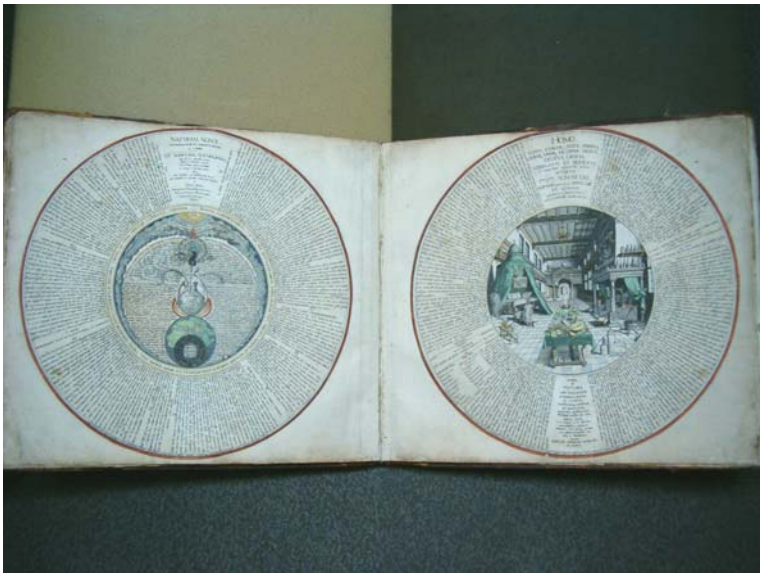


Fig. 6. Double spread from the Prologos in Khunrath's *Amphitheatrum* (1595).

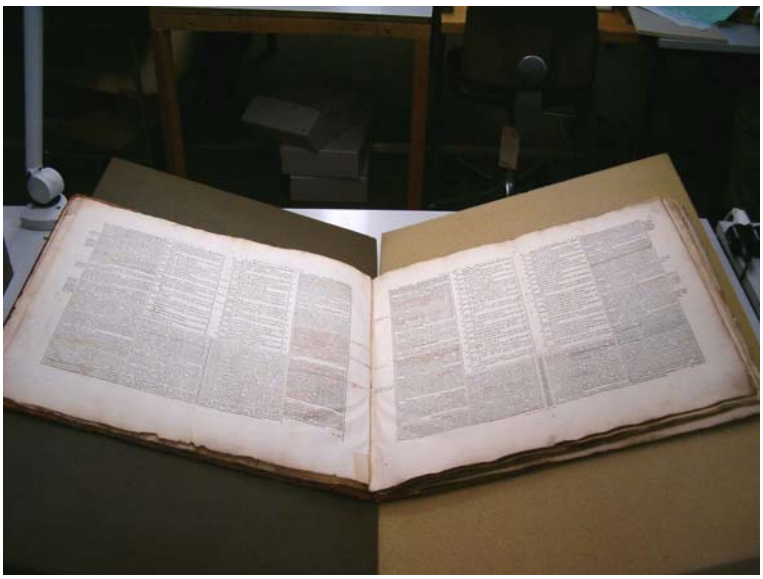


Fig. 7. Detail of the fourth circular figure (the Oratory / Laboratory) from Khunrath's *Amphitheatrum* (1595).

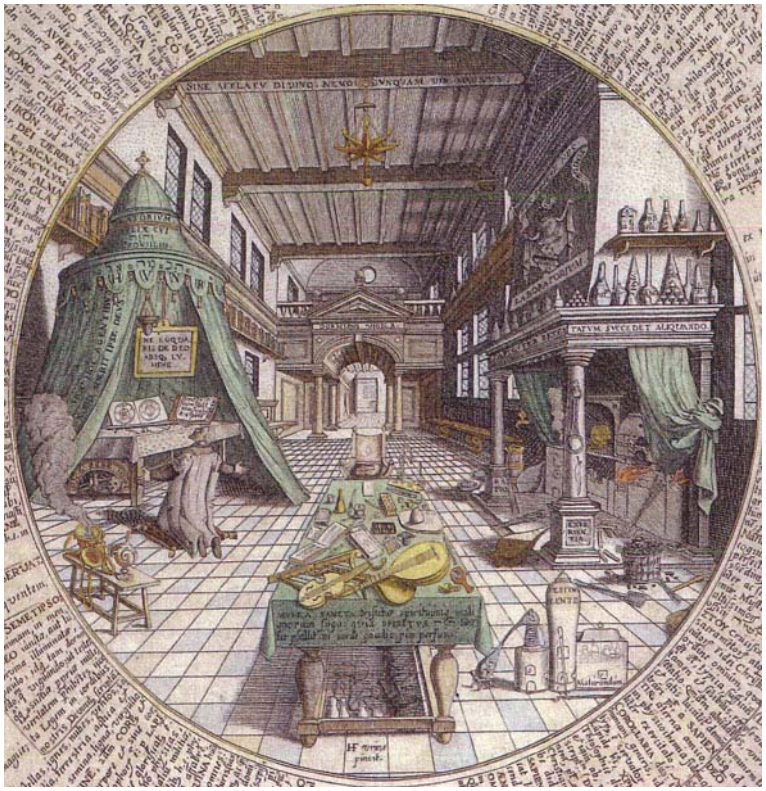


Fig. 8. Hans Vredeman de Vries, Design for an interior (engraving). Plate 10 from *Scenographiae sive Perspectivae* (1560).

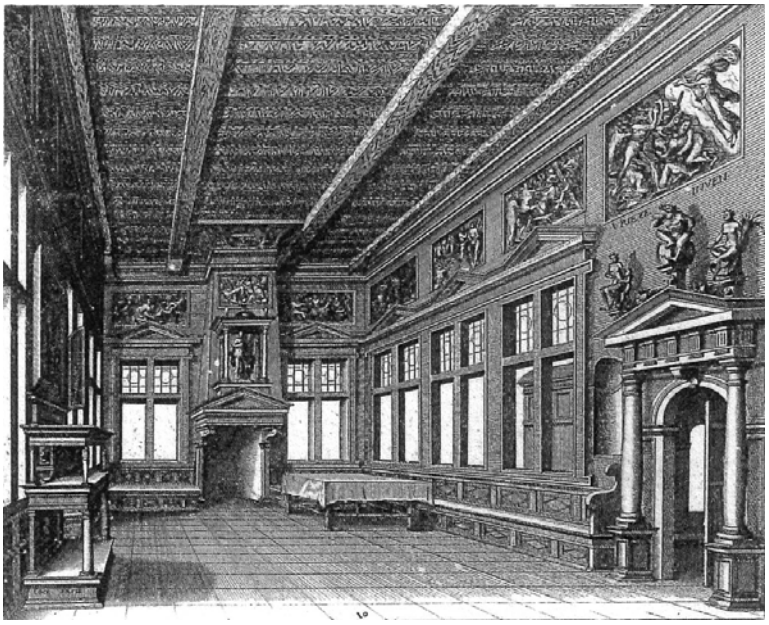


Fig. 9. Heinrich Khunrath, *Amphitheatrum Sapientiae Aeternae* (Hanau, 1609). Cover. Copy British Library.

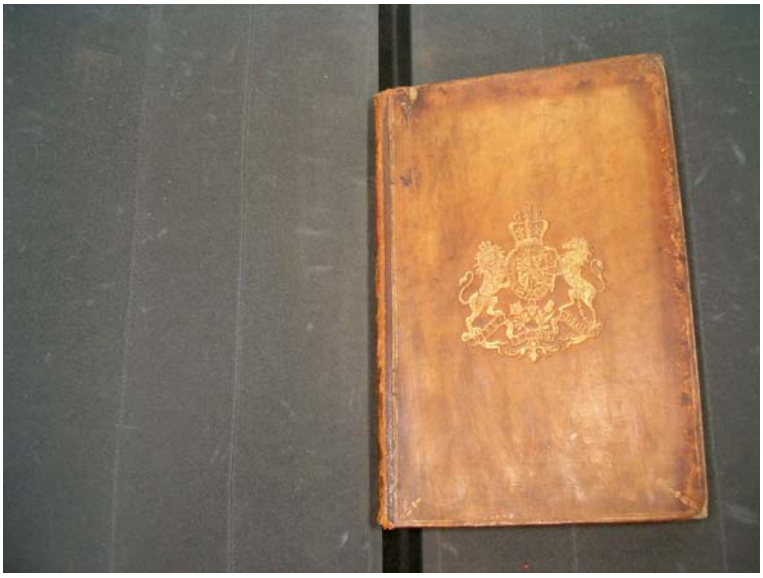


Fig. 10. Title-page of Khunrath's *Amphitheatrum* (1609). Copy British Library.

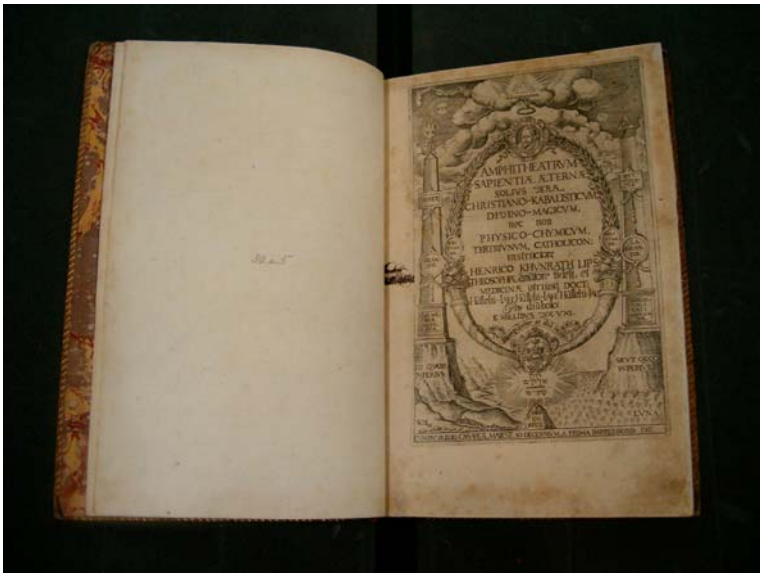


Fig. 11. Oratory / Laboratory engraving in Khunrath's *Amphitheatrum* (1609).



Fig. 12. Rectangular engraving in Khunrath's *Amphitheatrum* (1609). Copy British Library.



Fig. 13. Layout of the Prologue in Khurnath's *Amphitheatrum* (1609). Copy British Library.

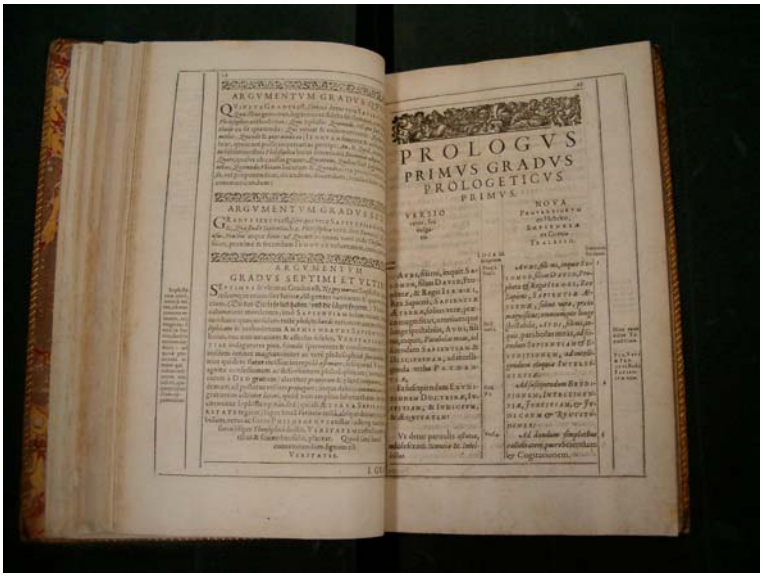


Fig. 14. Marbled endpapers in Khunrath's *Amhpitheatrum* (1609). Copy British Library.

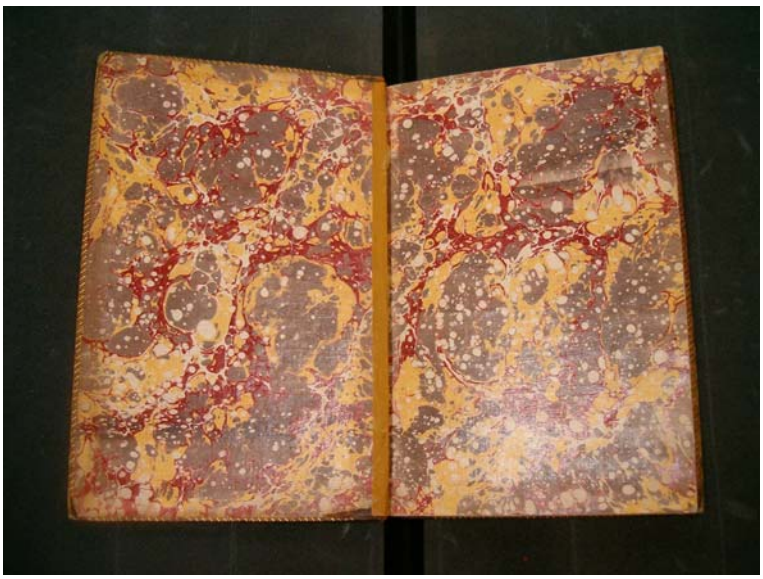


Fig. 15. Johan Diricks van Campen, Portrait of Heinrich Khunrath at the age of 42. The engraving is dated 1602.



Fig. 16. Hans Vredeman de Vries (1527–c.1606).



Fig. 17. Anatomy Theatre, Leiden.

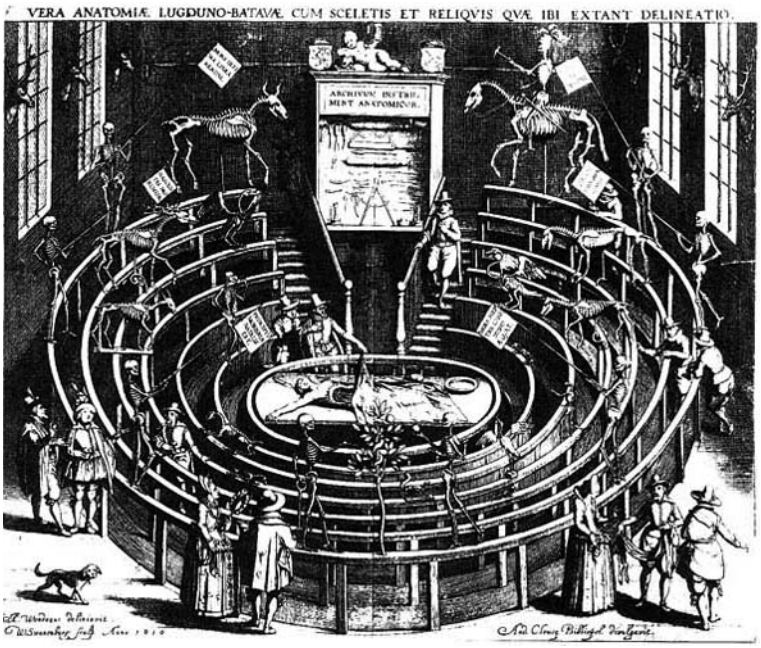


Fig. 18. Reconstruction of the anatomy theatre at Leiden. Boerhaave Museum, Leiden.



Fig. 19. Willem de Bruijn, ‘Reconstruction’ of Khunrath’s *Amphitheatre* (1595).



MAKING KNOWLEDGE VISIBLE: AN ESSAY ON PAUL OTLET'S ARCHITECTURE OF KNOWLEDGE[1]



Steffen Ducheyne[2]

Abstract: *In this essay, I unravel the underlying epistemological and ontological presuppositions in Otlet's thought and show how these presuppositions pop-up in his attempts to represent the world and knowledge of it.*

*** 1. General Introduction ***

After the "Second Scientific Revolution" which occurred during the nineteenth century (often associated with the "Industrial Revolution"), several scientists, social reformers, utopians, philosophers and many others felt the ardent necessity for establishing a *veritable synthesis*, which would harvest the intellectual and practical progress, of the

[1]. The author wishes to thank the organisers Guy De Tré, Pieter Uyttenhove, Wouter Van Acker and Sylvia Van Peteghem of the international conference *Analogous Spaces: Architecture and the Space of Information, Intellect and Action* (15-17 May 2008, Ghent) and the audience for their useful comments. Draft version: August 2007. It is dedicated to Guy, Pieter, Sylvia, Wouter, and, of course, first and foremost to Otlet *connaisseur par excéllance*, Boyd.

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ongoing and ever increasing myriad of scattered scientific material that was produced in several of the meandering branches of scientific inquiry.[3] The call for a *unifying synthesis* that could guarantee social stability and a prosperous peaceful mondial society was a typical inter-bellum topic.[4] The *Leitmotiv* question "Comment d'un coup d'œil embarrasser *ce complexe universel*, le Monde?[5]"[6] truly pervaded and catalyzed the *oeuvre* and thought of Paul Otlet. In a letter discussing *L'île du Levant* Otlet wrote that during his childhood a fierce encyclopaedic spirit was already awoken in him:

> La joie d'y collectionner les roches et le minéraux, d'y faire de herbiers, … Désireux de connaître toute de cette île, c'est pour moi l'encyclopédiste qui je suis venu. Le collections que je rapporterais de là-bas, je les développais ensuite par d'autres, et par d'autres, si bien qu'aujourd'hui, lorsque vous viendrais à Bruxelles où je vous invite à venir, vous trouverez le Musée Mondial ou Palais Mondial, et à l'Institute international de Bibliographie […][7]

Information science was the means, by which the required synthesis Otlet envisioned, was to be established.[8]

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[3]. Otlet, *Traité de Documentation, Le livre sur le livre* (D. Van Keerberghen & Sons, Brussels), 1934, pp. 3-4, p. 9, p. 23. Compare with Diderot and D'Alembert's efforts with their encyclopaedia which was published after the Scientific Revolution (1717-1783).

[4]. For an excellent case-study on this matter in the Netherlands, see David Baneke, "Synthese! Geef ons Synthese", H.J. Jordan en het Intellectuele Debat tijdens het Interbellum, *Gewina, Tijdschrift voor de Geschiedenis der Geneeskunde, Natuurwetenschappen , Wiskunde en Techniek* vol. 28(4), pp. 169-185.

[5]. Paul Otlet, *Monde, Essai d'Universalisme* (Editions Mundaneum, Brussels), 1935, p. 105 [my italics].

[6]. Otlet, *Monde*, p. 124.

[7]. Quoted from : Françoise Levie, *L'Homme sui voulait classer le monde, Paul Otlet et le Mundaneum* (Les impressions nouvelles, Brussels), 2006, p. 31. For my review of Levie's latest biography see *Knowledge Organization*, vol. 33(2), 2006, pp. 120-121.

He stressed the need of profiting from the new modern instruments for *synthesizing* and *representing* our current knowledge: "Il n'y a plus de Temple d'Artémise[9], mais il y a l'Imprimerie, il y a des Typographes, obscurs et loyaux amis."[10].

As Otlet himself noted, the word "encyclopaedia" derives from the Greek "*κυκλος*" (circle) and "*παιδεια*" (general education), both combined thus meaning "the circle of science".[11] Science represents elements of reality either *verbatim*, graphically or plastically. The aim of bibliography is to *represent* and *systematize* the representations that science provides us with into a meaningful *unified whole*. [12] Science tends towards certainty and necessity (or at least tries to do so), and serves as the basis of our practical and intellectual needs:

> On peut définir l'idéal d'une science parfaite: un ensemble de *propositions évidentes et certaines, nécessaires et universelles, systématiquement organisées, sui sont tirées immédiatement ou médiatement de la nature* du sujet et qui donne la raison intrinsèque de ses propriétés et des lois de son action. But: former l'image intellectuelle du monde mouvant (science statique, dynamique) et la détermination des points d'action sur

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[8]. See e.g. the classical papers on this matter: W. B. Rayward, The Origins of Information Science and the International Institute of Bibliography/International Federation for Information and Documentation (FID), *JOURNAL OF THE AMERICAN SOCIETY FOR INFORMATION SCIENCE* 48(4), 1997, pp. 289–300; M.K. Buckland, What is a "document"?, *JOURNAL OF THE AMERICAN SOCIETY FOR INFORMATION SCIENCE* 48(9), 1997, pp. 804-809; I. Rieusset-Lemarie, P. Otlet's Mundaneum and the international perspective in the history of documentation and information science, *JOURNAL OF THE AMERICAN SOCIETY FOR INFORMATION SCIENCE* 48 (4), 1997, pp. 301-309; W.B. Rayward, Visions of Xanadu, *JOURNAL OF THE AMERICAN SOCIETY FOR INFORMATION SCIENCE* 45(4), 1994, pp. 235-250.

[9]. The temple of Artemis is the place in which Heraclitus (6th century B.C.) allegedly deposited his *On Nature*.

[10]. Otlet, *Traité de Documentation*, p. 436 [my italics].

[11]. *Ibid.*, p. 137.

[12]. *Ibid.*, pp. 372-373.

> lesquels est possible une action en vue de leur transformation du monde selon les besoins humains (desiderata matériels et intellectuels).[13]

{Figure 1} aptly reflects this process of representation taking place during the study of books.

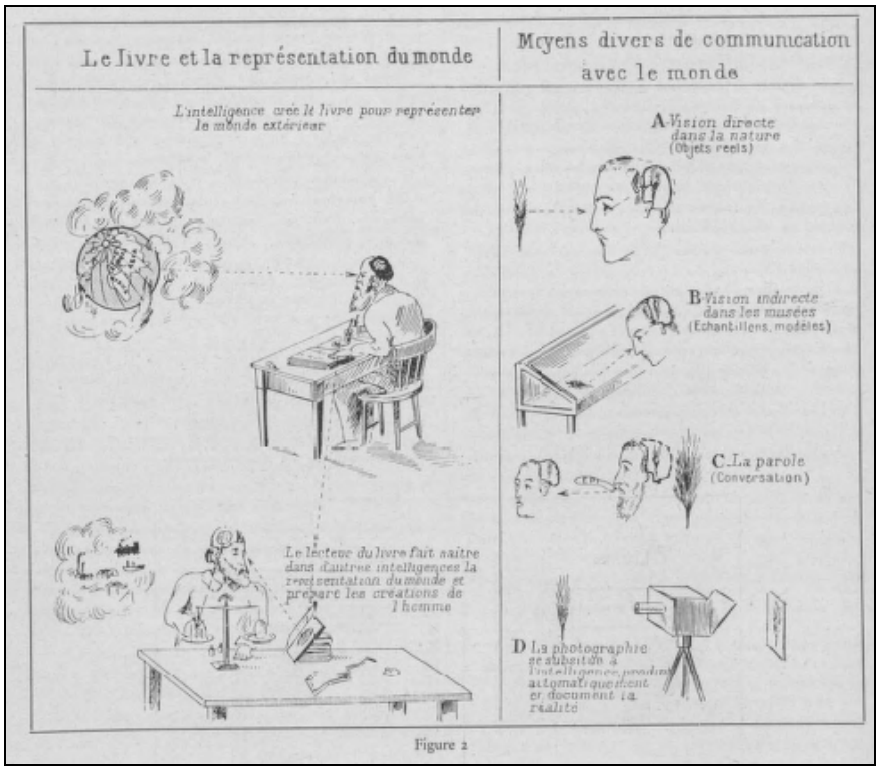


Figure 1. Otlet, *Traité de Documentation*, p. 42.

Books as carriers of knowledge about of the world that lead to practical applications.

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[13]. Otlet, *Monde*, p. 248.

The encyclopaedia's primary aim is to provide us with a set of abstract and universal *concepts* that capture reality {figure 2} and it may thus be aptly considered as "the book of books" or *Index Scientiae* {figures 3 and 4}:

> La Pensée part du réel (données immédiates de la conscience) et tend vers l'intelligible. Ce que cherche la Pensée, ce sont *des concepts abstraits, les plus économiques possible*, qui leur servent à traiter avec les faits, à les prévoir, à les saisir, de la manière la plus simple, la plus commode, la plus maniable, à les envelopper dans *les formes les plus universelles, les plus systématiques et par conséquent les plus abstraites*.[14]

[14]. *Ibid.*, p. 351 [my italics].

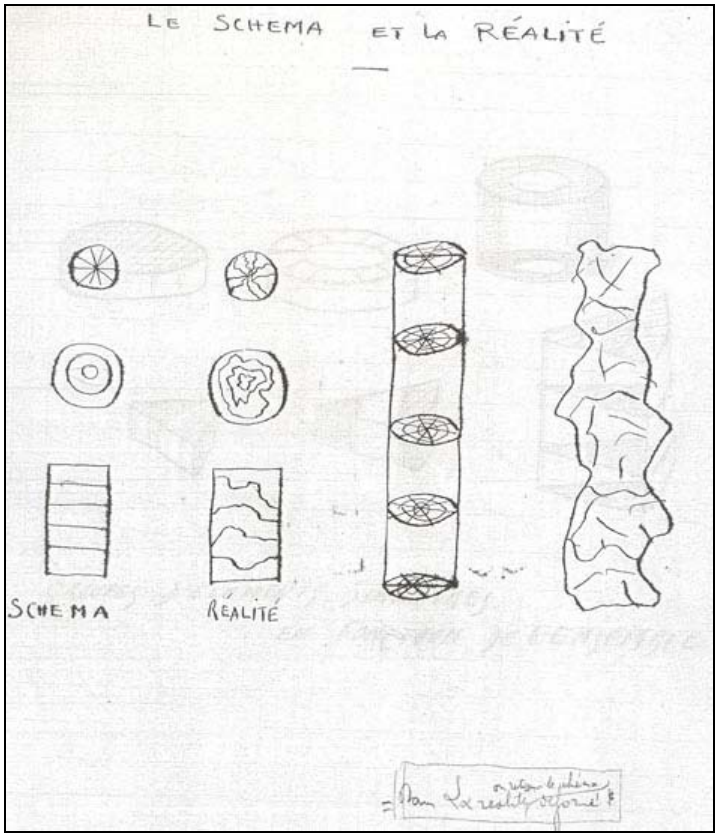


Figure 2. *Concepts versus reality. Abstraction is made from the complex world.*

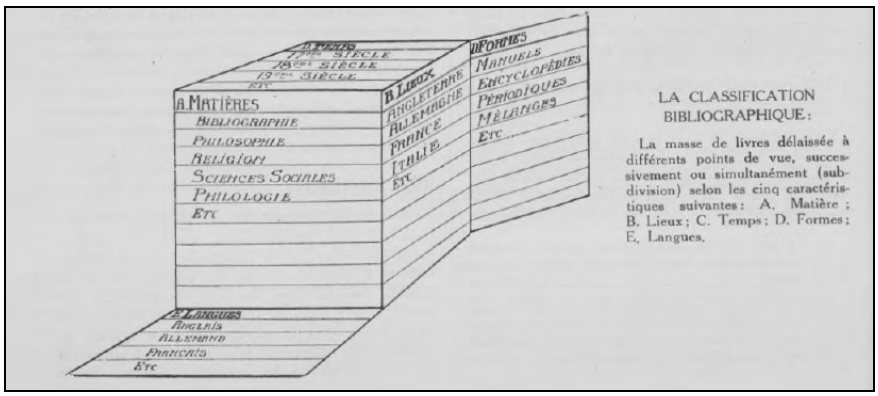


Figure 3. *Otlet's five-fold classifications of books (according to their subject, language, space, time and forms)* (Otlet, *Traité de Documentation*, p. 378).

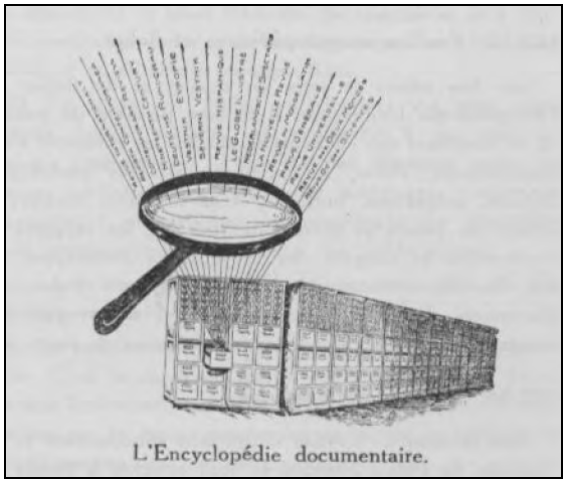


Figure 4. *Otlet's Information science* (Otlet, *Traité de Documentation*, p. 409).

Correspondingly, museums, our modern temples of knowledge, ought to represent our knowledge thus far obtained about the world. Otlet noted:

> Par leur moyen il tend devenir un Monde en miniature, un *Cosmoscope*, permettant de voir et de comprendre l'Homme, la Société, l'Univers.[15]

Otlet's German friend, Otto Neurath[16], made an interesting observation on Otlet's *Mondial Palace* that "In the future, museums will be manufactured, exactly as books today. This proposal to produce copies of museums has often been expounded, particularly by Paul Otlet of the Palais Mondial in Brussels. But the realisation of that idea implies international agreement on a *specific method of representation* [*cf.* Neurath's own ISOTYPE]."[17]. Note that Neurath's endeavours partially converged with Otlet's (except for Neurath's anti-metaphysical stance which was at odds with Otlet "genetic-causal" concept of science, as I have argued elsewhere[18]), as can be seen from the following quotes. Neurath wrote:

> To further all kinds of *scientific synthesis* is one of the most important purposes of the unity of science movement [the first congress was organised in 1934, the same year in which Otlet's *Traité de Documentation* appeared], which is bringing together scientists in different fields and in different countries, as well as persons who have some interest in science or hope that *science will help to ameliorate personal and social life*.[19]

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[15]. Paul Otlet, *Le musée international: notice-catalogue*, (Office Central des Associations Internationales, Brussels), 1914, p. 7 [my italics].

[16]. Nader Vossoughian, The Language of the World Museum: Otto Neurath, Paul Otlet, Le Corbusier, *Transnational Associations* vol. 1-2, 2003, pp. 82-93.

[17]. Otto Neurath, From 'Vienna Method' to 'ISOTYPE', in: *Empiricism and Sociology*, M. Neurath and R.S. Cohen (Eds.) (Reidel, Dordrecht), 1973, p. 219. *Cf.* Otto Neurath, Unified Science and Its Encyclopedia, Philosophy of Science 4(2), 1937, pp. 365-277, p. 274 [my italics].

[18]. Steffen Ducheyne, Paul Otlet's Theory of Knowledge and Linguistic Objectivism, pp. 110-116.

Neurath's Encyclopaedia of Unified Science would be beneficial to science and *vice versa*. And similarly, he wrote:

> The new Encyclopedia so aims to integrate the scientific disciplines, so to *unify* them, so to dovetail them together, that *advances in one will bring about advances in the other*.[20]

Now let us compare these quotes with Otlet's own phrasings in his *Traité de Documentation*:

> La synthèse est l'établissement d'une science à c*onnaissance totale, d'une explication du monde (sa conception et ses lois) embrassant toutes les connaissances particulières auxquelles* sont réservées l'étude des données analytiques et des synthèses partielles.[21]

Bibliography thus conformed to the standard scientific methods of *analysis* (reasoning from particular instances to more general ones) and *synthesis* (reasoning from general notions to particular instances) {figure 5}:

> On distingue *l'analyse* er *la synthèse*, l'induction et la déduction, par suite les sciences rationnelles reposant sur la déduction et les sciences d'observation reposant sur la déduction. [22] La documentation est une science

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[19]. Otto Neurath, Unified Science as Encyclopedic Integration, in: *International Encyclopedia of Unified Science* (V vols.), O. Neurath, R. Carnap, and C. Morris (Eds.) (Chicago, University of Chicago Press), 1955, vol. I, p. 1 [my italics].

[20]. *Ibid.*, p. 25 [my italics].

[21]. *Ibid.*, p. 351 [my italics]. *Cf.*: "Traiter du Monde (*de Mundo*), c'est exposer dans ses généralités essentielles l'état d'avancement de nos connaissances à l'égard des éléments principaux; c'est à dire les sentiments qu'ils font naître en nous; c'est proposer l'action organisatrice qui en découle." (*ibid.*, p. xiii).

[22]. The method of analysis (ἐπαγωγη) and synthesis (ἀποδειξις) derived from Aristotle's *Posterior Analytics* and was very popular during the seventeenth and eighteenth century. The following quote from Newton's *The Opticks* is a striking example of this: "As in Mathematicks, so in Natural Philosophy, the Investigation of difficult Things

> d'observation qui, une fois arrivée à l'expression de certains rapports généraux, se sert de la méthode déductive pour généraliser les données, et des méthodes de combinaison et d'invention pour imaginer des données nouvelles.[23]

Otlet wrote that the aims of bibliography are:

> Analyser, généraliser, classer, synthétiser les données acquises dans les domaines du livre et en même temps promouvoir de recherches nouvelles destinées surtout à approfondir le pourquoi théorique de certaines pratiques de l'expériences.[24]

And, more specifically:

> Ainsi une science générale, une philosophie de la science, une encyclopédie sont nécessaires pour *unir* entre elles toutes les sciences particulières, afin qu'elles y déversent leurs rapports fragmentaires, qu'elles y puisent leurs principes, leurs méthodes, le programme de leur développement et qu'elles parviennent à simplifier leur conception et leurs exposés.[25]

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by the Method of Analysis, ought ever to precede the Method of Composition. This Analysis consists in making Experiments and Observations, and in drawing general conclusions from them by Induction, and admitting of no Objections against the Conclusions, but such as are taken from Experiments, or other certain Truths. For hypotheses are not to be regarded in experimental Philosophy [...] By this way of Analysis we may proceed from Compounds to Ingredients, and from Motions to the Forces producing them; and in general, from Effects to their causes, and from particular Causes to more general ones, till the Argument end in the most general. This is the Method of Synthesis: and the method of Synthesis consists in assuming the Causes discover'd and establish'd as Principles, and by them explaining the phaenomena proceeding from them, and proving the Explanations." (Isaac Newton, *Opticks or a treatise of refl ections, refractions, infl ections and colours of light* (New York, Dover), 1979, p. 369). See Steffen Ducheyne, Newton's Training in the Aristotelian Textbook Tradition: From Effects to Causes and Back, *History of Science*, vol. xliii, (2005), pp. 217-237

[23] . *Ibid.*, p. 23 [my italics], *cf.* p. xiv.

[24]. *Ibid.,* p. 9.

[25]. *Ibid.*, p. 360 [my italics].



Figure 5. *The analysis and synthesis of books.*

On the nature of books, Otlet observed that they: "constituent dans leur ensemble la Mémoire matérialisée de l'Humanité, en laquelle jour par jour sont venus s'enregistrer *les faits, les idées, les actions, les sentiments, les rêves*, quels qu'ils soient, qui ont impressionné l'esprit de l'homme"[26].

In the remainder of this essay, I shall deal with the question of *how Otlet tried to represent human knowledge in a systematic and unified way* {figure 6}.

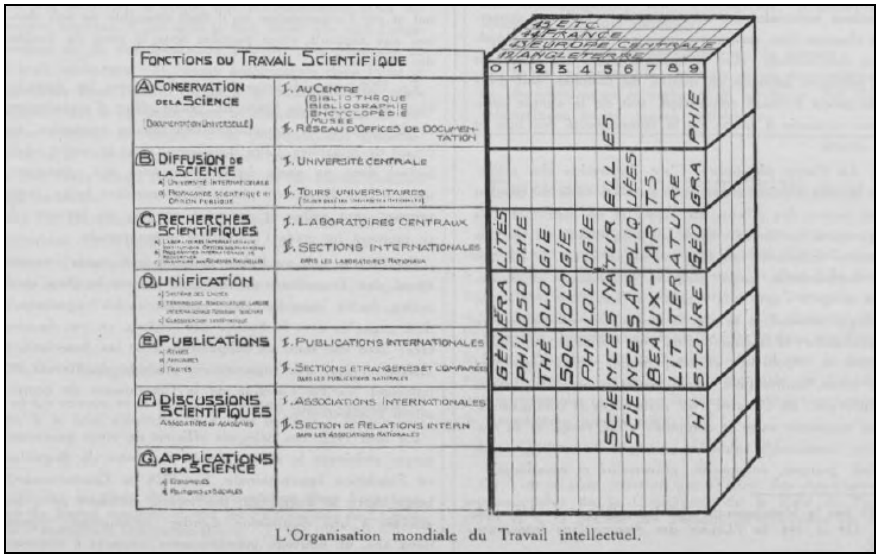


Figure 6. The mondial organization of scientific research (Otlet, *Traité de Documentation*, p. 418).

Needless to say, that this topic is of vital interest for information science (and its history) and knowledge management in its applications. The essay at hand is part of a diptych in which I seek to unravel the underlying ontology and epistemology in Otlet's thought.[27]

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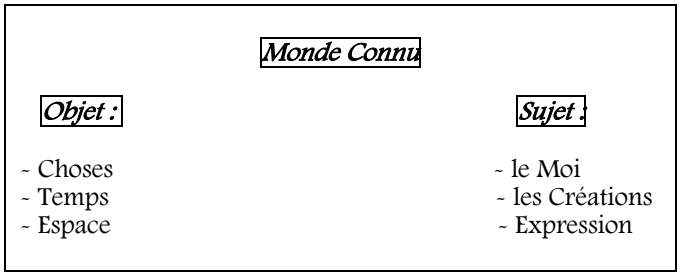
[26]. *Ibid.*, p. 43 [my italics].

[27]. Ducheyne, Paul Otlet's Theory of Knowledge and Linguistic Objectivism, pp. 110-116.

*** 2. Otlet's Ontology and Epistemology ***

Answering the question "How did Otlet *visually* represent the world and our knowledge of it?" begins by considering how he conceived of the world as an *ens*, i.e. how he conceived the world metaphysically.

Otlet's metaphysically loaded *Monde* provides us with the underlying theoretical framework of the *Traité de Documentation*. We must therefore turn to Otlet's metaphysical orientation – I shall focus here on the bare essentials. According to Otlet's metaphysics, reality consists of the following elements. The known world can be considered objectively and subjectively:[28]



Otlet wrote:

> Le système de l'Univers […]; ce système amène l'esprit à considérer les mêmes choses en elles-mêmes sous divers aspects : *les choses en elles-mêmes* (leur constitution, parties, espèces, structure, fonctionnement); *les choses dans le temps ou leur évolution* (histoire, préhistoire, cosmogonie); *les choses dans l'Espace au leur distribution* (géographie); puis *les choses dans leur utilisation pour l'homme* (technologie, organisation

[28]. E.g., *ibid.*, p. 401.

> sociale), puis encore *les choses au point de vie de leur expression* (les langues) et *au point de vue des réactions intellectuelles et affectives qu'elles ont sur l'homme* (les littératures et les arts); remmenant tout L'Univers au nos individualité la nécessité de forme et de culture ce moi et d'en une faire individualité forte et harmonieuse par un développement rationnel et à point de vue physique, intellectuel, moral, social, professionnel.[29]

As a true metaphysician, Otlet presents us his equation of the world ("*équation du monde*"). The formula goes as follows[30]: World = {(1) *objective components* (which consists of the following three types: (1.a) Things (including Nature, Man, Society and Divinity), (1.b) Space, and (1.c) Time)} × {(2) *subjective components* (including (2.a) the ego, (2.b) (human) creations, and (2.c) expression)} × {(3) the (3.a) *Unknown* and the (3.b) *Mysterious* (x + y)}. Otlet's "(x + y)" refers to what is yet undiscovered but exists objectively and to what is fundamentally indeterminate respectively.[31] On space Otlet noted:

> Le monde extérieur tel qu'il nous apparaît nous présente des corps juxtaposés dans l'espace, et des états de ces corps se succédant dans le temps. *On ne peut pas donc séparer dans son étude ce qui est si étroitement uni dans la réalité*. Ainsi une théorie de l'espace entraîne toujours une théorie symétrique du temps.[32]

And similarly, on time :

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[29]. Paul Otlet, L'Education et les Institutions du Palais Mondial (Mundaneum), *Union des Associassions Internationales* n° 121 vol. 11, 1926, p. 10 [my italics].

[30]. *Ibid.*, pp. xxi-xxii, p. 335, p. 359, p. 401.

[31]. The difference between "the Unknown" and "the Mysterious" is that in the case of the first it is theoretically possible that we come to know it, but in case of the Mysterious this is fundamentally impossible. So the first is *potentially knowable*, the latter is *fundamentally unknowable*.

[32]. *Ibid.*, p. 304 [my italics].

> Le temps n'est pas un phénomène, mais une forme de l'*aperception* dans laquelle se présente le phénomènes.[33]

He considered space and time in explicit Kantian terms: i.e. as synthetic *a priori* principles of perception. The equation of the world consists of *the fundamental concepts, i.e. the analytic atoms, which constitute the world and represent the inner essence of things*.[34] (However, it should be noted that Otlet's formula changes during the course of his book and its varying formulations are not quite consistent.) Otlet also used this framework in pedagogy:

> I faut adopter résolument ces points de vue: l'éducation conçue comme une formation intégrale et continue d'être humain, basée sur la connaissance de l'Univers, sur la détermination de nos rapports actifs et passifs avec lui, sur harmonisation de nos actions individuelles sur le plan de vue d'évolution sociale.[35]

Otlet, as I have argued elsewhere, endorsed *linguistic objectivism*. Linguistic objectivists subscribe to the following principle:

> (LO)
>
> *Linguistic atoms uniquely correspond to certain discrete and well-defined elements in the world and further combinations of these linguistic atoms can objectively capture "the order of the world".*

This thesis is at odds with positivism, since it assumes that "the order of the world" is derived from the essences of things, to which the positivists objected.[36] In other words,

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[33]. *Ibid.*, p. 317 [my italics].

[34]. *Ibid.*, p. vii.

[35]. Otlet, L'Education et les Institutions du Palais Mondial (Mundaneum), p. 6.

[36]. This is my crucial objection against R. Day, Otlet's book and the writing of social space, JOURNAL OF THE AMERICAN SOCIETY FOR INFORMATION SCIENCE 48

the order of things objectively corresponds to reality and does not refer to something we, as human beings, merely impose on it. After all, according to Otlet, reality is objective. [37] In their endeavour to construct an ideal representational system, linguistic objectivists frequently attempted to cleanse natural language from its inherent ambiguities. Otlet indeed made statements that referred to this type of purification of natural language. After the discussion of his world formula in *Monde*, for instance, Otlet noted that his notation is international and does not depend on any language: "it refers to concepts and *not to words and their fluctuating synonyms*" [38]. Basically we have three layers: Reality → Concepts → Language or Documents. So far for ontology, let us now turn to Otlet's epistemology.

The world unfolds itself to as according to four modalities: by direct perception of reality, by thought, by language, and by documents:

> Le Monde s'offre donc aux hommes vivant en sociétés sous ces quatre modalités : *Monde réel* (Réalité), *Monde connu* (Pensée), *Monde exprimé* (Langage), *Monde graphisé* (Document). Ces quatre modalités du même Monde sont interdépendantes. En principe, en toutes leurs parties, elles devraient *concorder parfaitement*. En fait, il y a décalage, inexactitude et incomplétude de l'une à l'autre. *La Pensée ne connaît pas tout, le Langage n'exprime pas tout et le Document n'enregistre pas tout. Mais ils y tendent ou doivent y tendre.*[39]

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(4), 1997, pp. 310-317. *Cf.*, more recently: Susana Sander, La sociedad del conocimiento en Paul Otlet: un proyecto comteano, I*nvestigación bibliotecológica* 16(32), 2002 , pp. 26-40. However this interpretation does not hold any water, for Otlet wrote, "La bonne lecture n'est pas le résultat d'un acte spontané. Elle doit être organisée; l'esprit doit être formé, il faut une méthode. (…) Le livre bien fait est un véritable édifice intellectuel, une synthèse d'idées et non uniquement une collection classée des renseignements. (…) Les mots, les phrases, les chapitres, se succèdent comme moyen d'exprimer, de faire comprendre et sentir une pensée unique, mais complexe, divisée, ramifiée. *Tant que la pensée du livre n'est pas perçue, comprise, assimilée, le livre n'est pas bien lu.* (Otlet, *Traité de Documentation*, p. 317 [my italics]).

[37]. *Ibid.*, p. 10, p. 30.

[38]. Otlet, *Monde*, p. xxiii, *cf.* p. vii [my italics].

Objectively these layers are connected, but subjectively we can only tend towards such systematic correspondence. But how to visually represent[40] the world and our knowledge of it? Otlet offers a small clue in the short chapter *Notation* of *Monde*:

> On pourrait aussi, schématiquement, *représenter le total du monde par une sphère dont divers grands cercles, divisés en segments*, se rapporteraient aux diverses catégories d'éléments et à leurs subdivisions, cercles et segments étant supposés projetés en un point central et s'y entrecouper pour figurer l'ensemble de leurs rapports réciproques.[41]

The crucial *rôle* of the sphere – *cf.* "*per orbem rerum humanitas unita*" occurring on {figure 13} – can easily be gathered from {figure 7} and especially from {figures 8, 9, 12 and 13}. Otlet announced that the World consists of four parts:

> *Première sphère*: celle des choses lointaines qui accablent par leur immensité, leur variété, leur contradiction.
>
> *Deuxième sphère*: celles des entités et des événements à portée humaine immédiate: la Terre et ses cinq parties, avec les deux milliards d'habitant répartis en une soixantaine d'Etats, et dont toutes les parties soumises à interdépendance à répercussion.

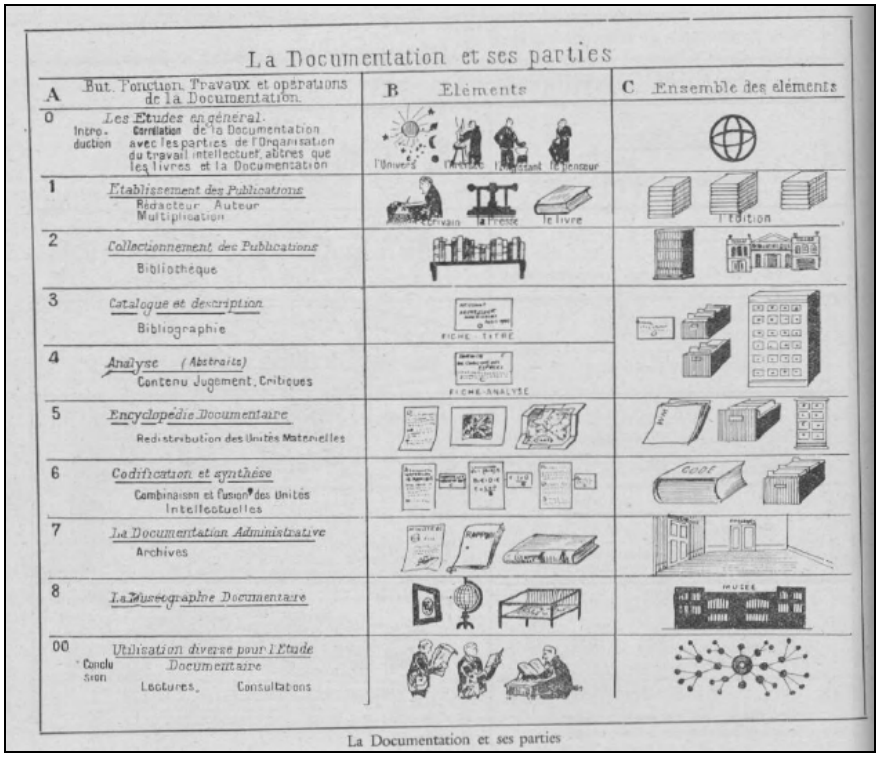
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[39]. *Ibid.*, p. vii-viii [my italics].

[40]. The issue of visual representation is the a hot topic in recent philosophy of science (see e.g., John Dilworth, The Variaties of Visual Representation (unpublished manuscript)).

[41]. *Ibid.*, p. xxv [my italics].

> *Troisième sphère*: celle de l'individu et son moi, à la fois spectateur et acteur, patient et agissant, miroir et microcosme de toutes les réalités extérieures.[42]



La Documentation et ses parties

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[42]. *Ibid.*, front page. Compare with the fact that his "*exposition de la conception du monde*" is undertaken in three successive steps which correspond to three different systems (*ibid.*, pp. xiv-xv):

(1) The *first system* deals with establishing the basic facts about the world provided strictly by experimentation. This part of the exposition of the concept of the world is analytical.

(2) In the *second system*, these core data gained in (1) are synthesized by means of the laws of logic and other (mostly ampliative) reasoning strategies (such as: hypothesis-formation, interpolation and limiting-procedures).

(3) The *third system* is that of religious thought and correspondingly deals with revelation. (Otlet, *Monde*, pp. xiv-xv.

Figure 7. Otlet, *Traité de Documentation, p. 42.*

According to Otlet, the elements of information science are the universe, the architect, the artisan and the thinker which can be written down by an author and published by an editor. This gives rise to a circular network of knowledge organization (cf. {figure 8}*).*

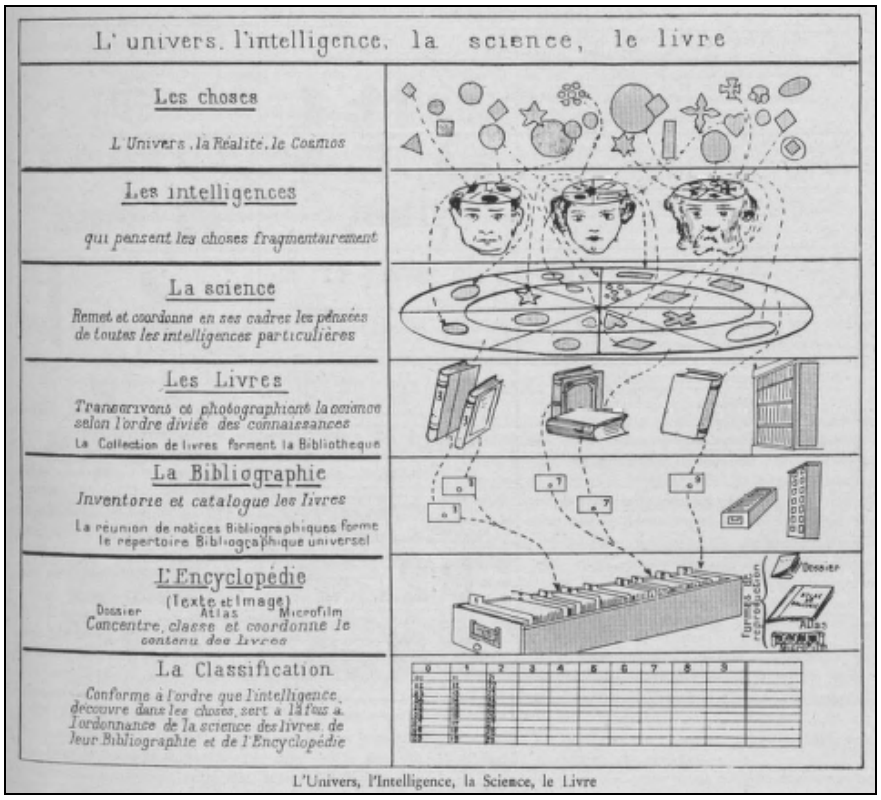


Figure 8. Otlet, *Traité de Documentation*, p. 41.

According to Otlet, humans are able to structure the rough data provided by phenomena into concepts and to systematize these concepts into a unified whole – note the third level an organized circle of knowledge. These

concepts are them materialised in books filed on separate fiches and ordered into a classificatory system.

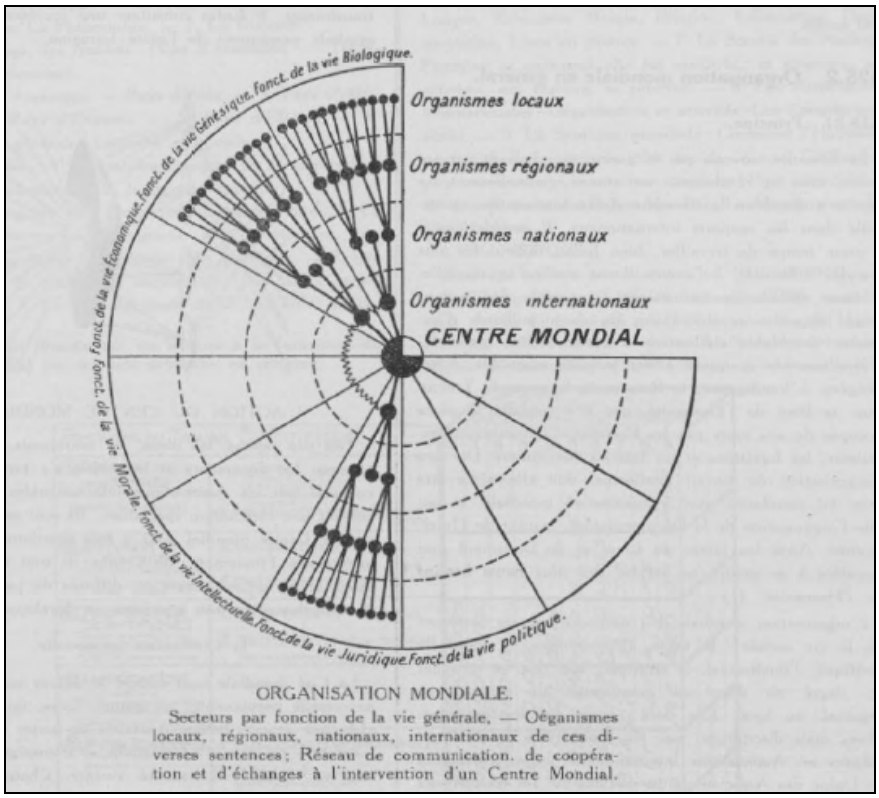


Figure 9. Otlet, *Traité de Documentation*, p. 420.

Everything emerges from the centre (cf. "totus ab uno/centro"); from the centre all is visible (cf. with the idea of a Panopticum in prison architecture; see {figure 10, 11 and 13}*).*

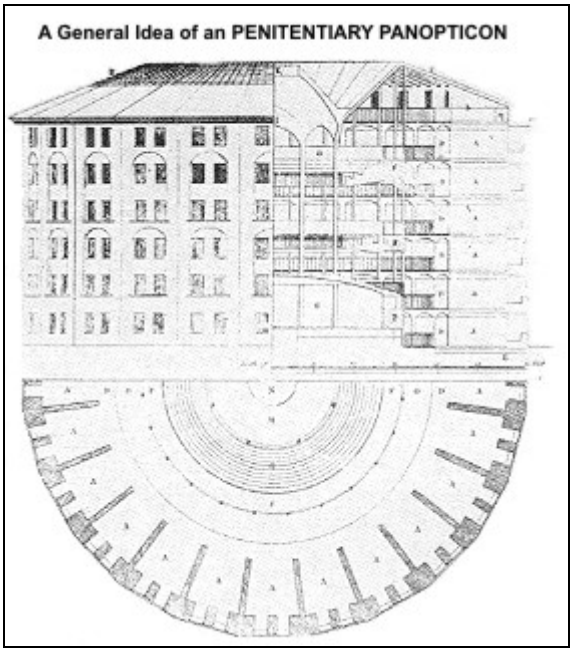


Figure 10. Jeremy Bentham's plan for a *Panopticum* 1791.

Described in Michel Foucault, Surveiller et punir: Naissance de la prison (Paris, Gallimard), 1975.



Figure 11. Presidio Modelo.

Presidio Modelo was built on the former Isla de Pinos, is an example of *Panopticon* ("all-seeing eye") design (see {figure 13}).

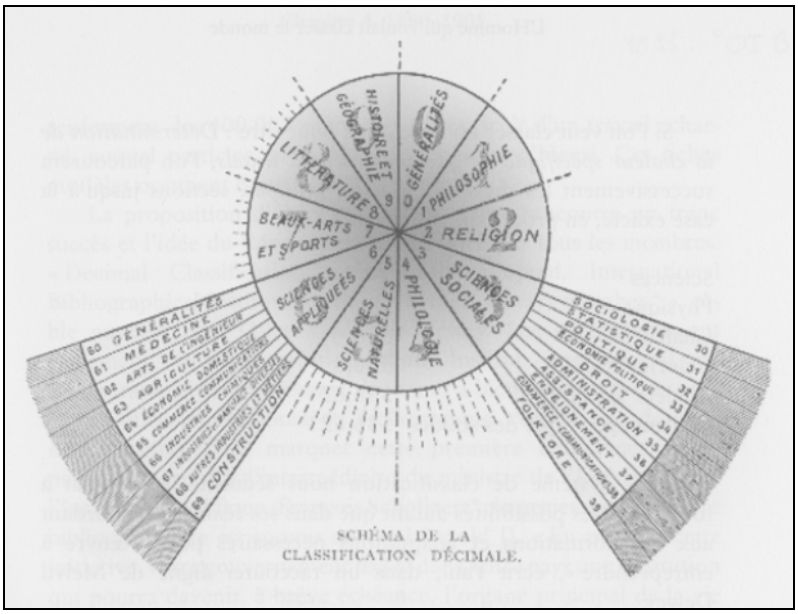


Figure 12. Otlet's Decimal System.

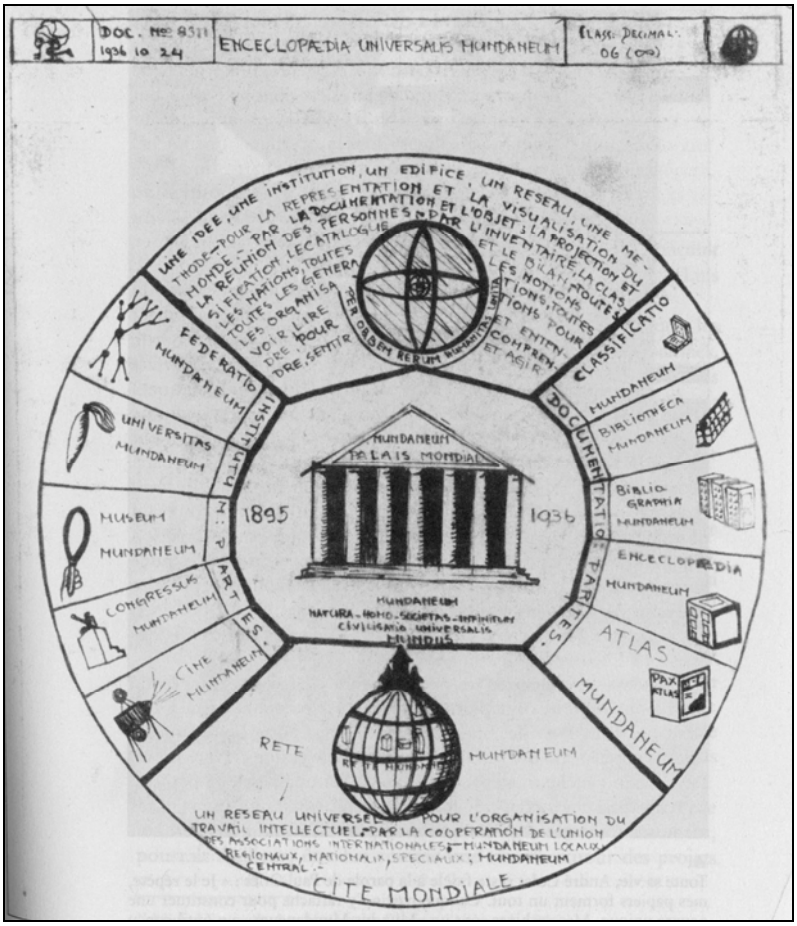


Figure 13. *Encyclopaedia Universalis Mundaneum.*

Now, being armed with some basic insight in Otletian ontology and epistemology, we move on to the specifics of *Otletian visual representation*.

*** 3. Representing the World and Knowledge[43] ***

Thus far, we have only considered Otlet's published works. Now we turn to his private notes which are now conserved at the *Mundaneum* at Mons.

As a *linguistic objectivist*, Otlet endorsed the view that a true synthesis of our knowledge should be more than a scheme *we merely and arbitrarily impose on nature*. For instance he noted that:

> La définition des mots doit reposer la définition des choses, des faits et des notions elles-mêmes qu'ils doivent server à exprimer. Une définition doit être un exposé précis des qualités nécessaires et suffisantes pour créer une classe afin d'indiquer les choses qui appartiennent à cette classe. […] Les définitions conduisent aux lois. Celles-ci sont l'expression de rapports entre des choses. Il n'y a aura d'expression claire que si les choses mises en rapport ont été elles-mêmes clairement bien définies.[44]

Rather, it should *mirror the elements of the objective world* (and, moreover, unravel the essence of such elements) *but also the relations visually represented by our scheme should furthermore structurally*

---

[43]. For this study I have studied the following classified material of Otlet's archives:

(1) Classification Décimale Universelle (CDU),
(2) La Cité Mondiale,
(3) Le Musée International, and
(4) *Encyclopedia Universalis Mundaneum* (EUM)

All conserved at the *Mundaneum*, Centre d'Archives de la Communauté Française, 76 Rue de Nimy, B-7000 Mons (Bergen), Belgium (URL: <http://www.mundaneum.be/index.asp?ID=410>). I thank the staff at the *Mundaneum* for their assistance during my archival work there in August 2007.

[44]. Otlet, *Traité de Documentation*, p. 12.

correspond to the objective relations amongst these entities. Let us see how Otlet tried to provide such a "*schéma du Monde*".

In this paragraph a small excursus on the notion of representation is made.[45] Elsewhere I have argued for a *pragmatic similarity model of scientific representation*. [46] I will begin by presenting its constituents.

> **(1)** *Provisional acceptance of shared characteristics*. Very often observational data concerning the target "suggest" to a person *p* that there is shared characteristic (see 4) between a target and a model. For instance, interference patterns suggest that light under some circumstances behaves in a wave-like manner. An agent provisionally accepts (hypothesizes) that there is a shared characteristic between the target and the model.
>
> **(2)** *Full acceptance of shared characteristics*. In view of a test of the model (see 5), a person *p* fully accepts a (set of) shared characteristic(s). This acceptance is not solely determined by the test. It is also dependent on our cognitive goals (see 3).
>
> **(3)** *Agreement with cognitive goals*. Our cognitive goals (CG) will determine the level of detail we require. If our goals are very stringent then we will require a very high

---

[45] "Representation" has only recently become a topic in the philosophy of science, see: Daniela Bailer-Jones, When Scientific Models Represent, *International Studies in the Philosophy of Science*, 17(1), 2003, pp. 59-74; Ronald Giere, How Models Are Used To Represent Physical Reality, *Philosophy of Science* vol. 71(5), Supplement, *Proceedings of the 2002 biennal meeting of the Philosophy of Science, Part II: Symposium Papers*, 2004, pp. S742-S752; Nelson Goodman, *Languages of Art, An approach to a Theory of Symbols* (London: Oxford University Press), 1969; R.I.G. Hughes, Models and Representation. *Philosophy of Science*, vol. 64, Supplement, *Proceedings of the Biennial Meeting of the Philosophy of Science Association, Part II*: Symposia and Invited Papers, 1997, pp. S325-S336; Mauricio Suárez, *Scientific* Representation: Against Similarity and Isomorphism. *International Studies in the Philosophy of Science* vol. 17(3), 2003, pp. 225-244.

[46] Steffen Ducheyne, Lessons from Galileo: The Pragmatic Model of Shared Characteristics of Scientific Representation, *Philosophia Naturalis* vol. 43(1), 2006, pp. 214-234.

level of detail. If our goals aim only at giving a rough sketch, we will be satisfied with a lower level of detail.

(4) *Sharing of relevant characteristics*. When we assert that a model fits a target we express that there is a set of common characteristics shared (= Γ(SC)) by that model and its target. Models do not represent a system in its entirety, but they are selective: they represent some *aspects* of a system. This set contains at least one element (one shared characteristic).

(5) *Testing of the relevant characteristics.* The result derived from the model is transferred back to observation (O). If the result does not correspond with observation, we may chose to no longer accept this shared characteristic. This means that the model loses its representational power.

Visually this can be represented as follows – the constituents are numbered in the scheme:

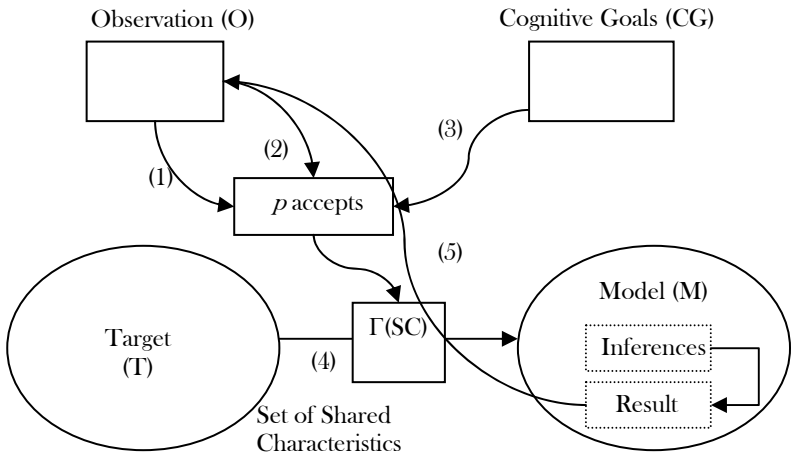


Figure 14. The PMSC model of representation.

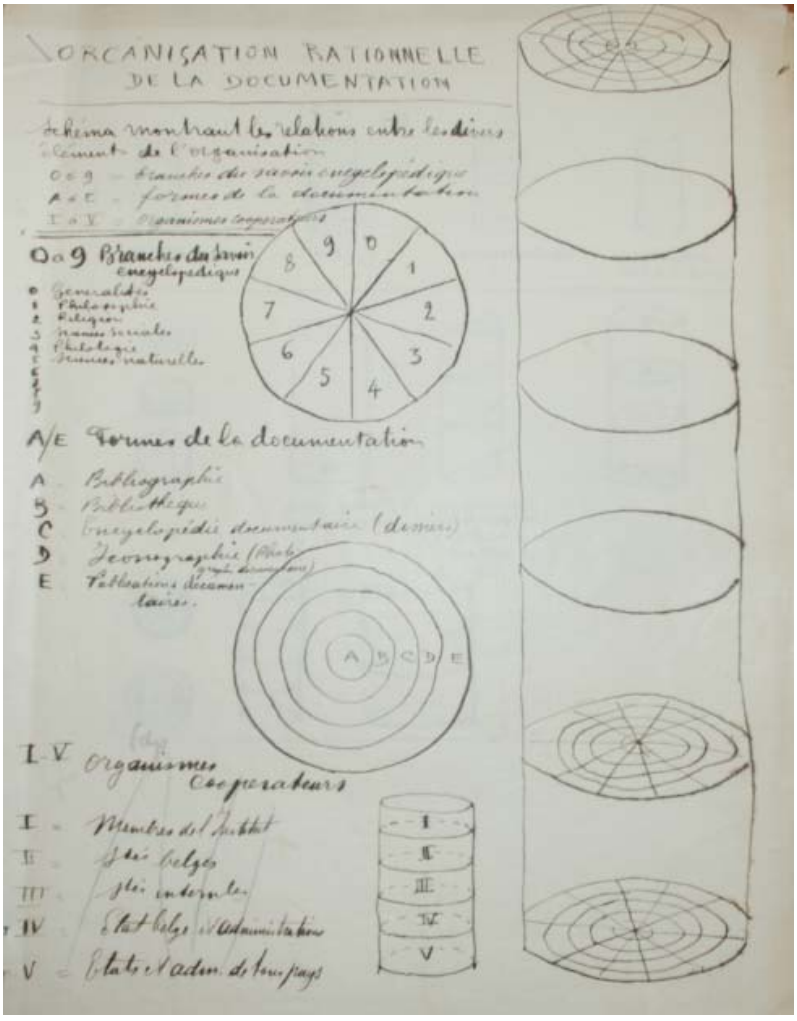
Of course, scientific representation may be more complex, but these five relations characterize what it means for a model to represent its target. This helps to answer the question: "*In virtue of what does model represent?*". This suggests the following definition of (scientific) representation, which incorporates these essential features (1-5):

> *A model M scientifically represents a physical system, i.e. a target, T, with respect to a set of relevant characteristics and certain cognitive goals for a person p,* iff:
>
> **(1)** Person *p* initially assumes that there is a shared set of relevant characteristics, *Γ(SC)*, between *M* and *T*.
> **(2)** In virtue of *Γ(SC) M* allows inferences to be drawn about *T (M → I)*.
> **(3)** These inferences lead to a result, *(I → R)*, which can be tested on its empirical adequacy.
> **(4)** In view the empirical adequacy of *R* a person *p* now fully accepts that *M* and *T* share a set of relevant characteristics.
> **(5)** *Γ(SC)* exhibited by *M* agrees with the cognitive goals (*CG*'s) of *p*.

(1) and (4) reflect that representational performance of a model is always provisional. (2) incorporates Suárez' notion of inferential power. (4) warrants a feed-back loop to test the shared characteristis with respect to *Γ(SC)*. This helps us to delineate the difference between representation in general and scientific representation – it also helps to explain cases of misrepresentation. (5) shows the pragmatic aspect of representation. I admit that the notion "inference" needs to be rendered more explicit. Inferences in science (especially in physics) are very often but not necessarily (e.g. analogy) related to mathematical operations on physically interpreted symbols. Scientific

models focus on certain characteristics which easily allow for a mathematical formalization. This focus (which entails abstraction and idealization) facilitates formalization. Focussing on something always entails neglecting or even transforming other things. Otlet's view differs from this model: according to him models do represent a system accurately in its entirety.




ORGANISATION RATIONNELLE
DE LA DOCUMENTATION
Schéma montrant les relations entre les divers
éléments de l'organisation
0 à 9 – branches du savoir encyclopédique
A à E – formes de la documentation
I à V – organismes coopérateurs
0 à 9 Branches du savoir encyclopédique
0 Généralités
1 Philosophie
2 Religion
3 Sciences sociales
4 Philologie
5 Sciences naturelles
A/E Formes de la documentation
A Bibliographie
B Bibliothèque
C Encyclopédie documentaire (dossiers)
D Iconographie (Photographie)
E Publications documentaires.
I-V Organismes coopérateurs
I Membres du Institut
II des Belges
III plan international
IV Etat belge et Administrations
V Etats et Administrations des autres pays

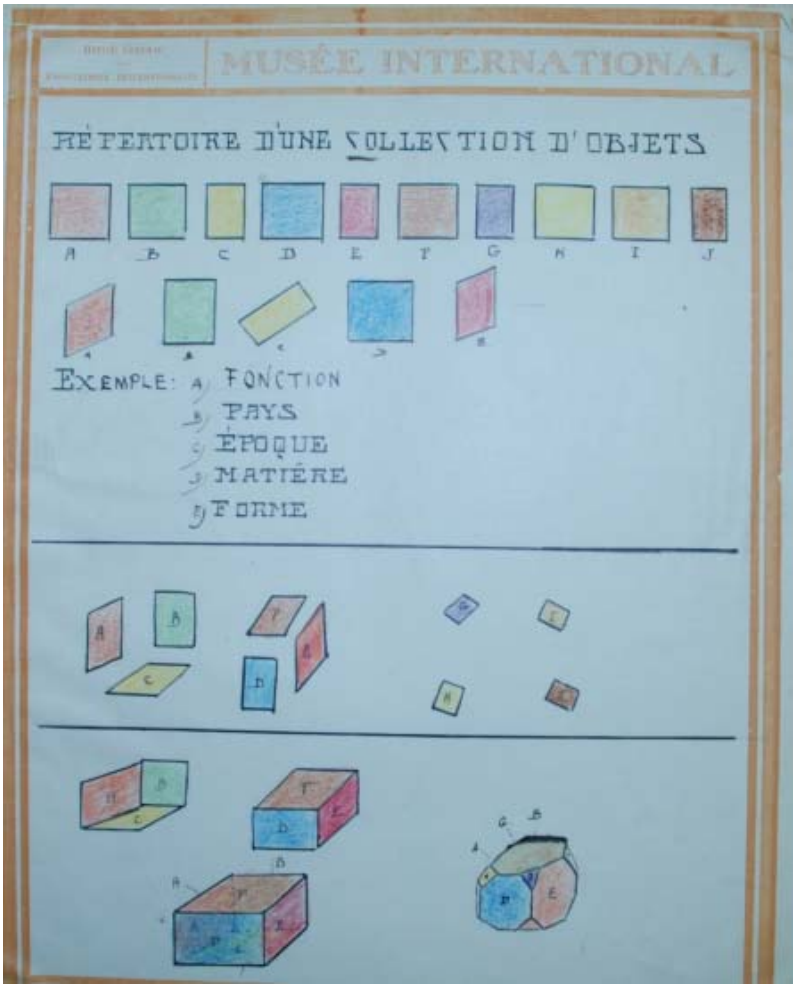
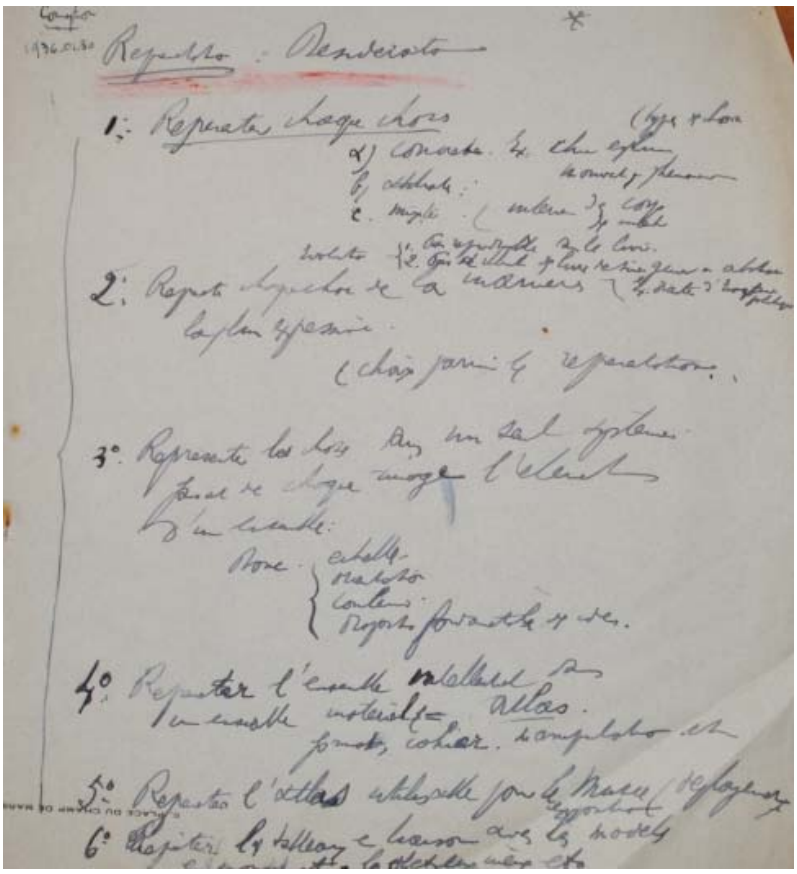


Figure 15(a,b,c). *Archives Personnelles de Paul Otlet* (Mundaneum, Mons), *Encyclopedia Universalis Mundaneum*, II 1 A2.



1936-1939 Repertoire : Dessin d'étude

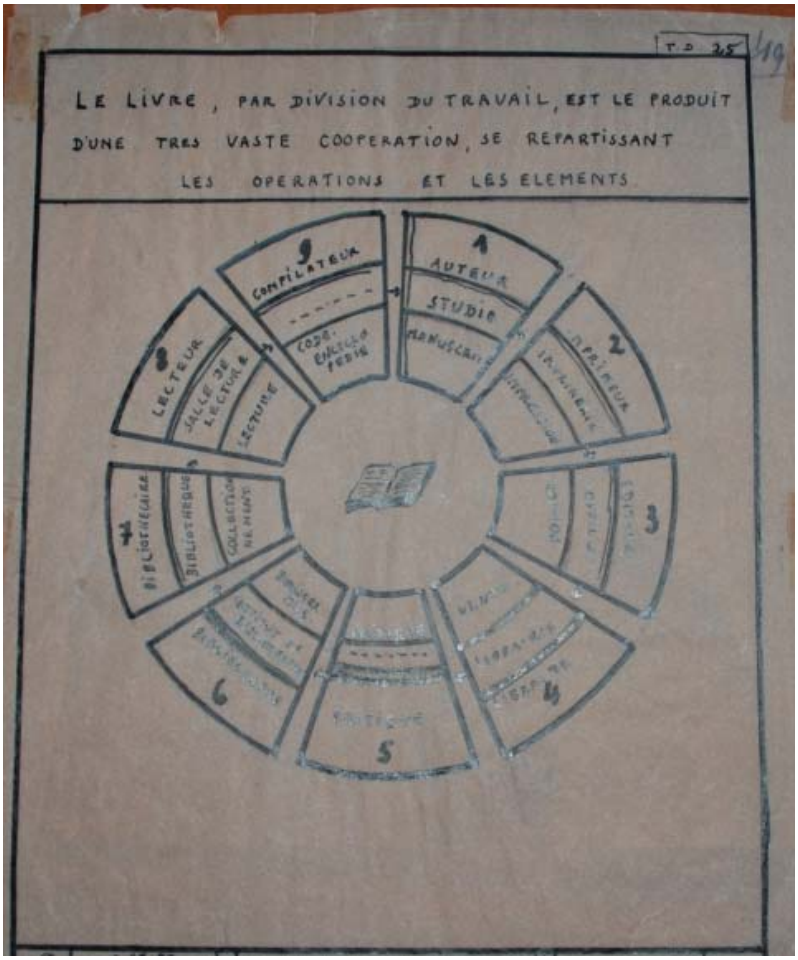
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3°. Représenter les lois qui ont fait typiques
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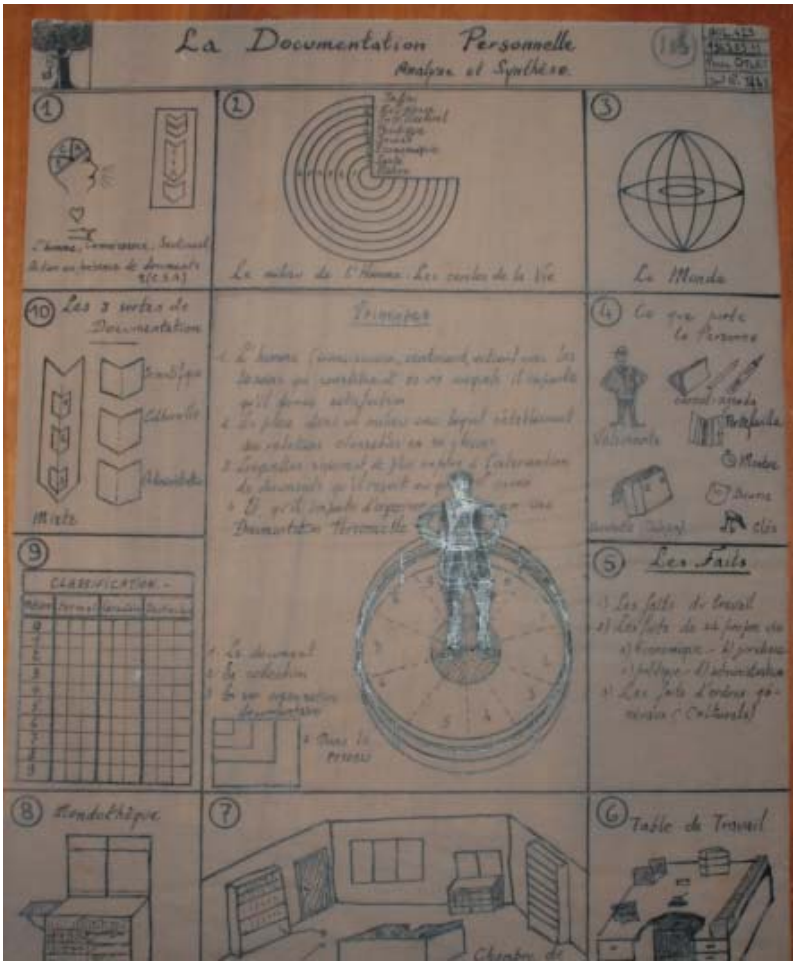
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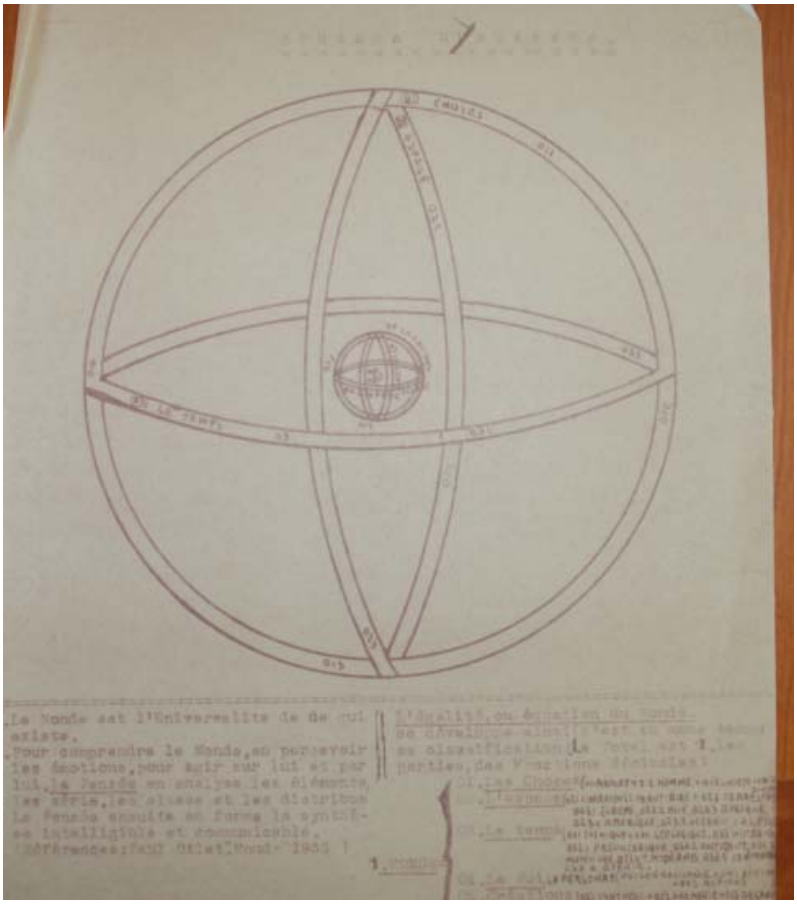

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LECTURE
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COMPILATEUR


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LA VIE ET LES TRANSFORMATIONS DU PERIODIQUE
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A
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TICLES ET LES COORDONNE
L'IMPRIMERIE
LA BIBLIOTHEQUE QUI LE CONSERVE.


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Analyse et Synthèse
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Le Monde
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Principes
Ce que porte la Personne
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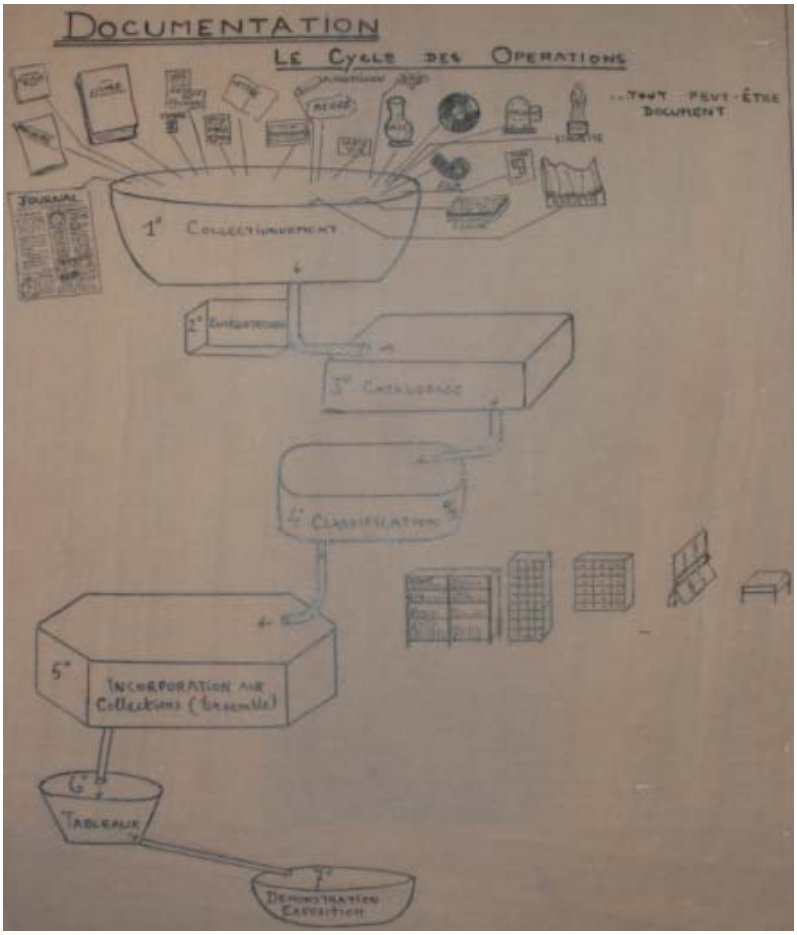

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Figure 16(a,b,c,d,e,f,g,h,i,jk,l,m,n,o,p). *Archives Personnelles de Paul Otlet* (Mundaneum, Mons), *Encyclopedia Universalis Mundaneum*, II 2 A2.



Figure 17. *Archives Personnelles de Paul Otlet* (Mundaneum, Mons), *Encyclopedia Universalis Mundaneum*, II 14 III 2.F3.



Figure 18. *Archives Personnelles de Paul Otlet* (Mundaneum, Mons), *Classifications de Documentation Décimale*, CDU 40.

*** 4. *Conclusio* ***

In this essay we have seen how the pioneer of information science struggled throughout his career to adequately represent knowledge and pointed to the underlying ontology and epistemology that give Otlet's attempts its *semantic depth*.

Representing and rendering knowledge accessible is and will be an ongoing pursuit and challenge for generations to come (especially in this age of knowledge), as science will never be complete and neither will our linguistic expressions ever be sufficient, but it is a task that is vital to continue to gain, harvest and disseminate knowledge relevant to our intellectual and practical needs. The Temple of Artemis is indeed gone for good, but there are many fruitful, potentially interactive and mutually enhancing, smaller ones. *Continuemus Otleti laborem* and let Otlet be our guide. To conclude let me quote our friend one more time:

> *Courage, ô Homme, simple roseau, mais roseau pensant. […] Tes découvertes successives n'ont fait qu'exalter en toi l'esprit de recherche, de lutte et de vie.*[47]

STEFFEN DUCHEYNE – GHENT UNIVERSITY



[47] Otlet, *Monde*, p. 404.

Reassessing Yale's Cathedral Orgy: The Ecclesiastical Metaphor and the Sterling Memorial Library

Paper Abstract

Margaret M. Grubiak*

In 1931, less than three weeks after the dedication of the Sterling Memorial Library at Yale University, Yale senior and future journalist William Harlan Hale gave a vivid and scathing account of the library's religious image in an article descriptively entitled "Yale's Cathedral Orgy":

> A library? You would never recognize it when you saw it. Enter it—pass through a bastard version of the west portal of an abbey. Continue down the main hall, which is a precise copy of a nave with five bays. Observe the massive and unnecessary piers, the inconvenient but orthodox side aisles, the lofty transepts bristling with sanctity above and serial catalogues below.…Pass down the corridors, and cry out in rapt adoration of more color, more carving, more corbels, more plaques, balconies, chandeliers, wall brackets (electric, in the style of ancient torch-holders), more sacred splendors! And, while at last laboring to find a book, bow your head in holy ecstasy![1]

Yet despite Hale's damning description of seemingly anachronistic architecture, the Sterling Memorial Library made a remarkable statement about the nature of knowledge and religion at Yale in the second quarter of the twentieth century. Constructed during an ambitious interwar building campaign, the Sterling Memorial Library became both library *and* cathedral at the campus center. An enormous neo-Gothic chapel had been planned across from the library in order to juxtapose religion and learning and communicate Yale's commitment to educating the "whole student." However, the ending of the centuries-long tradition of compulsory chapel in 1926 assured that no new chapel would be constructed at Yale. The Sterling Memorial Library alone would embody empirical and revealed knowledge at Yale's core.

By employing the ecclesiastical metaphor, architect James Gamble Rogers created a library laden with fluid meanings, at once preserving a role for religion and communicating its secondary status in the modern American university. As Hale's account illustrates, the immediate impression of the library was as a cathedral. At the culmination of the entrance hall nave, under fan vaults and above the altar-like circulation desk, was the Alma Mater mural by artist Eugene Savage (Figure 1). The mural depicted Yale's Alma Mater clothed in white with a blue mantle, standing in front of the Tree of Knowledge and attended by figures representing the disciplines. While the mural was in many ways a proper allegorical depiction of Yale—the blue and white of Alma Mater's robes signified Yale's colors, and the naked figures of Light and Truth symbolized the Yale motto, *Lux et Veritas*—the mural also read as a depiction of the Virgin Mary, overseeing and directing the consumption of knowledge.



Figure 1. Eugene F. Savage, Alma Mater mural, Sterling Memorial Library, Yale University, New Haven, Connecticut, installed 1933.

The inclusion of Yale's copy of the Gutenberg Bible within the library similarly carried double meanings. While the Gutenberg Bible was a secular relic, the product of an invention that carried enormous consequence for the dissemination of knowledge, it was also a sacred relic, the very embodiment of revealed knowledge. At the end of the rare book room, James Gamble Rogers created a chapel-like space, a polygonal chamber set off by iron gates, whose tall walls are pierced by lancet windows. Originally the Gutenberg Bible was placed at the center of this room, displayed and protected under glass. The reading of the

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[1]William Harlan Hale, "Yale's Cathedral Orgy," *The Nation* 132, no. 3434 (29 April 1931): 472.

Gutenberg Bible as a religious relic supported the interpretation of the Sterling Memorial Library as a sacred space.

As the single monumental structure at the center of Yale, the Sterling Memorial Library necessarily engaged the tensions at work in the modern university, articulating them, struggling with them, and ultimately casting religion as an omnipresent background to the modern work at hand. If revealed knowledge was no longer the dominant source of inquiry in the modern university, it remained the sanctifier of and gateway to all knowledge. This paper argues that the significance of the Sterling Memorial Library rests not in its assault on Modernist sensibilities but rather in the struggle of the modern American university to preserve the memory and role of religion and revealed knowledge in an increasingly empirical academic climate.

History or fairytale? Camillo Sitte's metaphor of the urban space as a memory

Sonja Hnilica*

Abstract - **The metaphorical analogies between urban spaces and memory have often been stated. The City has been used as a metaphor for the memory since antiquity. The memory as a metaphor for the city on the other hand is a frequently used metaphor even in our days. The focus is on the relevance of the memory-metaphor on urban design. I will analyse examples from Camillo Sitte's writings on urban design, considering not only his famous book Der Städtebau nach seinen künstlerischen Grundsätzen (1889), an early attempt of rethinking urban space in a time of major changes caused by the industrialization and the resulting emergence of large cites, but also Sitte's numerous pointed articles he wrote on Vienna throughout the second half of 19th century. Camillo Sitte's writings offer ambivalent viewpoints on the topic. Selective readings of Sitte reduced his idea to the mere imitation of the historical, irregular street layouts. Some architects might have overlooked, that Sitte strongly advised against metaphorically "writing" an imaginary story into the city. Considering the different notions of the memory-metaphor, this might not necessarily be a dilemma. A close reading of Sitte's use of the memory-metaphor will reconcile at least some of the contradicting meanings. I will contrast Sitte with other relevant positions to discuss how debates in different fields influenced both concepts likewise. I do understand metaphors not as mere rhetorical ornaments, but as hints on (more or less) hidden structures. Thomas S. Kuhn (1979) and Gorge Lakoff (1980) have shown, how metaphorical relations produce analogies, that structure our realms of experience and hence construct reality. I am going to show, what that could mean for urban design.**

I. Introduction

The metaphorical analogies between urban spaces and memory have often been stated. Cicero already suggested imagining the memory as a city. He recommended the visualization of prominent elements of a speech as objects that may be placed in a sequence of urban spaces. Since then, many architects have used this analogy the other way round, and conceptualized the city as a memory. It seems that even 2000 years later the old metaphor is still not outdated. Several German cities have recently decided to reconstruct historical buildings in their city centers that were destroyed during World War II. The proponents of this movement claim it necessary to regain the cultural memory that has been destroyed with the buildings.

In this paper I am focusing on the relevance of the memory-metaphor on urban design. I will present examples from the writings of the Viennese architect Camillo Sitte (1843-1903). His famous book Der Städtebau nach seinen künstlerischen Grundsätzen (1889), translated into 15 languages, is an early attempt to rethink urban space in a time when major changes were caused by the industrialization and the emergence of large cites. I will also consider some of Sitte's numerous pointed articles he wrote on Vienna throughout his career.1 In Sitte's writings, one can find many different metaphors for the complex phenomenon of the city. Among others, he describes the city as a house of many rooms, as a beast or endangered animal, a woman, an organism with a heart, lungs and veins. Sittes artwork metaphors are famous: painting, Gesamtkunstwerk, music or stage. He also makes use of landscape metaphors, likening the city to the ocean, desert or river delta, often with negative, life-threatening connotations. Technical metaphors however are negative: Sitte describes the modern big city as a technical product, a machine, diagram or prison. One important complex within these various metaphor conglomerations is the metaphor of the city as memory, monument, history or written text. The extensive use of metaphors for the city is typical for Sitte's writings - and not only for him, but for the architectural discourse in general, as I have shown in my PhD-thesis.2 It seems that it is not possible to think about the city without using metaphors. A city is a very complex entity, without clearly defined boundaries (at least nowadays), linking material structures with social, political, economical and cultural ones.

The concept of "memory" can be said to be as complex as the city. As Aleida Assmann stated in her book Erinnerungsräume (1999), one cannot talk about memory without using metaphors.3 Assman discusses several metaphors like wax tablet, book, palimpsest and photography, digestion, archive, buildings and library. Although she mentions the city as an important locus of remembrance, Assmann does not denote the architecure of the city and as a metaphor and as a media of memory.

I am going to discuss how both concepts-memory and city-influenced each other likewise. Why analyze metaphors? I do understand metaphors not as mere rhetorical ornaments, but as hints on (more or less) hidden structures. In his unpublished essay "The Philosopher" of 1872, Friedrich Nietzsche argued that "there is no 'real' expression and no real knowing apart from metaphor. (...) The most accustomed metaphors, the usual ones, now pass for truths and as standards for measuring the rarer ones. (...) Knowing is nothing but working with the favourite metaphors..."4 Nietzsche concludes: "Truths are illusions which we have forgotten are illusions; they are metaphors that have become worn out and have been drained of sensuous force, coins which have lost their embossing and are now considered as metal and no longer as coins."5

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Thomas S. Kuhn reckoned that metaphors might play a similar role as scientific models.6 This train of thought has been followed by George Lakoff and Mark Johnson, who claim that metaphors are not merely a linguistic matter but a crucial element of thinking. Reality itself is defined by metaphor, and as metaphors vary from culture to culture, so do the realities they define. A metaphor functions by systematically highlighting some aspects and hiding others. In so doing, it structures our action. Actions guided by the metaphor will, of course, fit the metaphor. This will, in turn, reinforce the power of the metaphor, making experience coherent. In this sense, metaphors can be self-fulfilling prophecies.7

Starting with a close reading of Sitte's use of the memory-metaphor, I will confront him with other relevant positions. The following questions will be addressed: Which interpretations of the city have been established by the memory metaphor? Which qualities are enhanced? As the concepts of city and memory have both undergone major changes during the past two centuries, I want to examine, if and how these changes found their ways into the other discourse. Are there dilemmas in city planning that result from implications of the memory metaphor? Can they be solved by abandoning the memory metaphor and by choosing another one instead or might it be more fruitful to apply new understandings of memory?

II. Monuments

Sitte wrote in 1891 that traditionally a city, that has grown over the centuries, "is a piece of history, like an old cathedral, whose walls, memorial stones, statues and paintings putting the observer back into long-forgotten times."8 To understand the relevance of this comparison of a city with a monument (lat. monere = remember) one has to be aware of the historical background. Sitte wrote these lines while his hometown Vienna underwent major changes. Many new building were being erected, and the number of inhabitants doubled within 40 years between 1850 and 1890. In his youth Sitte had seen the old fortifications fall. Most of the medieval, renaissance and baroque buildings within the old city centre were being destroyed, especially the townsmen's houses and cloister complexes. The streets were being widened and straightened, and new tenement houses were being erected in great numbers all over the place. The new Ringstrasse was an impressive broad boulevard with many lanes, framed by large and splendidly decorated buildings that offered the comfort of new technical equipment like elevators and water tubs. Most architects were enthusiastic. Nevertheless there were protagonists like Sitte who started to mourn the loss. There had not yet been established an institution who cared for the preservation of monuments. Only famous monuments like cathedrals or castles were estimated valuable.

The idea that old monumental buildings are worth saving even if they had lost their actual function was born in the renaissance. The Italian painter Raffael had written a letter to pope Leo X in 1520 that it was necessary to preserve the ruins of the Roman empire. Until then, the large ancient ruins, which had lost their functions in the shrinked medieval city of Rome, had been used as stone pits. Spolia from Rome were brought all over Europe to decorate palaces, churches and so on. Only the rising interest in the ancient arts in the renaissance put an end to this practice. At this point Rome became a destination for travelling architects and artists who studied the ancient monuments to explore the lost knowledge of classical architectural ornament, proportion and construction.

During the 19th century, prominent pieces of architecture from other periods also became objects of interest. The French architect Eugène-Emmanuel Viollet-le-Duc-the preservation expert from the middle of the 19th century on-had studied the beauty of gothic churches and initiated the catalogization and restauration of the French cathedrals, cloisters etc. At his time Sitte not only wanted to preserve outstanding buildings. He was also interested in the very normal houses, small plazas, and narrow streets. He found beauty in the city fabric and wanted to stress that by comparing it to the established monuments like cathedrals. The idea, that not only religious or monumental, but also very profane parts of the city, such as dwellings, typical street ensembles or even street patterns are worthy of being saved is directly connected with the dynamic city growth caused by the Industrial Revolution and the deep changes in the daily life of the citizens which it entailed. Feeling that nothing would ever be the same as before, architectural monuments were regarded as irreplaceable and _ in contrast to modernity _ embodied the lost world of the older days. In a famous article the Viennese art historian and Sitte's contemporary Alois Riegl differentiated between normal monuments and architectural monuments: only the former have been planned as monuments, whereas an architectural monument becomes a monument with time, retrospectively.9 In 1849 the English architect John Ruskin had stated that humankind cannot remember without architecture: „We may live without her [i.e. architecture], and worship without her, but we cannot remember without her."10 Ruskin felt a moral duty to preserve the work of his ancestors: „We have no right whatever to touch them [i.e. the old buildings]. They are not ours."11

Today, old city centers, the "hearts" of the cities, are often regarded as unique and very fragile objects, which have to be taken out of ordinary life for their own safety, like an artwork in a museum. Francoise Choay remarked that the metaphor of the city as a monument - no matter if it is unintentional or not - is not to be confused with a city that contains many monuments.12 She also showed the limits of this metaphor when she said that one cannot "put a bell jar over a city center". Today, the term "musealization" has a negative connotation, standing for tarted up city centers that are attractive for tourists but without importance for the actual inhabitants. Sitte criticized the idea of removing monuments from public spaces and putting them into museums for their safety, and called museums "prisons of art" (Kunstkerker).13

III. The City as collective memory

According to Sitte, monuments have an important function in public space. He interpreted the city center as an aggregation of signs: "The ruler's castle, palaces, large monuments of important statesman and historical signs of remembrance are standing side by side."14 According to Sitte, monumental structures in public space - or public space itself - convey history, patriotic feelings and civil values. As in the case of the Acropolis in Athens, where "the temples and monuments of the central space are the very myths of the Hellenic people turned into stone. [...] This is the true centre

of an important city, where a great people's world view (Weltanschauung) becomes tangible."15 In this passage Sitte evokes the imago of architecture as thinking becoming stone. Architecture and thinking are metaphorically connected in many ways. Take the fact the we use countless architectural metaphors to talk about Gedankengebaeude (constructs of thoughts), like the "foundation" of an argument or the "supporting pillars" of an argument.16

John Onians claims that the architecture of an age reflects the cognitive processes of its builder and inhabitants as well as it controls it. The Babylonian tower for example had influenced the image of god, and the motive of the column was crucial for the concept of the British constitutional monarchy.17

The sociologist Maurice Halbwachs (1925) thought that a community's shared memories accumulated a collective memory, bound to the community's built environment.18 The architect Aldo Rossi (1966) concluded that the built structure of a city might be seen as the collective memory of its inhabitants. Rossi wanted to unterstand the city a a constant process of construction, as a human artifact, in which history and presence coexist. Within this continuous procedure of modification, architecture embodies the built form of collective memory. For Rossi, the city's architecture itself is the collective memory of its inhabitants; he even used the term „a city's memory".19 In this sense the ideas are floating through the history of a city and shape its physical structure.20 That's why Rossi comes to the conclusion that every architectural intervention not only changes the physical form of a city but also the identity of its inhabitants.

Sitte claimed that the spatial and the social organization of a city are strongly connected: in ancient Greece and Rome the plaza itself, the surrounding buildings, the monuments and the daily life of the citizens formed a single harmonious, organic entity.21 But he does not suggest architecture to be a kind of universal Ursprache of mankind, a language everybody is able to understand. Associations and remembrances are evoked additionally to the actual visual impression in urban space: "Athene's olive tree was an ordinary olive tree (...) but the phantasy of literature had hallowed it and a whole people put up with this jugglery of phantasy."22 Symbolic meaning that is added to architecture can only be read if one has the cultural background. The meanings are established in literature, myth, religion or politics. There are many examples of pieces of architecture that have had different symbolic meanings at different times. Hagia Sophia with its famous cupola turned from the most important Byzantine church into the paradigm of a mosque. Likewise, there might be a conflict about the privilege of interpretation between rivaling groups at a time. Monuments can be associated with new symbolical meanings (e.g. the Brandenburger Tor in Berlin or the World Trade Center).

Of course not only the symbolic meanings of architecture are relevant. Architecture locates individuals in spaces with its physical substance. It is marking territory; architecture can be inclusive or exclusive, can establish spatial hierarchies, can connect or disconnect persons or groups visually, acoustically or physically. Paul Connerton claimed that social practice and rituals are more important than architectural forms or symbols. These rituals are indeed bound to certain places, but they take effects only through practices of incorporation, the participation of the bodies, and to a lesser extent because of the inscription of memories to a certain place.23 These different levels tend to be confused in the memory metaphor.

IV. Reading

If the symbolical meanings of built structures can change, the connection between meaning and architectura form is not stable. Sitte complained that the organic connection between the form of the urban space and the rituals of civil life had been lost in modern times. Citizens of the 19th century no longer discussed public matters in the agora as in ancient Athens: instead debate took place in the newspapers.24 (As a matter of fact, Sitte himself discussed questions of city planning in the articles he regularly wrote for the Neues Wiener Tagblatt.) This statement as well as Sitte's metaphor of the city as a cathedral reminds of the famous passage in Victor Hugo's novel "Notre Dame" (1831). Hugo coined the metaphor of a cathedral as a book with "letters of marbel" and "pages of granite". Before Gutenberg, Hugo stated, architecture was "the book of mankind", the "universal language".25 Inherent is again the concept of architecture as a language. This is a metaphor with a great tradition and many different interpretations.26 Hugo's reflections on architecture as a language culminate in his famous dictum: "Ceci tuera cela." The book will kill the architecture.

Unlike Otto Wagner who eagerly embraced traffic and the street as the essence of the modern city, Sitte refused to develop new public spaces for what he perceives as the new functions and instead intended to educate the citizens by shaping their environment according to artistic principles: "One must keep in mind that city planning in particular must allow full and complete participation in art, because it is this type of artistic endeavor, above all, that affects formatively every day and every hour the great mass of the population."27 Astonishingly enough, Sitte drew the conclusion that art is needed to preserve at least parts of the old designs as a memory without an actual function (see Fig. 1).

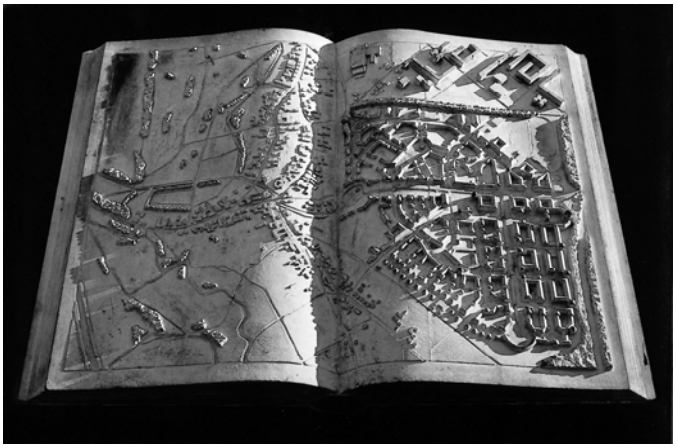


Figure 1. The city and the book: Rob Krier, Kirchsteigfeld, Potsdam (1992-97)

The city as media of memory can also be interpreted in a different way. When the architecture of a city is history becoming stone, then it is assumed that a suitable person is able to decipher the story inscribed in it. In front of oddly crooked streets and irregular forms in the city layout one usually hints on a former functional reason. That means one can assume that there once was a watercourse, a building or a passageway. 28 Rounded plazas with a gothic cathedral standing in the middle can be interpreted as the remains of

abandoned courtyards, which had surrounded the churches in former times.29 In some cases the (personalized) part of the city itself tells the story to everybody who likes to listen, as Sitte described: "That plaza (Platz, in German masculine) in front of the city hall has its own (hi)story (Geschichte) as well. And this (hi)story tells us that he has been a parade ground. And that's what he is today: a retired parade ground."30

This brings to mind Thomas de Quincey, who in 1845 thought of the memory as a palimpsest, a piece of parchment that has been used to write on several times. The ink of the older text was removed, an usual practice in antiquity and the middle age due to the high costs of parchment. In the 19th century scientific findings enabled scholars to reread former inscriptions under the last visible text with the help of chemicals. The idea that something lost and forgotten can be restored in total also in human memory, that every recollection is physically inscribed in the human brain, fascinated de Quincey: "Such a palimpsest is my brain (...)! Everlasting layers of ideas, images, feelings, have fallen on your brain as softly as light. Each succession has seemed to bury all that went before. And yet in reality not one has been extinguished."31

This metaphor implies that the history or memory remains hidden below the surface, maybe undetectable but otherwise unchanged. One only needs to be able to "read" it. In 20th century semiotic theory added another meaning to the metaphor of reading a city. In 1967 Roland Barthes wrote that everybody who moves through a city was a kind of reader. 32 To him, there could never be just one, unambiguous, reading. Michel de Certeau put forward the same image. He wrote in 1978 that the walkers' bodies obey the pressure of a city text, that they can write but not read. The web of moving and intersecting "texts" compose a manifold story without an author or a reader.33 Only a spectator from a watchtower or a city planner with his plans could dream of the city as a readable text. According to de Certeau, the city as a readable and understandable text is a chimera. De Certeau turns the text metaphor against totalizing interpretations of the city, opening it up for possibilities of subversive acting of the inhabitants.

V. Remembering

As I already mentioned, the city has been used as a metaphor for memory since antiquity. According to Cicero space is an important factor, because remembrances are inherent in places: "tanta vis admonitionis inest in locis".34 This phrase can be interpreted in two ways: Does a person remember the place, or does the place itself have a memory? Cicero deduced his mnemotechnique from this ambiguous image. He recommended the visualization of prominent elements of a speech as objects that may be placed in a sequence of urban spaces. Generations of rhetoricians moved mentally between the monuments of ancient Rome, placing specific objects in certain places and recollecting them afterwards in the same order (see Fig. 2).

During the following centuries, the concept of memory underwent several major shifts. Assmann finds a strong interrelationship between the metaphors of memory and the media of memory. The new technique of reproduction through printing imposed limits on the tradition of ars memorativa. According to Assmann, the way scholars and artists imagine the actual act of remembering and forgetting follow the dominant technique of the storage of information like writing, printing or photography. The metaphors stand for different models of how we memorize and how we remember.35

Nietzsche, Halbwachs and others used the term "memory" to criticize the scholarly historical debate. Nietzsche wrote 1874 that it was possible to live nearly almost without remembrances, whereas it was absolutely impossible to survive without the ability to forget.36 Sigmund Freud chose the example of a person who every day on his way through the city stops in front of every monument recalling long-forgotten events to describe the behaviour of neurotics.37 The term "memory" underlined the constructivist character of remembrance, which stabilizes identities of individuals as well as groups. Thus, these authors confirmed the relevance of memory in opposition to "history", which claimed to be objective and neutral. Assman differentiated between two kinds of memory to reformulate this distinction. 38 The functional memory is selective, it only contains a small part out of all possible information that could be remembered, so that a meaningful story is constructed. It is related to a group, connected to values and future-oriented. The so called collective memory, according to Assmann has no organic basis, no "collective soul" is existing in the literal sense. A society with its spaces, symbols and rituals influences the individual memories and thereby forms the identity of the whole group.

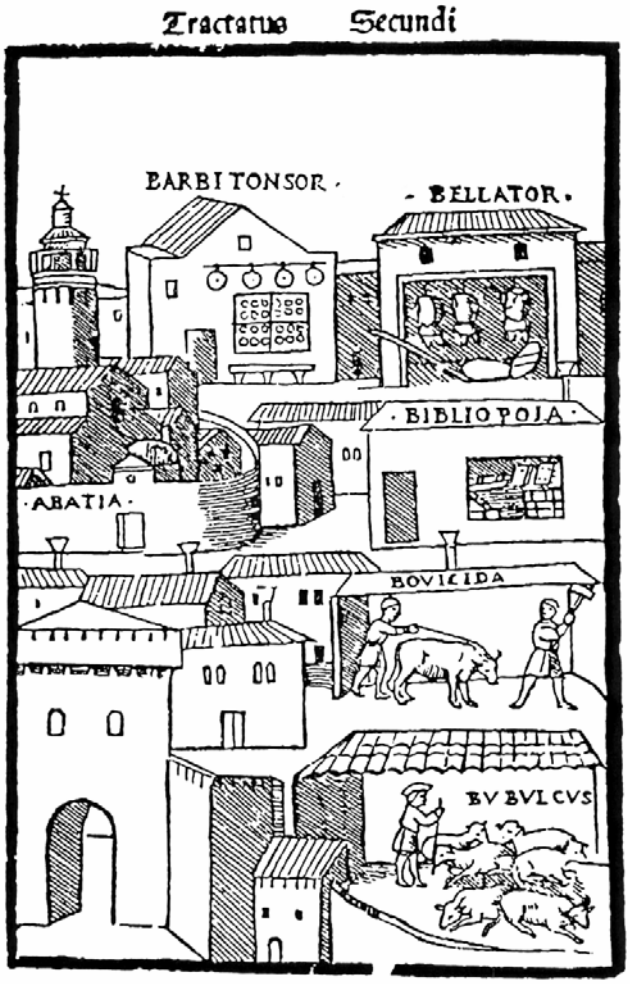


Figure 2. Johann Romberch, the artificial plan of a city in the service of mnemonics (1520)

The storage memory (which also stands for historiography) by contrast has no vital relation to the present time. Information is collected as a kind of reservoir for functional memory in the future. Assman's storage memory implies the existence of a storage medium outside the body. In oral societies there is no storage memory, because remembering is so laborious. With writing it became possible to store more remembrances than a person can memorize. During the last few decades the opposition of memory and history has been fading away, as historiography itself is understood as a result from present-day readings and interpretations of the past.

Taking into account this definitions of memory for the interpretation of the city, we can now deduce two conflicting issues: if we imagine the city as a functional memory, that constructs identity, this memory must be able to forget. But if we understand the city as a media for the storage of information, as a reservoir of the functional memories also for the generations to come, the city should store as much information as possible. Wolfgang Sonne concludes, "the city itself is not a memory, and historiography is not the same as remembering. It is we who can choose whether to use it as a means of experience or not."39

VI. Recollecting

Modernist architects throughout the 20th century dreamed of the possibility of a tabula rasa. They aimed to turn down the old and crowded city centres, to be able to implement their design of the ideal city. One of the most striking versions is Le Corbusier's Plan Voisin (1922) with its huge freestanding skyscrapers in a park landscape right in the middle of Paris (see Fig. 3). The term tabula rasa or "cleaning the slate" derives from the Greek tradition of writing on wax tablets. They can easily be cleaned and rewritten without leaving any marks of the former text. Platon had coined the wax tablet metaphor for the memory. Aristotle explained the idea that the phenomenon of memory can be compared seen as if an image we percept is imprinted into the memory as an engraving into the wax tablet.40 The wax tablet metaphor for the memory implies that it is possible to erase memories without leaving traces.

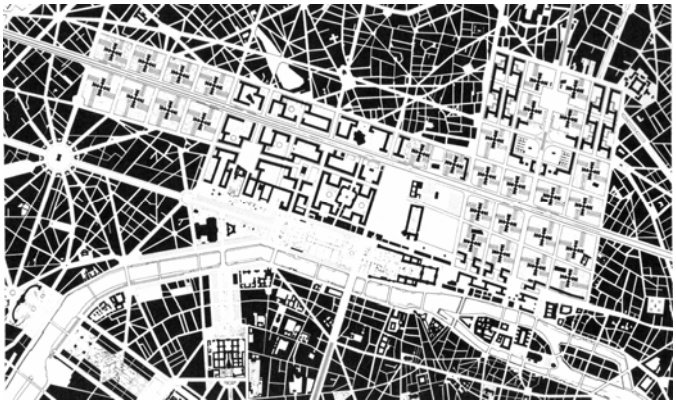


Figure 3. Le Corbusier, Plan Voisin for the center of Paris (1922)

Sigmund Freud, the Viennese contemporary of Sitte, similarly criticized the wax tablet metaphor. Freud believed that nothing that has been formed in the life of the soul can ever disappear. It could even be made to reappear through a process of regression reaching sufficiently back into the past. At the same time he added a new dimension to the metaphor of the memory as a city. He asked us, in a flight of fancy, to "suppose that Rome is not a human habitation but a psychical entity with a similarly long and copious past - an entity, that is to say, in which nothing that had once come into being will have passed away and the earlier phases of development continue to exist alongside the latest one. (...)A little that is ancient [is] still buried in the soil of the city or beneath its modern buildings."41

Sitte had used the same metaphor earlier the other way round. He argued against the tabula rasa, which he claims to be pure fiction anyway, for even an empty ground holds its history. He told a story about how some Viennese developers had lost a lot of money, having regarded the ground as a homogenous plane after the fortification had been removed and later found out that the foundations of their new houses had to stand half on rock-like foundations of the former fortress and half on a freshly filled moat.42

Freud also compared psychoanalysis with "the technique of excavating a buried city. (...) Just as an archeologist reconstructs the walls of a building from remaining parts and identifies the number of columns according to the marks in the floor (...), in the same manner the analyst draws conclusions from fragmented recollections (...). Both have the right to reconstruct adding missing parts and putting the preserved remains."43 Freud drew parallels between Rome with its antique ruins that have been de- and re-formed in many ways and the process of conservation of the past in the human memory (see Fig. 4).44

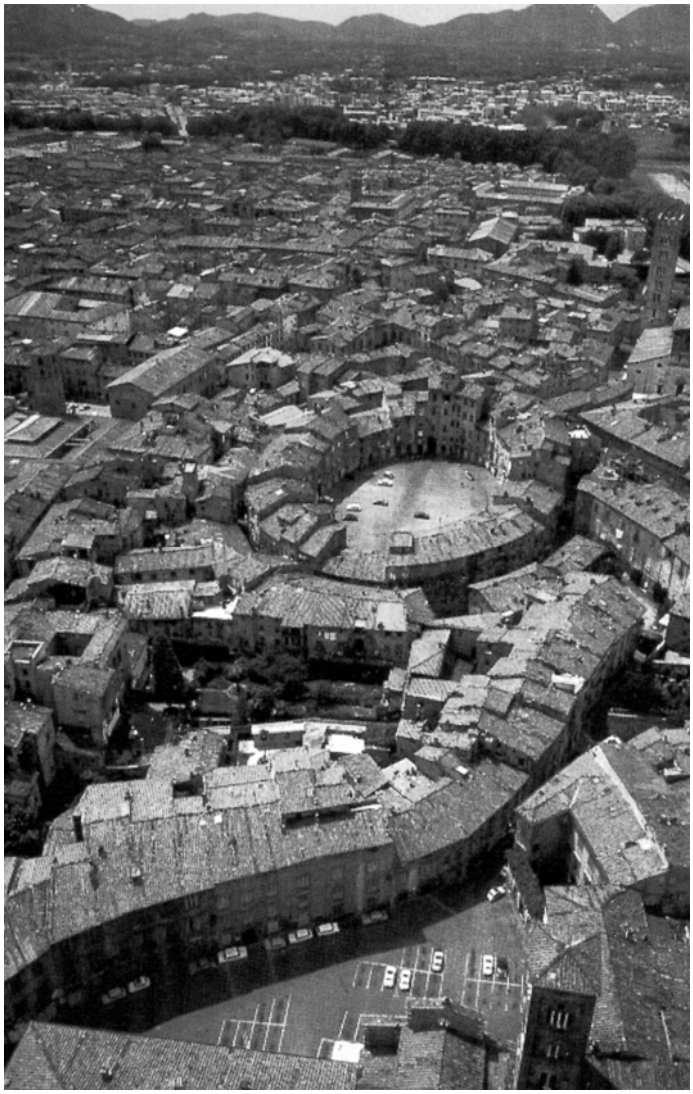


Figure 4. Roman amphitheatre in Lucca, transformed into houses.

The topos of the ruin can underline the durability of architecture as well as its transitoriness. Ruins are, metaphorically spoken „dead buildings", as they have lost their function, their connection to the lives of the people and as they have lost their integrity and stability. They make the dimension of time experiancable. In Romanticism, ruins were admired as paradigmatic objects for the romantic projections of an ideal past.

On the other hand side, it is ruins that remain even if every other evindence of a civilisation has vanished. As architecture is able to resist change more persistently than most other objects, it transforms temporal succession into spatial juxtaposition.45 Some classical authors claimed that a city had to be judged by the ruins they would leave behind one day. Thucydides foretold that "if Lacedaemon [Sparta] were to become desolate, and the temples and the foundations of the public buildings were left, that as time went on there would be a strong disposition with posterity to refuse to accept her fame as a true exponent of her power (...) Whereas, if Athens were to suffer the same misfortune, I suppose that any inference from the appearance presented to the eye would make her power to have been twice as great as it is."46 The fame of Periklean Athens as paradigm and birthplace of western philosophy and art is based on the ruins of Acropolis.

This passage inspired Adolf Hitler to emphasise that he wanted to use architecture to pass down his time and spirit to posterity. In the end only the monumental buildings remained of the great imperators. His architect Albert Speer developed a whole theory from this observation. In the history of every people there were periods of weakness; these were the times when the old monumental buildings start talking about the former power.47 According to Speer's theory of the ruin value (Ruinenwert) monumental buildings had to be made from bricks and stone instead of ferroconcrete, and designed in a way that they would look impressive even as ruins.

After the collapse of the Third Reich, a group of German architects (Otto Bartning, Fritz Schumacher, Lilly Reich, Heinrich Tessenow und Egon Eiermann and others) provided a statement of requirements for the rebuilding of the ruined German towns: "The collapse has destroyed our visible world of working and living. (...) Today, two years later we realise how much the visible collapse (of our buildings(only expresses our moral and mental disruption, and we feel paralyzed in desperation. (...) [1.] The old city centre needs to gain new life as cultural and political heart. 2. The destroyed heritage must not be reconstructed historically, it can only arise anew for new functions in new forms. (...) 5. We want our private and public buildings to be modest..."48 This document shows how strong a connection these architects drew between collective identity or memory and the urban and architectural forms. There was a strong impetus to rule off the Nazi ideology and the whole history of the German nation. (Clearly there were some architects who managed to go on with their usual practice without major interruption. Also there was the influence of modernist city planning ideas. Some architects were happy to get rid of the old and dense city canters with their narrow streets, as they had the chance to design everything new (see Fig. 5).49) Already in 1946 Bartning had argued against a reconstruction of the destroyed city centers. The Germans had lost their precious architectural heritage by their own fault. Bartning felt that he and his contemporaries had to bear the blame. He pleaded to keep the ruins as memorials. Any attempt to reconstruct the beautiful old buildings would be nothing but a lie to their grandsons and -daughters.50

VII. Reconstructing

Today the decisions of the post war years are again becoming matter for discussions. In public opinion the rebuildings are considered as a failure. Many cities are planning reconstructions of important historical buildings destroyed in Second World War. The Frauenkirche in Dresden and the façade of the Schloss in Braunschweig are already completed, other prominent cases are the Stadtschloss in Berlin and the Kroenungsweg in Frankfurt. The new term is "critical reconstruction". A symposium at the ETH Zurich with prominent organizers and speakers discussed the importance of reconstructions in January 2008. The discussion about reconstructions is remarkable grim, especially in Germany.51



Figure 5. C.B. Purdom, How should we rebuild London? (1945)

Advocates of reconstructions have to argue against the self-conception of professional monument conservators. The principles of the preservation of monuments are codified in the Venice Charter (1964). The authors of this document went back to the principles that had been formulated at the beginning of the century. Riegl had described the conflict of values: the preservation of as much original substance as possible, the visual impression of the artistic qualities of a building and the necessary adaption for the actual use of a building. Georg Dehio advised in 1908: "do preserve, do not restore". The authors of the Venice Charter claimed: "(§ 9) The process of restoration (...) [aims] to preserve and reveal the aesthetic and historic value of the monument and is based on respect for original material and authentic documents. It must stop at the point where conjecture begins, and in this case moreover any extra work which is indispensable must be distinct from the architectural composition and must bear a contemporary stamp."52 The authors of the Venice Charter mistrusted attempts to reconstruct lost parts of a building As 100 years of preservation of monuments have shown, "preserving" often means to destroy huge parts of a building, parts that are considered unworthy. In post-revolutionary Paris, for example, monumental buildings had been freed from their build surroundings and presented as points de vue. The secondary result was the destruction of the ensembles that had sourrounded the buildings. Similar problems always occur, when old buildings are used to invoke glorious times of the past. Therefore a restauration should not try to re-establish an assumed "original" status of a building, but make any intervention "readable" as a contemporary decision.

Reconstructions are the most extreme case, because no original substance is left over. In some cases the building that is to be reconstructed is only fragmentarily documented. And the site had been used for other purposes, new structures have developed. The traces of this newer history are destroyed by a reconstruction. Stefanie Hennecke showed, that with the chosen reconstruction of the Leipziger Platz in Berlin, traditions of 18th century bourgeois public space have been privileged at the expense of other historical events like the Fall of the Berlin Wall.53 The problem is always the same: who has the privilege of interpretation?

VIII. Writing

The debate on reconstruction puts forward a more general problem inherent in every action of an architect. The metaphor of the architect writing a new story into the book of a city's history raises the question of so called "truth". This is what I hinted on in the title of my paper, the question of what story might be the right one. Actually, my question was to some extent rhetorical. Postmodern philosophy has criticized the concept of an sole truth. Historiography does not longer aim to uncover a hidden one-and-only true history, but is aware that every telling of history is a construction of a story that has to be meaningful. But I want to return now to the problems of urban design.

Sittes attitude concerning the problem of "truth"is ambiguous. On one hand he recommended an "as if" as a strategy for building cities: Since cities no longer grow slowly over the years, the artist has to imitate the process as far as possible in his plan in order to make it look "as if a continuous development over many centuries had made it by itself. What in reality has grown naturally in old towns, has to grow alike on paper today."54 Sitte had a lot of followers who aimed to draw plans for new living quarters imitating medieval forms and structures instead of the regular grids typical for the Gründerzeit.

But Sitte was not as one-dimensional as many of his followers. He wrote: "It is not possible to give ourselves a history made of lies and a false naivety just for the old townscape's sake."55 Sitte felt that the irregular street patterns he admired so much had not been planned by one person, they did not grow on paper. To create towns as beautiful as the old ones, "sundry curves, twisted streets, and irregularities would have to be included artificially in the plan - forced spontaneities, intentional accidents. But can the accidents of history over the course of centuries be invented and constructed ex novo in the plan? Could one, then, truly and sincerely enjoy such a fabricated ingeniousnenss, such a studied naturalness? Certainly not."56 The latter passage seems to be directly contradicting to the one quoted above.

There exists a project by Sitte that brings the two positions to a synthesis. In his posthumously published article "Enteignungsgesetz und Lageplan" (1904) Sitte criticized a typical Gründerzeit city expansion, designated for the city of Hanover (see Fig. 6).57 To get a regular street pattern for the new quarter, the landowners usually had to be expropriated. As a result, the new quarters always looked the same. Sitte showed how a city expansion can be planned according to the existing property boundaries. On the one hand, as he puts forward, there would have been reasonable economic advantages: As the city council did not need to expropriate the landowners it saved on high compensations. On the other hand, Sitte's strategy creates some irregular forms. But these forms are not random curves. They result from the historical property boundaries of the place in combination with the requirements of the actual real estate and hygienic and infrastructural standards; that means they do have functional reasons. Metaphorically spoken: the history stays "inscribed" in the road network, landscape and townscape. In other words: the memory of the place, the original footprint is retained in the new plan.

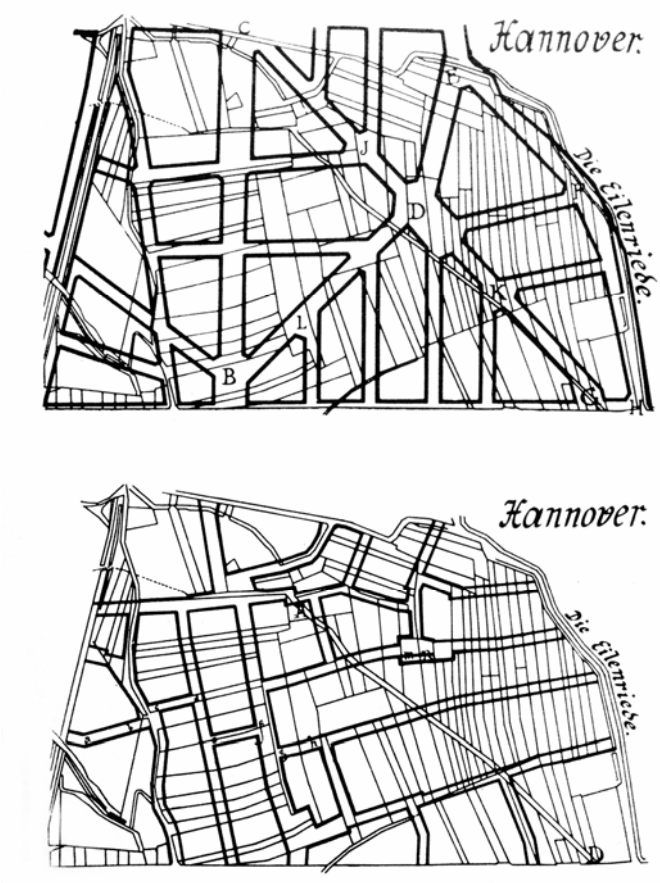


Figure 6. C.B. Purdom, How should we rebuild London? (1945)

IX. Conclusion and Further Prospects

We have seen how Camillo Sitte and others have interpreted the memory metaphor for the city in different ways. Camillo Sitte, chosen as an early proponent on urban design, developed a sophisticated concept of the qualities of urban space that can be conceptualized with the help of the memory metaphor. The ambiguities that I found in his writings, might be an adequate way to deal with the complexity of the matter. City planning is always dealing with conflicting interests.

I elaborated how new interpretations were possible because both concepts - city and memory - are changing. It seems reasonable to trace the metaphorical relation because there have been manifold fruitful ideas for urban design. Recently neurophysiology offers a renewed understanding of the process of recollecting: the human brain can be conceptualized as a mixture between a "genetic memory" and constant activity. Memory is a dynamic process of sorting, connecting and combining information. What would it mean to think about the cities as a brain? There are again striking similarities between remembrance and digital media. It seems that the relation between metaphors of memory and the dominant media, that Assmann stated, is still relevant. She mentioned the network metaphor, but she expressed uneasiness about the new media.58 I would say that the new image of memory in the digital age offers much inspiration. As the German debate on the preservation of monuments and "critical reconstruction" seems caught, a new metaphor might encourage new interpretations in a time of crisis. Sometimes those new metaphors can solve a dilemma. Therefore I am looking forward to the other lectures at this conference with keen interest.

Acknowledgements

I want to thank Kristian Faschingeder for his helpful comments on this paper. This paper is based on research I have done as a research assistant for the Camillo Sitte Gesamtausgabe, headed by Prof. Klaus Semsroth at Vienna Technical University and funded by the FWF.

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Building Texts + Reading Fabrics: Metaphor, Memory and Material in John Ruskin's *Stones of Venice*

Stephen Kite*

Abstract - **We cannot remember without architecture declares John Ruskin (1819-1900) in 'The Lamp of Memory' of his *The Seven Lamps of Architecture* (1849). For Ruskin the city is a space of collective memory, charged with metaphoric import: equally buildings can be analogized as texts – 'the criticism of a building is to be approached precisely on the same principles as that of a book', he contends. In the evangelical tradition of Ruskin's upbringing, there is a strong sense of *lectio divina* in this kind of interpretation. A great building is a sacred palimpsest of many layers: 'the main and leading idea is on its surface', but there are many depths to be plumbed and interpreted to those who can read the fabric with patience and insight.**

Reciprocally, a text like the three volumes of his *Stones of Venice* is endowed with a tectonic and a spatiality, in counterform to the city it depicts. The first volume is constructed from quarry to cornice; it demands its readers to roll up their sleeves, gives them 'stones, and bricks, and straw, chisel and trowels, and the ground, and then asks [them] to build'.

In exploring these analogous spaces of text and architecture, this paper operates within the empirical and documentary arena of Ruskinian interpretation, working with the primary notebooks, worksheets and diaries from which the *Stones of Venice* was constructed. It examines the interchange between Ruskin's exhaustive encounter with the *thingness* of the urban fabric, the erection of the manuscript, and the playing out of this intimate physical knowledge of the city in themes of metaphor, memory and material.

Keywords* – John Ruskin, Venice, *The Stones of Venice

I. Introduction

Ruskin began his thinking on architecture with those tough demands on those who claim to practice it which his criticism was to sustain. The startling statement: 'No [one] can be an architect, who is not a metaphysician' occurs in the introduction to his youthful *The Poetry of Architecture* of 1837.[1] Ruskin points thereby to the intricate relations between thinking, feeling, looking, making, and ethics, in the raising of the built world. Colin St John Wilson – architect of the British Library, and theorist – opens the 'Apologia' to his *Architectural Reflections* with Ruskin's pronouncement, pointing to it as evidence of the 'metaphysical distress' and division that remains at the heart of contemporary architecture: is it a liberal or a practical art?, or barely an art at all - simply a question of 'function x economics'.[2] For Wilson - in terms that Ruskin would recognize - architecture is certainly a public … art based upon a spoken pact with its society'; and also, a practice which is inevitably drawn … to make contact with a world that is other'. Wilson's 'other' encompasses both the everyday and the ineffable. In Ruskin's metaphysics the representation of this 'other' - the truths of a divinized nature - is the foundation of all art, which he analogizes to building in these terms: 'The noblest edifices of art are built of such pure and fine crystal that the foundation may all be seen through them'.[3] From the evangelical tradition of Ruskin's upbringing he learnt the *lectio divina* – the spiritual reading of the word, of nature, and of art and architecture.

II. Contented with Little – The Rogers Vignette



Figure 1. J.M.W. Turner, *Venice.* Vignette from Roger's *Italy*.

First, the reading of nature. Looking at nature can be epiphaneic, as Ruskin describes in the autobiographical *Praeterita*, the experience of drawing a tree at Fontainebleau in 1842: when, allowing the branching of the tree to compose itself, he learnt 'the bond between the human mind and all visible things'.[4] This experience would lead him beyond the picturesque, and its fascination with the peculiar, to a sense of innate beauty, and to the writing of *Modern Painters.* This is a celebrated account; but equally revealing for our purposes is the description Ruskin gives, in his diary of 3 June 1849, of a walk at

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Blonay in the Alps. In a marginal note on the diary manuscript he describes the experience as the 'effect of contemplative imagination'[5] – that 'Imagination Contemplative' which is described in volume 2 of *Modern Painters* (1846) as appealing to 'a deep heart feeling … faithful and earnest … in contemplation of the subject matter…'[6] George Landow sees in this intensity a link to eighteenth century romanticism - through passionate perception we grasp truth.[7]

Ruskin is flagging on a hot summer walk and his perception flags also; then he put his '*mind* into the scene …; and looked at it with the possession – taking grasp of the imagination – the true one'.[8] At once the imagination 'gilded all the dead walls'. He tries the same imaginative experiment on 'a group of old cottage and tower, near Blonay' which he longs to draw but is put off by a 'bit of fence and field underneath [that compositionally] would not do'. But 'throwing [his] mind full into the fence and field, as if I had nothing else but them to deal with, I found light and power and loveliness, a Rogers vignette character put into them directly'.[9] [Fig. 1] Here he refers to the works *Poems*, and *Italy* of Samuel Rogers[10] which were vignetted by the artist J.M.W. Turner: in understanding this fragmentary, or microcosmic, envisioning of the world, we shall learn much about Ruskin's interpretations of architecture. Thus, the diary marginal note also refers to 'p. 88 l[eft]', and in these later passages Ruskin feels 'very forcibly … how much the power of nature depended on the quantity of mind which one could give to her'.[11] Finding himself unequal to the task of responding to majesty of 'the whole valley of the Arve … the Dorons and its range behind me: Mont Blanc and all its aiguilles … in front of me', he discovers that when he confined himself 'to one thing, as to the grass or stones', he then had 'mind enough to put into the thing and [his] enjoyment arose from the quantity of mental and imaginative energy which [he] could give it'. The 'instructive lesson' of this is that 'each spirit can only embrace at a time so much of what has been appointed for its food, and may therefore rest contented with little'.[12] Contemplate a few *stones* therefore, and you may learn as much as the sweep of the Alps has to tell you, or the overwhelming complexity of a city.

We need to go further into the vignette character which Ruskin found in the fields of Blonay. In his autobiography, *Praeterita* he wondered how, in childhood, he had 'been allowed so long to sit in that drawing-room corner with only my Roger's *Italy* … the *Continental Annual*' of Samuel Prout and just a few other works 'for [his] working library'.[13] On 8 February 1832 he had been given a copy of Samuel Roger's poems *Italy* illustrated with Turner's vignettes; this was his first encounter with Turner and he was dazzled. In the following year his father introduced him to Samuel Prout's *Sketches made in Flanders and Germany* (1833).[14] Ruskin set himself to emulate Prout's style, copying Prout's drawings and using his teaching manuals. One such manual is *A Series of Easy Lessons in Landscape Drawing* (1820) reflecting – as Ruskin describes – Prout's 'strong love of truth'.[15] These drawing manuals were works to which, according to Ruskin, many artist's have 'frankly confessed their early obligations'.[16] *Easy Lessons* is 'arranged progressively from the first principles'. This 'progressive method' was the foundation of teaching in many of the manuals of this period: the student built up a picture of the world from microcosm to macrocosm – indeed Prout wrote a book on *Microcosms* - by making vignette drawings of picturesque objects, contextualising them, and working gradually wider to a full composition.[17] Reflecting Prout's 'love of truth', the picturesque had become imbued with a more scientific perspicacity by artists working in the medium of drawing and watercolour in the nineteenth century.[18] This paper explores 'building texts and reading fabrics' and Prout describes his 'progressive lessons' as analogous to 'an alphabet followed by words, and from words to sentences, it being precisely the same in its elements with language'.[19] While, in the early pages of *Modern Painters* Ruskin declares: 'Art … with all its technicalities, difficulties, and particular ends, is nothing but a noble and expressive language, invaluable as the vehicle of thought, but by itself nothing'.[20] That sense of engaged seeing described in the meadows of Blonay becomes increasingly evident in Ruskin's drawings and notebooks. As architecture moves to the focus of Ruskin's concerns in the writing of *The Seven Lamps of Architecture*, and *The Stones of Venice* (1851-3), the already firm link between art, words and intellect - foreshadowed at the beginning of *Modern Painters* - translates into an unequivocal stress on art and language and the notion of *reading* a work of architecture and art.

III. MICROCOSM TO MACROCOSM

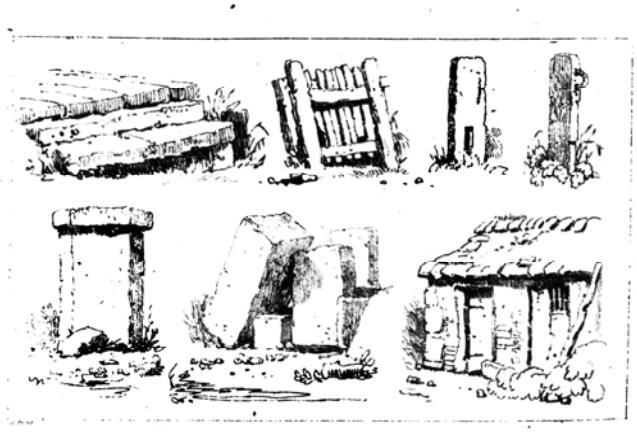


Figure 2. Samuel Prout, plate from *Easy Lessons.*

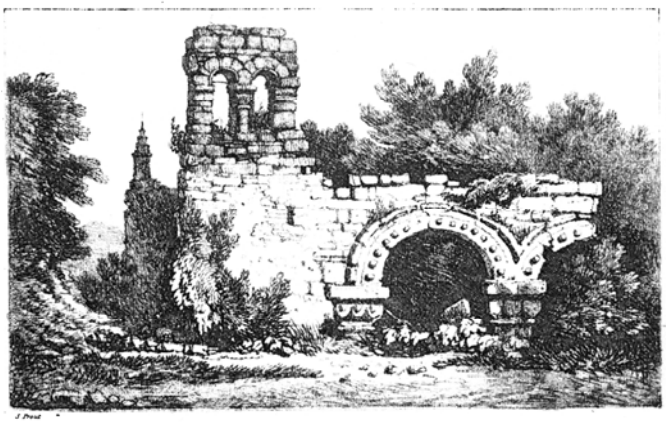


Figure 3. Samuel Prout, plate from *Easy Lessons.*

Let us see how Prout constructs the world in the progressive method from some plates of his *Easy Lessons.* [Figs. 2, 3] At the beginning he suggests the student confines looking to one thing; a single gate-post stone, or a few blocks upright or inclined, all delineated in the firm broken line and dots which the earlier Ruskin imitated. [Fig. 2] Then come plates of recognizable architectural fragments – Gothic and Romanesque arches and so forth. These fragments then coalesce into a vignette composition – two broken arches and a belfry for example – which takes its place in a landscape setting. [Fig. 3] In the context of this working through the fragment to the whole, J. B. Bullen identifies a synechdochical method in Ruskin whereby the contending forces of history 'are focused, as in a burning glass, within a single art – architecture. The flux of human events is arrested in art; the chronicle is memorialized in stone.'[21] In this method of cultural enquiry a moulding can metaphorise the fate of a nation. If events, as Bullen argues, are 'arrested in art' to become mouldings and buildings, then equally, as Ruskin progressively does, one can *read* the buildings as chronicles and texts.

In modernism all this sense of architecture as *lectio divina* might be summed up in Mies van der Rohe's well-known dictum 'God is in the details': equally, the person 'who can take no interest in what is small', argues Ruskin, 'will take false interest in what is great'.[22] Accordingly Ruskin points up social realities, and evidences truths, through the fragment; in counter to those commentators who suspect in the fragmenting picturesque a mask of truth. For Robin Evans, the picturesque breaks down and disguises the presence of power structures, whether in vast contemporary shopping centres, or in Humphrey Repton's emollient landscapes, which sweeten the presence of the country house and cloak the suppression evidenced by the enclosed field and ill-housed peasant.[23] Although Ruskin certainly condemns the heartless aspect of the picturesque that employs the ill-housed peasant to complete a composition.

For Ruskin, the drawing of the Casa Contarini Fasan he made in Venice in 6-16 May 1841, represented both the zenith and conclusion of his imitation of Prout's picturesque. [Fig. 4] Indeed, the master admired the study and borrowed it for himself. 'Though full of weaknesses and vulgarities', Ruskin thought his own drawings of this period had 'also much good in them'.[24] Look at the boat at the bottom left of the image; it is a Prout-esque microcosm where Ruskin delights in the 'interchange' of light and dark, and the interlocking patterns made by spar, sailcloth and rigging. In his *The Elements of Drawing*, Ruskin notes that this 'law of interchange [is] insisted upon at length by Prout in his Lessons on Light and Shade'.[25] Equally, on the palace itself, Ruskin renders the ephemeral patterns of fabric and shade as tenderly as the forms of column and capital. Certainly there is observation here, but little sense of the architecture possessing weight or bone structure. Writing forty years later, Ruskin claimed, with some truth, that he 'knew absolutely nothing of architecture proper' at this point, he 'had never drawn a section nor a leaf moulding' but nonetheless he 'drew with an acuteness of delight in the thing as it actually stood'. The following year, he continues, he 'began trying to do what I could not, and have gone on ever since, spending half of my days in that manner'.[26]

If we turn the pages of Ruskin's pocket notebook 'House Book 1', which he began, some eight years after the Contarini Fasan drawing, in October or early November 1849, we now find scores of sections and leaf mouldings. He records the wheel motif of the uppermost balconies of the same Casa in detail: the section of the cornice, the foliation of the arch and the profile of the lower arch and its cusps.[27] The balcony is published in the 'Gothic Palaces' section of *The Stones of Venice*, Volume 2. If the etching of the upper balcony elevation still has some Proutesque delicacy of line, we can now be sure of the archaeological intensity of investigation underlying the image, and Ruskin's statement in this chapter that the 'traceried parapet …is, when well designed, the richest and most beautiful of all forms'.[28]



Figure 4. John Ruskin. *Casa Contarini Fasan*, 1841. Ashmolean Museum

IV. THE 'DEPTH OF TURNER'S SENTIMENT'

What had happened? To recapitulate a process of many years, the vortex of Turner's imagination had shattered the picturesque frame, drawing Ruskin centripetally into an emotionally fired engagement with the natural world. In his psychoanalytical interpretation of Turner, Adrian Stokes writes of 'a whirlpool envelopment into which we are drawn'[29], of how 'in the act of painting, even his vast distances were pressed up against his visionary eye like the breast upon the mouth'.[30] Ruskin confesses his equally oral engagement with the stones of Venice in the letter to his father from Verona of 2 June 1852 in describing his instinct 'to draw and describe the things I love … like that for eating and drinking. I should like to draw all St Mark's,

and all this Verona stone by stone, to eat it all up into my mind, touch by touch'.[31]



Figure 5. John Ruskin. *Interior of San Frediano, Lucca.* 1845. Pencil, brown ink and wash. Manchester City Art Galleries.

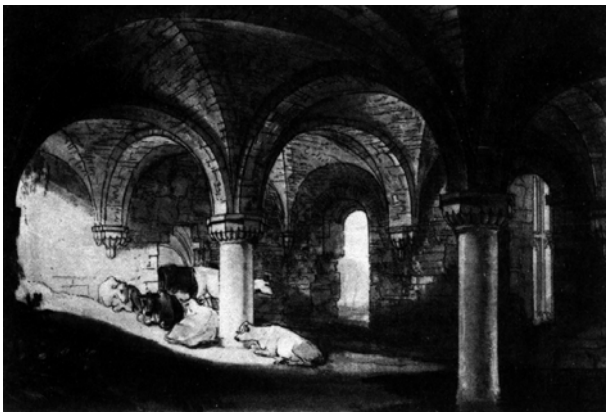


Figure 6. J.M.W. Turner. *The Crypt of Kirkstall Abbey.* 1812.

Look at the way Ruskin's swirling drawings of 1845, such as *Trees on a Mountainside* (1845) rhyme the rhythms of Turner's *Slave Ship* of 1840.[32] Lucca - in Ruskin's diary of 8 November 1840 - had been 'an ugly little [Italian] town' whose streets were 'narrow and uninteresting' – that is to say, lacking in picturesque motifs.[33] But in 1845 he came to Lucca again, on his first continental tour without his parents, intent on researching the Italian old masters for the second volume of *Modern Painters* – architecture had not been on the planned agenda. Now 'with all [his] new knowledge and freshness of aceptancy, [he] found as if never seen before, the inlaid [Romanesque] architecture of San Michele'.[34] At this instant he could now perceive beyond the Gothic filigree beloved of Prout and comprehend the sombre sheerness of such facades. Then, entering the church of San Frediano, 'the pure and severe arcades of finely proportioned columns … , doing stern duty under vertical walls, as opposed to Gothic shafts with no end, and buttresses with no bearing, struck [him] dumb with admiration and amazement'. There, he declared in retrospect, 'he began, in the nave of San Frediano, the course of architectural study which reduced under accurate law the vague enthusiasm of my childish taste…'[35] In these formerly uninteresting streets he had now discovered, as he wrote to his father, 'enough in an hour's ramble after mass, to keep me at work for a twelvemonth'. The buildings are now read as living texts: 'Church fronts charged with heavenly sculpture and inlaid with whole histories in marble…'[36] San Frediano is 'all glorious dark arches & columns'; and he concludes ' I must have a study of this Lombard church'.[37] Some commentators, such as Kristine Garrigan, accuse Ruskin of a disregard 'for the major architectural qualities of plan, mass, and proportion',[38] but here in this - one of the first studies under Ruskin's new rubric of 'accurate law' - are all those things. The cross-vista composition represents the tunnelled drama of the aisle, and the palely lit space of the nave beyond framed by severely planar walls. As the Corinthian columns of the arcades rise and recede, Ruskin inter-changes light and shade to allow their volumes to read against the shadows and lit surfaces beyond. [Fig. 5]

We can glimpse here what Ruskin had learnt from Turner, and especially from the dramatic architectural engravings of his *Liber Studiorum* which evidence the artist's early experience in producing drawings for architects.[39] San Frediano parallels the oblique composition and tonal drama of Turner's *The Crypt of Kirkstall Abbey* (1812). [Fig. 6] Interestingly, the same motif had also been sketched by Prout and in the notes on his Educational Series of drawings made in the 1870s, Ruskin could now contrast Prout's 'narrow sentiment fastening only on the picturesqueness of ruined masonry' with the 'depth of Turner's sentiment' in his reading of the subject which fastens 'not on the physical but the moral ruin' of the abbey.[40] To return the discussion back from Yorkshire to Italy: in the famous passages at the very end of *Modern Painters* where Ruskin contrasts the two boyhoods of Turner and Giorgione, Kirkstall offers Turner 'sound preaching … concerning fate and life. Here, where the dark pool reflects the chancel pillars, and the cattle lie in unhindered rest…'[41] The message is that it is *cattle* caught in the shaft of light that probes the gloomy undercroft of the broken abbey 'instead of priests' vestments'. Ruskin then distinguishes this interpretation of moral decay from a vision of Giorgione's Venice where there 'were indeed aged buildings … but none in decay'. Giorgione saw the bright cities of Italy, and 'only strength and immortality'; whereas Turner's Convent Garden, London boyhood, 'saw the exact reverse of this…. Meanness, aimlessness, unsightliness: thinwalled, lath-divided, narrow-garreted houses of clay, booths of a darksome Vanity Fair, busily base'.[42]

The impact of the symbolic force of Turner's penetrative imagination, and Ruskin's new intensity of vision is evident in *The Stones of Venice.* Elizabeth Helsingor argues that Ruskin's penetrating studies of architecture in the 1840s and 1850s intensified his sense of architecture as language; 'he formulates for himself a critical identity to which reading is central'.[43] All these concerns crystallise at the end of the celebrated 'Nature of Gothic' chapter in the second volume of *Stones of Venice.* Ruskin's invocation to '*Read*', therefore occurs at the axis of the three volume work prior to the crucial analyses of Gothic palaces, and the Ducal Palace itself: 'Thenceforward the criticism of the building is to be conducted precisely on the same principles as that of a book; and it must depend on the knowledge, feeling, and not a little on the industry and perseverance of the reader'.[44] There can be no doubt of the perseverance of Ruskin's reading in the outlay of energy that produced the inter-related system of diary-notebooks, large worksheets,

and pocket-books packed with notes and sketches that underlies *Stones of Venice.*

Helsingor claims *The Stones of Venice* as Ruskin's first and his most sustained effort to combine religious and artistic reading in a single critical activity',[45] and in Ruskin's injunction to '*Read*' imbricates at least four kinds of allegory and exegesis: the symbolical language of sculpture and pictorial iconography[46]; the 'parasitical' language of the picturesque endowed by time and ruin[47]; the geological language of the stones themselves; and their theological and ethical language and message.[48] Thus; opening the last and third volume of *The Stones of Venice* Ruskin affirms that the preceding two books have 'dwelt … on the historical language of stones; let us not forget this, which is their theological language', that is to say, as the same passage explains, that such stones set 'forth [the] eternity and … TRUTH' of the Deity, just as the 'elements of the universe – its air, its water, and its flame…'[49] While, in a wide ranging interpretation of Ruskin and allegory George Landow explores Ruskin's typological language and its roots in the exegesis learnt in Biblical readings at his mother's side.[50]

V. WINDOWS NEAR THE ARSENAL

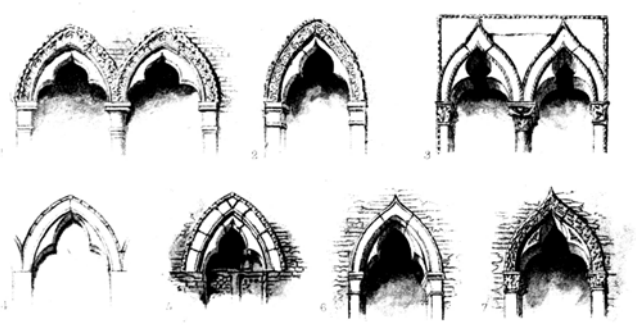


Figure 7. Detail of 'Windows of the Early Gothic Palaces', *The Stones of Venice, Volume 2.* Arsenal windows are top left.

In taking just a few fragments of Venetian workmanship – a 2-light and a single window near the Arsenal - from the vast body of drawings, measurements and observations that underpin *The Stones of Venice*, we can find many of these symbolical, ethical and interpretative readings and languages brought into play. Utilising the trope of 'watchful wandering' that recurs in *Modern Painters* and *Stones of Venice* Ruskin tells the reader how to locate these elements: 'If the traveller desire to find them (and they are worth seeking), let him row from the Fondamenta San Biagio … and look, on his right, for a low house…. Let him go in at the door of the portico in the middle of this house, and he will find himself in a small alley, with the windows in question on each side of him'.[51] The present writer followed Ruskin's instructions on foot and found one of the arches surviving in the Corte Contarina off the 19th century Via Garibaldi (one of the *ammiglioramenti* or rationalisations in Venetian communications against which Ruskin railed).



Figure 8. John Ruskin. *Worksheet 205.* Coniston Museum.

It would entail a more extended discussion of Ruskin's *reading* of the city to analyse his wandering in the spaces of the city against these journeyings and spaces he presents in his texts. This is the mobile Ruskin - the great spectator of the nineteenth century, that some commentators elide with the Walter Benjamin, or Henry James-ian world of the *flâneur*.[52] Indeed, it is not too difficult to equate the gas-lit, street-straightened Venice of the Via Garibaldi - opened to the whole of leisured Europe by the cutting of the Mont Cenis tunnel in 1871 - to the surreal *mis-en-scène* of Walter Benjamin's Parisian arcades; the city which taught the latter the 'art of straying'.[53] Certainly, Benjamin's *Arcades* project presents the primitive simplicity and innocence of Ruskin's vision in the opposite camp to the hyper-cultivated *décadence* of urbanites like Baudelaire. Yet, in his 'watchful wandering' and leisured, aleatory spectating of the city, Ruskin does seem to foreshadow the debonair detachment of a Henry James. Ruskin's wandering can, of course, also be located in a pre-modern earlier tradition which - following Byron, Wordsworth, and so on - adopts the *leitmotif* of the journey.

As presented in *The Stones of Venice* these two windows belie the level of scrutiny to which Ruskin subjected them – two small engravings whose detail is indiscernible in Plate 17, volume 2, displaying the 'Windows of Early Gothic Palaces'. [Fig. 7] The context of his 1851-2 diary account of them[54] vividly demonstrates the exegetical milieu from which his criticism arose, as his detailed architectural notes suddenly follow biblical commentary on the book of Ezekiel. Thus on page 34 of the diary a paragraph on the 'Renaissance' is, for Ruskin, emphatically not a new dawn or a rebirth; the 12th verse of Ezekial Chapter 7 he notes as 'especially applicable to Venice and the description of "the end" not as the night, but as the

morning'. Ezekial's prophecy encapsulates one of the great themes of *Stones*, that the first glimmer of the Renaissance was a false dawn: 'The time has come. The day has arrived, let not the buyer rejoice nor the seller mourn; for wrath is against all their multitude'.

As always in Ruskin's Venice fieldwork system, the diary cross-refers to the relevant notebooks and worksheets; in this case worksheets numbers 205, 206 and 207. Worksheets 205 and 206 survive in the Ruskin Library and Coniston Museum correspondingly. [Fig. 8] There is a pathetic framing to the notes and studies at this time; the same diary notes ''December 30th, 1851. Turner buried'.[55] While on worksheet 205, Ruskin wrote: 'Sketched February 9th 1852 in the afternoon the day of Mr Prout's death'. The passing, then, of the two great mentors of Ruskin's readings of architecture.

Worksheet 205 carefully records the moulded brick detail of the arch as Ruskin enthusiastically notes in the diary: 'Nothing can be more exquisitely sharp than the ornament on 205 … and all evidently moulded not cast'. [Fig. 9] As always he is alert to that vital nuance of difference that, in his view, was slain by the sham dawn of the Renaissance: 'Note leaf for flower in third brick counting down on the right. Small flowers all of different sizes'. In the published text he stresses the 'exquisite mouldings, not cast, but *moulded in the clay by hand*, so that there is not one piece of the arch like another'.[56] To this point there is an archaeological objectivity in the reading of the scroll ornamentation, with Ruskin's hand also evidently relishing the parasitical picturesque of the weathered outer mouldings of the arch. But this Chapter 7 on 'Gothic Palaces' follows the famous 'Nature of Gothic' Chapter 6, and the points he stresses on hand moulding clearly refer to the 'characteristic or moral element' of Gothic 'Changefulness' and the 'perpetual variety' evident when the worker is not enslaved.

Having led the reader to this text in brick, and having drawn its form and praised its variety Ruskin asks the reader to 'let me pause for a moment'. Reader, or is it listener at this point?: for this loaded pause between the reading of a text and its exposition is a curate's rhetorical device. Landow demonstrates how Ruskin works within the evangelical tradition of scriptural interpretation. An interplay operates between the reality of persons or things, and their allegorical and symbolic role, and there is an equal emphasis on 'both signifier and signified'. Under the influence of the typological tradition of Evangelical scriptural interpretation Ruskin maintains, argues Landow, 'a balance between the formal elements of a painting [and] its aesthetic surface' or, as here, an architectural element 'and its complex significances'.

At the larger scale the whole of *Stones* warns England not to follow Tyre and Venice into oblivion. Mechanised England, and its increasingly enslaved workers, can learn also from this tiny arch, 'the real use of brick'. 'Our fields of good clay' - declares Ruskin from his pulpit - 'were never given us to be made into oblong morsels of one size. They were given us that we might play with them, and that men who could not handle a chisel, might knead out of them some expression of human thought'. Against this mechanical production of repetitive one-sized morsels stands the infinite variety of the brick and terracotta 'architecture of the clay districts of Italy' where 'every possible variation of the material is found exemplified'.[57] In his first architectural essay *The Poetry of Architecture* of 1837 Ruskin had already revealed his proclivity for brick, with a kindred ethical message, for brick 'is incapable of pretension' or affectation.[58]

The condition of enslavement to which Ruskin was responding becomes yet more impassioned in *Fors Clavigera* (letter 64, April 1876) where Ruskin begins the letter with 'our Bible lesson' and characterises Egyptian slavery as '*labour without hope*'.[59] 'Do you think you can make a brick, or a tile'[60] he challenges those anti-slavery Victorian gentlemen 'who think it is right not only to make slaves, but *accursed* slaves of other people'. He then attacks the hypocrisy of making bricks 'by deputy, and by help of capital': 'Here is the Grand Junction Canal Brick, Tile, and Sanitary Pipe Company, Limited…. You will sit at home, serene proprietor, not able, still less willing, to lift so much as a spadeful … yourself; but you will feed a certain number of brickmaking Ethiopian slaves thereon, as cheap as you can; and teach them to make bricks, as basely as they can….'[61]



Figure 9. Detail of window near the Arsenal. Photo: Kite.

VI. CONCLUSION

In a hot, July, labyrinthine Venice, it took time to locate the well-preserved arch of Worksheet 205: the flaking dense palimpsest of the city bewilders comprehension. Yet, like an *Easy Lesson* from Prout, or the lines of scripture read daily at his mother's side, Ruskin builds from such microcosms to a reading of a city in *The Stones of Venice* that remains one of the greatest works of social and cultural criticism. Then – with a Turnerian depth of sentiment – he extends this reading of *one* city and society at its medieval apex as a present and future warning. His prophetic attack on uniformity and waste – both material and human – attracts renewed attention in a time of deep ecological angst.

In his important new study, *The Craftsman* (2008)[62], Richard Sennett points out that Ruskin – this lover and collector of medieval missals – accused the 'abominable art of printing [as] the root of all mischief – it makes people used to have everything of the same shape'.[63] Against the rigidity of type, points out Sennett, is the 'grammar' of Gothic stonework of the *Seven Lamps*, this is a ' "flamboyant" grammar, one form generating another

sometimes by the stonemason's will, sometimes simply by chance'.[64] Thus Gothic architecture is as fluent, grotesque, and imaginative, as the hand-scribed vellum of a missal; the so-called Renaissance, as mechanical, cold, rigid and repetitive as type-setting.

In the wider context of Ruskin's argument, whether he was pro or anti-machine is probably irrelevant. The larger question is that men, women, society as a whole, will continue to need to work on, or with, material things. What is radical in Ruskin's thought, argues Sennett, is that he 'sought to instill … the desire, indeed the demand, for a lost space of freedom; … a free space in which people can experiment, a supportive space in which they could at least temporarily lose control. This is a condition for which people will have to fight in modern society'.[65]

So are these spaces of text and building analogous; can we really 'build texts' and 'read fabrics'? Language has limits; you cannot really build much with it: as if in compensation, those who do the least *physical* labour – such as writers and poets – talk ceaselessly of their *craft*, while carpenters and plumbers get silently on with their jobs. Equally, buildings can be slow to reveal themselves; either because their meanings reside in a dense palimpsest difficult to transcribe, or their glassy opacity rebuts the discovery of what little content they may have.

Ruskin's astonishing project gives no clear answer, though he could envision texts and buildings as sharing one sacralized realm. He was painfully aware of the allegorical complexities of his task, and despaired that the influence of the *Stones of Venice* had been the building of Gothic public-houses and gasworks.[66] What can be claimed is that language calls us into being, and that being achieves meaning through making. Ruskin powerfully adumbrates the possibility of such analogous spaces of language and building.

ACKNOWLEDGEMENTS

I am pleased to acknowledge the assistance of Stephen Wildman, Rebecca Patterson, and Diane Taylor in archive research at the Ruskin Library, University of Lancaster. I am grateful for grant support towards this paper from the Welsh School of Architecture, Cardiff University. The Paul Mellon Centre for Studies in British Art kindly supported archive research, and fieldwork in Venice and Verona.

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Mental spaces, a design tool seen in historical perspective

A few considerations

Thierry Lagrange*

Abstract – **As a starting point engravings of architectural theorists of the 15th and 16th centuries are analyzed. This leads to new mental spaces, analogous spaces, generated by the specific construction of those images.**
This reflection is to be implemented in the actual situation. A three-dimensional matrix is constructed to introduce such mental spaces.

I.

Architectural theorists of the 15th and 16th centuries not only *wrote* their theory, they also represented it in a very specific way with images. This is the starting point of this paper – a paper in which we will have a look at some intriguing images. By analysing them, it becomes possible to situate some insights on so-called analogous spaces within a historical and contemporary perspective.[1]

II.

A new period in the history of architecture started with the publication in 1452 of Leon Battista Alberti's tractate *De Re Aedificatoria*. From then on, theorists would give their view of the theoretical and fundamental basis of architecture with the writings of Vitruvius in mind. Until the beginning of the 20th century the heritage of Vitruvius would in one way or another always be part of that discussion. It is interesting to focus on a particular characteristic that appears in almost every text, tractate or theory written in that period. Namely, that these writings are accompanied by images or, more precisely, engravings. The content of these images seems to vary strongly. We find frontispieces with the head of the master or a complex allegorical construction … or we find plans, perspectives, landscapes, urban settings ... or, sometimes, we see a mix of those subjects.

To situate the possible mechanisms introduced by these images, this paper will focus on three sets of examples created by Filarete, Francesco di Giorgio Martini and Vincenzo Scamozzi.

When Filarete (ca. 1400-…) completed his *Trattato di Architettura* in 1465, he wrote it in a very specific way. It is not a very theoretically elaborated text. It is a dialogue illustrated by images showing how his imaginary town Sforzinda was built, day after day. Sforzinda is a town built in an octagonal plan with structuring radii. This geometrical concept is situated in a landscape. But Filarete even focuses on the details of the town. Several buildings are more or less designed and the images that represent them give a sharp and utopian view of the content of the town plan.

This is an early example of how images became central instruments in communicating a theory. This theory, imbedded in the town Sforzinda and only existing in the mind of Filarete, thus became visible for the outer world. In this way his vision of architecture, which was not very structured, but rather chaotic and sometimes contradictory, became communicable in a very direct way.

The images he used for this communication were plans, views of landscapes, perspectives, etc. Each of them introduces a space. These spaces are linked in a rather consistent way. The town is situated in the view of the landscape. This town is enlarged in an image showing the main structures of the town. The structural plan becomes very concrete by showing the design of several buildings. This imaginary space functions as an analogous space with one aim: to explain his theoretical view of architecture. The direct communication makes it possible for the outer world to quickly understand how his theory might function. In his *Trattato di Architettura* part XIV we find an interesting called *IlLibro d'Oro*. In this *libro d'oro* there is a description of an antique town called Plusiapolis, situated in the antique period on the site of Sforzinda. The author of this *libro d'oro* is Onitoan Nolivera (anagram of Antonio Averlino, the real name of Filarete). The projects illustrated in *Il Libro d'Oro* are comparable with the ones built in Sforzinda. With *Il Libro d'Oro,* Filarete introduces a new analogous space in his imaginary world. This space is a possible explanation for the theory of architecture elucidated in Sforzinda. Filarete is constructing one space after the other. The spaces are literally constructed by theorizing, designing, drawing, writing and imagining. The image is seen and partly analysed before it could ever be written and described in a text.[2] Not only the perception of the image, but also the tracing of all implicit and latent links between several images are uncontrollable and unforeseen. Here starts a mechanism of possible insights. Some of them are prepared and planned by the author, most of them are not. By looking at these images, the audience enters this world of imagination and It is the mixture of the text and the seductive qualities of the images that make this mechanism possible.

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[1] This is the vision of an architect looking at the past who has affinities for that period. It is not the result of a historical study made by a historian. This reading of the past will result in insights probably different then those made by the historian. Beside the lack of a professional historical attitude, the main difference is the adding of a design attitude, an attitude that is looking for concrete solutions or at least perspectives on solutions for questions and problems situated in the present.

[2] The potential can be dangerous as well. Because of the velocity of the look. The whole process can be reduced to a glimpse.

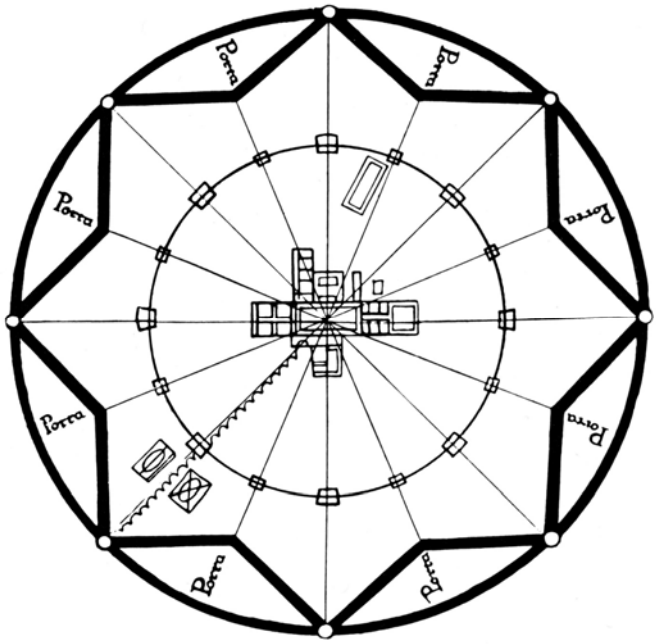


Figure 1. Filarete, Trattato di architettura. Firenze Bibl. Naz. Magl. II, I, 140 fol. 43 sg. Sforzinda



Figure 2. Filarete, Trattato di architettura. Firenze Bibl. Naz. Magl. II, I, 140 fol. 41r. Torre del castello di Sforzinda

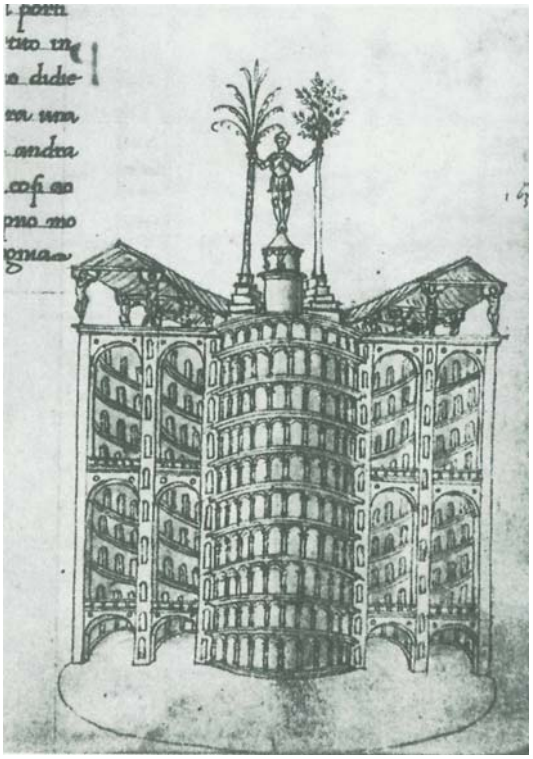


Figure 3. Filarete, Trattato di architettura. Firenze Bibl. Naz. Magl. II, I, 140 fol. 144r. Casa della virtù e del vizio

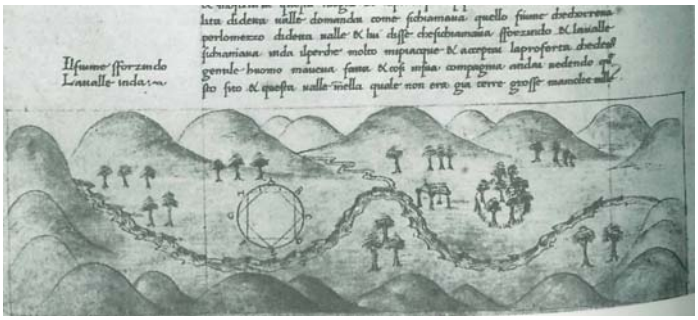


Figure 4. Filarete, Trattato di architettura. Firenze Bibl. Naz. Magl. II, I, 140 fol. 11v. Sforzinda

In Sforzinda the images are mostly not literally linked or layered on top of each other. This appears even more frequently in the work of Francesco di Giorgio Martini (1439-1501). In his tractate *Architettura civile e militare* he creates several superpositions of plans and human bodies, which are intended to emphasize the anthropomorphic relationship. His plan of a town is a symptomatic example. For Francesco di Giorgio Martini, the town is like a body. He immediately links the head with a fort, which is seen as the most noble part of the town. The body shapes the fortifications with strong angles at the limbs. In the centre there is a church situated on a town square. This technique is also applicable on other scales, ranging from a single façade down to the details of an entablature. Despite several inconsistencies in his theory, the impact of these images on the imagination is very strong. In this case it is also the directness of the communication that introduces a mental process. The images demonstrate a natural link between two scales, that of the town and its architecture, and that of the human body. It is this direct communication of two scales that immediately creates the existence of two spaces. And it is the evidence of the representation that generates a new analogous space, a space

that is the result of the superposition of two spaces with different scales. This mental process makes it possible to look and think in an analogous space in which the daily use of the human scale is put aside. What was unthinkable and impossible becomes natural and logical. This may generate new insights and perspectives.



Figure 5. Francesco di Giorgio Martini. Torino, Cod. Saluzziano 148 fol. 3. Pianta di città con figura umana inscritta



Figure 6. Francesco di Giorgio Martini. Torino, Firenze, Bibl. Naz., Cod. Magl. II, I, fol.47. Architrave antropometrico

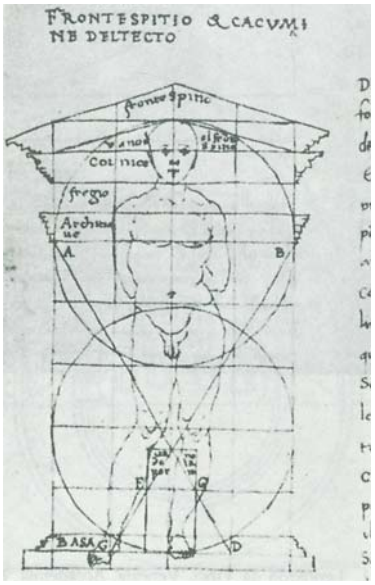


Figure 7. Francesco di Giorgio Martini. Torino, Firenze, Bibl. Naz., Cod. Magl. II, I, fol.38v. Facciata di chiesa (Madonna del Calcinaio, Cortona).

There where Filarete introduced a real perspective of an analogous space into another (and vice versa) with the introduction of *Il Libro d'Oro,* Francesco di Giorgio Martini stamps one space into the other. Almost as if he wanted to flatten or melt the two spaces together.

A more consistent example is from the hand of Vincenzo Scamozzi (1548-1616) in a paraphrase on the Vitruvian Man. Here the image is divided into fields, all of them well-proportioned. The Vitruvian Man is still in the centre related to the two most perfect geometric forms and, ultimately, to the universe. The fact that the human body is not situated *in* another geometric form or vice versa is crucial. The literal superposition upon a town, façade or entablature is missing. The body is framed like all the rest. The human body is still essential for Scamozzi, but not as a physical condition for creating the architecture. The human body is an allegoric figure, a reminiscence of the figurative art. The human body is a part, almost an accessory of the architect, who is working with his mathematical and philosophical tools. The detail of the framework works as a plan, an architectural plan that puts all the different instruments in different rooms. It is comparable with the opening sequence of Dogville, a film by Lars Von Trier. There, too, in an almost perfect orthogonal projection, the plan of the small village of Dogville is communicated. Within this framework we see people going about their daily activities. This direct communication immediately puts the audience in an analogous space, one configured with simple lines and some stage props. The audience can imagine how it is to live in this seemingly peaceful small town. In the same way, Scamozzi's image works as an analogous space in which the designer can trust on the handy setting of the theorist. He can plug and play with all the tools represented in the framework, all the while knowing that he is in good hands. All people functioning in this space are in harmony with the tools that are necessary for building architecture. This world is well balanced, seemingly.

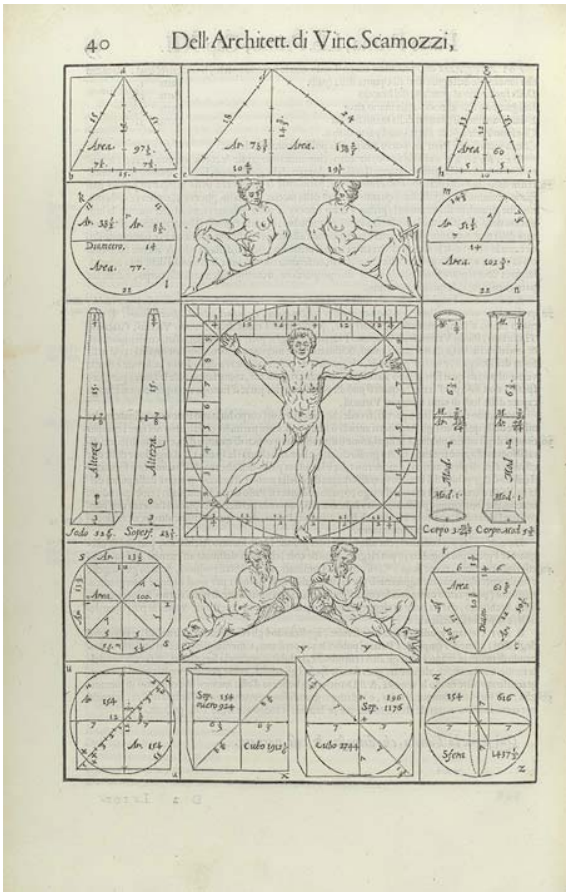


Figure 8. V. Scamozzi, L'idea dell'architettura universale (1615). Figura vitruviana

The image is an instrument with a rather complex impact.[3] The starting point remains logic. By introducing an image, these authors were trying to communicate something. The authors had something to explain, to tell. And text alone was not satisfying. These images can then be seen as illustrations of the text. With the use of these images, a specific mechanism is introduced. This mechanism facilitates and emphasises the introduction of other spaces. Moreover, the images demonstrate the spaces and make them attainable. This link is crucial in what happens next. It then becomes possible to *enter* the space and communicate with it. And this is not only the case for a single person, but also for a whole audience. This creates a very interesting situation with a lot of possibilities. It is the directness of the medium that makes the literal introduction into that analogous space rather easy and comfortable. From that moment on, it is thinkable to leave all sorts of contradictions behind and focus on other perspectives. For instance, the scale of the human body is variable and adaptable, a framework or matrix becomes accessible as a normal plan of a house or a building. Theoretical statements can be transformed into allegorical figures, materials, plans, etc.

[3] A crucial element when analysing the underlying mechanisms of these engravings is the position of the reader. There is without any doubt a difference between the audience at the time the authors were working and the interested party of the 21st century. This comparison would lead us too far away. Nevertheless the current audience can see it in a free manner, released from the typical disciplining architectural context dominated by the Vitruvian canon. Now we might see it as a surprising way of thinking and handling.

With Panofsky in mind, we can speak of these images in three ways. There is a pre-iconographical description, an iconographical analysis and, finally, an iconological interpretation. The way the audience, in an actual context, might look at these images is situated beyond the third way. There is, while looking at these images, what could be called an indistinctness. It is an indistinctness framed in a well known structure, the structure of an architectural theory. Moreover, the indistinctness appears in images that are very well designed, balanced, made and constructed by architectural minds. And thus the indistinctness is situated in an imaginable mental framework. The indistinctness functions as a lack, an emptiness that can be filled with thoughts … or as a place to escape from the controlled way of functioning and communicating.[4] This indistinctness is of vital importance to letting the engravings function as stimulators and generators of new insight. If this indistinctness were not present, we would probably have to return to the theory of Panofsky.

III.

Is it possible to create spaces like these in an actual constellation? And why would this be interesting? In the present study, there is an attempt to do so. For a better understanding of the issue, it is necessary to situate the context of this research project.

The process of doing architecture today is more complex than ever before. Within this process, the architect can function either as an individual or as a member of a team. The layering that is typical for this kind of complexity introduces a kind of tension between the different specialities (such as urban planning, finance, security …). When the architectural process has to handle all these questions and problems, each of these specialities becomes indispensable. This way architecture functions as a discipline that is disciplined more than ever through its own laws.[5] An architect takes a position against this situation. In doing so, the architect must situate himself in a field with extreme and explicit positions. If he knows nothing about the mechanism, then the only possibility at that moment is to function as an ignorant architect. Or else he is conscious of it, but from a certain indifference he does not want to be involved with it. In the end, there is the architect who knows that if he loses his concentration for a second, then he risks becoming a part of that disciplining

[4] In one of the interviews published in *Pourparlers,* Deleuze mentions the link between language and a controlled society …*Vous demandez si les sociétés de contrôle ou de communication ne susciteront pas des formes de résistance capables de redonner des chances à un communisme conçu comme « organisation transversale d'individus libres ». Je ne sais pas, peut-être. Mais ce ne serait pas dans la mesure où les minorités pourraient reprendre la parole. Peut-être la parole, la communication, sont-elles pourries. Elles sont entièrement pénétrées par l'argent : non par accident, mais par nature. Il faut un détournement de la parole. Créer a toujours été autre chose que communiquer. L'important, ce sera peut-être de créer des vacuoles de non-communication, des interrupteurs, pour échapper au contrôle.*[4] The *vacuoles* or cavities of non-communication of Deleuze function as moments of indistinctness. Gilles Deleuze, 'Contrôle et devenir', in *Pourparlers,* Parijs, 1990, p. 229- 239

[5] Architecture is also a matter of disciplining. For instance, architecture involves defining and handling public and private space. Architecture is a fragment of a larger complex of disciplines, each of which disciplines other disciplines.

mechanism. A mechanism where the control of the self shrinks to a footnote in the larger system. For a conscious architect this is always happening more or less. For him/her it is important to generate attitudes, instruments and strategies that can manage the disciplining laws.

Is this attitude of an ignorant and indifferent architect really so problematic? He is still functioning, isn't he? There are enough reasons to assume that this situation is not as evident as we might like it to be. The ignorant architect, working on his project in which he might find some kind of freedom, is perhaps a plaything of several seemingly unverifiable factors. He is then one of the pawns, lonely on the chessboard. His so-called individual point of view is reduced to a detail in the margin. The indifferent architect, focussing too much on one issue, one specialization or one project, or simply acting without any interest, cannot get a real overview of the ongoing mechanisms. He is struggling against the supposedly well known laws without having any real insight and oversight. A lack of sight usually means a lack of vision – the vision that is necessary for the practice. Not only for that individual practice, but also for formulating a vision concerning more global issues such as sustainability, ecology, timelessness, ... This vision is not necessarily linked with a specific project. In these circumstances the researcher is implementing themes with an impact that is stronger than that of an architect who is involved in a single project can ever achieve. At that moment there is a so-called 'social impact'. At that moment the attitude of the ignorant and indifferent architect becomes problematic. Then it becomes necessary to better understand where the disciplining mechanisms can lead to.

The corpus of the present study has all the characteristics of an experiment. The experiment starts from the work already done (architecture, publications and photography) and all the experience built up over a period of ten years.[6]

The central issue in the experiment is the design and the content of a matrix. The notion matrix is partially correct. The ultimate goal is a table, a plane geometry, a framework,… For the sake of simplicity, it is called a matrix. This matrix seems to function as an analogous space.

The matrix is layered. A first level consists of the work of architettura and ALT. A second level is divided into 16 fields and could grow in the future. Each field has a name: materiality, old masters, typology, image, commonplace, architecture, subversion, new masters, splinters, unclearness, puzzles, texture, strategy and intensity.[7] A third level is a matrix constructed of texts. Another multi-layered level introduces images ranked in series, called catalogues raisonnés. Those catalogues are introduced to rethink thoughts that are almost unspeakable in words.[8] So the output consists of texts, catalogues and an elaboration of the matrix.

To generate new elements in the construction (the design of matrices) and content (texts and catalogues raisonnés) of the matrix several methods are introduced[9]:

- The search for so-called nomads. These are elements that interfere in the different levels, for instance specific terms such as indistinctness or intensity. But sometimes it is a matter of specific images, words or text fragments.
- Working with specific strategies in mind, for instance communication, form/materiality, experience.
- The reaction on the palimpsest. The interference of several fields in one or more levels generates coincidences, confrontations, tensions, gambles, etc., and thus provides new reflections, attitudes, etc.

The characteristics of the knowledge coming out in this phase will be described in the next period. In an initial evaluation it looks as if the introduction of the whole concept (i.e. the mechanisms of the matrix) involves knowledge transfer. Knowledge that in an initial phase is not always explicit, but sometimes tacit and even ineffable, becomes 'manageable' through the reflection in the matrix. Further research will fine-tune this output and the methods for generating it.

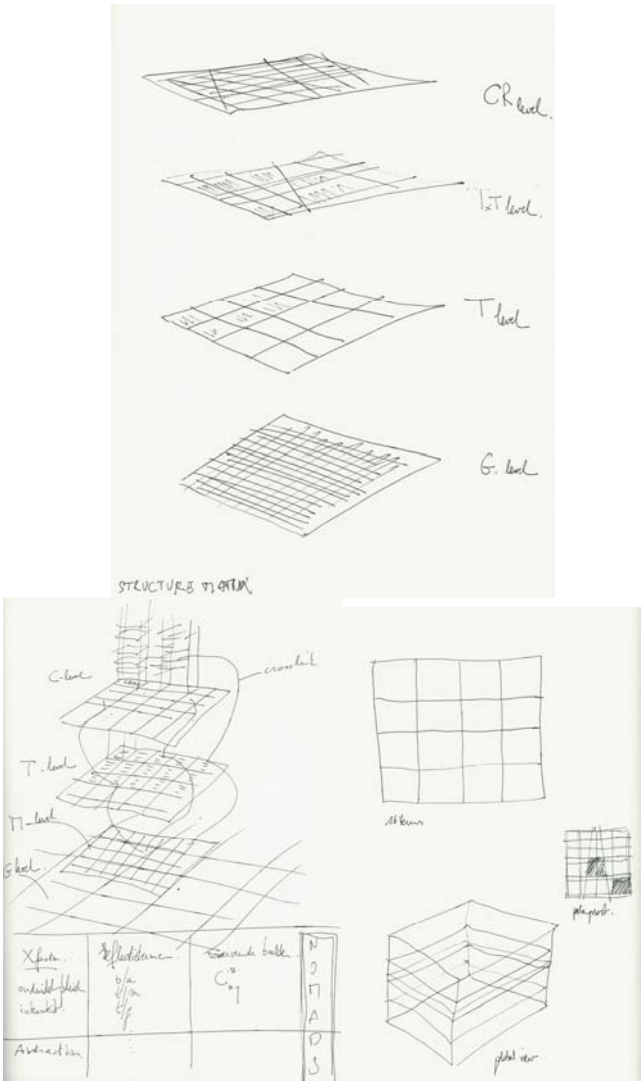


Figure 9. Matrix, all levels (study)

[6] The architecture is realised by architettura, changed to ALT in October 2007.

[7] These names are the result of an attempt to characterize the important issues in a design process.

[8] The catalogue is 'raisonné', i.e. set up with a reason. This enables us to realise an intellectual link between the two media (text and image).

[9] This may lead to a rhetoric attitude as we find in the literature.

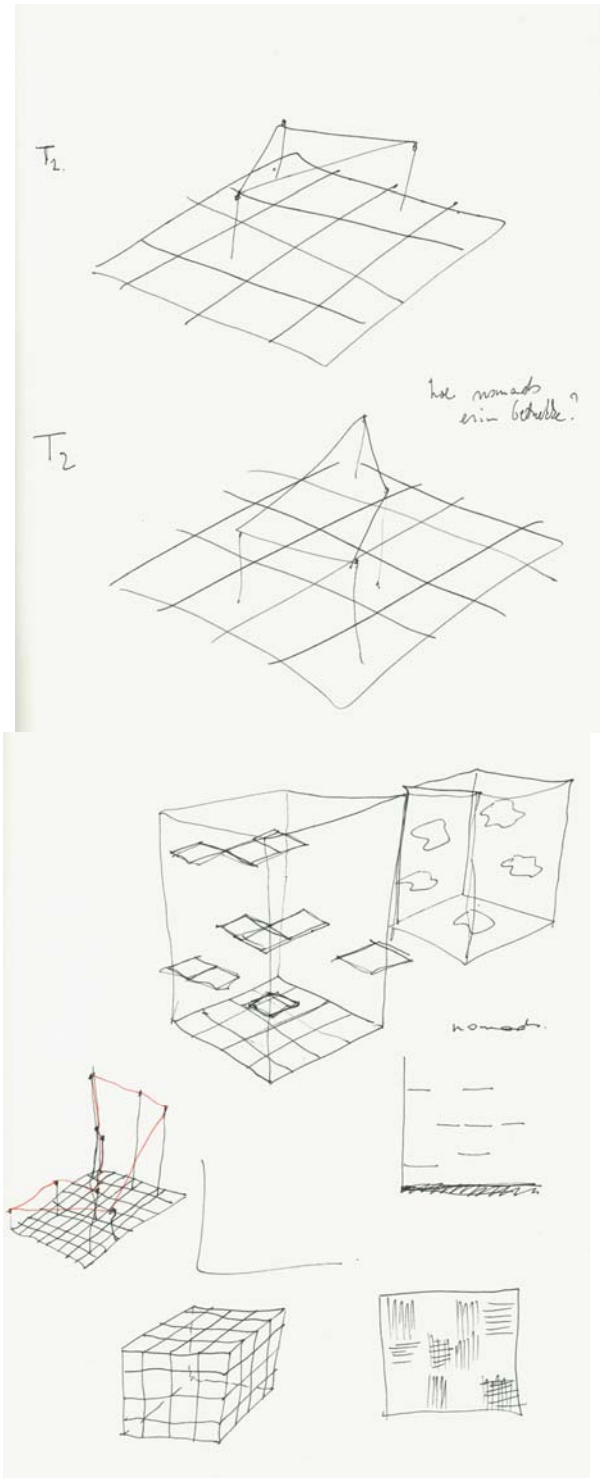


Figure 10. Matrix, looking for nomads (study)

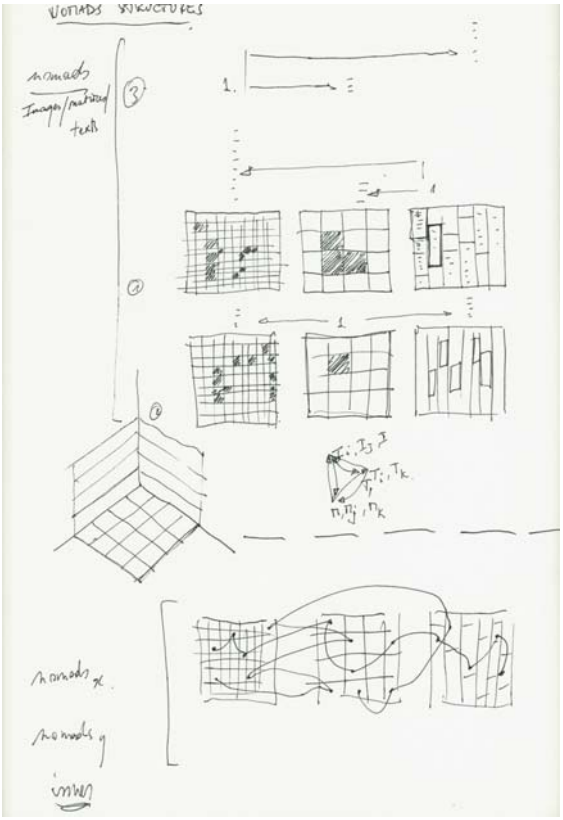


Figure 11. Matrix, nomad structures (study)



Figure 12. First part of catalogue raisonné

IV.

With this matrix constellation a new space is created. It is a mixture of a multi-layered plan, texts and a dynamic and flexible manipulated archive of images. Through its being communicating it to an audience, this structure becomes an analogous space wherein can be moved through all levels and cells. By the introduction of these methods, the factor of indistinctness is sneaked into this space. This leads to new perspectives for the visitor to the matrix.

First of all, the construction becomes fruitful for me as a researcher who wants to create new insights. This reflection deals with the range of terms (16) introduced in the matrix. The output is text and other media.

Secondly, this way of working may transform the analogous space into a platform where a cross pollination becomes possible. The different perspectives of the various researchers and visions and disciplines participate in this cross-pollination. For instance, scientists, architects, philosophers and economists can work and reflect on subjects such as sustainability, ethics, ecology and global warming. Some aspects are crucial for making this kind of pollination result in successful action.

The analogous space needs to be designed and defined. It is insufficient to put different views and disciplines together without creating a context that is *well shaped*. This means several things. There has to be content. Why do we bring these aspects together? Is there a goal, a problem, a theme, a discussion, …? And, even more important, there has to be a context. It is in this level that the challenge lies. Here it becomes possible to *construct*, in the literal sense of the word, a context. In this way spatiality, as a common understandable language, can be introduced. By using themes such as matrix, framework and vedute, this so-called spatial design becomes the upbeat for creating an analogous space. This elaborating level was the evidence for the historical examples, for that zeitgeist. Today it is rare to find this level as a triggering attitude in research modes. Nevertheless it is a level with interesting opportunities, for the researcher and for the designer or architect. The latter finds in this aspect a whole new range of possibilities and opportunities.

A crucial element in this way of starting up a reflection is the introduction of a theme such as indistinctness. It is this unstable factor that is indispensable in the whole construction. It generates uncertainties and lacunas in mental thoughts that might bring the visitors to the brink of an abyss. These places are of vital importance whenever researchers and visitors want to reflect in a profound way on certain themes. It is only through the synergy of indistinctness and analogous space that this consideration can become relevant.

The old masters are inspiring in this debate on analogous spaces. Seen from the viewpoint of the present day through direct visual barriers and delivered from the ancient architectural restrictions, these engravings are confronting. They are direct and, in a universal way, comprehensible. They allow contradictions to become intriguing interventions. This all happens with artistic tools. It is this spontaneous, natural attitude that we have lost. Bringing it back to the forefront might help in generating new perspectives on complex themes.

REFERENCES

[1] Hanno-Walter Kruft, *Geschichte der Architekturtheorie von der Antike bis zur Gegenwart* (München 1985)

[2] Erwin Panofsky, *Meaning in the Visual Arts* (1955)

Metaphors in action: early modern church buildings as spaces of knowledge

Maarten Delbeke*, Anne-Françoise Morel**

Abstract - **Churches incorporate symbolical and historical meaning and, as such, act as analogous spaces. The aim of this paper is to analyse and compare how text and architecture are symbolically connected in the post-reformation Roman Catholic and Anglican Church. We will draw upon early modern historical texts on early Christianity, religious biographies, sermons and biblical references in order to grasp how complex religious, political and historical meanings were conferred upon church buildings during the post-reformation period**

Catholicism and anglicanism heavily relied on Biblical and Early Christian 'prototypes' in their discussions of church architecture. Both confessions shared the same referents but employed them to different goals. The Catholic counter-reformation emphasized the existence of a continuous tradition from Biblical times until the present, while the Anglican Church sought to legitimize its rupture with Rome by drawing upon the golden age of Christianity exemplified by the first Christians. In both contexts, archaeological and historiographical arguments became conflated with the symbolical associations of the church building, to establish, by means of text and architecture, a lineage with the true origins.

A comparison of the strategies adopted in the context of the two confessions, as well as their development over time, will allow to propose a preliminary typology of analogous spaces in early modern religious architecture.

Keywords **- Church architecture, Catholic and Anglican Church, Early Christianity, Biblical symbolism, Allegory**

I. Introduction

When a building copies or references a model, it becomes an analogous space: regardless of how exactly the model is invoked, or whether the model ever existed, elements of the new building stand for an original that is not present, yet can be read, understood or remembered by means of these elements, their disposition, or use. If it is quite easy to accept that analogies of this kind exist, it is harder to establish how exactly they are established. What defines the connection between the building and its analogue? How is this connection established, recognized or activated? On what does it depend, on the design of a building, its use, its descriptions, its context?1

It is the aim of this paper to examine this connection by comparing how, during the early modern period, catholic and anglican churches were constructed, used and read as analogous spaces. As we will argue, churches act as analogous spaces because by definition they incorporate important symbolical and historical meanings. They are used and often described following well-established practices, which should allow to grasp the construction of the analogous space. By adopting a comparative perspective across confessional lines, moreover, we hope to establish some of the factors that determine the modalities of the analogous space. After all, among the major points of the confessional debate were the use of images and the appropriateness of architectural splendour, as well as the exact nature and meaning of liturgical rites. These issues directly affect the design of church architecture and the way it is able to incorporate references or analogies. Finally, as we will show, Catholic and anglican churches are 'analogous' to the same prototypes. The question then is whether and how the confessional context differentiates the analogy of early modern churches with those prototypes.

To examine these questions, we will first address in general terms how early modern churches operated as analogous spaces. Then we will examine in more detail how catholic and anglican churches embodied analogies with models or prototypes. In our conclusion, a comparison of these two traditions will allow us to propose a preliminary topology of the analogous spaces in early modern religious architecture.

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A. The symbolism of churches and historiography

The renaissance treatises written from the mid 15th C. onwards in emulation of Vitruvius' De architectura libri decem, such as Leon Battista Alberti's De Re Aedificatoria, almost invariably deal with churches. Generally places of worship are classed as the most important and dignified building type, and it is there that the architectural principles underlying the treatise become applied to their fullest extent.

The body of early modern literature on church buildings is however not at all confined to these treatises. Early modern church historians, archaeologists, dignitaries, priest, preachers, poets and image-makers, be they catholic or protestant, have produced a wealth of descriptions, poems, speeches, histories, … that deal more or less directly with church buildings.2 This body of literature however considers churches less as a topic of design, as the Viturvian treatises do, than as bearers of meaning, be it religious, historical or political. Abbey chronicles, for instance, often provide detailed accounts of church buildings, however not as an object of architectural design, but as an integral part of the life and history of a religious community.3 A speech delivered at the dedication of a church building, to give another example, is very little concerned with providing a detailed and accurate description of every detail of that building's design, let alone with laying out the designer's intentions and procedures, than with the possible significations that the actors involved in constructing the church might attach to making a building in that particular time and place.

This body of material is not easily summarized, but even a by definition incomplete survey leads to a simple observation: it is deeply marked by the confessional struggles dividing Europe in the 16th and 17th C., yet very homogeneous in its frame of reference. Except for the more extreme puritan factions in anglicanism and protestantism, all confessions, whether protestant or catholic, describe churches in very similar terms, for instance as refoundations of the Temple of Solomon, the second Temple erected as a permanent shrine to the Ark of the Covenant, or as prefigurations of the Heavenly Jerusalem, the perfect city built of gems and gold at the end of times.4

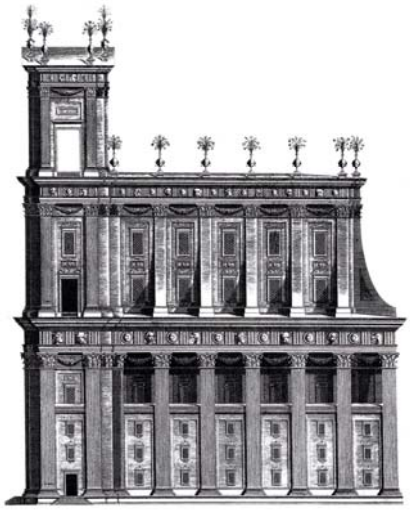


Figure 1 Guan Bauttista Villalpando, Ezekiel's vision of the Temple, 1598
W.J. Hamblin, D.R. Seely, *Solomon's Temple, Myth and History*, Thames and Hudson, 2007.

This body of metaphors is, of course, shared by all Christians, since it lies embedded in the Bible and early Christian literature.5 Moreover, the idea that the architecture of a church is prone to an allegorical reading where different parts of the building stand for either doctrinal or historical aspects of Christianity was well established by at least the 13th C. Around 1255 Wilhelmus Durandus wrote the Rationale divinorum officiorum, the most influential liturgical manual in Europe until deep into the 20th C.. The Rationale considers the church building as one component of the apparatus accommodating worship, and invests architecture with a symbolical charge similar to liturgy by offering a detailed allegorical reading of the building's architectural elements, such as the doors, the windows, the pillars, etc.. As such, the Rationale codified a much older and widespread practice to read buildings as allegorical texts.

This practise persisted in the early modern period, as is illustrated by the following example.6 An emblem (a composition of an image with a motto and an epigram) published in honour of pope Gregory XIII (1572-85) as part of the Allusioni, et imprese sopra l'arme di Gregorio Papa XIII shows a small domed church. It refers to the cappella gregoriana, the first part of new Saint Peter's to be decorated and finished in 1583.


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VRBS · BEATA · HIERVSALEM.

CVI.

Queſto gran Tempio, che col Ciel confina,
Hà d'Oſtro, Argento, e Smalto i Fondamenti,
D'Alabaſtro i Pareti, e gli Ornamenti
Fan d'intorno apparer luce diuina.
La Porta Orientale à cui s'inchina
Ciò, c'han ſotto gli Heroi del Ciel più ardenti
E de Topatij; e dentro hà traſparenti
Perle, ch'à pochi il Ciel dona, e deſtina.
Il Fronteſpicio è sì lucente, e vago
Con le fineſtre d'Hebano, e Piropo,
Che la materia vince il Magiſtero.
Il Tetto, ou'è quella celeſte Imago,
Che ſplende à queſto, e à quell'altro Hemiſpero
E d'oro à cui non è paragon' vopo.

Figure 2 Capella Gregoriana, Vatican, 1583, represented as 'Urbs beata Ierusalem'.
Principio Fabrizi, *Allusioni, et imprese sopra l'arme di Gregorio Papa XIII*, emblem 106. B.A.V. Capponi.IV, p 159.

Quite probably, the emblem serves to commemorate the dedication of the shrine: it takes as its motto Urbs beata Ierusalem, the first line of the hymn sung at the dedication of churches. The hymn portrays Jerusalem as a vision of peace built from the living stones of the faithful, descending from heaven on earth like a bride entering her nuptial chamber or tabernacle. It evokes the role of the master builder at length, and his artifice is praised as he constructs his holy edifice, walled with gold and gems, on the cornerstone of Christ. By joining an image evoking the chapel (in itself a pars pro toto for new Saint Peter's) to the dedication hymn, the emblem suggests how this precious building serves as a mirror for the ideal building of the Temple, but also for the institution of the Catholic Church, and its heavenly model, the Jerusalem of Revelation. Indeed, according to the legend of the emblem, the small church is, "the symbol of the church triumphant and militant, and the Roman pontiff, in imitation of the heavenly Jerusalem, as is described in Revelation 21." In the sonnet that completes the emblem, the chapel is described as a stunning compendium of the most precious materials, the heavenly image of a resplendent edifice. Marginal annotations gloss each of these elements as one constituent part of the Church and its history. The emblem thus identifies the particular architecture of the cappella gregoriana with the artifice of the Temple and, as such, renders it prone to allegorical interpretation: through its artifice, the building becomes an image of the Catholic Church.

With the confessional struggles, the allegorisation of architecture as performed in this emblem became part of a new agenda: comparison of the new building to its first prototype now served to legitimize the decision to build the church, its existence, and by extension the community that decided to erect the place of worship. In other words, one function of the references to biblical or other prototypes that permeate the early modern literature on churches is to define an origin, and to establish a lineage between the new building and that point of origin. The very existence of this lineage then proved the legitimacy of not only the act of building, but also of the builders.

It is this preoccupation with origins that could be considered as the most consequential effect of the early modern confessional struggles on the discourse regarding church buildings. To establish these origins, however, symbolical references did not suffice. They had to be substantiated by means of historical proof. Historiography became one of the most important battlegrounds of the reformation and the counterreformation.[7] Between 1559 and 1579 the Magdeburger Zenturien were published in Basel, to show by means of meticulous historical research that the Roman church and especially the papacy stood in no historical connection at all with the primitive church established by Christ and Saint Peter. This attack on the very legitimacy of catholicism spurred a group of historians in Rome to write a counter-history of Christianity, now to prove the prerogatives of Rome and the Catholic Church.

The motivation underlying the conscious attempts to reform catholic historiographical practise is explicitly stated in the introduction to the paradigmatic work of catholic historiography, the Annales Ecclesiastici, or Annals of the Church, written by Oratorian Cesare Baronio and published between 1587 and 1607. Baronio's aim with the Annals was to "demonstrate for every age that the visible monarchy of the Catholic Church was instituted by Christ our Lord and founded upon Peter and his true and legitimate successors, the true Roman pontiffs, and that it is preserved inviolate, religiously guarded neither broken nor interrupted but continuous, for ever." In two words, religion is "ever the same."

Simon Ditchfield has argued that the motivation for Baronio's historiographical endeavour resided as much in the post-Tridentine reform of liturgy as in the controversial use of historiography by the Protestants. Catholics saw history as the best instrument to prove the provenance of liturgical rites, the existence of saints and the continuity of their cult, the very elements of their religion that Protestants contested. Because rites are

accommodated in spaces and buildings that not only house the present cult but also carry the traces of older devotional and liturgical practices, the writing of history in the service of liturgy became intimately linked with the recording of places. As a consequence, Baronio's historiographic enterprise lead directly to the development of an auxiliary science, Christian archaeology, not only one of the suppressed roots of modern architectural history, but also a lively proto-scientific endeavour that fused humanist archaeological interest – one of the practises subtending Renaissance architectural theory – with counterreformation apologetical literature.[8]

This quest for the material origins of Christianity immediately translated into a program: the past not only served as a source of justification, but also as a call for imitation. This idea – yet another humanist trope – permeated a plethora of texts. An important example is Carolus Borromeus' Instructiones fabricae et supellectilis ecclesiasticae.[9] It is an administrative document drawn up to assist parish priests and bishops of the archdiocese of Milan in the design, construction and maintenance of their churches, published in 1577. In the introductory letter to the reader, Borromeus writes:

In these Instructiones we also advise an imitation of that ancient piety and reverence of the faithful (which originated in the time of the Apostles) and which clearly shone forth in the construction of those sacred buildings and the admirable disposition of their sacred furnishings. The remains which are to be seen today indicate that there once existed large and numerous ecclesiastical structures. There was also a large and valuable abundance of sacred vestments and vessels. … We have learned that all of these ecclesiastical furnishings were of extraordinary value, not only at Rome, Jerusalem or Constantinople, but also at Milan (which fact should have the greatest effect on our piety). [10]

The claim on the heritage of the primitive church was however as little a prerogative of the Catholic Church as the body of symbols and allegories available in the Bible and later religious literature. The Anglican Church, too, attached much importance to its association with the Golden age of Christianity, the primitive Church. This association served to legitimize the rupture from "the corrupt" Roman Church, while it also set out guidelines for the interpretation of the newly established worship. If the first articles of the Anglican Church remained mainly inspired by the catholic doctrine, the anglican worship became a truly reformed one under the reign of Edward VI (r. 1547-1553), declaring the Roman Church as superstitious and idolatrous.[11] The anglican liturgy, established in the Book of Common Prayer (1549), focussed on a corporate liturgical worship centred on the "service of the word" and "the supper of the Lord". Especially the latter was inspired on the rites and usages of the primitive Church, which guaranteed the grandeur of the Christian truth. The reform of liturgy led to the destruction of stone altars, which were seen as referring to Jewish sacrifice, in order to set up wooden communion tables as were supposedly used in the Primitive Church. Furthermore, medieval decoration (shrines, pictures and images) which, according to the anglicans, had given rise to superstitious and idolatrous practices were ordered to be destroyed. Instead it was recommended to install Commandment tables, in analogy with the place of worship of the Mosaic Law.[12]



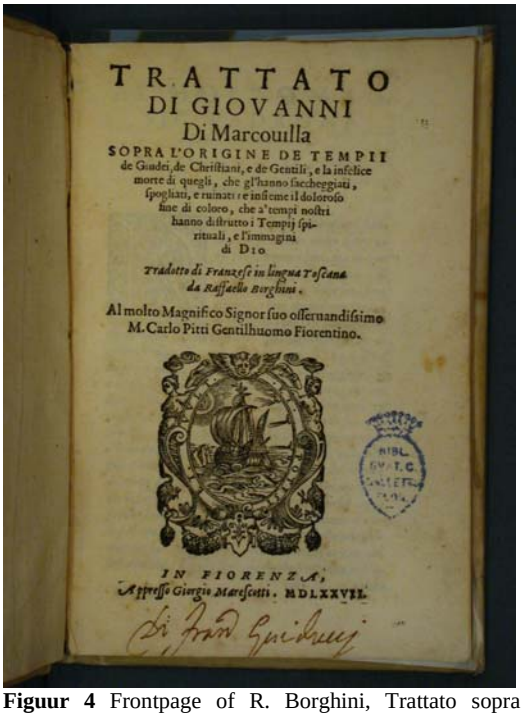
Figure 3 Commandment tables, St. Vedast alias Foster, London, C. Wren, 1673.
Photographed by A.F. Morel.

In a passage that show striking parallels with the admonishment of Carolus Borromeus, the ecclesiastical historian Joseph Bingham wrote in 1708-1722:

The subject of the present discourse, being an essay upon the ancient usages and customs of the primitive church, and a particular account of the state of her clergy, is such as, being considered barely by its own nature, I know I cannot but be approved by a person of you Lordship's [Jonathan, Lord Bishop of Winchester] character; whose care is concerned not only in preserving the purity of the primitive faith, but also in reviving the spirit of the ancient discipline and primitive practise.…The matters here treated of are many things of greatest importance, which when plainly set in order and presented to public view, may perhaps excite the zeal of many in the present age, to copy out those necessary duties, by the practice of which the primitive church attained to great perfection and glory, and as I may say, still provokes and calls us to the same attainments by so many excellent rules and noble examples.[13]

Across confessional boundaries, the double claim on the Primitive church as origin and model, lead to an important production of treatises about the primitive church and the true worship of early

Christians, all of them spending much attention to the origin and necessity of places of worship.[14] In the catholic sphere, an early treatise is Jean de Marconville's Traicté contenant l'origines des temples des Juifs, published in 1563 and translated into Italian by Raffaello Borghini in 1577.[15]


TRATTATO
DI GIOVANNI
Di Marcouilla
SOPRA L'ORIGINE DE TEMPII
de Giudei, de Christiani, e de Gentili, e la infelice
morte di quegli, che gl'hanno saccheggiati,
spogliati, e ruinati: e insieme il doloroso
fine di coloro, che a' tempi nostri
hanno distrutto i Tempij spi-
rituali, e l'immagini
di Dio
Tradotto di Franzese in lingua Toscana
da Raffaello Borghini.
Al molto Magnifico Signor suo osservandissimo
M. Carlo Pitti Gentilhuomo Fiorentino.
IN FIORENZA,
Appresso Giorgio Marescotti. MDLXXVII.

Figuur 4 Frontpage of R. Borghini, Trattato sopra l'origine de tempii de Giudei,…, Fiorenza, 1577.
CCA Collections

A later example is Francesco di Simone's Delle glorie de'sagri tempj e del culto, che ad essi si deve from 1734.[16] Anglican examples will be discussed below.
As a result, the historical frame of reference for churches acquired the same status as the symbolical: a common 'history' is not only put to use but also actively promoted as an argument by opposing confessional camps. Again it is not hard to see why catholics and anglicans would avail themselves of the same examples; after all, they lay claim on the same origin. But if these same examples serve to draw a distinction, it is worth asking whether they are read, interpreted and applied in the same way?

II. Analogous spaces in catholicism and Anglicanism

A. Catholicism

Catholic historiography and archaeology made available a body of texts and images that could facilitate the task set by Catholic Church authorities, namely to reinforce the symbolical attachment to the true model of every space of worship – the biblical prototypes – with historical references to specific architectural models able to carry and ventilate the apologetic agenda of the counterreformation church. Cesare Baronio, the author of the Annales Ecclesiastici, put his agenda into practise in his architectural patronage, most famously in the restoration of the church of SS. Achileo e Nereo in Rome.[17]



Figuur 5. Façade of SS. Achileo e Nereo, Rome.

Alessandro Zuccari has rightly termed Baronio's approach here "philological," drawing attention to the close parallel with Baronio's scholarly treatment of written sources, and the care with which clearly allocates each of the church building's constituent elements in accordance with their original historical value.
Baronio's restoration of SS. Achileo e Nereo fits into the widespread attention for both early Christian and Medieval churches emerging in Rome and elsewhere from the late 16th C. onwards, and the adoption in church architecture of elements with early Christian origins, like the confessio, an open crypt giving access to the space underneath the altar where the relics of a church's titular saint are kept. Important examples are the restoration of Santa Cecilia in Rome by Cardinal Emilio Sfondrati in 1599, or the rebuilding of the San Sebastiano fuori le Mura, by Cardinal Scipio Borghese in 1608.
Here, we would like to draw attention to another, less well-known restoration campaign, instigated by Cardinal Ludovico del Torres II (1552-1609), because it particularly addresses the analogy of text and architecture. De Torres was an important clergyman who stood in close contact with, amongst others, Cesare Baronio. In 1588, he was nominated arch-bishop of Monreale, the city South of Palermo that is home to the magnificent medieval cathedral. In occasion of his nomination, del Torres, adopting the name of his secretary Giovanni Luigi Lello, published and extensive description of the church, the Decrittione del real

tempio, et monasterio di Santa Maria Nuova di Monreale.[18]


HISTORIA
DELLA CHIESA
DI MONREALE.
Scritta da Gio. Luigi Lello
IN ROMA
Appresso Luigi Zannetti. M. D. XCVI.
Con licenza de' Superiori.

Figuur 6 Frontpage of G.L. Lello, *Historia della Chiesa di Monreale*, Rome, 1596.
CCA Collections

The 33-page long description very briefly introduces the construction of the cathedral, before leading the reader through the nave to the crossing, and from there to altar area, choir, the tribune, transept and transept chapels. After a short description of the floor, the attention turns to the famous mosaics in the nave. In a 15-page enumeration, these mosaics are listed by their inscriptions. The description then deals with the church exterior. Then follows a 3-page enumeration of the church's measures, arranged from large to small. The text returns to the interior to describe the altars, baptismal font, and the tombs in the church. After a remark on the light in the church follows a description of the monastery.
The Descrittione was published again in 1596, now as part of the Historia della chiesa di Monreale.[19] This book consists of three parts: the description of the building, brief descriptions of the Lives or gesta of the archbishops of Monreale up to de Torres, and a treatise on the privileges accorded to the church and diocese of Monreale. The description is based on the text of 1588 but has been expanded to include de Torres' numerous interventions in the church between 1588 and 96. Two of these interventions mirror the second part of the 1596 Historia, the Vite de gli Arcivescovi or gesta episcoporum : in the apse, Torres installed an inscription listing all the arch-bishops of Monreale since the inception of the diocese,[20] and de Torres decorated his most important intervention in the church, the construction of a chapel dedicated to San Castrense, with a portrait cycle of his predecessors.[21]
Why he did so can be gathered from a short treatise inserted into the Historia, which recalls that "the continuous succession of bishops is considered an important argument for the truth of the Catholic Church against the fables of heretics," and that it was therefore common to install books or tablets recording the names of deceased bishops, and to have their effigies painted in the church. The point is underscored with citations from the Church Fathers and scripture, and a short bibliography of other modern compendia of Gesta episcoporum.[22] Torres' attention to the motivation behind his collection of bishops' lives betrays his indebtedness to Cesare Baronio's Annales Ecclesiastici.
Quite probably, the Historia di Monreale, containing both the first description of the chapel of San Castrense and the gesta episcoporum, was published to celebrate the dedication or at least the construction of the chapel. The book thus simultaneously provided the accurate information concerning de Torres' intervention, and its precise meaning: the chapel should be understood, according to the Historia, much less an early baroque addition to a medieval church than the result of an act entirely similar to the interventions that gave the church its present shape. The gesta episcoporum of the 1596-edition offers a historical framework that unveils the true meaning of the church's art and architecture. The church exists because it was formed by a long and continuous succession of capable men who admininstered the church and her diocese. In their footsteps de Torres follows when he assumes the care and embellishment of the building.
The example of the description of Monreale allows to point out three aspects of the catholic attitude towards Early Christianity and its construction of analogous spaces. First, according to the description, the new chapel of San Castrense, too, incorporated early Christian elements, like the confessio or the ciborium, a vaulted canopy placed over the altar. The chapel was also fitted out so as to serve as a kind of liturgical training camp, provided with all the necessary reference works and instruments. In other words, the chapel was built to imitate early Christian religious practise. However, second, the chapel looked very much like a contemporary late 16th C. building. Like most of its Roman counterparts, the chapel of San Castrense consciously attempted to emulate early Christianity but without any hint of primitivism. The analogy between the present and the past was not established by means of form, but by liturgical use. Even more so, it could be argued that to men like del Torres, the analogy between the chapel and

its model was reinforced by the 'modernity' of the new intervention, because it demonstrated a similar dependence of form on historical context as the early Christian places of worship. Finally, the literary or descriptive method to connect the present with the past, through the building, is biography. Because the single building embodies the lives not only of the patron saint, but also of its successive patrons, it expresses the unchanging continuity of Christian faith.

Seventeenth C. catholic literature contains many examples of 'descriptions as biographies'; here, we will briefly discuss one very explicit case, to illustrate how the notion of the 'life' gives unity and meaning to church buildings with long and complicated histories. In 1680 Bianco Negri published a book called Basilica Petroniana ovvero Vita di San Petronio.[23] Despite its apparently paradoxical and equivocal title, "the Petronian basilica or/that is the Life of Petronio," the book offers exactly what it promises. The biography of the 5th C. saint Petronio seamlessly evolves into an account of the invention of his saintly body in 1141, the construction of the church from the late 14th C. onwards, the description of the actual state of the still unfinished building and short biographies of all known canons of the church, illustrated with their heraldry. The narrative encompasses without any hint of friction the events from the saint's life and the subsequent commemoration and veneration of his acts through building and liturgy. As the title of the book implies, the biography of the Saint and the description of his titular church extend into each other. However, since Petronio's life belongs to the past and the church is present, the book turns the church building as it stands in the 17th C. into a mirror image of Petronio's 5th C. life; the design of the church, its inscriptions and works of art become vivid testimonies of his actions; its foundations and stones, already sanctified by the presence of the saintly corpse, become a living image of his body; those who administer the church become at once Petronio's pupils and successors. The painstakingly constructed linear history, meant to prove the continuity between Petronio's life and 17th C. cult, finds its rationale in the eternal and immutable presence, first bodily, then architecturally, of Petronio.

While the 'biographical description' acts as a textual analogue to the 'real' building, the underlying idea that it is possible to discern an unchanging truth within the contingencies of historical forms, influenced architecture as well. As noted above, restoration of early Christian or medieval churches rarely if at all attempted to recreate 'old' forms. Rather, existing elements were transformed and recomposed into new and unseen forms. A famous example of this procedure is the Baldacchino, built in Saint Peter's in Rome by Gianlorenzo Bernini and Francesco Borromini between 1626 and 1633.[24]



Figuur 7 St. Peter, Rome, 17th C engraving of the 'Baldachino', G.L. Bernini and F. Borromini, 1626-1633.
17th C. Guide-Book

The construction (built above a confessio installed earlier) incorporates references to the twisted columns, kept in Saint Peter's, which were considered to be parts of the Temple of Solomon. In the Baldacchino, they are made much larger and out of bronze, another reference to the Temple, now to the twin columns Jachin and Boaz. These four behemoths carry a baldachin, originally a portable canopy made of brocade and carried with staves, to cover relics, the Eucharist or dignitaries in procession. The incorporation of many other references contributes to the meaning of the Baldacchino, but for the present argument it should be stressed that all these are composed into one construction that was, in the eyes of contemporary beholders, essentially novel. To those same beholders, it was exactly the expressive application of old forms that proved the legitimacy of the present Church.[25]

That is, if the beholders were catholic. When the English poet John Milton visited Saint Peter's in 1638 he seems to have been particularly impressed by the basilica's interior and the Baldacchino. In fact, several scholars have argued convincingly that Milton's description of Satan's palace, Pandemonium, in Paradise Lost, is actually modelled on the Baldacchino.[26]

B. Anglican Church

Besides a re-edition of Eusebius' Church History in 1577, the few anglican church histories dealing with early Christianity appear from the 1630's onwards. This does however not signify that Anglicans weren't preoccupied at all with Early Christianity. Rather, their interest has left traces in broader range of religious texts, especially in speeches written on the occasion of the consecration of church-buildings, consecration sermons.

The sermons of the (early) 17th C. display an interest in the biblical and early Christians examples that recalls the church histories devoted to the primitive church and its practises of worship. Compared to the historical treatises, they deal with the same subjects, but in a different way. The church histories defined and justified the 'true anglican worship' postquam by reconstructing the ideal Early Christian church-building and by showing the importance of the restoration of 'the Glorious Primitive Church'.



Figuur 8 Sermon preached at Paul's Cross for the rebuilding of the Old St.Paul's
Diptych by J. Gipkin, 1616, in: *Making History*: *Antiquaries in Britain 1707-2007*, exhibition catalogue, Royal Academy of Arts, London, 2007.

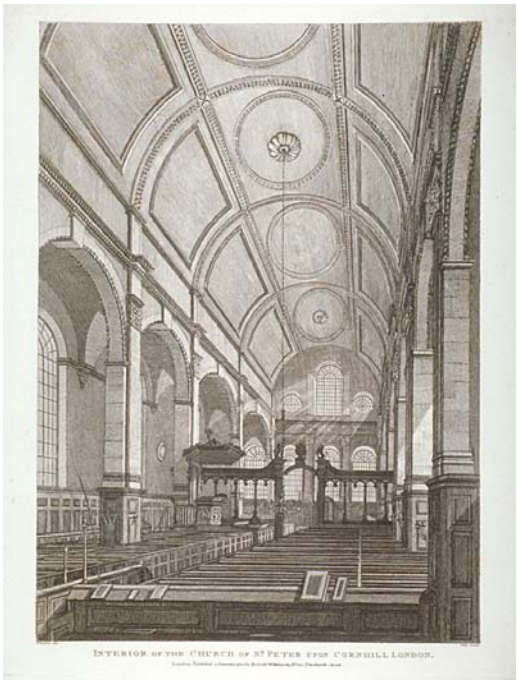
The sermons aimed to prove the necessity of building a church as well as its consecration by connecting the material building to ideal 'prototypes' found in the Bible (e.g. Solomon's Temple) or in early Christianity (mostly Constantine's churches). The sermons projected an analogous space of worship and commemoration upon the architecture of the new building.
In this part of the paper we will analyse the impact of the body of references contained in the corpus of religious texts on church architecture. A chronological examination of the text-building analogy makes manifest a shift from text to building between the 17th C and the 18th C. As pointed out, the text originally served only as a justification of the sacredness of the church-building. In the early 18th C, the texts still fulfilled the same function, but now also inspired the design of church-architecture. It was an evolution within the Anglican Church itself that produced this shift. After the civil war and the restoration a more ceremonial High Church approach emerged. This made way for a growing interest in church architecture and furnishings inspired by early Christianity.

The early 17th C anglican interest in the historical origins of the true church did not translate into the definition of specific architectural models, but the symbolical frame of reference did play its role in the definition of sacred space by analogy. These analogies were essential to the final phase of the building process i.e. the church consecration. From religious point of view, the consecration is without doubt the most important moment in the church building process. The consecration sets the building apart from the profane environment by dedicating it solely to the worship of God. The consecration creates a sacred space within the architectural frame, as Roger Abbot detailed in his sermon on the occasion of the consecration of a chapel in 1638:
First our churches and chappels are dedicated to God, for his holy uses and services: and what is this? When is it done? It is their setting apart to holy uses for ever. The Jewes did it by holy oyle appointed by God as a type of Christs graces: and then no ordinary businesses, though the end was scarifying, was to be done in them; … the church of Rome doth it by over-loading ceremonies as oyle, salt, ashes,… But wee doe it with the word of God and prayers, decent ceremonies, to hold them for Gods uses for ever. Thus Constantine having finished a goodly church, dedicated it with orations, sermons, prayers, praises, saith Eusebius.[27]
Besides the emphasis on the importance and necessity of the church-building, the sermons also cautiously refer to church- architecture itself. Special points of attention were decoration and liturgical setting.
The degree of ornamentation was extensively discussed. Should the House of God be kept in a decent sobriety in order to avoid any danger of idolatry and superstition? Such superstition was after all the hallmark of the Roman Catholic faith. Or does the presence of God necessitate a glorious architecture? In the first decades of the 17th C most authors seem to have advocated a decent place of worship that would however not distract the believers and lead to superstition and idolatry. Low Church consecration sermons generally referred to the sobriety of the early Christian places of worship under the persecution as the ideal model:
How well therefore the holy Ghost fitted Rome in this regard, with the title of an Whore (revel.17.). Why an whore? One reason, because she is degenerated from that simplicity, and matron-like modesty where with Christs chast Spouse is attired, and shee is now as (prov.7.10.)in the attyre of an harlot…She is decket with gold and precious

stones: so are her churches, her images, her idols, all gloriously adorned…Oh the simplicity of the primitive Church and Christians, then no popish pomp in Gods services, and yet what excellent Christians, what rare measure of grace and holiness![28]

The historical references explained the degree of ornamentation of the building and established a relation between the existing pile, an ideal prototype and the true worship. These analogies with the early Christian and symbolical referents were very flexible, depending on the case.

Even more important than the decoration of the building was the liturgical setting. As explained in the introduction, liturgy was a major point of disagreement between catholics and anglicans. The architectural implications of liturgy included the position of the communion-table and the use of chancel-screens. The re-introduction of chancel screens in order to separate the chancel from the nave, fitted with the early Christian requirement for two separated spaces in the church: one for the service and the sermon, and one for the sacrament.[29]



Figuur 9. Chancel-screen, St.-Peters-Cornhill, London, 1681.
City of London, Collage.

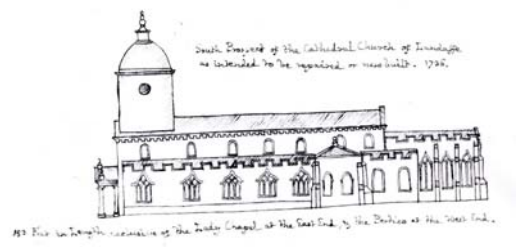
Although the debate about these screens was especially fierce in the 1620-1630's, William Beveridge (1637-1708) still emphasised their importance in 1681 in his opening sermon of the parish church of St. Peter's Cornhill:

Hence that place where this sacrament is administred was always made and reputed the highest place in the Church. And therefore also it was wont to be separated from the rest of the church by a screen or partition network, in Latin cancelli, and that so generally, that from thence the place itself is called the 'Chancel'. That this was antiently observed in the building of all considerable Churches (…) within few centuries after the Apostles themselves, even in the days of Constantine the Great, as well as in all ages since.[30]

These examples demonstrate the importance of the Early Christian and Biblical history in the (early) 17th C. Anglican Church. Their role in the consecration sermons was not driven by architectural design principles. The main objective was to show that the Anglican Church was the sole heir of the golden age of Christianity because of her immediate relationship with the Bible. Therefore all liturgical and ritual actions undertaken by the Anglican Church, served to restore the original state of Christianity and the glorious Christian nations which flourished under Salomon and Constantine. Thus, the historical references in consecration sermons not only established the church building as the place of 'good' worship, but also as an analogous space for the 'correct' (anglican interpretation of) ecclesiastical history (a place of memory) and for the dispersing of the knowledge of the true religion (place of knowledge).

This program changed from the 1660's onwards after the restoration of the monarchy. The growing architectural interest in the Early Christian period developed in parallel with an increasing preoccupation with the actual design of the most important Biblical building: Solomon's temple. If reconstruction in word and image had been developed from at least the 13th C onwards, in 1596-1604 Guan-Bautista Villalpando had published his highly influential and lavishly illustrated reconstruction of the temple of Solomon as part of an exegesis of the psophecy of Ezekiel. In 1643 Joseph Mede's The key to the Revelation (1643) provided the first representation of the temple of Jerusalem in English.[31] As was the case elsewhere in Europe, this growing interest in the pictorial representation of biblical and early Christian buildings gradually found its way into the architectural practise. The religious theoretical model became an architectural model. In at least one case, Llandaff Cathedral, this led to the reconstruction of an actual church according to the design of the temple of Solomon. At the same time, the contemporary interpretation of the ideal Christian basilica would inspire the lay-out of new churches, as those built in London from 1711 onwards.

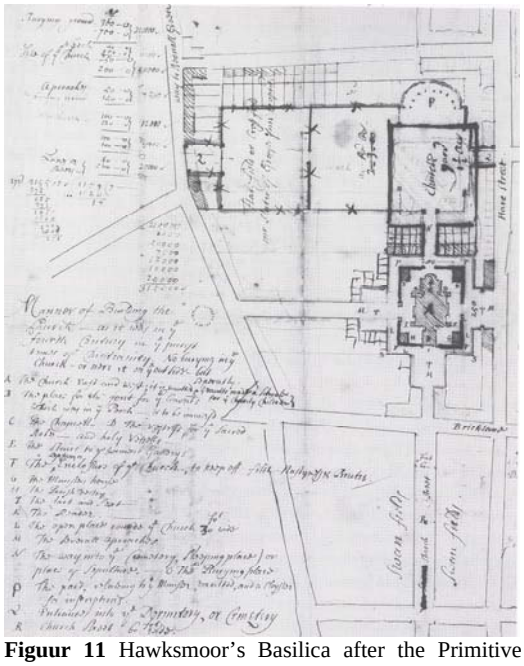
In 1734 John Wood (1704-1754) begun with his 'restoration' of Llandaff Cathedral, the oldest place of Christian worship known in England.



Figuur 10 Llandaff Cathedral, South prospect, J. Wood, 1736.
C. Stevenson, 'Solomon 'engothicked': the elder John Wood's restoration of Llandaff cathedra'l, in: *Art History*, vol. 6, nr.3, 1983.

Wood intended to bring the Cathedral back to her original early Christian state. In his the manuscript of his treatise The Origin of Building (1741) Wood demonstrated that the original measurements of Llandaff had been founded on the description of Solomon's temple. Part of his intervention was to restore this original state. Secondly he chose to restore the Gothic church in a Palladian style, inspired by his knowledge of the early Christian and Roman tradition. Finally, the Corinthian canopy which he installed over the Communion table was probably derived from Bingham's description of the 'tabernacle' in his Antiquities of the Christian Church. From the perspective of the primitive Christianity, *the Llandaff Cathedral project was an attempt to return the first monument of the Apostolic Church of England to its original glory.* 32
The 'historical' correction of the measurements, the 'restoration' of the original style and the replacement of 'original' furniture made it possible to realise this project in architecture.

The early Christian basilica served as a model for the Commission for the Building of Fifty New Churches, established in London in 1711. What begun as a petition for the rebuilding of the church of St. Alphege, Greenwich, led to a general program for revitalizing the Anglican Church by a church building program in London. One of the leading figures of this commission, Reverend Francis Atterbury (1662-1732), dean of Christ church, possessed all the available publications from his time on early Christianity. Also Peter King, author of An Enquiry into the constitution, Discipline, Unity and Worship of the Primitive Church (1691) was a member. Finally amongst the commissioners were three architects: Sir Christopher Wren, Sir John Vanbrugh (1664-1726) and Thomas Archer (1668-1743). The surveyors chosen by the commission to carry out the program were Nicholas Hawksmoor and William Dickinson, architects who had worked as draughtsmen with Wren in connection with the city churches.33 The committee's first decision was to supply 50 new buildings. The initial idea was to provide one 'ideal' church plan for this gigantic project.34 This plan was based on the 11 'resolutions' of the committee. On the first sight these resolutions seem very practical. One remark of George Hickes (1642-1715) in his Observations on John Vanbrugh's Proposals about Building the Fifty New Churches is much in line with the texts quoted before of Borromeus and Bingham, and shows the historical – theological background of the 11 resolutions:
*The plans of the most primitive structure of churches, as described in Eusebius' history may be seen, not to mention other Authors in the third Vol. of Mr. Bingham's Ecclesiastical Antiquities and there it will appear that the old way of building churches is capable of most if not all the state, and graces of Architecture, and as that way of building was the most ancient: so it is most fit to be imitated, and the same modelle will serve for building little as well as great churches.*35
The 11 resolutions finally led to Hawksmoor's drawing of the 'Basilica after the primitive Christians'.36



Figuur 11 Hawksmoor's Basilica after the Primitive Christians, 1712.
P, De La Ruffinière du Prey, *Hawksmoor's Basilica after the Primitive Christians : Architecture and Theology*, in : *The Journal of the Society of Architectural Historians*, vol.48, No 1, 1989.

The churches that were built did not entirely rely on this ideal plan and their elevations bear witness of a larger 'architectural laboratory' than the early Christianity alone. Nevertheless the main features of their architectural design were the result of a century of historical and theological study for and by the Anglican Church.37

As we have stated earlier in this paper, the historical and thus metaphorical referents of anglican churches were made explicit at the consecration. Because of their idolatrous connotations, allegorical and other pictures were not used in the building. It was the text of the consecration sermon that provided the building with its metaphorical and symbolical qualities. The question is whether this process was still valid when the architecture itself embodied the symbolical content, as became the case in the early 18th C? Unfortunately we do not possess sermons preached at the consecration or the re-opening of Llandaff, nor any of the Hawksmoor Churches. However, sermons written for some other churches of the 1711 campaign, St. Martin's in the Field (architect James Gibbs), St. Botolph Bishopgate (architect James Gold), allow us to address this question.[38]

The case of St. Martin's is especially relevant as the consecration sermon was published with the preacher's An essay on the Origin and Progress of Temples.

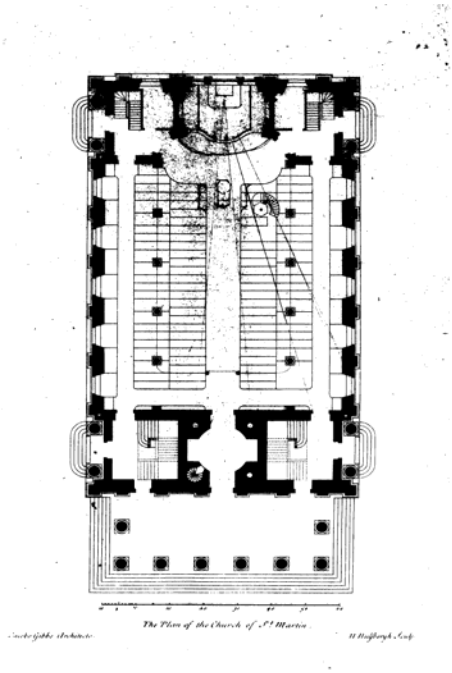


Figuur 12 St. Martin's in the Field, London, elevation, James Gibbs, 1728.
Eighteenth Century Collections Online.

Similar to the 17th C consecration sermons the main arguments of this sermon attend to providing historical evidence for the erection of place of worship and secondly for the consecration ceremony itself. The arguments are again based on the biblical and early Christian examples. There is however a small but important change. The sermon heavily relies on contemporary English church histories such as Mede and Bingham and presents them as an 'equivalent' of the Holy Scripture in historical matters:

Nor is there any reason under the Gospel why places should not be assign'd (as of old) for religious worship. And tho' perhaps we have no indisputable proofs in the writings of the apostles…we find in the ecclesiastical historians [Meade and Bingham] of some Christians places of worship very early.[39]

The historical treatises which provided the basis for a reformed anglican church-building practise were now totally assimilated with their referents. As a result, the buildings themselves now became a contemporary image of the Early Christian Church and demonstrated how the Anglican Church had re-established the early Christian Church. The importance of biblical and church-historical references is not limited to the consecration sermon, but is also visible in the architecture itself. The church's plan closely follows those of Hawksmoor: a huge portico, spare rooms at the west end and an open view on the altar.



Figuur 13 St. Martin's in the Field, London, plan, James Gibbs, 1728.
Eighteenth Century Collections Online.

Although the architectural design is less extravagant than Hawksmoor's, it fits the general 18th C tendency to use classicism rather than the gothic style. Classicism had already been slyly promoted by R.T. in his treatise De Templis in 1638 and was commonly associated with restitutions of Solomon's temple.[40] The familiarity of Gibbs' design with the temple emerges from the fact that Rev. William Stuckeley used a variant of it in his 1751 reconstruction of Solomon's temple.[41]

However, the most important feature in this context is the vaulted crypt, mentioned in church histories like De Templis and referred to in

Hawksmoor's 'Basilica after the primitive Christians':

The Chancell or Quire, must be higher than the body of the Church; and in Cathedrall Churches, it has been an ancient custome ever since Constantines time, that vaults should be built under the Quire which were called Cryptae, in remembrance of those vaults, caves and secret places, under ground, where the Christians in times of persecution, were wont to assemble to serve God… 42

It must not surprise us then that St. Martin's church was praised by several contemporary antiquarians who had showed interest in the archaeology of the old church at time of its demolition. A logical, but still very honourable consequence was the election of Gibbs as a member of the Society of antiquities in London (1726) and as Fellow of the Royal Society in 1729.43

All this strongly suggests that the historical accounts connected St. Martin's church, like its predecessors, with its Biblical and early Christian prototypes. This connection was architecturally translated in the church building. Besides the building's reliance upon early Christian prototypes, the consecration of this specific building gave the opportunity to reconsider those 'histories of the biblical and early Christian architecture' that had been in vogue as the ultimate justification as well as a resource for the anglican 'church-building'. The building, the consecration and the consecration sermon not only formed analogous spaces for religious practice and the knowledge and memory of 'the true religion'. They also created a space of knowledge and memory of the anglican quest to become a real-time pendant of those early Christian and biblical ideals. St. Martin's-in-the-Field became the most widely quoted model in the English Speaking world.44

Finally, how dreadful it might have been to the anglican church-goer of 1726, historical deontology requires me to reveal this much praised "anglican" architect's secret: he always remained a catholic under a mask of fear. 45

III. Conclusion

Our brief survey of catholic and anglican positions with regard to the imitation of both biblical and historical prototypes raises a number of questions which deserve further attention: how, for instance, did factual archaeological knowledge about early Christianity circulate, and were parts or aspects of this knowledge confined to particular confessional spheres? Also, if the reservoir of imagery was largely shared, were there images or referents that became more or less associated with one confessional strand? From or survey, it seems that for instance the Solomonic Temple was a much more explicit reference in the anglican architecture of the first half of the 18th C. than it ever was in catholicism. Also, we haven't addressed the question whether architectural forms acquired confessional associations; an obvious and important issue here is the discussion about the appropriate ground plan for a church, basilical or circular.46

What we do discern are different strategies or operations to establish the analogous space of the religious building. Moreover, by treating catholic and anglican attitudes towards their symbolical and historical referents side by side, it is possible to see how in each case these operations are distributed differently over time. A first operation is the incorporation of models or specific (iconographic) elements that recall the analogous space of the referent. Examples are the 'first generation' of restorations in Rome, on the catholic side, and – much later – the restoration of Llandaff cathedral by Wood on the anglican side. A second operation is much more of a process: a creative emulation of 'original' models into a new composition inviting the active interpretation of the user or beholder; here the examples are the Baldacchino (and much of Roman baroque architecture), and the churches of Hawksmoor and Gibbs. Finally, we have encountered examples of texts that were so to speak draped over a building, so as to invest it with particular meaning. Here we can think of the descriptions of Monreale and San Petronio, and the anglican consecration sermons in the first half of the 17th C..47

If each of these three models prescribes a different relation of architectural design to its analogue, they all also play out differently in time. If the first model could by rights be termed a monumental approach, fixing into stone the analogy between a building and its prototypes, the other two models are much more dynamic, and depend on an active participation of the beholder or worshipper. This helps to explain why these types depend on ritual events and sometimes ephemeral reconfigurations of space by means of liturgy or a description to lay bare the analogous space hidden underneath the architecture.

[1] As such, this paper offers an oblique approach to issues first raised in: R. Krautheimer, 'Introduction to an Iconography of Medieval Architecture', *Journal of the Warburg and Courtauld Institutes* 5 (1942), pp. 1-33. See also K. van der Ploeg, 'Transformations of Meaning in Medieval Architecture', in: R. Suntrup, J. R. Veenstra (eds.), *Building the Past. Konstruktion der eigenen Vergankenheit*, (Frankfurt, 2006).

[2] See, for instance, A. Arwed, *Architektur- und Kunstbeschreibungen von der Antike bis zum 16. Jahrhundert*, (München-Berlin, 2004); U. Schlegelmilch, *Descriptio Templi: der Lateinische Dichtung des konfessionellen Zeitalters*, (Regensburg, 2003).

[3] On chronicles, see M. Sot, 'Gesta episcoporum, gesta abbatum', *Typologie des sources du moyen âge occidental*, (1981)37. A famous example of such chronicles are the writings of abbot Suger, see *Abbot Suger on the Abbey Church of St.-Denis and its Art Treasures*. Edited, translated and annotated by E. Panofsky, (Princeton, 1946).

[4] For a topology of this imagery, see for instance Y. Hirn, *The sacred shrine: A study of the poetry and art of the Catholic Church*, (London, 1958).

[5] D. Iogna-Prat, *La maison Dieu. Une histoire monumentale de l'Eglise au Moyen Age*, (Paris, 2006).

[6] For what follows, see M. Delbeke, 'Framing history: the jubilee of 1625, the dedication of new Saint Peter's and the Baldacchino', in: S. Bonnemaison, C. Macy (eds.), *Festival Architecture*, (London, 2008), pp. 129-54.

[7] See, a.o. S. Ditchfield, *Liturgy, Sanctity and History in Tridentine Italy. Pietro Maria Campi and the Preservation of the Particular*. (Cambridge, 1995).

[8] See, e.g., R. de Maio (ed.), *Baronio e l'arte: atti del Convegno internazionale di Studi, Sora, 10-13 ottobre 1984*, (Sora, 1985); B. Agosti, *Collezionismo e archeologia cristiana nel Seicento. Federico Borromeo e il Medioevo artistico tra Roma e Milano*, (Milano, 1996); G. Finocchiaro, *Il museo di curiosità di Virgilio Spada : una raccolta romana del Seicento*, (Roma, 1999).

[9] E.C. Voelker, *Charles Borromeo's Instructiones Fabricae Et Supellectilis Ecclesiasticae, 1577: A Translation With Commentary and Analysis*. Ph.D. Diss., (Syracuse University, 1977). The quote is from this translation.

[10] C. Borromeus, *Instructiones fabricae et supellectilis ecclesiasticae*, (Rome, 1577), s.p.

[11] L.J., Rogier, R. Aubert, M.D. Knowles (eds.), *Nouvelle Histoire de l'Eglise: Réforme et Contre-Réforme*, (Paris,1968), pp.99-103.

[12] G.W.O., Addleshaw, F. Etchells, *The architectural settings of Anglican Worship*, (London, 1948), pp. 29, 35.

[13] J. Bingham, *Origines Ecclesiasticae: The antiquities of the Christian Church*, 2 vols., republished (London, 1875), pp. 3,4.

[14] The establishment of the official Anglican Church took a long time. There were lots of different opinions about the necessity or not of a radical reformation. The heat of the discussion continued until the first decades of the 18th C.

[15] R. Borghini, *Trattato sopra l'origine de tempii de Giudei, de Christiani, e de Gentili, e la infelice morte de quegli, che gl'hanno saccheggiati, spogliati, e ruinati ; e insieme il doloroso fine di coloro, che a' tempi nostri hanno distrutto i tempii spirituali, e l'immagini di Dio / di Giovanni di Marcouilla ; tradotto di Franzese in ligua toscana da Raffaello Borghini*, (Fiorenza, 1577).

[16] F. Di Simone, *Delle glorie de'sagri tempj e del culto, che ad essi si deve. … Divisa in tre libri data alla luce da Francesco Di Simone Prete*, (Rome, 1734).

[17] On SS. Nereo and Achilleo see M. G. Turco, 'La chiesa di SS. Nereo e Achilleo nel Parco dell'Appia antica: la definizione del progetto cinquecentesco nel manoscritto baroniano', *Palladio*, 7 (1994), pp. 215-226.

[18] G. L. Lello, *Decrittione del real tempio, et monasterio di Santa Maria Nuova di Monreale*, (Rome, 1588).

[19] G.. L. Lello, *Historia della chiesa di Monreale*, (Rome, 1596). This edition is republished as a photographic reprint by Forni editore in Bologna, 1967.

[20] G.. L. Lello, *Historia della chiesa di Monreale*, (Rome, 1596). p. 5.

[21] M. Del Giudice, *Descrizione del real tempio, e monasterio di Santa Maria Nuova, di Morreale*, section: *Vite de gli Arcivescovi abbati, et signori di Monreale Per Annali*, (Palermo, 1702), p. 95.

[22] M. Del Giudice, *Descrizione del real tempio, e monasterio di Santa Maria Nuova, di Morreale*, section : *Vite de gli Arcivescovi abbati, et signori di Monreale Per Annali*, (Palermo, 1702), pp. 1-8.

[23] G. F. Negri, Bianco, *Basilica Petroniana, overo Vita di s.Petronio vescovo, e protettore di Bologna, con la descrittione della sua chiesa, e funtioni cospicue fatte in essa, cavata dall'Historie di Gio: Francesco Negri, col catalogo, et armi di tutti i canonici ...* , (Venice, 1680).

[24] See the summary in: M. Spagnolo, 'G. L. Bernini, Il Baldacchino' in: A. Pinelli (ed.) *La Basilica di San Pietro in Vaticano*, vol. 'schede', (Modena: 2000).

[25] An excellent case-study of the Roman baroque attitude towards restoration is: F. Barry, 'Building history: the Baroque remodellings of S. Anastasia al Palatino', *Storia dell'arte*, 95, (1999), pp. 45-102. See also G. M. Mariano, 'Il 'Cristianesimo primitivo' nella riforma cattolica e alcune incidenze sui monumenti del passato', in G. Spagnesi (ed.), *L'architettura a Rome e in Italia (1580-1621)*, (Rome, 1989), I, pp. 133-66.

[26] R. W. Smith, 'The Source of Milton's Pandemonium', *Modern Philology* 29 (1931), pp. 187-98; P. P. Fehl, 'Epilogue', in: W. Chandler Kirwin, *Powers Matchless. The Pontificate of Urban VIII, the Baldachin, and Gian Lorenzo Bernini*, Frankfurt, (New York, 1997), pp. 236-52; R. T. Erikson, 'Princely Abodes: Fregoso, Milton and the Ethics of Architecture', in: R. Eriksen, M. Malmanger (eds.), *Basilike Eikon. Renaissance Representations of the Prince*, (Rome, 2001), pp. 133-46.

[27] R. Abbot, *The Holinesse of Chrisian [*sic*]churches, or a sermon preached at the consecration of the chappel of Sr. Iohn Baker* , (London, 1638) , p.17.

[28] I. Dyke, *Sermon dedicatory. Preached at the consecration of the chappell of Epping in Essex, October 28, 1622*,(London, 1623), pp.9, 10.

[29] S. Ploeg, *Staged experiences: Architecture and Rhetoric in the work of sir Henry Wotton, Nicholas Hawksmoor and sir John Vanbrugh*, PhD Dissertation, (University of Groningen, 2006), p. 133.

[30] W. Beveridge, *The excellency and usefulness of the common prayer: preached at the opening of the parish church of St. Peter's Cornhill, the 27th of November*, (London :1681), republished 1850, p. 388.

[31] S. Bagg, 'Chronological List of Representations of the Temple of Jerusalem in the English Language 1627-1741' in: P. De la Ruffinière du Prey, *Hawksmoor's London Churches, Architecture and Theology*, (Chicago and London, 2000), pp.125-132.

[32] Quoted from C. Stevenson, 'Solomon 'engothicked': the elder John Wood's restoration of Llandaff cathedral' in: *Art History*, 3, (1983), p.312.

[33] P. De La Ruffinière du Prey, *Hawksmoor's London Churches, Architecture and Theology*, (Chicago and London , 2000), pp.52-54.

[34] P. De La Ruffinière du Prey, 'Hawksmoor's Basilica after the Primitive Christians : Architecture and Theology' in : *The Journal of the Society of Architectural Historians*, vol., 1, (1989), p.42.

[35] G. Hickes, *George Hickes's Observations on John Vanbrugh's Proposal about building the Fifty New Churches*, as quoted in: P. De La Ruffinière du Prey, *Hawksmoor's London Churches, Architecture and Theology*, (Chicago and London , 2000), p.139.

[36] E.G.W. Bill (ed.), *The Queen Anne Churches, a catalogue of the papers in Lambeth Palace Library of the Commission for Building Fifty New Churches in London and Westminster 1711-1759*, (London, 1979), p.11.

[37] P. De La Ruffinière du Prey, 'Hawksmoor's Basilica after the Primitive Christians : Architecture and Theology' in : *The Journal of the Society of Architectural Historians*, 1, (1989), pp.47, 52.
[38] St.-Martin's-in –the-Field was included in the commission's list of 1715. No further progress was made until 1717. The Vestry petitioned parliament independently and an 'Act for rebuilding at the charge of the inhabitants of the parish' was passed.
[39] Z. Pearce, *A sermon preached at the New Parish Church of St. Martin in the Fields, Westminster, Oct. 20. 1726.*, (London, 1727), p. 5.
[40] R.T., *De Templis. A Treatise of Temples, wherein is Discovered the Ancient Manner of Building, Consecrating and Adorning of Churches*, (London, 1638), p.194 *: Over the capitals according to the common rules of Architecture must run an architrave, freeze and coronis, which every work-man knows how to adorne with leaves and flowers &c. according to the order of building.*
[41] T. Friedman, *James Gibbs*, (London and New Haven, 1984), pp.61, 70.
[42] P. De La Ruffinière du Prey, 'Hawksmoor's Basilica after the Primitive Christians : Architecture and Theology' in : *The Journal of the Society of Architectural Historians*, 1, (1989), p.45.
R.T., *De Templis. A Treatise of Temples, wherein is Discovered the Ancient Manner of Building, Consecrating and Adorning of Churches*, London, 1638, pp. 192, 193.
[43] T. Friedman, *James Gibbs*, (London and New Haven, 1984), p. 16.
[44] T. Friedman, *James Gibbs*, (London and New Haven, 1984), p.20.
[45] T. Friedman, *James Gibbs*, (London and New Haven,1984), p.12.
[46]C. Jobst, 'Die christliche Basilika. Zur Diskussion eines Sakralbaues in italienischen Quellen der posttridentischen Zeit', *Zeitsprünge. Forschungen zur Frühen Neuzeit* I, 3-4, (1997), pp. 698-749.
[47] That the 'models' of analogous spaces occur at different times in the Catholic and Anglican context is probably best explained by the internal development of the two confessions and their ambitions and anxieties, mutually as well as regarding other competing confessions.

Mapping the City of Senses and Meanings

The work of three students of Kevin Lynch and its context

Clément Orillard*

Abstract - **This paper deals with the colletive production of new mapping systems led by Kevin Lynch during the 1960s at Massachusetts Institute of Technology's School of Architecture and City Planning. The first part shows the work of three students of Kevin Lynch who represent three different kinds of collaboration relationships with him, three different kinds of methodologies of research, and who worked on "three different Boston". The second part proposes to put this production into perspective through an analysis of its historical context. Only the first part will be presented at the conference.**

***Keywords* – Urban perception, mapping systems, cognition**

Lorsque l'on évoque le nom de Kevin Lynch, c'est souvent pour citer l'auteur d'un seul ouvrage, *L'image de la cité*. Cet ouvrage est présenté comme proposant une approche relativement inédite de la ville : l'appréhender non pas à travers sa forme physique mais à travers la représentation mentale que ses habitants s'en font. Surtout, pour analyser et manipuler cette représentation, l'ouvrage propose une méthodologie permettant de la cartographier et une notion, l'imagibilité, capacité qu'a un espace urbain de développer une image lisible.

Si L'image de la cité se retrouve régulièrement dans les biographies traitant d'urbanisme, l'approche originale qu'il propose fait de son auteur un penseur qui peut être reconnu comme génial mais qui est surtout perçu comme isolé. Cette perception est pourtant l'inverse de la réalité historique.

En effet, Kevin Lynch a été enseignant et chercheur au Massachusetts Institute of Technology (MIT). Il a travaillé au sein du département city planning de la School of Architecture de 1948 à 1978. En 1950, il dirige son premier étudiant en mémoire de master puis son premier doctorant en 1965. En tout, il a dirigé environ une quarantaine de mémoires de master et 25 thèses de doctorat. A la lecture des mémoires et thèses de ses étudiants de la fin des années 1950 à la fin des années 1960, on se rend compte que la plupart se situent délibérément dans la poursuite du travail entamé par Lynch dans *L'image de la cité*. L'ensemble forme une production collective qu'il convient de penser dans sa globalité.

I. Trois etudiants, trois exemples d'une production collective

Parmi les étudiants de cette période, on peut distinguer trois noms : Donald Appleyard, Carl Steinitz et Michael Southworth. Tous trois auront par la suite une brillante carrière d'enseignant-chercheur mais le travail de chacun porte sur des sujets relativement différents et chacun entretiendra une relation différente avec son directeur devenu par la suite collègue. A travers le travail de chacun essayons de comprendre un peu mieux en quoi consistait cette production collective.

A. Donald Appleyard, le premier assistant et la question de l'opérationnel

De très loin, Donald Appleyard conservera, jusqu'à sa mort accidentelle en 1982, une place particulière parmi les collaborateurs de Kevin Lynch. Né en Angleterre, Appleyard, un architecte de formation, soutiendra en 1958 un mémoire de master en *city planning* au MIT sous la direction de Kevin Lynch intitulé « Vers une structure capable d'imagibilité pour les espaces résidentiels » [Towards an imageable structure for residential areas]. Dans ce mémoire, il propose de travailler sur l'imagibilité d'un parcours.

L'année même de son diplôme, Donald Appleyard commence à collaborer activement avec Kevin Lynch sur une recherche qui poursuit les réflexions entamées dans son mémoire. Cette recherche intitulée « Highway Project » aboutira en 1964 a un ouvrage, co-écrit avec John Myer enseignant dans le département architecture du MIT, *The View from the Road*[1]. Celui-ci peut être conçu comme le versant opérationnel de *L'image de la cité*. Dans cet ouvrage, les auteurs se proposent d'envisager les nouvelles autoroutes urbaines alors en construction aux Etats-Unis comme l'occasion de restructurer l'imagibilité des villes qu'elles traversent. Le troisième chapitre de *The View* se concentre sur une étude de l'impact d'une autoroute, la Northeast Expressway, qui chemine depuis la banlieue vers le centre de Boston, sur la perception visuelle qu'un conducteur a de cette ville et des moyens d'utiliser ces effets pour en améliorer l'imagibilité. Pour y arriver, les auteurs empruntent le même chemin que dans *L'image de la cité* et proposent de mettre en place un système de notation permettant d'enregistrer les séquences autoroutières.

Ce système de notation graphique consiste en deux diagrammes (Fig. 1). Ceux-ci sont organisés pour rabattre le

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[1] Donald Appleyard, Kevin Lynch, John R. Myer, *The View from the Road*, Cambridge (Mass.), The MIT Press, 1964.

parcours le long d'une échelle temporelle régulière figurée verticalement. Le premier diagramme, appelé « diagramme de l'espace et du mouvement », résulte de la codification de l'expérience sensible du conducteur, de ses sensations visuelles et kinesthésiques. Le deuxième diagramme, appelé « diagramme de l'orientation », reprend lui directement le système de notation inventé dans *L'image de la cité* pour représenter l'image mentale du parcours pour le conducteur. L'association des deux doit permettre de lier l'imagibilité aux sensations visuelles et kinesthésiques et donc d'agir sur la première à travers la seconde. Le but est de développer des moyens opérationnels, c'est-à-dire de l'ordre du projet, pour agir sur l'imagibilité.

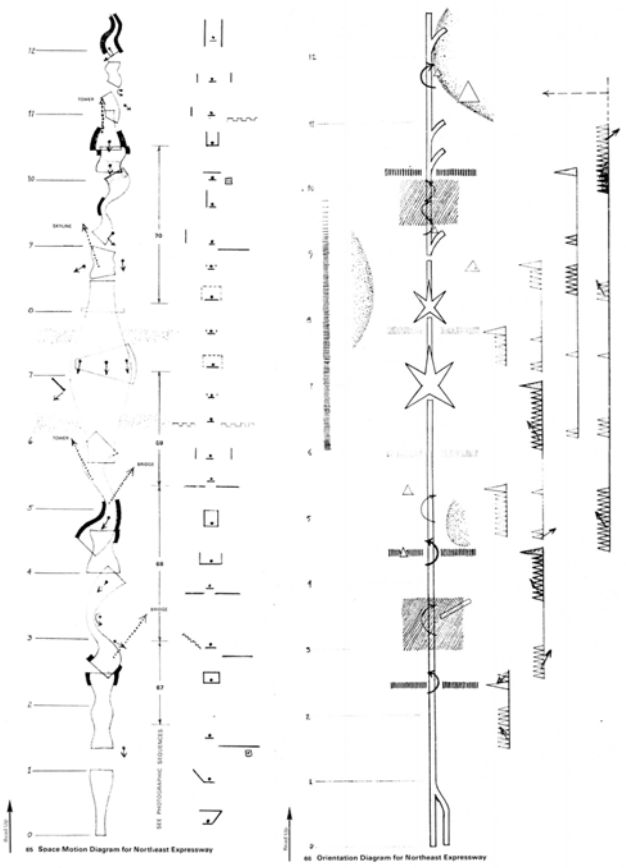


Figure 1. Diagrammes de l'espace et du movement (à gauche) et de l'orientation (à droite) correspondent au parcours le long de la Northeast Expressway

Donald Appleyard tentera de poursuivre cette démarche en travaillant sur un système de notation caractérisant l'ensemble du système routier d'une ville. Il ne terminera jamais cette recherche intitulée « Boston Street System » dont seulement une étape sera publiée[2]. En 1967, il partira enseigner à Berkeley et abandonnera ce travail sur la cartographie mentale.

B. Carl Steinitz, le doctorant et la méthode scientifique

Le parcours de Carl Steinitz est différent. Né aux Etats-unis, il obtient d'abord un master en architecture au MIT en 1961 puis passe l'année suivante à travailler non pas pour une agence d'architectes mais pour l'agence d'urbanisme de Frederick Adams et John Howard qui sont parmi les principaux enseignants du département *city planning* du MIT. Il devient deux ans après moniteur dans ce département et entame directement un doctorat. Ses recherches s'appuient sur le tout nouveau Laboratory for Computer Graphics de la Graduate School of Design (GSD) d'Harvard. Puis il soutient son doctorat en *city and regional planning* au MIT l'année suivante[3]. Ce n'est alors que le deuxième doctorat que Kevin Lynch dirige.

Les principaux éléments de ce doctorat intitulé « Congruence et signification : l'influence de la consistance entre forme et activité urbaines dans la connaissance de son environnement » [Congruence and Meaning : The Influence of Consistency between Urban Form and Activity upon Environmental Knowledge] sont publiées dans un article du *Journal of the American Institute of Planners* en 1968[4]. Il s'agit là encore d'un travail qui se situe dans la poursuite de l'ouvrage de son directeur de thèse Kevin Lynch, *L'image de la cité*. Mais cette fois-ci, il s'agit de rechercher une plus grande scientificité.

D'un côté, il reformule la notion d'imagibilité pour la rendre plus scientifique et la faire correspondre à un sens plus large. A partir de la redéfinition qu'un anthropologue donne de cette notion[5], il lie forme et activité en utilisant la notion de « congruence » issue de la psychologie cognitive. Steinitz cherche ainsi à tester l'hypothèse selon laquelle la signification qu'un individu se fait d'un espace dépend de la congruence, c'est-à-dire de l'homologie, entre la forme urbaine et l'activité urbaine.

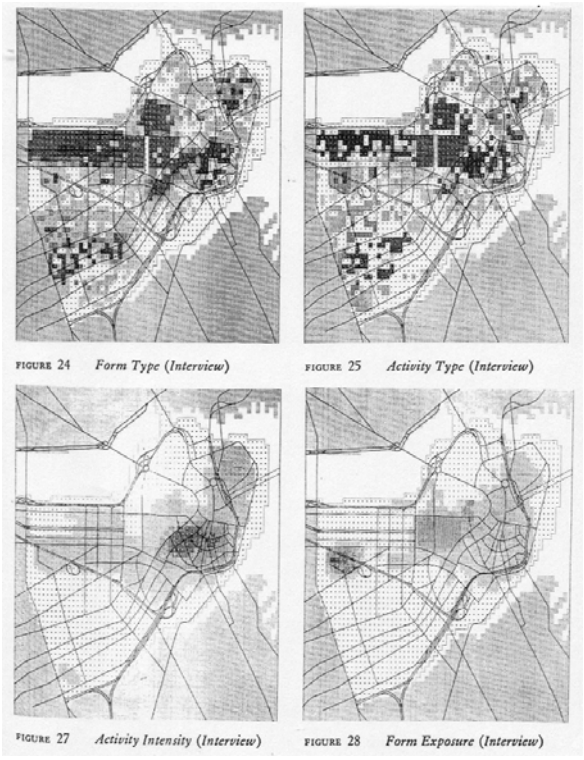


Figure 2. Cartes synthétiques des réponses aux interviews

[2] Il s'agit d'un article sans titre dans le numéro spécial « Transportation Graphics » de la revue *Dot Zero* n°5 (automne 1968), pp. 26-31.

[3] Pour une biographie complète voir http://www.gsd.harvard.edu/people/faculty/steinitz/cv.html

[4] Carl Steinitz, « Meaning and the Congruence of Urban Form and Activity », *Journal of the American Institute of Planners* vol. 34 n°3 (juillet 1968), pp. 233-248.

[5] Il s'agit de John Gulick « Images of an Arab City », *Journal of the American Institute of Planners* vol. 29 n°1 (aout 1963), pp. 179-198.

D'un autre côté, si cette hypothèse, comme dans *L'image de la cité* est testée à travers un double système d'enquêtes un *survey* fait par l'expérimentateur lui-même et des interviews portant toujours sur la ville de Boston dont les résultats sont par la suite spatialisés, la méthode pour construire ces cartes est différente. Au lieu d'une représentation dessinée (Fig. 2), il utilise l'un des tous premiers systèmes informatique de représentation géographique : SYMAP développé par le Laboratory for Computer Graphics de la GSD et qui est l'ancêtre immédiat des systèmes d'informations géographiques actuels[6].

Le territoire de la ville de Boston est divisé en carrés couvrant 4 km^2 (une acre). Chaque carré peut correspondre à une gamme de valeur allant du blanc ou noir. Cette variation de valeur est utilisée pour produire une carte par critère observé. Mais ce qui est très intéressant est que Steinitz utilise le même système de représentation informatique pour présenter les résultats des interviews de manière abstraite afin de tester une des hypothèses-clés de sa thèse, la congruence entre forme et activité urbaine, selon trois critères (Fig. 3). Alors qu'il revient à la représentation graphique manuelle pour produire à la fin une analyse graphique des deux plus importantes cartes produites informatiquement.

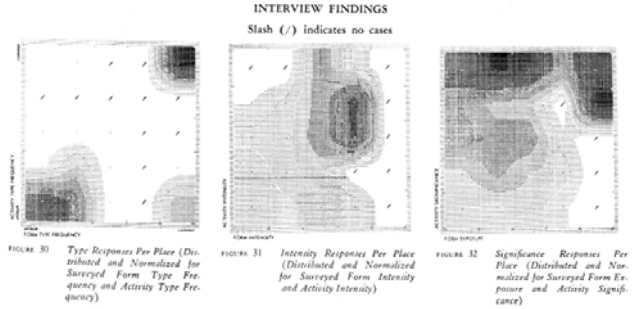


Figure 3. Analyse graphique des réponses aux interviews

Cette thèse produite au sein du Laboratory for Computer Graphics permit à Carl Steinitz d'entamer une fructueuse carrière, non au MIT, mais à la GSD d'Harvard où il obtient en 1969 un poste commun aux départements de paysagisme et de city and regional planning.

C. Michael Southworth, le membre de l'équipe et la question des autres sens

Michael Southworth offre l'exemple d'un troisième et dernier parcours différent. Né lui aussi aux Etats-Unis, titulaire d'un master d'architecture à l'Université du Minnesota en 1964, il rentre au MIT pour obtenir un master de *city planning*. Son mémoire de master n'est pas dirigé par Lynch mais par celui qui a remplacé Appleyard auprès de lui comme son principal assistant au MIT, Stephen Carr[7]. En fait, autour de Lynch, c'est désormais une petite équipe d'étudiants en master et de doctorant qui s'est formée. Le mémoire que Southworth présente en 1967 se situe lui aussi dans la poursuite de *L'image de la cité* mais la question développée ici n'est par celle du projet, ni celle de la scientificité. Southworth explore l'imagibilité des espaces urbains augmentée d'un autre sens que la vision : l'ouïe.

L'article qui en est tiré est publié sous le même titre, « L'environnement sonore des villes », dans le premier numéro de la revue *Environment and Behavior*[8]. La démarche développée par Southworth consiste à explorer la question de la perception sonore du centre de Boston à travers un parcours effectué par trois types de personnes – des personnes aveuglées artificiellement, des personnes rendues sourdes artificiellement et des personnes disposant de la vision et de l'ouïe – comportant 33 étapes. Il s'agit pour Southworth de tester comment le son agit en parallèle avec la perception visuelle pour renforcer ou non l'identité des espaces traversés. A partir des interviews de ces trois types de personnes, il développe une catégorisation des sons mais aussi des détails visuels cités et de la fréquence de ces citations dans le but de reconnaître quels sont les éléments qui sont retenus par l'observateur et structurent sa perception. Mais son travail se conclue sur une note plus ambitieuse : une véritable carte de du « paysage sonore » [soundscape] du centre de Boston (Fig. 4). Cette carte est très proche de celles produites dans *L'image de la cité* tout en s'autorisant une plus grande standardisation de la représentation. A première vue le centre de Boston n'est pas reconnaissable et ce sont les informations sur la qualité sonore et visuelle des espaces qui apparaît selon un graphisme volontairement proche d'un document produit de manière mécanisé.

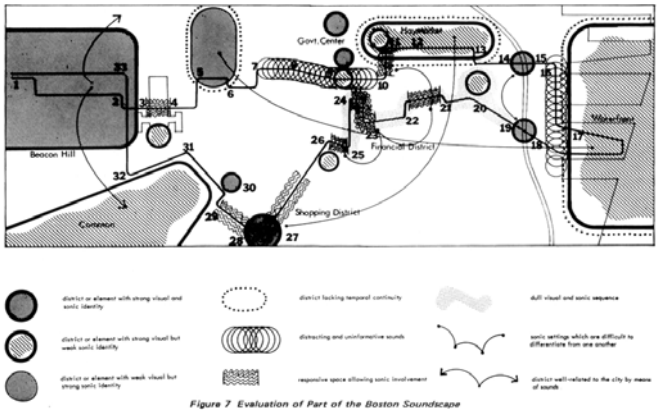


Figure 4. Evaluation d'une partie du paysage sonore du centre de Boston

Après l'obtention de son master, Michael Southworth participe à une grande recherche menée par Stephen Carr au sein de l'agence d'urbanisme Adams, Howard & Greeley et qui s'intitule « City Signs and Lights » pour le compte de la Boston Redevelopment Authority[9]. Cette recherche vise à la mise en place d'une politique plus rationnelle en matière de « communication environnementale » dans le centre de Boston. Dans cette nouvelle étude, la question est moins celle de la perception et de la représentation que celle de la communication entre l'espace urbain et l'observateur. D'une manière générale, la question de la représentation, et donc des

[6] Voir Nicolas Chrisman, *Charting the Unknown: How Computer Graphics Became GIS at Harvard*, Redlands (Calif.), ESRI Press, 2006.

[7] Carr fut d'abord étudiant de Kevin Lynch puis a poursuivi la démarche développée dans *The View from the Road* en testant des méthodes plus scientifique pour analyser la perception du conducteur. Lynch et Carr finiront par fonder une agence commune Carr, Lynch and Associates.

[8] Michael Southworth, « The Sonic Environment of Cities », *Environment and Behavior* vol. 1 n°1 (juin 1969), pp. 49-70. La revue *Environment and Behavior* est fondée en 1969 par trois enseignants de la School of Architecture de l'Université de Washington à Seattle, un architecte, un urbaniste et un psychologue. L'architecte est Philip Thiel, un ancien étudiant devenu ami de Kevin Lynch.

[9] Voir Stephen Carr, *City Lights and Signs*: *a Pilot Study*, Cambridge (Mass.), The MIT Press, 1971.

cartes mentales, marque le pas durant cette période. Lorsqu'il passe sa thèse de doctorat avec Lynch en 1970, il se détourne de cette question. Et lorsqu'en 1976, Kevin Lynch publie *Managing the Sense of a Region* qui revient une dernière fois sur la question de la représentation spatiale que les habitants se font d'un espace, la démarche de l'enquête et le travail de cartographie n'occupe plus la place centrale du propos.

II. LE CONTEXTE HISTORIQUE DE CETTE PRODUCTION COLLECTIVE

Le travail de Kevin Lynch et de ses étudiants dans les années 1960 se situe ainsi dans une étroite fenêtre chronologique. Cette fenêtre correspond à des ruptures majeures dans l'histoire de l'urbanisme états-unien en général mais elle est aussi le produit d'une histoire particulière: celle du MIT.

A. Transformation massive de la ville et construction d'un nouveau champ

Les Etats-Unis connaissent une accélération sans précédent dans les années 1950 et 1960 des processus de transformation à l'oeuvre déjà avant guerre. Ils concernent l'urbanisme dans sa double dimension c'est-a-dire à la fois comme action concrète et comme champ du savoir et chaque fois l'agglomération de Boston est au cœur du mouvement.

1) Rénovation urbaine et construction du « Nouveau Boston »

Au tournant de la seconde guerre mondiale, Boston connaît des problèmes très importants qui diminuent grandement l'attractivité de son centre-ville. Pour répondre à ces problèmes, le tissu urbain de Boston connaît dès les années 1950 ses premières transformations massives avec la construction d'une autoroute urbaine en viaduc traversant la péninsule, la fameuse « central artery » et l'implantation d'un premier ensemble de tours de bureaux au sud de la péninsule, le Prudential Center. Mais cette rénovation urbaine prend une nouvelle dimension avec la création en 1957 de la Boston Redevelopment Authority (BRA). Un vaste programme de rénovation urbaine est alors mis en place pour construire un « nouveau Boston »[10].

Kevin Lynch est très impliqué dans ce programme, à travers l'agence d'urbanisme Adams, Howard & Greeley, en étant sollicité pour participer à la conception des nouveaux plans du centre gouvernemental et du front de mer[11]. Donald Appleyard, Carl Steinitz et Michael Southworth sont eux aussi impliqués dans cette politique en travaillant pour la même agence dont deux les deux premiers associés sont encore parmi les principaux enseignants du département *urban planning* du MIT.

2) Harvard et la naissance du nouveau champ de l'Urban Design

Lorsque Jose Luis Sert succède à Walter Gropius à la Graduate School of Design (GSD) d'Harvard en 1953, alors qu'il est confronté à la montée de la contestation des jeunes turcs du Team X, il entreprend d'y poursuivre avec Siegfried Giedion et Jacqueline Tyrwhitt le travail développé dans CIAM depuis la fin de la guerre : redécouverte des questions de l'esthétique urbaine et de la centralité. Pour qualifier cette démarche qui se différencie de l'approche de plus en plus technique et politique de l'*urban planning*, Sert utilise alors le terme d'*urban design* qui désigne successivement un séminaire expérimental en 1955 puis un grand cycle de conférences pluridisciplinaires de 1956 à 1970 et enfin à partir de 1960, un programme d'enseignement aboutissant à un nouveau diplôme[12]. Le champ de l'*urban design* était né.

Kevin Lynch est dès le départ un acteur clé de la naissance et de l'institutionnalisation de ce champ. Il participe ainsi activement aux *urban design conferences* à la GSD d'Harvard et rédigera de nombreux articles sur ce sujet[13]. Donald Appleyard dirige le même type de formation que celle de la GSD à Berkeley et fonde une des principales revues d'*urban design*, *Places*. Le poste transversal de Carl Steinitz participe de cette volonté de construire une transversalité entre urbanisme et professions de la conception. Michael Southworth s'inscrit aussi dans cette transversalité comme enseignant d'abord au sein du MIT puis à partir de 1985 à Berkeley à la suite de du décès de Donald Appleyard.

B. La place particulière du Massachusetts Institute of Technology

La plongée dans le contexte général de l'urbanisme bostonien ne permet que d'expliquer en partie l'originalité de l'approche de Lynch et de ses étudiants. Pour aller plus loin, il est nécessaire de comprendre les particularités du Massachussetts Institute of Technology.

1) La voie particulière de la modernisation de la School of Architecture and City Planning[14]

A la School of Architecture du MIT, qui est le plus vieil établissement d'enseignement d'architecture aux Etats-Unis, la modernisation de l'enseignement prend un direction spécifique par rapport aux autres universités.

Cette politique est marquée par le recrutement de Gyorgy Kepes issu du New Bauhaus de Chicago et ancien bras droit de Laszlo Moholy-Nagy[15]. Dans le cadre de son travail au

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[10] Sur l'histoire de l'urbanisme bostonien durant cette période voir Lawrence W. Kennedy, *Planning the City upon a Hill : Boston since 1630*, Amherst (Mass.), The University of Massachusetts Press, 1992, pp. 157-192.

[11] Voir John R. Myer & Magaret H. Myer, *People and Places : Connections between the Inner and Outer Landscape*, Hanover (NH), Sandwich Publications, pp. 62-70.

[12] Sur l'histoire de la naissance du champ à Harvard voir Eric Mumford, « The Emergence of Urban Design in the Breakup of CIAM », *Harvard Design Magazine* n°24 (2006), pp.10-20 et Jaume Freixa, « Sert and Teaching : The Persistence of Reason » in Josep M. Rovira, *Sert 1928-1979 : Half a Century of Architecture*, Barcelone, Fundacio Juan Miro, 2005, pp.266-281.

[13] Il préfèrera finalement employer le terme d'*environmental design* puis de *city design* pour indiquer que ce champ devrait traiter non pas de l'architecture à grande échelle mais bien de l'environnement humain ou de la ville comme phénomène dans son ensemble. A la fin de sa vie, alors que le repli vers une approche strictement architecturale s'accentue, il publiera deux articles très critiques dans les deux principales revues d'*urban design* qui viennent juste de naître : « City Design : What It Is and How It Might Be Taught », *Urban Design International* vol. 1, n°2 (1980), pp. 48-53 (republié dans *City Sense and City Design*, pp. 652-659) et « The Immature Arts of City Design », *Places* vol. 1 n°3 (1984), pp. 10-21 (republié dans *City Sense and City Design*, pp. 498-510.

[14] Sur cette histoire voir Caroline Shillaber, *Massachusetts Institute of Technology School of Architecture and Planning, 1861-1961 : a Hundred Year Chronicle*, Cambridge (Mass.), The Massachusetts Institute of Technology, 1963.

[15] Sur le New Bauhaus voir Alain Findeli, *Le Bauhaus de Chicago*, Sillery (Québec) – Paris, Septentrion – Klincksieck, 1995.

New Bauhaus, Kepes avait synthétisé un enseignement basé sur la question de la perception visuelle qui sera résumé en 1943 dans l'ouvrage *Language of Vision*[16]. Au MIT, il développe cette approche notamment en 1951 dans une exposition, The *New Landscape in Art and Science*, où il cherche à rapprocher l'art moderne des nouveaux moyens techniques d'observation du visible[17]. C'est au contact de Kepes que Lynch s'intéresse puis travaille activement sur la perception et la représentation de la ville, notamment à travers un séminaire expérimental qui a lieu aussi en 1951 puis du programme de recherche *The Perceptual Form of the City* qu'ils dirigeront ensemble de 1954 à 1959. *L'image de la cité* mais aussi nombre d'autres pistes de recherche sont tirées de ce grand programme financé par la Fondation Rockefeller, ces différentes pistes étant souvent à l'origine des recherches menées par les étudiants de Lynch.

Mais c'est dans le domaine de l'urbanisme que cette modernisation de l'enseignement prendra une grande ampleur[18]. En 1948, un des premiers départements de *city and regional planning* des Etats-Unis est fondé au sein d'une School of Architecture and Planning désormais divisée en deux départements distincts. Sous la direction de Frederick Adams, le département évolue avec la profession de *planner* depuis une pratique proche de l'architecture vers une approche de plus en plus scientifique. En 1946, il recrute Lloyd Rodwin, spécialiste en économie urbaine, qui pousse l'enseignement vers les sciences sociales et la recherche, vers les « urban studies ». Cette évolution passera par la fondation d'un Center for Urban and Regional Studies devenu en 1960 Joint Center for Urban Studies (JCUS) associant le MIT et Harvard dont Rodwin est nommé directeur pour la partie relevant du MIT. Puis de 1969 à 1973, Rodwin prend la tête du département dont l'intitulé est désormais « Urban Studies and Planning »[19]. Le travail de Kevin Lynch et de ses étudiants s'inscrit dans cette évolution : leurs travaux de recherche se font au sein du JCUS avec le soutient enthousiaste de Rodwin qui n'hésite pas à coécrire des articles avec Lynch et Southworth notamment.

2) Cybernétique et sciences cognitives : le traitement quantitatif des données qualitatives

Mais cette évolution vers plus de scientificité se produit à un moment particulier de l'histoire des sciences sociales, au moment d'un changement de paradigme : le basculement du paradigme behavioriste au paradigme cognitif et la réapparition de la question des représentations mentales. La seconde guerre mondiale apparait comme le moment de ce basculement à travers diverses recherches engagées par des équipes interdisciplinaires, associant mathématiciens, ingénieurs et spécialistes du comportement, sur la voie de la gestion mécanisée de données qualitatives c'est-à-dire de l'information.

Or le MIT est résolument à l'avant-garde de cette révolution scientifique à travers un double mouvement. Tout d'abord, l'Institut est dès le début de la seconde guerre mondiale un des principaux lieux de recherche militaire aux Etats-Unis, recherches qui porteront plus particulièrement sur l'interface homme machine et continueront au début de la guerre froide[20]. Ensuite, au sortir de la seconde guerre mondiale, le MIT entame une profonde mutation pour devenir une université généraliste. En 1950 est fondée une nouvelle School of Humanities qui est bien entendu fortement marquée par l'atmosphère technoscientifique du MIT[21]. Le recrutement de cette faculté s'appuie notamment sur le réseau du mathématicien Norbert Wiener, enseignant au MIT, considéré comme un des principaux pères fondateurs de la cybernétique et des sciences cognitives[22]. A travers le Research Laboratory for Electronics, le MIT devient un des lieux de naissance des sciences cognitives. D'abord en attirant des figures fondatrices comme Noam Chomsky, arrivé en 1955 pour poursuivre ses recherches et qui propose le premier d'explicitement rompre avec le modèle béhavioriste. Ensuite en organisant en septembre 1956 au MIT un colloque sur la théorie de l'information qui sera unanimement célébré comme la date de naissance des sciences cognitives[23].

Le travail de Kevin Lynch et de ses étudiants se situe dans le moment particulier de ce basculement. Si la notion d'imagibilité est à l'origine plutôt gestaltiste[24], elle part du même a priori que la pensée cognitive : l'existence de représentations mentales composées d'éléments unitaires universels et combinables. Si dans *L'image de la cité*, il n'est pas fait référence au débat marquant le début des sciences cognitives, la situation est différente pour les travaux présentés dans cet article. *The View from the Road* s'appuie beaucoup sur un chercheur, James J. Gibson dont les travaux très novateurs sur la perception proposent une troisième voie entre behaviorisme et cognition. Carl Steinitz cite deux psychologues appartenant explicitement au courant cognitif. Enfin, Michael Southworth s'appuie sur le travail d'un des grands noms de la psychologie cognitive : Donald Broadbent. On note donc une évolution alors même que le courant cognitif s'institutionnalise dans les sciences sociales. Mais paradoxalement, c'est peut être cette institutionnalisation qui finit par détourner ces auteurs de la question des cartes mentales.

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[16] Gyorgy Kepes, *Language of Vision*, Chicago, Paul Theobald, 1944.

[17] Voir l'ouvrage qui en sera issu : Gyorgy Kepes, *The New Landscape in Art and Science*, Chicago, Paul Theobald, 1956.

[18] Voir MIT Institute Archives & Special Collections, *History of the Department of Urban Studies and Planning* , in http://libraries.mit.edu/archives/mithistory/histories-offices/urbstud.html

[19] Sur Lloyd Rodwin, voir la notice nécrologique rédigée par le New Office du MIT dans http://web.mit.edu/newsoffice/1999/rodwin.html

[20] Voir Howard Gardner, *Histoire de la révolution cognitive. La nouvelle science de l'esprit*, Paris, Payot, 1993 (trad. de *The Mind's New Science: A History of the Cognitive Revolution*, New York, Basic Books, 1985), pp. 27-41. Voir aussi Jean-Pierre Dupuy, *Aux origines des sciences cognitives*, Paris, éditions de la Découverte, 1994.

[21] Voir MIT Institute Archives & Special Collections, *History of the School of Humanities, Arts, and Social Sciences* in http://libraries.mit.edu/archives/mithistory/histories-offices/sch-hum.html.

[22] Voir James R. Killian Jr., *The Education of a College President*, Cambridge (Mass.), The MIT Press, 1985, pp. 45-49. Killian a été le Président du MIT de 1950 à 1959. Auparavant, il fut enseignant puis Vice-Président du MIT.

[23] Voir Howard Gardner, op. cit., pp. 42-44.

[24] Kenneth Boulding n'a rien à voir avec la naissance de cette notion, à la différence de ce qu'ont pu penser certains commentateurs, induits il est vrai en erreur par Lynch lui-même qui cite l'ouvrage dans *L'image de la cité*. Ce n'est pourtant qu'à la toute fin de ses recherches pour son ouvrage qu'il découvre Boulding. Voir Kevin Lynch, « Reconsidering *The Image of the City* » in Tridib Banerjee and Michael Southworth, *City Sense and City Design: Writings and Projects of Kevin Lynch*, Cambridge (Mass.), The MIT Press, 1995, pp. 247-256.

Urban Grids, Computer Grids and Global Grids
A historical exploration of analogous architectures of the Information Society

Charles van den Heuvel*

Abstract - **Grids in cities and in cyberspace lead to associations with both domination and democracy. The urban grid is probably the most defused planned form of cities and is characterized by a great variety from army camps to utopias. We can recognize a similar variety in computer grids from interconnected computers to virtual communities. In this paper we will explore from a historical perspective urban and computer grids and assess such claims. The hypothesis is that grids are in principal are value free, but that external projections on the grid or interrelationships between analogous architectures might add meaning to grids, changing their original architectures, sometimes with serious consequences for society or the Information Society. This exploration follows three paths: the architecture of grids (centralism, hierarchy, connectivity, growth, modularity) the spaces/places within the architecture of grids and the grid as interface between analogous spaces/places and the viewer. Grids sometimes distort geographical reality to accommodate the viewer and sometimes are distorted to enable the most accurate representation of reality possible. In the last part initiatives will be explored that extend urban and computer grids to a global level. In particular we will focus on relations between overlaid, but interconnected grids consisting of real architecture and architectural metaphors. Following the rationale of the conference we conclude with the question how Otlet can be seen as a source of inspiration to study analogous architectures or urban, computer and global grids.**

Keywords – **grids, urban morphology, Internet architecture, history of information, Information Society, open access, Second Life, WWW**

I. Architectural Principles Of The Internet And Three Different Grids

In June 1996, Brian E. Carpenter, Group Leader of Communications Systems Computing and Networks Division of CERN and editor of the Internet Architecture Board (IAB), sent out a request for comments around on behalf of the Network Working Group with the title: *Architectural Principles of the Internet*. In this "informational" document the IAB stated: "A good analogy for the development of the Internet is that of constantly renewing the individual streets and buildings of a city, rather than razing the city and rebuilding it".[1] The document was a plea to formulate some architectural principles based on change and evolution, conveying guidelines that had been found useful in the past, rather than to lay down dogma about how the Internet should be designed. It was clear that the IAB wanted to express a minimal shaping of architecture; the emphasis was on the design of the protocols running the Internet, rather than on the network itself. The analogy between the city and the Internet and the plea for a minimal architecture, open for change and historical lessons, makes Carpenter's document a good starting point for the issue that will be addressed in this paper: analogous architectures of urban grids, computer grids and global grids. However, we are not only interested in the design of these architectures, but also in grids as architectural metaphors of the Information Society. Although the inventor of the World Wide Web, Tim Berners-Lee referred to Carpenter's document about the architectural principles of the Internet, the context of his reference targeted a much wider scope: the relation between the design of the World Wide Web and his personal religious beliefs. Whereas Rudolf Wittkower in his influential study: *Architectural Principles in the Age of Humanism* (1949) had tried to explain the classical language of Renaissance architecture from neo-platonic views on [metaphorical] relations between the macro and microcosms, Berners-Lee explored the design of the World Wide Web in retro respect by comparing it with some fundamental principles of Unitarian Universalism.[2] In 1998 he wrote: "People have often asked me whether the Web design was influenced by Unitarian Universalist philosophy. I have to say that it wasn't explicitly, as I developed the Web well before I came across Unitarian Universalism at all. But looking back on it, I suppose that there are some parallels between the philosophies."[3] Berners-Lee's architectural design of the Semantic Web is in principle non-hierarchical, decentralized and non positivistic.

> The Semantic Web is what we will get if we perform the same globalization process to Knowledge Representation that the Web initially did to Hypertext. We remove the centralized concepts of absolute truth, total knowledge, and total provability, and see what we can do with limited knowledge.[4]

Berners-Lee portrayed the design of the Semantic Web in an underground map as a "decentralized" action model.5

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[1] Carpenter (1996)

[2] Wittkower (1949).Compare Berners-Lee (1998a), paragraph: 'Knowledge Representation goes global': "It is clear that because the Semantic Web must be able to include all kinds of data to represent the world, that the language itself must be completely expressive".

[3] Berners-Lee (1998b), advocates a Web that is decentralized, tolerant, unites people in a quest for truth without labeling one true solution and encourages hope

[4] Berners-Lee (1998a), paragraph: 'Knowledge Representation goes global'.

[5] The author claims despite Berners-Lee's intentions his visual representations of the WWW and Semantic Web and RDF building stones hereof, contain hierarchical, centralized and positivist elements. See, Heuvel, (2007). It is important to note that Berners-Lee does not want to present his

Frank Lloyd Wright a follower of the same Unitarian philosophy designed his Broadacre City (figure 1) as an urban grid as the corner stone of a model democracy, which he called Usonia.[6]

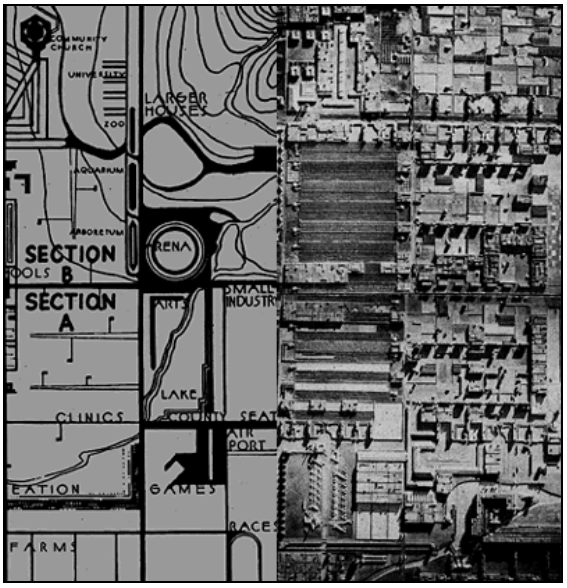


Figure 1. Frank Lloyd Wright – Broadacre

Both Unitarians chose grids as expressions of egalitarianism and stressed their non-hierarchical, decentralized character. At the same time the grid is the most frequent form of colony cities and Lessig in his *Code and Other Laws of Cyberspace* (1999) stated "that if Cyberspace would be left to itself, cyberspace would become a perfect tool of control".[7] Barabési in his classic of network theory *Linked* (2003) reported the most intriguing result of his Web mapping project as: "the complete absence of democracy, fairness, and egalitarian values of the Web".[8]

Apparently the use of grid patterns in cities and in cyberspace leads to associations with both democracy and domination. In this paper we will explore from an historical perspective the various characteristics of urban, computer grids and global grids. This exploration follows three paths: the architecture of grids, the spaces/places within the architecture of grids and the grid as interface between analogous spaces/places. Furthermore initiatives will be explored that extend urban and computer grids to a global level. In the last part we will ask the question how we can get a grip on these grids by analyzing these analogous architectures from an historical perspective. We will end by trying to explain why it can be useful studying hereto the works and visualizations of Paul Otlet.

II. The Architecture Of Urban And Computer Grids

The urban grid is probably the most defused planned form of cities. Although the term is mostly used in its singular form, there is a great variety of this urban form built and theorized, from army camps to utopias. We will mainly focus on the most common urban grid form, the rectangular one, but keep in mind that different grid forms are associated with similar fictions. Frank Lloyd Wright's view on democratic land-use translated in the rectangular grid of Broad-Acre City had its radial counterpart in the utopian Democracity presented during the New York's World Fair of 1939. Famous are the urban studies of the sociologist Ernest Burgess and the economist Homer Hoyt and who both claimed that Chicago (in reality for the greater parts composed of rectangular grids) supported respectively their zonal sectored and radio-concentric models.[9] The architecture of various urban and computer grids will be explored by following the patterns of roads and links concentrating on flexibility, growth, centralism, hierarchy, and other characteristics. Furthermore we will look at the connectivity and modularity of urban and computer grids as distributed networks and explore their boundaries.

In this study we define the grid as a system of lines meeting in right angles around regular spaces which are either square or rectangular. The great diffusion of the grid as settlement form might be explained from efficiency in land use. As Homer Hoyt underpinned with economical arguments in his classic: *One Hundred Years of Land Values in Chicago* (1933) it allows an efficient lottization of land for habitation or cultivation. However, the "material" grid is less efficient for connectivity. For those urban forms in which high connectivity was required, for example the supply of troops and munitions to the bastions of a military city, a radial structure was more convenient.[10] In virtual grids it is the other way around. Space (apart from memory space) plays hardly a role in this "metaphorical" architecture; however the connectivity between the users is its most important requirement. For that reason the virtual grid is very often represented as a radial " architecture" or network that connects places rather than spaces This brings us to a second distinction between urban and computer grids: their different distribution of spaces and places. Michael Batty in 1997 visualized the concepts of 1) space and place, 2) computerspace, 3) cyberspace and 4) cyberplace in architecture of nodes (the first two concepts) and networks (the latter two). [11] (figure 2)

design as a coherent theory but rather as notes in constant flux. Berners-Lee (1999a).

[6] Usonia is an abbreviation for *United States of North America*. Frank Lloyd Wright tried to create a democratic, American style that was affordable for common people. Moreover it resembles the Esperanto term for the United States, Usono.

[7] Lessig (1999), 5-6.

[8] Barabási (2003), 56.

[9] Burgess and Park(1921) Hoyt. H. (1933)

[10] Croix (1960). See further for an extensive bibliography on this topic Heuvel (1991) .

[11] Batty, M.

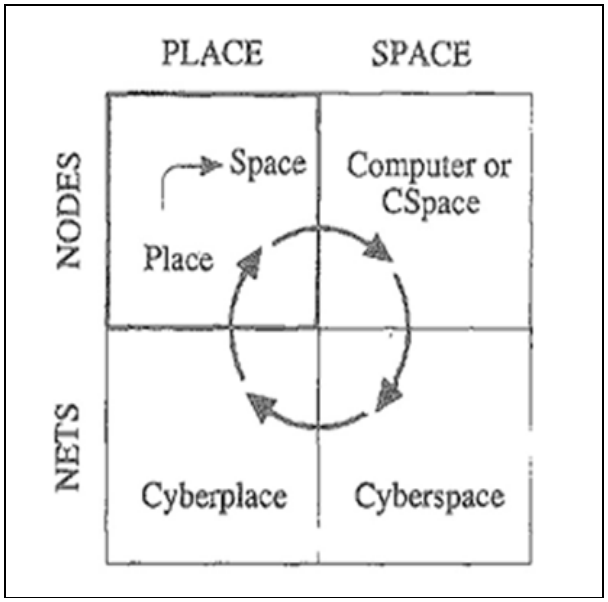


Figure 2. M. Batty – Place/Space, CSpace, Cyberspace, Cyberplace

It can be argued, whether space and place in a material sense and computerspace in a single apparatus can be best explained by the term "node". Moreover one can question whether we should read cyberspace nowadays exclusively as interconnected computers. Nevertheless Batty's visualization can be seen as a good starting point for locating space and place in various grids.

III. Spaces and Places within the Architectures of Urban, Computer and Virtual Grids

A. *Urban grids*

The first statement we would like to make is that the urban grid in our definition as a system of lines meeting in right angles around regular spaces which are either square or rectangular is in principal value free and as such can't be interpreted as either oppressive nor democratic. True, there are many historical examples in which grids according to our definition are superimposed on a site and express power by denying existing structures. The same applies, although supported by less historical evidence, for forced implementation of "democratic" models. However, in most cases grids are no true grids in that sense that they contain hierarchical elements either by combining square and rectangular units or varying the sizes of the regular units, often to create particular places. Another possibility is that the grid has a regular, non hierarchical structure, but that additional architectural constructions give a certain "value" to the grid. Finally it is important to realize that material grids can be flexible or can develop into non-grid forms. Of all these forms we will give an example. The Florentine New Towns created in the 13th and 14th Centuries can be seen as a good example of grids in which hierarchies make part from the original design to create places expressing community life.[12] (figure 3) The division into four quarters around a central church to organize defense, taxes and neighbor support and other urban function in medieval Florence was taken as point of departure for the settlement of its New Towns. Apart from the four quarters, each with its own central church, around a square with the principal church and town hall, also the building blocks themselves expressed a certain hierarchy as the result of a centralized design system using triangulation.[13]

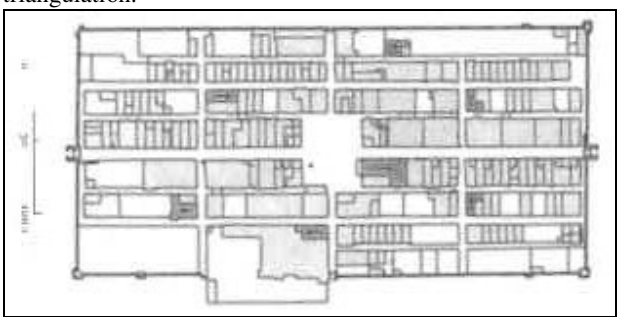


Figure 3. Florentine New Towns – Terranuova (14th century) Hierarchical grid following administrative organisation Florence

Whereas in the case of the Florentine new towns places were created in and as part of the design of the grid, in many cases such places are superimposed on the grid and not necessarily following the existing structure. A map of gangs in the Compton and Watts areas reveals power relationships on the grid of Los Angeles. (Figure 4)

Figure 3. Florentine New Towns – hierarchal grid with four churches in four quarters following structure Florence

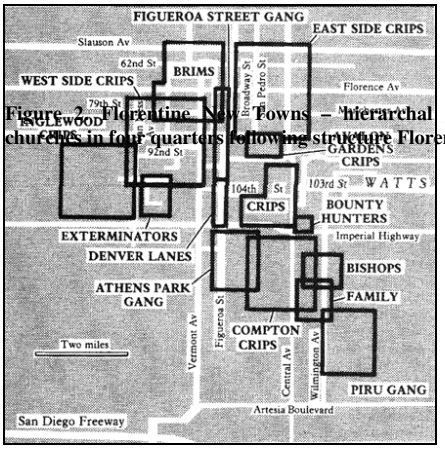


Figure 4. LA gang maps overlaid over urban gird LA Neighborhoods of Watts and Compton

It is also possible, and this model applies to many colony settlements, that a grid is considered to be an expression of domination, while actually the real place of power is outside the grid. The first step that most colonists took when setting foot in new territories was to create strongholds. This is the case for instance for the plan that the West Indian Company provided to Crijn Fredericksz van Lobberecht as an instruction to lay out a settlement when arriving in America. It is an abstract line-out of what would become the scheme for New Amsterdam, later New York.[14]

[12] Braunfels (1953) and Friedman (1989).

[13] Guidoni (1970), 219-234 , figures 116-118.

[14] Westra (1998). For the interpretation of this plan as a flexible grid: Heuvel (2005) 61-63. For Dutch colonial grids: Oers (2000).

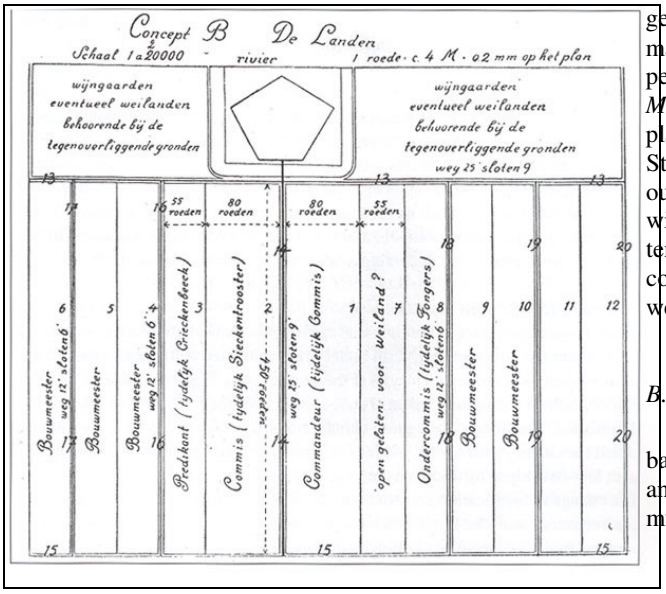


Figure 5. Grid for Dutch colony overseas which became New Amsterdam, later New York

Of course the grid reflecting the Dutch lottizzation of polders was an alien element in the existing structure of the island of Manhattan, but the real hostile structure, was the pentagonal fort [which in the end was realized as a square castle] outside the grid, that was designed to control its inhabitants in case of an uprising. (figure 5) The grids of the Florentine New Towns, of LA (not of the gangs) and of New Amsterdam were designed; places made part of the design or were overlaid.

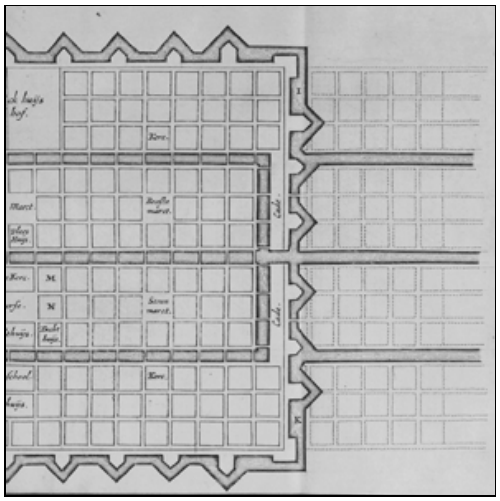


Figure 6. Stevin. Grid of ideal city with extension

Apart from the grid as (superimposed) design there is the grid as a method in which the structure could be adapted to accommodate places expressing differences in hierarchies. This is especially the case for temporary settlements like army camps. The Dutch mathematician and engineer Simon Stevin in his *Castrametatio. That is Camp-measurement* of 1617 developed a grid in which the lots could be laid out a little wider or narrower in case one needed quarters for visiting gentlemen or officers, where for no calculations had been made for so exact measure.[15] Such changes could get a more permanent character as in Adam Freitag's *Architectura Militaris* typology of army camps ranging from sleeping places for the night to fortified semi-permanent cities.[16] Simon Stevin foresaw temporary extensions of his ideal grid city outside its fortifications which in a later phase would brought within a new perimeter.[17] (figure 6) As we will see such temporary and emerging grids are comparable to forms of colonization of cyberspace. But before exploring cyberspace we say a few words on computer space.

B. Computer spaces, computer grids and virtual grids.

The computer space, Michael Batty was referring to is basically the internal memory space for the operating system and programs and for the files of the user. Computer grids must in this definition been seen as interconnected computers.



Figure 7. Computer grid Interconnected

Connecting computers started off as an efficiency and safety issue. One supercomputer that would handle all operations would make the communication network just too vulnerable. Baran who in 1959 had joined RAND Cooperation to provide intellectual know-how in the military built-up of the Cold War began to think about the optimal structure of the Internet. He considered centralized and decentralized structures just as too vulnerable for attack and therefore proposed a distributed architecture.(figure 8)

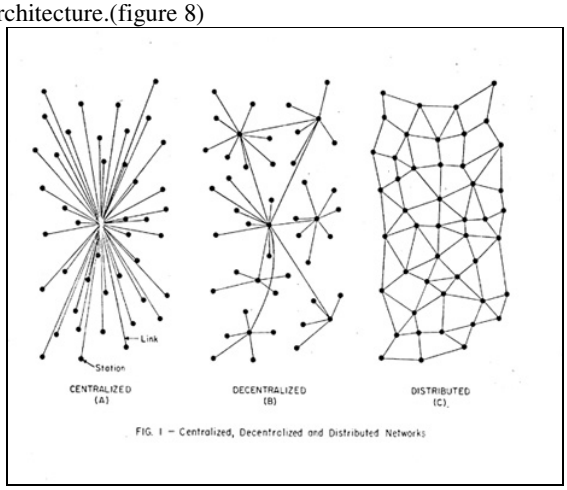


Figure 8. Baran. Design of networks for RAND 1962

[15] Stevin (1617). Eng. Translation in Schukking (1964)
[16] Freitag (1631).
[17] Posthumously published by his son Hendrik Stevin in Dutch in 1649 and in English by Heuvel (2005), *On the layout of towns*, 347-395, in particular ill. 43 and 46.

Baran's search for an optimal Internet structure would be followed by designs of computer grids interconnecting individual computers for an efficient use of working and storage memory. You might say to a certain extent that in this latter model of the computer grid, individual places are used to create collective computer space, or in Batty's terms cyberspace.

However, more and more the term grid is used for interconnected users rather than for interconnected computers, facilitating an old dream of collaborating in knowledge production (figure 9).

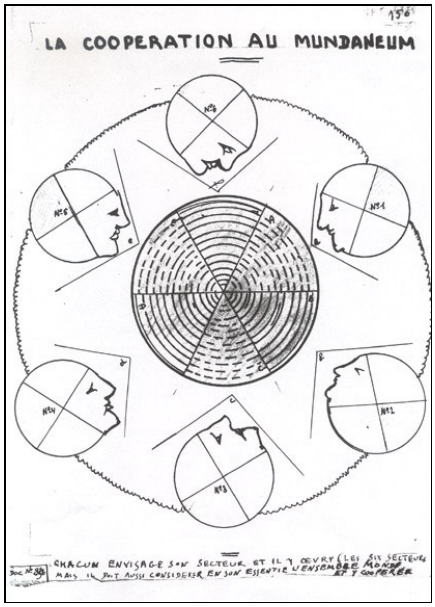


Figure 9. Otlet's Mundaneum grid of interconnected scholars

The original idea behind the architecture of the Internet is that computers "within" the network just do very basic operations, like passing the parcel with data, but that the real intelligence is placed at the "ends" of the network, where users dial into the Internet, to get access. It was intended to be neutral. Berners-Lee states: "I had designed the Web so there should be no centralized place where someone would have to 'register' a new server, or get approval of its contents."[18]

The grid is a good metaphor of a space with no centralized places. But how can one create creative places in the Web to communicate and to collaborate, without bringing in controlling centralizing rules, without changing its decentralized architecture? The answer to that question might be found in the three-dimensional grid. Lessig speaks of an architecture composed of "the building blocks commons and layers".[19] Commons are resources shared "in common", free for use for anyone within the relevant community, without obtaining the permission of anyone else. Layers are best explained as various levels within the architectures of the Internet and World Wide Web to facilitate communication. First of all, there is the "physical" or hardware level of the interconnected computers on the Internet. Then there is a middle layer of codes, consisting of the software to run the protocols that define the interactions between these interconnected computers and finally there is the "content" layer which transmits our texts, images, movies, sounds etc. Each of these layers in principle can be controlled or free, more or less independently from each other. We can compare Lessig's architectural metaphor of commons and layers to the building blocks of LA. The areas on the LA gang map are controlled grids on top of the free LA grid. That is in principal; in reality the indicated territories are no go areas for rival gangs, but still open to inhabitants with no conflicting interests. One could drive freely through the street grids of these neighborhoods, but it might be wise at some intersections to close your doors, since a breakdown of your car might come at a high cost. In short, the commons in the various layers are not completely free nor controlled, which also affects the interaction between the layers. The same is true for the Internet and the World Wide Web. The Internet was free and as the inventor of the World Wide Web stated: 'Its being [the Web's] "out of control" was very important'.[20] However, the Internet on the code level more and more mixes both free and controlled layers with serious consequences for society. "Our aim is" states Lessig in his Future of Ideas. The Fate of the Commons in a Connected World "to understand how this mix produced the innovation that we have seen so far and why changes to this mix will kill what we have seen so far."[21]

In cyberspace the regular grid is no more than a metaphor. Often the urban grid is mimicked in digital form probably as point of reference for users who try to create new, but at the same time recognizable places they can identify with. The oldest collaborative virtual world AlphaWorld is a good example hereof. (figure 10)

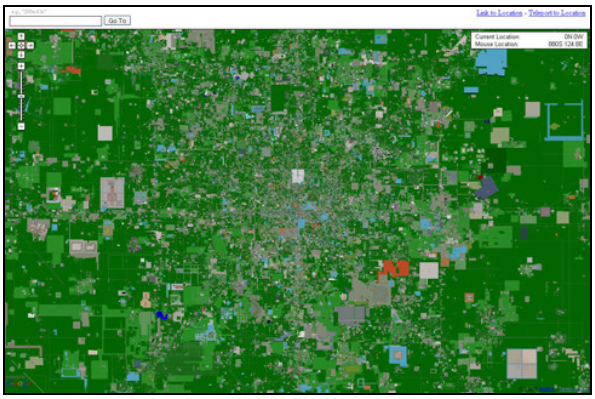


Figure 10. AlphaWorld – congestion in virtual grid around the centre: Ground Zero

Certain features of its architecture, like the grid of 10x10 meter cells, are hard programmed while other features of the environment might be altered by the users in the form of human avatars that move through this (sub-) urban cyberspace but at the same time create new (cyber-) places in which they assign new meaning and values to objects.[22] There are hardly planning laws or policies in AlphaWorld, but that does not mean that new visitors have the same freedom in shaping their environment than its first inhabitants that since 1995 populated this square virtual reality space the size of

[18] Berners-Lee (1999b), 106.
[19] Lessig (2002), ch. 2.
[20] Berners-Lee (1999b), 106.
[21] Lessig (2002), 25.
[22] AlphaWorld might be seen as a combination of a MUD (Multiple User Domains or Dungeons) of which the environment is programmed and a MOO (Multiple Object-Oriented environment) which can be altered by users. See further Dodge/Kitchin (2001), 153-165.

California. AlphaWorld contains vast, plains and has an average population of less than 0,1 person per square kilometer. However, around "Ground Zero" there is densely populated city that sprawls out in all directions for about 15 kilometers. It hard to find an empty plot, but it is also difficult to keep an open space here. Every plot that has no building can be claimed by someone else. This means that a non built-over backyard can be appropriated leading to building disputes between neighbors. AlphaWorld has its own voluntary citizens that act as gatekeepers and peacekeepers, and once a year Active Worlds citizens gather from all over the globe to get together in the "Real World". However, the control by citizens is not absolute. Some areas, are only accessible by ActiveWorld Inc.- employees who develop AlphaWorld.[23] This is not a real problem, if there is no real estate problem. However, in a similar, but faster growing (from 65 acres in 2003 to 65,000 acres today) virtual world like Second Life, with already over 13,000.000 residents, this might become a real problem. Last year the system developers Lindens, nicknamed the Gods, decided overnight to a large land emission with the result that land prizes and therefore the investments of landowners dropped to about the half of their original value. Linden dollars are cheap, but still real dollars. In First Life we also cannot prevent ground speculation of the government officials, but at least we have a vote to send them away.

The problem in this virtual world is twofold. One, limited control for users (due to limited access to the necessary code) over what is visible and secondly invisibility of where being controlled. Unfortunately, this problem does not only exist for residents in Alpha World or Second Life. The same problems of limited control and invisibility also shape the World Wide Web with serious consequences for the Information Society of First Life, or what we call 'real life'

Lawrence Lessig claims "that the invisible hand of cyberspace is building an architecture that is quite the opposite of what it was at cyberspace's birth".[24] The end-to-end network architecture, owned by nobody and open to everybody turns by this invisible hand into a network of control. This "invisible hand" that shapes cyberspace into an architecture of control is according to Lessig and others "code". [25] Barabási agrees to a certain extent, but put more emphasis on the self organizing dynamics of the architecture of the Web and on the limitations with tinkering with code.

> Code – or software- is the bricks and mortar of cyberspace. The architecture is what we build using the code as building blocks. The great architects of human history from Michelangelo to Frank Lloyd Wright demonstrated that, whereas raw materials are limited, the architectural possibilities are not. Code can curtail behavior, and in it does influence the architecture. It does not uniquely determine it however. Like architects' buildings, the Web's architecture is the product of two equally important layers: code and collective human actions. The first can be regulated by courts, governments, and companies alike. The second, however, cannot be shaped by any single user or institution, because the Web has no central design –it is self-organized.[26]

To self organizing aspects of real and virtual architectures we will return later. By first we need to ask what happens if we tinker with the code of the architectures we are exploring. What happens in that case with the grids between analogous spaces?

IV. The Grid as Interface between Analogous Spaces

Up to now we have presented urban and computer grids as systems defining/or defined by spaces and places. In this section we explore the use of the grid as an interface between analogous spaces. In particular we will focus on the role grids played as intermediates between the viewer and the represented space.[27] Grids sometimes distort geographical reality to accommodate the viewer and grids sometimes are distorted to enable the most accurate representation of reality possible.[28]

When studying the impact of tinkering with code in grids it is important to keep the abovementioned distinction between over-laid grids and grids that somehow are connected to the (analogous) spaces in mind. A famous print of Albrecht Dürer in his *Unterweisung der Messung* (1525) shows how the grid can be instrumental to capture perspective spaces by looking through a screen grid that enables to split up complex images, like the curved lines of a female body, in standardized compartments.[29] (figure 10)



Figure 10. Dürer's grid as instrumental interface for design

Volker Welter explained how Patrick Geddes during a temporary period of blindness sorted problems in various window panes to order his thoughts and ideas. This grid of window panes resulted in his 'thinking machines', regular folded pieces of paper, of which the squares represent thoughts and ideas and their relationships.[30] (figure 11)

[23] At the moment are about 25 areas flagged as Flagg areas (named after one of the Active World developers of AlphaWorld) and about 50 AW 3D Worlds are in use as storing and testing areas.

[24] Lessig (1999), 6.

[25] Lessig (1999), 89-90 quotes William Mitchell and Ethan Katz.

[26] Barabási (2003), 174.

[27] Williamson (1986) for the history, use and meaning of the grid in design. Different from Williamson, who describes a linear development in changing roles of the grid as threshold between "physical and superphysical worlds", we focus on the impact of distortions of the grid on analogous architectures of all times.

[28] A good example is "rubber sheeting" in overlaid geo-referenced maps in GIS in which changes in one layer affect the (visual) data in another layer.

[29] Dürer (1525)

[30] Welter (2002), 12-13.

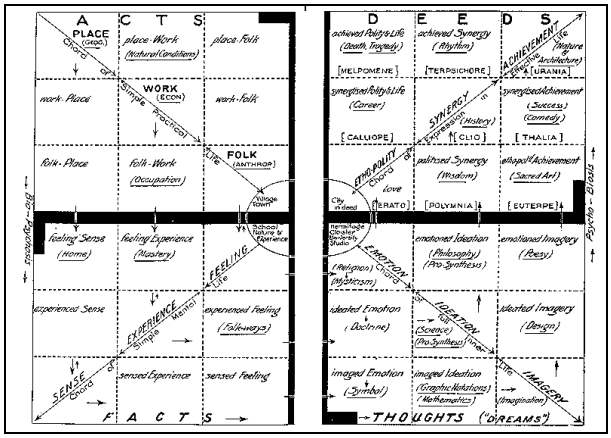


Figure 11 Geddes's grid as thinking machine for ordering concepts

Increasing or decreasing the sizes of the cells of Dürer's or Geddes's grids would perhaps make them less instrumental in capturing and memorizing images and thoughts. There might have been either too few or too many data to come to a clear picture, but data itself would not be distorted during the mapping. How different is this when we look actually at maps in which various grids are related to geographical situation on which they are overlaid. The problem to project the continents distributed over the globe on a two-dimensional surface resulted in all sorts of distortions of geographical space and place. The political debate around the map that Arno Peters proposed as an alternative to the Mercator projection illustrated that this is not just a technical matter, but that manipulations of conventional grids can have a serious impact on our cultural conventions within society. The American Modernist architect Buckminster Fuller came with his Dymaxion map to a different solution by making this problem somehow invisible. Instead of trying to change the 3D global grid into a 2D one, and transforming the geographical spaces of the continents accordingly, he cut in the oceans. These less contested areas mattered, culturally speaking, less. The Dymaxion Map is the only flat map of the entire surface of the earth that reveals our planet as it really is an island in one ocean without any visible distortion of the relative shapes and sizes of the land areas, and without splitting any continents. Buckminster Fuller used the map in which the continents are united as playground for his World Game.(figure 12)



Figure 12 Buckminster Fuller – Dymaxion map as playground for World Game

However the scope of his World Game Institute was serious. It produced 'the world's largest and most accurate map of the world, one of the most detailed and substantive databases of global statistics available anywhere and educational resources designed to teach interdependence, collaboration, respect for diversity, and individual participation in a global society'.[31] This new world map was both a metaphor of and an instrument to create a global society. It became a global grid.

V. The Global Grid combining Urban and Computer Grids for Society

Grids are easily to design, to lay out and to extend. For that reason there is a long history in urban design to use grids to structure large areas. In 1969 a Florentine group of architects around Aldolfo Natalini, Superstudio, presented in various images a linear grid called *The Continuous Monument. An Architectural Model for Total Urbanization* that encompassed the whole world. One of the photo-collages shows Manhattan captured in a stories high suffocating grid. Superstudio proposed these images as Anti-Design for society to criticize Modernist preoccupation with the grid and their claims of creating civilization. Also computer grids developed gradually to a global level. (figure 13)

[31] For this historical account of the development from Buckminster Fuller's World Game, via World Peace Game towards Earth Global Simulation, see <http://www.osearth.com/ws_history.shtml> [copyright 2004].

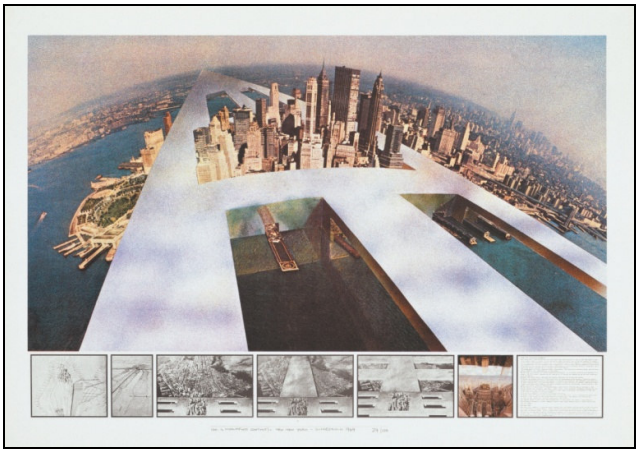


Figure 13 Superstudio – Global Urban Grid Manifest against Modernist preoccupation with grid to create society

The Internet grew out off from the network ARPANET as an initiative between some California universities and the US Ministry of Defense to avoid one expensive and foremost vulnerable super computer but developed into a worldwide infrastructure between the continents. According to the *UNDP report of 2007/08*, an average of 136 people per 1.000 people in the World had access to the Internet in 2005. However, for the least developed countries this average was only 12, while of the highest incomes 525 per 1,000 had access. Sally Wyatt rightly observes: "the digital divide remains, even if it has slipped the policy agenda, especially in rich countries and regions". [32] Tim Berners-Lee explains in *Weaving the Web: The Past, Present and Future of the World Wide Web* how he saw the potential to develop the internal communication system that he developed in CERN with the name *Enquire-Within-Upon-Everything* into one single global information space. One of his future dreams of the World Wide Web is that it becomes a more powerful means for collaboration between people. Berners-Lee imagines this information space as something to which everyone has immediate and intuitive access, not just to browse in, but also to create in. For people to share knowledge, he says, the Web must be a 'universal space'. [33] Whether this dream will come true depends on the architectures of the Internet and World Wide Web. We noticed already the digital divide that determined who has, and who has not access to the Internet. If this trend develops in the same way future access certainly will not be distributed in a "universal" way. The same is true for the World Wide Web. Whether Berners-Lee's dream of creating and sharing knowledge will be fulfilled by the promises of the Web2.0 will heavily depend on future developments in the architecture of the World Wide Web. Lawrence Lessig claims that "the future of ideas" is at stake, due to the above mentioned modifications of its original end-to-end architecture by layers of control that give network owners a say in how the network develops.[34] Barabási has a more complex picture of the architecture of the World Wide Web which is his view is scale-free, hierarchical and modular. It is shaped by interlinked communities but at the same time self organizing, visible and to large extent invisible.[35] "Researchers that with search engines mapped large samples of the Web, since his own early experiments", Barabási says: "have found that the Web is fragmented into continents and communities, limiting and determining our behavior in the online universe. Paradoxically, they have told us that there is terra incognita out there, whole continents of the Web never visited or seen by robots. Most important, we learned that the structure of the World Wide Web has an impact on everything from surfing to democracy."[36] In short architecture, visible or invisible, matters.

VI. Epilogue: analogous architectures of the Information Society and Paul Otlet

Architecture matters, architecture visible or invisible, matters. I stress the point of visibility, since for obvious reasons designers focus on visual aspects of architecture. And also the World Wide Web Consortium, better known as W3C, who continued to work on the abovementioned request of comments on *Architectural Principles of the Internet* set out by Brian E. Carpenter, mentions explicitly that these include "visual semantics" [37] However, we are much shaped by the less visible dynamics of self-organization. Urban grids are planned, but you only have to look at the maps of most American cities to notice that a few shifts in the original pattern, a couple of diagonal boulevards for instance, led often to urban sprawl of which the effects only on the longer term became "visible". As we already saw Barabási made a similar observation with regard to the Internet and World Wide Web. Now, I come to my last set of related questions in this paper: How can we analyze these visible and invisible analogous architectures, these sometimes intertwined and dynamic architectures that transform the Information Society. How can we get a grip on the grid from a historical perspective and finally why can Otlet's works and visualizations be useful?

We stated that in our definition the grid as a system of lines around rectangular spaces is in principal a value free architecture. Nevertheless, we made a distinction between 1) grids that were no real grids according to our definition, since they contained irregular hierarchical, centralized elements in their design expressing certain values or meanings 2) grids that were non hierarchical and decentralized grids, but to which "value" or "meaning" was given by additional (hierarchical, centralized) architectural constructions 3) grids not connected to and therefore not changing analogous architectures but instrumental as interface and 4) grids as combinations of architecture and interface connected to, sometimes intertwined with, other layers, affecting the design of the original (analogous) architectures. Furthermore we stated that the access to (the infrastructures of) the Internet and the World Wide Web, access to code and collective human actions, like linking, change their architectures. Finally

[32] UNDP http://hdr.undp.org/en/media/hdr_20072008_en_complete.pdf. For an interpretation of this report regarding access, use and non use of the Internet and WWW, see Wyatt (2008), esp. 13 and 16.

[33] Berners-Lee (1999b), 1 and 5.

[34] Lessig (2002) preface xv.

[35] Barabási (2003), 227-238.

[36] Barabási (2003), 162.

[37] W3C (2004) Complete definition: "An architectural principle is a fundamental rule that applies to a large number of situations and variables. Architectural principles include "separation of concerns", "generic interface", "self-descriptive syntax," "visible semantics," "network effect" (Metcalfe's Law), and Amdahl's Law: "The speed of a system is limited by its slowest component."

we introduced the impact of the self-organization of the architecture of the Web. We change codes and create and connect nodes, but we need to realize that the rest of the Web is invisible. This large-scale topology of the Web, "its true architecture" according to Barabási "enforces severe limitations on our behavior."[38] How can we get a grip on these dynamic grids, real and metaphorical, visible and invisible, affecting our Information Society and our interaction? Since these grids are changing over time we propose a historical approach. The first distinction between urban grids and non grids in a formal sense has a long tradition in historical morphological research. It allows comparisons of spaces, structures and systems, but only on an abstract level. The second one is about the context of grids that give meaning to its formal structure. One could think of other approved approaches within the historical disciplines like iconographical research and micro-histories of "lieux de memoirs". The third category of grids requires focus on changes in interfaces as design instruments, or a knowledge-historical approach of thinking or memory machines rather than on architecture. However, the complex fourth category as combinations of architecture and interface in which real architectures and architectural metaphors of knowledge organization are combined, in which the visible is merged with the invisible, and in which both design (code) and especially self organization of dynamic architectures have a great impact on society requires a different set of (historical) strategies. We need histories of codes, histories of protocols, histories of visualizations of (dynamic) grids and of networks to understand cyber infrastructures and -spaces and we need histories of (virtual) communities to understand (cyber)places. We are especially in need of a history where these are coming together, a history of interfaces in the widest sense. Most of these histories still have to be written, let alone that we can bring them together. The question is where to start? And here Paul Otlet comes in. Not to give the final answer, but as the rationale of this colloquium suggests, as a source of inspiration, here to explore the analogous spaces from a historical perspective.

A. Otlet is of interest for the analogous architecture of grids:

Otlet was interested in urban planning and architecture and in cities and constructions as architectural metaphor. In *Monde* (1935), Otlet discusses the role of the Mundaneum in the creation of a civilized society. This role is partially based on Otlet's idea to house a World Library, World Museum, World Archive, World University and a World Headquarters for International Organizations in one building. On the other hand the Mundaneum was not just a project for a real building, but an architectural metaphor of knowledge organization and dissemination on a global level. The Mundaneum is, Otlet wrote: "an idea, an institution, a method, a material body of work, a building and a network".[39]



Figure 14 Otlet – Species Mundaneum
Hierarchical network of material and virtual architectures from individual space to universal civilization

B. Otlet is of interest for computer grids:

There were no computers at the time of Otlet, but he was interested in the way technology could be used both as a chain of connected instruments to organize and to disseminate information and as a means to facilitate collaboration in knowledge production. Otlet visualized his network in his unpublished *Encyclopedia Universalis Mundaneum*, (a visual encyclopedia of hundreds of diagrams and schemes expressing his views on knowledge organization and the actions needed to come to an universal society. This network served in the first place a process of intellectual cooperation in knowledge production and consisted of a hierarchical chain of buildings and institutions that linked the individual with the universal society, situated in a world city.[40] (figure 14) Although Otlet's network is completely centralized and hierarchical, and therefore the opposite of the original intents expressed by the IAB in their *Architectural Principles of Internet*, it might be compared to computer grids, both as interconnected computers and interconnected users/producers.

C. Otlet is of interest for global grids.

Apart from the abovementioned Mundaneum (or actually his hierarchical series of Mundaneums) this interest can perhaps be explained best by looking into his comprehensive plans for

[38] Barabási (2003), 175.
[39] Otlet (1935), 448-452, Rayward (2003).

[40] Mons Mundaneum, EUM II Thèmes 2 Documentation A. Atlas 1 Version finale, boite 3 farde 14 document 8504. See further, Rayward 2003, 6–7.

the world: "Le Plan Mondial". [41] Although Otlet speaks of a concept and a plan of the world, he was focusing on the latter. Otlet seems to have been far more concerned with the completeness ("total knowledge") and with the "scientific" explanation of its internal logic (in classifications) of his technocratic model, than with the concept of the civilized society in this world itself. While most utopias depict a new society, without indicating how to get there (Thomas More does not describe the journey to the island Utopia), Otlet maps all possible routes (administrative, organizational, architectural, epistemic) without giving a clear picture of this new society after arrival. As such it might be compared with activities of Berners-Lee and the W3C who create architectures for the Semantic Web and protocols to enable people using and producing knowledge in one "universal space'. Their strategies will shape our places in cyberspace considerably, but what the future Information Society will look like is not their first concern.

D. Otlet is of interest for interfaces.

Otlet's synthesis of the world, expressed in *Monde,* is not an utopian imagination of a world community, but rather a compilation of architectural and epistemic design strategies to create interfaces to a civilized society. The Mundaneum in Mons (Belgium) contain hundreds of visualizations in which Otlet combines the architectures of his Mundaneums and World Cities with architectural metaphors of knowledge organization. As such they combine visual architectures with invisible, "to be visualized", architectures. Of particular interest is Otlet's study of a dynamic interface for "Le Plan Mondial". (figure 15) In this image the three visible sides of a cube represent (1) the domains of knowledge, (2) the organizational sectors and (3) the instruments that had to be embraced within the *Plan Mondial*. This cube is shown as moving along three axes: x (degree of reach), y (space) and z (time), which would continuously change the relationship among the data. The three remaining side of the cube are invisible, but make part his design.

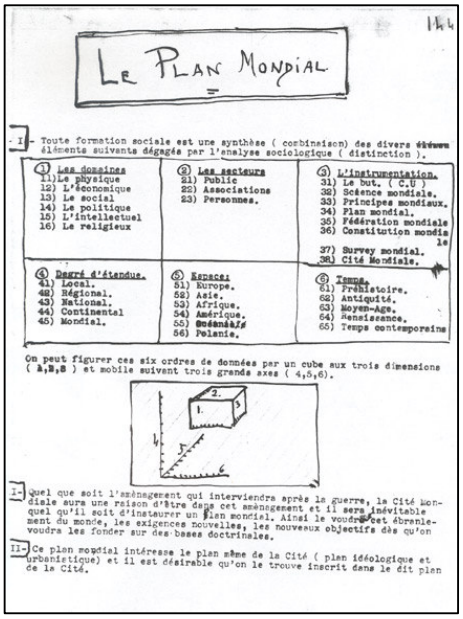


Figure 15 Otlet – Le Plan Mondial
Design for a dynamic interface to the world combining 1 domains, 2 sectors, 3 instruments on a cube moving alone the axes 4 level 5 space and 6 time.

In *Monde* Otlet captures the making of a world society in one formula as the product of object, subject and the unknown and/or mystery. (figure 16)

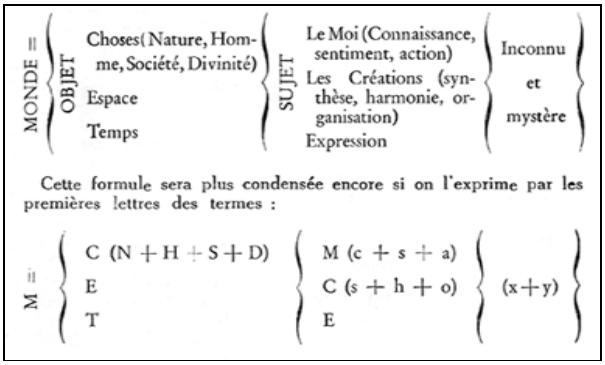


Figure 16 Otlet – Monde, equation of the world
Monde=object x subject x the unknown and mystery

Moreover these latter categories are visualized as part of his visual classifications of Monde. Otlet's attempt to bring the visible and the invisible together in one interface is interesting with regard to mapping experiments of the invisible architecture of the Web that shapes the visible Web topology.

E. Otlet is of interest for recent debates of the Information Society.

In *The Cult of the Amateur* (2007), Andrew Keen questions "the false democracy" of the Internet and the world of Web 2.0 in which the mass dictates what is true and valuable.[42] He criticizes an idolization of the "amateur" who creates a new intellectual order of mediocrity in Wikipedia and pleads instead for authority. It is interesting to compare Keen's statements with Otlet's views on distributed knowledge production. His network served in the first place a process of intellectual cooperation in knowledge production that linked the individual with a future universal society. In this process multimedia information is filtered and purified until the most essential 'facts' remain.[43] These facts are the bricks and mortar to build the architecture of a universal knowledge society. Otlet's views are often regarded positivistic and might be seen as the representative for the centralized concepts of absolute truth, total knowledge that Berners-Lee claims to avoid in his design of the Semantic Web. Nevertheless the building stones of this Web, the so-called RDF schemes, are hierarchical and have "trust and proof" on top. This makes it interesting to compare Otlet's knowledge constructions of " facts" with various claims of Internet democracy.[44] It makes Otlet a good starting point for a historical exploration of analogous architectures of the Information society.

[41] Otlet 1935, XIII.

[42] Keen (2008)
[43] Frohmann (2007), Heuvel (2007)
[44] Compare note 4- 5

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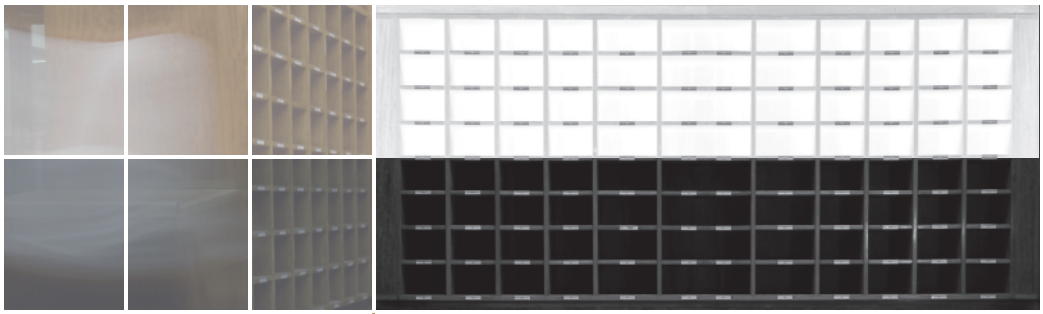
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Space of Action and Decision Making

Saturday 17 MAY

Papers Session 3a, 3b & 4

The third theme explores the space required for speed, action and decision making. In modernity, fast and effective action generates its own space of organization, intelligence and feedback. What does this space look like, and what are the different ways in which it can be represented?

Using Tacit Knowledge in Decision-Making Case of the Town planning in Kyoto Prefecture

Elia Guiheux*

***Abstract* - The department of Town Planning of the Kyoto Prefecture is organized with a Central Office in Kyoto City and local offices in the prefecture. Since the structure of the department is strongly centralized, the local branches may not make decisions by themselves, without the agreement of the headquarters. The headquarters establish some "global laws", identical for all local branches even if their employees are not confronted to the same situations, the same problems. In this situation, "good decisions" are made by experienced employees who have their own tips, but this procedure cannot be applied to all workers. However its origin, tacit knowledge, may be the source of great improvement for decision-making.**

Town planning is characterized by a huge number of heterogeneous data, and decision-makers search everyday in databases for accurate ones. Then, it would be interesting to create a tool allowing all employees to use tacit knowledge of their colleagues for their own decisions, and to couple it with everyday-used databases and traditional decision-support systems.

We proposed to optimize the functioning of this "local procedures" system by coupling a traditional Decision-Support System (DSS) and a Case-Based Reasoning one to obtain an intelligent DSS. This paper presents the context of the town planning in Kyoto Prefecture, the modeling made for the proposed system, and the software created.

***Keywords* – Tacit knowledge, knowledge management, Kyoto Prefecture, Town planning, decision-making**

INTRODUCTION

At the base of this work is a problem of the decision-making at the Town Planning Department of the Kyoto Prefecture. The Prefecture's office is organized with headquarters in Kyoto City, and local branches in the entire prefecture's area. The territory of the prefecture (Figure 1) is big and populated: more than 2.5 million inhabitants in 4,612.71 km2.



Figure 1: Map of the Kyoto Prefecture (adapted from http://www.japan-101.com)

The prefecture encloses heteroclite spaces. Kyoto is the main city of the prefecture, with more than 1.4 million inhabitants and its dynamic brilliant new avenues, where the department stores have taken up residence and where the big companies of the area have their headquarters (Figure 2). Very near lay the suburbs, where council tower blocks and rice fields cohabit. The example of Mukaijima, at 8 km south of central Kyoto, is relevant: instead of the former marshland, a new town has been built, and the railway line now separates the rice fields and the blocks of fifteen-storey buildings (Figure 3 and Figure 4). A bit further appears the real agricultural zone, where the rice fields reign, interrupted by huge infrastructures, expressway nodes in the middle of nowhere (Figure 5).



Figure 2: A bustling crossroad in front of the Kyoto station, Kyoto city

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Figure 3: West and East sides of the railway at Mukaijima new town: rice fields and council tower blocks



Figure 4: The train line (in black) clearly separates the rice fields (left side) and the housing spaces (right side: the red frames indicate building ensembles (aerial view adapted from http://maps.google.com)





Figure 5: Agricultural landscape: a 10-roads expressway interchange, and a rice farmer

In Kyoto Prefecture, as in Japan in general, the steep relief prevents from using the soil, except in flat areas. The center of the Kansai area is quite flat, and thus a part of the Kyoto Prefecture. Generally, the Japanese geography is characterized by the immediate juxtaposition of steep mountains and totally flat plains. It looks like a kind of sea from where mountainous peaks suddenly burst out. If the mountains are mainly free of constructions, the plains on the contrary are over-occupied (Figure 6). In the plains lays the main characteristic of the Japanese scenery: the intimate mix of housing, rice fields, industries, cars, etc. in cities that never end. It's certainly the main and amazing characteristic of the Japanese urban landscape (Figure 7).

The center of the Kansai area is a kind of endless conurbation. The following map (Figure 8) indicates the population density for the Kansai area.



Figure 6: Scenery in Shikoku, Kagawa-ken: austere immaculate mountains in the middle of a lake of houses



Figure 7: In the suburbs of Nagoya, Aichi-ken: Rice fields, cars, industries, and houses in the background

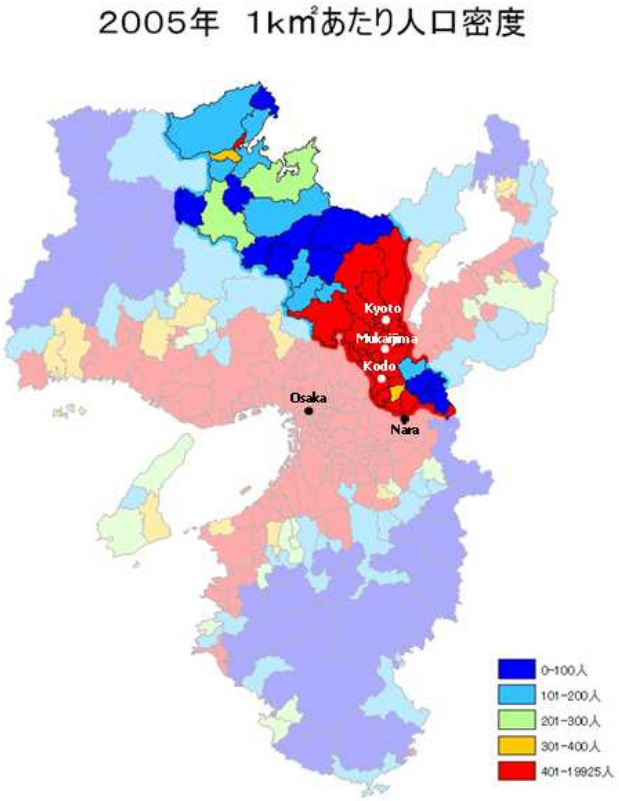


Figure 8: Map of density of the population in the Kansai area; the Kyoto Prefecture territory is highlighted (adapted from the map established by the Development Bank of Japan in 2005, http://www.dbj.go.jp/japanese/download/database/map/index.html)

Kodo (Figure 10) , a small town of 3434 inhabitants[1], is located in the middle of the Kyoto Prefecture (20 km south of Kyoto), close to the Doshisha University campus (with some 24 000 students), and where housing buildings just touch the fields. Students and professors come everyday from the whole Kansai area.



Figure 10: Housing buildings and rice fields in Kodo

Given this situation, one of the main stakes of the Japanese town planning (excluding earthquakes) is to succeed in optimizing this mix. For example, the crossing of transportation ways (roads and rails) is complex, in the middle of this tangle of houses and fields that do not demand the same requirements (Figure 11). The progression of the housing front on the agricultural zones is another problem (Figures 12, 13). Actually, the number of houses – often one- or two-storey buildings – increases, and nibbles the area that is dedicated to agriculture, instead of concentrating apartments in multi-storey buildings and leaving place for rice cultures. In a similar situation, in France, at 25 km of Paris, the urban space only tries to emerge in the rural area: multi-storey buildings and cereal fields do not cohabit (Figure 14).

The farmers we interviewed[2] (Figure 15) are thus angry: their fields become smaller and smaller, and they cannot cultivate enough for being able to live on their cultures. Farmers living at Kodo need to take a part time job in parallel, for example co-caretaker at the very close Doshisha University.



Figure 11: The train passes between housing buildings and fields (Kodo)

[1] Census report established by the Kyotanabe City Council in 2006, http://www.kyotanabe.jp

[2] The farmers were interviewed in Kodo and in Miyamaki (Kyoto Prefecture) in October 2007 by Elia Guiheux.



Figure 12: the housing front in Miyamaki, Kyoto Prefecture



Figure 13: … and the aerial view of the same front (aerial view adapted from http://maps.google.com)



Figure 14: Aerial view of the countryside near Charles-de-Gaulle Airport (25km of Paris, France): no housing front but individual houses clusters of random shapes (aerial view adapted from http://maps.google.com)



Figure 15: Interviewed farmers in Kodo and Miyamaki, Kyoto Prefecture

In most cases, there is no separation between the agricultural space and the urban one, and in the case of the housing front, the separation is brutal and the two kinds of spaces are so close that they must be considered altogether, as a set; the circulation problems of cars are always linked with the forms of the fields which edge the roads on one side, and with the demands of citizens who live in the buildings edging the other side.

All the elements of the environment have to be dealt at the same time and together, and each of the town planning decision highly involves domains that in other countries tend to be more clearly distinct.

Since the organization of the Kyoto Prefecture's office is strongly centralized, the local branches may not make decisions by themselves, without the agreement of the headquarters. The headquarters establish some "global laws", identical for all local branches even if their employees are not confronted to the same situations, the same problems. In this situation, "good decisions" are made by experienced employees who have their own tips, but this procedure cannot be applied to all workers. However its origin, tacit knowledge, may be the source of great improvement for decision-making.

Town planning is characterized by a huge number of heterogeneous data, and decision-makers search everyday in databases for accurate ones. Then, it would be interesting to create a tool allowing all employees to use tacit knowledge of their colleagues for their own decisions, and to couple it with everyday-used databases and traditional decision-support systems.

I. STANDARDIZING THE USE OF TACIT KNOWLEDGE

"Global laws" versus "local procedures"

The inefficiency of the "global laws" established by the central office has lead to the emergence of a parallel system, with the apparition of "local procedures" inside each local branch, and that overlay the "global laws". It is grounded on the experience of employees who faced problematic situations where they had to make a decision by deviating from the headquarters "global laws". Thus, it is based on tacit knowledge.

Since this system is not regulatory, it is badly organized, not standardized, and of course little efficient. At each stage of the transmission, from tacit knowledge in the head of a decision maker to the reuse of this decision by another decision maker in another situation, the knowledge about this decision loses parts of its content. Furthermore, there is no organized feedback, and the organization does not take advantage of past errors to prevent from new ones.

We proposed to optimize the functioning of this "local procedures" system. Three main problems then appear*:*

- How to catch this tacit knowledge? This is the question of acquiring and formalizing tacit knowledge (chapter *Explicit and Tacit Knowledge*).
- How to transmit it? This second question asks for methods and tools to deal with this knowledge. The idea of a database where everybody could dip into seems to be better than organizing boring and expensive "transmission sessions". Then, to use fruitfully these data from the base, it is necessary to install a mechanism, and case-based reasoning (CBR) was chosen. This tool will also include the storage of the acquired knowledge (chapter *Case-Based Reasoning*).
- Will it be efficiently used by employees? This third question focuses on the re-use of this knowledge embedded and made available to other employees. In the case of the town planning in particular, external data are essential and it is impossible to make a sensible decision without relying on them. In an organization, a Decision-Support System (DSS) precisely allows accessing these data, and intelligent systems exist by coupling standard DSS and expert systems (chapter *Decision-Support Systems*).

Therefore, the chosen option is a coupling between a DSS and a CBR system to obtain an intelligent DSS. The great majority of organizations already have a DSS, so the CBR would be coupled to an existing DSS.

Explicit and Tacit Knowledge

When considering knowledge in an organization, two kinds of "knowledge" appear: explicit and tacit knowledge.

Explicit knowledge is easy to describe quickly, clearly, and by writing. This is "stated, formalized knowledge, directly workable, and transmissible to the whole organization, without any lack of integrity" [1].

Next to this explicit knowledge, "tacit knowledge is not materialized by a report, a document, etc. [...]. It is the know-how hold by employees, […] the teams' way of working, the "best practices", and the expertness. This knowledge is not directly workable" [1]. This knowledge is the most difficult to study, to capture, to store, and to transmit. Examples of tacit knowledge may be useful to better understand what it is: many cooking recipes end with "salt, pepper, and serve", but who knows how many grams of salt should be put in the dish, and how many twists of a 4cm diameter pepper pot are necessary? At work, "Examples of tacit knowledge would be the technician who can tell the health of a machine from the hum it generates, or the bank manager who develops a gut feeling that a client would be a bad credit risk after a short conversation with the customer"[3].

[3] 2001, *Encyclopedia of Communication and Information*, Macmillan Reference USA, New York, USA

When trying to domesticate knowledge, four main steps appear: acquire, store, transmit, and re-use knowledge [4]. These phases are much more difficult to deal with for tacit than for explicit knowledge. Actually, the knowledge engineer will have to extract knowledge from the brain of experts sometimes against their will (usually through interviews), store it in a practical format (usually as cases in databases), transmit it being sure that a novice will understand the complex thoughts of an expert, and finally cross fingers and hope that applying an old decision (in the case of knowledge as decision-making) to a new one won't produce a fatal error.

Case-Based Reasoning (CBR)

CBR is one of the existing methods for dealing with tacit knowledge, based on the idea of solving new problems by using previous "close" situations. In order to do this, a stock of previous cases is recorded (thanks to interviews of experts by a knowledge manager) and stored in a library; then, a problem solver (a subpart of the computing program) will link the actual problem to older ones using analogy – like the human brain – rather than logic.

Since the development of a CBR system represents an important investment and a certain learning period, CBR is mostly useful for long-term decisions and where it is not possible to establish an algorithm of resolution [6], that is to say strategic decisions.

CBR allows approaching tacit knowledge the closest, because it describes a real-life experiment with its environment, not only inputs and outputs. CBR makes it possible to analyze the reasoning of the expert, the links his brain uses to reach a solution, his working habits, etc.

In the decision-making process, the part of tacit knowledge will essentially lay at the suggestion step, when the expert will use his know-how and field experience to make ideas and propositions burst out. Thus, CBR helps the decision-maker in replacing the expert by a search in the previous decision cases, by the fusion of the obtained results, and by the adaptation to the current situation.

Decision-Support Systems (DSS)

CBR can be very interesting for strategic decisions; nevertheless for operational or tactical decisions, this method is either useless, or time and money consuming. Simpler tools for decision support have to be used, and using raw data.

A DSS is an observation and description tool for organizations: using data, it gives the managers means of enhancing their management by giving a synthetic presentation (graphs, dashboards…), through a practical tool [8]. It does not give explanations: the managers will still have to do it, using the information given by the DSS.

The point of a DSS is to obtain quickly and easily information on a given situation. The stress is thus put both on the ergonomics of the interface and on the data gathering (to avoid any loss and being able to apply various treatments to the data).

The descriptions of DSS differ according to the authors, but three main parts always come to light: to catch and store data (with a "Data Management Subsystem": DMS [2]), work on it (with a "Model Management Subsystem": MMS), and give a result to the user (through interfaces).

If DSS are used for easy data analysis, they are also used to create intelligent systems, or Knowledge-Based Decision-Support Systems (KB-DSS), where advanced functions (Expert Systems[4]) are added to the DSS and allow the tool thinking and reaching conclusions, not only drawing data from a database.

The intelligent part of a KB-DSS is located in the Knowledge Management Subsystem (KMS [2]), an optional module grafted to a DSS.

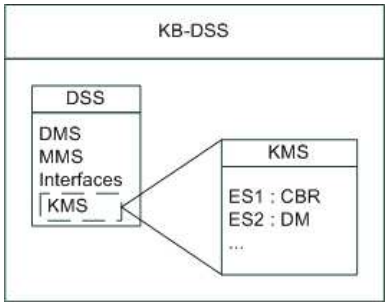


Figure 16: Composition of a KB-DSS

Characterization of the proposed coupling

The proposed system is a KB-DSS, whose KMS includes a DMS, a MMS, and a User Interface, that is to say the elements defining a DSS [2]. Thus, it can be considered as a "double degree DSS".

The MMS will be made of a CBR system, including a library of cases and a simple solver which will allow searching amongst the decision-cases. The DMS will be designed to allow the knowledge manager to deal with the different entities of the system: actors, recorded elements, and links between them. The interface will be double: for the "real" user of the system – the Decision-Maker (DMr) looking for help in decision-making – and for the knowledge manager (KMr) who is not supposed to be particularly good at computing and who is also considered as a user.

The DSS part of the KB-DSS will be an already existing one, supposed to be constructed with the typical structure of a DSS, including a DMS, a MMS, and interfaces.

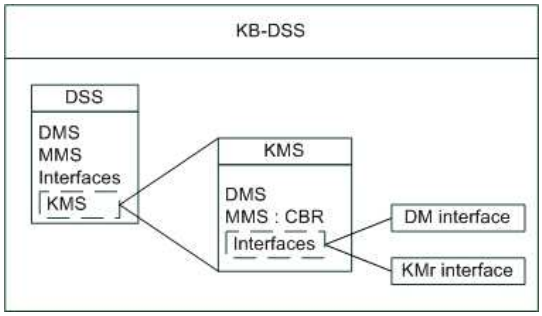


Figure 17: Recapitulative schema of the proposed KB-DSS system

II. MODELING THE SYSTEM

We created two models from the global idea of the project: first a functional one for modeling the general functioning of the system; second a "computing" one, a UML Class diagram, which gives details about the different elements intervening in the software.

[4] For explanations about Expert Systems (ES), see [2].

The functional modeling of the system

The aim of the system is to allow a DMr to find previous decisions made in a similar situation, and to help him making a new decision. To achieve it, the system's database requires to be fed with previous decisions made by other decision-makers. We chose to create two main functions: a "Feeding the system" one which gives data to the databases, and a "Using Knowledge" one which extracts knowledge from the databases.

The SADT (Structure Analysis and Design Technique) method was chosen to model this system: also known as the "descendant functional analysis" method, it allows both having a global view of the system and giving details on different subparts.

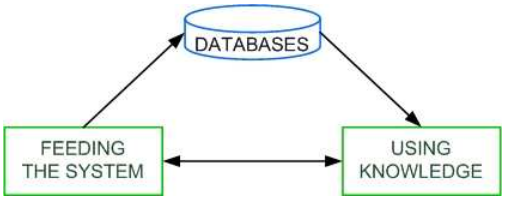


Figure 18: Basic principle of the system

There are two main actors: the Knowledge Manager (KMr), who is responsible for the whole system function

ning and acts both in the Feeding and in the Using functions, and the Decision Maker (DMr), who is an employee making decisions, at any hierarchical or functional level. Like the KMr, the DMr gets involved in the two main parts, and thereby can act either as an Expert (in the Feeding function) or as a User (in the Using function).

In the Feeding function, the KMr first interviews the DMr as an expert, and writes a memo of this interview (Extracting Knowledge function). The memo contains standard elements (date, place...) and a text field where the KMr writes the tacit elements of the interview. But the memo cannot be directly used, it must be formalized into a decisionCase. An automatic step extracts the memo's standards elements and transfers them in the standard elements of the decisionCase. The KMr uses the memo's text content to manually fill in the tacit attributes of the decisionCase: these two steps form the Formalizing Knowledge function.

When a DMr uses the system as a User (Using Knowledge function), he first makes a search in the decisionCase database (Decision Search function), and the system displays the available cases to the User who chooses one case for the coupling. The system then makes the coupling between the chosen decisionCase and the DSS database (Coupling function).

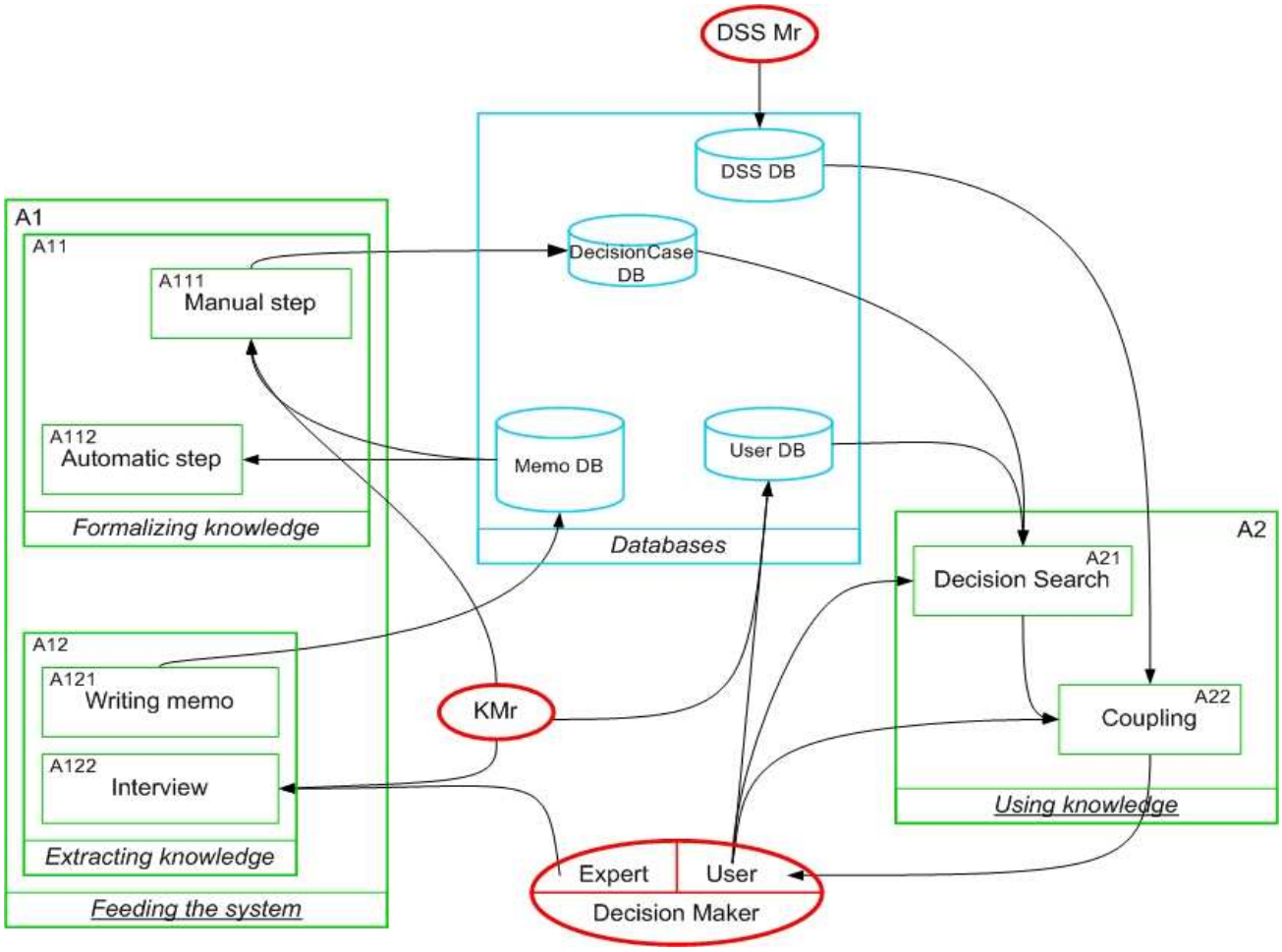


Figure 19: Functional modeling at a high level of precision

The UML class diagram picturing

The first functional modeling was fundamental for building the system, and understanding how it will work. But in order to be able to implement it, another modeling was essential, using a "software" point of view. The UML class diagram – and thus the object-oriented concept – is chosen, and the use of the Model-View-Controller (MVC) pattern allows an easy transfer between the two models.

The model will not be detailed in this paper, but the result is a complex diagram (Figure 20).

III. SOFTWARE DEVELOPMENT

Coding aspect

The UML modeling is particularly useful for coding a software, but a framework for software development had to be chosen: we selected the Ruby on Rails framework, both for its practical aspect (it is a MVC and Rapid Application Development framework) and for a cultural reason (Ruby is a language developed by a Japanese developer, Yukihiro Matsumoto [7], and therefore is widely used in Japan).

Using Ruby on Rails, the software was developed, based on the UML modeling. Some parts were easy to obtain thanks to the Rails framework, particularly the management of the entities with the CRED principle (Create, Read, Edit, Delete [5]).

Here are some screenshots of the software we created (Figure 21, 22, 23, 24).

Optimization of the prototype

The software could be enhanced on two main points: improve the formalization phase and enhance the search capabilities of the solver. Currently, the automatic formalization part only takes really basic elements from the memo to introduce them into a new decision-case, but a very interesting point would be to develop a method to catch standard elements in the text content of the memo and input them directly into the new decision-case. Our solver of the CBR system is a simple search engine and does not provide pertinent enough results. However solvers can be complex expert systems, and may include sophisticated process and technologies, such as neural networks, genetic algorithms, etc. displaying to the user meaningful outcomes.

Three other enhancements could be added, all referring to more global modifications: to include a sorting function for the results of the search functions (search decisions, and search DSS data), to consider the access rights problem (which is fundamental for any real project), and to incorporate into the software the interviews (which would be "auto-interviews" made by the experts themselves).

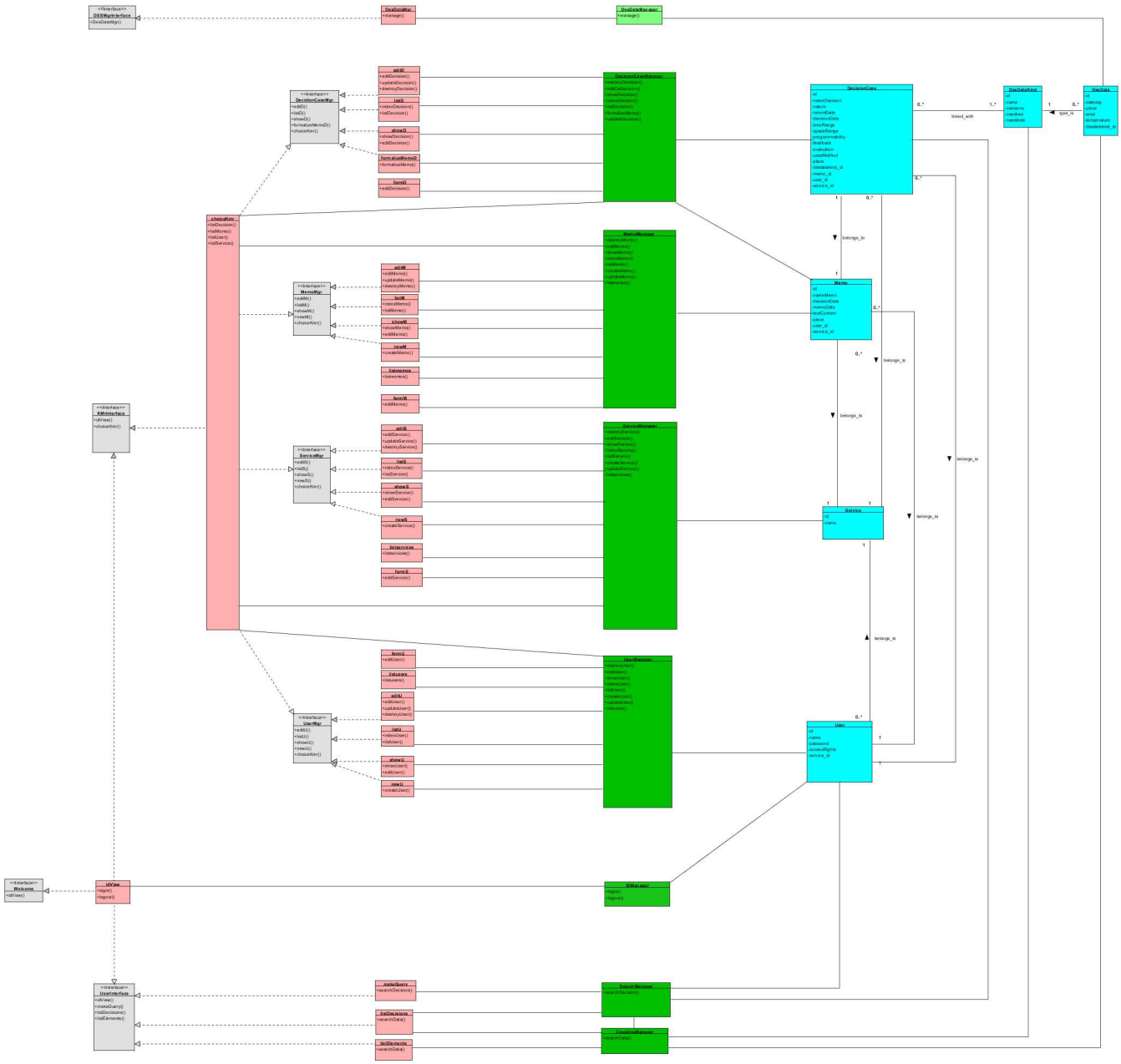


Figure 20: Complete diagram of the whole system



Figure 21: Knowledge Manager Interface: The KMr can manage the different entities (user, memo, decision case, and service)

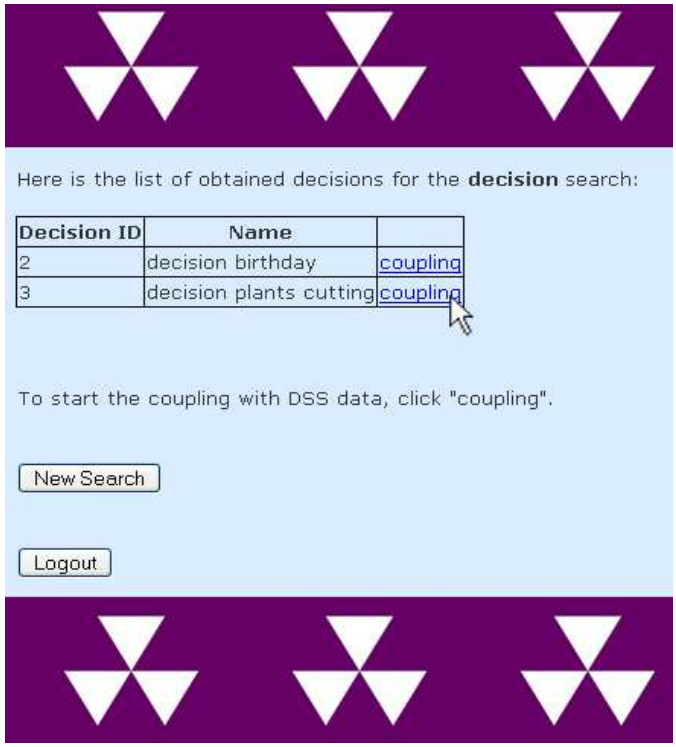


Figure 23: Results of the decision search: The user obtains the list of the recorded decisions containing the keyword in their title

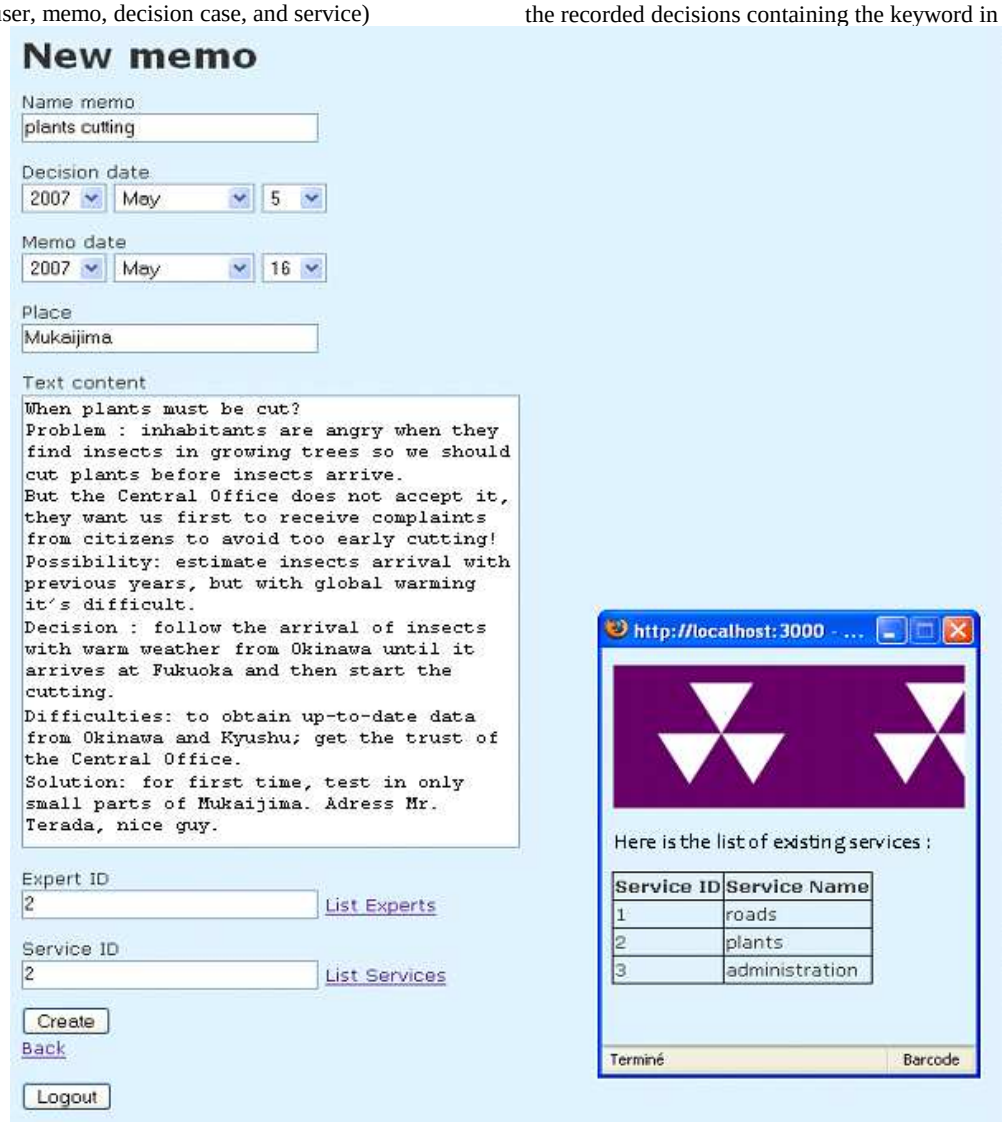


Figure 22: Creation of a new memo: The KMr fills in the fields using the interview. Here is a possible example for the plants cutting.



To describe the **decision plants cutting** (ID = 3) decision-case, there is a need of data of **weather** kind.

Description of the decisioncase :

ID	Namedecision	Nature	Recorddate	Decisiondate	Place	Timerange	Linked_data
3	Decision plants cutting	operational	2008-01-12	2007-05-05	Mukaijima	1 month	weather (ID = 1)

Spacerange	Prog.	Feedback	Usedmethod
Middle to high if considering the contact with the other prefectures	middle	Problem : inhabitants are angry when they find insects in growing trees so we should cut plants before insects arrive. But the Central Office does not accept it, they want us first to receive the complaints from citizens to avoid too early cutting. Possibility : Estimate insects' arrival with previous years, but with global warming it is difficult. Difficulties : to obtain up-to-date data from Okinawa to Kyushu, and to get the trust of the Central Office. In case of big areas? Contact Mr. Terada : good guy.	Geographical follow-up of the temperatures from Okinawa to Fukuoka and start the cutting. For the first time, test only on a small area (Mukaijima).

The corresponding **weather** is :

ID	Daydate	Place	Wind	Rain	Temperature
3	2007-05-05	Mukaijima	8 knots	5%	12

New Search

Logout

Figure 24: Results of the coupling: The system displays the results of the coupling between the "decision plants cutting" decision-case and the DSS data linked to it (the weather on the day of the decision).

CONCLUSION

In this work, we elaborated a modeling of a knowledge-based decision support system, by coupling a traditional Decision-Support System and an expert system grounded on Case-Based Reasoning and which allowed dealing with tacit knowledge. This modeling was applied to the town planning domain, and a tool was set on the basis of the modeling. We saw that much amelioration could me made on the prototype.

Concerning the more general principle of decision-making with tacit knowledge in town planning, two main directions could be looked into. About the content, a better modeling of knowledge itself – and particularly tacit knowledge – in the case of the town planning activity, would highly improve the pertinence of the model. About the container, the media for acquiring and transmitting tacit knowledge are for the moment too weighty and uninviting. The examples of the current experiences in companies, often based on games or recreational tools [3], should be analyzed and their philosophy introduced to scientific researchers.

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Wal-Mart's Transbuildings

Jesse LeCavalier, ETH Zurich
May 07, 2008

Wal-Mart Stores, Inc. is the largest company in the world and characterized by an obsession with information and efficiency. These obsessions, though motivated economically, manifest themselves in a new species of architecture. This paper will focus on these manifestations in an effort to identify the spatial traits of this new species – here dubbed the "transbuilding." By examining the architecture of Wal-Mart's retail centers, distribution centers and data centers, it will be argued that each can be understood as a version of this building type, each with its own characteristics and architectural implications. Regarding them as such offers an index for the changing relationship of architecture to information and suggests an eventual sublimation of architecture into logistics. For the purposes of this presentation, the focus here will primarily be on the distribution center and the date center. First, the sources of this building type – commonly referred to as "big-box" will be briefly traced.

Big-Box, sources of

A large warehouse buildings often used to house retail enterprises is commonly, and often derisively, referred to simply as a "big box." Such an appellation reinforces the notions that the architecture is a single entity and that it is predicated on the act of enclosure. This term is misleading because even though it is certainly true that these boxes are 1) very large and 2) very box-like is indisputable, the important point that is missed with such a categorization is that *these buildings cease to function as architecture*. Rather the big box presents a version of architecture as infrastructure, as logistics, in the sense that the singularity of the particular enclosure is irrelevant. Therefore, contemporary big boxes can be understood not as building *types* but as parts of an infrastructural *system* more akin to the root suckers of an aspen grove rather than isolated and freestanding trees. But how did this format emerge? The process of mutation from the small "store" into the large "big box" has been enabled by certain technological innovations and has been marked by significant architectural moments. The Crystal Palace designed by Joseph Paxton in 1850 for the "Great Exhibition" in London of the same year offers an obvious predecessor to the contemporary array of big box formats. The building was constructed in linear fashion based on a hierarchy of systems derived from the architectonic logic of greenhouses (Paxton himself was a horticulturalist by trade). The building was built in an amazingly short amount of time because the construction processes was systemized using prefabricated elements. At 990,000 ft^2, the completed Crystal Palace would still dwarf the average Wal-Mart supercenter (with an average area of 187,000 ft^2) but would be roughly the same size as Wal-Mart's recent distribution centers (all slightly over 1,000,000 ft^2). While the scale of the project resonates with those of later big box projects, the method of assembly is also familiar: the territory is first cleared, then the cast iron skeleton erected, and finally the crystalline glass skin is inlaid. Though the technology has advanced significantly since the construction of Paxton's palace, the needs for expediency and efficiency remain. The method in which a conventional big box is constructed often relies on either concrete masonry units (CMUs) or on Tilt-up Slab construction. In the former, CMU's in the figure of an '8' are laid in offset courses, threaded with re-bar and then secured by pouring concrete into the cavities. In tilt-up, the slabs that comprise the walls are poured horizontally on the ground and then "tilted" into place sequentially, thus allowing the reuse of the formwork rather than time-consuming and costly custom equvialent for poured-in-place concrete. In a third parallel, the content, program, even attitude about the roles of the buildings also bear certain significant similarities. The Crystal Palace endeavored to showcase an exhaustive array of the world's industrial goods while the retail supercenters are also vessels for the expansive inventories available to the contemporary consumer (most of these now made in China). Of course the major difference is the singular and spectacular quality of the

Crystal Palace as opposed to serial and unassuming qualities of big-box retail outlets and supporting formats.

Other roots of big box formats are found in the development of the modern department store and in the emergence of the "self-service" model of buying food and merchandise. The department store emerged in the second half of the 19th century and offered array of products contained in one building with fixed prices. Rather than always a negotiation process, the department store standardized the way in which its merchandise would be inventoried, displayed and sold. In 1916 in Memphis, Tennessee, Clarence Saunders opened the first "self-service" grocery store called Piggly-Wiggly. Access to the shop floor was controlled by a turnstile, customers would take a shopping basket with them, select the desired items themselves, and paying for them all at once upon gathering all the needed items. This format gave the customer more freedom to choose and even though the merchant was still responsible for selecting the products to include, the customers could assert their needs as well based on what they chose to buy. Saunders patented this concept in 1917 and it has since become ubiquitous. While the early department stores were primarily urban and depended on a steady stream of pedestrian traffic, the smaller scale self-service stores lent themselves well to areas with a smaller populations and proved to be especially compatible in rural and later suburban areas. Of some relevance is Clarence Saunder's invention of an "automatic store" that was patented in 1953 for its resonance with contemporary logistical practices.

The contemporary form of the big box has further been enabled by a series of technological advances that have allowed their organization to be systematized, their inventory handling to be more closely controlled and their construction and deployment to be more expedient. In a manner similar to that described by Rem Koolhaas in *Delirious New York*, these certain advances or elements constitute a sort of "genetic code" for buildings like big box retail outlets and, like the emergence of the elevator and steel, these technological developments have enabled a significant increase in the amount of construction volume. Relative to questions of organization, the Universal Product Code has been hugely influential in the organization of large systems like Wal-Mart. First used in 1973 on a packet of Wrigley's Spearmint chewing gum, the UPC has since become a fundamental element of the contemporary logistics and retail sectors. The UPC symbol is a means of encapsulating a product's pertinent information in an array of parallel bars (hence the term "bar code"). These black bars are actually attached to their adjacent void and each pair forms a binary digit. The combination of these digits is unique for each product and is scanned at significant nodes along its journey. The UPC creates a more efficient way of managing information that reduces input errors, standardizes formats and allows the monitoring of inventory with a higher degree of scrutiny. Through this mechanization of inventory control, suppliers and shippers also became more accountable for the manner in which they managed their goods. Likewise, the inventory levels of the various outlets could be controlled and calibrated to reduce the risks of overstocking or selling out of desirable goods. Every item for sale is scanned when it is placed on display and then subsequently scanned to tabulate to the price and register its purchase and removal from the store. This in turn feeds into the overall supply protocols and alerts that warehouses and distribution centers that more stock will be needed soon. More recently, Radio Frequency Identification (RFID) has been positioned as the heir to the UPC as the primary mode of inventory monitoring and managing. As RFID "tags" (consisting of a transmitter and antenna) continuously broadcast their location in space, the parties monitoring them can maintain close watch over their entire journey. This is different than the current mode of the UPC because the latter can only account for the products' locations at the checkpoints of their paths. The promise of RFIDs is ultimately to automate the process of shopping almost entirely. If all the items in a shopper's cart have RFID tags, then the consumers can pass through an electronic gate and their account will instantly and automatically deducted the amount necessary. The rise of the UPC also allowed – if not demanded – a more extensive and responsive distribution network. Now that merchandisers had the possibility of monitoring their stocks so closely, it became easier to adjust the networks' settings.

Two other significant developments in the standardization and deployment of these building types are concerned primarily with the logistics operation and emerged through motivations to standardize shipping protocols. The shipping container, or Twenty-Foot Equivalent Unit (TEU) has become the standard module for international trade and its success is largely due to the ease with which is can switch modes of transit (e.g. from boat to train to truck). At a smaller scale, the wooden shipping pallet has also indirectly transformed its surroundings so that is can be maneuvered and accommodated. Standardized to fit efficiently with a TEU, the shipping pallet success is also due to its ability to be handled by one employ with a so-called "pallet jack." While the TEU requires large machines to be moved, the pallet allows large quantities of goods to be moved by one person.

Wal-Mart

In the particular case of Wal-Mart, these systems of standardization and efficiency have been bundled together to create a streamlined process of spatial production and deployment of spatial products. This system is repeatable, it is genetic, and it is a result of prioritizing "programming" over program. Before addressing the specifics of the relationships between the architecture of the big box and Wal-Mart's spatial practices, it bears introducing the nature and scope of the company in slightly greater detail.

Wal-Mart presents one of the most extreme examples of a logistics-driven corporation. In 2007, Wal-Mart secured the top position on the Fortune 500 list with earnings for the year of over 351 billion dollars, making it America's largest company and the world's largest retailer. While the spaces of other large corporations are often concentrated, the space of Wal-Mart's retail empire is an expansive and diffuse net that has been cast over the entire United States.[1] Analysts use Wal-Mart's quarterly economic performance as a bellwether for U.S. consumer trends and Wal-Mart's sustainability initiatives could position it as a major driver of environmental change. However, even as Wal-Mart's global influence expands, its headquarters are still based in the rural town of Bentonville, Arkansas that, until recently, was impossible even to fly to directly from most major airports. Such tensions between the global and the local are producing new urban forms which, when taken with the examples above, suggest that the workings of Wal-Mart will reverberate beyond the realm of discount retail into those of space, politics, economics and sustainability.

Wal-Mart's success is largely because of its economies of scale and its ruthless efficiency. The company opens a new store almost once a week and has its own real estate company and its own architecture division. Because the Wal-Mart earns money by maintaining razor-thin profit margins, it constantly attempts to improve efficiency across all of its operational strata. For Wal-Mart, logistics is an obsession for its leaders and a way of life for its employees. According to former CEO, David Glass, "Our distribution facilities are one of the keys to our success. If we do anything better than other folks, that's it."[2] Current CEO, Lee Scott, also states, "From the time Sam Walton founded the company and established our first distribution center and our trucking fleet, he understood logistics as an integral part of Wal-Mart's success."[3]

Wal-Mart's primary "instrument" of territorial expansion is the "big box" described above and its attendant spaces and points of access. These boxes are calibrated to align specifically with the company's logistics enterprises and are deployed as standards to extend both territorial and market control. Designed as prototypes in the central office in Bentonville, the plans of these formats are then sent to new sites to be adapted to local conditions.

[1] The company has nearly saturated its sales area in the United States because "fully 60 percent of the entire U.S. population lives within 5 miles of a Wal-Mart location and 96 percent are within 20 miles." (See: Zook, Matthew and Mark Graham. "Wal-Mart Nation: Mapping the Reach of a Retail Colossus" in *Wal-Mart World: The World's Biggest Corporation in the Global Economy*. London: Routledge, 2006, p. 20.)
[2] David Glass quoted on wall display, Wal-Mart visitors center, Bentonville, AR July 28, 2006
[3] Lee Scott quoted on wall display, Wal-Mart visitors center, Bentonville, AR July 28, 2006

Wal-Mart's real estate division carefully chooses the locations of these new stores by using combinations of demographics research, growth modeling tools, etc. Once these store locations have been established, the distribution network of Wal-Mart keeps them well stocked with merchandise that is specifically adjusted to suit the statistical needs of the given location's shoppers. The company organizes these data through the use of proprietary software and by monitoring every transaction every day at every location for two years. As chief architect William Correll stated, "Operational needs rule and productivity and efficiency is at the very *center* of what we're trying to." This need for efficiency is coupled with the need to acquire as much information as possible - in fact the company has the largest private database in the world - the only larger one belongs to the U.S. Department of Defense. These needs established logistics as Wal-Mart's primary arena of expertise, research and innovation. By mining its vast stores of information and mobilizing its hyper-efficient logistics machine, Wal-Mart is able to maintain unparalleled control over its operations.

Transbuildings

In the case of Wal-Mart, logistics produces neutral condition that allows its buildings, having been liberated from their duties as architecture, to do other things and perform different roles. Architecture, heretofore largely understood as a container now takes on the form of a conduit, or medium, and in doing so suggests multiple possibilities for the future of the city. While Wal-Mart's operations rely on three basic building blocks - the supercenter, the distribution center and the data center - the latter two will mostly be addressed here. Both of these constitute forms of "automatic buildings" and it is one of the wagers of the paper is that this format signals a significant mutation in the evolution of architecture that challenges it in a fundamental way. Because these buildings are integrated in a significantly larger system, their territorial influence expands beyond the limitations of their built enclosure. Likewise, each of these systems are composed and constituted from the "inside-out" in the sense that their ultimate configuration is not the result of willful decision making but reflects the specific calibration requirements of the varied and minute components. The development of such buildings really amounts to a process of programming. In the case of the distribution center, material does not so much enter the building as merely pass through it. In the process known as "cross-docking," the merchandise in transit is unloaded from the trailer of one courier, processed through the center's vast network of machinery, conveyance systems and human operators and then promptly reloaded on to awaiting transport. According to a Wal-Mart representative for Distribution Center 6094, not more than 10% of the total inventory remains in the building for longer that 24 hours.[4] Though this is a somewhat banal example, the implications for architecture are more significant. What does it mean when buildings cease to be concerned with inhabitation and containment and instead become processing devices? While buildings like the Wal-Mart distribution center form a relatively small percentage of total building stock, it is the contention of this paper that a) they will continue to proliferate in increasingly greater speeds, b) that their principles will come to dominate the planning of "regular" buildings, and c) that in spite of their small numbers, their urban impact far exceeds their quantifiable presence (i.e. trying to quantify these buildings will yield small numbers but looking at how cities are rearranged to accommodate them makes their impact clear).

Automatic building could be referred to as *transbuildings* because the borders of their architecture identity are blurred. It is the contention here that they can be considered a new architectural species - a mutation of sorts whose traits reflect the requirements and protocols of the organization that spawned them. Though there are of course other examples of automatic buildings like the contemporary automobile factory, the hydroelectric dam, waste processing facilities, incinerators, water treatment plants, etc., the

[4] Based on an interview at Wal-Mart Distribution Center 6094, Bentonville, AR on January 18, 2008.

buildings in question are different because they are neither producing any tangible thing nor are they transforming any matter. Distribution centers are like airports for things. In this regard, the links to a more contemporary architecture can be formed, positioning the spatial implications presented by the transbuilding as both opportunities and threats. In other words, the factory or the processing plant is separate from the human experience of buildings because they use the architectural enclosure as a platform to build things or to transform things. However, the more common use of architecture by humans is to occupy it. These spaces are vulnerable to infiltration by automated throughput. As mentioned above, the development of these automatic buildings has been enabled by a set of technological developments related to the management and handling of information including the Universal Product Code, the standard pallet, the TEU, the contemporary forms of conveyance and object selection. This marks a significant moment in the development of architecture because the "inhabitants" of the building become inconsequential and therefore the parameters by which its designs are evaluated must be reset. It also promises a new set of possibilities for the development of architecture and cities once it is recognized that architecture is liberated from its role a shelter, that architecture can be understood as a broad logistical infrastructure and that very small modifiers can have significant ripple effects at a much larger scale.

The transbuilding is a medium. In *Understanding Media*, Marshall McLuhan never specifically addresses architecture a medium but by understanding it as such, the role of the transbuilding as a conduit becomes clearer. Indeed, according to McLuhan, "The electric light is pure information. It is a medium without a message, as it were, unless it is used to spell out some verbal add or a name. This fact, characteristic of all media, means that the 'content' of any medium is always another medium. The content of writing is speech, just as the written word is the content of print, and print is the content of the telegraph."[5] In this sense, media become conduits sublimated into other forms. This concept is helpful here in the context of a discussion about the role and nature of the architecture of Wal-Mart's retail empire because it helps to illuminate the role of architecture within their operations and the manner in which they are deployed - not as isolated events, but as a one facet of a broad infrastructural regime in which the buildings are not seen as enclosures but instead a infrastructural and territorial markers intent on claiming and securing hostile territory. The supercenters, datacenters, distribution centers are primarily conduits for other flows. Perhaps this is different than other forms of architecture where there is some sense of it as a terminus of media flow, as an endpoint in an arc.

The question of what architecture "communicates" is a fundamental one and it is clear that the "message" offered by a gothic tympanum, the internal organization of a modern office building, or the skyline of booming instant-cities can all reinforce the performative role architecture has a communicative device like the television, radio, etc. However, in the cases of the spatial products of discount retail, like those of Wal-Mart, the communicative aspects of architecture mutate. At the architectural scale, the supercenters communicate a familiarity and predictability in the manner of franchises. What you see is what you get, everywhere all the time the same. The orange juice, the cold cuts, the stockings, will always be in the same place. Externally, the buildings themselves broadcast this "message" even through the utter blankness of their façade. In this manner in fact, a new aspect of architecture emerges, as pointed out in *Learning from Las Vegas: The Forgotten Symbolism of Architectural Form* by Robert Venturi, Denise Scott-Brown and Steven Izenour. In the form of the decorated shed, architecture is cleaved in two, the back of house "pure function" dutifully does what it is told while the glitzy "decoration" proclaims is contents and attempts to seduce passers-by (who realize they have been duped when the interior is always the same thing). In the case of Wal-Mart, the stores themselves have been going through and identity crisis of sorts in which, because they have no fixed standard appearance, the architecture can take on any of the attributes of locality in order to "fit in." Utterly without qualities, the stores absorb locality like alien shape-shifters whose form is familiar but whose manners and movements are awkward and tentative. It

[5] McLuhan, Marshall. *Understanding Media: The Extensions of Man*. Cambridge: MIT Press, 1964 (reprinted 1997), p. 8.

should be clarified that Wal-Mart's architectural strategy is, or at least has been, and opportunistic one. When they can, the company would prefer to erect the least expensive and most utilitarian of concrete warehouses. When a local community resists Wal-Mart's entry, the stores are often modified to ameliorate local desires for "contextual" architecture. The community design boards can leverage their resistance in order to force Wal-Mart into offering a range of design concessions and flourishes that vary from site to site. As this is becoming increasingly common, Wal-Mart is attempting to establish a standardized compromise in which the standard store has an acceptable quality in order to avoid the lengthy and costly process of constant customization. However, in both cases, the essential role of the building, and even the assumed definition of architecture, remains the same. The "architecture" in both cases, is constrained to an 18-inch ribbon between the edge of the parking lot and the interior of the store. The difference between these decorated sheds and those of Venturi and Scott Brown is that Wal-Mart's version are acting as a network and the "buildings" are the local manifestations of the organizations rhizomatic imperial structure. Here, architecture here is not an information receptacle but is an information *conduit*. Information is not applied to the building in the form of decoration – instead, information moves through the building.

These transbuildings, the datacenter and the distribution center, owe their allegiance to managerial decisions made early in the industrializing climate of the mid-19th century. The perceived need to increase efficiency as much as possible produced new sets of organizational regimes both managerial and structural.[6] The Taylorist influence to break down tasks to their smallest reducible increment then allowed an unprecedented amount of scrutiny to be directed toward each component, in turn allowed to be micro-adjusted to achieve a maximum level of productivity. The transition from the Taylorist factory floor, the Fordist, to the automated production line has been addressed in great detail.[7] What is significant with regard to the buildings discussed here is that even though they are automated and organized in a similar manner, they produce nothing, at least nothing physical. These buildings are only concerned with the processing of goods already produced and packaged. So even though they conform to the efficient logic of the automatic factory, in fact they produce nothing, instead only handle things. The significance of this is that at one level, the boundaries of architecture are reconstituted – no longer must one "enter" a building but instead the entire system becomes part of an architectural network – or more appropriately, the architecture dissolves into an infrastructural network.

The specific case of Wal-Mart's unnumbered data center on the Arkansas / Missouri border presents a perplexing manifestation of the transbuilding that is nonetheless consistent with their means of operation. Roughly the size of a standard supercenter, the anonymous data center is located conspicuously – an almost literally – at the border between the border to Arkansas and Missouri. While further research is currently underway to determine the incentives for this location strategy, it can be speculated that it has to do with some manner of cost-saving efforts. It is located as close as possible to the Arkansas border and Bentonville without actually occupying any state soil. It is located near a confluence of roadside services that capitalize on the fact the Benton county is "dry" – meaning that alcohol is only available from licensed bars and cannot be purchased by the public for private consumption. As a result, there are two wholesale "Liquor-marts" at Missouri's first exit off the interstate. This same exit is the one needed to access the data center, which lies along a minor trunk road that serves the adjacent cluster of private homes hidden in the Ozark foothills. The relatively pleasant pastoral image is at odds with the heavily secured and fortified data center. Four security cameras cover its unmanned entry gate and the entire complex is surrounded by two layers of chainlink fence and capped with a continuous loop of razor wire. While the security cameras are presumably linked to an internal control room, it is the McDonald County sheriff's department that is dispatched when suspicious activity is recorded.[8]

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[6] See Chandler, Alfred D. *The Visible Hand: The Managerial Revolution in American Business*. Cambridge: The Belnap Press of Harvard University Press, 1977.

[7] See Rabinbach, Anton. *The Human Motor: Energy, Fatigue, and the Origins of Modernity*. Berkeley: University of California Press, 1992.

[8] Based on the experience of the author when trying to photograph the center on Sunday, January 20, 2008. The author was questioned be one plainclothes deputy and subsequently by a uniformed officer. Both were

The building itself conforms to the protocols of the transbuilding with some notable exceptions. The built enclosure is located against the rear edge of the lot. Between the entry gate and the building is a long rectangular parking area and storage ground, complemented by a smaller lot for employees between the building and rear fence. The "entrance" to the building is seemingly on the wrong side but illuminates the design methodology at work. Since there is no context, there is, in fact, no "front" but only a face of the built enclosure where it is most efficient to provide a human entrance. There is also an opening for large trucks that allow them to dock with the building unload their cargo. The human entrance is executed with a minimum of architectural flourishes and consists of a low canopy emerging between two of the cinder block wings. This element provides shelter for a small number of plastic-coated yard furniture that staffers use when taking cigarette breaks. It faces decidedly away from any adjacent buildings and keeps the employees effectively out of sight of any accidental passers-by. Another variation in this case is the fact that the building itself is generously surrounded by sloped earth berms that give them impression that the data center is mostly buried in the ground. As the primary architectural requirement for buildings like these is to keep the servers cool, the earthen embankments are most assisting with insulation requirements. Flanking the flat expanse of green standing-seam roofing are two large ventilation arrays though conspicuously and signs of air-handling units, chillers and the like are artfully disguised. This attention to streamlining the building and disguising the excessive mechanisms required to keep it operational brings to mind the fortified architecture of bunkers, battlements, and, to some extent, the long lines buildings of long-distance telephone companies. Compared to Google.com's datacenter, Wal-Mart's version is decidedly anonymous and camera shy. The Google version is also located to reflect the insatiable thirst for cheap power next to - in fact, almost on top of - the Dalles Dam along the Columbia River border in the state of Oregon in the United States. However, the Google data center makes no attempt to disappear and proudly wears its outrageous assembly of cooling components, clad in glinting metal screens, as a crown atop the mute container full of server-towers. The Google complex is located near the Columbia Gorge National Scenic Area and the building has become somewhat of a tourist attraction itself, prompting local ancillary programs to name themselves after it and so on. While both versions of the data center conform to certain protocols, the difference between the two illuminates some of the intentions of Wal-Mart's spatial operations. The Google complex makes no effort to be anything other than a building in a very conventional sense. It even makes a point of architecturalizing its mechanical features. Conversely, the Wal-Mart datacenter through camouflage and fortification attempts to disappear or to become absorbed into the infrastructural network to which it is connected.

The transbuilding presents evidence of architecture becoming sublimated by logistics. Rather than this posing a threat to architecture, it allows for an expanded notion of how it is constituted and for an expanded arena in which it can act. The logistical demands for agility and responsiveness suggest that it is being pushed toward dematerialization - here glimpsed with the examples of the distribution and data centers. Likewise, as the interior spaces are removed from architecture's purview, the site of action can shift to the possibilities of surfaces, thresholds, membrane and voids. Taken together, these examples of Wal-Mart's information architecture can be seen as an index of architecture's changing relationship to information.

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very friendly though slightly annoyed for being called away from the NFL league championship game being broadcast.



Wal-Mart data center, Arkansas/Missouri border

Civil Defense and the Space of Decision Making

David Monteyne*

Abstract - **In the United States, early Cold War anxieties about what might happen to American spaces in the event of a nuclear war resulted in specific architectural and urban responses. A national fallout shelter survey begun in 1961 ultimately found protective space in over 100 000 existing buildings across the nation. But civil defense planners realized that it would be difficult to match all citizens with shelters. Citizens were mobile and located in different places at different times; and many citizens lived or worked great distances from available shelters. Community Shelter Plans attempted to rationalize the messiness of spatial practice, meshing population data with the results of the survey, and mapping them in relation to movements within the city. When an air raid siren sounded, citizens had to make rapid decisions about where to take shelter. By processing and disseminating information about shelters and the city, civil defense sought to manage the decisions made by citizens in crisis moments. However, the knowledge of America's cities and citizens assembled by civil defense was inevitably incomplete. This paper proposes civil defense as a spatial iteration of "biopower," Foucault's theory in which the state offers social welfare in exchange for social control. In the end, the manifold failures of civil defense to rationalize space parallel the failure of the state to rationalize subjectivity.**

Immediately after World War II, citizens and policy makers in the United States worried about what might happen to their cities should the nation be attacked with atomic bombs (Figure 1). Scenes of urban destruction from the war, and the reports of the U.S. Strategic Bombing Survey from cities like Dresden and Hiroshima, provided impetus and data to the plans for Cold War civil defense in the 1950s-60s. The purpose of civil defense during the early Cold War was proving the possibility of surviving a nuclear war, and then convincing Americans that preparations could and must be made. In the 1950s, the basic tenets of civil defense were

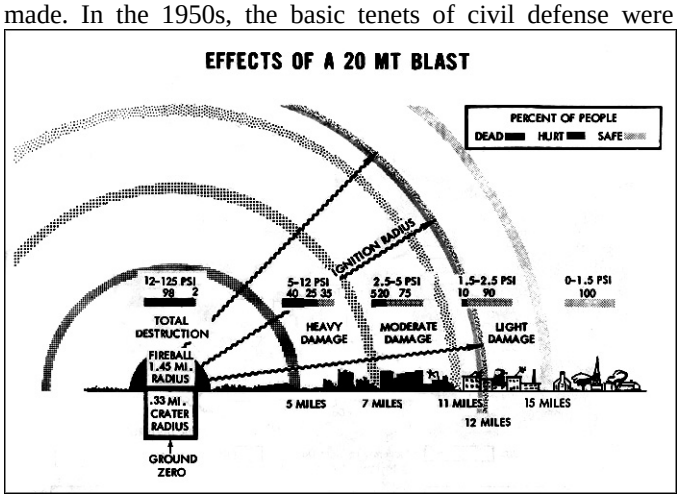


Figure 1. Diagram showing urban devastation wrought by a nuclear bomb. From Office of Civil Defense, *Highlights of the Architecture and Engineering Development Program* (Washington, DC: GPO, 1964).

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urban dispersal and self-help. Through the existing and ongoing process of suburbanization, citizens were to be relocated away from presumed target areas in city centers.[1] In the suburbs, they were encouraged to build their own, *private*, backyard or basement bomb shelters. By 1960, civil defense officials came to the realization that citizens were not building their own shelters. "Self-help" was a failed policy; disaster planning needed to be more interventionist.

This realization led to the development of a civil defense system based on large, *public*, fallout shelters approved by the federal government. The changes in civil defense also paralleled advances in weapons technology and production. Greater numbers of more powerful bombs, which could be delivered rapidly in missile form, affected how shelter could be planned for. Civil defense officials admitted that there was no protection from the awesome blast and fire effects of a nuclear detonation. The U.S. Department of Defense frankly estimated as many as 100 million dead from these initial effects in an all-out attack. However, it was argued that citizens could be protected from fallout, the radioactive dust and vapor churned up by the explosion and carried aloft by weather patterns, sometimes settling on surfaces hundreds of kilometers from ground zero. The new civil defense concept posited that any American lucky enough to survive the initial blast and fire still would be affected by fallout, and would need to find shelter immediately from the deadly dust.

Thus, parallel with the heating up of Cold War hostilities in the early 1960s, a reorganized federal civil defense agency, the Office of Civil Defense (OCD), was given the responsibility to effect a nationwide system of public protection, particularly protection from fallout. Begun in 1961, the National Fallout Shelter Survey represented an unprecedented attempt to analyze, record, and map every non-residential structure in the U.S. The Survey amassed extensive knowledge about the built environment, recording everything from materials of construction to ownership and access. Professional architects and engineers were mobilized to conduct the Survey under contract to the OCD. By 1969, no fewer than 100 000 existing buildings had been surveyed and marked with fallout shelter signs, and most of those spaces had been stocked with provisions (Figure 2).

However, finding and marking fallout shelters was only half of the equation: was the population located where it could access those shelters? The answer to this question was necessarily partial. As a civil defense manual bemoaned in 1961, "People, unlike structures, are at different locations depending on the time of day a detonation occurs."[2] To make the rapid decisions that might save their lives under an attack,

[1] Matthew Farish, "Disaster and Decentralization: American Cities and the Cold War," *cultural geographies* 10:2 (2003), 125-148; David Monteyne, "Shelter From The Elements: Architecture and Civil Defense in the Early Cold War," *The Philosophical Forum* XXXV:2 (Summer 2004), p. 179-199.

[2] Office of Civil and Defense Mobilization, *Nuclear Weapons: Phenomena and Characteristics* (Washington: Government Printing Office, 1961).



Figure 2. Fallout shelter sign.

citizens needed to know ahead of time exactly where to go in an emergency. With the new missile systems, planners could assume only fifteen minutes of lead time for people to take shelter. In effect, by processing and disseminating information about shelters and the city, civil defense sought to manage the decisions made by citizens in crisis moments—decisions made in those fifteen minutes between siren and shelter.

The result was Community Shelter Plans (CSPs) for each municipality in the nation. For CSPs, the burgeoning new profession of urban planning was mobilized to match people with shelters, mapping shelter capacities and deficits in relation to population data. To remedy shelter deficits, planners attempted to alter local building codes to require fallout shelter in certain types of construction; to influence governments, school boards, local businesses, and so on, to include shelter in their new buildings; and to educate architects to prudently incorporate shelter at the design stage of these same buildings. To map shelter availability within the community, planners studied census records, transportation facilities, traffic circulation, barriers to movement, and other urban data, in addition to the information collected by the National Fallout Shelter Survey.[3] The CSP process epitomized "systems analysis," the theoretical lynchpin of federal government sponsored urban renewal programs of the 1960s.[4] In this, planning theory embraced the latest methods of quantitative social science to process and interpret CSP data. To match individuals with local fallout shelters "in the best possible combination" was clearly a tremendous task for the planning profession, especially in the area of information management. Changes in the demography, traffic patterns, and the built fabric of the plan area would need to be constantly monitored, and the updated plan communicated to the citizenry. Map booklets were produced for distribution to all households, and local media campaigns explained to citizens "where to go and what to do" when they needed to take shelter (Figure 3).

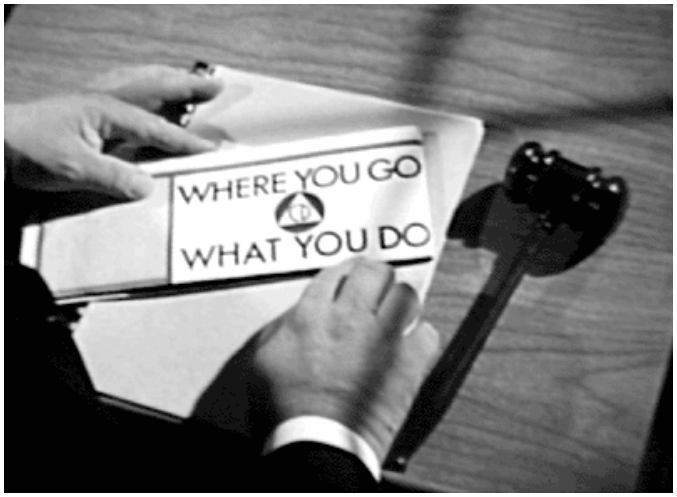


Figure 3. Film still from *Community Shelter Planning* (OCD, 1966).

At the same time, a national public relations campaign demonstrated to Americans that their government was concerned with their welfare in a nuclear war. At least, the government was concerned with the welfare of specific Americans who conformed to national images of ideal citizens: competent, patriotic, prepared, white. Civil defense propaganda of the 1950s-60s hardly bothered to address itself to any other audience. Civil defense publications always showed white "organization men" managing public shelters wherein a limited diversity of Americans draw together in crisis; alternatively, white nuclear families are shown huddling together in their private shelters (Figure 4). In either case, the nation was produced and reproduced according to a particular

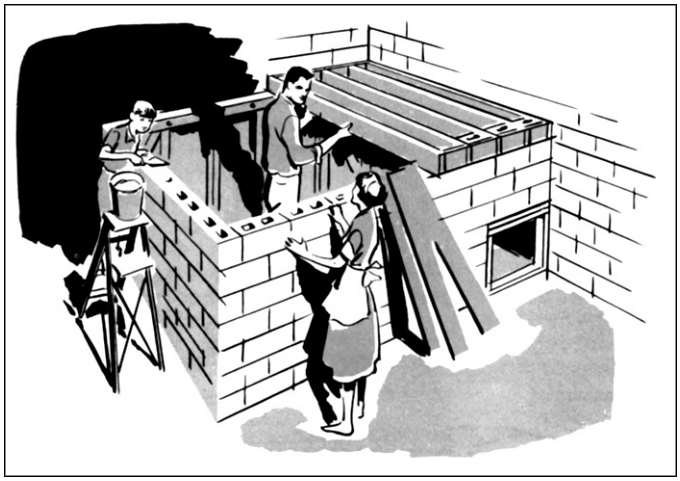


Figure 4. A family works on their basement fallout shelter. From OCD, *Fallout Protection: What to Know and Do About Nuclear Attack* (Washington, DC: GPO, 1967).

[3] OCD, *New Dimensions: Annual Report 1970* (Washington, DC: GPO, 1971), 11.

[4] Jennifer S. Light, *From Warfare to Welfare: Defense Intellectuals and Urban Problems in Cold War America* (Baltimore: Johns Hopkins, 2003), 39-49.

image of good citizenship. It was hoped that a national identity could be solidified through the representations and practices of a common welfare.

To reinforce the desire for conformity to a national ideal, Community Shelter Plans emphasized that civil defense would keep neighbors and other homogenous groups together, thus managing the messy diversity of the city and of the nation. CSPs would direct specific populations to specific fallout shelters within their "shelter drainage area," a metaphor borrowed from environmental science to naturalize the results of the planning process (Figures 5-6). Drainage areas would be "determined by either the capacity of the shelter(s) or the estimated travel distance as modified by the barriers to movement and other local terrain features."[5] If possible, no

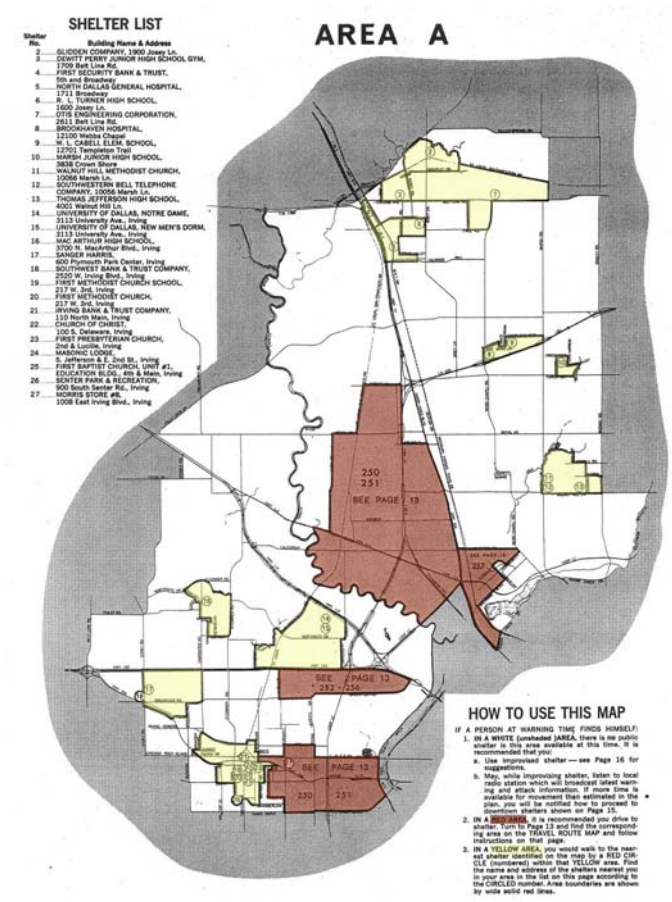


Figure 5. Map from Dallas County (Texas) CSP. Courtesy of www.civildefensemuseum.com.

allocation would be further than a fifteen minute commute; in built-up areas where traffic jams would be a problem it was assumed that this would be a pedestrian commute. The delineation of CSP drainage areas would ensure the homogeneity of the populations assigned to most public fallout shelters. The barriers to movement that would determine CSP watershed boundaries, such as freeways, rail corridors, industrial zones, and topographic features, had always sorted American communities by class and race, and they would continue to do so in the nuclear age. The assurance that Americans, in the midst of nuclear war, would not encounter uncomfortable social situations due to the mixing of classes or races helped to legitimate both civil defense and the new bureaucratic powers of urban planning.

As a discourse, civil defense exemplifies Michel Foucault's theoretical model of "biopower": the state protects the individual from any number of life hazards, including war; but it expects something in return, the rational organization of individual conduct as demonstrated in the civil defense plans themselves. In addition, Foucault writes, the "atomic situation is now at the end point of this process: the power to expose a whole population to death is the underside of the power to guarantee an individual's continued existence."[6] In exchange for this guarantee, citizens would need to buy into state civil defense programs and planning, accepting responsibilities and performing specific duties. This ambiguity between protection and dominance —between the openness of individual choice and the authority of the state— was integral to the formation of modern subjects and national citizens. But what the history

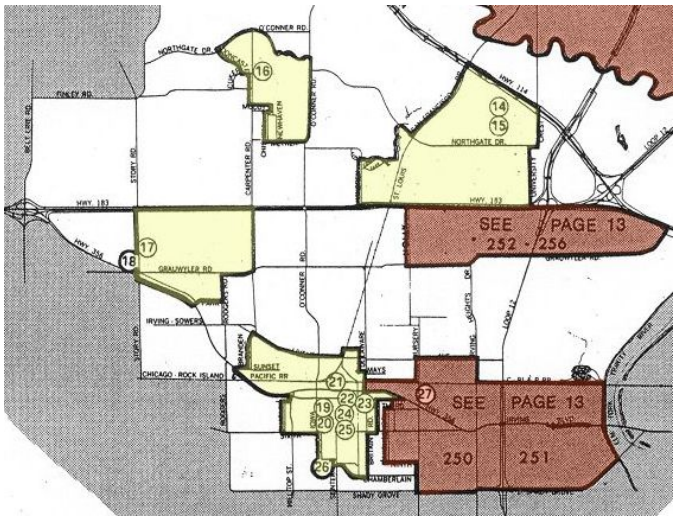


Figure 6. Detail of Figure 5.

of civil defense foregrounds is the inherently spatial character of biopower. While the state may have recognized that its shaping of citizens was fraught with the contingencies of everyday life and resistance, that civil defense propaganda only could go so far, it did believe that it could shape spaces with more precision. Civil defense officials were keen on the idea that modern architecture and urban design could help form identities and influence behavior. Protective spaces, in fact, would be material evidence that the state held up its side of the bargain of biopower, the welfare of the citizens. Fallout shelters were reminders, on every block of every town, that citizens needed to hold up their side of the bargain: behavior according to established social norms. In this way, spaces shaped by the state might shape human behavior, whether in an emergency or not. Civil defense was one attempt to extend the successes of the carceral institution —its capacities for control of space, research, and reformation of the individual— to the scale of the city and state.[7]

[5] *Community Shelter Plan: Tri-City Area, Michigan* (Lansing: Tri-City Regional Planning Commission, [1966]), 89.

[6] Michel Foucault, *The History of Sexuality: An Introduction, Volume 1* (New York: Vintage, 1990), 137, 142.

[7] E.g., Michel Foucault, *Discipline and Punish: The Birth of the Prison* (New York: Vintage, 1995); and Matt Hannah, "Imperfect Panopticism: Envisioning the Construction of Normal Lives." in Georges Benko & Ulf Strohmayer, eds., *Space and Social Theory: Interpreting Modernity and Postmodernity* (Oxford: Blackwell, 1997), 344-359.

However, civil defense officials soon discovered that the urban spaces of the nation were not as static as they imagined. The city was not subject to the same controls as the institution. Indeed, community shelter planners had difficulties controlling the data, let alone the spaces and the citizens. For example, the Fallout Shelter Survey data had to be continually updated just to reflect normal urban development. Properties changed hands necessitating new fallout shelter contracts between owners and the OCD, buildings were renovated or demolished, and new construction reconfigured the national landscape. In big cities, and rapidly developing suburbs, it was a full-time job just to keep on top of shifting shelter data and the condition of supplies. In Boston —which, like so many U.S. cities in this period, was experiencing massive inner city redevelopment— the civil defense administrator complained that, "[i]n addition to already existing logistical problems, the [federal] urban renewal program has reduced the number of potential shelters already established and stocked with supplies, resulting in the additional burden of retransfer of supplies from buildings to be demolished."[8] At the most basic level, the list of available shelters fluctuated.

Furthermore, while the use of local planning capacity to implement the national program was both economical and necessary to success, the quality of local data, maps, and planning skills was wildly inconsistent.[9] For many municipalities, their town planning department was barely a decade old, and there was a nationwide deficit of trained professional planners to staff these departments. Finally, the entire civil defense program relied on the accuracy and availability of data from the National Fallout Shelter Survey, but a CSP pilot study conducted in the state capitals (where one might expect a higher level of civil defense organization and concern for security) found numerous problems: survey data had not been updated since first collected; data was missing or contradicted other information; local civil defense agencies never received printouts of survey data for their locations, or had not bothered to keep them; and if they did have the printouts, local officials (like the researchers for this pilot study) had not been trained to interpret them. The same report expressed concern that the population continued to grow at a rate faster than the number of shelter spaces to be found in new construction. Lighter construction materials, such as Modernist steel frame and plate glass architecture, plus a propensity for one-story structures on slab, like the prolific strip malls of suburbia, did not result in spaces that could serve as fallout shelter. Also hindering the design of new shelter, city staff preparing the Lansing (Michigan) area CSP noted among local architects and clients a "lack of knowledge concerning the nature of fallout," even after four years of OCD publications specifically directed at architects and their clients.[10] In sum, if the OCD had difficulty managing the practices of planners and researchers in its employ, then convincing architects to consider fallout shelter in new buildings was an uphill battle.

Despite the manifold failures of implementation, civil defense officials imagined that space at the urban scale could be managed to ensure specific behaviors. Fallout shelter signs and the controlled spaces they indicated would be ubiquitous reminders of the state's power over the preservation of life; the citizens they hailed were meant to modulate their behavior in relation to that power. That is, fallout shelter signs were directional markers meant to manage decision making in a moment of crisis, but they were also an ongoing representation of welfare. Signs and shelters were nodes of meaning in a much broader discursive grid intended to demonstrate that cities and populations could be totally rationalized through planning expertise, data collection, and good management, even in the midst of the most chaotic situations. The diverse and previously un-surveyed spaces of the city could be made to conform to a national civil defense project. If urban space could be managed, perhaps urbanites could be too; if citizens could be managed during the aftermath of nuclear war, then why not in everyday life? Civil defense propaganda modeled the good citizenship and controlled behavior that the state expected in return for protecting its citizens. In the end, though, the managerial controls incorporated by the CSP process betrayed the political biases inherent to the expert interpretation of the data. For example, planning decisions based on pre-existing neighborhood boundaries, which attempted to ensure that like would shelter with like, can be read as a reflection of boundary-making between self and other in the production of national identity. Ultimately, the inability of civil defense plans to rationalize space points to the unstable processes of subject formation. The city, in the untraceable practices of its citizens, exceeded the logic of modern management epitomized by civil defense.

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[8] Department of Civil Defense, "Annual Report" (City Document No. 9), *Boston City Documents* (1968) 3.

[9] For the assessment of inconsistent local planning agencies, see Stanford Research Institute, "CSP Management Development: Urban Planning Relationships to CSP," (1965), 3.

[10] Tri-City Regional Planning Commission, "A Special Staff Report from Local Area Planners to the Stanford Research Institute," (1966).

Multiple Dimensions of Search Results

Tamar Sadeh*

Abstract - **The library community—librarians and developers of software for libraries alike—has invested a great deal in organizing and describing scholarly information and in developing searching techniques and query interfaces to enable library users to discover that information. Until recently, little effort had gone into the display and management of search results: these were typically presented in a one-dimensional list, regardless of the number of results in the list. A method of presenting results in a way that is meaningful and useful to searchers is now emerging and beginning to show its impact on scholarly research. By incorporating clustering—the grouping of search results according to the similarity of words and phrases—or faceted categorization—the grouping of results on the basis of predefined, structured metadata that is available for scholarly materials—information systems can render the linear display of results into a multidimensional structure and improve the findability of the content that searchers are seeking.**

Keywords – **faceted categorization, clustering, search interface**

I. Introduction

Now that online searching has reached a certain maturity, the information retrieval community is realizing that for information systems to find the items that are relevant to a user's query is not enough. The new challenge is for the systems to present the results of a query in such a way that users will be able to easily locate the results that fulfill their needs. Among the first industries to encourage the development of features that increase a user's probability of finding relevant items were companies in e-commerce, because the "findability" of products is crucial for business survival. Since 2000, search engines such as those from Endeca Technologies and Mercado have been enabling e-commerce systems to delve into metadata and bring to the surface information that makes a multidimensional presentation of results possible. Among the scholarly information systems that are joining this emerging trend are Scirus from Elsevier, the WorldCat® catalog from OCLC, AquaBrowser® Library from Medialab Solutions, the Primo® and MetaLib® systems from Ex Libris, and library catalogs that deploy the Endeca engine (such as the North Carolina State University catalog). Such information systems now incorporate clustering—a feature that enables them to group search results according to the similarity of words and phrases—or faceted categorization—the grouping of results on the basis of predefined, structured metadata that is available for scholarly materials. By presenting results in this multidimensional fashion, information systems help users understand the content of a given result list and home in on the most relevant materials.

II. Searching in Scholarly Information Systems

The organization, description, and storage of scholarly data have always been the target of much attention. In particular, libraries and information providers have invested in creating rich metadata that describes scholarly data and in designing query interfaces that include a multiplicity of options. The perception of the designers of scholarly information systems has been that users take advantage of the complex query interfaces to accurately specify their information needs, thus enabling the systems to easily match the users' specifications with the metadata and find the appropriate results.

For example, the basic query interface of the HOLLIS Catalog at Harvard University provides a dropdown list for selecting one option out of the almost 30 that are offered for Search Type, such as *Keywords anywhere*, *Title beginning with…*, and *Medical subject beginning with…* In addition, the HOLLIS Catalog provides an Expanded Search option (Figure 1), in which the user can combine several fields with Boolean operators, request that the system regard the search terms as separate words or as phrases, and limit the search by using various criteria such as language, location, format, and date range. The Command Search option offered by the HOLLIS Catalog enables expert users to type their queries in a command line.

Information providers in the scholarly arena build their interfaces in a similar way, providing both simple and advanced query interfaces. For example, the Elsevier ScienceDirect® interface offers three query levels: Quick Search, Advanced Search, and Expert Search. In the Quick Search interface, users can specify one or more words from an article's title, abstract, keywords, or author's name; part or all of a journal or book title; the volume; the issue; and a page number. The Advanced Search feature offers more search options, including a subject and date range, and enables the user to combine a few queries to form a new search. The Expert Search feature enables users to enter search terms along with Boolean operators.

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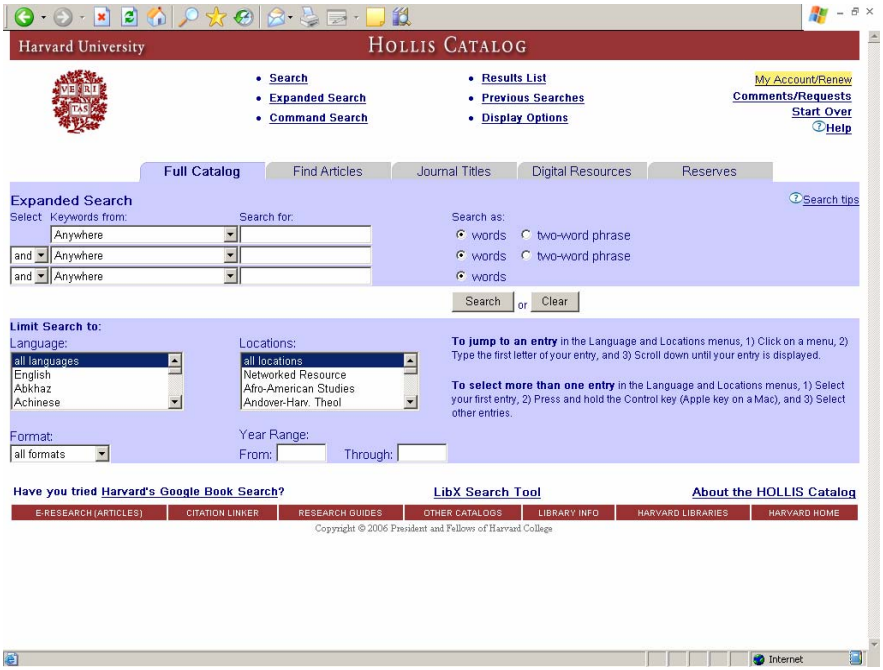


Figure 1. Expanded Search in Harvard University's HOLLIS Catalog

Whereas in the past, users took advantage of at least some of the options that query interfaces offered, recent surveys point out that searches have become simpler: searchers enter fewer words per query, hardly ever use Boolean operators, and rarely use any of the more advanced search options. According to K. Markey, "people enter a few short search statements into online IR systems. Generally, their queries bear two to four words. Boolean operators are uncommon. Boolean operators are even few in number in the searches of end users who receive training in system use. End users rarely use advanced system features and when they do, they are quite likely to use them incorrectly. Although research findings demonstrate that end users are not conducting sophisticated online searches, the vast majority are satisfied with their searches. In fact, percentages of users who express satisfaction with the results of their searches reach into the high seventies and beyond" [1] (see also [2]). Other surveys indicate that academics are drawn to simpler interfaces like those of Google and Google Scholar and are willing to trade off the accuracy and trustworthiness of the traditional information resources against quick, friendly, and easy-to-use interfaces [3], [4]. If we take into account that today's searchers became familiar with the interfaces of Web search engines before encountering scholarly query interfaces, it is no wonder that such searchers are intimidated by the complexity of the latter. Furthermore, many searchers are not subject experts and cannot define their information needs in a precise way, especially when they conduct an exploratory search about a topic.

Despite the effort that libraries and information providers have invested in search engines and query interfaces, not much progress has been made in the display and management of search results—although e-commerce sites such as eBay and Amazon.com (Figure 2) have implemented new ways of handling results to improve their products' "findability" (defined by Peter Morville as "The quality of being locatable or navigable…The degree to which a particular object is easy to discover or locate…The degree to which a system or environment supports navigation and retrieval" [5]). In the scholarly environment, search results are typically presented in a one-dimensional list, regardless of the number of items in the list.

However, with the huge amount of data that is available today (and growing exponentially) and the indifference shown by typical users toward the phrasing of their search queries, many searches in the scholarly environment generate a large number of results. A purely linear presentation of so many results is inadequate, despite the use of sophisticated relevance-ranking algorithms to prioritize the result list. When applied to scholarly materials, these algorithms, though enabling systems to display results in an order that users prefer, are questionable in that they lack the context in which the query was defined and hence cannot assist the system in tailoring the presentation of the results to the specific person and need. Furthermore, relevance-ranking algorithms alone cannot bridge the gap between a user's intended query and the way in which the user phrases it.

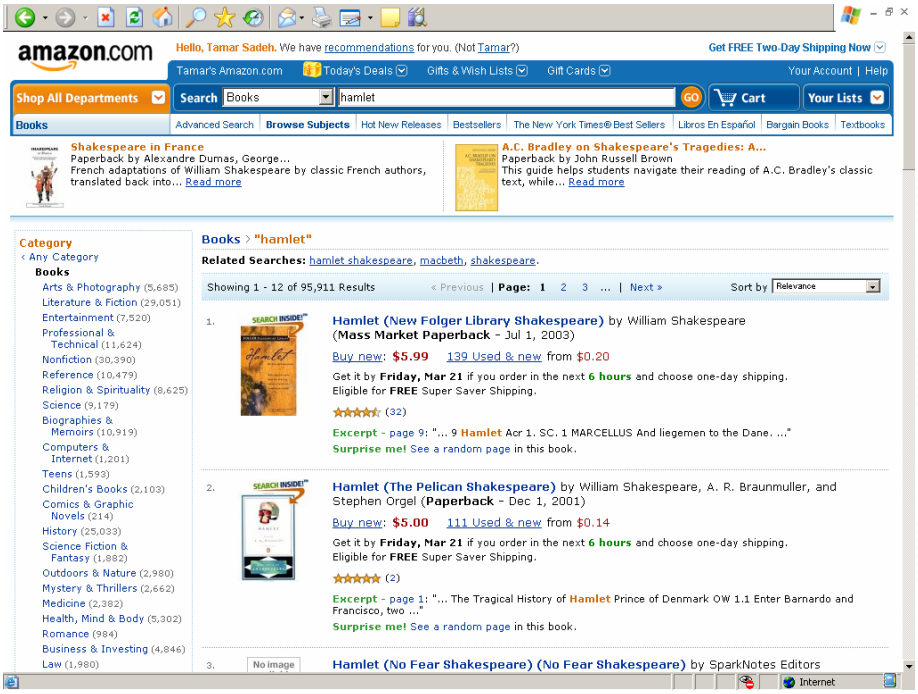


Figure 2. Findability enhanced at Amazon.com by the grouping of results by topic

In addition, information-seeking patterns that searchers have evolved in other contexts, such as in a quest for non-scholarly information on the Web, lead them to focus on the first results in the list, regardless of its length. In a query for a specific, "known" item (such as a particular article), this behavior may prove adequate because the searcher is likely to have entered enough information (for instance, the article's title and author) for the system to find the exact match, which will then be displayed at the top of the result list. However, when a user conducts an exploratory search to find items relevant to a particular topic, the first results might not be applicable; the reason could be that the query terms were too broad or that they differed from the metadata terms used by the system. For example, an inexperienced searcher might look for *brain and mind* rather than choose a more professional term, such as *neuropsychology* or *cognitive neuroscience*, which are the terms that are likely to be found in the metadata. Moreover, query terms can be interpreted in more than one way, especially when used for searches in information resources that are not targeted at a specific discipline. For example, a searcher might type the acronym *ABC*, which is an abbreviation for the basic steps of cardiopulmonary resuscitation (*airway, breathing, circulation)*, a measurement of the sustainable harvest level of a fishery (*acceptable biological catch*), the name of a light car developed in the 1920s by the British company ABC Motors, and many other phrases.

Some systems try to overcome the challenges of exploratory searches by providing lists for browsing. Systems such as library catalogues enable the searcher to browse through subject headings and drill down in a controlled hierarchy of subjects until the exact subject is found (Figure 3). At this point, the searcher can examine all items that the library classified under the specific subject. This type of search process requires familiarity with the hierarchy of the subject headings. The process can be long and cumbersome and can lead to a dead end when a subject heading has no items at all. Furthermore, browsing through a hierarchy requires a single selection at every stage. That is, once the user selects one subject heading, all the others are excluded. A user who is interested in civil wars in both North America and South America, for example, will probably have to repeat the browsing process because the subject headings, such as those from the Library of Congress Authorities list, are either too general (*Civil war*) or too specific (*Civil war Brazil*). Another obstacle to the novice user is that the organizational logic of subject headings is not evident; the user might not know that the best way to find materials about the American Civil War is to start with *United States*, then choose *History*, and then choose *Civil War, 1861-1865*—rather then start with *Civil war*.

Because users are accustomed to Web search engines, most do not opt for browsing through subject headings. Rather, such users are likely to conduct an exploratory search by entering one or more terms that describe their information needs and then trying to make the most of the result list. To help such users, designers of scholarly information systems are starting to pay more attention to postsearch processing.

There are several ways in which a system can increase the findability of items once the initial result list is displayed. For example:

- If a search yields no results or too few results because of a poor query term or a misspelling, the system can suggest alternative searches ("did you mean?"), which might enable the user to obtain the desired results.
- If a search yields a large number of results, the system can enable the user to drill down to subsets of the list (Figure 4, Figure 5).
- Regardless of the length of the list, the system can analyze the results and on the basis of the analysis, suggest that the user drop the initial query and search the whole collection again for one of the topics associated with the current result list.



The Library of Congress >> Go to Library of Congress Online Catalog

LIBRARY OF CONGRESS AUTHORITIES

Help | New Search | Search History | Headings List | Start Over

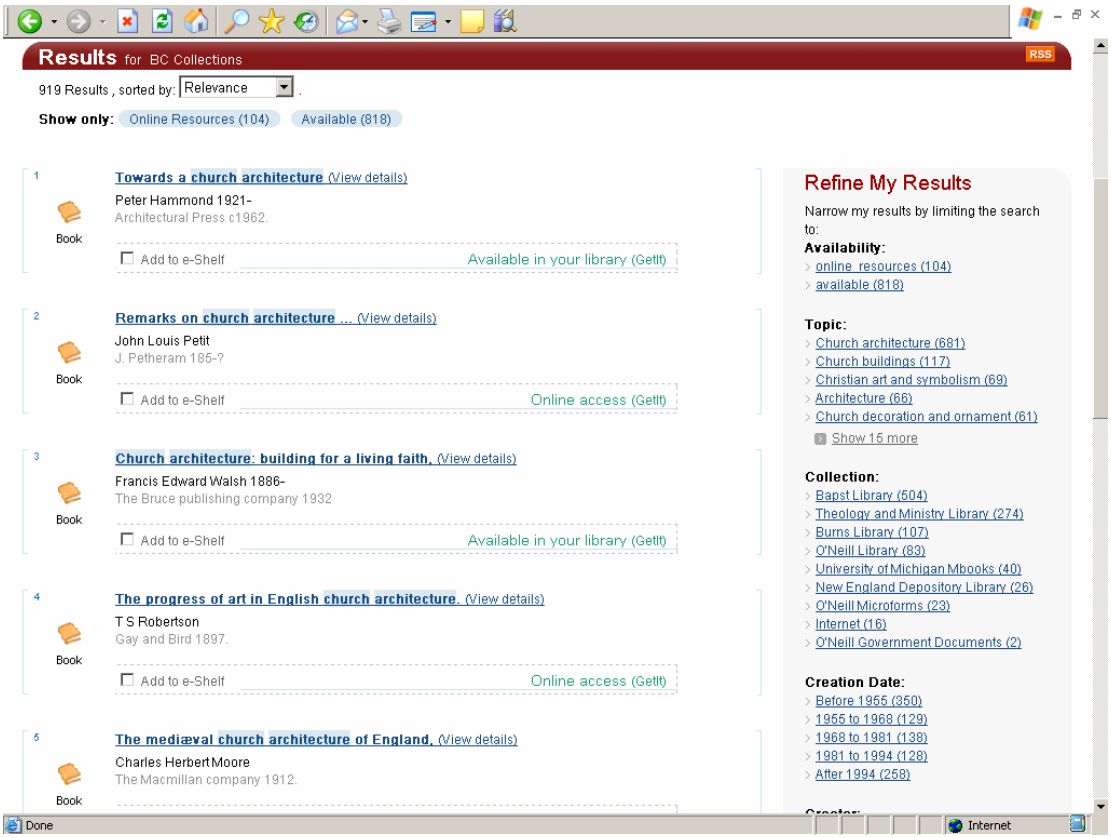
SOURCE OF HEADINGS: Library of Congress Online Catalog
YOU SEARCHED: Subject Authority Headings = civil war
SEARCH RESULTS: Displaying 1 through 25 of 25.

◀ Previous Next ▶

#	Bib Records	*select icon in first column to...* View Authority Headings/References	Type of Heading
Authorized, Refs & Notes 1	150	Civil war	LC subject headings
2	1	Civil war.	not applicable
3	1	Civil War, 1861-1865 Military personnel Union Virginia.	not applicable
4	1	Civil War Addresses, essays, lectures.	LC subject headings
5	11	Civil war Africa.	LC subject headings
6	3	Civil war Africa Case studies.	LC subject headings
7	1	Civil war Africa, Eastern History 20th century.	LC subject headings
8	2	Civil war Africa Fiction.	LC subject headings for children
9	1	Civil war Africa Juvenile fiction.	LC subject headings
10	1	Civil war Africa, Northeast.	LC subject headings
11	1	Civil war Africa Prevention.	LC subject headings
12	1	Civil war Africa, Southern Fiction.	LC subject headings
13	4	Civil war Africa, Sub-Saharan.	LC subject headings
14	1	Civil war Africa, Sub-Saharan Case studies.	LC subject headings
15	1	Civil war Africa, Sub-Saharan Congresses.	LC subject headings
16	3	Civil war Africa, Sub-Saharan History 20th century.	LC subject headings
17	1	Civil war Africa, Sub-Saharan History 20th century Congresses.	LC subject headings
18	3	Civil war Africa, West	LC subject headings

Done Internet

Figure 3. Beginning of the list of subject headings at the Library of Congress



Results for BC Collections RSS

919 Results , sorted by: Relevance

Show only: Online Resources (104) Available (818)

1 **Towards a church architecture** (View details)
Peter Hammond 1921-
Architectural Press c1962.
Book
Add to e-Shelf Available in your library (GetIt)

2 **Remarks on church architecture ...** (View details)
John Louis Petit
J. Petheram 185-?
Book
Add to e-Shelf Online access (GetIt)

3 **Church architecture: building for a living faith.** (View details)
Francis Edward Walsh 1886-
The Bruce publishing company 1932
Book
Add to e-Shelf Available in your library (GetIt)

4 **The progress of art in English church architecture.** (View details)
T S Robertson
Gay and Bird 1897.
Book
Add to e-Shelf Online access (GetIt)

5 **The mediæval church architecture of England.** (View details)
Charles Herbert Moore
The Macmillan company 1912.
Book

Refine My Results

Narrow my results by limiting the search to:

Availability:
- online_resources (104)
- available (818)

Topic:
- Church architecture (681)
- Church buildings (117)
- Christian art and symbolism (69)
- Architecture (66)
- Church decoration and ornament (61)
- Show 15 more

Collection:
- Bapst Library (504)
- Theology and Ministry Library (274)
- Burns Library (107)
- O'Neill Library (83)
- University of Michigan Mbooks (40)
- New England Depository Library (26)
- O'Neill Microforms (23)
- Internet (16)
- O'Neill Government Documents (2)

Creation Date:
- Before 1955 (350)
- 1955 to 1968 (129)
- 1968 to 1981 (138)
- 1981 to 1994 (128)
- After 1994 (258)

Done Internet

Figure 4. Result list presented in Super Sleuth, at Boston College, enabling users to drill down through subsets of the list

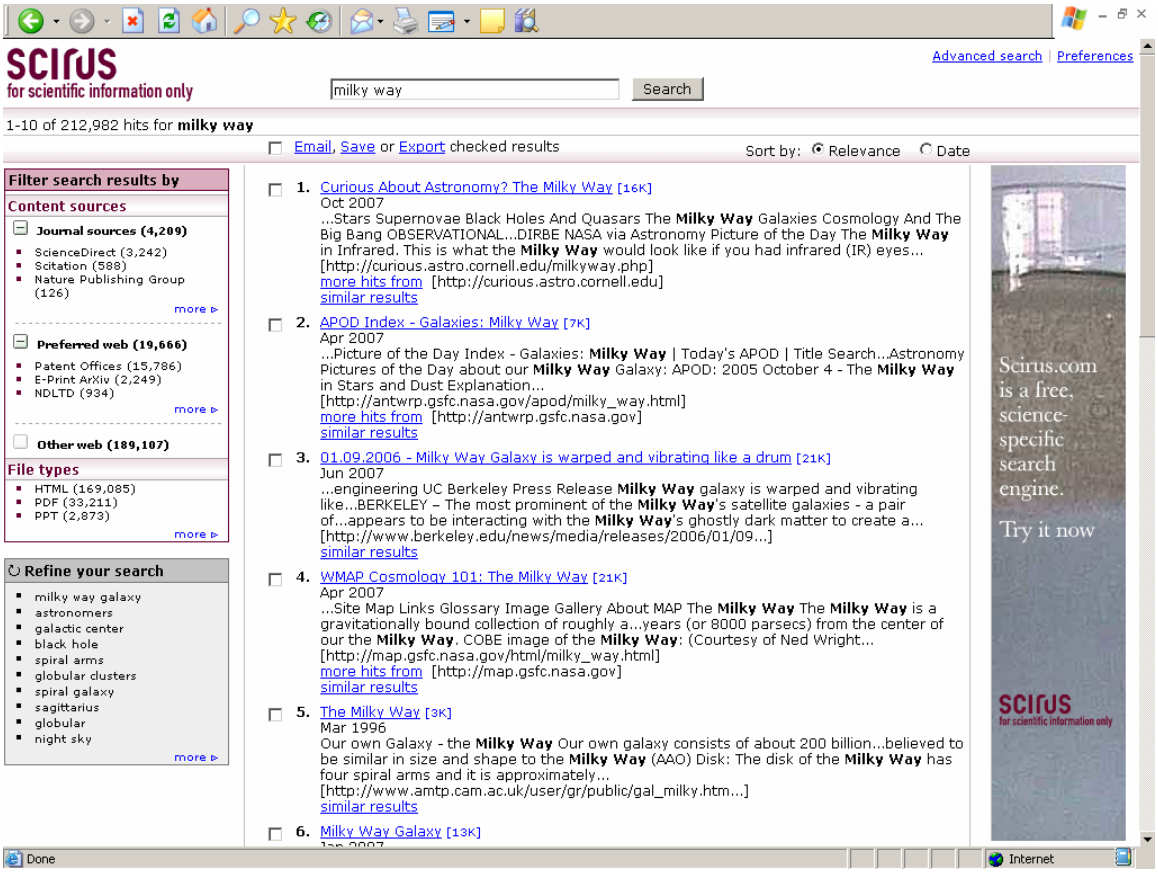


Figure 5. Results presented in Scirus, enabling users to refine their search by selecting a topic

What these options have in common is the notion that the result list itself is a tool that can be exploited. One of the ways in which the system can exploit the list is by analyzing it and presenting it as a multidimensional structure; users can then examine it from various angles, gaining a better understanding of its content and the way it applies to their query. A multidimensional structure also helps users easily identify and discard those results that are not relevant.

III. Creating a Multidimensional Structure for a Result List

Each item on a result list of scholarly materials is associated with metadata, a set of library-defined attributes, which can include subject, author, type (such as a book, article, journal, or image), genre (such as biography, bibliography, fiction, or film and video adaptation), language, year of publication, and the collection in which the item is stored. Some attributes can have only one value, such as year of publication, while other attributes can have several values, such as number of authors or number of subjects. The values for the subject attribute can be derived from an authoritative list such as the Library of Congress Subject Headings vocabulary or the National Institutes of Health Medical Subject Headings (MeSH®) vocabulary. A scholarly information system can create multiple dimensions from a result list by presenting the list of attributes alongside the result list and, for each such attribute, a list of the values that are shared by the records in that group (for example, one of the attributes could be the type of item, with the values “book”, “journal”, “article”, and so on) (Figure 6). Each time the user selects a value, the result list is redisplayed to show all the items that share that value. In this manner, the system enables the user to look at the results from different angles, each time focusing on a specific characteristic of the result list. Furthermore, the list of attributes and their values provides a summary of the results: at a glance, the user can see which topics characterize the result list, which types of items the list contains, in which languages they are written, and so on.

The system has two ways of identifying the values of the attributes that will constitute the multiple dimensions of a result list. In one method, typically referred to as *faceted categorization* or *faceted browsing*, the system groups the results on the basis of one attribute at a time—extracted from library-defined, structured metadata—such as subject or date of publication. In the second method, typically referred to as *clustering*, the system looks through numerous metadata fields of each record and extracts phrases that are repeated in multiple records. Let’s look at a case in which the system locates the phrase “chronic fatigue” in the subject field in record 1, the phrase “Anxiety, fatigue, and privation” in the abstract field in record 2, and the phrase “adrenal fatigue” in the description in record 3. In this case, the system might identify the word “fatigue” as the common thread among the three records, put them in the same group, and label it “fatigue,” thus indicating to the user that all records under this label are related to the fatigue.

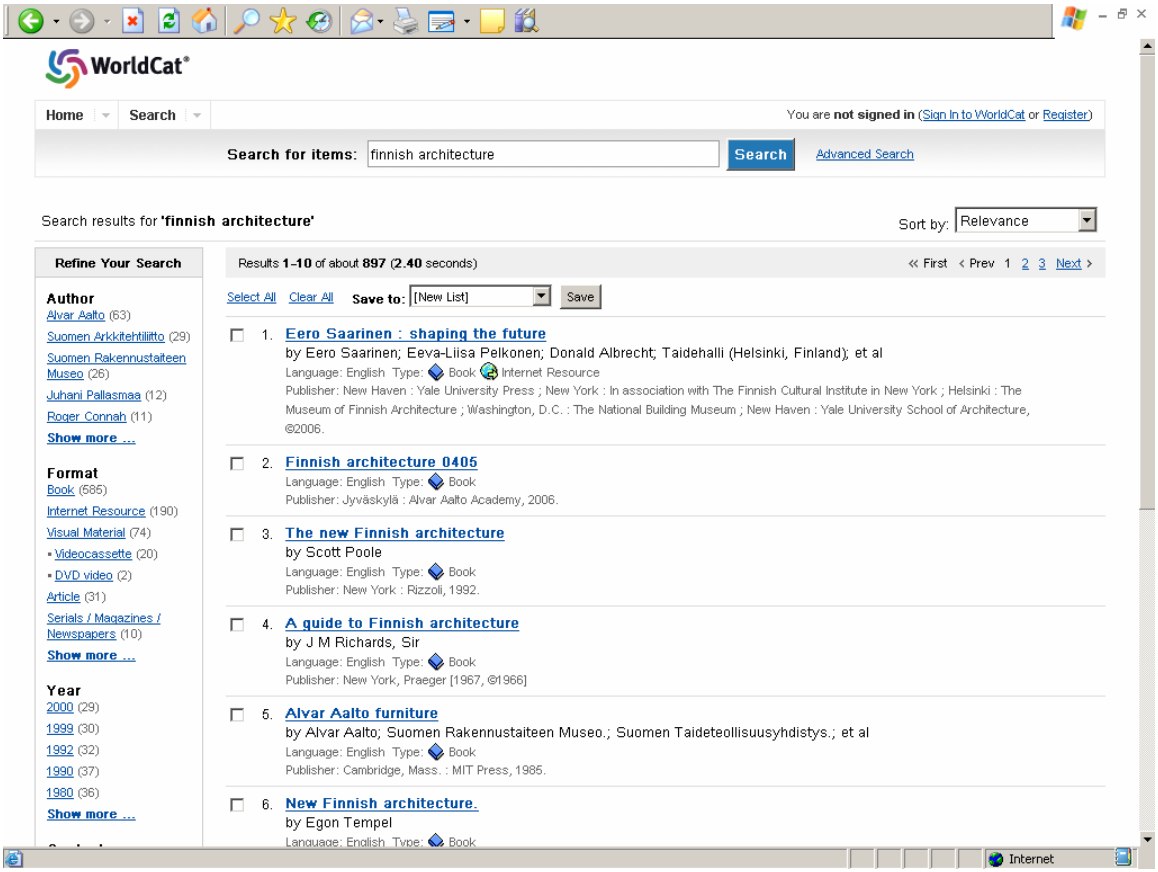


Figure 6. Result list presented along with its groups in OCLC WorldCat

The way in which a scholarly information system displays the grouped items and provides access to subsets of the result list is the same for the two underlying technologies that are used to create the groups. Moreover, both technologies can be deployed for the same result list. For example, the system might have used clustering to group records by topic but faceted categorization to group records by material type, language, publication date, and genre. A searcher can select any of the options presented: when looking at the language group, the searcher can choose the option *Chinese*, for example, and narrow down the list to see only the items written in Chinese; when looking at the topic group, the searcher can choose any of the topics and narrow down the list to see only the items that are relevant to that topic. The selection process is repetitive; that is, every time the user selects an option, a new result list is displayed. On the basis of this list, the system updates the groupings and enables the user to select a new option. The user can continue selecting options for any of the attributes until a concise, manageable result list is attained.

To understand the benefit of multiple dimensions in a result list, let us think of a searcher who is looking for materials related to English poetry of the eighteenth century but doesn't have a specific item in mind. A novice searcher may start with a general query, such as *English poetry*, without specifying any restrictions of the metadata fields in which the query terms appear. Such a query is likely to yield many thousands of results, the first of which are not necessarily relevant to the user. For example, when one searches the catalogue of the Library of Congress for *English poetry*, the system returns 10,000 results—the upper limit on the result list—with the first ones as follows:

On whistler mountain by Martyn Crucefix (1994)
Loving letters: an Islamic alphabet by Riad Nourallah (1995)
Fayre formez of the Pearl poet by Sandra Pierson Prior (1996)
Sad piper/poems by Omar Tarin (1994)
Stumbling dance edited by Rupert M. Loydell (1994)
Poems of three generations by Stafford Cripps et al. (1977)
Poetry India: voices for the future edited by H.K. Kaul (1993)
Muppet babies giant book of rhymes illustrated by Tom Brannon (1994)
S'adi-e-Hind: Hasan Dehlavi by Nargis Jahan (1989)
Twinkle, twinkle, little star: a lullaby book with lights and music illustrated by Jannat Messenger (1988)

Clearly, none of the results makes sense for the specific need. When the user rephrases the query to make it more specific—for example, *English poetry eighteenth century*[1]—the result list is of the same size (10,000 results) but some of the records displayed at the top of the list seem slightly more relevant:

William Collins and eighteenth-century English poetry by Richard Wendorf (1981)
Poetry of the landscape and the night: two eighteenth-century traditions (1970)
Byron's "Don Juan" and the eighteenth-century English novel by András Horn (1976)

[1] Subject headings from the Library of Congress Subject Headings classification are shown here with the capitalization used in that classification scheme.

Eighteenth-century English poetry: the annotated anthology edited by Nalini Jain and John Richardson (1994)

New Oxford book of eighteenth century verse chosen and edited by Roger Lonsdale (1994)

Silence and sound: theories of poetics from the eighteenth century by Richard Bradford (1992)

Points in eighteenth-century verse; a bibliographer's and collector's scrapbook (1972)

Language of natural description in eighteenth-century poetry (1966)

Landscape, liberty, and authority: poetry, criticism, and politics from Thomson to Wordsworth by Tim Fulford (1996)

Literary transmission and authority: Dryden and other writers by Jennifer Brady et al. (1993)

Still, when scanning this list, the user will never be able to find all, or even most, of the items that she thinks will fulfill her needs. A user who is more familiar with library searching may try a query with *English poetry eighteenth century* in the subject field; however, this search yields no results, because the correct subject heading, according to the Library of Congress Subject Headings classification, is *English poetry 18th century*. A search for the broader subject—*English poetry*—shows that 2,108 books have the subject *English poetry* and 377 more books have the same subject but as a subject heading for children. Then there is a list of 21 subject headings that start with *English poetry 18th century*, such as *English poetry 18th century History and criticism*, *English poetry 18th century History and criticism Bibliography*, and *English poetry 18th century History and criticism Congresses*. Each such subject is a gateway to one or more items, and it is unclear whether items that show up when the user chooses one subject will also appear when the user chooses another subject; would a book that is located under *English poetry 18th century History and criticism* also appear when one chooses the subject *English poetry 18th century*?

A system that analyzes the result list and offers multiple views of it creates a completely different experience for the same user with the same query. For instance, a search for *English poetry* in the Smart Search system of the University of Iowa libraries, an implementation of the Ex Libris Primo® technology,[2] also yields many results—19,129—but the system provides the searcher with tools to narrow down the list by examining various aspects of it. For instance, the user can choose the topic *English poetry 18th century* and focus on the 270 items that share this topic.

The information that is likely to be the most helpful to a user who is trying to target relevant items is the list of topics related to the results. By presenting these topics, the system enables the user to understand what kinds of items appear on the list—even way down the list—and concentrate on those topics that are relevant. The list of topics can be organized according to the number of applicable items, so the user can see right away which topics are more dominant. The user can decide to focus on *English poetry 18th century* but can also choose another subject that is closer to the area of research, such as *Literature, Comparative*; *Romances, English*; *Literary form*; or *Monologue*. Because the process is repetitive, the user can first focus on one topic, say, *English poetry 18th century*, and then, once the list of topics that apply only to the records related to the query *English Poetry* and the topic *English poetry 18th century* is displayed, the user can narrow down the choices even farther by selecting another topic. What is more, the list of topics can show relationships of which the user may not have been aware; for example, when the same query—*English poetry*—is submitted in Super Sleuth, Boston College libraries' implementation of Primo, the topic *Political satire, English* comes up. Choosing that topic brings up the book *Poetry and politics under the Stuarts*, which, although not classified under *English poetry 18th century*, may be relevant to the user's research.

The list of topics can help in many other cases. When the user enters an author name that is common, the topic list can help the user locate the works of the specific author. When the term itself is used in multiple disciplines, the list of topics enables the user to exclude items from non-related disciplines. An example is the term *mercury*, which can apply to astronomy, chemistry, engineering, literature, and even music.

Grouping the results according to the topics that the result list represents is only one of the many ways in which a system can present results to users. A system can group results based on other criteria, as well. If we look at the Smart Search system (Figure 7), we see that it groups results according to several criteria, including:

- Availability—enabling a user to separate out the online items, for example
- Type of item—enabling the user to divide the list into books, journals, audiovisuals, and so on
- Collection in which the item is stored
- Language of the item
- Publication date
- Genre
- Library of Congress classification headings

[2] For information about this technology, see http://www.exlibrisgroup.com/category/PrimoOverview.

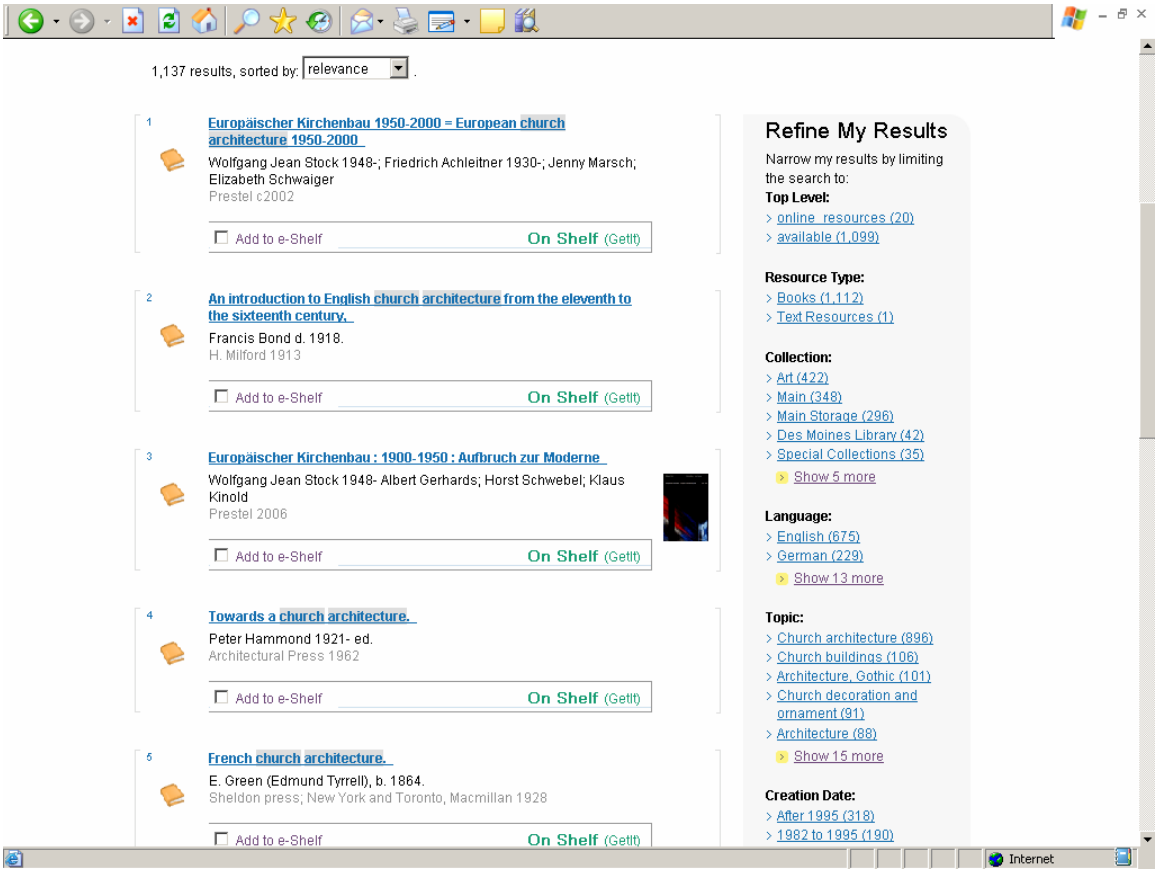


Figure 7. Faceted categorization, shown in Smart Search at the University of Iowa

Because the system identifies the possible groupings on the fly on the basis of the specific result list, all the groups that the system offers apply to items in the result list. There are no dead ends: the user will not see any reference to groups that contain no items. For example, if the list does not contain bibliographies, the genre group will not include a reference to bibliographies. Furthermore, the number of items associated with each attribute option is displayed in the window (Figure 8).

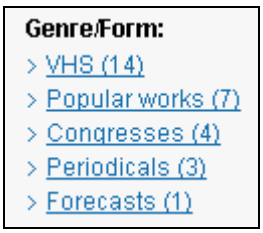


Figure 8. List of genres characterizing items in a specific result list

Such a structure of the result list enables the searcher to combine various criteria to quickly narrow down the list. A searcher who is using Super Sleuth to find new books about the Romantic Movement in eighteenth-century English poetry may start with the query *English poetry 18th century*, which yields 600 results (Figure 9). Looking at the various attributes that characterize the items on the list, the user can click the topic *Romanticism*, thus limiting the list to 61 results. Examining the attributes presented for the 61 results, the searcher can select the books with a recent publication date, limiting the list to 21 results—a size that is manageable. In only two selections after the original query, the searcher has managed to focus on the relevant items.

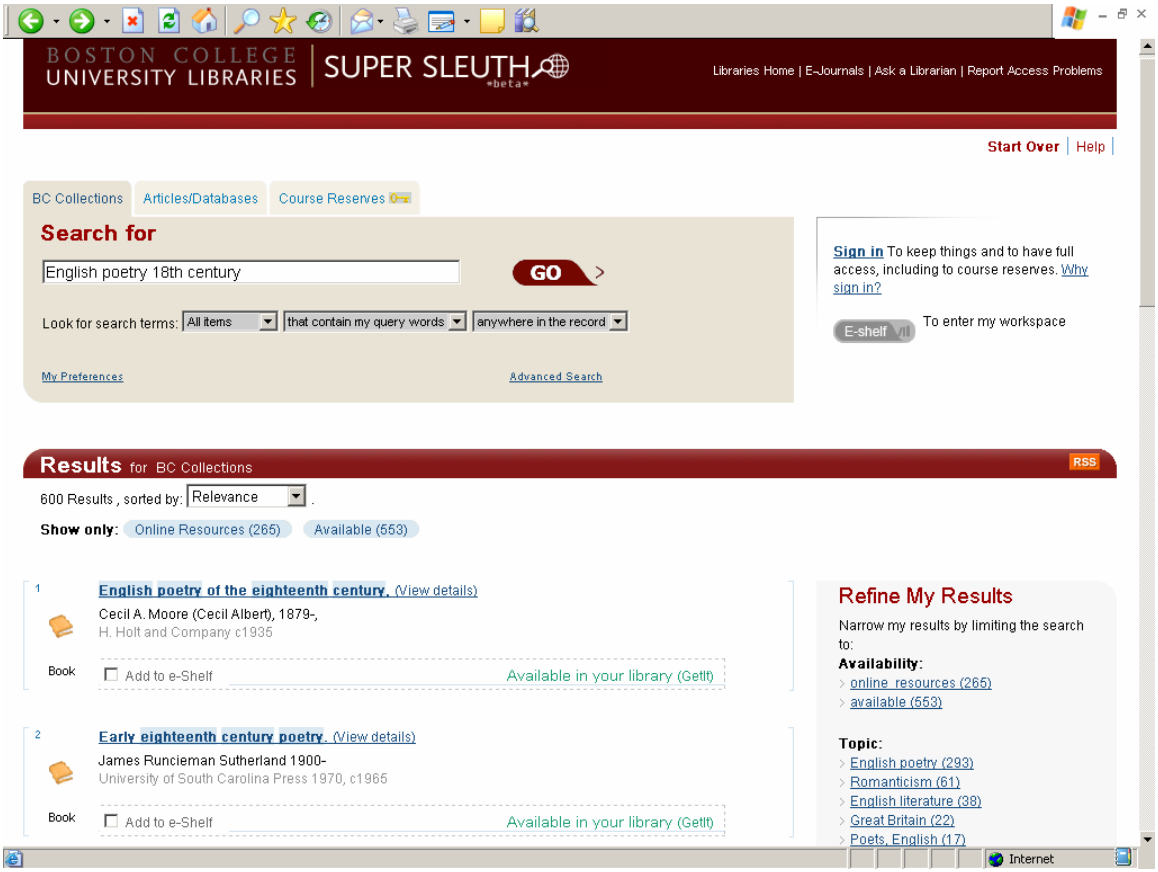


Figure 9. Results for the query *English poetry 18th century* presented in Super Sleuth

IV. From Metadata to Facets and Clusters

Usability studies have shown the benefits that can be achieved, from the user-experience point of view, when the system creates a multidimensional result list [6], [7], [8], [9]. However, the success of the multidimensional structure depends on the system's ability to gather meaningful metadata from the records in the result list and to group the records on the basis of similarities in the metadata. The task of gathering metadata is not trivial; metadata carries with it certain challenges. Do the relevant records have metadata? What is its breadth? How accurate is it? To what metadata schema does it adhere?

Some providers of information resources invest more effort than others in creating or assigning comprehensive and coherent metadata. Furthermore, the homogeneity of a collection is crucial for the grouping of similar items; a set of records that share the same attributes, and the same values for those attributes, enables the system to group the results in a meaningful way. A set of records that do not share the same attributes or whose attributes' values adhere to different authoritative lists are less likely to enable the system to create high-quality groupings. For example, if some of the results have *genre* as an attribute and some do not, either the latter results will be completely absent from the groups that the system creates for the attribute *genre* or, if the system defines a catchall *genre* group for those cases in which records have no genre attribute, the results will be found in such a group (which might be labeled *other*, for instance). In either of these two cases, a user who selects the genre *bibliographies* will miss all the bibliographies that were not assigned a genre at all. Another example relates to the uniformity of the attribute values: if some records are assigned a subject from one list of subject headings, such as the Library of Congress headings, and other records are assigned a subject from another list, such as the MeSH headings, the grouping of records by subject becomes challenging.

A library catalogue can serve as an example of a collection that is fairly homogeneous in terms of the metadata assigned to each item and therefore enables the system to present a well-defined list of attributes. In such a catalogue, the adherence of author names to an authoritative list of authors permits excellent faceted categorization by author: all references to a specific author, say, Jane Austen, will have the exact same form, and hence when a user searches for *women novels 19th century*, the system will group all Jane Austen novels under one author name—for example, *Austen, Jane, 1775-1817*. If the values of the attributes are not well defined, the author name could be phrased in more than one way (*Austen, Jane*; *Austen, J.*; *Jane Austen*; and so forth). As we can see, the importance of the quality of the metadata is not limited to the search; the quality is also crucial for the processing of the result list.

Very few systems can provide optimal metadata. In many cases, metadata was defined over long periods of time and is therefore inconsistent, reflecting different trends. In other instances, the items originate from various collections and hence their metadata adheres to different rules. New items are usually catalogued in a more standard and uniform way: after a long tradition of cataloguing in-house, today's libraries and information providers typically obtain cataloguing information from authoritative national or international resources. Nevertheless, libraries and information providers often add metadata or modify some of it. When a system tries to extract attribute values, the inaccuracies and inconsistencies of the metadata become apparent.

Furthermore, many of the systems that enable users to search for scholarly information provide access to more than one information resource, each of which might deploy its own metadata schema in a way that applies to that resource. For example, with the Super Sleuth system at Boston College, users can search for materials originating from the university's library catalogue, course materials created at Boston College, the institution's digital collections, and external resources, such as MBooks (the digitized book collection of the University of Michigan). Since the system must match attribute values that originate from each of these resources, it needs to adjust these values so that they all conform to one form. Such adjustments, referred to as "normalization," may include the removal of punctuation and extra spaces and the changing of all the letters to the same case. However, normalization can only help when the differences between attribute values are minor; hence, heterogeneous collections, which may differ considerably in the metadata that is defined for their items, pose many challenges to faceted categorization.

The advantage of using metadata, if, indeed, it is of high quality, is the coherence and uniformity of the list of attributes and their values. As a result, the user can expect a standard set of attributes for every result list and knows that the absence of a specific attribute signifies that it is not applicable to the list. For example, if the result list contains no items written in Chinese, Chinese will not be listed under the *Language* attribute; and if all the items on the list are in English, the *Language* attribute will not appear at all. Furthermore, all values of a specific attribute are always of the same type; for instance, only values such as *English*, *French*, *Dutch*, and *Chinese* can be listed under the attribute *Language*. The predictability of the attributes is reassuring, on the one hand, but limiting, on the other hand: only groupings that were predefined will be presented to the user.

Clustering is another approach to grouping. As explained earlier, clustering refers to the process of grouping items on the basis of similarities between words or phrases across metadata fields, or, as Hagedorn et al. put it, "taking words and phrases that make up metadata records and gathering them together into semantically meaningful groupings. For instance, a record about the feeding and care of cats can be grouped with a record about the feeding and care of hamsters" [6]. In addition to finding similarities, the clustering engine labels them; that is, it assigns a textual description to each similarity.

The clustering approach proves to be more effective than faceted categorization when the available metadata is incomplete or inconsistent, such as in a search across collections. In Web searches, clustering is the only method that can work because of a lack of structured metadata assigned to Web pages.

The clustering engine of Vivísimo is demonstrated through Clusty, an application implementing the Vivísimo Velocity search technology over the Web.[3] When a user searches for *Nobel prize winners*, for example, the Clusty application displays the first results (228 results out of "at least 550,200 retrieved," according to the site), and clusters them on the fly to form, initially, 10 groups (Figure 10).

The labels of the groups—for example, *university*, *physics*, and *chemistry*, demonstrate the power as well as the weakness of clustering. On the one hand, the clustering engine is not restricted to a specific metadata field but matches words and phrases across fields; hence, it can identify the commonalities between the records and bring to light concepts that were not necessarily expected yet make sense. On the flip side, the list of values is neither coherent nor complete. In this example, *literature*, *economics*, *chemistry*, and *physics* refer to areas for which a Nobel Prize is awarded, whereas *university* connects universities that publicize their graduates who are Nobel Prize winners; and *photographs* might have been picked by the system because pages about Nobel Prize winners also often point to photographs or photo galleries. Users may find this assortment of groupings confusing. Another issue worth mentioning is that the clustering engine dealt with only the first 228 records. The limit is imposed, in this case, because the clustering is performed on the fly: fetching over half a million records from the Web, analyzing them, determining which terms characterize them, and grouping the results according to these terms would prove costly in respect to time and resources. Some would argue that a list of 228 results is more than enough for the user to process, particularly because the Web search engines probably already sorted the results by relevance before returning them to Clusty. However, one of the great benefits of clustering, as with faceted categorization, is that the groupings provide an overview of the whole result list. This benefit is lost if grouping applies to only a very small subset of the result list. As Hearst notes: "The disadvantages of clustering include…[clusters'] lack of predictability, their conflation of many dimensions simultaneously, the difficulty of labeling the groups (Clusty.com's top-level labels are among the best implementations) and the counterintuitiveness of cluster subhierarchies" [10].

Faceted categorization relies on attributes that are specified for each item. When the system is grouping items, it identifies facets without considering other items' attributes or any particular result list. Clustering, on the other hand, is applied to an entire list of items, and the labels that the clustering engine generates for part of the list might differ from those that it generates for the list as a whole. Furthermore, the clustering engine can build on one set of words and phrases describing a specific item when it appears on one result list and another set when the item appears on another result list. For example, an article about the works of the architect Antoni Gaudí can be grouped with articles about churches if the initial query concerned churches, yielding many church-related results; but the same article will be grouped with articles about ceramic tiles if the initial query happened to be about tiling in Barcelona. These groupings are, of course, not necessarily related to any of the subjects that a cataloguer might have assigned to the Gaudí article; the article's similarity to other articles may have surfaced through the title, the abstract, or another field. (The Vivísimo technology uses only the title and the abstract to detect similarities.)

[3] For information about this technology, see http://vivisimo.com/html/products.

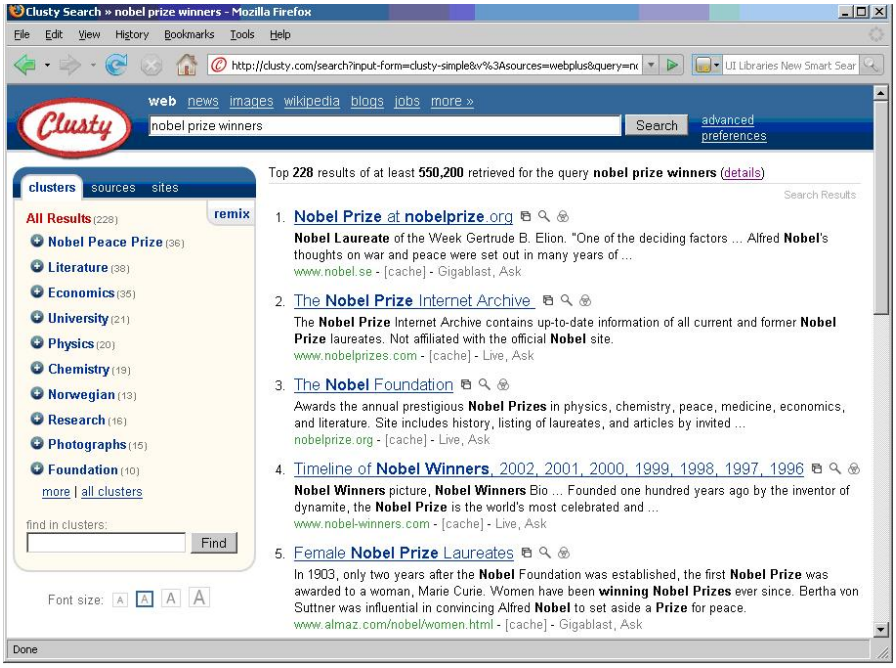


Figure 10. Clustered results presented in Clusty

Vivísimo's clustering engine has been incorporated in the MetaLib® metasearch system from Ex Libris. Using MetaLib, a searcher can submit a query to heterogeneous information resources. The system broadcasts the query to each resource and returns the results to the user in a uniform format [11]. When presenting the results to the user, MetaLib employs both faceted categorization and clustering to make the result list multidimensional: values that are extracted from metadata fields that tend to be uniform across information resources—author, date, journal title, and information resource (database)—are used for faceted categorization, and the Vivísimo clustering technology is deployed to create groups of results by topic, because subject headings tend to differ across information resources (Figure 11).

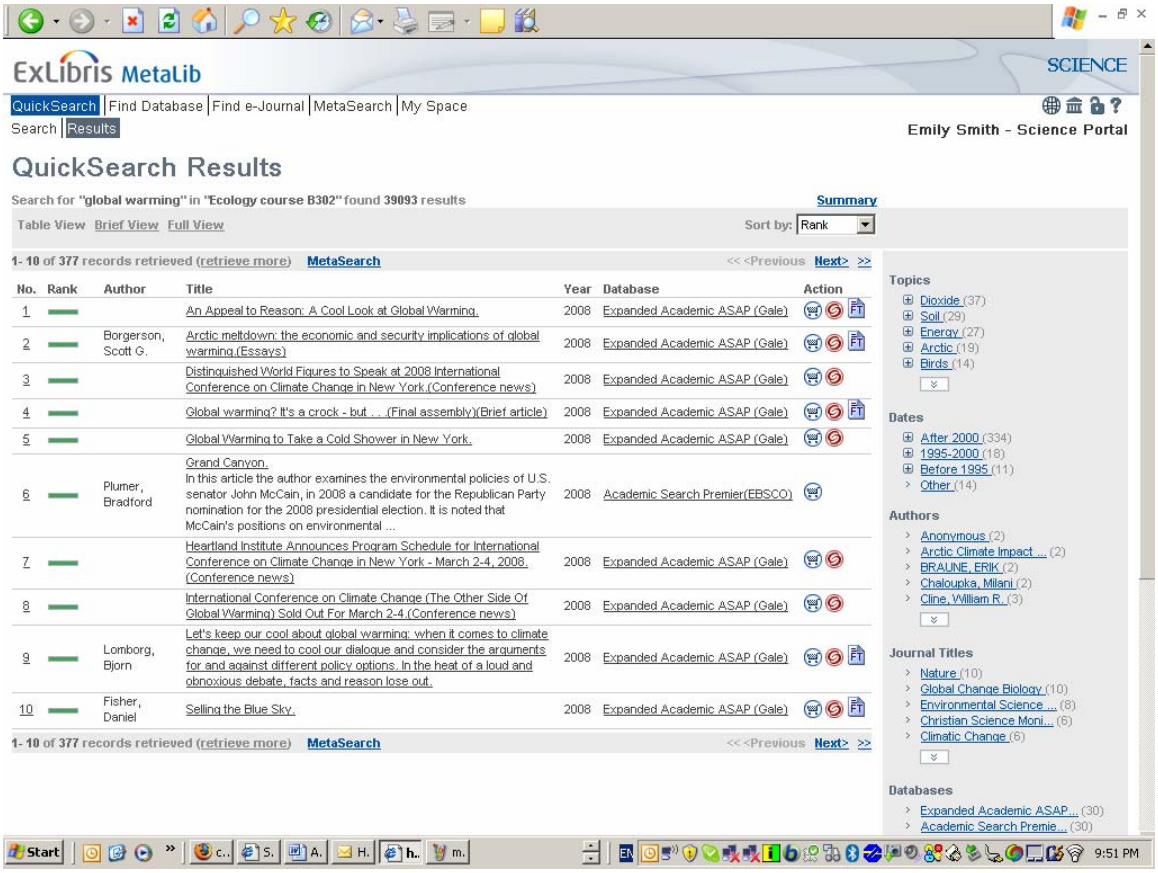


Figure 11: Clustering and faceted categories in a MetaLib result list

To demonstrate how metadata enrichment and automated classification deployed in a large, heterogeneous collection affect users' ability to search the collection, a team from the University of Michigan and the University of California,

Irvine, carried out a project that was described in a January 2007 report [6]. The team used a topic modeling algorithm to automatically group a collection of 2.5 million records, originating from 388 OAIster[4] repositories, into 500 clusters. Out of the 500 clusters, 352 were usable in the sense that the words that were picked up by the system as characterizing the group seemed to belong together or had a strong subject affiliation with each other. Staff from the Digital Library Production Service and the Scholarly Publishing Office of the University of Michigan University Library then manually examined the clusters and labeled them with a word or phrase that would define or describe each group. The next step was to map the labels to a classification system, embed the labels and the classification categories in the data, and build a user interface layer that would take advantage of the cluster labels.

According to the team's report, the users did benefit from the automatically generated clusters:

> . The clustering methods we used enabled us to improve the findability of appropriate materials by providing additional subject categories for use in searching and browsing. These new terms were then used as selections within the search interface, on a new browse page, and as a way to filter the search results. We quickly realized that the real power of including new subject terms was on the search results page. To reiterate the benefits, we provided:
>
> - narrowing and/or expanding the results using the "Results by Topic" facet,
> - the freedom and context of viewing records in individual categories,
> - the discovery of different results by choosing a different category, and
> - clarification of vague or broad search queries [6].

The project demonstrates a novel approach, whereby clusters are generated without regard to any particular query or result list. Because the clusters are created in advance and their labels are embedded in the metadata records, the system is able to group records in a manner that resembles faceted categorization; that is, the system uses the cluster labels in the same way it uses any other metadata field. Despite the reported gain for end users, the effort of creating the clusters and embedding them in the metadata was rather intensive. Furthermore, such a process does not seem applicable in all cases, particularly when the metadata cannot be preprocessed.

V. Conclusions

Faceted classification and clustering are two technologies that enable scholarly information systems to present search results in a way that makes sense to users. These features render a purely linear representation of a result list—as long as it may be—into a multidimensional structure where items are intelligibly grouped by various attributes or aspects. In addition to gaining an immediate grasp of the contents of the result list, users can easily focus on items that are more relevant to them by selecting any of the groups that the system presents.

Usability studies have confirmed that searchers welcome the multidimensional display. Also, according to Morville, faceted classification coheres with the way people understand information and provides the flexibility that is required to address the rich and complex nature of the information that is now available to users. Morville writes:

> We classify to understand…In a formal taxonomy, a single root node sits atop the hierarchy. Properties flow from class to subclass through the principle of inheritance. Each object and category is assigned a single location within the taxonomy. We live at an address within a nested hierarchy of streets, cities, states, and countries. We exist as *Homo sapiens* within the taxa of domain, kingdom, phylum, subphylum, class, order, family, genus, and species.
>
> Of course, the world doesn't always cooperate with this Platonic approach to classification. Fish with lungs. Mammals that lay eggs. Documents about multiple topics. Words with many meanings. Meanings with many words. Reality confounds mutually exclusive classifications, and so we find ourselves debating which existing category works best or defining new categories to allow a perfect fit…
>
> We embrace faceted classification…using multiple fields or "facets" to describe the objects within our collections. First defined in the 1930s by Indian librarian S. R. Ranganathan, faceted classifications have flourished in digital domains, where objects can exist simultaneously in many locations ([5], pp. 127-128).

Faceted classification and clustering differ in the way they group result lists, and each may be more applicable than the other in a particular context; faceted classification is a better fit when complete, comprehensive metadata is available and when groups can be predefined, whereas clustering is more suitable when metadata is incomplete or lacking or when the heterogeneous nature of the searched collection will benefit from a more flexible and dynamic method of determining groupings. "Rather than stuffing content into mutually exclusive buckets," as Peter Morville puts it, "we apply structural and semantic metadata" ([5], p. 128), thus helping users arrive at an intuitive understanding of what the result list offers and assisting them in navigating through the list more successfully.

Acknowledgements

The author thanks Nancy Dushkin for her encouragement and Ricka S. Rak for her wise advice and continual support.

[4] OAIster is a union catalog of digital resources. Metadata records in OAIster are harvested from multiple digital resources using the Open Archives Initiative Protocol for Metadata Harvesting (OAI-PMH).

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WEB SITES REFERRED TO IN THE TEXT

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AquaBrowser Library (Medialab Solutions): http://www.medialab.nl/
Boston College libraries: http://www.bc.edu/libraries/
Boston College libraries Super Sleuth: http://www.bc.edu/supersleuth
eBay: http://www.ebay.com/
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The evolution of knowledge landscapes – measurement, visualization, models and simulations

Andrea Scharnhorst

Abstract - Problems of information retrieval and knowledge management are core for the "information society". Knowledge is not generated in one piece from a single source, but spawned over many, highly differentiated social layers in a fragmented way. Combining knowledge resources and competencies becomes a prerequisite for adequate problem solving strategies in many complex decision-making processes.

Considering science and technology, we find massive accumulations of data—scientific publications, patents, and technical manuals. In the last decades information science has developed tools to visualize this information in virtual spaces. Recently developed animated 3D representations of "science maps" make the unknown knowledge landscapes visible. They seem to wait to be explored by researchers. The aim of this type of data visualization consists in the strategic use of information as well as in the understanding of the underlying mechanisms of knowledge production. However, large accumulations of data are often confronted with a lack of theoretical understanding of the process of knowledge production creating them.

In this paper, some of the historical roots of the "landscape metaphor" for dynamics and evolution in abstract characteristics or problem spaces are revealed; a specific concept of so-called Geometrically-Oriented Evolutionary THEories (G_O_E_THE) is presented; eventually the use of this concept to structure measurement as well as to interpret measurement and to simulate the "exploration of unknown landscapes" is demonstrated.

***Keywords* – knowledge landscape, evolutionary theory, modeling science**

I. Surrounded by landscapes

My "obsession" with landscape is probably rooted in my physics training in a group dealing with problems of self-organization and irreversible thermodynamics. I remember how surprised I was that despite the complex mathematics in the background – Fokker-Planck equations or Master equations - most of the discussions were conducted using scribbles on the blackboard. Due to the content of these discussions my colleagues were drawing bowls, indicating energy levels in it and jumping out scenarios of "something". We were also drawing maps of territories for different states, where borders could be crossed or not and where borders also changed in time (Fig 1). I have no other "record" of this time than my incomplete visual memories which can be complemented by some usual textbook illustrations using the same visual language.

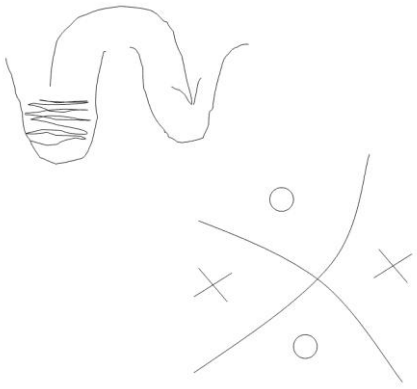


Figure 1

Turning naïve fascination into academic reflection I could say, that – at least in our group – we followed a culture of visual exploration of problems. I need to leave it to systematic ethnographic studies to prove if this was just special for the Ebeling school (Scharnhorst 1996) or if this is common in some branches of physics and beyond. Personally, I found it an attractive, seducing approach to think about complex dynamics.

The landscape metaphor is often used, and this has probably to do with shared experiences. We move, orient, live in a three-dimensional space. To project objects and processes to landscapes prepares the ground for an intuitive understanding. Beside our natural environment, one talks about "social landscapes", "economic landscapes", "the landscape of history" (Gaddis) or "the landscape of education" and "technological landscapes". At the same time landscapes are a permanently present theme in art (see Berlyn, 2006 as just one example). In this paper I will describe how the dynamics of systems can be described using the concept of a landscape, how knowledge processes can be mapped to a search in a landscape and what the potentials and limits in playing around which such models are.

II. Systems and innovations – models in the cycle of generalization and re-specification

The questions I'm interested in are:

- How and under which circumstances a system can reach a new state?

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- How influential are random changes?
- How the "circumstances" are set internally by interactions in the system and externally by the environment in which the system behaves?

Thereby, the system can be thought as a landscape or part of a landscape. These questions, made on an abstract level of general system theory, can be turned into concrete questions about a specific context. In this paper I will apply them to knowledge landscapes, and mainly landscapes of scientific or scholarly knowledge. Then, a possible re-formulation could be:

- How a new scientific idea triggers the emergence of a new specialty?
- What makes it easier for new ideas to spread out and when ideas are hindered to emerge and diffuse and when they are buried?
- Which ways of scientific collaborations and communication trigger the emergence of new ideas?
- Which institutional conditions support innovative ideas and people?

This is *one* possible re-contextualization of the general questions and forms the core of this paper. However, I would like to mention that this is not the only possible application. Taking "innovation" as something "new" on a very general level (Parthey 1990), the same questions can be posed towards the biography of a person (development of its competences and learning) (Erpenbeck, Scharnhorst 2005; Scharnhorst, Ebeling 2005), towards science policies shaping national research profiles (Bonitz et al. 1993; Scharnhorst 2002), towards innovative products as car, busses or airplanes (Ebeling et al 1999; Aigle et al. 2008), towards scientific debates (Scharnhorst, Hellsten 2005) and towards scientific communication (Scharnhorst et al. 2003).

The questions I have posed at the beginning about source, course, circumstances and final destiny of something "new" in a system can be answered in very different ways. Mathematical models are by far not the only valid method to seek for answers. In this paper, I will discuss how mathematical models, used among and combined with other methods can be applied as specific heuristic tools. To be able to judge the epistemic value of models it can be of use to think about the cyclic processes from which models emerge and how they are built and re-built in their travel between different contexts. What I have in mind particularly are models which can be formulated using the language of mathematics, and more specifically models describing non-linear dynamics. I discuss further how models emerge from a cycle of generalization and re-specification and how they can be used to structure research.

In Figure 2 two processes are visualized. In the left upper corner a general model appears as extraction from one or several models which have be built in different contexts. An example is the Schlögl model, which was originally designed to describe the ability of chemical reactions to produce different outcomes in terms of stable concentrations. The Schlögl model which can be interpreted as mathematical model for the Formaldehyde reaction is composed of four reactions (Ebeling, Feistel 1982, p. 171ff). Mathematically, one variable (the concentration of a substance) changes over time and this change can be described by a non-linear differential equation. It turns out that under certain circumstances the process has one, two or three stationary states. A stationary state in this case corresponds to a certain fixed value of the concentration of the substance which is kept in the circular ongoing reactions. This model has been generalized as a kind of "white mouse" for a situation under which a system can make a choice between two possibilities. These possibilities need to exist and to be stable against small perturbations. The technical term is bistability. It is also a prototype of a situation under which the system might want to transit to a new state. For the model a function can be defined which can be interpreted as "landscape". We will return to this specific model later again.

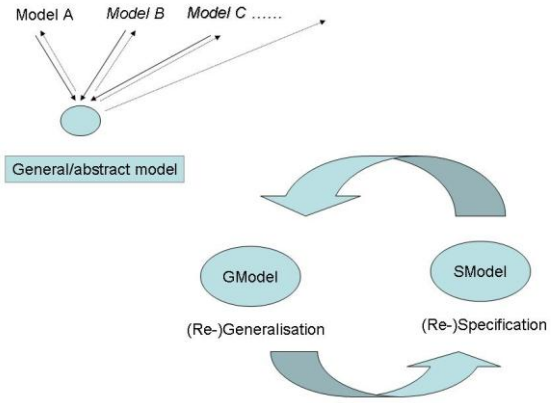


Figure 2

III. MERGING TWO MODELS – LANDSCAPES IN BIOLOGY AND PHYSICS

In this paper I refer to a general framework in which two ways of using landscape as explanation are merged. The one is rooted in evolutionary biology and the other in physics. Since Wright, Simpson and others evolutionary biologists have thought biological evolution as a search process of populations in a fitness landscape. The arguments how to do this, the consequences of different conceptualizations and the still open questions have been presented and discussed in a recent book (Pigliucci, Kaplan 2006). Here, I will restrict myself to a very short and certainly simplified presentation of the main ideas using a figure of Wright (1988) (Figure 3).

Wright thought evolution in terms of moving populations in a genotypic or phenotypic space covered by a fitness or adaptive landscape. Selection pressure would force the population to a hill-climbing on to the next hill. An increase of selection would shrink the genetic variety inside of the population and result in a shrinking of the occupied territory. An increase in mutation would lead to a spreading out of the population. More dramatic movements - meaning bigger changes in genotypic and phenotypic attributes - can be caused either by changes in the environment which result in a changed landscape, or by specific recombination paths which can lead to movement and re-adaptation of the population. The main elements which will travel in the course of generalization are the idea of attributes for individuals and groups, basic mechanism behind changing attributes as random move (mutation), directed move (re-combination) and an evaluation of positions (selection). This leads to the existence of a fitness landscape which visualizes the "adaptiveness" of a certain agent or group.

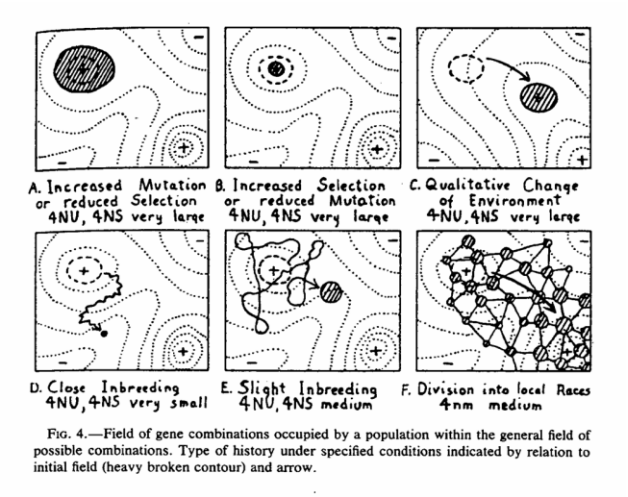


FIG. 4.—Field of gene combinations occupied by a population within the general field of possible combinations. Type of history under specified conditions indicated by relation to initial field (heavy broken contour) and arrow.

Figure 3

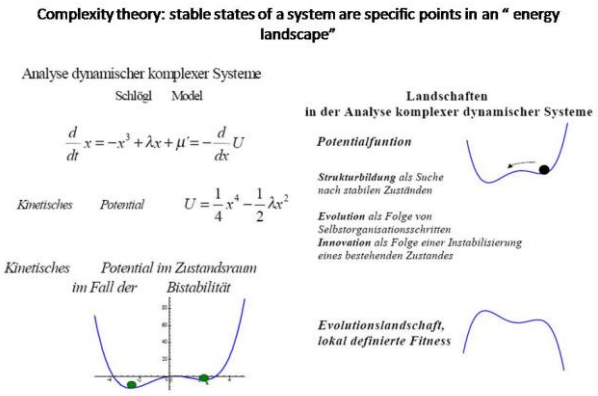


Figure 4

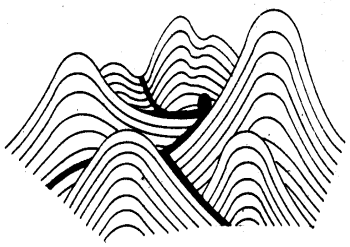
In evolutionary biology some of these assumptions can be proven in experiments, but they can also be described using certain mathematical approaches where probabilistic rules are defined for each of the evolutionary mechanisms. This is the bridge on which biology (mathematical or theoretical biology) and physics meet.

In physics, the behaviour of a system can be described in terms of a "state". In a state, the relevant variables have certain values. Their change is a change of the state. Often, a function can be defined on the level of the system. This function indicates special states which are stable against disturbance and towards which the system develops. This function, whatever its physical meaning is (energy or entropy or something else), forms a landscape over the space of all possible states (Wales 2003).

An often used analogy to explain this existence and action of such a function is to imagine the movement of a ball in a bowl. The ball will always roll to the deepest point in the ball. As a combination between potential and kinetic energy one can calculate and proof that the deepest point of the bowl is just the stable state for that mechanical system. This imagination can be generalized towards all sorts of (physical) systems. In the figure below the Schlögl model is presented once more. Although very simple, this model already entails ONE complex element: there are two possible outcomes towards which the system may develop. In this case, the "ball" (as place holder for the system) can end either in the left or in the right minima of the "landscape". That physical systems seek the minima in a landscape while the biological ones seek the maxima plays no role on an abstract general level. Mathematically it is just the question of introducing a minus sign which inverts the two landscapes.

IV. LANDSCAPES AND INNOVATIONS

Many applications have made use of the analogy between energy and fitness landscapes. Calculations have been done to determine which search mechanisms are useful in landscapes with a certain shape. In cases the landscape is not known, and this holds for most of the complex systems, one can derive statements from certain statistical properties of the landscape. But, beside these abstract mathematically formulated insights, there are also very practical ones. Engineers have used so-call evolutionary strategies to develop new tools, using biological mechanisms as recombination for "recombining" technical parameters (evolutionary strategies; Rechenberg, Schwefel).



The topography of technological evolution

Sahal (*Foundation of Technometrics. TFSC 1985 27:1-37)* : technological models occupy different loci in a parameter space the shape of the probability curve stands for technological tradeoffs the movement indicates technological change

Figure 5

The use of a "landscape metaphor" to visualize knowledge spaces has a long history in quantitative science and technology studies. Technological evolution has been visualized as pathway in a landscape (Sahal 1985) with an explicit reference to "attractor landscapes" in early self-organization theories (Prigogine) in physics. The landscape concept is one of the key concepts in the analysis of the dynamics of complex non-linear systems. The emergence of self-organized structures can be understood as the result of a search for optimal solutions to a specific problem. The corresponding models (conceptual and mathematical) describe characteristics of search processes in unknown landscapes. In the mathematical description the spatial representation of the state space plays a central role in visualizing divergent temporal system behaviour. Concerning the long-term behaviour of the system, different types of stationary states, i.e., attractors like fixed points and limit cycles or chaos can

be distinguished. Correspondingly, trajectories have different shapes. If the inner composition of the system (types and strength of interactions) or its embeddedness in the environment changes, a stabilization or de-stabilization of stationary points can be observed. Possible paths or trajectories in the evolution of a system will then also change.

In complexity theory concepts as the one of fitness landscapes (biology), value function of optimization problems (computer sciences and mathematics) and potential or energy landscapes constraining dynamic processes (physics) are connected to each other in order to explain existent and newly emerging structures. But, how such a framework can be useful to explore how new ideas develop? Under which institutional circumstances and by which individual behaviour of scientists will the probability increase for new ideas? How one could ever belief that a complex system as science, scholarly activity or knowledge production in general can be mapped to a mathematical description such as hidden in the landscape picture?

As long as regularities in scientific activity have been observed scientists have also proposed mathematical models to explain them. One example is the law of scientific productivity by Lotka (Lotka 1926). If one looks at a group of scientists they show different levels of productivity, simply measured by the number of articles published by year. This differs between disciplines and age cohorts. But, always one finds a distribution which can described by a mathematical function and one can discuss which "model" of production explains this regularity.

Indeed since many years several scientists have tested out to which extend the metaphor of science as a self-organizing system can help to explain some regularities and phenomena observable in data, know from ethnographic studies or experienced in own practice. The science system, like many other complex systems in nature, faces a complicated task. It needs to produce good solutions to (or resolutions of) certain problems in a reasonable length of time and with an economic and efficient use of resources.

To apply the landscape idea sketched above one would need to re-specify the elements in this theory (Scharnhorst 1998). To be able to do this I will first summarize these elements on a general level in general language. The approach I rely here as been also labelled G_O_E_THE (Scharnhorst 2001).

V. GEOMETRICALLY ORIENTED EVOLUTIONARY THEORIES - G_O_E_THE

The following concepts are central to geometrically-oriented evolution theories:

- SPACE: in the sense of a phenotypic space or, more generally, a feature space, the features describing the searching agents. Instead of features also the notion of attributes or characteristics can be used. The introduction of a space enables the definition of concepts such as proximity and distance and – something of particular significance for evolution theory – the consideration of evaluation and fitness landscapes. Furthermore, important concepts like evolution rate can be introduced into this picture.
- SEARCH AGENTS (GROUPS, POPULATIONS): search agents occupy specific locations in the feature space. While they change (develop) their attributes change. In certain contexts one can also talk of a search for better attributes. This attribute change leads to the movement of the agents in the feature space. The variety of attributes agents can carry in a system (their "individuality") is mirrored by the spreading out of agents in the feature or attribute space. Structures become visible in the accumulation of agents in particular places in the feature space. Agents are the carriers of information relevant for the search process.
- OCCUPATION LANDSCAPE: groups or populations are formed by the accumulations of searchers in the landscape. Overall, the frequency distribution of the agents in the space forms an occupation landscape. Groups – represented by connected denser occupied areas - are the target for evolution. The formation of group can be explained as result of the search process.
- EVALUATION LANDSCAPE: in the sense of a fitness landscape or value landscape. This landscape can be determined externally as an exogenous factor. But, the landscape can be modelled also as influenced by the system dynamic itself, create endogenously in a co-evolution with the occupation landscape. The evaluation landscape forms a second landscape over the space or, in other words, the occupation landscape develops in parallel to the evaluation landscape. It is also possible to refer to the occupation of the evaluation landscape.
- SYSTEM DYNAMICS: the system dynamics characterizes the dynamic of the search in an evaluation landscape. At its most simple, it involves a local gradient dynamic, i.e. locally only improvements are accepted. However, far more complex cases exist, in which the population distribution influences the form of the landscape in a non-linear way and hence also the search in the landscape.
- EVOLUTION MECHANISMS: mechanisms, according to which the form taken by (colonization) certain features in one or more populations changes. Competition, selection and mutation are described as base or elementary mechanisms. In terms of social systems, imitation is also involved as an important new mechanism of evolution. The evolution mechanisms can also be understood in the sense of the evolution strategies of the searching agents. These look for maxima in the evaluation landscape. Thus, evolution can be understood as an optimization process. The set of evolution mechanisms determines the system dynamics.

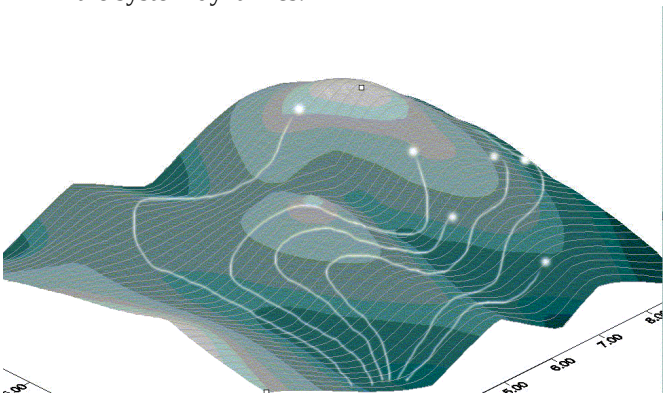


Figure 6 *Courtesy of Thomas Hüsing*

VI. KNOWLEDGE PRODUCTION AS SEARCH PROCESS IN AN EVOLUTIONARY LANDSCAPE - HOW TO USE THE THEORETICAL FRAMEWORK?

In the process of re-specification we need to find an "analogy" or "representation" for each of the elements – space, landscape (in the sense of a dimension in the multidimensional space with a specific function), agents, groups, dynamics and evolutionary rules. But, first we need to determine the system we will use as reference point. The emergence of new ideas can be traced in very different ways, as emergence of new ideas in the biography of a scientist, as visible in new combinations of key words or changes in citation patterns, as new disciplinary fields changing the university landscape, as new journals changing the landscape of scientific communication. Accordingly, journals, institutions, articles or researchers can be seen as the carriers of the information in an evolutionary process. From every of these perspectives it is a *tour de force* to re-specify the model. I have been involved in such an endeavour concerning the competition of scientific fields (Scharnhorst 1988, Bruckner et al. 1990) and recently in describing competence development in groups and for individuals (Scharnhorst, Ebeling 2005; Ebeling et al. 2005).

What follows is *one* example how the framework designed above can be applied to processes of knowledge production. I will give an impression of the complexity of the re-specification process and but also draw attention to the fact how the model(s) change in the process of re-specification. Criteria as focus on a certain phenomena, availability of data, but also mathematical solvability govern the process of reduction and selection for this specific model.

A. A "classical model application" – competition of scientific fields

In a model of scientific growth and competition (Scharnhorst 1988) I have introduced "types" of scientific activity representing groups or populations moving through the landscape. In this context we looked at scientific sub-fields or specialties. Here agents are scientists, which work can be associated with the one or other specialty. However, with a typology one leaves out one of interesting features of the landscape concept, namely that attributes or characteristics can change continuously, and that scientific specialties can merge and divide. In a certain way the space gets fragmented and the only trick to cover "empty" unknown territory is to carry with you in the description an endless number of empty, not yet "discovered" fields. This loss is compensated by some calculations which are now possible.

Once we have the "groups" or "populations" in place as the objects for evolution and the researchers as the carriers of the process of knowledge production the next question is which processes take place. In the more general framework of Ebeling and Feistel (1990) both for a deterministic description (trends in variables) and for a stochastic model (taken into account random events) elementary processes can be defined related to "entry", "exit" and "exchange" of "representatives" (individual, elements) between "types" (groups, populations, species). In our case these are researchers moving into, away from and between scientific fields. The variable to "observe" the system is the number of scientists working at a certain field. This number changes over time. As Gilbert has pointed out, population dynamic models seem to produce an invert representation of the processes going on: scientific fields compete for scientists – instead of scientists choosing for scientific topics. The latter is of course the primary process, and the first is only how it appears in the mathematical formulation (Gilbert 1998).

The "population model of science" and the biological once are Lotka-Volterra systems and belong mathematically to the same class. However, there is an important difference. In biology the carriers of biological information – the individual organisms – cannot change their "membership", while for the science system moving on to new topics is the "pumping mechanism" for innovation (Bruckner et al. 1989). By calling it "pumping mechanism" I refer to an understanding of self-organization as structure formation which takes place in a (physical) system while at the same to dissipative processes are present which destroy structure. The only possible explanation for that is that the system is "pumped" with energy or neg-entropy. Ebeling has used the picture of the sun (energy) pumping the ecological system on earth (Ebeling, Feistel 1994). Using this idea metaphorically, one could say in this conceptualization of the science system, that the (in)flow of researcher with new ideas is the driving, pumping force.

The thematic mobility (also called field-mobility, Ebeling, Scharnhorst 1986)) is an exchange or transition process which forms the basis of competition between the fields and of innovation. This transition process is a "search process" – only now not in a space anymore but at a typology. The search can be further specified into a random search and a directed search. It would lead too much into the details to explain this differentiation. Therefore, only one last remark. In the model we have chosen to link "the random search" of a researcher only to characteristics (described as parameters now) in her/his current domain of the research. Note that I use "random search" here as a placeholder for creative knowledge production and learning. The decision for a new research topic is taken on an individual level based on reasons which can be very heterogeneous. From the perspective of a system that can be modelled as a random process without taking away the purposefulness on the individual level. Further, these reasons are not necessary statistically correlated with any characteristics of the new field. In other words "You change because you do not want to stay". Different from this is a transition which is more goal-oriented, also on the level of the system. In this case, a connection can be made statistically between the many individual reasons to change and the new topic to change to. "You change because you want to go somewhere". A trigger for this transition can be a characteristic of the target field as the number of other researchers working there. Orientation on others and following them has been called imitation. Another possibility is that the change is motivated by some "attractiveness" of the new field. For all these differentiations indications can be found in interviews with scientists about their motivations to change (see references in Bruckner el al. 1990). Let me note, that evidently only the "random search" can lead to systemic innovations. To make a move to a goal as imitation this goal need to exist first. Different from this is the creation of the "target field" by own creative activity. Creativity means to conquer new territories and to go without knowing where the trajectory final end.

So far I have spoken about the search or decision processes of researchers for topics. The model took into account

additional processes as education (the inflow of newcomers) and retirement. Education leads to a specific moment growth in science. In general, an indication for the growth potential of a scientific field is the emergence of new journals or at its institutionalization in university settings. Mathematically, this growth potential can be expressed equivalent to the self-reproduction rate. In biological systems the self-reproduction rate is a parameter which represents the fitness value of a species. By looking at self-reproduction as a specific part of the overall entry the seeming tautology of the principle "survival of the fittest" is broken. This part of entry can be measured, at least in principle. It determines, at least in this model, mainly the outcome of the competition. The entry rate mirrors a kind of attractivity that can be seen as an expression of the – now as fragmented as the space – fitness landscape above it. Using simulations one can "experiment" how the interplay of the processes mentioned above can lead to different growth patterns of new fields. Examples are prematurity long before the actual breakthrough; exponential explosion; classical logistic growth (Figure 7), or a temporary fashion without sustainability.

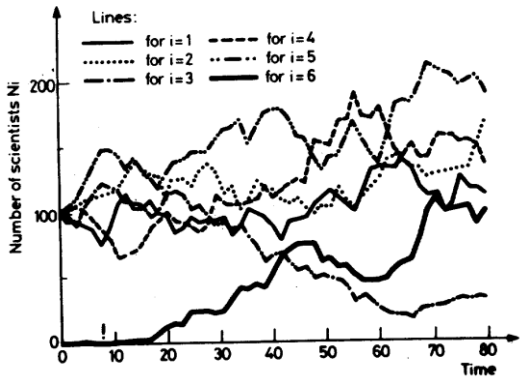


Figure 7: This simulation of a stochastic model shows the emergence of a new field which comes to coexistence to the established once. The advantage of a stochastic model is that is also covers temporal disappearance as part of an internal dynamics not as artificially introduced event. (Source: Bruckner et al. 1990)

So far, I have discussed how the "landscape concept" is broken using a specific re-contextualisation and applying a specific mathematical apparatus. I have touched on unfolding the inner complexity of non-linear dynamics by pointing to some "elementary processes" and there re-contextualisation. In the case of this model we have followed almost the usual cycle of applying models and simulations in social sciences.

Evidence has been collected:

- About the phenomena on the macro-level such as growth curves rates of fields measured in terms of publications or citations or numbers of authors
- About the occurrence of some of the practices we assume in the model as transition patterns

The model has been compared with other model approaches.

This is what one can call the "classic use" of mathematical models as explanations. Models are than seen as tool or step in the circular workflow from data collection, model building and validation, simulation and reconciliation with data again. (Gilbert, Troitzsch 1999; Lenhard et al. 2006)

A mathematical model set up in this way offers a connection between processes which have been studied in isolation as education, scientific biographies and formation of fields. It places this processes in a framework for an overall dynamics and allocates "functions" to them in a simulation of competition and growth. With these functions one can play. Influences formulated as theoretical hypothesis can be tested in a simulation for their dynamic consequences.

B. Beyond the classical application – models as heuristic tools

Let me note at the end of this section that this is not the only possible use of such mathematical models. In other studies we have applied the framework as an inspiration to order measurements and to visualize change (Scharnhorst 2001). Testing out to construct a space and landscape is a complex operation in itself already and another way in which a model can be used as heuristic tool.

To summarize, models can be used to

- Design knowledge spaces - structure measurements – search for spaces, trajectories, units of analysis (Scharnhorst 2001) (see also Figure 8)
- Design scenarios of knowledge search processes, differentiate mechanism, test out collective behaviour by simulations (Scharnhorst, Ebeling 2004)
- Structuring conceptualizations - develop typologies of knowledge products and processes (Beaulieu et al. 2008) (see also Figure 9)

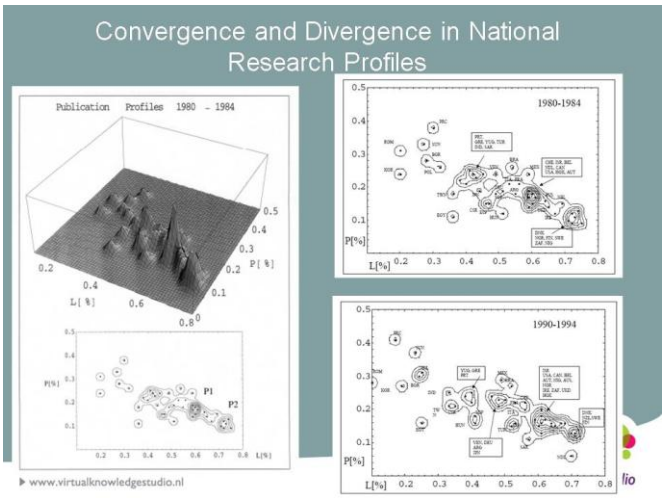


Figure 8

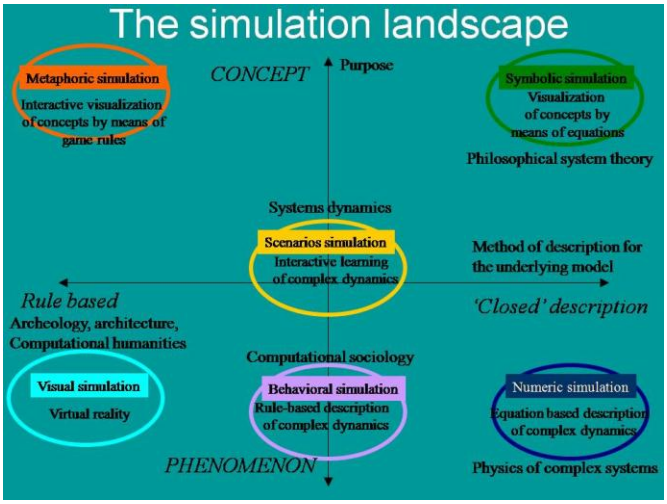


Figure 9 (Beaulieu et al 2008; Scharnhorst 2008)

VII. Future research questions – networks and landscapes

Recently, achievements in information and computer sciences have made it possible to visualize research activities at an unprecedented scale and with a high level of sophistication (Börner et al. 2003, 2004; Börner et al. 2007). Networks of publications and their citation patterns, word use, collaborating researchers, or topics in e-mail threads have been measured, visualized and analysed over time. With the emergence of network science as a new cross-disciplinary approach (Barabasi 2002; Committee 2006) and in particular with the achievements of visualizing knowledge domains in the information sciences (Shiffrin and Börner 2004), old dreams of mapping the sciences (Small and Griffith 1974) can now be realized.

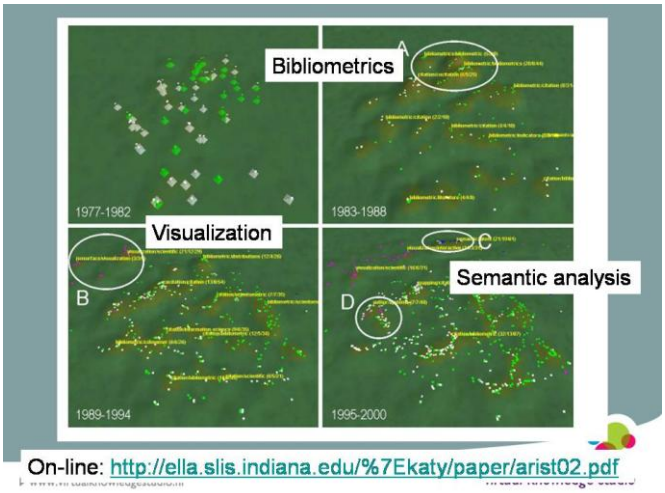


Figure 10

The so-called "maps of science" are a prominent example of this approach. They show all scientific disciplines (as far as their activities are covered by the web of knowledge (ISI Thompson Scientific) or Scopus (Boyak et al. 2005). Information gathering about science as a backbone of the knowledge society is only one aspect of these new developments. These instruments are also meant as tools to detect and maybe forecast conditions of and areas in which scientific discoveries emerge. At the same time basic questions about the understanding of science are raised. Such visualizations have already inspired debates about the role of actors in science (individuals, groups or institutions) and about basic mechanisms explaining change in scholarly activities.

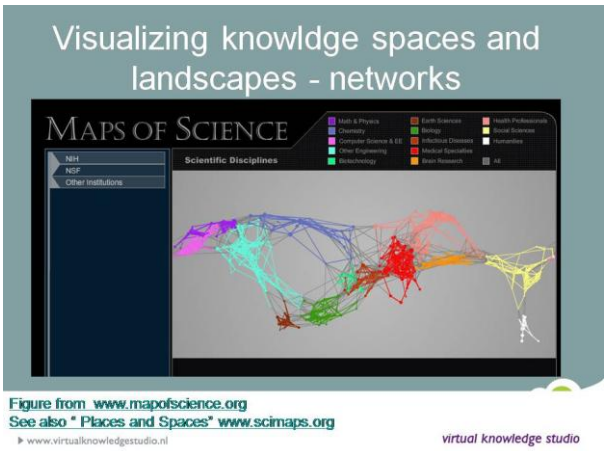


Figure 11

One challenge for future research is to organize a knowledge exchange around different model approaches – including network growth models, agent models and landscape models. Another is to link the model approaches to historical, philosophical, social and ethnographic studies of research activity. Another link goes to conceptualization around knowledge production, distribution, storage and re-use developed in other fields, as presented at this conference and often inspired by the *Zeitgeist*.

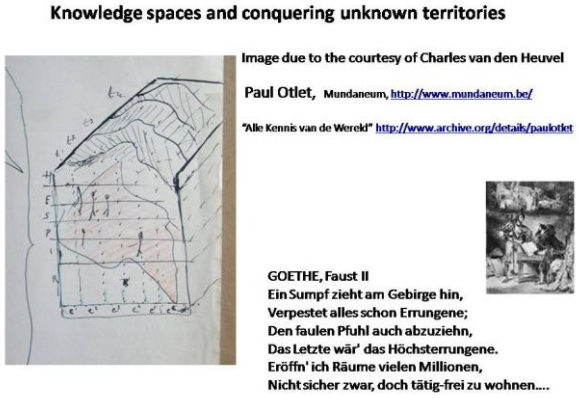


Figure 12

What I tried to explain in this paper is how models can be used as one inspirational source of explanation. I have focuses on problems of re-specification or re-contextualization. In this context, articulation work must be understood not as additional but necessary pre-condition to unfold the explanatory power of models while at the same time paying attention to the process of epistemic commitments in the "source" and "target" fields (Ratto 2006). Having said this I would like close with a quotation of Peter Allen (2008) who has recently expressed provocatively "Models do not make predictions. They are our interpretive frameworks. They may warn us about possible futures (e.g., climate change, limits to growth). The more "credible" predictions are, the more likely they are NOT to happen."

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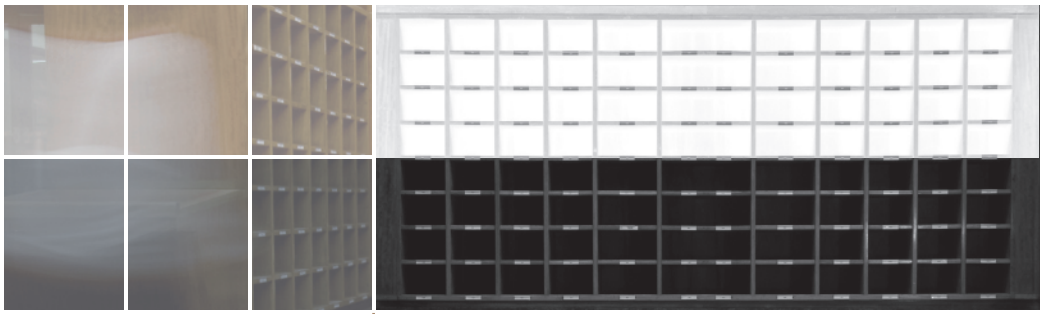
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POSTER
AND
POSTER ARTICLES

Jeffrey Abt

Title: *Wandering Gallery Project (spiritual mobility)*

This work is one in a series that explores the display, transportation, and storage of art. Because these activities extend beyond the finished products of art objects and exhibitions, the ambition of this piece is to capture their breadth—the space of art in a larger sense, and to do so in the context of an ever more transient culture. Accordingly this work embodies the tasks of packing and shipping art, as well as its display. The mini-exhibit it contains addresses an aspect of display, the uses of a "period room," a chapel interior installed in the Metropolitan Museum of Art in New York.

Designed to be a self-contained shipping crate, exhibit space, and documentation-collecting device, the work is intended to absorb and show its passage through various settings, the choices made by gallery staff about its display, and responses from viewers. Based on an accordion-fold structure of four hinged panels, it closes into a flat crate for shipping, and opens into one of three setups for display as chosen here. The other alternatives are shown in the ADisplay Options@ diagram. Evidence of this work=s travels is recorded in the travel log and other information is contributed by viewers in remarks written in the comments booklet.

The framed images in the white panel show different views of the same period-room gallery in the Metropolitan Museum of Art, each intended to depict different uses of the space as a display site. The drawing on the left imagines the space installed as an overtly religious setting with a crucifix placed at the visual and, one might say, spiritual center of the room; the painting in the center imagines the same view without any works mounted in that location; and the photograph on the right shows the space as actually installed with a tapestry hanging on that wall. Other changes made in the treatment of wainscoting, placement of chairs and figures, and lighting are intended to explore the vocabulary of spirituality as used in museums where religious content is often present but carefully controlled.

All in all then, the work embodies the space of the art world broadly conceived in order to explore the mobility of a seemingly fixed museum space.


FRAGILE
Non Conveyable
MOUNTING RAIL
Remove Screws Only If Needed
SUPPORT BAR
Remove Screw Only
If Needed

ANALOGY / ANALOG / MODEL/ SPACE
Understanding analogous spaces

Ioana Ardelean*

Abstract - **The aim of this paper is to discover an essential quality of analogous spaces, and to answer the question whether there is a matrix or a specific executable for generating such spaces or not; or if there is at least one quality of these spaces to be identified as major and suit in a matrix.This implies first understanding analogous spaces. If the processes of accumulating, storing, transforming and transferring information stand at the basis of analogous spaces, it is clear that these spaces have to comprise a common set of qualities.As it results from the reference to analog devices seems that ananalogous space could be defined as a continuous field.Any field is the expression of a changing energy state , or as the space where the interaction potential energy between two elements is acting.**

The notation of a choreograph on the harmonious movement into a space can offer new types of space analysis and space generating mechanisms, if space is the field of the users/generators. The generative elements of the space take particular states, shapes or qualities in order to reach one specific need. A particular situation would be when this space would also fit the harmonic criteria of a space that is both functional and aesthetic.

Motto: 'To write a space is better than to draw it'

I. ANALOGY

Paraphrasing on Leonardo Da Vinci's sayings: the architectural space is "cosa mentale". The way one perceives the architectural space is similar to the way one looks to the dance movements or listens to the music and it is achieved through ones culture and mental routine.

In the same way we hear harmonious music (flow lines theory, by Jared E. Andersen), we understand harmonious movements (space theories, by Rudolf Laban) or we perceive harmonious spaces.

If the processes of accumulating, storing, transforming and transferring information stand at the basis of analogous spaces, it is clear that these spaces have to comprise a common set of qualities.

II. ANALOG

Making any inquiry upon the subject of analogous space, brings into light the issue of defining it.

'Marian Pour-El and Ian Richards,…[proves] in a mathematically precise way, that analogue computers are more powerful than digital computers. They give examples of numbers that are proved to be non-computable with digital computers but are computable with a simple kind of analogue computer [...] as a digital computer deals only with discrete variables. Their analogue computer is a classical field propagating through space and time and obeying a linear wave equation. The classical electromagnetic field obeying the Maxwell equations would do the job. Pour-El and Richards show that the field can be focussed on a point in such a way that the strength of the field at that point is not computable by any digital computer, but it can be measured by a simple analog device.'[1]

Pour-El-Richards theory does not explain what an analogous space is, but provides an idea about it. From this perspective, an analogous space works as a classical field observing a linear wave equation. The classical field is the material expression of the space where the interaction between two particles takes place. As any particle is characterized by its potential interaction energy it is also characterized by the existence of a field where this energy acts. The field theory is essential for any inquiry over the analogous space definition or comprehension.

III. MODEL

The dance is a continual sequence of changing potential energy states that does generate a space.

The movement with its state changes can be registered mathematical or graphical. This coding shows the traces and the intensity points that come from the energy gap. This spatial expression recording at a certain sequence of time can be found in choreographic notation. Dance notations represent executable software, or a matrix of the space-time once created by dancers according to the music. Without being some descriptive or narrative means, nor mathematical, the choreographic notation is rather analytical and it brings into discussion the issue of time as dimension. All it is done in such a way that the essential feature of dance namely its flow of movement is registered in all its details. Expressing neither writing nor image, the basic material of dance notation is the motion characters from which it is built up.

Therefore the notation of a choreograph on the harmonious movement into a space can offer new types of space analysis and space generating mechanisms, if space is the field of the users/generators. The generative elements of the space take particular states, shapes or qualities in order to reach one specific need. A particular situation would be when this space would also fit the harmonic criteria of a space that is both functional and aesthetic.

This would also mean that the method of movement analysis and notation[2] could generate an analog harmonious space for specific functions without using any architectural routines.

It would exist a clear notation and diagram of each space that would contain essential qualities plus harmonic coincidences. If so one could generate architectural spaces or could analyze existing spaces.

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[1]Freeman Dyson, in "*Is Life Analogue or Digital?"* , on Edge, www.edge.org

[2]there are several system of notation of movement developed by dance theories , LMA-Laban movement analysis .

IV. SPACE

All the systems dealing with information flow are part of larger informational networks. This means that all infrastructure and all the spaces generated for this need represent joints, or articulations on the wider networks.

The informational process is acting as a continuous flow of transmissions and receptions at any level and in any system whether this is natural, analogue or digital, etc.

As shown, an analogous space depends on two parameters: continuity and information transportation and transfer as continual substance with energetic states.

In the case of a particle with a continual field is there a conclusion to be raised about the fact that an analogous space can be expressed as the interaction field of that particle?

If the answer is positive, then the analogous space is the field generated by this particle.

In other words, the field of potential interaction energy between informational elements can be expressed in more concrete terms and relations: for instance the field of books and the space of the library, the material to be stored and the space of its storage, the encyclopaedia and the space of a museum, the data and databases, the organic data and the space of a data bank.

ACKNOWLEDGEMENTS

I owe a lot to my teachers from Bucharest and abroad. I am also grateful to some people with whom I have discussed this work. I do not mention their names as I have not asked for their permission , nor I wish to bother them about it now.

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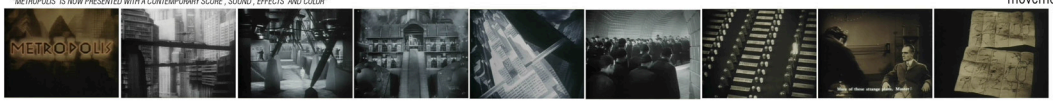
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[3] Dyson Freeman , "Is life analog or Digital?" article on www.edge.org

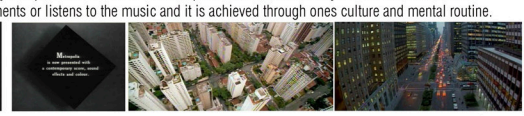
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ANALOGY / ANALOG / MODEL / SPACE UNDERSTANDING ANALOGOUS SPACES

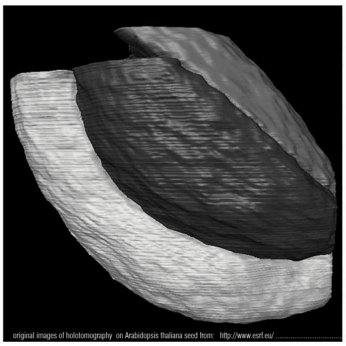
Fritz Lang's METROPOLIS (1926) versus BARAKA by Ron Fricke (1992).
"METROPOLIS IS NOW PRESENTED WITH A CONTEMPORARY SCORE , SOUND , EFFECTS AND COLOR"



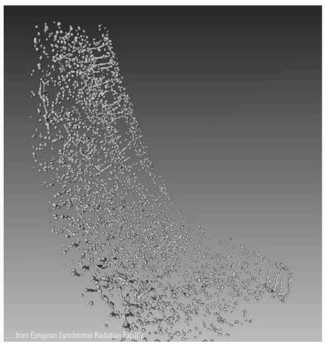
The way one perceives the architectural space is similar to the way one looks to the dance movements or listens to the music and it is achieved through ones culture and mental routine.



ANALOG



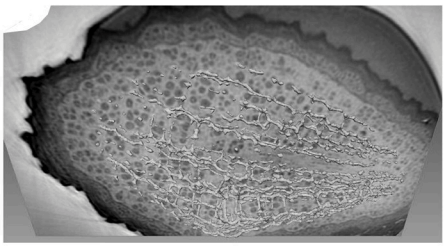
original images of holotomography on Arabidopsis thaliana seed from: http://www.esrf.eu/

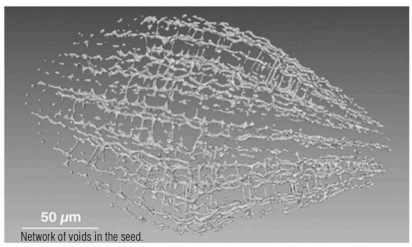


from European Synchrotron Radiation Facility

the field of potential interaction energy between informational elements can be expressed in more concrete terms and relations. For instance the field of books and the space of the library , the material to be stored and the space of its storage, the encyclopedia and the space of the museum , the data and databases, the organic data and the space of a data bank.
the structure and dynamics of an organic material (as seeds) could give trough its continuous interaction some characteristics of the space of a seed bank.This space would be nothing else than the field-space of the interaction itself.

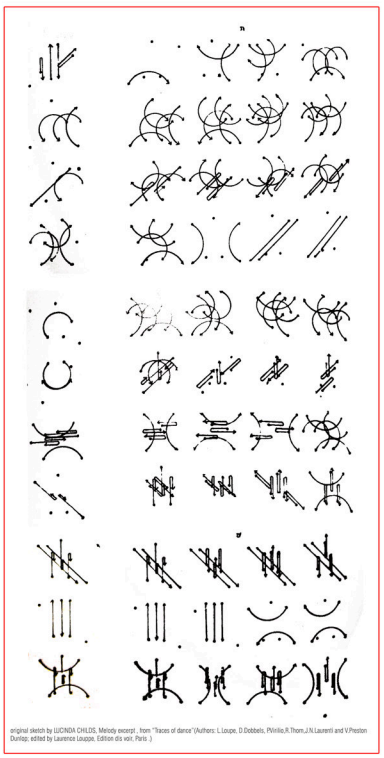
The white dots showing up at the junction of cells correspond to essentially zero density, i.e. to gas.The voids form a network. This network of air space it is an important actor in plant life, by first storing and then, at the onset of the germination process, quickly distributing oxygen.





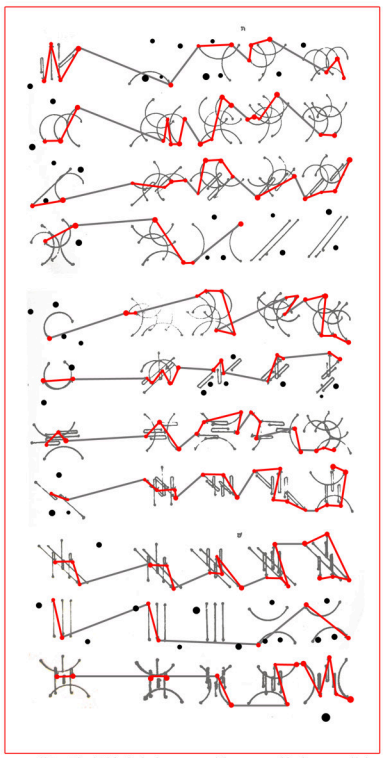
Network of voids in the seed.

MODEL



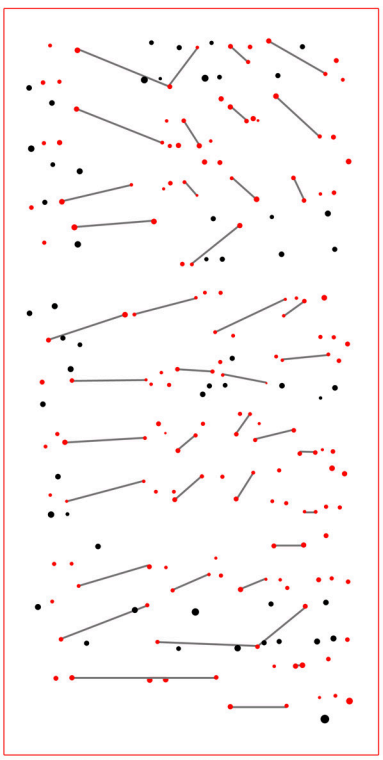
original sketch by LUCINDA CHILDS, Melody excerpt , from "Traces of dance"(Authors: L.Louppe, D.Debbels, PVirilio,R.Thom,J.N.Laurenti and V.Preston Dunlop; edited by Laurence Louppe, Edition dis voir, Paris .)

time is important for coreography as for music. flow motions are linked to flow sequences of time . the suuccession of drawings is always a concise "calendar". these are the strength lines that gather afterwards , other qualities , as rythm , emotion and composition .
The choreographic notation is rather analytical and it brings into discussion the issue of time as dimension.



proposed interpretation sketch for showing the energy gaps , during a sequence of time for a coreographical fragment. black and red dots are representing different energy states. the black dots are assimilated with movements on the ground surface, while red dots are assimilated with movements above the ground level.
the red and gray lines are linking the most intensive energy states, that are pointing usually the end and thus the beggining of the next coreographic element.

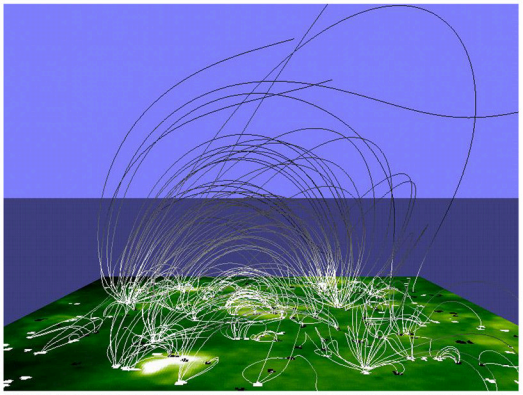
Dance notations represent executable software, or a matrix of the space-time once created by dancers according to the music.



gray lines are pointing the sequence of time between two different coreographic elements , and the energy changes between each next element.usually the time sequence is identical with musical timing .each point has a different value or intensity .

Dance is a continuous sequence of changing potential energy states that does generate a space.

SPACE



In the case of a particle with a continual field is there a conclusion to be raised about the fact that an analogous space can be expressed as the interaction field of that particle?
If the answer is positive, then the analogous space is the field generated by this particle.

"Analog / Analogy / Model / Space ..... Understanding analogous spaces"..... .....author : Ioana Ardelean..... .....graduating student - "Ion Mincu" University of Architecture and Urbanism , Faculty of Architecture..... Bucharest , Romania .....email adress :ioana_c_ardelean@yaho
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"Ion Mincu" University of Architecture & Urbanism

Combinatorics and order as a foundation of creativity, information organization and art in the work of Wilhelm Ostwald

Thomas Hapke*

Abstract - **The physical chemist and 1909 Nobel laureate Wilhelm Ostwald (1853-1932) developed broad and multifaceted interests in philosophy (of nature), history (of science) as well as color theory and the international organization of scholarly work. Applying combinatorics, which grew out of his philosophy of nature and which was viewed by Ostwald as a basis for creativity, Ostwald developed a theory of forms and colors. His work influenced marginally the activities of such movements in art like the German Werkbund, the Dutch De Stijl, and the Bauhaus. This poster supports a today more and more visible connection between "in-formation", education as well as art and design.**

Keywords **- Wilhelm Ostwald, creativity, combinatorics, order**

I. Introduction

Wilhelm Ostwald, 1853 (Riga, Latvia) - 1932 (Leipzig, Germany) was one of the founders and organizers of the discipline 'physical chemistry' at the end of the 19th century [1][2]. He worked from 1887 until 1906 as professor in Leipzig, received the 1909 Nobel Prize in chemistry for his work on catalysis, equilibria and rates of chemical reactions. Especially after his retirement he developed broad and multifaceted interests in philosophy (of nature), history (of science) as well as color theory and the international organization of scholarly work.

II. Combinatorics and Ostwald's Philosophy of Nature

The search for harmony and order in combination with Ostwald's energetic imperative ("Do not waste energy, but convert it into a more useful form") was a foundation of his activities in the organization of scholarly communication, in the system of scholarly disciplines itself, in colors and forms. He proposed a "science of order" as a basis of his "pyramid of science" [3]. The need for standardization especially expressed in his ideas about paper formats as well as the need for a synthetic auxiliary language to facilitate international communication of science was also an outcome of his philosophical concept of order.

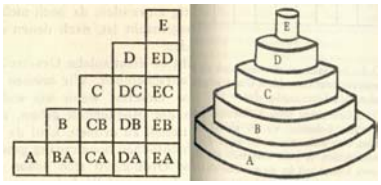


Figure 1. Combinatorics and the pyramid of sciences.

After describing how concepts or terms could be combined, Ostwald noted in a book about the philosophy of nature: "The laws of combinatorics even allow it to decompose an area of research formally and exhaustively in its branches and fields of research - by initially locating empirically the elements of the domain and then by exhaustively combining them [...] The application of combinatorics in scholarship is far from being widespread, as it should be. [4]"

Taken from his chemical experience, Ostwald's method of scholarly research can be described as: Defining the problem (1), exploring the problem by going back to the basic concepts of it (2), and combining these basic concepts in a combinatorical way to explain the diversity of the complex world (3). The diverse objects created through combination had to be held together by a holistic framework (4) like Ostwald's monistic world view and scientistic energetism (see Table 1).

Table 1. Ostwald's method of scholarly research

1	Chemistry	Informat. Organizat.	Color theory	Theory of forms	Sciences
2	Chemical Elements	Fragmentation to unique thoughts	Pure colors, white and black	Basic forms	Defining basic sciences
3	Combined within periodical system	Combined within classification	Combined within a double-cone	Combined in diverse ways	Combined within a pyramid (Figure 1)
4	Physical Chemistry as General Chemistry	Central agency, World Brain	Harmony of colors	Harmony of forms	Energetic imperative, Monism

III. Applying Combinatorics

A. The Organization of Scholarly Work

In 1911 Ostwald founded with others "Die Brücke [The Bridge]", an "International Institute for the Organization of Intellectual Work" which tried to build a comprehensive, illustrated encyclopedia on sheets of standardized formats and to improve and organize scholarly information and communication. As a "World Brain", as Ostwald called the Bridge, it should connect people and institutions working for scholarly purposes. He developed ideas to disassemble the contents of printed journals and disseminate single papers separately (monographic principle). To arrange the separate pieces these

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were held together through a universal classification (UDC). For Ostwald the standardization of paper sheets was a practical application of his energetic imperative. He sought to create conditions for the unity of science and a seamless unity of scientific thinking with practical life.

B. Creativity and Education

"Combinatorics doesn't replace productive imagination only, but is superior to it!" [5]. For Ostwald creativity contained also "combinatorics". Ideas and discoveries were often only "a novel combination of existing components". New facts in research also had to be combined with diverse existing ones to create new insights. His idea on creativity corresponds with modern views concerning an alternative exposure to copyright and intellectual property within the "Creative Commons" licenses: "Share, reuse, and remix - legal".[1]

Ostwald's activities in education showed his sense for individual development combined with systematic treatment. He believed that "the art of discovery" should become "a part of the intellectual inventory of every one [6]." Ostwald was aware that teaching research skills combined with enabling effective use of libraries was important. He suggested that teaching centers should be created at technical universities to improve techniques for the presentation of engineering knowledge and that these should be integrated into engineering education [7].

C. The Harmony of Colors and Forms

In 1914 Ostwald was asked by the German Werkbund which aimed at standardising industrial design to prepare a "rational" atlas of colors (see Figure 2). His ideas for color composition from a scientific viewpoint were combated by most contemporary artists. In connection with his color theory Ostwald was also engaged in the "harmony of forms" [8]. Using the rules he developed Ostwald created ornaments and new forms "according the laws of combinatorics" which were "all beautiful, without any exception" [9]!

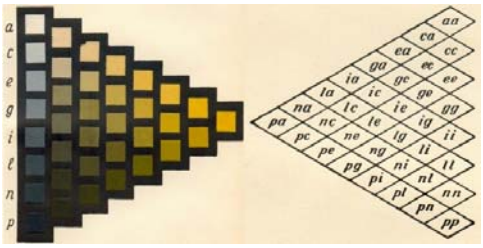


Figure 2. Combinatorics in colors.

IV. Connections to Werkbund, De Stijl, and Bauhaus

His imperative "order = legality = harmony" and his color theory had influence on the Werkbund, the Bauhaus and the Dutch artistic movement De Stijl. In 1912 Ostwald joined the Werkbund. He published a paper on "standards" in the yearbook of the Werkbund in which he called art a "social product" which made it necessary to standardise it [10]. In the first volume of the journal De Stijl a review on Ostwald's "Color Primer [Farbenfibel]" was published. Two years later this journal of the Dutch art movement published Ostwald's paper on the "Harmony of colors" [11]. In the Twenties Ostwald got contact to members of the Bauhaus, e.g. to Walter Gropius. He gave talks at the Bauhaus in Dessau in 1927. The same year he was invited to join the Bauhaus board of trustees. Nevertheless most of the Bauhaus members remained offish to his ideas [12][13].

V. Hidden Connections until Today

Today more and more connections between "in-formation", education as well as advertising,[2] art and design are visible in domains like information literacy, information design and knowledge media design. One 'hidden' connection to information science is shown here: Horst Rittel, later professor of design in Berkeley [14], was a successor of Max Bense at the Ulm School for Design founded by Max Bill. Ostwald was mentioned by Bill in the afterword of the German edition of Kandinsky's "Point and line to plane" [15]. Max Bense wrote books about philosophy of nature and aesthetic information, Rittel together with Werner Kunz a book on the foundation of information science in Germany [16]. All this supports the German philosopher Ernst Bloch's quote: "It will be perceived […] with the aim of *in-formatio* about the world and of the world itself [17]."

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[1] http://creativecommons.org , visited March 20, 2008

[2] See [7] and also the weblog "Creative Combinatorics", accompanying this paper: http://notes.hapke.de , visited March 20, 2008

Lemmas for a community

Converting an early printed biobibliographical work into a wiki

Karen Janssens*

Abstract - **This paper discusses how an early printed reference work was converted into a wiki. The aim was to publish the original content of an 18th-century biobibliography online and to allow for an annotation of the original information. Both similarities as well as differences between the analog and digital spaces are discussed. It is demonstrated how the original 'architecture' of the book was used to set up and structure the wiki. Furthermore, we show how the annotated information can be added to the wiki but how we keep it separated from the original information.**

***Keywords* – historical reference works, wiki**

I. INTRODUCTION

Even today, early printed biobliographical[1] reference works can still be invaluable research tools for, among others, historians and students of literature. Much of the information contained within these reference works, however, remains undiscovered, largely due to their poor search and retrieval possibilities. Furthermore, both time and space restrictions act as a threshold for a more intensive use. Digitisation of the works provides a means to resolve the above shortcomings: it makes it possible to perform full-text searches within the original content; and when the information is placed online, it is accessible at any time and from any place.

This study focuses on one particular reference work, namely the 18th-century biobibliography *Mémoires pour servir à l'histoire littéraire des dix-sept provinces des Pays-Bas…* compiled and written by Jean-Noël Paquot and printed by the Leuven University Press between 1765 and 1770. Why we chose this work is outlined further in this article.

The aim of this digitization project was not only to bring online the current content of the original reference work, but also to offer an added-value by allowing for the annotation of the content. Why annotating? The original work was published about 250 years ago and much of the information in it is therefore outdated (e.g. described books do not exist anymore of can be found in other locations). Furthermore, it would be very interesting to insert links to other projects, sites, studies… where persons or places mentioned by Paquot are discussed.

The annotations should ideally be provided by whoever has interesting information. We thus needed a means to *receive* input apart from *delivering* information. The 'classical web' does not meet this need. We therefore opted for a wiki, a Web2.0 tool that allows for easy publication and stimulates online collaboration.

In the next section, we explain why we chose the *Mémoires* as case study, and we introduce the concept of a 'wiki'. The last section focuses on the comparison between the original work, which can be called 'analog space', and the digitized version, the 'digital space', where both the similarities and the differences between these two spaces are outlined.

II. THE CASE STUDY

A. *The book*

Why did we choose to digitize Paquot's *Mémoires*? First of all, the *Mémoires* are still an important research tool [1], but, as the introduction points out, much of the information it contains remains undiscovered. The Short Title Catalog Vlaanderen (STCV) project aims to provide an online bibliography of books printed in 17th-century Flanders [2]. For 18th-centrury books however, digital bibliographical information is still very scarce.

B. *The Wiki*

What is a 'wiki' [3]? As 'e-mail', 'instant messaging', 'blogs' or 'social bookmarking tools', a wiki is a 'social software' tool. This means: software that facilitates social interaction and stimulates collaboration and exchange of information. This implies the existence of virtual user communities: groups of people working together on specific projects or sharing common interests. The most famous 'wiki project' is the internet encyclopedia Wikipedia.

III. THE 'ANALOG SPACE' VERSUS THE 'DIGITAL SPACE'

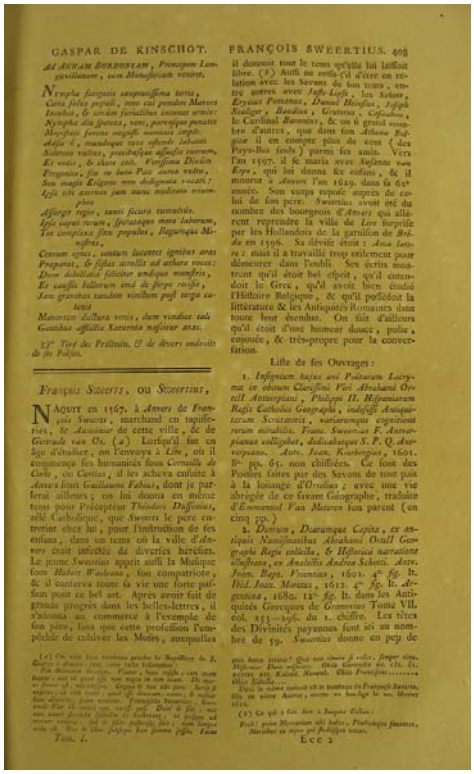
A. *Similarities*

The most important similarity between the analog and digital space is the *content*. The information as provided by Paquot is fully and without any alteration incorporated in the wiki. The wiki provides both the digitized text (obtained by OCR) and an image of the original page.

Apart from the content, also the *structure* of the two spaces is very similar. Where Paquot dedicates a separate lemma to each author, we chose for the wiki version to make a new wiki page per author.

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[1] The lemmas in a biobibliography contain both biographical and bibliographical information.



CASPAR DE KINSCHOT. FRANÇOIS SWEERTIUS. 499

François Sweerts, ou *Sweertius*,

NAQUIT en 1567. à *Anvers* de *François Sweerts*, marchand en tapisseries, & Auteur de cette ville, & de *Gertrude* van Os. (a) Lorsqu'il fut en âge d'étudier, on l'envoya à *Lire*, où il commença ses humanités sous *Cornelle de Corte*, ou *Curtius*; il les acheva ensuite à *Anvers* sous *Guillaume Fabius*, dont je parlerai ailleurs; on lui donna en même tems pour Précepteur *Théodore Dussenius*, zélé Catholique, que Sweerts le père contrint chez lui, pour l'instruction de ses enfans, dans un tems où la ville d'Anvers étoit infectée de diverses hérésies. Le jeune *Sweertius* apprit aussi la Musique sous *Hubert Waelrans*, son compatriote, & il conserva toute la vie une forte passion pour ce bel art. Après avoir fait de grands progrès dans les belles-lettres, il s'adonna au commerce à l'exemple de son père, sans que cette profession l'empêchât de cultiver les Muses, auxquelles il donnoit tout le tems qu'elle lui laissoit libre. (b) Il cessa cependant d'être en relation avec les Savans de son tems, entre autres avec *Juste Lipse*, les *Scaliger*, *Erycius Puteanus*, *Daniel Heinsius*, *Joseph Scaliger*, *Baudius*, *Grutérus*, *Casaubon*, le Cardinal *Baronius*, & un si grand nombre d'autres, que dans son *Athenæ Belgicæ* il en compte plus de cent (des Pays-Bas seuls) parmi ses amis. Vers l'an 1597. il se maria avec *Suzanne* van *Erpe*, qui lui donna six enfans, & il mourut à *Anvers* l'an 1629. dans sa 63e année. Son corps repose auprès de celui de son père. *Sweertius* avoit été du nombre des bourgeois d'*Anvers* qui allèrent reprendre la ville de *Lire* surprise par les Hollandois de la garnison de *Bréda* en 1596. Sa révolte étoit : *Ama lateras*: mais il a travaillé trop utilement pour démeurer dans l'oubli. Ses écrits montrent qu'il étoit bel esprit, qu'il entendoit le Grec, qu'il avoit bien étudié l'Histoire Belgique, & qu'il possédoit la littérature & les Antiquités Romaines dans toute leur étendue. On fait d'ailleurs qu'il étoit d'une humeur douce, polie, enjouée, & très-propre pour la conversation.

Liste de ses Ouvrages :

1. *Insignium hujus avi Poëtarum Lacryma ex obitum Clarissimi Viri Abrahami Ortelii Antverpiani, Philippi II. Hispaniarum Regis Catholici Geographi, indefessi Antiquitatum Scrutatoris, variarumque cognitionum mirabilis. Franc. Sweertius F. Antverpianus collegebat, dedicabatque S. P. Q. Antverpiano.* Antv. Joan. Keerbergius, 1601. 8vo. pp. 65. non chiffrées. Ce sont des Poésies faites par des Savans de tout pais à la louange d'*Ortelius*; avec une vie abrégée de ce savant Géographe, traduite d'*Emmanuel Van Meteren* son parent (en cinq pp.)
2. *Deorum, Dearumque Capita, ex antiquis Numismatibus Abrahami Ortelii Geographi Regi collecta, & Historicâ narratione illustrata, ex Analectis Andreæ Schotti. Antv. Joan. Bapt. Vrientius*, 1602. 4to fig. *Ibid. Joan. Moretus*, 1612. 4to fig. *Argentinæ*, 1680. 12mo fig. Il dans les Antiquités Grecques de *Gronovius* Tome VII. col. 253-296. du 1. chiffre. Les têtes des Divinités payennes sont ici au nombre de 59. *Sweertius* donne en peu de mots l'histoire de ces Divinités, avec les passages des Anciens qui en font mention.
3. *In VII. Cæsarum Icones, Narrationes Historicæ, ex. Analectis Andreæ Schotti Soc. Jesu. Antv. Joan. Bapt. Vrientius*, 1602. 4to
4. *Belgii totius Descriptio. Avec une Carte des Pays-Bas publiée en 1603. par Jean-Bapt. Vrientius.*
5. *Meditationes Joannis Cardinalis de Turrecremata, cum ejusdem Vitâ. & Precibus Beatis. Colon. Agrip. Gualterus*, 1607. 12mo
6. *Selectæ Christiani Orbis Delitiæ, ex Urbibus, Templis, Bibliothecis, & alijs. Colon. Agrip. Gualterus*, 1608. 12mo Il Edito auctior. Ibid. Idem, 1625. 12mo pp 847.; C'est un recueil d'Epitaphes qui se trouvent en différentes villes de l'Europe Nathanaël Chytræus, Recteur du collége de Brême, en avoit donné quelques année auparavant un semblable sous le titre de *Variorum in Europa Itinerum Deliciæ* 8vo qui a été d'un grand secours à *Sweertius*.
7. *Hieronymi Magii de Tintinnabulis Liber Posthumus, cum Notis Franc. Sweertii Francofi. & Hanoviæ, typ. Wechelianis*, 1608 12mo Il. — Item ejusdem de Equuleo Liber posthumus cum notis Gothofredi Jungermanni. Accedit Appendix variorum illustrium olim argumentum pertractantium. Editio novissima, aucta, emendata, & figuris ænels exornata. Amst. 1664. 12mo Il. Ibid Henr. Wetstenius, 1689. 12mo
8. *Clarissimi Viri Justi Lipsii Musæ errantes. Ex Auctoris schedis partem descripsit sparsas collegit, ac junctim posterittati edidit, Franc. Sweertius F. Antverpiensis. Antv Joan. Keerbergius*, 1610. 4to gros caract. Italique, pp. 109. y compris une pièce en prose, qui est : *Marci Ant. Bonciari Perusini, Epistola in laudem Lipsi.* Il dans les Delicæ Poëtarum Belgarum Tom III. p. 302. Il. Cum aliquot ejus Epistolis Hardervici, 1621. 12mo Ce sont les Poésies de Juste-Lipse.

Tom. I. Eee 2

Figure 1. A lemma in the book, showing a clear structuring of the information.

Before starting the digitization process, a typographical analysis of original work was carried out [4]. This revealed a very consistent use of typographical elements throughout the work. For every lemma five distinct elements could be distinguished:

- the title (i.e. the author name),
- a biographic description,
- a bibliographic description, distinguishing published and unpublished works,
- footnotes, and
- references.

The main elements, as found in the original work, were taken as basis for the outline of the wikipage.

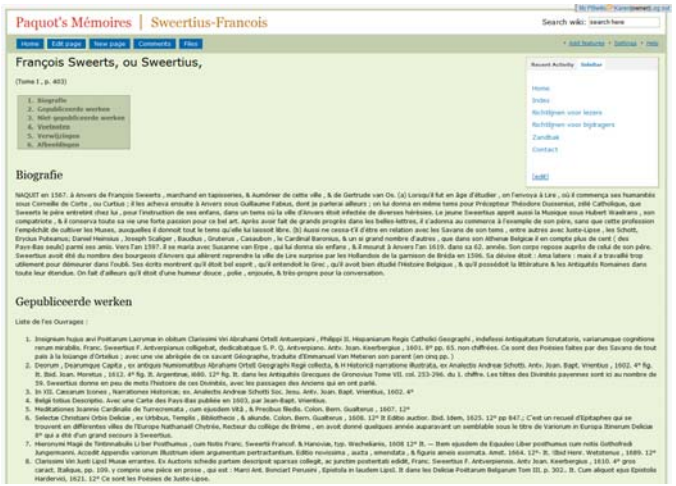


Figure 2. A screenshot of the wikipage as constructed from the original lemma, shown in Figure 1.

A third similarity concerns the *annotation* of the original content. The possibility to annotate the original content was a very important reason when opting for a wiki approach. However, annotations were made to the original (analog) work as well. A copy of the *Mémoires*, owned by Karel Van Hulthem and currently in possession of the Royal Library of Belgium, is thoroughly annotated by its owner [5].

B. Differences

The main point of difference between the analog and digital space are the consultability and searchability of its contents. The content of the book can only be consulted when one has access to a copy: one is constrained in both time and space, as library visits are required. Furthermore, the content of the book can only be searched using the index of author names and is thus very limited. This is in contrast to the digital version, the wiki. The wiki is online consultable by all, without time or space restrictions and the wiki allows a full-text search of its contents.

The way to assemble and distribute the knowledge is a second point of difference. The original information was compiled by Paquot and every copy of the Mémoires is identical. However, when annotations were made to a specific copy, this copy became unique. This operation is therefore very 'one-to-one': one person makes annotations to a specific copy, and this annotated information is only consultable by someone with access to that specific copy. This is in contrast to the digital version, where the operation of annotating is 'many-to-one': everyone can contribute to the one digital copy. The consultation of the digital space is 'one-to-many': there is only one wiki and the information on it is visible to all visitors.

ACKNOWLEDGEMENTS

This study was carried out in the framework of a master thesis for the 'Gespecialiseerde Studie Informatie- en Bibliotheekwetenschap' at the University of Antwerp. The illuminating ideas and guidance of my two promoters, Prof. dr. Richard Philips and Prof. dr. Pierre Delsaerdt, are much acknowledged.

REFERENCES

[1] J. Roegiers, 'De eerste Leuvense Universitaire Pers, 1759–1797' in Ex Officina, 19(1) (2005), p.2–4.

[2] http://www.stcv.be

[3] J. Klobas, Wiki's: Tools for collaboration (London 2006).

[4] P. Luna, 'Clearly defined: Continuity and innovation in the typography of English dictionaries' in Typography Papers 4 (2000), p.5–56.

[5] Copy VH 22.472 A Mss, consultable at he section 'Precious Works' of the Royal Library of Belgium (http://www.kbr.be).

Lemma's for a community

Converting an early printed biobliographical reference work into a Wiki

Karen Janssens
Universiteit Antwerpen

Abstract This study aims to provide a means to publish the original content of an 18th-century biobibliography online and to allow for an annotation of the original information. I investigated whether, and how, a wiki could be used for this purpose. Both similarties as well as differences between the analog and digital spaces are discussed. I will demonstrate how the original 'architecture' of the book was used to set up and structure the wiki. Furthermore, I will show how the annotated information can be added to the wiki but how we keep it separated from the original information.

Analog Space : Book	Digital Space : Wiki

Similarities

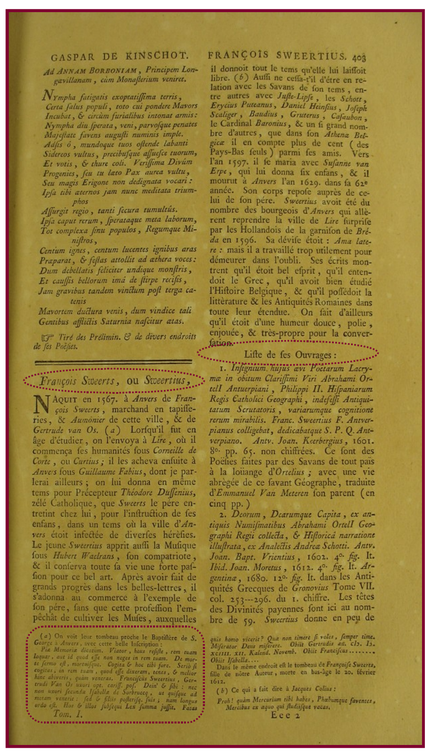
Content


MEMOIRES
POUR SERVIR A
L'HISTOIRE LITTERAIRE
DES DIX-SEPT PROVINCES DES
PAYS-BAS,
DE LA PRINCIPAUTE DE
LIEGE,
ET DE QUELQUES CONTRÉES VOISINES.
TOME SECOND.
A LOUVAIN,
DE L'IMPRIMERIE ACADEMIQUE.
M. DCC. LXIII.

Mémoires pour servir à l'histoire littéraire…

Jean-Noël Paquot

Academische Drukkerij, Leuven, 1763 – 1770


GASPAR DE KINSCHOT. 403

Ad annam Borbonam, Principem Lorgavillanum, cum Monasterium veniret.

Nympha fuisgutis exoptatissima terris,
Cara fidos pepulit, voto cui pondere Mavors
Incubat, & circùm furialibus intonat armis:
Nympha diu speravi, veni, purvolque penates
Mayoptate foveas augustis numinis umbrâ.
Assis ô, mundoque tuos offerde labanti
Sideros vultus, precibusque affusa tuorum,
Et vota, & chara oris. Perfidima Divûm
Progenies, fea ta lato Pax aurea vultu,
Seu magis Erigone non dedignata vocari:
Ipsa tibi asseros jam nunc meditata triumphos
Affurgit regio, tanti fecura tumultûs.
Ipsa caput rerum, ipsa cuique munia laborum,
Tot comprexa sinu populos, Regumque Ministros,
Centum ignes, centum lucentes ignibus aras
Preparat, & fessas attollit ad æthera vovet:
Dum debellatis felicitor undique monstris,
Et cassis bellorum imâ de strage recisis,
Jam gravibus tandem virtûum post terga catenis
Mavorem dustura venis, dum vindice tali
Gentibus officiis Saturnia nafcitur ætas.

☞ Tiré des Prélimin. & de divers endroits de ses Poésies.

FRANÇOIS SWEERTIUS. 405

il donnoit tout le tems qu'elle lui laissoit libre. (c) Aussi ne cessa-t-il d'être en relation avec les Savans de son tems, entre autres avec *Juste-Lipse*, les Schott, *Erycius Puteanus*, *Daniel Heinsius*, *Joseph Scaliger*, *Baudius*, *Gruterus*, *Casaubon*, le Cardinal *Baronius*, & un fi grand nombre d'autres, que dans son *Athenæ Belgicæ* il en compte plus de cent (des Pays-Bas seuls) parmi ses amis. Vers l'an 1597. il fe maria avec *Suſanne van Erpe*, qui lui donna fix enfans, & il mourut à *Anvers* l'an 1629. dans fa 62e année. Son corps repoſe auprès de celui de ſon pere. *Sweertius* avoit été du nombre des bourgeois d'*Anvers* qui allérent reprendre la ville de *Lire* ſurpriſe par les Hollandois de la garniſon de *Bréda* en 1596. Sa dévife étoit : *Ama latere* : mais il a travaillé trop utilement pour démeurer dans l'oubli. Ses écrits montrent qu'il étoit bel eſprit, qu'il entendoit le Grec, qu'il avoit bien étudié l'Hiſtoire Belgique, & qu'il poſſédoit la littérature & les Antiquités Romaines dans toute leur étendue. On fait d'ailleurs qu'il étoit d'une humeur douce, polie, enjouée, & très-propre pour la converſation.

Liſte de ſes Ouvrages :

1. *Voluptatum hujus ævi Posterum Lacryma in obitum Clariſſimi Viri Abrahami Ortelii Antuerpiani, Philippi II. Hiſpaniarum Regis Catholici Geographi, indefeſſi Antiquitatum Scrutatoris, variarumque cognitione rerum mirabilis. Franc. Sweertius F. Antverpianus colligebat, dedicabatque S. P. Q. Antverpiano. Antv. Joan. Keerbergius, 1601.* 8°. pp. 65. non chiffrées. Ce font des Poéſies faites par des Savans de tout pais à la louange d'*Ortelius* ; avec une vie abrégée de ce ſavant Géographe, traduite d'*Emmanuel Van Meteren* ſon parent (en cinq pp.)
2. *Dorum, Duarumque Capita, ex antiquis Numiſmatibus Abrahami Ortelii Geographi Regis collecta, & Hiſtoricâ narratione illuſtrata, ex Analectis Andreæ Schotti. Antv. Joan. Bapt. Vrientius*, 1602. 4°. *fig.* It. *Antv. Joan. Moretus*, 1612. 4°. *fig.* It. *Argentinæ*, 1680. 12°. *fig.* It. dans les Antiquités Grecques de *Gronovius* Tome VII. col. 253—296. du 1. chiffre. Les têtes des Divinités payennes font ici au nombre de 59. *Sweertius* donne en peu de mots l'hiſtoire de ces Divinités, avec les paſſages des Anciens qui en ont parlé.
3. *Fr. Sweertii Athenæ Belgicæ, ſive Nomenclator Inf. & Hiſtorica Belgii Deſcriptio, collecta. Colon. Agrip. Gualterus*, 1628. *fol.* pp. 708. On peut voir ce que j'ai dit de cet Ouvrage dans ma Préface : j'ajoûterai ſeulement, qu'on trouve à la fin quelques liſtes de livres Mss. de *Valere André* ayant répandu que *Sweertius* avoit copié ſa *Bibliotheque Belgique* imprimée en 1623, celui-ci s'eſt défendu fort cavalierement de ce reproche dans ſa Préface, & à l'article *Valerius Andreas*. Ce qu'il dit des Bibliothéques & des Univerſités, eſt peu de choſe.
4. *Belgi totius Deſcriptio.* Avec une Carte des Pays-Bas publiée en 1603. par *Jean-Bapt. Vrientius*.
5. *Meditationes Joannis Cardinalis de Turrecremata, cum ejuſdem Vita, & Precibus ſelectis. Colon. Bern. Gualterus*, 1607. 12°. l'an 1597. il ſe maria avec *Suſanne van Erpe*, qui lui donna ſix enfans, & il mourut à *Anvers* l'an 1629. dans ſa 62e année. Son corps repoſe auprès de celui de ſon pere. *Sweertius* avoit été du nombre des bourgeois d'*Anvers* qui allérent reprendre la ville de *Lire* ſurpriſe par les Hollandois de la garniſon de *Bréda* en 1596. Sa dévife étoit : *Ama latere* : mais il a travaillé trop utilement pour démeurer dans l'oubli. Ses écrits montrent qu'il étoit bel eſprit, qu'il entendoit le Grec, qu'il avoit bien étudié l'Hiſtoire Belgique, & qu'il poſſédoit la littérature & les Antiquités Romaines dans toute leur étendue. On fait d'ailleurs qu'il étoit d'une humeur douce, polie, enjouée, & très-propre pour la converſation.
6. *Sebilla Chriſtiana Orbis Delicia, ex Virginibus, Templis, Bibliothecis, & aliunde. Colon. Bern. Gualterus*, 1608. 12°. It. *Editio auctior. Ibid. Idem*, 1625. 12°. pp. 847. C'eſt un recueil d'Epitaphes qui ſe trouvent en différentes villes de l'Europe ; *Nathanaël Chytræe*, Recteur du college de *Brême*, en avoit donné quelques années auparavant un ſemblable lous le titre de *Fœnorum in Europa Itinerum Delicia* 8°. qui a été d'un grand ſecours à *Sweertius*.
7. *Hieronymi Magii de Tintinnabulis Liber poſthumus, cum Notis Franc. Sweertii. Francof. & Hanoviæ, typ. Wechelianis*, 1608. 12°. It. —— *Item ejuſdem de Equuleo Liber poſthumus cum notis Gothofredi Jungermanni. Accedit Appendix variorum Illuſtrium idem argumentum pertractantium. Editio noviſſima, aucta, emendata, & figuris æneis exornata. Amſt.* 1664. 12°. It. *Ibid. Hinc. Wetſtenus*, 1689. 12°.
8. *Clariſſimi Viri Juſti Lipſi Manes erranres. Ex Auctoris ſchedis partem deſcripſit, ſparſas collegit, ac junctim poſteritati edidit Franc. Sweertius F. Antverpienſis. Antv. Joan. Keerbergius*, 1610. 4°. gros caract. Italique, pp. 109. y compris une piéce en proſe, qui eſt : *Marci Ant. Boncarel, Perſiſtis, Epiſtola in laudem Lipſi.* It. dans les *Deliciæ Poetarum Belgarum* Tom. III. p. 502. It. *Cum aliquot ejus Epiſtolis. Herdervici*, 1621. 12°. Ce font les Poéties de *Juſte-Lipſe*.
9. *Monumenta Sepulcralia & Inſcriptiones publicæ privatæq. Ducatûs Brabantiæ. Antv. Gaſp. Bellerus*, 1613. 12°. pp. 394. Il y a de bonnes choſes dans ce Recueil ; *Sweertius* y rapporte entre autres diverſes Inſcriptions, que les Hérétiques avoient détruites pendant les troubles du XVI. ſiécle, & que des Curieux avoient pris ſoin de copier. Il en périt encore tous les jours, que nos neveux regretteront.
10. *Joannis Bochii Poemata, a Franciſco Swertio collecta. Acceſſerunt quædam Joannis Afcanii Filii, adjuvantque. Francof.* 1614. 16°. It. *Colon. Joan. Kinchius*, 1615. 12°.
11. *Juſti Lipſi Flores ex ejus Operibus decerpti, per locos communes digeſti. Acceſſere ejuſdem Teſſimonia & Symbola, opera Franc. Sweertii. Colon. Bern. Gualterus*, 1614. 12°. It. *Editio auctior, & melior. Antv. Gaſp. Bellerus*, 1616. 24°. pp. 350. avec *Cl. V. J. Lipſi Vita in compendium redacta per Franc. Sweertium ex Elogio H. D. Roberti Méri* pag. 351—387. de cette Edition. It. *Colon. Bern. Gualterus*, 1620. 12°.
12. *Rerum Belgicarum Annales, Chronici, & Hiſtorici, de bellis, urbibus, fitu, & moribus Gentis, antiqui recentiorſique Scriptores, quorum pars magna hactenus non edita, pars longè auctior nunc evulgatur ... Francof. Daniel ac David Aubrii, & Clemens Schleichius*, 1620. *fol.* pp. 373. 206. & 107. Ce volume, qui devoit être ſuivi de pluſieurs autres, contient les Annales de Hollande de *Jean Gerbrand de Leyden*, & de *Regner Snoy* ; les Annales Belgiques d'un Anonyme, Moine d'*Egmond*, & celles de *Gilles de Roye*, Moine des *Dunes*. On parlera ailleurs de ces Ecrivains.
13. *Epitaphia Jocoſeria Latina, Gallica, Italica, Hiſpanica, Belgica. Fr. Sweertius Antverp. Profeſſatûs & Urbanitatis collega. Colon. Bern. Gualteri*, 1623. 12°. pp. 311. Ce recueil eſt utile.
14. *Rariores Sententiæ, ex præcipuis, primaque nova Hiſtoriographiæ, collecta. Colon. Bern. Gualterus*, 1625. 16°.
15. *Athenæ Belgicæ, ſive Nomenclator Inf. fcr. Germaniæ Scriptorum, qui Diſciplinas Philologicas, Philoſophicas, Theologicas, Juridicas, Medicas & Muſicas illuſtrarunt ... Acceſſit .... juccincta XVII. ejuſdem Infer. Gem. Provinciar., nec non præſidum Orbis Bibliothecarum & Academiarum locatina Deſcriptio. Antv. Gul. a Tungris*, 1628. *fol.* pp. 708. On peut voir ce que j'ai dit de cet Ouvrage dans ma Préface : j'ajoûterai ſeulement, qu'on trouve à la fin quelques liſtes de livres Mss. de *Valere André* ayant répandu que *Sweertius* avoit copié ſa *Bibliotheque Belgique* imprimée en 1623, celui-ci s'eſt défendu fort cavalierement de ce reproche dans ſa Préface, & à l'article *Valerius Andreas*. Ce qu'il dit des Bibliothéques & des Univerſités, eſt peu de choſe.

Outre ces Ouvrages imprimés, *Sweertius* avoit promis les ſuivans, qui font reſtés en Mss., ou qui ſe ſont perdus.

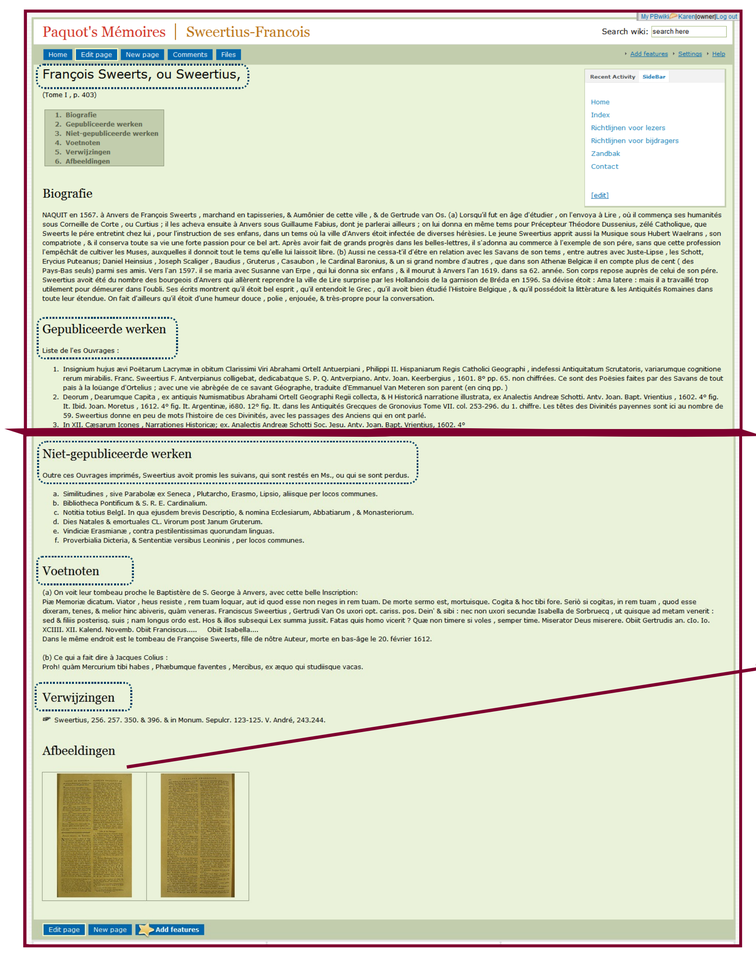
a. *Similitudines, ſive Parabolæ ex Seneca, Plutarcho, Erasmo, Lipſio, aliisque per locos communes.*
b. *Bibliotheca Pontificum & S. R. E. Cardinalium.*
c. *Notitia totius Belgi. In qua ejuſdem brevis Deſcriptio, & nomina Eccleſiarum, Abbatiarum, & Monaſteriorum.*
d. *Dies Natales & emortuales Cl. Virorum poſt Janum Gruterum.*
e. *Vindiciæ Erafmianæ, contra pplliſſimos quorundam linguas.*
f. *Proverbialia Dicteria, & Sententiæ vobis Leoninis, per locos communes.*

☞ *Sweertius*. 256. 257. 350. & 396. & *Monum. Sepulcr.* 125—125. *V. André*, 243. 244.

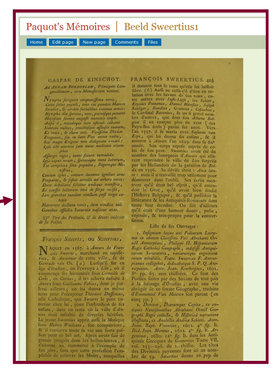


Structure of lemma's

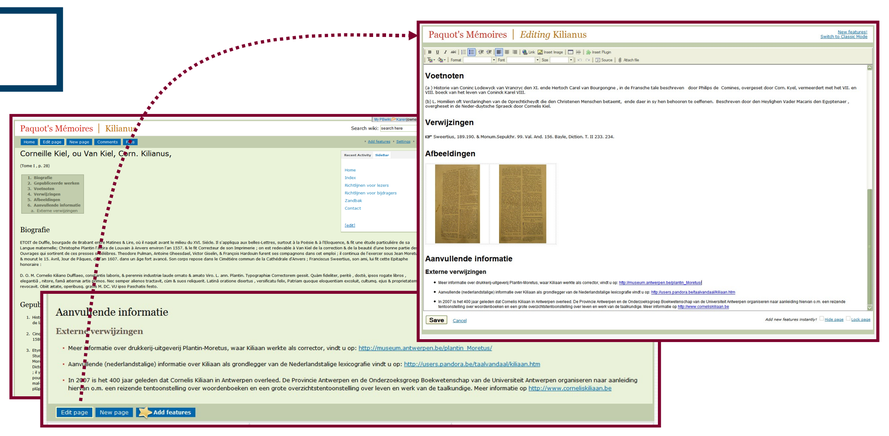
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Annotations



Differences

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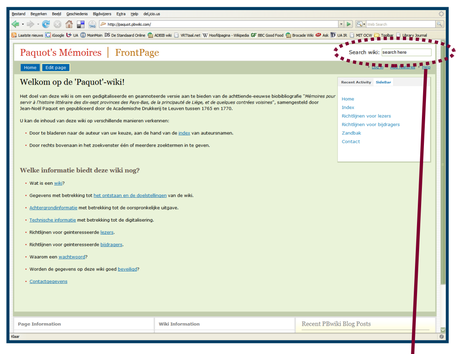
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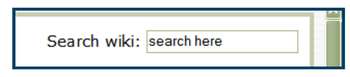
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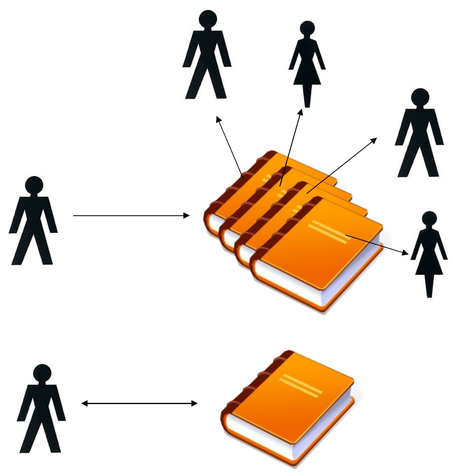


Search and retrieval of information

Alphabetical index of author names

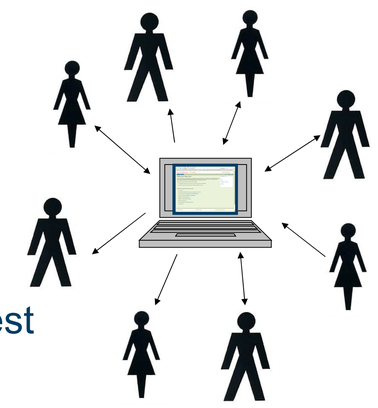
- alphabetical index of author names
- full-text search facility

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- annotations made to specific copies only consultable by owner
  1-to-1

- Jean-Noël Paquot
- annotations made by whole community of interest
  contributions consultable by all wiki visitors
  1-to-many & many-to-1



The 'Routinisation' of Time-Space: Issues of Stability and 'Black-Boxing' in Relation to the Shipping Container

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cmartin@ucreative.ac.uk

Introduction

The primary focus of this text is the means through which the standardizing tendencies of global capitalist time-space reflect a shift in the ordering and standardisation of knowledge, or rather the elimination of difference or multiplicity. It will be argued that the means through which this process of standardization occurs is through a means of 'routinisation'[1] of time-space partly inscribed by the twin roles of visibility and invisibility, specifically in terms of the blankness of form that we associate with that 'vehicle' of global capital – the shipping container.

In itself the material form that the shipping container takes is rather innocuous. Its key features are its regularity (it comes in four standard sizes – ten, twenty, thirty and forty foot variations, but most typically the twenty and forty foot sizes dominate) and its ubiquity, the sheer number that proliferate throughout the world – currently some 300 million of them circumvent the globe[2] Perhaps its most telling feature is blankness, it is a closed space; there is little to the container in terms of how it confronts the viewer, nothing to identify its contents. As these blank boxes traverse rail and road networks we are left to wonder at what is being carried. We see nothing. The quantity of containers highlights the importance of standardisation, both of the unit itself but also the logistical infrastructure behind their movements. For the operation of global commodity movement is predicated on a highly attuned inter-modal system, one that requires the seamless transference between different elements of the system, be that from truck to crane to ship, highlighting the specific context of this debate in relation to contemporary questions of mobility.

The present paper sets out, with mobility as its ever-present theme, to investigate the relationship between the standardising processes of containerisation, the notion of infrastructural inter-changeability and the twofold role of visibility. These aims are developed by considering the relationship between 'foreground' and 'background', that is, respectively, the standardised form of the container itself and the logistical infrastructure that 'powers' this movement. The opening discussion concerns the role of containerisation, its regularity of form and the move toward a packaging of efficiency through 'black-boxing', before moving on to the importance of 'visibility' outlined in relation to commodity movement and the inter-changeability of time-space, again with reference to the routinisation of 'black-boxing' and the drive toward spatial and temporal stability. A key facet of this text is the way in which these aspects portray the distributive phase of commodity culture as 'natural'.

The flux of 'stuff' and the onset of containerisation

Bill Gunston writing in the late 1960s when containerisation was beginning to take hold notes that prior to this cargoes came "in crates, pallet loads, bags, cans, sacks, bales, packing cases, and as carcasses, and [had] been characterised by a complete lack of uniformity".[3] This suggests that before the gradual onset of containerisation in the mid-1950s the loading of cargo ships was typified by the complexity of packing, as well as the length of time taken to load and unload cargo. The loading of commodities on cargo vessels prior to containerisation was by individually boxed, or loosely arranged items, with photographs of the time depicting an intricate system of tightly packed boxes of items, complex layers of varying sizes, with stevedores engaged in manoeuvring cargo in the ship's hold. Viewing such images from the early twentieth century for example one is struck not only by the vast quantity of goods that had to be loaded or unloaded, be that boxes of oranges or loose planks of timber, but also the sight of the actual contents of the cargo, something that would shift dramatically with containerisation.

The multiplicity of cargo that we saw with non-containerized commodities, or the 'flux of stuff' as I would term it, was a demand on time and space. In this era there was the spectre of immobility in relation to the amount of time spent in port due to the multiplicity of loosely packaged commodities and the intricacy of loading required. The length of time taken to achieve this level of 'fit' should not obscure, especially in spatial terms, the efficiency and skill of loading ships. For pre-containerisation the system of fit was clearly one of organisation but a rather more skill-based means of efficiency through highly-skilled labour, rather than the automated, standardized nature of containerisation. In discussing the move toward containerisation Frank Broeze, like Gunston before him, notes that previous to this there were a "multitude of different cargo items".[4] His use of the term 'multitude' is telling in that the container is seen as reducing this multiplicity. In its packaging of difference the container controls multiplicity, thus pointing to the two factors that would characterize the desire within the transport industry to move toward containerisation: the *speed* of loading and unloading, alongside the spatial *efficiency*, highlighting the emphasis on spacio-temporal ordering and precision. However, given the earlier complexity and skill of loading, as such the container does not *radically* alter the actual efficiency of packing but instead reduces the skilled labour required by automating and standardizing this efficiency and skill. 'Skilled fit', a term I employ to render the importance placed on the efficiency of packing, is achieved through a *regularized, automated system* rather than one that requires the expertise of stevedores to produce spatial efficiency. We can see from this brief outline that containerisation parallels other forms of standardisation within the realm of production and manufacture.

Regularity of form and the inter-locking of time-space through fit

Similar to other forms of industrial automation containerisation was based on the reduction of labour time for the benefit of economic efficiency. The means of *reducing time* was premised on the spatial precision and efficiency offered by the standardised form of the container. Instead of the flux of stuff the container homogenised all cargo by demanding that commodities be fitted into the standardised units. For Broeze standardisation of the shipping container "simplified and accelerated"[5] the process of commodity distribution, highlighting again the emphasis placed on homogenisation and speed. Similarly Gunston notes how "standardised dimensions for containers on international routes and standardised detail design ensure[d] compatibility".[6] This was a twofold procedure, for the development of a standardised system required both a common and agreed upon set of sizes as well as a system to facilitate the movement of these, which was not only achieved by the design of the container itself but also through an integrated infrastructure that created "an effective multi-modal sea-and-land system with door-to-door transport from producer to consumer".[7] In doing so containerisation overcame the previously fragmented infrastructure of the transport system. The regularity of form that we see with the shipping container is critical for the development of a multi-modal system, given that the standardised size and design of the shipping container is necessary in order to facilitate the *interlocking* of various parts of the system, i.e., in order for the container to interlock with a truck or rail bed a universal locking mechanism had to be developed [8] so as to allow the seamless transferral between modes, demonstrating the emphasis on compatibility and inter-changeability. My use of terms such as compatibility and inter-changeability, but interlocking in particular are intended to suggest a coming together of two mutually dependent factors within a system, a coupling of two elements, with 'lock' implying a means to stabilise and make semi-permanent the interaction, so that when permanence is required it is available, but when flexibility is the requisite this too is accessible via a simple mechanism of sorts. This may be the case with an obvious 'lock-on' such as the container's twist lock mechanism, locking the container to the truck bed. It may also be seen with the larger scale lock-on systems such as the movement of the container from ocean to land through gantry cranes, but further to this the interlocking function may be extended to a global scale in the organisation of customs clearance procedures as part of the operation of shipping lines for example. Up to this point we have seen that processes of standardisation and interlocking are suggestive of attempts to regulate and control the problems associated with the transportation of commodities prior to containerisation.

These 'problems' with commodity movement are analogous to wider considerations of social ordering and stability, a debate that is richly analysed by those scholars working in the field of Science and Technology Studies (STS), in particular with the writings of John Law. Like my own assertions concerning the desire for inter-modality requiring some form of stability Law notes how, in rather more philosophical terms, the surety of reality depends on the notion of *fit* and *stability*, given that often within the social milieu there is a plethora of "uncertainty, fuzziness and undecidability".[9] This leads us to an important consideration of how fit and stability can be seen in terms of the spatial and temporal control of commodity movement – thus providing an analogous notion of *surety*. In relation to the development of technological or scientific systems Law notes how the issue of routinisation[10] becomes apparent – that is, in order to facilitate production, experiments or movement for example, the mechanisms that do so, be they machines, vehicles, textual documents, procedures, objects etc., have to take "standardised and transportable forms".[11] They have to be regularised and taken as established and trusted entities. In relation to commodity movement the system of containerisation becomes a standardisation or *routinisation of movement*. Although the term routinisation is atypical in relational to spatial form, being more applicable to temporal repetition, its use here is intended to suggest the interdependence between spatial and temporal organisation. It could be argued that the standardisation of time becomes the routinisation of form.

Black-boxing of movement

Over time the efficiencies associated with routinisation and standardised systems such as containerisation become 'black-boxed'[12] that is they are taken for granted or rather normalized to the point that they appear 'natural', without historical or material grounding. Susan Leigh Star has argued persuasively that, "technology freezes inscriptions, knowledge, information, alliances and actions inside black boxes, where they become invisible, transportable, and powerful in hitherto unknown ways as part of socio-technical networks".[13] Such a statement allows us to consider the means through which objects and systems become 'naturalised', but it also posits the way in which ideas or knowledge become 'packaged' in order to facilitate ease of movement, or in more practical terms the routinisation of black-boxing is akin to the efficiency of organisation seen with the container. Given the focus of the present paper the revealing term here is that of *invisibility*, for invisibility I argue is synonymous with routinisation, something that will be discussed shortly.

In essence the 'packaging' that black-boxing refers to creates an ease of technological or social development through an acceptance of established techniques and procedures. This 'trust' in the package is a neat means of considering the routinisation of commodity movement, for just as Law states that one does not need to worry about "individually assembl[ing] all the elements that make up the assemblage",[14] in relation to the purchase of a computer for example so the complexity of meaning associated with individual commodities is reduced. For the consumer the black-boxing of movement or distribution of commodities limits the awareness of exactly how consumer culture is produced via an intricate, highly managed, highly policed assemblage. Much of this concurs with and mirrors the work of the geographer Nigel Thrift.[15] For him there are textual, material and technological developments that alter people's perceptions of time (and space) consciousness, from the role of train timetables to the spatial organisation of cities. Following Thrift it is possible to posit a shift in the meaning of spatiality and temporality that the movement of the shipping container as a piece of black-boxed mundane technology institutes, especially the assumption on the part of consumers that commodities simply *appear*. There is an apparent lack of appreciation for how commodities 'move' through time-space. It could be argued that the idea of effortless arrival may be a result of the instantaneous qualities associated with the ubiquity of immaterial communications technology – a more widely acknowledged generator of shifts in understanding the consciousness of space and time through the notion of 'time-space compression'.[16] This shrinking of geographical and temporal 'distance' is analogous to the invisibility associated with black-boxing, but the critical point in relation to my own consideration of invisibility is that of speed. The speed and efficiency of commodity movement, the purported instantaneous appearance, seems to depend on a closing off, a bracketing off of the visibility of commodities in transit.

This returns us to Star's discussion of black-boxing and invisibility. The interplay of visibility/invisibility, or visibility and blankness as initially described, is clearly central to this debate, for this operates on a variety of levels that both promote the need on the one hand for traceability of commodities through container identification and tracking, but also the simultaneous anonymity and blankness of commodities in movement and the black-boxing of the system itself. Respectively, visibility elicits a making known, a becoming public, but also the means to track and so render movement stable in the sense that it is knowable and readily enforceable. Anonymity asserts a further kind of stability through the means of its becoming ubiquitous without knowing. Ubiquity is an important consideration for the current debate, for the constant presence of an object like the shipping container suggests a familiarity, an abundance of awareness through ongoing visibility. However, the quantity of presence, the over-familiarity with these objects makes us blind to the same presence. This invisibility through the sheer mass of visibility leads us directly to the question of infrastructure or 'background'. Invisibility is operative at both the level of the material form of the shipping container as an object in its own right, but also in relation to the work that distributes this, that of infrastructure in the form of the physical networks of shipping lanes and train lines, but also the logistical organisation of these. Like the commodities travelling inside the container, the background production of movement is often hidden through specific forces of invisibility. For Bowker & Star[17] there is a decisive relationship between visibility and invisibility when we consider infrastructure. This invisibility of infrastructure is predicated once again on standardization – because there is a purported 'effortlessness' of commodity movement there is an assumption of 'ease', so the power of infrastructural standardization in the form of transport networks and logistics is that it cloaks the work that is involved in distributing commodities. Instead there is a routinisation or naturalisation of movement, or somewhat more prosaically a taken-for-granted-ness. As I have argued elsewhere that "the space of flows being offered by the ideologues of unencumbered movement is the only version of capitalist space that we are offered. Under the auspices of a flattening-out of timespace the actual organisational forces that power these movements are withheld, hidden from view".[18] The accent then is on *stability*, for within the system of movement the 'propulsion' of the shipping container is predicated on the means to secure the system itself and keep movement regular and stable, without interruption and this is achieved in part through the invisibility of operation.

Conclusion

Although the mundane regularity of an object such as the shipping container might suggest that it lacks complexity or indeed profundity, I have attempted to outline in this brief text that this is far from the case. As with other forms of material culture or everyday technology that many people take for granted this standardised object of contemporary capitalist culture provides potentially complex insights into the organisation of time and space. In particular the standardising processes of containerisation and the idea of infrastructural inter-changeability suggest just how complex the organisation of commodity movement is. Above all the emphasis that is placed on the need for fit and stability demonstrate how wider considerations of social ordering are played out in analogical terms through an object like the container. Finally there is often a downplaying of complexity given the invisibility and black-boxing of movement associated with commodity distribution, especially when these commodities simply 'appear'.

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Physical architecture and information architecture, NOT

Paul Nieuwenhuysen*, Joni Nieuwenhuysen**

Abstract - **Introduction: Design considerations are applied in physical architecture as well as in more virtual information architecture. An approach that is productive and useful in physical reality may also be applicable in the more virtual reality, in some analogous way.**
Problem statement: Which elements of reality are NOT well included in mainstream architectural design considerations, while they may nevertheless be quite important for the result of the design process? How can such factors be incorporated in architecture nevertheless?
Results:
A. We found that analogous challenges face the architectural designers working in physical space and information architects working with virtual space, even when we focus on aspects that largely escape the mainstream architectural design process.
B. For an analytical view we have placed the hardly tangible architectural aspects that we have identified in a theoretical model to accommodate 3 dimensions.
C. Further we step from the theoretical considerations to more practical actions and decision making: for challenges that we have identified, we also make a recommendation on how to take them into account in the design process, in spite of their hardly tangible nature.

Keywords **-information architecture, physical architecture**

I. INTRODUCTION

Architects design order versus disorder.

Design considerations, methods, principles, rules, tactics and strategies are applied in spatial, physical architecture as well as in more virtual information architecture.

An approach that is productive and useful in physical reality may also be applicable in the more virtual reality, in some analogous way.

II. PROBLEM STATEMENT

Which elements of reality are NOT well included in mainstream architectural design considerations, while they may nevertheless be quite important for the result of the design process?

And how can such factors be incorporated in architecture nevertheless?

III. RESULTS

A. Hardly tangible factors in architectural design

We found that analogous challenges face the architectural designers working in physical space and information architects working with virtual space, even though their practical methodology and technology is quite different,
even when we focus on aspects that largely escape the mainstream architectural design process.

Examples are found in the areas of

- aging of the creation,
- interactions of the creation with the changing environment,
- modifications of the creation by a user…

B. Modeling the struggle with disorder

For a systematic, efficient, analytical view on this domain of discourse, we have placed the hardly tangible architectural aspects that we have identified in a theoretical structure/model in the form of a cube to accommodate three dimensions = variables (see Figure 1):

1. We consider the two extremes to start with:
   Purely physical
   or purely virtual architecture.
2. We can distinguish two other extremes:
   Immediate interactions with the environment
   or much slower subsequent applications, adaptations, aging, deterioration over longer time.
3. A further refinement:
   Impact due to the user(s) of the creation
   or to other elements of the environment.

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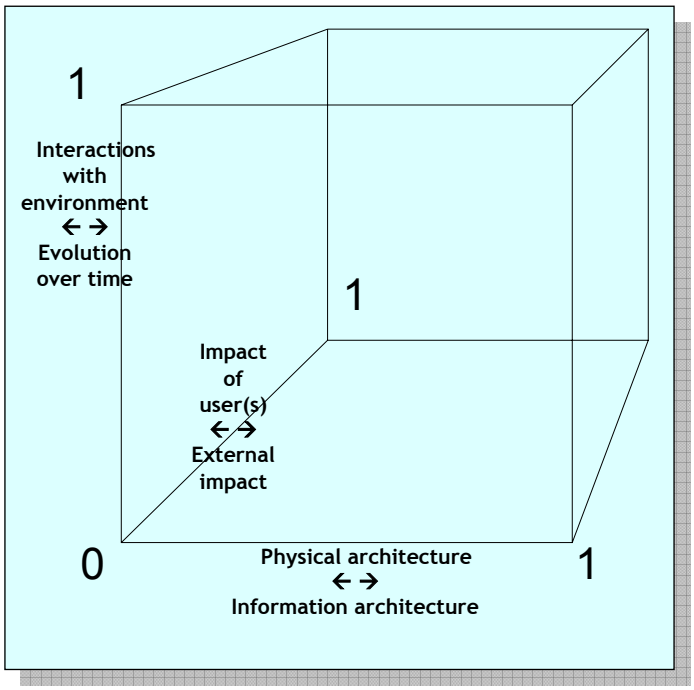


Figure 1. Model of the architectural struggle with disorder in three dimensions.

C. Architectural design recommendations

Further we step from the theoretical considerations to more practical constructive and concrete actions and decision making, to include some of the hardly tangible aspects in a more systematic and formal way into the design process.

Concretely, for each of the challenges that we have identified, we also make a recommendation on how to take them into account in the design process, in spite of their hardly tangible nature.

This is justified by the hope that such a way of working leads to products of higher quality, usability and durability.

Physical architecture and information architecture, NOT

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Introduction: Designing order versus disorder

- Design considerations, methods, principles, rules, tactics and strategies are applied in spatial, physical architecture as well as in more virtual information architecture.
- An approach that is productive and useful in physical reality may also be applicable in the more virtual reality, in some analogous way.

Problem statement:

- Which elements of reality are NOT well included in mainstream architectural design considerations, while they may nevertheless be quite important for the result of the design process?
- And how can such factors be incorporated in architecture nevertheless?

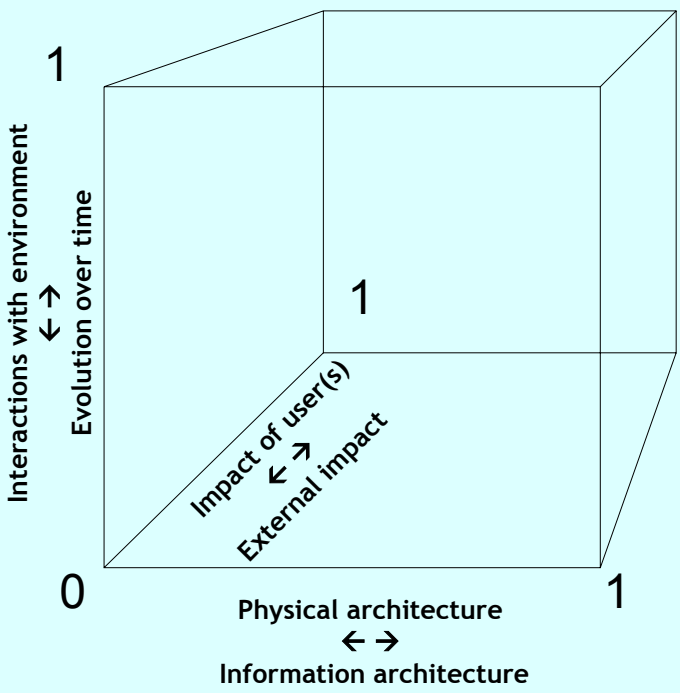
Results Part 1: Hardly tangible factors in architectural design

- We found that analogous challenges face the architectural designers working in physical space and information architects working with virtual space, even though their practical methodology and technology is quite different, even when we focus on aspects that largely escape the mainstream architectural design process.
- Examples are found in the areas of aging of the creation, interactions of the creation with the changing environment, modifications of the creation by a user…

Results Part 2: Modeling the struggle with disorder

- For a systematic, efficient, analytical view on this domain of discourse, we have placed the hardly tangible architectural aspects that we have identified in a theoretical structure/model in the form of a cube to accommodate 3 dimensions=variables:

1. We consider the two extremes to start with: Purely physical or purely virtual architecture.
2. We can distinguish two other extremes: Immediate interactions with the environment or much slower subsequent applications, adaptations, aging, deterioration over longer time.
3. A further refinement: Impact due to the user(s) of the creation or to other elements of the environment.



Results Part 3: Architectural design recommendations

- Further we step from the theoretical considerations to more practical constructive and concrete actions and decision making, to include some of the hardly tangible aspects in a more systematic and formal way into the design process.
- Concretely, for each of the challenges that we have identified, we also make a recommendation on how to take them into account in the design process, in spite of their hardly tangible nature.
- This is justified by the hope that such a way of working leads to products of higher quality, usability and durability.

International Conference ANALOGOUS SPACES, Universiteit Gent, Belgium, May 2008
Section 2. Space of Knowledge and Memory

Knowledge Atlas: a cartographic approach to the social structures of knowledge

Marco Quaggiotto*

Abstract - **This poster aims to visually present the first results of the ongoing research on a cartographic approach to the representation of knowledge in its present configurations by showing some applications of the 'Knowledge Atlas', a software tool developed to explore such approach.**
The concept of 'atlas' in this context doesn't depict as much a list of maps, but rather a system of representations of space, a communication device aimed at representing complex contexts through the use of many partial overlapping narrations: a network of maps, diagrams, texts and peritexts, combined together to describe the space of research in its multifaceted aspects.

***Keywords* – knowledge cartography, research management, knowledge visualization,**

I. Introduction

In a context where the modalities of creation, organization and access to information have dramatically changed, computers and networks are acquiring a dominant role in the definition of new methods for its creation and sharing. To *know*, in the digital age, means to be connected to a network (both social and technological) able to provide information and competences at the time of need.

Clearly, while a social paradigm for knowledge is being defined, the tools and methodologies for its representation are still missing. Traditional representation images such as trees of knowledge, scales and networks are hardly able to describe such complex environments.

This poster aims to visually present the first results of the ongoing research on a *cartographic approach to the representation of knowledge* in its present configurations by showing some applications of the 'Knowledge Atlas', a software tool developed to explore such approach.

II. The Atlas

The *Atlas of knowledge spaces* takes advantage of the experience developed by cartography in the representation of complex and open spaces, historically able to hold heterogeneous, natural and social elements together in the same picture. The concept of 'atlas' in this context doesn't depict as much a list of maps, but rather a system of representations of space, a communication device aimed at representing complex contexts through the use of many partial overlapping narrations.

From a practical point of view, the *Atlas* is a software prototype being developed by the *Communication Design Research Unit (d.com)* at the Politecnico di Milano, for the management of research systems (ie. resources, actors and relationships that interact in the creation of new knowledge), designed to support common tasks of research such as survey, mapping and analysis.

The software, built on web-based technology, presents itself as a social web-application that allows any user to build his own bio-bibliographic database four types of resources (authors, texts, projects, conferences and research groups) related to their research.

Each resource in the system can be described *collectively* by the users (as in a wiki) in its essential features (such as date, description, location,…) and *individually*, by each user, through the definition of tags, comments, and through the establishment of relationships between entities (e.g. relating a text to its author, a person to a research group).



Figure 1. Screenshot of Atlas interface.

III. Knowledge Cartography

This management model for the research ecosystem offers the ability to create a collective network of users, resources, and keywords. Working on these data it's possible to create an *Atlas of knowledge spaces* made of maps at various levels of scale, ranging from personal research maps to department-level maps of knowledge, or even collective maps of research areas emerging at university level.

Of course, a naive visualization of *all* the entities stored within the database would be both impossible and useless because of excessive information density. As with traditional cartography, the task of representation doesn't simply lie in the creation of a *replica* of reality, but appears as a cultural process for the narration of the territory. According to cartographic rhetoric, reality must be *selected*, *projected* and *symbolized* in order to create maps with specific objectives.

- The selection process distinguishes the elements relevant to the description of space according the map intended

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use. Depending on the author's choices, the map can choose to show only the relationships between the authors and their texts, or the relationships between researchers and their research themes, or maybe just the most popular conferences.

- The *projection* process, just like in traditional cartography, aims at placing the cartographic entities on the map space in order to create the best possible image for a specific activity. In the context of knowledge spaces, the *Atlas* currently provides four main projection modes placing entities on semantic, socio-relational, geographic and temporal spaces.
- Finally, the *symbolization* process on one hand allows to create a hierarchy of visual resources, highlighting some of them depending on the map's intended function, and the other hand it lets the author adjust the connotations related to the visual form through the definition of a representation language, a lexicon and a visual style.

Unlike traditional maps, however, users of the *Atlas* are allowed not only to intervene in the navigation of space, but also in the cartographic process. The previously introduced rhetoric operations are thus shared with the users, enabling them to create multiple visual narratives designed to perform specific actions: deepen the understanding of some issues, identify reference authors for a specific discipline, find connecting paths between two seemingly separated research areas, etc.

IV. Future developments

Future developments of this research will investigate its possible application to design research, academic libraries and visual communication archives, while further exploring the cartographic metaphor.

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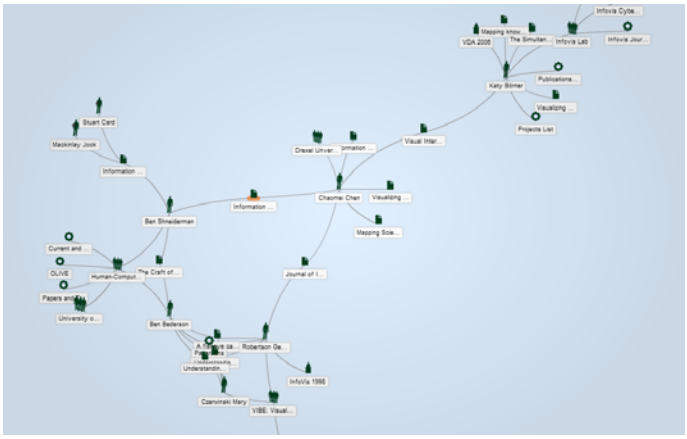


Figure 2. Example of relational resource map.

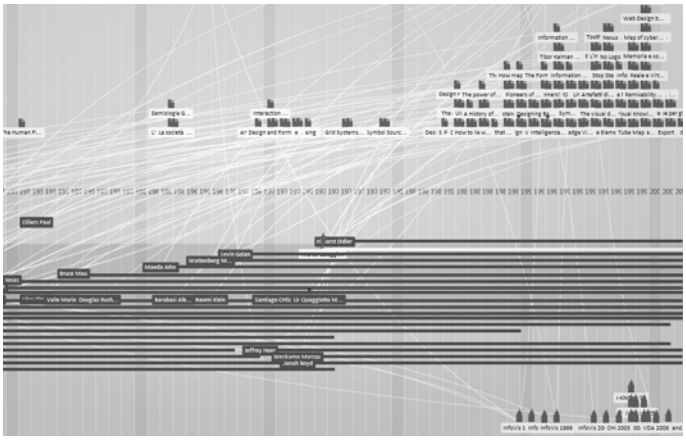


Figure 3. Example of temporal resource map.

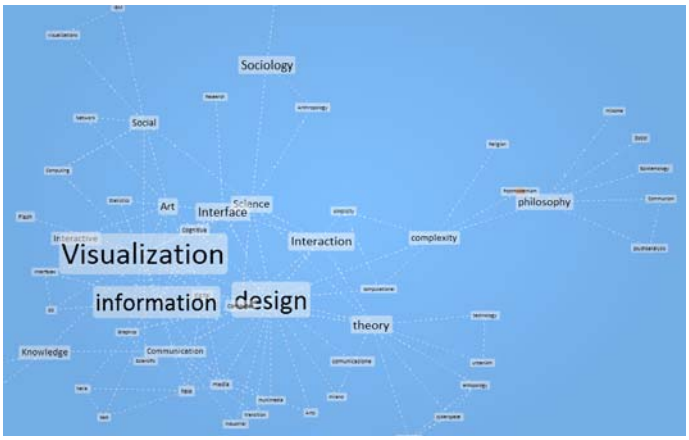


Figure 4. Example of semantic map.

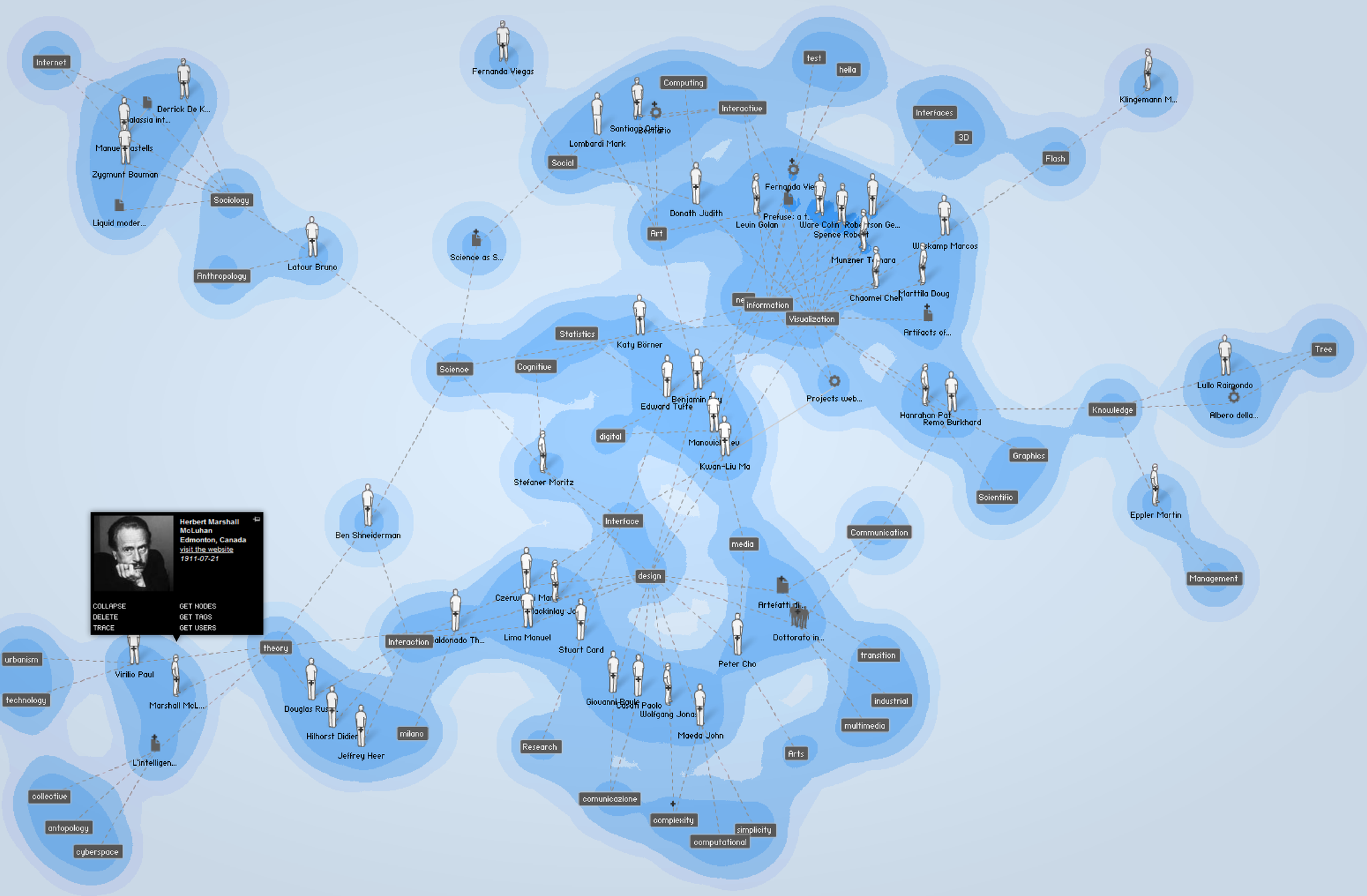


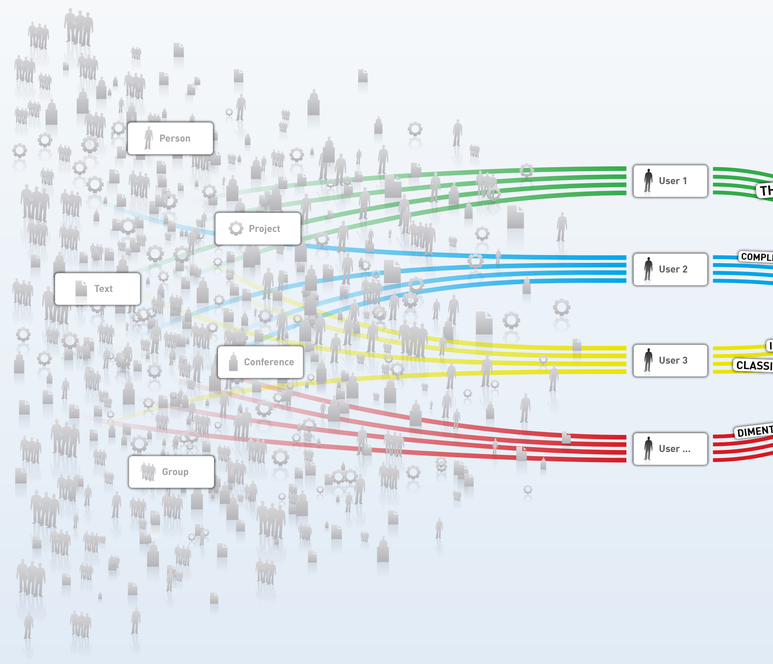
Figure 5. Example of geo-thematic map.

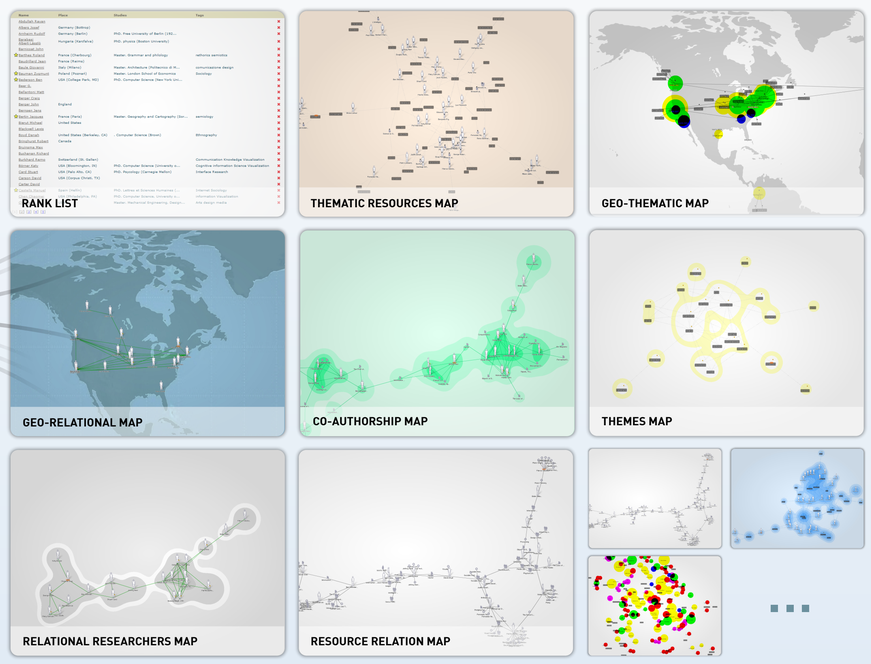
KNOWLEDGE ATLAS

A CARTOGRAPHIC APPROACH TO THE SOCIAL STRUCTURES OF KNOWLEDGE

The Atlas of knowledge spaces takes advantage of the experience developed by cartography in the representation of complex and open spaces, historically able to hold heterogeneous, natural and social elements together in the same picture.
The Atlas isn't just list of maps, but rather a system of representations of space, a communication device aimed at representing complex contexts through the use of many partial overlapping narrations: a network of maps, diagrams, texts and peritexts, combined together to describe the space of research in its multifaceted aspects. Just as a map itself, the Atlas is a toolset that enables users to act on space: navigate, describe, explore, compare, change scale, shift focus.







ATLAS

Atlas is a software prototype for the management of research resources (texts, people, projects, conferences), aimed at supporting common tasks of research such as survey, mapping and analysis.
The social nature of the software allows users to share resources with each other, discover the existence of potentially interesting studies and explore other users' research maps.



Every user (both individually or as research group) can add resources to its own list, classify them through the use of shared keywords (tags), evaluate them, add comments, and establish connections with other resources (eg. authorship, citation, collaboration).
Through distributed entity classification it becomes possible to define thematic contexts and social categorization.



Working on resource collections, the software builds a network that relates users, resources and research themes, thus creating a structure for the evaluation of similarity values. This similarity value enables the system to offer suggestions and recommendations to each user.



The resulting research space is a space meant to be navigated and explored, described and designed. The software's aim is to provide a set of appropriate maps for this kind of tasks. Just like geographic cartography, this new kind of cartography proposes its own rhetoric for the creation of cultural tools, aimed at expressing both their narrative and instrumental natures.

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Academy of the Refused: Patronage and Propaganda Networks of the International Style in New York, 1930-1935

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Abstract: **The idea that modern architecture was an "International Style" was first offered by a group of young critics and historians in New York around 1930. Its members were citizens of overlapping and mutually reinforcing social or intellectual communities. They are seen to advantage in the exhibition of "Rejected Architects" mounted by Philip Johnson in 1931. Central to the communities was the belief that their members were outsiders to their elite social class. Diagramming the "International Style" group as overlapping "spaces" of artistic advocacy avoids the ambiguities encountered when historians apply exclusively biographical models to this group, or attempt narratives of its "impact" on architectural production. The model of a system of mutually reinforcing social and intellectual communities exposes the "International Style" group's commonalities with patrons and educators in architecture, and its tangential but productive relation to that part of American architecture culture concerned with technology and society.**

The idea that modern architecture was an "International Style," a paradigm that shaped architectural production and discourse between the 1940s and the 1970s, was first offered by a group of young critics and historians in New York around 1930. Their leader, Alfred H. Barr Jr., director of the Museum of Modern Art (MoMA), coined the term for his museum's 1932 exhibition of modern architecture. The book *The International Style* was co-written (with historian Henry-Russell Hitchcock Jr.) by Philip Johnson, curator of the MoMA show. Unaffiliated with architecture culture, the group's members are best understood as citizens of overlapping and mutually reinforcing social or intellectual communities. Central to them were the belief that their members and their heroes were outsiders. It is not MoMA's "International Style" show but Johnson's 1931 storefront exhibition "Rejected Architects," featuring International Style designers not accepted for a New York Architectural League show, which best reveals these communities.

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The group's **prime social community** was that of **scholars and merchants of art history.** It began in Harvard University's liberal-arts college community and its graduate program in art history, and was largely transferred to Manhattan, with Harvardians in colleges or museums elsewhere (like Hitchcock) remaining part of it by virtue of origins. Harvard-trained art dealers like Julien Levy (whose family connections secured the space for "Rejected Architects") encouraged a belief that art patrons could be "sold" on modern architecture as well as painting. A subsidiary social community was that of **art patronage.** The ability of MoMA trustees like Abby Rockefeller to support young talents was very much on Philip Johnson's mind in mounting first "Rejected Architects" and then MoMA exhibitions of modern architects between 1932 and 1934. Instead of forging contacts with architects, Johnson's cohort thought of advancing modernism as Harvard-trained art connoisseur Bernard Berenson had done for Renaissance painting: by using art-historical scholarship to get patrons to spend on particular kinds of art. [1]

Harvard fostered two nodes of **intellectual community**: one asserting that **art is a perfect world unto itself**, the other that **modern art was rebellion.** Starting from Berenson's model of formalist connoisseurship, Hitchcock wrote that European modernists had subjugated the formless technologies of engineering to a pure style based on abstract form. Barr explained that the history of modern art showed the academy's rejection of successive avant-gardes, who always triumphed in the end as agents of "progress." Johnson's "Rejected Architects" were heroes of a Salon des Réfusés, more historically inevitable than the backward-looking, aesthetically "impure" Empire State Building celebrated at the League show. MoMA's 1932 "International Style" show and book made the rebellious posture milder by featuring better-known architects like Walter Gropius, stressing

inevitability more than rebellion. This made *The International Style* a textbook for architectural educators seeking change.[2]

The "réfusé" paradigm reinforced another **social community**: heirs of elite families who felt themselves **psychically marginalized or defective**. Philip Johnson, emotionally fragile son of a wealthy lawyer, is the best known such figure. Their world overlapped in proximity or sympathy with Harvard "aesthete" culture and the nascent gay cultures of New York and Berlin. These men felt that they could turn anger at their marginal places in the elite into passionate demonstrations, as members of the community of art patronage, that their "rejected" aesthetic values were historically inevitable. Thus "Rejected Architects" assumed a "David and Goliath" role vis-à-vis conventional architecture culture, but also solicited well-known men like Charles Lindbergh as potential clients.[3]

The agonism of this posture distanced it from advocates of modernism's social mission, despite their community of interest, and even from the established European modernists it publicized. However, as an aesthetic-formalist intellectual community, it had a productive tangential relationship with members of mainstream architecture culture concerned with its relation to engineering. The "Rejected Architects" rethought engineering or planning decisions so that the most aesthetically fine option—and the least socially or conceptually iconoclastic one--was chosen. To use Peter Bürger's terms, Barr's cohort produced modernism, but not avant-gardism: it attacked old forms, but not the established uses of form in society.[4] When Philip Johnson confusedly wrote of his 1931 show, "I hope to turn the REJECTED ARCHITECTS into an institution!"[5], he showed how connoisseurial and self-therapeutic frameworks of community could turn radical architecture into an "International Style."

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[2] Terence Riley, "Portrait of the Curator as a Young Man." *Museum of Modern Art Studies in Modern Art 6* (1998), 39-44, 51-55. Riley, *International Style*, 43-47.
[3] Steven Watson, *Prepare for Saints* (New York: Random House, 1998), 79-114, 133-162, 173-196.
[4] Peter Bürger, *Theory of the Avant-Garde* (Minneapolis: University of Minnesota, 1984).
[5] Robert Benson, "Douglas Putnam Haskell: The Early Critical Writings" (Ph.D. diss, University of Michigan, 1987), 284.

ACADEMY OF THE REFUSED: PATRONAGE AND PROPAGANDA NETWORKS OF THE INTERNATIONAL STYLE IN NEW YORK 1930-35

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The idea that modern architecture was an "International Style" was first offered by a group of young critics and historians in New York around 1930. Its members were citizens of overlapping and mutually reinforcing social or intellectual communities. They are seen to advantage in the exhibition of "Rejected Architects" mounted by Philip Johnson in 1931—a trial run for the better known show Museum of Modern Art show of 1932, "Modern Architecture," and its accompanying book, *The International Style*. Central to the communities was the belief that their members were outsiders to their elite social class. Diagramming the "International Style" group as overlapping "spaces" of artistic advocacy avoids the ambiguities encountered when historians apply exclusively biographical models to this group, or attempt narratives of its "impact" on architectural production. The model of a system of mutually reinforcing social and intellectual communities exposes the "International Style" group's commonalities with patrons and educators. in architecture, and its tangential but productive relation to that part of American architecture culture concerned with technology and society.

Professional/social community: scholars and merchants of art history. Originating in Harvard University's liberal-arts college community and its graduate program in art history, and largely transferred to Manhattan, with Harvardians in colleges or museums elsewhere remaining part of it by virtue of origins.

Members: Philip Johnson, Alfred Barr (director, Museum of Modern Art [MoMA], New York), Henry-Russell Hitchcock (architectural historian of modernism), Julien Levy (art dealer), Lincoln Kirstein (publisher of arts and letters journal *Hound & Horn*, Kirk Askew (art dealer; his house was a salon for Barr's friends and colleagues), Edward M. M. Warburg (patron of modern art), J. B. Neumann (Berlin-based art dealer, with connections to Mies van der Rohe and other German modernist architects)

Operating assumption: art patrons could be "sold" on modern architecture as well as painting. Modernism could be advanced as Harvard-trained art connoisseur Bernard Berenson had done for Renaissance painting: by using art-historical scholarship to get patrons to spend on particular kinds of art. Johnson designed "Rejected Architects" and MoMA's architecture shows to attract the attention of elite potential clients for the architects shown.

Subsidiary social community: **art patronage.** Members: Johnson**,** Johnson's parents Louise and Homer Johnson, Levy, Warburg, Abby Rockefeller, Helen Resor (MoMA trustees). Levy family supplied the storefront for "Rejected Architects." The senior Johnsons sponsored house projects from Alfred Clauss ("Rejected Architects") and eminent Dutch modernist J. J. P. Oud (for the "International Style" exhibition, "Modern Architecture," MoMA 1932).

Emotional/Social Community: heirs of industrial or financial fortunes who found or felt themselves **psychically marginalized or defective**. Members: Johnson, Warburg, Kirstein, Levy. Overlapping in proximity or sympathy with **Harvard "aesthete"culture**, widely understood as dominated by self-preoccupied poets and connoisseurs; the **expatriate** cultural circles of the 1920s; and the nascent **gay cultures** of New York and Berlin.

These men passed through the **Harvard art-history** community and had their sense of commonality strengthened thereby.

The cultural historians Christopher Lasch and Jackson Lears have remarked that from 1870 until World War II, members of American elites nursing a wounded sense of self used radical literary or artistic causes in quest of wholeness. Donald Kuspit has posited this mindset for much of avant-garde culture since its inception around 1860.

Operating Assumptions: modernist knowledge of new cultures to come would have therapeutic effects; the "marginalized" must explain this culture to those outside of and ignorant of it, and actively battle institutions ("the schools," "the dull businessman") which were closed to the coming culture's insights.

Intellectual community: **art is a perfect world unto itself.** Prime advocates: Barr, Hitchcock, Warburg.

Operating assumptions: Berenson's model of formalist connoisseurship, Clive Bell's theory of art's effectiveness through abstract "significant form" rather than representation.

Hitchcock wrote that European modernists had subjugated the formless technologies of engineering to a pure style based on abstract form. Barr suggested that pure form was the key to modern aesthetics and had been applied constructively to design at the Dessau Bauhaus.

Origins of the vocabulary of the International Style: planarity, regularity, volume accented over mass, geometry.

Intellectual community: **modern art is rebellion.** Prime advocates: Barr, Johnson, Kirstein, Levy

Operating assumptions: the history of modern art showed the academy's rejection of successive avant-gardes, who always triumphed in the end as agents of "progress." Courbet's and Manet's "salons of the refused" were models of probity and daring in the name of historically inevitable change. Culture belonged to the young and the revolutionary.

Barr and Johnson asserted that the International Style's basis in machine functionalism was a rebellion against academic eclectic architecture and a sign of personal probity. But they also declared that the real heroes of the Style, like Oud and Mies van der Rohe, also rebelled as formalists against civilization's machine utilitarianism (which still corrupted New York skyscraper architects like Raymond Hood).

"REJECTED ARCHITECTS" New York 1931



April-May 1931
Director: Philip Johnson.
Exhibitors: Foreign-born modernists (Alfred Clauss, Walter Baermann, Oskar Stonorov), European-trained Americans (William Muschenheim) and others.
Rationale: to protest the exclusion of the Modern Movement by the Architectural League of New York; to posit the existence of an engineering-based but formalist International Style; and to preview ideas and strategies being planned for "Modern Architecture" International Exhibition," MoMA 1932

Tangential community: Practicing modern architects. From this community the figures under study took data and visual documents. The relationship was distant because the New York figures, unlike the practicing Europeans, understood architecture as style. Sources: Oud, the Bauhaus as seen by Barr, office of Mies van der Rohe, historian G A Platz. Exponents: Hitchcock, Barr, Johnson. Douglas Haskell, Lewis Mumford, Catherine Bauer as collaborators with them, but viewed as outsiders

Tangential community: Architectural culture press. *Architectural Record*, *Architectural Forum*, *T-Square* (Philadelphia) (this last briefly an International Style propaganda organ 1931)
Tangential community: the intellectual press: *New Republic*, *Nation*, *Fortune*

Tangential relationship: members of mainstream architecture culture concerned with its relation to engineering (Wallace Harrison, George Howe, A. Lawrence Kocher).

The "Rejected Architects" rethought engineering or planning decisions so that the most aesthetically fine option—and the east socially or

conceptually iconoclastic one--was chosen.

Outcome: MoMA's 1932 "International Style" show and book made the rebellious posture milder by featuring better-known architects like Walter Gropius and stressing inevitability more than rebellion. This made *The International Style* a textbook for architectural educators seeking change. Their work cemented the "International Style" paradigm in the 1940s.
Assessment: In the Harvard art history based paradigm, a rebel becomes a historian, who surveys and finds the overall structure of a style from "outside" the phenomenon. As a guide to patrons, he then guides the consumption of artifacts in the "style" being studied. In Peter Burger's terms, by declining to suggest that the International Style called art institutions into question, they became not avant-gardists but expert modernist explainers/cicerones to the dominant elites.

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The Network Dependence of Creative Minds

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Keywords **– different influence systems on creativity, John Donat, photography, 1960s**

I. INTRODUCTION

A high-quality work of art, according Oscar Wilde's 'The critic as Artist' (1891) is the one which reveals new thoughts and not the repetition of already existing. Suppose you know two painters. One tells you the idea for a great painting but does not paint it. The other has the same idea and paints it. You could easily say the second is a great artist, but you could say the same thing from the first? Obviously not. He talks and does not paint, but might have given an impulse to somebody else to do something. That is precisely the problem with creativity – often one cannot trace the origin of an idea and its pure ownership.

In general today's creative work is lead through cultural policy today, but with all its best intentions it rarely happened to produce outstanding works. How could we encourage creative work to do better?

II. ENVISION OF END STATE

Opposite of the idea of a 'genius' on creativity, creative thinking depends upon making transitions and connections between seemingly contradictory references, thinking styles and collaborative contexts. The research assumes that creative persons have developed a *distinctive organizational culture*, based on the specific demands of creativity and creative work. It is commonly assumed that creative processes are only individualistic, unpredictable and irrational, but they are most of the time collective, rational and calculable.

Any kind of creative mind is embedded in networks of like-minded collaborators in a specific geographical region. Content is produced in face-to-face communities (e.g. bars and coffee shops), a more local network, whereby the more global networks serve mainly for the distribution of ideas and products. Time limited and short term projects emerge from situations and project teams that are assembled and redistributed within a wider project ecology, which are not easy to depict and therefore not well researched. Taking as its starting point an analysis of the complexity and diversity of the creative process undertaken by one person, this research will *analyse a community with shared values and experience* against the 'individualisation' of artists and mediators, and it aims to question the *conventional separation of 'creative minds' and 'consumers'*.

III. DEFINING APPROACH

The existence of different networks and their intersection in one single person is going to be the base for the definition of new fields of co-existent collaboration. Therefore the key unit of analysis is not the individual work of an artist but his relation to his networks and systems that he is a part of. The British photographer John Donat (1933-2004), a significant example for the tendency of photo-journalism applied in architectural photography during the 1960's, tried everything to expand the influence of architectural photography beyond the narrow borders of the profession. Working actively not only as photographer, but also as an architect, writer, editor, broadcaster and teacher at the same time, his overlapping activities make him particularly interesting as a subject of study. His concern for overcoming the gap between the professional world of architects and the public suggests his consciousness of the importance of a network culture. John Donat did not wake up one morning and say to himself, today I'm going to take a new kind of photograph. He did not think about it until maybe his private relations, son in law of the British editor Monica Pidgeon, lead him into the publishing business.

There was much debate over the perfect representation and expression in the 1960s. To define 'the' perfect way of expression might not be necessary, but for sure some styles are far more close to other artistic areas than people would like to admit.

The approach for the study of connecting networks chosen here is to measure the *growth of the creative infrastructure for artistic production* during Donat's most influential period, by analyzing links between producers and users - number of publications, journals, and readership. This structural development was influential on the production of art work during this time. By identifying clusters and hubs of infrastructure (business activities), such as museums and galleries, cultural councils, publications, and schools, through which creative networks were supported, and then by comparing them with the individual work of John Donat, this research looks for how communication has been built up and how his ideas were connected to the market.

Besides studying the main historical events of a time span it is equally important to observe the less-important ones. Often we focus on the `important' global-scale pattern of evolution while the events of minor importance can silently acquire the strength to change the world, as it happened through the punk movement in the 70s. In the 'unimportant' issues, like fashion or music, we have the possibility of expression escaping the

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control of superiors (reference to M. Kundera *'The book of the rice and the oblivion'*[1], M. Greil *'Lipstick traces'*).

The large number of different, highly interacting components (places, disciplines, institutional support) results in dynamic behaviors, and these systems often evolve, adapt, and exhibit learning behaviors. The applied idea *of non-linear time-zones* by Edouard Glissant[2] allows both the imagination of various contact zones between different cultures and disciplines and to find points of stimulation for development and innovation. Through the analysis of a single person's network, the paper wants to promote a community, or shared values and experience, against 'individualisation'. The hope is to inform policies to improve 'network culture' and not only through cultural sponsorship of single artistic works but also through an 'attractive' city planning (rents, guidance, communication).

ACKNOWLEDGEMENTS

I grateful thank the Swiss National Science Foundation for their support during my research.

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[1] *„Wir stehen im Bann der erstarrten Auffassung darüber, was wichtig und was bedeutungslos ist und heften unseren Blick ängstlich auf das Wichtige, während das Unwichtige im verborgenen, hinter unserem Rücken seinen Guerillakrieg führt, der die Welt letztlich unbemerkt und uns unvorbereitet treffen wird.*" **Milan Kundera** (2000). Das Buch vom Lachen und Vergessen. München : dtv. p.264; © 1978

[2] Edouard Glissant (1928 -), was a Francophone writer, poet and literary critic. His thinking seeks to interrogate notions of centre, origin and linearity, embodied in his distinction between atavistic and composite cultures (from the book *Do it*, ed. Obrist).

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NETWORK DEPENDENCE OF CREATIVE MINDS

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1958 -1968

John Donat (1933 - 2004)

photographers

Richard Einzig | Henk Snoek | Garry Winogrand
Grete Stern | Tony Lee Jones | Johan van der Keuken

friends

Robert Donat (actor) | Paul Oliver (writer) | Wendy Taylor (artist) Dennis Crompton (journalist) | Peter Carl (historian) | Sherban Cantacuzino | (editor) | Monica Pidgeon (editor) | Mary Griffith (editor) | Nicky Akehurst (gallerist) | John Craxton (artist) | Julian Keable (editor, architect) | Nicolas Jones (Campaign for Better Broadcasting) | John Killick (writer) | Peter Polumbo | John Read (director) | ...

journals

Architectural Association | Architectural Review | Architectural Design
Sunday Times | ...

places

London | New York | Los Angeles | Boulder | Agh'Amar (Iran) | Isfahan | Crete

themes of the day

Unnecessary embellishment and ***aesthetic barbarism*** | criminology | cluster ***city*** by Alison and Peter Smithson | Modern architecture has become a style | battle of styles - correcting the mistake that the external appearance of a building could be discussed and judged independently of other things | street noise | public transport | mediaeval carpentry | abstractism drunk with the idea of painting about paint | James H. Chadwick : ***apply conscius acts of judgements by all means***, but *with* ***emotional warmth*** behind them, not cold-headed intellectual detachment | classical revival which brings the cult of the nude into alliance with scientific enquires | investigation in the difference between 'fine' and 'pop' art | prefabrication | revival of the Victorian period | ...

films

A. H. Lipsett | Alain Resnais | Johan van Keuken | Orson Welles | ...

architects

Frank Lloyd Wright | Ahrends Burton & Koralek | John McAslan + Partners | Skidmore Owings Merrill | Shepheard Epstein Hunter | Scott Tallon Walker | Richard Rogers | Lord Norman Foster | Hanscomb Davies | Eric Lyons Cunningham & Partners | Colin St. John Wilson | Johnson-Marshall & Partners | Neave Brown | Architects Co-Partnership | Basil Spence & Partners | Chamberlin Powell & Bon | Powell & Moya, Denys Lasdun Redhouse & Softley | Su Rogers | Ted Cullinan | David Armstrong | Arup Associates | Stirling & Gowan | Matthew Johnson-Marshall | Howell Killick

exhibitions/galleries

Claude Gillot : **human interest** | Allan Ramsay : evaluation of **human personality** | Picasso : sensual and hieratic, all-over pattern | Rothko : baffling and mysterious in its simplicity | Lynn Chadwick : cool, serious | Alexander Zyw : abstract impressionist, sense of expanding space | Cesar Baldacchini : arbitrary complexities of construnction | Jack Smith : fascination of ruins | William Roberts : classical rendering of a universal truth | Alan Reynolds : manifestation of conservatism | Roger Hilton : non-figurative pictures **with evident signs of stress and torment** | Edward Middleditch : plant lifes | 19th century master of French school like Goya, Manet El Greco, Cezanne | Italian paintings of the 13th-15th century | abstractitism | Henry Moore : organic and abstract forms in intimate relationship | Ben Nicholson : removal of all references to organic matters | John Piper : free texture, measurable mysterious space Classical masterpieces of Rubens and Goya make us feel like barbarians | Toulouse-Lautrec : trance-like state of figures brings us to a kind of boundless regions | Moholy-Nagy : gay, cool, humourous | Asger Jorn : abstract pointillism | Jackson Pollock : our idea of Now and Forever, **progress** Honorè Daumier : **profound social observations** | Bill Copley : false conclusion about 20th century | Alexander Archipenko : **human figure** out of purely geometrical elements | Kurt Switters : magical in its way as the story of Cinderella, spaciousness and dignity | Josef Albers : extreme purity and simplicity of means | Max Ernst : extremely impure | Magritte : **no artistic purpose**, insult our intelligence | Antonio Tapies : mystery | Lucio Munoz : keep back the image | Mark Tobey : quiet spirits | Michael Fussel : representation of the 'end of the road' | David Hockney : vision of happiness | Peter Blake : sensitive | Roy Lichtenstein : right choice is vital to the success of a painting | Francic Bacon : **intensify the presence and psychic content of an image** | ...

countries

Great Britain | Burma | Puerto Rico | India | Sweden | USA | Germany | Australia | Hawaii | Japan | Mexico | Poland | Finland | France | Canada | Ecuador Italy | Danemark | Sri Lanka | Greece | Spain | Brazil