Systemic Thinking in Conservation Theory

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**ABSTRACT**

The purpose of this contribution is to better understand the theoretical background of conservation of archival material. The methodology to better understand the already existing conservation-theory is found in the so called pattern language by Christopher Alexander. The article aims to show how this application can be performed and what benefit will derive from this.

**Key words:** conservation theory, pattern language, archival documents, conservation

1 Introduction

This general approach to conservation takes its root in European philosophy, self-awareness and thinking from Ancient Greece through Christian Middle Ages to Renaissance and Enlightenment to our days and has finally given rise to the refinement of philosophy and methodology of the cultural heritage conservation by Alois Riegel (**Riegel, 1903**), Cesare Brandi (**Brandi, 1963**) and Umberto Baldini (**Bald-**
These outstanding thinkers made conservation of cultural heritage into a discipline in its own right by developing a consistent theory which, in its turn, served as a foundation of research, development and university training in conservation of cultural heritage in Europe and elsewhere which became the present-day standard (Sawicki, 2017).

Conservation of archival documents, books and other paper-based items is a part of conservation of cultural heritage and therefore everything which is true for the latter also applies for the former.

Things get more interesting and complicated, though, as we begin to address these issues in more detail.

Even if we agree today on all of the above as a sort of standard European approach, there is broad variance in the interpretation of these general notions both in education¹ and in practical conservation. The cultural and legal background of different European countries gives rise to various interpretations and it is this wealth of interpretations that fosters the development of solutions for new upcoming issues in cultural heritage protection.

There are also changes in emphasis placed on different aspects of heritage protection that become clear as time passes. Such changes usually are “registered” by international umbrella organisations and influence the interpretation of things in the conservation practice. In the recent 100 years for example, we have been witnessing a strongly natural-sciences oriented spirit, as well as some reaction to it in the form of stressing the need of preserving the intangible aspects of our heritage, which lead to some re-thinking of the relationship of the tangible and intangible in the heritage (Engel, 2016, pp. 247-249).

Unlike with buildings, where the replacement of some of their elements is a long tradition dictated by the need to ensure their safe use, written texts – in particular if they do not carry some generally known contents such as traditional liturgical texts and their copies of copies, are unique, so one can not replace some elements and leave other elements intact, this includes the binding. These unique objects, archival documents, letters, diary notes, etc., kept in archives, libraries and museums, as well as in private collections, must “stay as they are”, even if there are some lost pages, for the simple reason that the risk of misunderstanding and loss of detail when only some elements are replaced, is far greater.

This already leads to the question of context, which has to be properly understood before any practical conservation is undertaken.

2 Context

Any written document or book is embedded into a context of meaning, a context of time and circumstances in which it was made, a line of contexts in which it was used and kept, which it “lived through,” so to speak, and a context in which it is kept and used today and in the near future². Equally important is the spacial context, which is the cultural environment and understanding of the book, its appearance, the symbolic value of its design, the language and the letter system. All this must be deciphered and understood by the conservator to be able to do justice to the item at hand before deciding in what condition the material is and before selecting the proper material and method for conservation. The conservator is imbedded in his/her own time-space continuum and his/her own educational and cultural background, which shapes his/her particular understanding of the book/text at hand and makes any conservation, in the final analysis, into an act of interpretation. The conservator attempts his/her interpretation to help the user with his/her own interpretation. Still, even though such interpretation is never free of personal bias, the conservator should strive for an unbiased and neutral way, focusing on facts, which serve as a proper interpretation of the meaning of the book and a good basis for a conservation concept. To achieve this, several techniques are applied. They help understand the material, the artistic techniques and the history of the object at hand.


2. For this topic please see the time-discussion in Brandi’s conservation theory.
3 Material/Technique

Understanding the material of the object is a very important prerequisite for developing the conservation concept. Information on the material may help verify the dating (because certain material may not have been invented before a certain date) and is necessary for understanding which elements in the object’s appearance observable today are a result of its decay and which were produced on purpose. Finally, good understanding of the material of the historical item is a basis for the choice of appropriate conservation material. There are specific guidelines on the way of choosing conservation material. It must be from a sufficiently known source, so that there is no risk of damaging the historical item by applying unknown material with unclear ageing behaviour, which might eventually destroy or spoil the original material. There are also physical limits: for example, the conservation material must be weaker than the original, otherwise the softer original material may be damaged by its interaction with the more rigid or harder new material in the handling of the restored item.

The survey of material is strongly facilitated by modern technology and our general modern understanding of physical and chemical analysis.

The challenging element here is not the analysis in itself, but asking the proper question and the correct interpretation of results. X-ray, IR, spectroscopy, etc. can be of help for surveying books and other written documents. However, an essential element for the interpretation of the results are the knowledge of historic writing material, paper making and book binding techniques. These techniques must be studied from old sources, which sometimes are difficult to read due to the use of old languages and the old way of thinking. The conservator who studies such texts usually also performs the old techniques him/herself following the instructions of the old masters to better understand how the various materials can be handled and what results can be achieved by performing certain recipes. Paper making, leather making, ink and colour preparation, gold application, marbling on paper, embossing, polishing, and many more steps are necessary to end up with a book. Not to mention books made of palm leaves or some other material, even older than paper, material on which the text is written by scratching. Deleting techniques must also be studied, because, especially in the case of texts, deletion is an important topic, as the conservator must be able to understand whether certain missing text is a damage or an intentional deletion and why it was done. Deletions in particular, but also other features might help shed new light on aspects of the history of a certain text. If the conservator is negligent in his/her research and survey work and does not base it on profound knowledge, certain features can easily be misinterpreted and some information about the text may be lost.

Here the circle closes as the survey of the material supports strongly the contextualisation and the research into the history of the individual item.

Finally, any document also has an aesthetic aspect, a certain beauty, which must be understood and preserved, even if it does not necessarily follow our modern aesthetics (Engel, Books Convey).

In view of the above, Cesare Brandi’s definition of what conservation of cultural heritage actually is becomes clearer when he defines conservation as the “moment” of understanding a historical item in its historical and its aesthetic dimension and its material composition which is required to “bring it into the future”. Cesare Brandi also makes a clearly distinction between conservation and practical conservation when he says that the latter is only a part of the former. This is a very good way to express it. While conservation includes the work of the archivist, the librarian, etc. and the conservator, practical conservation is part of the conservator’s responsibility.

Only after an overall survey of the book or document is completed and all the information about all its aspects is accumulated, the conservator can gain a more comprehensive picture of the item at hand, the book or text emerges as a unity, and only then an appropriate and individually designed concept of the object’s conservation can be developed.

The concept not only takes into consideration the use of the item in the past, but also its intended future handling and use. Some documents are read, some are actually only kept and occasionally displayed, but need not be fully opened and pages need not be turned any more, etc. The “use policy” depends on the nature, characteristics and historical value of the particular item.
As conservation concepts and practical interventions in the conservation context can vary largely, a sort of categorisation of measures has been agreed upon. According to E.C.C.O., there are several sorts of intervention defined by international conventions:

“Preventive conservation consists of indirect action to retard deterioration and prevent damage by creating conditions optimal for the preservation of cultural heritage as far as is compatible with its social use. Preventive conservation also encompasses correct handling, transport, use, storage and display. It may also involve issues of the production of facsimiles for the purpose of preserving the original. Conservation consists mainly of direct action carried out on cultural heritage with the aim of stabilising condition and retarding further deterioration. Restoration consists of direct action carried out on damaged or deteriorated cultural heritage with the aim of facilitating its perception, appreciation and understanding, while respecting as far as possible its aesthetic, historic and physical properties. Documentation consists of the accurate pictorial and written record of all procedures carried out, and the rationale behind them. A copy of the report must be submitted to the owner or custodian of the cultural heritage and must remain accessible. Any further requirements for the storage, maintenance, display or access to the cultural property should be specified in this document. The record remains the intellectual property of the conservator-restorer and shall be retained for future reference” (E.C.C.O. Professional Guidelines, 2002).

That these definitions are based on a European perspective is even more clear if one reads the Code of Ethics in Conservation promoted by the European Confederation of Conservator-Restorers’ Organisations and adopted by its General Assembly, Brussels, 7 March 2003, which refers to “all European laws”.

However there are, of course, some general ideas applicable worldwide.

To better understand the somewhat sophisticated conservation theory by Brandi a new attempt is suggested, which is to use the pattern language by Christopher Alexander for conservation theory. The ideas of splitting up complex actions into smaller units and form patterns by bringing the smaller units together was supported by system theory in the beginning of the 20th century and is worth a thought in conservation of cultural heritage too.

There are two reasons which make us presume that pattern language can be applied to conservation of cultural heritage in general and archival document conservation in particular:

1st the Alexandrian method is modular, which is the only way to represent the variations in sequencing conservation steps. Step order is individual from case to case.

2nd the Alexandrian method enables an endless enrichment of the first structure and therefore all standpoints of all sorts of stakeholders (also future stakeholders) can be taken into account in a proper way and all pros and contras in conservation find an adequate expression.

It should be emphasized that any decision making and choice of conservation measure, technique and material is easy, so long as the conservation theory supplies adequate justification for it. As said above, practical conservation is only a part of conservation of cultural heritage items.

To test the idea, of splitting up Brandi´s theory into easily digestible units which are then brought together again to a unit, we made a first attempt to apply the pattern language to archival material preservation in a summer school workshop in Vilnius University in summer 2016.

The conservators of the University Library and the author steped into new lands of communication of theory and, to be on the safest ground possible when performing this new step in applying the patterns methodology to conservation, they used even narrower focus in this first approach, i.e. start with practical paper/book conservation, because the workshop team was a group of conservators who have dealt with paper conservation for several decades.

4 Christopher Alexander´˘s systemic approach

Before presenting the results of the co-operation in the workshop, a short introduction to Chri-
Christopher Alexander and his theory is provided. Christopher Alexander was born in 1936 and is a mathematician and an architect. He has developed a method which he applied to building houses and residential environments, but he has pointed repeatedly that his method could just as well be applied to other fields of human activity. C. Alexander benefited from studying systems philosophy and managed to effectively apply the systemic approach to a practical task. Information technology is one field where these pattern method is being applied extensively. Alexander’s method based on what he terms “patterns” and “pattern language” helps depict a particular system in a simple and yet sophisticated way and seems to be a promising and comprehensive tool and framework to underpin the complex actions and decision-making processes in conservation.

C. Alexander has written 3 books showing application of the method the team found immediately relevant to the task it had before it. This is how C. Alexander himself describes his pattern language: “The elements of this language are entities called patterns. Each pattern describes a problem which occurs over and over again in our environment, and then describes the core of the solution to that problem, in such a way that you can use this solution a million times over, without ever doing it the same way twice.”

In conservation, just like in many other fields of creative human activity, decision-making acts and practical actions are repeated again and again in quite similar, but never identical way and there has been no consistent systematizing tool so far to depict this complex activity in a sufficiently systemic way.

To understand why Alexander’s language could help out with this, a more detailed description of the application of patterns in architecture is provided here, before starting to apply it: “For convenience and clarity, each pattern has the same format. First, there is a picture, which shows an archetypal example of that pattern. Second, after the picture, each pattern has an introductory paragraph, which sets the context for the pattern, by explaining how it helps to complete certain larger patterns. Then there are three diamonds to mark the beginning of the problem. After the diamonds there is a headline, in bold type. This headline gives the essence of the problem in one or two sentences. After the headline comes the body of the problem. This is the longest section. It describes the empirical background of the pattern, the evidence for its validity, the range of different ways the pattern can be manifested in a building, and so on. Then, again in bold type, like the headline, is the solution -the heart of the pattern -which describes the field of physical and social relationships which are required to solve the stated problem, in the stated context. This solution is always stated in the form of an instruction -so that you know exactly what you need to do, to build the pattern. Then, after the solution, there is a diagram, which shows the solution in the form of a diagram, with labels to indicate its main components.

After the diagram, another three diamonds, to show that the main body of the pattern is finished. And finally, after the diamonds there is a paragraph which ties the pattern to all those smaller patterns in the language, which are needed to complete this pattern, to embellish it, to fill it out.

There are two essential purposes behind this format. First, to present each pattern connected to other patterns, so that you grasp the collection of all [...] patterns as a whole, as a language, within which you can create an infinite variety of combinations. Second, to present the problem and solution of each pattern in such a way that you can judge it for yourself, and modify it, without losing the essence that is central to it.

Let us next understand the nature of the connection between patterns.

The patterns are ordered, beginning with the very largest, for regions and towns, then working down through neighbourhoods, clusters of buildings, buildings, rooms and alcoves, ending finally with details of construction.

This order, which is presented as a straight linear sequence, is essential to the way the language works. [...] What is most important about this sequence, is that it is based on the connections between the patterns. Each pattern is connected to certain “larger” patterns which come above it in the language; and to certain “smaller” patterns which come below it in the language. The pattern helps to complete those larger patterns which are “above” it, and is itself completed by those smaller patterns which are “below” it.” (Alexander, 1977)

3. While it is taken for granted, that Brandi’s theory is well known in the field of conservation, Alexander’s theory is better known amongst architects.
C. Alexander stresses that “... no pattern is an isolated entity. Each pattern can exist in the world only to the extent that it is supported by other patterns: the larger patterns in which it is embedded, the patterns of the same size that surround it, and the smaller patterns which are embedded in it. This is a fundamental view of the world.” (Alexander, 1977)

The “nature of the relation between problems and solutions, within the individual patterns” can be explained by understanding, that “each solution is stated in such a way that it gives the essential field of relationships needed to solve the problem, but in a very general and abstract way” - “It contains only those essentials which cannot be avoided if you really want to solve the problem.” (Alexander, 1977) This approach is fully applicable to conservation of cultural heritage.

In case one wishes to apply this method to conservation - say, to conservation of a map - one has not only to follow the instructions provided by the pattern “Practical conservation of a manuscript map,” but also try to embed it into the pattern “Conservation of cultural heritage on paper” and complete the “conservation of the map” by selecting specific activities, such as “Closing tears on paper items” or “Dry surface cleaning of paper items”.

To find out whether or not the tool of pattern language is applicable to her field, the author invited the team of conservators to identify a topic and try out this approach together. It turned out that the method was easily understood both by archivists without background of practical conservation and conservators trained on various levels of education according to EU standard4.

5 A tentative pattern

Maps are one of the typical products of European culture. They represent ways of understanding space and power and need to be preserved as items of considerable value to geography, history and social sciences.

The pattern helps to develop the larger pattern of “Conservation of maps,” which again helps to complete the field “Practical conservation of heritage on paper,” which is one step higher in the hierarchy.

4 While in some European countries training for conservators is level 8 as standard, there are other countries, where the level is lower; in general the profession is not legally protected which means, that de facto anyone can call him/herself a conservator, which is a very bad situation and risky for the heritage items.
This pattern, again, will assist to complete the pattern “Practical conservation of the works of cultural heritage,” which finally will assist to complete the pattern “Conservation of cultural heritage,” which is the pattern at the highest and most general level of this scale.

6 How to make practical conservation of a manuscript map?

Maps are found in archives, libraries, museums and historical buildings, both in private and public ownership. They can be made of various materials, however the vast majority of European maps are handwritten and drawn or printed on paper. In terms of meaning and material maps can be said in general to be distinct from other similar artefacts, such as portraits-drawings, even if both are hand-made. The fact that the maps of this pattern are hand-made requires certain conservation materials and rules out others, which can very well be used in the case of, for example, printed maps.

This distinction is made in the context of practical conservation, as it directly affects the choice of conservation method and material.

Maps not only represent a specific group of items due to the fact that they convey geographical information in one or the other way, but they have often large size, distinct mounting and were used in particular way, which leads to particular sorts of damage.

Maps are very often backed with paper or even more frequently with textile, and rolled up. This causes characteristic types of damage, which interact in a complex way.

Types of damage on maps are usually

- mould
- dust
- stains
- tears
- lacunae
- discoloration
- instability of the paper (acidity)
- loss of adhesion of the glue between paper and the canvas
- copper/ink corrosion
- deformation
- old repairs

All these damages must be treated with due regard to the material of the map: different sorts of paper, aquarelle and inks, backing material and adhesives as well as the wooden sticks. Sometimes maps are also varnished and feature stamps their of owners.

To approach a conservation concept and find the best possible practical conservation method, several questions must be answered and results must be interpreted by taking into account the answers to all of them at once. The history of the individual item must be understood, to allow the conservator to decide, for instance, whether or not certain parts can be considered repairs and taken down if they pose a risk in terms of the survival of the item or if these elements hold some information about the particular item and its history and must be preserved together with the map itself. In parallel, the material of which the map is made must be studied and understood, in order to make a good choice for the proper conservation material. This survey can be started by visual observation and continues in application of instrumental analysis.

Furthermore, the conservator must establish the existence of mould and its toxic capacity in order to be able to select a treatment appropriate for its disinfection. Also the future use and function of the map must be described, as it plays an important role in the decision as to how thorough the treatment must be.

This survey already provides a conservator with a first picture of the concrete item and requires him/her to come up with a first idea of a conservation plan. He/she may ask him/herself how long the

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5. The material used in the process of conservation, which might stay, in whole or in part, in the original heritage material.
item might survive if no practical conservation is applied, as a good starting point for a concrete concept, because this question might bring to light what must be done at the minimum (for example, reducing the number of the mould spores).

The order of these steps is actually fixed:

First comes good understanding of the heritage item, which might already lead to some initial conservation strategy. Then comes the communication with the stakeholder to get information about the intended future use of the heritage item. On the basis of this information from the stakeholder the original conservation strategy that was outlined in general form can be shaped into a final plan. In some cases too stressful plans for use should be prevented by explaining the stakeholder the problems in the specific case and bringing forward appropriate alternative setup for the item’s use.

When the conservation plan is identified, it is executed as a next step.

The last step involves writing documentation and returning the map.

Perceive the practical conservation of manuscript map as a distinct set of actions.

Follow certain steps in a set sequence order and apply others according to individual needs of the heritage item and/or the owner (stakeholder). Understanding always comes first and decision making is always done on the base of understanding both the intangible value of the item (its artistic, aesthetic and historic value) and its material and its condition in combination with the full set of possible conservation measures (preventive conservation, conservation, etc.\textsuperscript{6}).

Describe fully both the item itself and its contextual meaning, its condition and the measures taken as well as the reasons why these measures were taken and communicate this information to the society.

\textsuperscript{6} See definitions at E.C.C.O. Professional Guidelines.
The pattern is a “suprapattern” above a series of patterns describing practical conservation tasks such as “practical conservation of tears” or “practical conservation of mould-infested cultural heritage on paper” and is a side branch pattern to “conservation of books,” “conservation of charters,” “conservation of artistic drawings,” etc.

7 More patterns

Alexandrian patterns may be brought into an order from more general to more particular or vice versa. The most general possible pattern in our context would be “conservation of cultural heritage,” which in a way equals “conservation theory” and should be followed by a layer of patterns such as “practical conservation” with “environment” coming as next layer and again next layer would be both “temporal environment” and “local environment,” such as “the act of producing the work of art” and “reception in the past” being elements again of “temporal environment” and “storage and display,” “handling and transport” and many more as sub patterns, being elements of “local environment.” “History of conservation” and “research in conservation” would be at the same level as “environment,” which is directly under the “conservation of cultural heritage.” A sub-pattern under “research in conservation” would be “methods of research in conservation,” and two sub patterns of this should be “logics” and “intuition.” “Values” with “evaluate quality of conservation,” “evaluation of practical conservation” or “value of cultural heritage” as substructure, would be itself in the hierarchy besides or next to “environment” and “history of conservation,” which is the third layer after “conservation of cultural heritage.” Also directly under “conservation of cultural heritage” must come the patterns “worth/quality,” “context” (bringing together under it, for example, “time and place,” “perception,” “the aim is the people,” “rite versus museum,” “romanticizing conversation work/profession”), “education of conservators” (with “training of senses,” “description of use of senses’ under it), “aesthetics” (with “the invisible in conservation” and “interpretation” immediately under the pattern “aesthetics”), “ethics” (with “relevance for people,” “transformation of material to heritage by man,” “reversibility,” “authenticity” under the pattern “ethics”). Here, another subpattern under “authenticity” can be defined by the pattern “material authenticity versus appearance authenticity.” The patterns “function,” “mind,” “impact on other disciplines,” “respect,” “work of fine art/work of applied art,” “workflow,” “speed,” “whole is more than the sum of parts,” “wholeness in conservation,” “feedback mechanisms in conservation” are all, again, the third layer directly under “conservation of cultural heritage.” The pattern “feedback mechanisms in conservation” brings together under it “control,” “possible equifinality, i.e. reaching the same result in various ways,” while “intangible aspects of tangible heritage” is again directly under or, as Alexander puts it: “completes” the “conservation of cultural heritage” pattern, etc.

Practical conservation is divided into patterns like “book and paper conservation,” “mural painting conservation,” “easel paintings conservation,” etc., according to our today’s material- oriented thinking. If we select “book and paper conservation” and go into more details: “practical conservation of graphic art,” “practical conservation of books,” etc. will follow, of which each pattern is again divided into patterns like “material of the books/graphic/charter etc.,” “conservation survey,” “damages,” “conservation techniques,” “evaluation of practical conservation,” etc. as sub-layers.

“Survey pattern” is split into “survey by our senses,” “device-assisted survey,” etc.

Apart from assisting in building the pattern language of conservation, the patterns “material of the original book,” “techniques of the original book” and “structure of the original book” may well be quite directly integrated into an (electronical) editing program of any sort.

The pattern “Values” is subcategorized into “Riegl’s value system,” “intangible values of tangible heritage,” or even patterns which describe the methods suggested how to evaluate heritage values (for example by Mason 2002, pp. 5-29).

Best practice models can be inserted at any level to make various steps and stages more clear.

The model gives an opportunity to show connections of topics that seem to not follow rules, as the rules are difficult to be detected, but the inner referencing which is part of the patterns provides these connections. An ever finer mesh is thrown over the entire field of conservation by referring, for example, from value to education to practical mending of a tear and how this is done, back to communication with society. As persistently repeating patterns and regularities are progressively identified in the conservation
procedure and described as patterns, this will help describe the “natural inner law” of conservation and achieve greater consistency in practical conservation and its integration with the existing and evolving general conservation theory.

8 Resume/Training/Research/Publications

It could be shown that the contemporary understanding of conservation of cultural heritage in general and written heritage in particular, which includes survey, contextualisation and practical conservation work is based on several centuries of development of conservation theory and practice. Furthermore, proper maintenance and storage are mandatory for helping the material heritage to survive into the future. To achieve the qualification and knowledge needed to perform this work, university training in conservation-restoration is the standard today. Conservation-restoration is an independent discipline, while book and paper conservation is one element of this discipline that follows its general theoretical premises. To assist this understanding the systemic approach of Christopher Alexander’s pattern language can be used. To enable the best possible treatment of our heritage and give answers to new questions and challenges that face us, we need appropriate research. Universities include research activities in their programmes and there are some research institutions explicitly founded and run for the wellbeing of the written heritage. International interdisciplinary approach in research is essential. The results are communicated in international publications and special continuing education courses, such as the course “Interdisciplinary Methods in Graphic Art, Book and Document Conservation” (MA) newly organized in Krems, Austria.

References

**SUMMARY**

The contribution describes conservation of documents in archives as a complex task of cooperation between conservators and archivists rooting in a conservation theory. The conservation theory was provided by outstanding thinkers such as Alois Riegl and Cesare Brandi. Because of the complexity of the theory and the sophisticated language in which it is written, it is not completely anticipated until our days. Therefore, the author suggests to apply Alexander’s pattern language, which stems from the area of system theory, to both show how the conservation of documents is a team work of conservators and archivists, that conservation is an own academic profession in its own rights and that practical conservation does not equal conservation.

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