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THE HOUSE OF MULTIPLE DIMENSIONS: DESIGN REFERENCING AS CREATIVE PRACTICE

04

The online version of this article can be found at:
<http://drawingon.org/uploads/papers/IS01-004.pdf>

ABSTRACT

This paper explores referencing as a creative practice in order to visually describe the role of references in the development of a design research project. The starting point for this exploration is a series of personal sketchbooks, which hold a serendipitous collection of references accumulated during the development of a design project entitled House of Multiple Dimensions. These sketchbooks locate that project in relation to various ideas, objects and experiences and, under closer examination, reveal certain recurring preoccupations directing the project. But in standard presentations of this and similar projects such an accumulation of references remains hidden; attempts to describe the influence of references on the development of a project are commonly limited to a highly controlled exercise in post-rationalisation. As a result many important references go un-acknowledged in attempts to present clarity and progressive linearity. This paper aims to challenge this (either conscious or unconscious) masking of reference material and to reflect on possible creative modes of documentation that acknowledge the role of references in design development.

At the same time design practices tend to passively accumulate references through visual exposure, and as a result the importance of a given reference to a project may easily be overlooked. To this end this paper and the accompanying presentation embrace the challenge of describing the function and role of references in the documentation of a design research project and consider such a description as a form of design research in itself. In this way this collected paper both promotes the idea of referencing as creative practice and highlights how design research as a mode of research might shed new light on wider academic referencing conventions and standard presentation formats.

BIOGRAPHY

Ersi Ioannidou is an educator, researcher and designer. Currently, she is Lecturer in The Design School, Kingston University and Director of Zapp Design. She studied architecture at the National Technical University of Athens and The Bartlett School of Architecture, UCL, from where she holds a PhD by design. Her research interests include: the meaning of the house and home in modern urban environments; the minimum, minimalism and miniaturisation; systems of organisation and taxonomy; and the machine as design paradigm. Her design work has been exhibited internationally.

THE HOUSE OF MULTIPLE DIMENSIONS: DESIGN REFERENCING AS CREATIVE PRACTICE

By its very nature design research accumulates a complex system of references, either in the form of texts, objects or representations of objects. These three reference elements constitute the support for any research project, but these various reference-forms are not tautological; texts do not simply restate objects, and representations of objects are fundamentally distinct from objects themselves. Rather this accumulation of 'data' (in its original Latin sense meaning 'that which is given') creates a complex constellation of existing texts, existing objects, existing representations of objects, newly produced texts, new objects and new representations of objects. Usually such an accumulation of references, this constellation, remains un-seen. The final presentation of a project uses only a small selection of references, often as a means of post-rationalising the design process and supporting a linear narrative imposed on the development of the design project. This 'masking' of references is frequently exacerbated by the requirement within academic publishing to document and disseminate research and its findings in a particular manner, a manner in which the complex combinatorial system common to design research is subordinated to the linearity of established systems of documenting research which favour textual descriptions. But this enforced linearity reveals little of the design process and the role of references in that process. This paper argues that rather than subordinating references critical to design research to the limits established by text-led formats, design researchers ought to embrace the challenge of describing the function of references in the documentation of a project. This challenge might lead to a more appropriate format for presenting design research, one that not only acknowledges that the process of design

is a complex and continuous interchange and exchange between the existing and the new, but also questions the pre-eminence of text in explaining and describing this relationship. In turn this new approach to presenting research might lead to an alternative means of presenting all research, one that more readily acknowledges the process by which research projects emerge and develop.

In this context the starting point for this paper is a series of sketchbooks filled during the development of a design research project entitled *House of Multiple Dimensions*. These sketchbooks hold a serendipitous collection of potentially useful references: design precedents, text citations, photographs, notes and ideas. Cumulatively they act as an informal record of the project's theoretical and design background. They locate the project in relation to ideas, objects and experiences and when critically examined reveal certain recurring, constant preoccupations that, sometimes unwittingly, directed the project.

TEXT, OBJECTS AND REPRESENTATIONS

The first issue to address in this context is format. Standard presentations of academic work deny design research the opportunity to include one of its key constituent elements: newly produced objects. This is problematic, and the result is that something is always conspicuously absent in the presentation of design work. While we are able to understand the intentions of the designer without the objects being described being present, the visual power of the work is diminished and a key part of the emergent

argument is denied to us. However, while problematic this apparent weakness in presentation might also present an opportunity for design researchers. Charged with ensuring that any representation of an object either conveys the power of that original object or, perhaps more provocatively, is produced in such a way as to be more powerful than the original objects themselves, the designer is put in a position in which their own production is under constant re-evaluation. Documenting an object through a series of well-considered representations therefore gives the designer the opportunity to not only curate the viewer's engagement with and understanding of the design research project, but also to see their own project in a different light. Constructing these representations and discussing their particular effects might, therefore, be considered a necessary element of a critical design project. For this reason in what follows I will argue that the absence of objects is not the main problem in text-led formats, rather it is the imposed linearity of the conventional format, and the manner in which this linear form conditions our reading of non-linear processes.

Linear documentations of pieces of design research favour textual descriptions that provide the reader with those elements necessary to understand a given project. However, in this format the main documentary form is the text, everything else refers to or illustrates this text: existing or cited text is referenced fastidiously in footnotes; existing representations of objects are captioned and their provenance documented in the list of figures; representations of newly produced objects are demoted to illustrations, often accompanied by explanatory texts of their own. This typical format respects and conforms to a set of established conventions and traditions of research, it seeks to present design research processes in a rational way and, in so doing, omits and conceals the complex relationships between the various elements underlying a given project. I would stress here that in the wider context of research and academic publication this is not an extraordinary occurrence, limited only to design research; other fields of research frequently force their research processes and outcomes into linear narratives and in so doing similarly screen the more chaotic, free-moving reality of research. Design research, however, is an emerging field, unencumbered by congealed conventions and traditions. It thus has the opportunity to tackle a series of issues concerning both methodology and documentation as they emerge with a freedom other

research modes might not. These issues might include, as Henk Borgdorff notes:

What kinds of documentation would do justice to research that is guided by an intuitive creative process and by tacit understandings? What value does a rational reconstruction have if it is far removed from the actual, often erratic course taken by the research? ... And what is the relationship between the artistic and the discursive, between what is presented and displayed and what is described?¹

These questions express, as Linda Candy and Ernest Edmonds note, "the need to consider frameworks that identify the flow of actions and ideas between different aspects of the research process."² They also acknowledge that "different projects will traverse different trajectories," and the challenge, here, is to create formats of documentation that reflect the complexity of design processes and question the pre-eminence of linear textual description, not purely for the purposes of presenting design research, but for opening up new ways of thinking about the presentation of all types of research.³

REFERENCING AS CREATIVE PRACTICE

Two interesting examples of recent design research that deal with issues of referencing and documentation are Jan Kattein's *The Architecture Chronicle: Diary of an Architectural Practice*, completed in 2008, and Yeoryia Manolopoulou's *Drawing on Chance: Indeterminacy, Perception and Design*, completed in 2003, both of which have recently been published.⁴ Kattein's PhD document follows a linear format, but one in which the design process becomes the preeminent element of the research documentation. Text, references to existing texts and representations of existing objects and projects are placed in the margins as secondary elements, while the visual references and the results of the design process occupy the central position on the page. This format questions both the convention of text as pre-eminent means of description, analysis and critique and invites a new means of 'reading' research. At the same time this format illustrates the critical role of references as a collection of ideas, thoughts, and visual and textual cues that "assemble themselves" around the work produced, and consequently those representations of newly produced objects can speak and be read in the context from which they emerged.⁵

Sunday, 18 September 2006

The first lamp test is carried out. In spite of the heating blanket, the fermentation of Luminaire No. 02 has not produced any methane yet and a butane-propane mix from a camping gas bottle is used to test the lamps instead. Each Luminaire is fitted with a special gas inlet connector with a gas tap. I have also made an adaptor to connect the gas cylinder outlet to the Luminaire's gas inlet valve. The taps to the fermentation vessels are closed as a precaution against explosion. After inflating the gas pockets, the inlet valve is closed and the gas bottle removed. The gas valve on the lamp is then opened and the gas flame lit. Due to the extremely low pressure of the stored gas, the flame is yellow and smoky. The gas, however, lasts much longer than anticipated. The flame goes out when the gas reserves have burned off. We decide that the lamp test is satisfactory for our purposes and that revisions to the lamp design can be made in a later version of the Luminaire.

Monday, 19 September 2006

A second invoice of £1500 is issued to Blackpool Council. Unless any additional funding becomes available, this is the last charge that we can make.

Tuesday, 20 September 2006

The temperature is still low and there has only been one day of sunshine since the start of the test fermentation. With the fermentation vessel of Luminaire No. 02 filled to the top it is immovable and we will have to empty the vessel and interrupt the fermentation to move the Luminaires to Blackpool.

The media, the mayor of Blackpool and a number of local celebrities have already been invited to the lighting of the Luminaires. It will be embarrassing if we have to justify spending £3000 of the Council's money on a series of streetlights made from junk that do not work. After a whole week of heating the sludge no methane has been produced.

When looking from the functionalist's point of view, the question of whether the Luminaires 'work' or not has a simple answer. However, though the functionalist's position enjoys a splendid amount of popularity, it is in fact no more objective than any other perspective. A project that has technically failed can still be viewed as a successful project.

The book *For Clever Scholars, Astronomers and Doctors* reproduces the work of Belgian artist Henri Van Herwegen (born in Antwerp in 1940).

The artist who operates under the pseudonym 'Panamarenko' has made technical failure the

Image no. 169 (left): Luminaire no. 01 central section and light.

Image no. 170 (center): Luminaire no. 02 back-up fermentation vessel and agitation crank.

Image no. 171 (right): Luminaire no. 02 lamp and gas storage detail.

Image no. 172 (below top): Filling the Luminaire with camping gas.

Image no. 173 (below bottom): Testing the lantern.

Camping gas is used to test the lantern. To avoid an explosion, the gas pockets are filled and then the gas bottle removed before the lantern is lit. The gas pressure is low, so the flame is yellow and smoky. Hardening the glass of the lantern. This is not considered to be a problem and the lamp works well enough to impress its audience. The evaluation of the essential idea takes precedent over technical perfection. For the *Luminaire* it is sufficient if they work a bit!



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01:
Jan Kattein, *The Architecture Chronicle: diary of an architectural practice.*

In her PhD document Yeoryia Manolopoulou takes a different approach. In this document Manolopoulou constructs a complex cross-referencing system. In her abstract she writes:

Volume I contains collected research material. It is a volume of references – mainly visual – some of which have been investigated further by design or text. These ‘notes’ are organised in seven assemblages according to theme. Volume II is a text that follows the thematic organisation of the ‘notes’; the same themes are investigated and discussed by different means.⁶

The parallel reading of the two volumes reveals “the links between the notes, the text and the design work.”⁷ A system of referencing numbers and notes in brackets criss-cross the two volumes, not only connecting the material within the volumes but also pointing to material that, while not present in the volumes themselves, informs the PhD research. Here the format speaks of the thesis at hand, the notion of ‘chance’ investigated and discussed in the thesis; the reader is encouraged to construct his/her own readings based on incidental associations.

These two examples challenge linear formats that favour textual descriptions and point to the need to consider flexible formats and frameworks that, while addressing the needs of conventions of research, allow for a documentation that through its format illuminates the particular individual trajectory of each design research project. They also, however, illustrate referencing understood as creative practice – that is, they create imaginative links between objects.

I would note here that this rethinking of referencing is neither new nor extraordinary – especially in art practices – however it raises two key issues that referencing frequently overlooks. Firstly we might consider the issue of originality. Originality is a relatively recent concept in western thought. It gained significance in the 18th century when a work of art ceased to be understood as the outcome of a continuing process of interchange, exchange and appropriation of past and present sources, and instead came to be recognised only through discovery.⁸ Of course, this does not mean that the practice of creative appropriation stopped, only that from this point on the acknowledgement of appropriation was sub-ordinated to the presentation of novelty. The second issue, of greater interest here, is the assumed knowledge of the reader and the manipulation of this knowledge. In visual arts there is a long tradition of playing on the pre-existing

knowledge of viewers to create meaning. This is as true of allegorical paintings with biblical or mythological themes as of Marcel Duchamp’s *L.H.O.O.Q.* (1941-1942), which appropriates Leonardo Da Vinci’s *Mona Lisa* (1503-1506) for its own aims. Indeed, throughout the 20th and 21st centuries referencing has been used as a creative practice in literature and visual art to subvert existing taxonomies, to create meaning through juxtaposition, and to interweave visual and textual narratives.

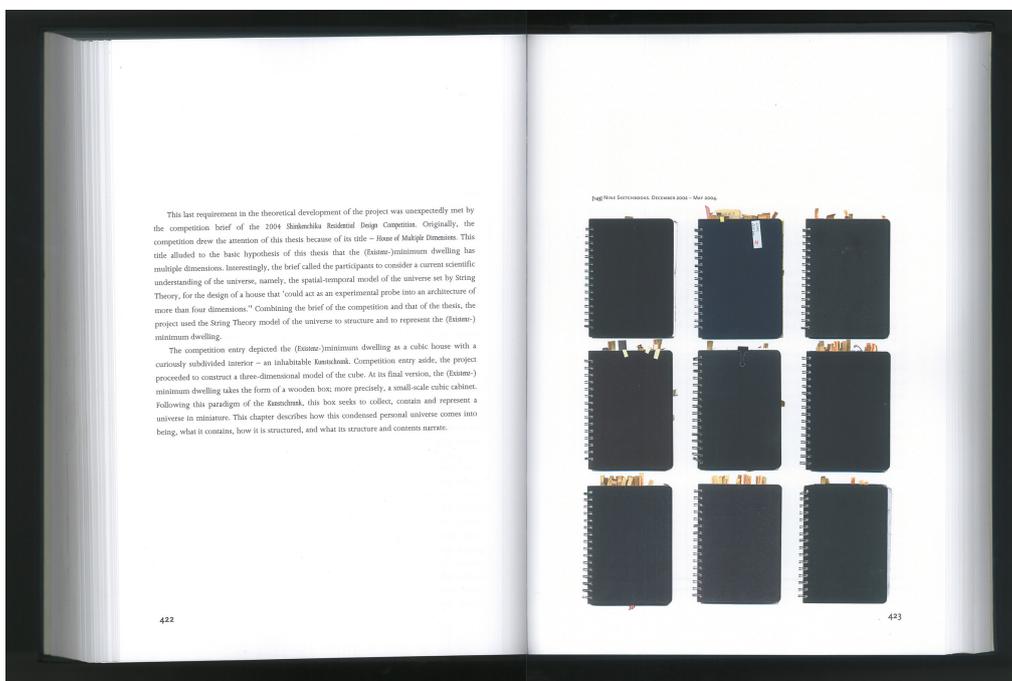
As an example we might consider how these objectives are evident in works such as the curatorial projects of Sophie Calle and Fred Wilson, who employ visual and textual juxtapositions to subvert existing museum categorisations and invest museum objects with new complex meanings. In *La Visite Guidée* (1994), for example, Calle places new objects – most famously a red bucket – in museum vitrines next to ancient artefacts – in this case chamber pots. This juxtaposition of objects is accompanied by a narrative text explaining the personal significance and use of the particular contemporary objects. As Tony Godfrey states:

As the visitor looked at these banal objects she realised that all objects in the museum once had similar associations, a personal, social history, a patina of use. The museum became, however briefly, a museum of lives lived, not just things.⁹

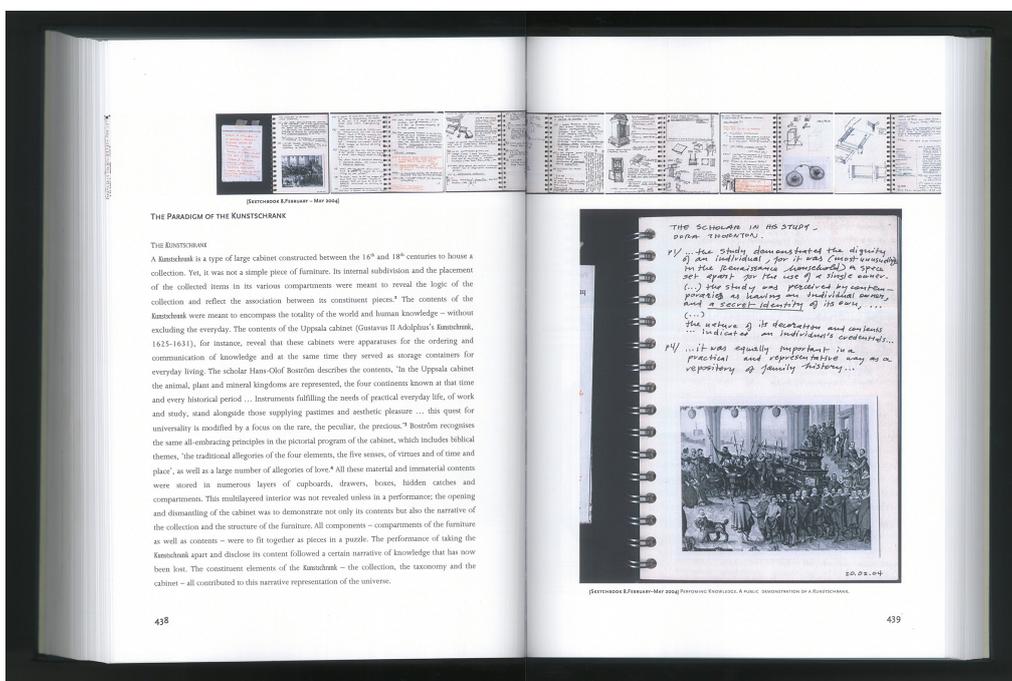
The red bucket thus works as a footnote that refers the viewer back to the present and one’s personal experiences. This unexpected object in the vitrine breaks the convention of arranging objects according to historical periods or geographical provenance, and of valuing rare ancient objects over new readily available ones.

Similarly, in *Mining the Museum* (1992), Wilson places shackles in a vitrine of exquisite decorative silverware labelled ‘Metal Work 1793-1880’. This work links the objects exhibited to other objects of the same era and thus draws the viewer’s attention to the stories of people not represented in the museum (in the case of silverware vitrine, slaves). Interestingly, as its title suggests, for this work Wilson only used objects stored in the museum; his assigned role was to research the collection and to propose imaginative links between artefacts.

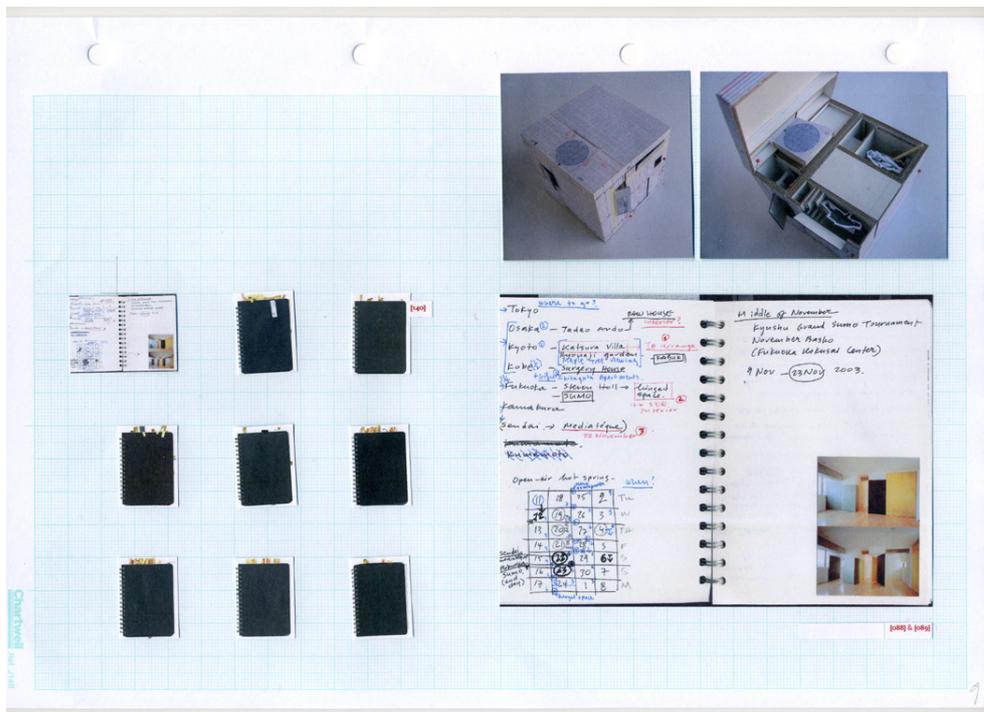
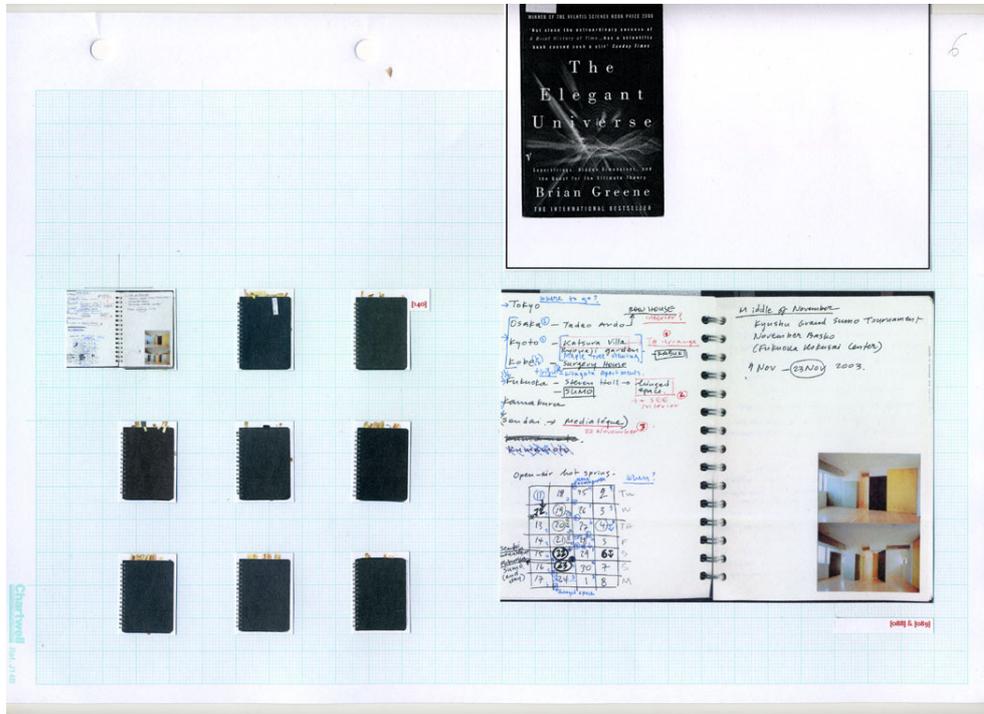
Recent texts have also employed acts of creative referencing. One extreme example is *House of Leaves* by Mark Z. Danielewski (2000). Danielewski uses footnotes as a means to structure his book’s multi-layered narrative.



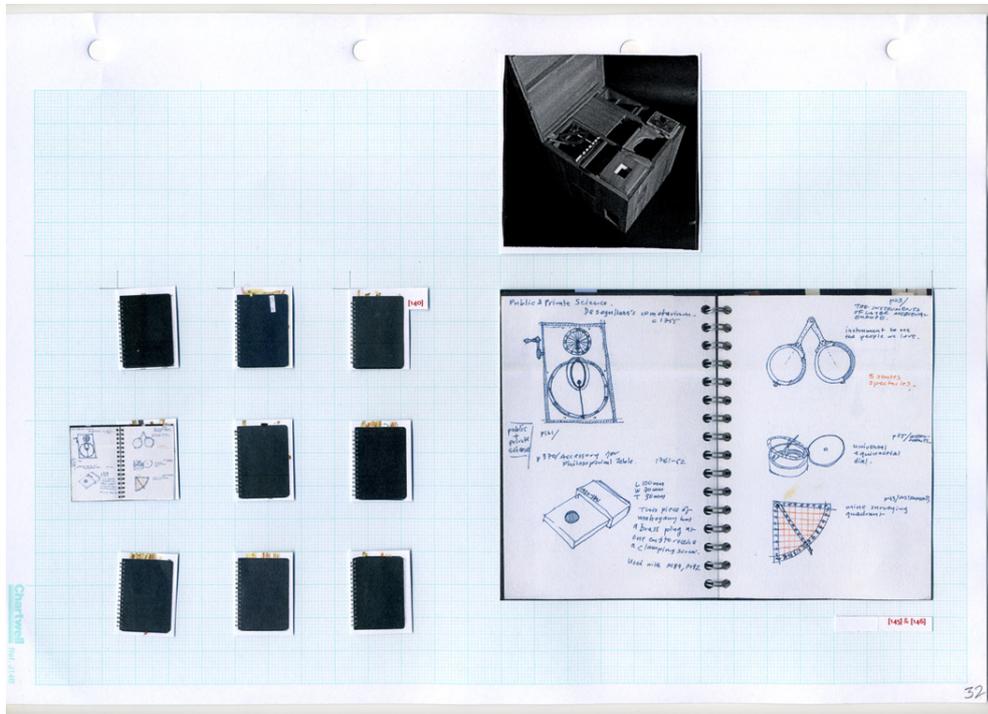
02:
Ersi Ioannidou, *The (Existenz-) Minimum Dwelling*.



03:
Ersi Ioannidou, *The (Existenz-) Minimum Dwelling*.



04: Ersi Ioannidou, . Nine Sketchbooks: Cross-Referencing Machine.



05: Ersi Ioannidou, *Nine Sketchbooks: Cross-Referencing Machine*.

He subverts the conventions of referencing to design the book's text and to involve the reader in a complex tangle of story telling. Here, Danielewski takes advantage of his readers' knowledge of referencing conventions and uses it to liberate them from a linear reading and to involve them in creating the narrative.¹⁰ Interestingly, Danielewski not only subverts the textual conventions for creating a narrative and the academic conventions of footnotes but also the visual conventions of how to organise text on a page. The text is framed, becomes a frame, occupies the margins, occupies the page diagonally, disperses itself across the page and sometimes disappears. This visual manipulation of the text reflects the twist and turns of the narrative developing within. Thus, an imaginative link is created between what is read and what is viewed.

THE HOUSE OF MULTIPLE DIMENSIONS

These various works emphasise the combinatorial nature of creative practices and thought processes. They exploit the viewer's knowledge of conventions to establish visual, textual and verbal links and thus enable the viewer to create new meanings and narratives. The documentation of design research could similarly exploit existing referencing conventions and traditions in scholarship and art to expose the creative combinatorial systems behind design projects. Returning to the sketchbooks mentioned at the start, and the collection of research material contained within, in the piece accompanying this paper I investigate the possibility of creating a visual representation of the connections between collected references and the design development of *House of Multiple Dimensions*.¹¹ As the final chapter in a long inquiry this project sought to bring together the various strands of a larger research project, and consequently from its very beginning *The House of Multiple Dimensions* referred to a considerable collection of visual and textual references that were, in the process of designing and writing, informally recorded within the sketchbooks.

In the original documentation of the project scanned pages of these sketchbooks were presented in a continuous strip, as a visual introduction to a final written chapter. This strip was organised chronologically, from *Sketchbook 1: December 2002-March 2003* to *Sketchbook 9: May 2004*. Within this strip selected pages were enlarged to draw attention to specific images and texts that played an important role in the research project in general and in

the development of the design project in particular. This process of selection revealed certain recurring themes; namely, mechanical transformation, narrative interiors and minimum space – as well as the potential combination of these themes. This visual re-presentation sought to incorporate aspects of the research that had not been obviously influential in the final project as presented, but on reflection it revealed little about the design process and the role of references in that process. To address this shortcoming the accompanying piece to this paper embraces the challenge of describing the function of references in the documentation of a design research project and considers such a description as a form of design research in itself. The premise behind this visual re-presentation is that it should create an investigative multi-layered space in which the viewer could explore the material in the sketchbooks and the links between this work and the project, a project that is, in this presentation, largely absent.

This arrangement is inspired by the paradigm of the *Kunstschränk*, a large cabinet constructed to house a particular collection, common between 1540 and 1740.¹² The objects contained within were arranged in a chain of four links that seamlessly united natural formations, ancient sculptures, works of art and technical equipment. However, the ordering principles of the cabinet were not made immediately apparent. The *Kunstschränk* ordered its encyclopaedic collection in a three-dimensional structure; the contents were stored in numerous layers of cupboards, drawers, boxes, and hidden compartments. Rather than establishing taxonomic groups the very purpose of the collection was thus to form bridges between artefacts, and the arrangement of pieces within drew connecting threads between objects on the basis of playful associations and juxtapositions; each object had its own significance but at the same time contributed and belonged to the meaning of a greater narrative embodied in the cabinet. Only by examining the cabinet's complex internal subdivisions and the placement of the collected items within was the logic of the collection revealed.

In this way the *Kunstschränk* might be considered to represent a cumulative, potentially manipulative, approach to collecting, organising and presenting research material with the purpose of disseminating knowledge. Its fluid organisation system encourages cross-referencing and allows the emergence of new taxonomies by the arrangement and re-arrangement of

objects. To an exercise of creative referencing in design research, this early modern way of structuring material might be considered a particularly useful source: first, it emphasises visual readings and understandings over textual ones; second, it presents a spatial system of cross-referencing; and third, it acknowledges those indirect connections which linear sequences try to conceal.¹³

Through this re-presentation, and using the *Kunstschränk* as a presentation paradigm, we might find an alternative approach to (cross-)referencing that addresses Barbara Maria Stafford's writings on the need to generate a 'visual praxis' for the digital age. In *Good Looking* (1996) and *Visual Analogy* (1999), Stafford argues that although modern western culture is saturated by images, visual material still occupies a subordinate position to written material in the production and dissemination of knowledge. Stafford suggests a re-reading of early modern methodologies, such as the encyclopaedic visual arrangement of the *Wunderkammer*, in order to escape what she sees as the 'totemisation' of language in contemporary thought and the linear sequences imposed by this totemisation.¹⁴ The *Kunstschränk*, in contrast, cannot be subjected to linear sequencing.

Continuing this line of thought, in designing the digital *Kunstschränk* presented here we might turn to Susan Delangrange's "Wunderkammer, Cornell and The Visual Canon of Arrangement" (2009) and its accompanying piece "When Revision is Redesign: Key Questions for Digital Scholarship" (2009).¹⁵ In the first of these digital essays Delangrange both discusses and employs the *Wunderkammer*, the cabinet of curiosities, as a paradigm for design to argue "that the (visual) canon of arrangement, as represented in the *Wunderkammer* ... is a heuristic for invention and discovery."¹⁶ Delangrange believes that "a digital *Wunderkammer* would function as a thought engine in which the manipulation and arrangement of its contents by both collector/designer and visitor/viewer animates the process of inquiry and insight."¹⁷ Designing her digital essay as a *Wunderkammer* Delangrange seeks to enact this argument.¹⁸ In her second piece, "When Revision is Redesign: Key Questions for Digital Scholarship," Delangrange notes that a key issue when designing her digital *Wunderkammer* was how to maintain ambiguity when what was asked for by her reviewers was clarity and user-friendliness. Delangrange wished to remain 'deliberately enigmatic' in order to "enable the

viewer to confront the experience of *aporia*, of being on the edge of understanding, as well as the Aha! experience of discovery that ground a heuristic of visual arrangement as invention."¹⁹ Thus the *Kunstschränk* and the *Wunderkammer* represent not only a visual arrangement that encourages cross-referencing but also a process of discovery and understanding that successfully mirrors the complex process of research.

The first screen of the digital *Kunstschränk* presented in the accompanying piece, being 'deliberately enigmatic', depicts the front covers of nine (almost) identical sketchbooks. There are no instructions given to the viewer as to how to interact with these images. Moving the mouse over the screen reveals that two of the sketchbooks are active links. Once clicked these covers open to disclose their contents of textual and visual notes. Flicking through the pages of each sketchbook allows the viewer to explore accumulated research material. Occasionally a page contains an active link that relates the material on that page to drawings and models or other pieces of research material. Here, although the references within each sketchbook are arranged in a linear, chronological sequence, they are revealed to influence the design projects at intermittent points. These sketchbooks thus represent an arrangement of possibilities open to chance findings and personal interpretations; in their format they engage the viewer in a process of associative discovery. In this way exploration of these sources gradually reveals how references have been incorporated and finally assimilated into the project – or indeed by their ensuing absence where they have not. This presentation of a project through its references highlights the constellation of research material and references within which any project develops. In this presentation this constellation becomes a means of constructively juxtaposing 'found things' and 'newly made things', setting in motion mechanisms of discovery.

This digital *Kunstschränk* thus represents how design development might progress as a process open to accidents, lucky discoveries, irrational decisions, or non-linear links. It highlights the potential for on-going discovery through the accumulation and manipulation of references, a method of making connections intentionally directed toward something that has not yet found expression. It represents design research as a journey into the unknown that becomes embedded in or embodied by the designed object.²⁰

CONCLUSION

Research is an act of imagination contained within a framework of tradition and conventions. Referencing – that is the acknowledgement of the work of others and its influence on the research outcome – is one of these universally accepted conventions. As noted above design research has the potential to create its own traditions and conventions within the broader field of academic research. This paper advocates new formats of referencing that question the pre-eminence of text and the necessity of linearity in the documentation of design research. It puts forward, through the *Kunstschränk*, the idea that referencing as a creative practice, that is understood as adding a designed layer to research documentation, could provide a means by which new forms of presentation emerge; presentation formats that more effectively communicate the workings of design development, and at the same time might provide a means of re-thinking both the conventions of referencing and the presentation of research beyond design-based practices.

NOTES

- 1 Borgdorff, Henk. 2010. 'The Production of Knowledge in Artistic Research' in Biggs, Michael & Karlsson, Henrik (eds.). *The Routledge Companion to Artistic Research*. London: Routledge, p.57.
- 2 Candy, Linda and Edmonds, Ernest. 2010. 'The Role of the Artefact and Frameworks for Practice-based Research' in Biggs, Michael & Karlsson, Henrik (eds.). *The Routledge Companion to Artistic Research*. London: Routledge, p.136.
- 3 Candy, Linda and Edmonds, Ernest. 2010. 'The Role of the Artefact and Frameworks for Practice-based Research', p.136.
- 4 Kattein, Jan. 2009. *The Architecture Chronicle: diary of an architectural practice*. Doctoral thesis, UCL (University College London). Jan Kattein's research will soon be published as: Kattein, Jan. 2014. *The Architecture Chronicle: diary of an architectural practice*. Farnham: Ashgate. Manolopoulou, Yeoryia. 2003. *Drawing on Chance: Indeterminacy, Perception and Design*. Doctoral thesis, UCL (University College London). Yeoryia Manolopoulou's research has recently been published as: Manolopoulou, Yeoryia. 2013. *Architectures of Chance*. Farnham: Ashgate. The book does not follow the complex cross-referencing system of the PhD volumes.
- 5 Borgdorff, Henk. 2010. 'The Production of Knowledge in Artistic Research', p.58.
- 6 Manolopoulou, Yeoryia. 2003. *Drawing on Chance*, p.7-8.
- 7 Manolopoulou, Yeoryia. 2003. *Drawing on Chance*, p.8.
- 8 Smiers, Joost. 2010. 'No copyright and no cultural conglomerates' in Biggs, Michael & Karlsson, Henrik (eds.). *The Routledge Companion to Artistic Research*. London: Routledge, p.392.
- 9 Godfrey, Tony. 1998. *Conceptual Art*. London: Phaidon, p.404.
- 10 In forums dedicated to *House of Leaves* readers new to the book ask how to tackle its complex and extended footnotes; shall they go down the road of reading the footnotes as they come or ignore the footnotes in order to make sense of its 'main' narrative by reading the main text.
- 11 *The House of Multiple Dimensions* was the final project in my PhD thesis. Ioannidou, Ersi. 2006. *The (Existenz-)Minimum Dwelling*. Doctoral thesis, UCL (University College London).
- 12 The *Kunstschränk* is a key reference in the larger research project; it successfully describes a transformable, narrative, minimum space.
- 13 Stafford, Barbara Maria. 1996. *Good Looking*. Cambridge, MA & London: The MIT Press, p.34.
- 14 Stafford, Barbara Maria. 1996. *Good Looking*, p.5.
- 15 Delangrange, Susan. H. 2009. 'Wunderkammer, Cornell and The Visual Canon of Arrangement' in *Kairos: A Journal of Rhetoric, Technology and Pedagogy*, Vol.13 No.2. Available at <<http://kairos.technorhetoric.net/13.2/topoi/delagrange/index.html>> (Accessed 5th December, 2013).
- 16 Delangrange, Susan. H. 2009. 'When Revision is Redesign: Key Questions for Digital Scholarship' in *Kairos: A Journal of Rhetoric, Technology, and Pedagogy*, Vol.14 No.1. Available at <<http://kairos.technorhetoric.net/13.2/topoi/delagrange/index.html>> (Accessed 5th December, 2013).
- 17 Delangrange, Susan. H. 2009. 'When Revision is Redesign: Key Questions for Digital Scholarship'
- 18 Delangrange, Susan. H. 2009. 'When Revision is Redesign: Key Questions for Digital Scholarship'
- 19 Delangrange, Susan. H. 2009. 'When Revision is Redesign: Key Questions for Digital Scholarship'
- 20 The researcher/designer takes on the role of an expérimentateur; a director of experiments in the sense the word had before the mid-19th century when the meaning of the term 'invention' was connected to the 'workings of imagination.' As Jon Thompson notes, the expérimentateur is concerned of how 'a whole trajectory of thought, aimed at an empty location of a certain kind, the journey into the unknown, the "adventure", becomes embedded in or embodied by the thing'. In Thompson, Jon. (2000). 'Panamarenko: Artist and Technologist'. In Panamarenko (ed.). *Panamarenko*. (Exhibition Catalogue). London: Hayward Gallery. pp.13-50. Here pp. 29-30.

FIGURES

- 01 Kattein, Jan. 2009. *The Architecture Chronicle: diary of an architectural practice*, pp.144-145. © Jan Kattein Munckton. Reproduced by permission of the author.
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