

Jewellery Theory and Practice:

**An investigation into emotionally invested and mnemonic jewellery
through sensitising materials.**

by

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A Doctoral Thesis

Submitted in partial fulfilment of the requirement for the award of

Doctor of Philosophy of Loughborough University

July 2019

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Abstract

This research explores the capacity of jewellery to be emotionally embedded and to perform a mnemonic function. It investigates the work of European jewellers, jewellery design methods and thought-provoking ways of displaying jewellery in an atypical setting. It is situated in the context of contemporary jewellery design and practice and aims to expand our knowledge of the potential of materials and new technologies to advance opportunities for the making of jewellery as an artefact with the capacity to be a carrier of emotions and memories. Throughout, the author utilises concepts of sensitising materials and notions of narrative quality. A body of work comprising nineteen publications including a chapter from a monograph book by the author is presented. The academic outputs illustrate a range of approaches from the theoretical and the experimental to exploratory qualitative methods.

The findings, testing innovative materials and new technologies contribute to our understanding of technical and aesthetic solutions to the problematics of investing jewellery with memories and emotions through the application of both digital technologies and traditional craft techniques. The results were then applied in qualitative contexts, firstly to explore their capacity to support the designing and making and secondly, in a collaborative setting to explore the capacity of this novel practice for enhancing well-being.

The distinctive contribution to knowledge comprises, in part, reflections on the materiality of the object from the jewellery maker's perspective. The purpose is to further an understanding of the role of emotionally and mnemonically embedded jewellery both in everyday life and as an agent of well-being. In doing so, it can be seen as: extending the work of anthropologist Ingold; informing the theory of

jewellery initiated by Lindermann; and as refining conceptualisations of the capacity of emotionally charged jewellery for enhancing well-being.

Keywords: craft research & knowledge; contemporary jewellery; design; well-being; critical theory.

Acknowledgements

I'd like to express my gratitude to both of my supervisors Dr. Rob Harland and Prof. Ian Campbell, and Prof. Jenny Fry, Prof. Mike Wilson who supported my PhD at Loughborough University.

My gratitude is extended with deep appreciation for her expertise to Dr. Jackie Goode, her support and key discussions on various dilemmas in my thesis were fundamentals to its completion. I'd like to thank Prof. Jayne Wallace as her work in the field has been pivotal in recent practice. Her friendship is also a precious gift.

Thanks also to my dearest friends Melanie Häni, Rossana Bottone, Anna Fornari, Pauline Jones and my wonderful daughters: Violet and Stella for their precious help and encouragement.

Special thanks go to the participants, artists, collectors and curators who generously took part in participatory and interview processes, including every curator who offered me the opportunity to exhibit my own work.

I'd like to express my deep appreciation to all my teachers/professors, from three different countries, who taught me the seduction of understanding, the nobility of the academic generosity and the beauty of striving for a contribution to knowledge; without this basis I would have not pursued a PhD degree at this stage of my life.

I wish to dedicate this submission to my parents and my brother. Grazie di cuore.

Thank you all.

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Introduction

Jewellery has been used in a multitude of ways for millennia, with one role being communicative, for example to denote rank or to signify betrothal, age or gender. On these occasions, it is being worn for its symbolic value. At other times, it may be valued for its aesthetic or decorative attributes, as when it is worn to embellish, decorate and beautify the wearer, with its symbolic content becoming of secondary importance. In both cases, jewellery becomes empowered by the meanings and emotions invested in it. When worn on the body, it contributes to the affirmation of the 'self'. Jewellery is therefore conceived of here as an artefact with inherent attributes that can be activated in the process of identity formation and presentation (Goffman, 1956).

This submission presents a collection of book chapters, a research article and other equivalent academic outputs with the aim of investigating two things: the capacity of jewellery to be emotionally embedded and function as mnemonic jewellery through sensitising materials; and how jewellers utilise the amalgamation of new technologies, materials and emotions in the settings in which jewellery is displayed to an audience. Jewellery practice and theory is used here by the author to explore and understand the function of emotionally embedded and mnemonic jewellery in a European context.

While the archaeological and anthropological literature on Material Culture pays relatively little attention to actual materials and their properties, with the emphasis 'almost entirely on issues of meaning and form, that is, on culture *as opposed to* materiality' (Ingold in Candlin and Guins, 2009:82), this investigation combines considerations of both meaning making and materiality. It explores notions and processes of subjectivities, using an interpretative and inductive approach in

which meanings are constructed by the author in combination with an object-centred approach, which builds on recent discourse in Material Culture, Jewellery Practice and Theory of Jewellery (Lindemann, 2011).¹

This approach expands the contemporary research focus on the object itself and its materiality by making a contribution from the jewellery maker's perspective. It furthers an understanding of the jewellery practitioner's perspective on the actions involved in investing emotional and mnemonic properties in jewellery to constitute it as an agent of well-being. This research is an enhancement of studies on craft as a 'vital and viable modern discipline that offers a vision for the sustainable development of human social, economic and ecological issues' (Niedderer, Townsend, 2015). Theoretically it draws on the work of anthropologist Ingold's concept of narrative quality (Ingold, 2009:8) and on the author's own concept of sensitising materials (Bernabei, 2011:37-38),² utilising notions of social constructionism to explicate the 'building of meanings' within contemporary jewellery practice and theory.

Positivist sociologists³ have placed a high value on objectivity. In contrast, this

¹ Theory of jewellery has been developed collectively by contributors to scholarly symposia from 2005 to 2010 organised by the University of Applied Sciences Idar –Oberstien and the city of Idar-Oberstien. It looks at jewellery from the angles of philosophy and cultural anthropology, psychology and sociology with great attention to the anthropological foundation of jewellery above and beyond the usual categories of crafts, applied art or fine art (Lindemann, 2011:12).

² This concept of sensitising materials is further developed in the research undertaken for the monographic book (output 7) 'Contemporary Jewellers: Interviews with European Artists' (Bernabei, 2011:37,38). The author argues, through the analysis of case studies, that some jewellers e.g. Mario Pinton, instead of portraying socio-political or autobiographical meanings in the pieces of jewellery they produce, their work deals with the sensitising of materials. This is achieved through a close manipulation of and familiarity with materials. The ability and skills of the maker are embedded in the surface and within the object to the point that the jewel itself is charged 'with personal expression and is manifested as either content or sensitised materials' (Bernabei, 2011:234).

³ 'Positivist' social scientists follow founding fathers of sociology like Comte and Durkheim in conceiving of 'social facts' that exist 'out there' to be discovered by researchers who place a high value on their own

jewellery-based research has more in common with recent developments within the social sciences (such as feminist, postcolonial and autoethnographic approaches), in that it brings embodiment, experiential knowledge and subjectivity back into consideration within the research process. In the work presented here, the human is at the centre of the craft practice, and methods of inquiry are aimed at the interpretation of results, the illumination of social and cultural phenomena and the development of new insights. Therefore, after the initial materials-based experimental phase, the research methods used are primarily qualitative, the approach to analysis is interpretative and the author engages in reflective and inductive research throughout. The analysis of artefacts is conducted with reference to the following criteria: narrative quality (Ingold, 2009:89), form generation (manual or mechanical), acts of sensitising materials (Bernabei, 2011:37, 38) and building on contemporary jewellery practice as a process centred on emotion as social, discursive and human-relational (Wallace, 2007:198). This research does not investigate the psychology or ‘pure science’ of how our brain creates emotions and memories.

The publications (pp. 66-211) brought together in this thesis as a body of work demonstrate both the broad research approaches used and the specific methods employed to disseminate findings to wider audiences (e.g. through participatory practices and exhibitions).

‘objectivity’. This model had a powerful influence for many years on the way research was conceptualised as being properly conducted according to traditional ‘scientific’/hypothesis-testing methods - in contrast to subsequent social constructivist approaches, which recognise the inescapable contribution of the researcher herself to the process of knowledge production and its outcomes.

This investigation into jewellery practice and theory addresses three research questions:

- A)** How do sensitising materials and digital technologies used in jewellery practice determine its capacity to embody memories and emotions?
- B)** How can participatory jewellery practice and exhibitions affect the dissemination of embedded jewellery?
- C)** To what extent can jewellery imbued with memories function as an aid to well-being?

As illustrated in Table 1 (p. 15), this thesis is composed of eleven contributions in all, each of them contributing to the overall investigative project. The outputs are conventionally grouped and numbered from 1 to 11. Research question **A** is addressed by all of the publications (pp. 66-211) except 2 and 8 (which set the author's investigation of personal memories and emotions within a wider analysis of European jewellers' creation of emotionally embedded jewellery); research question **B** is answered by outputs 1.2 (p. 67), 2 (p. 72), 4.3- 5 (pp. 81-87), 8-9 (pp. 166-198) and 10 (p. 201); and research question **C** is answered by output 10 (p. 201).

Moreover, outputs are individually presented in the Appendix (pp. 65-225) according to the following format: title of output; short description of it and its contribution to knowledge; its innovative qualities (if applicable). In the case of written outputs, the published article or chapter is included; whereas in the case of exhibitions, an image of a key piece of work appears. Where possible, every output has a link to the catalogue, set of images or article deposited on Loughborough University Repository. The Glossary provides a succinct

explanation of some specialised or uncommon terms. Finally, in regards to participants' involvement in the study, the author has adhered to Ethical Procedure and approved documents where deposited at Loughborough University.

The overall research process through which the aims of this doctoral study have been addressed passed through different ‘stages’ of research and production, as outlined in the Abstract (testing innovative materials/new technologies, investing jewellery with memories and emotions, applying findings in qualitative contexts to explore capacity for enhancing well-being, exhibiting findings etc).

In the first column of Table 1 (p. 15), these different stages are described and numbered; the second column indicates which of the research questions are being addressed during this stage; the third column identifies the specific ‘evidential’ outputs, numbered as they appear in the Appendix (pp. 65-225); the final column indicates the author’s percentage contribution to the published outputs. In relation to exhibitions, the author’s participation came about via direct invitation from curators or through work selected by judging panels.

In this thesis a body of work comprising nineteen publications, selected amongst 117 published outputs is presented. The academic outputs listed below are in a chronological order to demonstrate the research progression. In many instances two or more outputs are grouped into a category to explicate the production stage and thinking logic behind the investigative approaches.

Table 1 The contribution of the publications towards the thesis research questions.

Research & Production Stages	Research Questions	Single output or a group of outputs that addressed RQs	Author Contribution
1. Memory spaces & maker's memories (sensitising materials).	A A, B	1.1 Roberta Bernabei Jewellery, 1995, (solo exhibition) 1.2 Roberta Bernabei Contemporary Jewellery, 2003, (solo exhibition) 1.3 Pensieri Preziosi II, 2005 (group exhibition)	100%
2. Maker's emotions in sensitising materials, memory space and innovative installation.	B	2 Mapping Impermanence, 2005-6, (solo exhibition)	100%
3. Transforming emotionally embedded second hand costume jewellery and memory of material.	A	3 Contemporary Jewellery from Italy, 2007-8, (group exhibition)	100%
4. Sensitising materials with emotions by using digital technologies: laser cutting, transfer printing and precision photo etching.	A A, B	4.1 Binary Flowers, TEN, 2009, (group exhibition) 4.2 Cutting Edge: Lasers and Creativity Symposium, 2009, (presentation) 4.3 Collect - Women in Jewellery, 2006, (group travelling exhibition) 4.4 Souvenirs: Reinvigorating Bilston Enamel in the Twenty First Century, 2013, (group exhibition)	100%
5. Dissemination of embedded jewellery in participatory jewellery practice and new technologies in relation to the democratisation of jewellery.	A, B	5 Digital Jewellery: The Democratisation of Authorship and Ownership, 2014, (refereed journal paper)	100%
6. Sensitising materials, embedding maker's memories and emotions by using new technologies.	A	6.1 Castelli Miniature, Astri ed Alchimia la Padova Carrarese nel Gioiello Contemporaneo, 2011, (group exhibition) 6.2 Contemporary Jewellery- Homage to Donatello, 2015, (group exhibition)	100%
7. Theoretical context provided by literature review, sensitising materials approach, imbuing content (memories, emotions).	A	7 Contemporary Jewellers: Interviews with European Artists, 2011, (monograph on contemporary jewellery)	100%

8. Investigation on how the innovative exhibition modes proposed by some artists have affected the dissemination of embedded jewellery.	B	8 Jewellery Can Be Worn Too, 2017, (book chapter)	100%
9. Sensitising materials with maker's emotions and participant's memories in artists' collaboration.	A, B	9.1 4 Pontos de contacto entre Lisboa e Roma, 2010 9.2 Dialoghi- AGC- JJDA, 2016-17 (group exhibition)	100%
10. Jewellery memory: community & well-being. Sensitising materials and embedding participants memories.	A, B, C	10.1 Loughborough Jewels: Interactive Exhibition to Imbue Memory with Jewellery, 2016, (participatory project and exhibition). 10.2 Cedar House-Rothley: Memory and Jewels Project, 2016, (participatory project and exhibition).	100%
11. Writing on sensitising materials.	A	11 The Poetry of Sensitising Materials, 2018, (short essay)	100%

The body of research here presented has relevance for jewellery practice, design and theory. Contributions to knowledge are claimed in the following areas:

- The novelty of the investigation to extend the exploration of sensing materials during the practical action of making and the action of sensitising materials from a maker's perspective.
- The continuation of exploration of contemporary jewellery practice as a process centred on emotion and memories that integrates methods from craft practice to studies on materiality.
- The physical body of work conceived as a physical and theoretical investigation to challenge and test methods to embed emotions and memories in jewellery, which resulted in an innovative somatic and self-reflective method added to the existing craft practices.
- The exploration of the application of diverse digital technologies in order to help define approaches used in transferring the sensory experience and memories through imagery into tangible jewellery.

- The identification, through theory and practice, of new modes of jewellery display in an exhibition setting, facilitating a debate productive of further analysis and critique within the broader field.
- The furtherance of investigation into a scant literature in the field of knowledge in jewellery theory and practice, through with the application of a relatively new methodology with reference to traditional practices; namely the application of interview and storytelling methods.
- The novelty in relation to the identification of participants' responses to using an object (a jewellery artefact) employed as an initiator for communicating with people, reinforcing their memories and re-asserting their existence.

Context to the thesis

In recent studies, jewellery has frequently been viewed through the lens of Material Culture, (Andreade 2010; White 2007) in User Centred Design (UCD); and Human Centred Design (HCD). However, these approaches focus on gaining a deep understanding of those who will be using the product throughout all the phases of the design and development life cycle. The emotional engagementsensitising materials and narrative quality ‘from the maker’s perspective’ is not always an implicit consideration in UCD and HCD methods.

In Material Culture approaches used in Anthropological, Archaeological and Museum Studies, the incorporation of an historical as well as a present-day perspective means that the store of source materials available for studying and understanding societies is vast since the approach focuses on the relationship between objects and people irrespective of space and time. Recently Material Culture has shifted towards understanding *practice*, while still maintaining a focus on the social implication of human values invested in objects. Nonetheless, ‘human values do not exist other than through their objectification in cultural forms’ (Simmel in Miller, 1998:19). This research strives to understand the ways in which cultural form becomes manifest in matter. Moreover, material forms become an integral constituent of the meaning and knowledge involved in researching ‘objectification’ in Material Culture. Despite the shift towards a focus on practices, however, (including an acknowledgement of the digital), there have been few attempts to examine craft’s implications for design in an increasing digital culture (Wallace, 2012). The maker’s perspective on *the process of making*

powerful objects such as jewellery has been given little attention or recognition in these disciplines. By contrast, in relation to the author's pieces of jewellery, it is processes of making that are foregrounded and moreover conceived of as a process of 'growth'⁴ (Ingold, 2009:86).

The specific cultural, temporal and spatial contexts typically attended to by sociologists, anthropologists and cultural geographers are not the primary focus here. Rather, the gap highlighted above is addressed by focusing on the creative process, on the making of the object, its materials and the use of new technologies; furthermore, the process under examination does not end with the completion of the artefact but extends to its dissemination and the functions it goes on to serve in specific social settings.

This research on contemporary jewellery is therefore situated between and across the above disciplines, bridging the relationships between maker, jewel and wearer and focussing on the dynamic interaction between the 'self'-objects - and 'other' (human beings) through which jewellery comes to constitute a part of the wearer's social, physical, emotional, aesthetic and mnemonic world. Objects have a role in our lives, they have agency: they are active players in linking people with diverse sets of social relations in that they do not just reflect or convey meanings from the wearer to the viewers but are actively constitutive of such meanings.

Building on the work of a group of European practitioners in the 1960s who initiated the emergence of 'Contemporary Jewellery' (Besten, 2010) as a practice

⁴ In relation to making an artefact, Tim Ingold sees the action of making as a process of growth. Growth is when the maker is placed from the outset as a participant in amongst a world of active materials (Ingold, 2013:21).

which reconnected with the origins of jewellery as a signifier, the research reported here places the notion of jewellery as a carrier of emotions and memories, with potential to contribute to people's identity formation, presentation and *habituality* (Goseden 1994:11 in Candlin, Guins 2009:90) at its centre. In choosing what they wear, human beings are outwardly demonstrating an aspect of their personal identity and to some extent determining at the same time how they interact with others. Wearing jewellery can be a conscious manifestation of how people choose to open a communicative channel to the wider public.

In so far as a 'self' persists throughout one's life, it is through this self that one can actively engage with how one's body is perceived by others, adding material attributes which variously function to protect, build and present that 'self' (Goffman, 1956/69).

Jewellery is conventionally seen as *expressing* aspects of identity which are likely to be related to socially-constructed ideals of beauty, or notions of identity which are seen in some cultures as occupying a predestined place in society (MacCormack, 2006). The notion of jewellery as 'agentic' used in this thesis contrasts with this idea of identity as predestined – here, jewellery is conceived of as allowing the wearer a degree of self-determination in the 'building up' of their identity.

This research is therefore relevant to the jewellery discipline and beyond, as it expands understandings of the role jewellery plays in the valuing of the body and the self, that is, the ways the jewel is empowered to constitute and enrich one's

identity as an ‘embodied self’. It shows how we can highlight and explore the interaction between the individual and the jewel as a process of co-construction of identity. This ‘collaborative’ process of identity construction between individual and artefact enhances the individual’s sense of agency, freed to some extent from the societal constraints that dictate who and what we should be. In this context, jewellery making becomes an emancipatory practice with potential for increasing the value of one’s life.

Those undertaking critiques of craft and art historians alike sought to achieve a re-assessment of the contributions of both of these domains to the field of art and design by positioning their *modus operandi* as a form of art in themselves.

Jewellery practice was implicated in such challenges, so that by 1976, Ralph Turner could highlight ‘the creative potential and freedom embraced by jewellers in the second half of the 20th Century’ (Turner, 1976).

Recently, this discourse has been enriched by a growing number of academic researchers who are studying the field. Studies conducted by Jayne Wallace, for example, have opened up new possibilities for seeing digital technologies in jewellery as having the ability to enhance jewellery’s positive role in society and as an aid to well-being. She asserts:

Craft practice can be an intimate and empathic process engaging a practitioner as an individual in the expression of personal ideas through the creation of objects. (Wallace, 2007:12).

Wallace initiated investigations into what she termed ‘emotionally charged jewellery’ (Wallace, 2007:1). This is one of the key elements in understanding jewellery practice as the construction of the ‘self’ in society. As demonstrated by the earlier discussion of related literature, there is a need to extend our knowledge and understanding of the role of jewellery in this context. What is being submitted here does this through the practical investigations undertaken, supported by a theoretical framework, evidenced by a selection of key peer-reviewed publications (i.e. a chapter from a monographic book, a separate chapter, an article and a short essay). They investigate: the historical role of jewellery and the beginning of contemporary jewellery in Europe; the design methods of selected makers; their use of traditional and new technologies; and innovative ways of displaying jewellery.

Through the body of work presented and contextualised here, the author explores this hypothesis (that is, that jewellery does have such a capacity) further within the Contemporary Jewellery arena, and demonstrates, through examples, various approaches to emotionally embedded jewellery and its use as an aid to well-being. Finally, it presents examples of how the processes through which emotionally embedded jewellery-artefacts have been created, via participatory practice, have been disseminated in exhibitions.

Methods

In this section, the various methods used in the research underlying the publications collate here are described. In Table 2 (p. 27), a summary of outputs will be listed alongside the corresponding research methods.

As outlined earlier the outputs arise from an investigation by the author using a framework drawn from Ingold (2009) on narrative quality; from Wallace on processes centred on emotion; and from sensitising materials by Bernabei (2011). It draws on methods familiar in social science disciplines, notably qualitative interviews and action research (Adelman, 1993).

In the context in which these methods were employed, the jeweller works as co-creator with participants while gaining an insight into participants' memories and emotions through simultaneously interviewing them as the process unfolds. Philosophically, this is based on a social constructionist view of meaning-making. This approach is eloquently explained by John W. Creswell as individuals 'develop subjective meanings of their experiences – meaning directed toward certain object or things' (Creswell, 2009:36).

Theoretically/methodologically it is an example of the use of qualitative research in that the (emotional and mnemonic) meanings are co-constructed in interaction with the participants and identified/elicited through the informal interviews and final focus group. The resulting subjective meanings are co-created by the maker and the participants, (as in social constructivism) and through the interaction and collaboration with materials constitute 'making as growth' (Ingold, *ibid*). As the

jewellery-artefacts come into being, therefore, their embedded/embodied meanings arise from the interactions that constitute their co-production (rather than from any pre-conceived sets of ideas or hypotheses about what their emotional meaning is or will become).

The author's research therefore uses a combination of experimental and qualitative methods: experimental materials-testing and jewellery-making; semi-structured interviews with open-ended exploratory questions; archival data collection; an 'action research' component consisting of participatory processes through which meaning is co-constructed and the jewellery's 'performative' function is identified (i.e. its actual and potential contribution to well being); and innovative dissemination practices via exhibitions. For output 10.2 (p. 201), the author visited participants in their own personal space and engaged in discovering their thoughts and exploring and identifying what connotations their visual and abstract memories had. This social interaction 'in the field' enabled the author to collect the kind of 'data' that would act as a generative 'visual aid', enabling her to manifest interpretation of participants' memories. The personal account of emotions and memories is manifested through a sensory experience with materials in the act of sensitising them. The argument here is that there are two approaches in the theoretical framework for embedding emotions and or memories in jewellery: firstly, a social constructivism model, in which sensitising materials and narrative quality are adopted for participative projects between maker, materials and participants; and secondly, an 'introspective approach', in which sensitising materials and narrative quality become manifest in pieces of jewellery as they are being charged with the author's emotions and/or memories (with imagery) alone.

The differences between narrative quality, narrative content, sensitising materials, embedding emotions and memories from the author's perspective are the following.

Narrative quality contextualised in the jewellery discipline is the collaborative interaction between the maker, materials and tools during the making process. The form of the jewellery grows with the interaction between them (maker, materials and tools) until the surfaces of the object are finished with the act of sensitising materials. The latter qualifies the last stage of the narrative quality process. If during the design, model-making and form-generation the maker introduces imagery for depicting a specific memory or to narrate a story, then it can be referred as to narrative content or narrative jewellery⁵. One could argue that the narrative content in jewellery subsists if imagery is used to illustrate a story or create mnemonic jewellery.

The act of imbuing emotions into jewellery is argued by the author to be a collaborative process inherent in handling materials by the maker but this can be anything from a minimal intervention to a greater one.

The act of embedding memories is in the hands of the maker or is a collaborative decision, which unfolds through depicting the memory with imagery, supported in some instances by the use of specific colours that can trigger memories.

⁵ It is crucial here to differentiate the widespread knowledge of the notion of narrative jewellery with the notion of narrative quality (see above). Narrative jewellery as defined by Jack Cunningham as 'a wearable object that contains a commentary or message which the maker, by means of visual representation, has the overt intention to communicate to an audience through the intervention of the wearer' (Cunningham 2007).

Table 2 Research Methods used in the research for the publications.

Methods	Approach	Outputs
Archival data collection; observational methods; semi-structured interview	Investigative; interpretative; introspective; analytical	7
Object-based interview; semi-structured interview; participant observation; reflection; focus group	Investigative; interpretative; analytical	5, 7-11
Maker's creative process: Step 1 Design, Step 2 Material investigation, Step 3 Test making, Step 4 Object making, Step 5 Analysis of material object, Step 6 Reflection on the jewel when it is worn. Generation of an object with emotions/memories (steps 1-4). Analysis of artefacts in two contexts (steps 5-6).	Visual analysis; tactile investigation; somatic experience; self-reflective; sensitising materials	1- 4, 6, 9 -10

The impact of the intervention of digital technologies and sensitising on materials' capabilities to embody memories and emotions.

The first research question (A) asks: How do sensitising materials and digital technologies used in jewellery practice determine its capacity to embody memories and emotions?

This question has been addressed in all of the outputs (pp. 65-225) (with the exception of outputs 2, p. 72 and 8 p. 166), in several forms and at different levels: from the author's investigation of her personal memories and emotions through a wider analysis of European jewellers' contribution of emotionally-embedded jewellery to the co-creation of mnemonically-invested jewellery; and from an analysis of the application of various materials to the use of digital technologies.

The work and analysis related to this question focuses on the process of thinking, designing and making the artefacts. The author does not use 'expressive movement for creating products that elicit *predefined* emotional responses' (Niedderer 2012 in Lee, Park and Nam 2007, Weerdesteijn, Desmet and Gielen 2005:1335); nor has she developed a systematic way of incorporating emotions or memories with a predefined emotional audience reaction. Instead, she co-collaborates with materials like a co-worker in an act of connecting with intrinsic qualities of the materials during the explorative process of making models, in combination with form-generation, and followed by surfaces-manipulation.

For instance, in outputs 1 (pp. 66- 71), 4.3 (p. 81) and 6 (p. 112-115) the author conceived a series of pieces of jewellery as an exploratory research process to imbue her personal memories or to capture memory spaces. For example in output 1.2 (Fig. 2, p. 69) the memory spaces captured the void left by the presence of missing stones, whereas in output 1.3 (Fig. 4, p. 71) the memory space captured the space around the body. The author's intention with these pieces of jewellery was to elicit the viewer's notion of the memory space rather to test in a scientific way the results of viewers' understanding of the visible void. Consequently, the contribution to knowledge is in the fact that the work generated other ways of inducing the sense of space in the viewer when observing or wearing the jewellery. In output 1.1 (Fig. 1, p. 67) the nature of telling a story (in this case, about the author's memories of a journey) through jewellery, was pursued with a pendant. Here the object acts as a catalyst for sharing travelling memories between the wearer and viewer, in fact the interplay between the two has to happen in order to explore the innovative usage of the jewellery. The author produced a series of pieces that responded to participants' memories as a result of participatory projects in outputs 10 (pp. 201-206) and artists' projects in outputs 9 (pp. 198-200). In outputs 6 (pp. 112-115), the author's memories were elaborated with imagery and the application of 3D printing before, finally, materials were sensitised during the finishing process.

The author's expressive movement generated during the design and making process was charged with emotions and acts of sensitising materials in all of the pieces of jewellery, in combination with personal memories in outputs 1.1 (p. 66) and 6 (p. 112) and participants' or artists' memories in outputs 9-10 (pp. 198-206). The artefacts conceived by the author acquire significance through the

author's emotions. The action of making during the creative process has what Ingold refers to as narrative quality, in the sense that every movement, like every line in a story, grows rhythmically out of the one before and lays the groundwork for the next (Ingold in Candlin and Guins 2009:89). This contrasts to the somatic experience in making the object and the predefined emotional response theorised by Niedderer; here, by contrast, the author proposes a much more spontaneous approach to materials and the construction of meanings. She offers possibilities to viewers to extend the makers'/object's 'intention'.

The author's argument is that the narrative quality in her work is combined with 'soft functions', for example emotional bonds, sentimentality, personal taste, feelings and personality (McDohagh-Philip, Lebbon 2000). Moreover, during the creative process narrative quality is joined by the action of imbuing emotions and memories. The latter is based on an inductive method and work with materials, creating a bridge between the intangible emotions and memories and the material world. The interface to connect the two worlds is through an 'experiential sensibilities' approach (Connor and Peck, 2016). The most appropriate term to define this approach, utilised in outputs 1-11 (pp. 66-211) (excluding 5 and 8), is the term 'sensitising materials' (Bernabei 2006, 2011). Sensitising materials has long been used to indicate the maker's ability to emotionally charge jewellery surface amongst jewellers from the School of Padua in Italy. This approach to materials and maker's capacity has not been fully defined and explained as the author is proposing here. The complexity of sensing and sensitising materials with human senses is disclosed with its definition first and examples of sensitised jewellery during the making process then.

Sensitising materials refers to the emotionally invested surface of the ‘finished’ piece of jewellery that acquires a poeticised quality. This emotionally charged surface could be perceived and re-experienced through our senses for example sight and touch by the wearer and viewer.

The artefact can be sensitised at different levels by the maker through a somatic experience in collaboration with materials and tools. The extent to what materials can be imbued with emotions is directly proportional to the maker’s manipulating of the materials by hand, hand-tools or mediated by machines such as the 3D printer. From the maker’s perspective, the closer the somatic experience and manual manipulation of the jewellery surface, the deeper is the emotional engagement. This does not exclude the mechanical emotional investment of jewellery if the input comes for the maker. Even at nano-technology level nano-materials can be ‘touched’ (Heinzel, 2019) by the maker. In this instance, the level of emotional engagement transmitted by the sensorimotor experience and the proximity of the maker mediated by hand tools is diluted if substituted by the 3D printer. In sensitising materials two key factors interplay to poeticise the jewellery surface: vision as the most important sense (Merleau-Ponty, in: Jönsson, 2005:17) and tactility – touching and feeling (Serres, in: Jönsson, 2005:17).

Furthermore, the term identifies the ability to transform surface materials through a combination of knowledge acquired during formal training, maker’s sensibility and tacit knowledge. This approach led contemporary jewellery artists such as Hermann Jünger to the notion of the sensitising of materials into poetic artefacts (Bernabei 2011:37). This concept further argued by Bernabei in output 11 (p. 207) for the work of jeweller Annamaria Zanella. Her work, as a case study, has been

analysed to demonstrate when the artistry of working with metals and pigments can poeticise the work.

As stated in Table 2 the research methods for the creation of artefacts by the author are:

Step 1 - Design

Step 2 - Material investigation

Step 3 - Test making

Step 4 - Object making

Step 5 - Analysis of material object

Step 6 – Reflection on the jewel when it is worn.

The body of work of outputs 1- 4 (pp. 66-86), 6 (p. 112), 9 (p. 198) and 10 (p. 201) is the result of maker's creative process. The thinking process, one could argue that in this context it can be defined as jewellery thinking process for its nature correlated with issues linked with the body and wearability, is therefore an invisible thread that starts in step 1 and goes along every step - not necessarily always in the same order - but inexorably arrives at step 5 to complete its maker's journey in step 6. The narrative quality grows into the object during step 4, and the surface is sensitised when the object is nearly completed.

This is particularly evident in pieces of jewellery where the hard material, e.g. metal and even hard wax is filed or engraved with lines. The metal (silver, gold or copper) or hard modelling-wax surfaces are scratched with a continuous or interrupted line to define a drawing or pattern. Although the engraved lines do not always 'grow rhythmically out of the one before' the line writes the story on the

piece of jewellery (e.g. see engraved drawing in the brooch *Father and Son* - Fig. 17, p. 204). The result is a narrative quality described by the line. The narrative quality of the design and making process is combined with images added to the object in outputs 1.1 (p. 66), 6 (p. 112), 9 (p. 198) and 10 (p. 201) to elicit memories. In this context Step 4 refers to the manual operation of making the object, however this is obviously replaced if during the creative process the machine prints or etches the work.

At the 2D form-generation stage (Step 1), through drawings on paper, the line generates the form of the jewel. At the 3D making stage, the line describes the tactile quality of jewellery. For example in some brooches in outputs 10 the rhythmic movement of engraving copper plate has generated grooves on the surface; they are filled with black graphite to highlight the drawing (e.g. brooch in Fig. 17, p. 204). During the slow process of engraving the participants' stories were echoing in the author's mind. Although there was a unique story to follow for each participant and consequently for each brooch, the author's surface transformation and intervention refers to joining forces from materials, the personal experience of the author and the participants' memories.

In output 3, Fig. 8, p. 77, the author's personal emotions are imbued in the jewellery together with melted second hand costume jewellery; previous memories were reconstructed into a piece of jewellery to elicit materials capacity to carry the author's emotions intertwined with unknown prior memories.

It is widely recognised that objects can be loaded with metaphorical significance or semiotic content (Guss in Ingold, 2009) from an anthropological point of view, where 'significance' stands for what a work of art means when looked at by a

viewer; just as from a jewellery practice perspective, jewellery can be emotionally charged (Wallace, 2004). Emotions embedded in the jewellery are by their nature very personal and unique to the author. Memories and emotions are inexorably intertwined; in fact memories are generated by emotions as Hochschild states ‘*emotion as bodily cooperation with an image, a thought, a memory [...]*’ (Hochschild, 1979:551).

The imbuing of the memories into pieces is achieved in three ways: firstly, physical spaces reproduced with various materials (e.g. white chocolate - output 1.2, Fig. 3, p. 69 and transparent silicone – output 1.3, Fig. 4, p. 71); secondly the author’s or participants’ memories are suggested with the assistance of imagery (e.g. output 10.1, Fig. 18, p. 204) and thirdly the participants’ memories depicted with a juxtaposition of colours for example with an abstract micro painting composition on copper or the use of coloured mixed materials (e.g. output 10.2, Fig. 19, p. 206).

The intervention of new technologies such as laser cutting, precision photo etching and 3D printing were introduced to challenge and test the process of embedding emotions and memories in pieces of jewellery. In output 5 (p. 87) these technologies were investigated in relation to the democratisation of jewellery⁶ and the findings revealed that the democratisation of authorship commenced due to the advance of digital technology.

⁶ The term Digital jewellery used in output 5 (p. 87) refers to the creation and production of pieces by contemporary jewellery artists with the application of digital technologies. It does not allude to the digital jewellery (within contemporary jewellery) definition elaborated by Jayne Wallace (2007): jewellery objects embedded with electronic components [...] extensions of contemporary jewellery through personally and emotionally significant experience (Wallace, 2007:5).

In the following outputs 4 (p. 78), 6 (p. 112), 9.2 (p. 200) and 10 (p. 201) the main body of each piece of jewellery has been designed with the aid of design programmes, Illustrator, Photoshop, Maya and made by the four-manufactory techniques (transfer printing, 3D printing, laser cutter and or precision photo etching). The results have indicated that the act of forms generation through drawings has not been replaced by the digital intervention. Therefore, the design step had to be manifested through a drawing on paper. This approach was tested for a series of laser cut leather bracelets and necklaces (some pieces in outputs 2 and 4.2, p. 80).

In the creation of the other artefacts the form was developed by hand and then executed with the aid of CAD-CAM. The result is that the author felt the need to finish the jewellery with a manual touch, either a handmade gold clasp (e.g. output 4.2, Fig. 10, p. 81) or by adding a silk or cotton thread (e.g. output 9.2, Fig. 16, p. 200). The narrative quality was inferred by an albeit minimal but important sensorial intervention by the maker. Therefore, embedding emotions was possible even though the digital aid replaced Step 4 of the creative process that had formerly been a hand or semi-mechanical experience. This experience of the relationship between the maker and the execution of the jewellery revealed that there is still the need from the maker's perspective to sensitise materials and this cannot be done with the same level of emotional engagement by a machine.

Furthermore, the body of work for both outputs 10 (pp. 201-206) was conceived by the author with the application of 3D printing for the brooch frames. This decision was dictated by a desire to facilitate the democratisation of the project. In

fact, with the use of the 3D printer, affordable brooches were printed by Shapeways (an international 3D printing service provider). The author's intention was to combine traditional goldsmith techniques and digital technologies. The brooches were personalised with the participants' memories and emotionally charged with the author's emotions via the process of acquiring the narrative quality and sensitising material.

The contribution to knowledge from this phase of the research (and these outputs) therefore was that, provided the maker can have the last say on the object with her hands, the embodiment of emotions and memories was still possible. This discovery contributes to the initial discourse on 'Theory of Jewellery' by Wilhelm Lindermann.⁷

⁷ 'Theory of Jewellery' by Wilhelm Lindermann was illustrated in a compendium titled *Thinking jewellery on the way towards a theory of jewellery* on the occasion of the symposium at the University of Applied Science, Idar-Oberstein, 2011. The publication elucidates various tentative thoughts on this theme starting from Georg Simmel in 1905, in *Philosophie der Mode*, in which he explained the impact [jewellery] made on fashions, such conflicting needs as adaptation to social group by means of imitation (Lindermann 2011).

Dissemination of embedded jewellery in participatory jewellery practice and exhibitions.

The second research question (B) tackled by outputs 1.2 (p. 67), 2 (p. 72), 4.3-5 (pp. 81-87), and 8–10 (pp. 166-206) is: How can participatory jewellery practice and exhibitions affect the dissemination of embedded jewellery? The outputs have contributed to exploring the efficacy of challenging the traditional notion of showing pieces of jewellery in a display case in order to attract and capture the audience's gaze.

Publication 8 (p. 166) specifically demonstrated that 'display can become integral to the process of creating jewellery', as in the case of Christoph Zellweger (Bernabei, 2017). Jeweller Ted Noten goes further; for him, the general requirements are even more demanding since he implores that 'display should challenge the viewer' (ibid). He in fact influenced the meaning and self-expression that is often central to contemporary practice and the body of work he presented as *In Hermes Wings*, 2011, is used by the author as one of the case studies. The winged brooch he made for the taxi drivers of Middlesbrough, in England, was hung by some of the recipients from the rear-view mirrors of their taxis. By seeking to use the brooch and some of its taxi-driver recipients as verbal ambassadors for the commissioning museum's jewellery collection, Noten simultaneously invented a jewelled ornamentation for the car and a mobile showcase. Amongst other solutions, two very different interpretations of jewellery display were identified in the paper: the jewel as catalyst for communication and

the ‘performed’ jewel. The latter was exemplified by Dinie Besems’ performance *Logarithm of the Grotesque*, 2012.

The authors’ numbered publications identified above have continued this line of research by investigating how ‘participatory jewellery practice’ can affect the embedded jewellery. In output 5 (p. 87) one of the results of the investigation revealed an increase in dissemination of participatory projects similar to Ted Noten’s case in *Wanna Swap your ring*, due to the decreased cost of each jewel produced with the 3D printer.

Output 1.2 (p. 67) and 4.3 (p. 81) exhibited ‘embedded memory spaces’ in pieces of jewellery, which had used white chocolate, (representing the space between the fingers- Fig. 3, p. 69); human hair; and other materials unfamiliar in jewellery-making, such as transparent silicon. The audience was thereby challenged to reconsider the cliché of traditional materials for jewellery such as gold and silver. A similar investigation had been undertaken in 1999 by British jeweller Naomi Filmer. Her wearable pieces of work analysed and made manifest the spaces between toes. They were made in bronze and then worn in the same place where they originated. The author’s work extends the idea of wearing the spaces between the fingers, by relocating them around the neck, thereby creating a reference to one of the traditional typologies of jewellery: the necklace. The necklace (output 4.3, Fig. 11, p. 83), took great advantage of this innovative way of display by and wearing a transparent disc of silicone, like a protuberance from the body. This new way of wearing a *pendant* enabled the viewer to see through the object, like a lens that helps to resize the space around the body. This made the memory space

visible to the human eye – a space which is difficult to see when worn on fabric, as in the case of a brooch.

In output 2, Fig. 5 (p. 73) the author's solo exhibition at Birmingham Museum and Art Gallery proved to be an excellent opportunity to display the memory of the shadow of brooches directly printed on T-shirts. The act of displaying T-shirts with the brooches subverted the traditional display mode, proposing a new interpretation of the jewellery in relation to our body. This provocation was extended by a 'brooch installation' (Figures 6 and 7, pp. 74-75) on the opposite wall of the exhibition space. Dozens of silicon amber brooches were pinned on the white 26metres long wall to challenge the traditional preconception of jewellery displayed under display cases. In output 4.4, Fig. 12 (p. 86), the author set a challenge to the audience to decipher the rebuses depicted in the images produced with transfer printing onto a collection of pendants. The novelty here consisted in embedding the clue in the enamelled QR codes inserted in the imagery. The accessibility to the information was offered through a digital means and not a written explanation printed on the label corresponding to the display case of the jewellery.

Participatory jewellery projects in outputs 10 (p. 201) demonstrated the key elements in exchanging and sharing experiences through jewellery. In both events, the projects culminated with an exhibition, a public one for output 10.1 (p. 201), and with participants only in output 10.2 (p. 201). As in both events the results are congruent, one could argue that sharing memories is pursued through a seeing and touching experience. The participatory project acts as a catalyst for the wearer to

develop emotional ties to a jewellery object, which is charged with emotions and memories. Following on from this, participants build a bond with the jewellery, so that a sense of appropriation and 'ownership' has been elicited by the memories associated with the pieces of work.

Mnemonic jewellery as an aid for well-being.

The last research question (C) asks: To what extent can jewellery imbued with memories function as an aid to well-being? The following participative projects with local communities - for the *Loughborough Jewel Project* and with elderly people in the *Cedar House: Jewellery and memories project* (outputs 10, pp. 201-206) - provided the context to this question and enabled a review of contemporary jewellery in craft and design that aids well-being.

Following on from Wallace, cited in one of the above case studies, the use of artefacts to investigate possibilities for improving well-being is at the core of output 10.2 (p. 201). Through object-focussed interviews and observational methods, the author collected data in order to create jewellery that responded to participants' personal memories, simultaneously imbuing these memories within the jewellery.

In the first workshop, the intrinsic power of storytelling of participants' memories to reinforce their 'selves' was noted. As Wallace, Thieme, Meyer and Olivier observe, 'Personal memories and their (re)construction as narratives are fundamental to a person's self-concept and have increasingly received attention in mental healthcare' (Narrative Therapy, 2015, [61][80]). The intervention of jewellery-making as a practice in aiding patients with impaired memory is innovative, however. Empirical studies on memory support the idea that memories lie within internal experience, the memories themselves depend on variables such as how the memory was encoded, the time that has passed since the remembered experience and how often the memory is recalled (Eber and Neal, 2001:21).

Consequently, as an attempt to provide a therapeutic intervention, wearing a piece of jewellery imbued with personal memories can provide an aid to keeping those memories alive. The more often a memory is recalled, the more solid it becomes.

The findings of the author's research (output 10.1 and 10.2, p. 201) arose as a result of observational work conducted in the Cedar Care-home setting by her and the patients' carer. For example, some participants used the brooch to instigate a discussion when being visited by their friends or relatives. In occupying this time and space in this way, therefore, the jewellery-object becomes an activator of conversations, enabling the wearer to share their past and to reaffirm their present. It seems also that the function of the object is to affirm their existence as human beings in a stage of their life where they are at risk of feeling abandoned. This mediating role was also confirmed both by other carers and the manager (Rothley, 16 May 2016, conversation between the author and Cedar Care-home carer) as they used the brooches in conversations with patients to: check if patients remembered the story behind that jewellery and/or if they could tell them the story again.

In addition, for those carers who were new to the Care-home setting, the object acted as a catalyst to start a conversation and build up a sense of trust. For some participants, the brooches became an ornament to put on display amongst picture frames of their loved ones, thereby positioning the bespoke jewellery in a privileged position and emphasising the intangible value of the jewel. Almost all of the participants have '*absorptio*ned' (Gandlin, Guins, in Ingold, 2009:90) the artefacts into their life activity, in fact it became a routine for them to check that

they had put the brooch in the drawer or back on the window sill before closing their room.

One participant had a clear plan for the use of the jewellery: she wanted the brooch to be the manifestation of her existence at the end of her life in a care home. The brooch had to depict the façade of the home, thus constituting a symbolic image invested with meaning and memories. She had a predetermined concept of the nature of the jewellery, which she intended to become a ‘new’ heirloom for her relatives. Similarly, one of the participants in the participative project in publication 10.1 (p. 201) had a plan for the jewellery to become a potential receptacle for a potent meaning and memory as an aid for well-being. The participant did not want a brooch for herself but for her sister. Their mother was affected by Alzheimer’s disease and had lost her memories, and her sister was suffering greatly over this. The participant saw the potential of the brooch to act as a healing agent in this context: she wanted her mother’s memories imbued in the brooch which was then to be worn by her sister. The results from the research addressing this final question revealed the huge potential for jewellery to act as an aid for well-being through this process, once the object has been charged with emotions and memories.

Finally, another important finding emerged from author’s analytical approach during this participatory project (output 10.2, p. 201) and as a result of the focus group conducted during the accomplishment of output 10.1, p. 201. While the jewellery was the centre of attention, the sense of touch was discovered to be pivotal in the interaction between the wearer, the jewellery and the viewer, perhaps allowing the participant to (re)evaluate/(re)construct relationships anew. As de la Bellacasa (2009) observes:

If touch extends us, it is also a reminder of finitude ... It gives us a sense of measure to comprehend our relationship with the emotions and memories of the object (2009:11).

In this way, through seeing and touching, jewellery exerts agency in the production of 'experiential knowing'. Jewellery has a sensory value in addition to its visual value, therefore, in both its wearing and its 'exchange': since it is worn on the body, it is literally as well as metaphorically 'in touch with' our intimate spaces; and when the wearer (or participant, in this instance) passes the jewellery to the viewer (carer, relative or friend), it becomes in this interaction a vehicle for connecting with others and sharing experiences. Indeed, in both projects, the participants gave their brooches to others in exactly this way.

The nature of such interactions offer further possibilities for future investigations in this area, exploring Wallace's (2007) assertion, for example, that 'jewellery is at the border between one and the environment'. The author's research builds on this conceptualisation of jewellery as a porous membrane, laying the ground for further research into the ways in which a piece of jewellery not only connects the person who wears the jewellery to viewers but to the wider environment too.

Future development

This thesis analyses the act of the maker in imbuing memories and sensitising materials with emotions in jewellery. As a reminder, the three research questions being addressed by this investigation into contemporary jewellery were:

- A) How do sensitising materials and digital technologies used in jewellery practice determine its capacity to embody memories and emotions?
- B) How can participatory jewellery practice and exhibitions affect the dissemination of embedded jewellery?
- C) To what extent can jewellery imbued with memories function as an aid to well-being?

Further research should be pursued into the emotional domain in jewellery and the mnemonic capacity of jewellery to act as an aid to well-being.

Other relevant aspects that might be considered are in the investigation from a maker perspective based on Ingold's notions of narrative quality and Bernabei's sensitising materials and narrative jewellery in order to expand on sensing materials in craft and design, borrowing methods familiar in those disciplines, notably interviews, action research and participatory methods. The narrative quality can be further explored in relation to digital jewellery and participatory projects, including the additional exploration of digital jewellery that might become *social digital art jewellery*. The differentiation between the value of narrative quality added to jewellery during the maker's creative process and 'narrative jewellery or narrative content' will extend the existing knowledge in

this arena.

Additional study could be sought of the extent to which new technologies enhance or inhibit the sensitising material aspect from the maker's perspective, considering emotional intervention, somatic and sensorial experience from a Foucauldian perspective (Foucault 1988), that is, how might new technologies enhance or inhibit the 'project of the self'?

Jewellery can enhance the value assigned to the body – that is the way it is visually evaluated by others – but its use is not *essentially* about embodiment. These findings have opened opportunities for further exploration of jewellery as an intervention for well-being where the sensory value, empathic involvement with participants and the oral history told by them can be explored further in combination with other techniques such as animation practice and applied digital storytelling.

For example, elements of this research have already been presented in workshops, books, reviews, symposia and conferences over the past years, but further development of this research is planned, in a project entitled 'Animated Jewellery', where the investigation of artefacts as an aid for well-being has been joined with other disciplines for research enquiry, such as Applied digital storytelling and Animation. The common ground of the three techniques is storytelling and image or object led interview as a participative method with participants. This collaborative research project started with the invitation to join HEART Healing Education Animation Research Therapy™ in 2017.

Finally, considerations might be instigated by the discourse on digital elimination of authorship, democratisation of jewellery through the digital design knowledge of co-collaborations versus the old notion of intellectual property and copyright.

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Glossary

Absorption: In Ingold words: ‘in speaking of the absorption of artefacts into the life-activity of their users my aim is to emphasise, to the contrary, the inseparability of persons and objects in real-life contexts of accustomed (that is, usually) practice’ (Gandlin, Guins, in Ingold, 2009:90). The expression of ‘absorbing an object’ refers to the partaking of abituality of everyday life and not to its usefulness (Gandlin, Guins, in Ingold, 2009:90, as cited in Gosden, 1994).

Contemporary Jewellery: Contemporary jewellery in this context does not refer to jewellery conceived today. It is a term that indicates a wide range of activities within the same area denoted with contemporary jewellery in the UK but also named differently in other countries such as art jewellery in USA or research jewellery in Italy (It. *gioiello di ricerca*), (Bergesio, Lenti:2006). It is a discipline that started almost 70 years ago. The main characteristic of contemporary jewellery is the maker’s intention to pursue his/her own research through the designing and making jewellery. The latter is an investigative method to achieve the maker’s research objectives.

Craft: An activity and various processes that take place in a social context, that involves the maker’s skills, tacit knowledge, somatic experience, materials, technologies and tools including the surrounding space, time and network of production to determine the artefact.

Digital Jewellery: In the design framework is the creation of a piece of jewellery with an electronic component or with the use of digital technologies. ‘It can be contextualised from two distinct perspectives: contemporary jewellery practice and pervasive computing practice relating to wearable computing and body-centric digital objects’ (Wallace, 2007:21). When Digital Jewellery is situated in contemporary jewellery practice it explores a new digital-craft approach (often with participants’ collaboration) to achieve a meaningful, ‘personal and emotionally significant’ (Wallace, 2007:5) symbiosis between form and content of a jewellery object that enables us to affirm our ‘self’.

Human Centred Design: Design research that encompasses a set of methods and practices aimed at getting insight into what would serve or delight people [...] it amplifies the designer’s ability to shape popular culture and to smoothly transit values through design (McDonagh, 2006:5). In this area of investigation the designer’s role has moved from problem-focused to user-focused.

Jewellery: A general definition, provided by Marian Unger states that ‘a piece of jewellery is a discrete object that is worn by human beings as a decorative and symbolic complement to their appearance’ (2018:55). Under the umbrella of the term jewellery we have a variety of other names to identify the kind of jewellery, production, design, materials and where and how the maker operates during the creative process (for example fine jewellery, costume jewellery, contemporary jewellery etc...).

Narrative Quality: Ingold defines narrative quality as follow ‘skills which are exemplified in basketry but which are nevertheless common to the practice of any craft’. He states ‘the action has a narrative quality, in the sense that every moment, like every line in a story, grows rhythmically out of the one before and lays the groundwork for the next.’ (2003:89).

Participatory Design: User’s direct involvement in one or more stages of the design and decision-making processes that aid to exchange information and emotions between the researcher/designer/maker and the participant to generate an output. In the context of contemporary jewellery practice is an approach often used to imbue emotions and memories into the artefact.

Appendix

In this appendix one research monograph, one research article, one book chapter, one conference presentation, one short essay and the equivalent academic outputs (exhibitions and participatory projects) will be also accomplished with: full text or part of it depending on copyright restrictions; detail on acceptance of article through refereed process; one or more images of key pieces of work and website link of each output deposited on Loughborough University Repository (when applicable) ⁸.

⁸ Please note: copyright information is provided for each output, however if the copyright holder is not identified, the author then holds the rights.

Publication 1

1.1 Roberta Bernabei Jewellery

Solo exhibition at Sir Richard Young Gallery, Dean Clough Galleries, Halifax, UK (1995). Participation by invitation from the panel of Dean Clough galleries sponsored by Henry Moore Foundation. The exhibition presented a body of work of 23 pieces of jewellery and 7 drawings. In two showcases, the silver jewellery was inspired by the maker's memories of various journeys. The jewellery was sensitised through direct manipulation of the metal surfaces and physical reproduction of symbols related to visited places and engraved words. One of the pieces in question is the *Travelling* necklace (Fig. 1). It acts as a coadjutant to tell stories in the following way: the wearer shows the object to the viewer who then spins the pendant and stops it with his/her hand in one point. The small images on the pendant are used by the wearer to start telling the story embedded by the maker in the jewellery object. Consequently, the object triggers both the viewer and the wearer to start a conversation about their memories on journeys. In this context, the performative quality embedded in the object opens up an innovative way of interacting between the wearer and viewer, in so that the common use of jewellery is challenged.



Fig. 1 *Travelling*, pendant, silver, copper, leather cord

Photo: Chris Sacker, 1995

Full set of images available from: <https://dspace.lboro.ac.uk/2134/36516>

Images published with permission by Chris Sacker.

1.2 Roberta Bernabei Contemporary Jewellery

This solo-touring exhibition (35 works) was hosted by the Alternative Contemporary Jewellery Gallery, Rome and the Italian Institute for Culture in Stockholm in 2003. A fully illustrated catalogue (supported by LeArtiOrafe-Florence, Alternatives gallery and Istituto di Cultura Italiana in Stockholm) accompanied the exhibition with critical texts from Bruno Cora' and Andrew Stonyer. It was reviewed in the following design magazines: *Arte y Joya* (Spain) no. 156 and *Next Exit* (Italy) September 2003.

The novelty of the body of work was to provide an insight into mapping the space around the body and casting the memory spaces with unconventional materials to jewellery making such as chocolate (Fig. 3) and ice. The brooch *Chocolate*

memory space represents the physical manifestation of the memory spaces between the fingers. The memory spaces are made in white chocolate and set in silver settings in a wire brooch. The concept behind the work is to enable the wearer or viewer to eat the edible memory spaces, in doing so the innovative participative process starts between the jewellery and the person. Once the chocolate memory space has been eaten its entity becomes again part of the cycle of life.

Furthermore, the investigation was tested through a series of traditional goldsmith techniques and an initial attempt to use non-traditional materials such as transparent silicone. The outcome sought to identify a new way of treating the memory of spaces by removing the actual physical object; for example, the stone from the setting (e.g. *No Title*, ring, Fig. 2).

The narrative quality is manifested through the making process of cutting the wax sheet and folding it around the pieces before casting them in silver. This piece of work was selected by curator Hilde Leiss for the exhibition *Papier*, at the Museum für Kunst und Gewerbe, Hamburg, Germany in 2000. In the catalogue images 6 -20, 23 -24 maps the developmental work of investigating memory spaces of the human body as a parameter of measurement in objects that enable the wearer and observer to reconsider and understand their bodies and the surrounding world. In the ring depicted in Fig. 2, the physical matter set in a setting has been removed to manifest the void or memory space. The claws are left open and forces have been joined together to manipulate wax first and metal after. This is one piece of work on *memory space* series selected by curators Rita Marcangelo and Andrea Lombardo for the following exhibition in 2001

L'Immagine del Gioiello at Alternatives Contemporary Jewellery, Rome (7 pieces of work, group exhibition with catalogue).

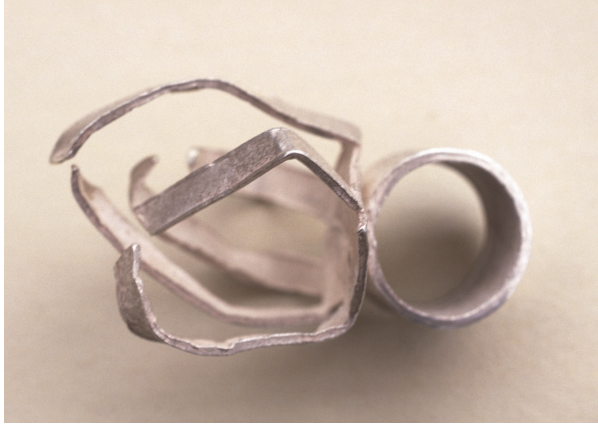


Fig. 2 *No title*, ring, silver

Photo: Michael Shaw, 2000

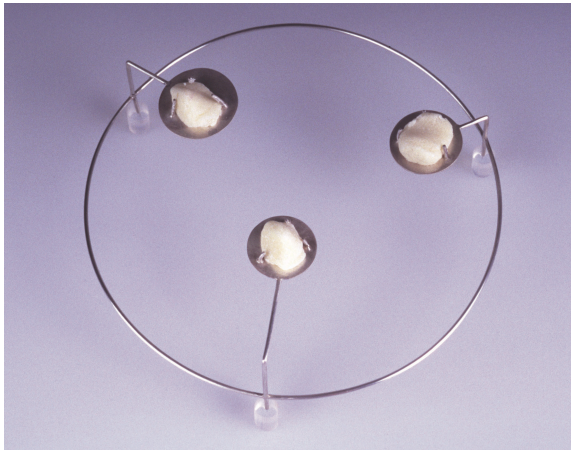


Fig. 3 *Chocolate memory space*, brooch, silver, white chocolate, silicone

Photo: Roberta Bernabei, 2002

Catalogue will be available from:

<http://publications.lboro.ac.uk/publications/all/collated/acrb2.html>

Texts in the catalogue published with permission by Prof. Andrew A. Stonyer and Prof. Bruno Cora'.

1.3 Pensieri Preziosi II

The group exhibition is a survey of mid-career female jewellers from Europe, it took place in 2005 (8 pieces) in Oratorio di San Rocco, Padova, Italy. It was accompanied by a catalogue, with critical texts by Mirella Cisotto-Nalon, Dorothy Hogg and Ellen Maurer Zilioli. The author at the invitation of curator Mirella Cisotto-Nalon showed a selection of eight pieces of jewellery.

The show was reviewed by local Italian television stations La 8, Gaia Padovan and Televeneto Lara Tresoldi, 15.12. 2005; online jewellery platform www.Klimt02.net and in *Findings*, magazine published by the Association of Contemporary Jewellery (UK) March, no 35.

In this case the investigation of imbuing memory spaces has led to employing the micro spaces around the body such as the space between our fingers. They were captured with alginate and encapsulated in silicone like faced stones. Alginate was removed to evoke the concept of the void (Fig. 4). This body of research developed the material language of jewellery by examining notions of relocating memory spaces on the body and wearing them with a reminiscence of traditional jewellery typology such as the solitaire with a square diamond cut.

It investigated the capacity of silicone to reproduce the various nuances of skin. The author maintained the imperfection of air bubbles trapped in the material to highlight the human touch of making the jewellery object. The narrative quality is

materialised by the complementary quality of the roughness of the handmade silicone cut with the unpolished and unrefined iron wire ring.



Fig. 4 *Memory Space 3*, ring, iron, silicone

Photo: Roberta Bernabei, 2002

Images of pieces of work are also available with permission by Mirella Cisotto-Nalon and Padua City Council from:

Publication 2

Mapping Impermanence

Mapping Impermanence was a solo exhibition held at Birmingham Museum and Art Gallery between 18 November 2005 and 24 April 2006, as part of the annual *Brilliantly Birmingham* jewellery festival. Senior Applied Art curator Glennys Wild offered the author a solo exhibition. The body of work comprises around 80 pieces. The catalogue, was supported by an Arts Council grant and Birmingham Museum, had a critical text from Rita Marcangelo (curator of Alternatives Gallery). It was reviewed in *The Times* in *Top Five Museums* 15. 04. 2006 and by the Association of Contemporary Jewellery UK in *Findings*, June 2006. The maker was interviewed for a report on *Brilliantly Birmingham* for Radio 4's *Woman's Hour*.

The research further expanded explorations of the boundaries between form and space in jewellery through the manipulation of drawings, CAD, alongside embodying memory spaces with laser cutting and milling machine. The form generation of the jewellery was challenged with the use of slip clay. The body force and emotional engagement were intertwined to generate the forms. The simple geometric form of a circle was used together with a repetitive movement. The pieces were made in different materials such as white porcelain, white enamel on copper and white silk. The whiteness of the work was challenged by the introduction of its opposite colour black. Black leather and black porcelain was used with the laser cutter and clay drip techniques with *bucchero* (black clay used for Etruscan ware between about the 7th and early 5th century B.C.).

In this exhibitions there were three installations curated by the author. They were conceived to achieve and challenge the traditional display setting of jewellery in museums. The first installation invited the observer to actively move up and down when looking through cut out small squares of paper walls to see the pieces of jewellery in the big display cases. The second set of work was composed by silver brooches pinned on white T-shirts hanging on the wall (Fig. 5). The white T-shirts had printed drawings and shadows of the brooches. Both interventions questioned the relationship between the piece of jewellery and the human body when they both come to interact in a museum context. The third installation was conceived with 30 silicone brooches pinned on the wall to challenge the notion of traditional mode of display jewellery (Fig. 6). The following images (Figures 5-7) show the above-described installations.



Fig. 5 *Installation with T-shirts*, silver brooches, cotton, coat hanger

Photo: Roberta Bernabei, 2005



Fig. 6 *Installation with amber silicon brooches*, Birmingham Museum and Gallery

Photo: Roberta Bernabei, 2005



Fig. 7 *Detail of installation*

Photo: Roberta Bernabei, 2005

Catalogue available from: <https://dspace.lboro.ac.uk/dspace-jspui/handle/2134/32704>

Publication 3

Contemporary Jewellery from Italy

Travelling exhibition of a group of 14 jewellery artists. The participants were selected by a panel chaired by Prof. Stephen Bottomley (Chairman of ACJ- Association of Contemporary Jewellery, 2005-7). The exhibition toured in four venues: Flow Gallery London; Galeria Bielak, Krakow; Hipotesi, Barcelona; Velvet da Vinci, San Francisco from 7 June 2007 to 8 June 2008. The author exhibited 7 pieces of work. A catalogue accompanies the exhibition.

The author created a body of work to investigate how second hand costume jewellery can be transformed and merged with the maker's emotions to re-invest jewellery. She used some discarded costume jewellery and heated it until it was partially transformed into a different form. This metamorphosis took place through the application of heat as 'force'. Subsequently, it was set in the centre of an enamelled silver pendant completed by a red cotton thread (Fig. 8).

The body of work was the result of a conscious manipulation of second-hand jewellery that had had a previous life and personal memories. Pre-existing memories were retained in the new work and transformed through excessive heat or the application of heat where ordinarily none would be used in a making technique. The latter was used to extend the parameters of aesthetic significance. The emotions were intertwined and forged during a somatic experiential relationship between the maker and the materials. The narrative quality is throughout the whole process of making the object via heat (spirit lamp for wax modelling, gas torch and enamelling kiln) and direct manipulation of wax and metal. The sensitising material process is manifested through details such as the

rough edge of the oval base or the white sprinkled enamel used here in an unconventional way to expand the knowledge and language of working with this technique in a much more freely way than the ordinary and methodological manner.



Fig. 8 *Trasformazioni*, pendant, second hand melted costume jewellery, enamel, cotton thread

Photo: Roberta Bernabei, 2007

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In the body of work for output 4.1 and 4.2 the author examined how digital technologies such as laser cutting and precision photo etching can facilitate the maker's ability to imbue emotions in jewellery.

4.1 Binary Flowers, TEN

The author was commissioned in 2009 by Bilston Craft Gallery to develop a new body of work of 10 pieces of jewellery to celebrate the 10th anniversary of the Gallery. This commission set in a group craft exhibition titled TEN supported by Arts Council. The 10 pieces of work are now part of the permanent collection of the gallery.

Binary Flowers explores to which extent the maker's emotions can be invested in stainless-steel jewellery with the aid of digital precision photo etching. The author developed 10 wearable pieces of jewellery that refer to ten flowers that are also colours, for example Violet, Rose, and Fuchsia etc.

The number 10 is composed by a zero and one and is the most basic visual representation of the binary code that underpins the computer and all digital technologies. The project exploits digital technologies through computer aided design such as photo etching from digital image. 2D vector drawings made in Illustrator were used to machine output the finished objects. The resultant body of work highlighted the need to finish the work by hand with traditional finishing techniques such as setting, bending and folding metal parts with pliers. The design of each flower was conceived in two halves, which can be closed together to elicit the three dimensionality of the object. The delicate etched but yet strong

decorations were created to construct an optical illusion. Moreover, they were lifted and bent to penetrate the space around the piece of jewellery to expand its volume into the void. An attempt to sensitise the material was made during the maker's actions of manipulating the surfaces. Although minimal the maker's final touch embedded emotions into the jewellery object.



Fig. 9 *Violet*, pendant, stainless-steel, ribbon, plastic

Photo: Roberta Bernabei, 2009

Images available from: <https://dspace.lboro.ac.uk/dspace-jspui/handle/2134/12825>

4.2 Cutting Edge: Lasers and creativity Symposium (presentation)

The author presented a visual discussion with images and expanded captions at the *Cutting Edge: Lasers and Creativity Symposium*, Loughborough University School of Art and Design, 4th November 2009.

The title of the presentation was *CAD CAM and laser cutter in jewellery: the creation of a physical distance between the artist/designer and the artwork/design in jewellery*.

The presentation highlighted a case study into the author's research topic: 'The maker's ability to sensitise materials when there is a physical distance between the artist/designer/maker and the artwork during the application of digital technologies such as the laser cutting'. In 2005 the author was trained to use the laser cutter at the Optical Engineering Dept. at Loughborough University. Part of her experiment with the machine was cutting different materials such as leather, fabric and cardboard.

The resulting body of work demonstrated that the maker attempted to sensitise materials with emotions by finishing the work by hand or by exaggerating technical imperfections. The image below (Fig. 10) depicts a laser cut leather necklace with a hand made gold clasp. The latter is the result of the manual maker's touch. The small yellow dot, within the bigger black circular composition, plays a big role in the overall visual configuration. This golden dot is juxtaposed on the left hand side of the whole to guide viewer's explorative eye to the different quality of material manipulation in relation with the mechanically laser cut leather. The sensitising material and act of embedding emotions is

concentrated in a tiny small detail. Finally, in order to soften the colour and edges of the object, the gold in the clasp has not been polished (Bernabei, 2009).



Fig. 10 *No Title*, black necklace, laser cut leather with gold clasp

Photo: Roberta Bernabei, 2005

Conference presentation available from:

<https://dspace.lboro.ac.uk/dspace-jspui/handle/2134/24609>

4.3 Collect 2006 - Women in Jewellery

Group exhibition presented at *Collect* from the 9th to the 13th of February 2006 at the Victoria and Albert Museum, London by Alternatives Gallery, Rome. *Collect* is an International art fair for contemporary objects presented by the British Crafts Council at the V&A in London. A catalogue titled: *Contemporary Jewellery* was simultaneously issued. Subsequently, the exhibition was hosted by Alternatives

Gallery in Rome from 25th March to 29th May 2006. The aim of this event (curated by gallerist Rita Marcangelo) was to emphasise the female interpretation of jewellery as leading role in the context of contemporary jewellery/studio jewellery. A group of 15 female artists were selected to take part in this travelling exhibition. The title of the exhibition presented at Alternatives was *Women in Jewellery*.

The body of work, of 8 pieces of jewellery in silver and silicone exhibited by the author, involved the design process described in *The Impact of the intervention of digital technologies and sensitising materials' capabilities to embody memories and emotions* (pp. 28- 36) and the sensitising material approach. The investigation of embedding the maker's emotions while mapping the space around the body and encapsulating the memory spaces in silicone is here continued. The resulting artefacts proposed to the public a new way of wearing the pendant. As depicted in Fig. 11 the author's design decision posed a challenge to the public: to reconsider their preconceived ideas of wearing pendants on the torso and observe a new relocation on the neck. In this necklace the pendant is a protuberant attribute worn on one side of the neck and it provokes the wearer to be more conscious of the space around her neck. Its distinctive position allows the viewer to see the subtle but visible nuance of the skin reproduced with transparent silicone. The novelty of the work is proposed by the new jewellery typology that transforms the jewellery in a conversation piece. Thus becoming an object that sollicitates an interaction between the wearer and viewer. The latter was conceived by the maker to expand the possibilities of disseminating embedded jewellery with memory spaces in an exhibition setting. Due to the qualities described above, this necklace was selected by the Association of Contemporary Jewellery (UK) curatorial panel as the main

visual image to welcome the audience at the *Jewellery Unlimited* exhibition at Bristol Museum (2004). The poster (scale 1:1 to the model) depicted the necklace as worn by a model.

The audience visiting the jewellery exhibition had an immediate reaction to the human size poster as they were confronted with a new parameter of measurement of small objects such as jewellery and the body. Finally, the body of work for output 4.3 was made by the author with the combination of traditional goldsmith techniques and other machine tools such as the lathe and pantograph.



Fig. 11 *No title*, necklace, painted brass, silicone

Photo: Roberta Bernabei, 2002

With permission from Rita Marcangelo, Alternative Gallery, Rome, catalogue available from:

<https://dspace.lboro.ac.uk/dspace-jspui/handle/2134/32783>

4.4 Souvenirs: Reinvigorating Bilston Enamel in the Twenty First Century.

Souvenirs: Reinvigorating Bilston Enamel in the Twenty First Century was part of a group exhibition: *Craftsense* at Bilston Craft Gallery from the 10th of September 2012 to 1st September 2013.

As a result of a selection process, the author was commissioned to undertake a body of work for the Craftsense ethos' exhibition: to re-engage the public with local traditions and heritage. The 5 pieces of jewellery meanwhile become part of the museum's permanent collection

This body of jewellery explores how digital technologies and craft processes can reinvigorate the traditional Bilston enamelling (late 18th century) when emotionally embedding jewellery.

The resulting 3 necklaces each suspend a pendent that combines a 3D printed nylon bezel with a traditionally enamelled copper oval, on which imagery has been applied through digital enamel transfer, the other 2 necklaces were made in wax and subsequently cast in 18kt gold.

The digital application of enamel also achieved a secondary aim: namely the intention to update the communicative functions of the archetypes of Bilston enamel. The images applied to decorate the ovals are compositions related to the use of the boxes. However, they are not literal illustrations, but depict an idiom in a visual riddle. Adjacent to these are miniscule Smart Codes (QR Code) that allow viewers to use their smartphones to explicitly reveal the idiom or saying that the drawing represents. Innovation resides in the use of digital enamel transfer to depict with great accuracy the Smart Codes on physical crafted objects when most common usage is on printed materials. Thus, our modern way of communicating information has been made comparable with the unspoken rules of non-verbal

communication particularly of the late 18th century, such as those concerning the use of beauty spots and where they were placed on the face.

The introduction of micro QR codes in jewellery challenged the traditional notion of the interaction between the jewellery and the audience.

The gold jewellery pieces were emotionally embedded during the working process starting with generating the forms with drawings, working with wax and the process of lost wax casting. Stringing beads and pearls complemented those stages. This was a repetitive gesture that completed each piece of work. In the making process, the slow movement of the body was counterbalanced with the force in filing metal. The engraved lines on the metal surface were produced to define the rhythm and time passed in experiencing the work.

The craft processes used and new technology aimed to reinterpret the forms and techniques of patch boxes, nutmeg containers and souvenir boxes that bore engraved enamel transfers. The objects created were designed with some decorative elements directly extrapolated from the images enamelled on the late 18th century boxes; these were merged with my drawings to produce a distinct interpretation. There was an immediate link with the existing antique object but the other elements were added to provide a contemporary interpretation of the use of the boxes in the past. For example, patches on the face were used to convey messages to other people so a QR code was added in the enamelled image to disseminate the message hidden in the depiction of the rebus. An example of the creative approach adopted by the author for the pendants is depicted in Fig. 12.

An idiomatic expression is suggested through the maker's drawing enamelled on a

copper oval set into a 3D printed coloured frame. The QR code on the top of the drawing, if scanned will reveal the title of the work: *Time Flies*.



Fig. 12 *Time Flies*, necklace, copper, nylon, glass beads, enamelling and QR code

Photo: Roberta Bernabei, 2006

Images available from: <https://dspace.lboro.ac.uk/dspace-jspui/handle/2134/12826>

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Publication 5

BERNABEI, R., 2014. **Digital jewellery: the democratisation of authorship and ownership.** In Bunnell, K. and Marshall, J. (eds.) All makers now? Craft Values in 21st Century Production. Conference Proceedings, Falmouth University, 10-11 July 2014, Conference Journal 1, pp.17-22

Title: **Digital Jewellery: The Democratisation of Authorship and Ownership**

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Abstract

The paper analyses the consequences of computer-aided design and manufacture (CAD/CAM) on the authorship and ownership of contemporary jewellery. It identifies the ramifications for jewellery design and contemporary jewellery through an examination of the respective roles of the jewellery designer, contemporary jeweller and consumer. The latter focuses on the extent to which individual members of the public can become virtual craftspeople. It therefore aims to ascertain if and how the act of creating jewellery has been democratised through digital manufacture and delivery. A complementary investigation seeks to establish how far CAD/CAM has enabled contemporary jewellers to democratise the consumption of artistic jewellery through a reduction in production costs.

Analyses chart CAD's gradual shift from exclusive use by expert technicians to generic deployment by amateurs manipulating user-friendly and intuitive software. They determine how its unification through web delivery in apps by companies such as Nervous Systems, effectively converts consumers into designers. Parallel investigations explore the work of jewellery artists such as Ted Noten and Christoph Zellweger who have exploited CAD/CAM to mass produce works that democratise consumption through lower purchase prices.

The presentation concludes by summarising the key differences and similarities between the artistic use of CAD/CAM in jewellery, with those of its more commercial and design orientated counterparts. It determines the relative shifts over time in both parties respective roles since the inception of digital technologies, identifying convergences and divergences. Finally, it assesses the relative merits of both approaches in terms of democratising ownership and authorship, as well as the consequences for aesthetic integrity.

Keywords: Jewellery, Democratisation, CAD/CAM

Key Question: To what extent has the advent of computer-aided design and manufacture democratised the production and consumption of contemporary jewellery?

Digital Jewellery: The Democratisation of Authorship and Ownership

Introduction

This paper explores jewellery that has been enabled by the advent of digital technology and computer-aided design and manufacture (CAD/CAM), analysing the extent to which authorship and ownership may have been democratised through these digital means. It identifies the ramifications of digital manufacture and the internet upon jewellery design and contemporary jewellery through an examination of the respective roles of the jewellery designer, contemporary jeweller and consumer. These are sequentially analysed through the initial stages of jewellery including design, production and consumption. In so doing, the paper aims to ascertain if and how the authorial act of creating jewellery has been democratised through digital manufacture and delivery. A complementary investigation seeks to establish whether ownership has been democratised through a reduction in production costs and online distribution.

The notion of democratising access is not necessarily new, for in its origins jewellery was probably as simple as a threaded shell or found object.ⁱ After centuries of increasing technical sophistication in metalsmithing and stone setting, a desire to return to the rudimentary, easily available and low cost origins accompanied the post war emergence of new European approaches to jewellery. One early innovator was Margaret de Patta, who in 1946 started “creating prototypes that could be produced at lower prices.”ⁱⁱ As ideas coalesced further in the 1960s and 1970s through the

movement commonly known as Contemporary Jewellery, certain jewellers even encouraged or demanded that the consumer become an agent of design through the selection and matching of multi-component works, as in the ring sets by Wendy Ramshaw. Works such as her 1971 *Ring Set*, encompassed 5 rings in gold, enamel, dyed acrylic, cornelians and amethysts were shown on a stand that was also an integral part of the work. This enabled the consumer to view the rings before deciding how many and which rings to wear, as well as whereabouts on the hand they should be positioned. Whilst Ramshaw established the design of the components, the final composition was literally and metaphorically in the hands of the consumer.

Outcomes also extended to an explicitly acknowledged exchange of roles between author and consumer through works such as Lous Martin's *Make Your Own Brooch*, 1974, which as the title suggests, required the consumer to actually create the jewellery from the supplied kit of a perforated aluminium form and pipe cleaners. Instructions were supplied, but the final design was chosen by the consumer turned maker. Lous Martin describes the work going on in Holland at the time as "art without pretensions to uniqueness, democracy through a stress on the concept instead of materials"ⁱⁱⁱ. The action 'to make' shifted 'to chew' with Ted Noten's participatory *Chew Your Own Brooch*, 1998. Buyers received a stick of chewing gum to be chewed into a form that was then cast into metal and transformed into a pin brooch. Allied to the emergence of these practical intentions to democratise jewellery, as noted by den Betsen, were the views of the French theorist Roland Barthes in 1961 with his essay *From gemstones to jewellery* where he describes the liberalisation of jewellery.^{iv}

If the basic foundations for democratising authorship and ownership were laid during the latter half of the Twentieth Century, potential fruition may have been enabled by the accelerated development of digital technologies, including the advent of widespread computer-aided design and computer-aided manufacture (CAD/CAM), as well as the internet. Presently, jewellers have multiple software options for the virtual design of jewellery, with GemVision's *Counter Sketch Studio*, allowing a library of wedding and engagement rings to be altered in front of the customer, prior to passing the resulting file for manufacture to partner company Stuller. In light of these new technologies, the following sections analyse the extent to which they have broadened the customer base for jewellery and how meaningfully they allow consumers to design jewellery.

Democratising Design

The first stage of creating jewellery entails its conception and design, and invariably the consumer was previously an infrequent influence, unless seeking bespoke commissioning. The democratisation of authorship is analogous to the consumer customisation of design and production, and in particular design because digital production is invariably machine led. The advance of digital technology and the internet has increased the possibilities for the consumer to be innately involved in the design process and this has resulted in varying levels of personalisation. According to Lionel T Dean, academic and designer of 3D printed artefacts, these levels can be categorised as “Individualisation, Personalisation and Full Customisation”^v. Dean asserts that the control of the consumer over design ranges from basic through to

complete. With 3D printing a key facilitator, it is uniquely suited to what Dean describes as 'mass individualisation', arguing that "it costs the same amount of money to produce similar parts as identical ones using rapid prototyping, so why produce two products that are the same?"^{vi}

At the most basic level, the extent of choice is synonymous with that offered by traditional jewellers, with variations including engraving, stone and metal selection, as well as physical dimensions. Whilst made available through websites, manufacture relies on traditional modes of production at the jeweller's bench; meaning distribution is digital, but manufacture remains analogue. A pertinent example is Jewlr^{vii}, who allow consumers to progress through a series of web pages, each offering a design choice that contributes to the overall look and composition of the jewellery. Much in the same way many websites offer consumer services with add-ons that can be accepted or rejected. This helps create a familiar pathway to completion and purchase.

A more interactive development, akin to Dean's notion of 'personalisation' has resulted from the creation of software applets or apps, which have allowed mainstream mass production to become personalised in a manner that was previously less widespread and less feasible. Indeed, a potential shift from the designer as author to the consumer as author has consequently been made possible. At the intermediate level of consumer input, apps such as those offered by Suuz^{viii} and Zazzy^{ix} allow consumers to choose a word or words that define the geometry of their jewellery. The software is instantly responsive, meaning visual feedback confirms on screen how a given word will look once manufactured. Text is immediately converted into the band

that creates a ring or a cursive strip of mass for another typology of jewellery, such as a pendent. Tellingly, the tagline on Zazzy's website is "You do the chic, we do the geek"^x, meaning the consumer is free to design, but remains liberated from the taxing demands of manufacture. A similar driver of design can be the use of initials to create a monogrammed outcome, as in the service offered by Mymo. Two initials are merged into a single form, with each remaining distinct from different viewing angles.^{xi} Another option for personalisation is enabled via the upload of images that then dictate geometry, for example, Suuz also provide a service whereby a photographic facial profile becomes a planar ring's silhouette. Most of these websites seek to enhance options for personalisation by allowing ring and bracelet size to be altered, font type and material thickness to change, as well as some choice over materials and finish. They seek to do so in the most simple and visually responsive manner possible, often through the use of sliders in the apps that can be moved up or down. In other words, the technical skill required to use these apps and websites is minimal and the representation of consumer's changes is instantaneous. The final fillip for ease of use and purchase is that all these products are then manufactured and delivered direct to the consumer's home.

A similar pathway is offered by Shapeways^{xii}, the online 3D printing bureau, who offer a range of jewellery apps that aid the personalisation of a design. From the relatively simple based on text through to the more geometrically complex *Turks Head Knot*. Alternatively, the Italian company Makoo^{xiii} offers an innovation in personalisation through speech or sounds. Personal sentiments can be spoken into the computer and their software transforms the captured sound waves into modulated form. Users can then further deform and disrupt the form using sliders.

Despite these innovations in the consumer input required to design the jewellery, these modes of production are confined to predefined parameters of possibility. Whilst consumers' arrangement and composition may be genuine, the scope for expressive design is limited. For greater input, one needs to look towards those companies who incorporate generative algorithms into their apps, to effectively grow forms. Nervous Systems^{xiv} might be considered an exemplar of unifying creative software, online delivery and bespoke production. The latter is implemented through simple, user-friendly applets that allow people to create complex forms by manipulating sliders and numeric counters for various parameters. Visual feedback is immediate and the resulting forms are abstract and being devoid of text or obviously personal references may even give the impression of having been designed by a professional, rather than the consumer.^{xv}

Co-founded by Jesse Louis-Rosenberg and Jessica Rosenkrantz, Nervous Systems provides evidence of how software, such as their *Kinematics*, *Cell Cycle* and *Radiolaria* applets, may help transform members of the public into virtual craftspeople. In this sense, the company's design creativity resides in coding the systems that allow the jewellery to be created, but its final manifestation is determined by others. It is intriguing that within the remit of personalisation that according to Louis-Rosenberg "there is no definitive product; instead, the many designs created allow for mass customization."^{xvi} Going on to explain that "designing algorithmically requires manufacturing digitally", making it "a very good way to explore the concept of repetition because it is just as easy to make many things as one thing. It allows the

possibility of infinite variability for the same reason.^{»xvii} This variability confers considerable choice for those using the applets. Louis-Rosenberg believes this less to be a distinct aspiration than an innate consequence of digital production, stating that “the ability to abstract your process and create a user interface also encourages interactivity and customization.”^{»xviii}

Consumers’ completed designs are then manufactured by Shapeways, which makes a wide range of materials, colours and finishes available for selection. This shifts Nervous System’s output further towards the notion of ‘Full Customisation’ outlined by Lionel T Dean. It cannot however provide full customisation given that the programmers define the apps and set the parameters of ‘look’, if not the exact details of geometry and material. It does however become a paradigm of what the art historian Susanne Ramljak describes as ‘Prosumerism’. Outlined in her essay *A Touchy Affair: on contemporary and commercial jewelry*, where she discusses “hybrids of production and consumption... a cross between producer and consumer behaviours”.^{xix} I would argue this may become a kind of self-fulfilling prophecy in which demand for personalisation from customers will increase until bespoke becomes a norm at all market levels. Key to this may well be the increased dispersion, affordability and usability of computer-aided manufacture, as will be discussed in the following section.

Democratising production

Once design has been finalised the inevitable next step is its production, and in this context there appear to be two potential strands for the democratisation of authorship through digital technologies. The first concerns the consumer turning creator in an act of DIY craft, and a second whereby digital design requires machine manufacture.

Both have consequences on craftsmanship and the extent to which traditional making skills are required.

For those consumers with some basic software knowledge there is a proliferation of online manufacturing bureaus offering 3D printing, laser cutting, laser etching and digital photo etching. Costs are fixed pro-rata according to volume or area and pricing is automatically revealed on file upload. This, along with the increasing user-friendliness of CAD software, means ease of use is becoming a reality. Access to expensive equipment is democratised through collective contribution. With this access and ease of process, the argument then goes, why pay someone else to design jewellery for you, when you, as the consumer can become the designer and create your own fully customised jewellery? These websites are answering that question through the digital manufacture of jewellery with home delivery; meaning that the distinction between amateur and professional is softening. Furthermore, when so doing, the consumer is no longer confined to the preordained parameters set by the aforementioned apps.

Examples include Ponoko^{xx}, who enable images or illustrator files to be laser cut from plastic or other materials and Shapeways, who offer the 3D printing of materials including metals, wax, plastics and ceramics. Shapeways are clearly seeking a global market, offering a worldwide service, as well as creating an online community of makers and designers through their galleries, forums, blog and individual users' shops. Not only can a user's work be manufactured, their designs can be offered for sale to all, with the added bonus of not having to invest heavily in stock thanks to print on demand.^{xxi} Shapeways therefore simultaneously enable complex production and promote worldwide sales. It may appear that in so doing, traditional making skills are being negated and one might argue that this in turn means production becomes democratised by being made available to all because the machine creates the object.

The counter argument suggests that despite the machine printing jewellery, the extent to which skill is still required essentially correlates to the aesthetic and geometric complexity of the resulting jewellery. In other words, digital technology is no panacea and whilst in this ambit there may have been a shift from traditional hand making skills to digital production, the necessity to acquire and hone high levels of craftsmanship persists. It just pertains to the digital realm of computer-aided design, for that is where the geometry and aesthetic of the jewellery is primarily decided, even if some post-production does occur after 3D printing.

Support for this notion of digital excellence is provided by those jewellers who appear to have developed a high level of digital design acumen. Exemplars include Joshua Demonte, who creates architectonic headdresses and other body pieces of

considerable scale and intricacy. Stefania Lucchetta prints in metal by exploiting Direct Metal Laser Sintering (DMLS) to create tightly latticed forms in titanium that would be extremely challenging to hand manufacture. Along with Dorry-Hsu, who exploits Stereo Lithography (SLA) to create complex and translucent animal-like forms. One might argue that the geometric accuracy of 3D printing means that even professionals are excused the need for hand skills. Therefore, access to the manifestation of complex forms is open to anyone, so long as they have the skills to model in CAD. Thereafter, digital solutions can also assist the transition to marketplace, as will be investigated in the following section of the paper.

Democratising consumption

In pre-digital times, jewellery would traditionally have been distributed and sold through networks of shops, traders, catalogues and galleries. As previously discussed, the digital realm has enabled production and distribution to merge through a union of the internet and computer-aided manufacture, as amply demonstrated by Shapeways. Digital manufacturing has also had consequences upon contemporary jewellery and its tendency to favour one-off pieces. Perhaps the biggest revolution in terms of democratising access to artist produced jewellery has been the reduced unit cost that CAM technologies such as 3D printing, laser cutting and digital photo-etching can procure. Lower prices steer these pieces of jewellery away from high-end objects of desire towards accessible and more readily purchasable items, where the quality of design is not reduced by lower prices. As Jesse Louis-Rosenberg of

Nervous Systems notes, “we make very affordable things. If I make something that costs \$10 to \$20 then I can sell that to basically anyone.”^{xxii}

This relative affordability extends to some recent work by contemporary jewellers such as Christoph Zellweger, Ted Noten and Noon Passama. As well as lowering production costs, the innate reproducibility of digital designs lends itself to serial production as limited or unlimited editions. These jewellers therefore appear to build on the democratic aspirations of earlier multiples that were embedded in the “utopian vision of the Sixties and Seventies”^{xxiii} A period when mass-produced components were used to aid cost reduction, as in Charlotte van der Waal’s *Suitcase Snap Bracelet*, 1972; composed of two parts with suitcases snaps so consumers could easily select different colours. Subsequently, Dutch jewellers Lous Martin and Hans Appenzeller produced ‘*Serie Sieraad*’ a series of twenty-three inexpensive editions between 1973 and 1974 with the ambition of broad dissemination through affordable prices. Despite the democratic aims, according to Appenzeller the results suggested that endless cheap copies were not the solution, stating that “if you want to conquer the market with a rubber bracelet in 1973, you’d better off making ten than a hundred”^{xxiv}. Dutch consumers seemingly accorded value to the prestige of one-off or tightly limited production at that time. Perhaps their works might have achieved more widespread success had they been produced in the digital age, in which worldwide publicity is a real possibility.

An early example that exploits digital manufacture is Christoph Zellweger’s *Data Jewels*, 2001, digitally photo-etched from thin sheets of stainless steel to create

pendants. He outlines their development by explaining how “in 1998, I experimented with a program called Processing, which finally led to the work *Data Jewels*, work I produced industrially in stainless steel but developed on Autocad. It was a first attempt to create easy wearable jewellery that can carry individually customised information. The ornaments referred to the kind of chips found in credit cards, or to QR codes or patterns on circuit-boards, yet at the same time some aspects in the design appeared organic.”^{xxv} In this context, *Data Jewels* was a forerunner to the subsequent emergence of Nervous Systems, a paradigm of its commissioner’s (Chi ha paura...?) aspiration to create designs of intelligence that can be made relatively affordably through serial production. Finally, Zellweger’s work also constitutes a predecessor for Ramljak’s Prosumerism concept.

The next example concerns the elegant and elemental 3D printed brooches *Extra Button, Edition III*, 2011, by Noon Passama. These offer both the artist and consumer a range of finishes from sprayed to electroplated, meaning digital production contributes to works that are both customisable and affordable; notwithstanding their luxurious appearance.^{xxvi}

The exploitation of the relatively low cost of 3D printing can also enable projects in which consumer participation becomes vital to its success. Ted Noten’s *Wanna Swap Your Ring*, Tokyo project in 2010 involved the production of 500 3D printed *Miss Piggy Rings*, which were then hung on nails arranged in the shape of a gun and offered to viewers willing to exchange one for a piece of their own jewellery. Over the course of the installation the work shifted from an unadulterated plethora of Noten

rings to a panoply of jewellery of different kinds, styles, aesthetics, materials and value that came to represent the host city. The low cost of digital production meant producing and exchanging so many copies of the same ring became financially viable; essentially democratising access to Noten's work. It is a possibility that evidently appeals to Noten, given he previously created the laser cut pin, *St James Cross Revisited*, 2005. A large edition of 1500, it costs roughly £20, and also constituted an early exploitation of a website for the purposes of promotion, distribution and 'conceptual completion' of the work. The latter because its dedicated website allows consumers to upload images of their edition being worn or placed in a setting of their choice.^{xxvii}

Another way in which consumers can actively contribute to increasing access to innovative jewellery is crowdfunding, where in exchange for pledges of money, consumers receive samples according to their level of support. Examples include *Human Chromosome Jewellery*, 2014, by Louise Hughes.^{xxviii} Whilst consumers admittedly receive jewellery or related artefacts in exchange for donation, they effectively 'buy into' the idea of the work, becoming involved in design and production by proxy. Consequently, patronage democratises community ownership. This seems particularly beneficial to Josh Harker whose various projects to fund sculpture and body ornaments were oversubscribed on Kick-starter. Clearly an advocate, he reveals his belief that "Crowdfunding is democracy at its core. It provides public empowerment through participation."^{xxix}

The final possibility for the digital democratisation of ownership concerns the emergence of website

repositories such as YouImagine^{xxx} and Thingiverse^{xxxi} that store, collate and freely offer uploaded 3D files for download and printing. Submission requires acceptance of creative commons licence and the relinquishing of copyright and authorship. This effectively means consumers need only pay for production costs with a bureau of their choosing. Or, should they have a home printer, print it themselves. Given the falling costs of purchasing a machine, this will be an avenue increasingly open to more consumers^{xxxii}. In a paradigm of open access, MakerBot's Thingiverse community has designers freely distributing customisable ring software for use with a MakerBot 3D printer.^{xxxiii} The contemporary jeweller Christoph Zellweger believes this has potential for innovation given that he already observes "wonderful ideas (as downloadable files for print out) coming from sensitive jewellery designers and artists that are studying now. Intelligent and beautiful pieces I can print out before a dinner party that I will wear again and again."^{xxxiv} At the same time he cautions about over production and the need for greater development of three dimensional forms and jewellery with embedded content. Stating that designs tend to be "limited and often lack quality on many levels, especially when it comes to the final surface finishing. Designs are still very flat. We also need more designers and artist who use the technologies available to develop intelligent and forward looking products that express strong ideas based on sound concepts; ideas that go beyond building aesthetic variations, ideas that are focused on content too."^{xxxv}

Conclusions

There cannot be much doubt that digital technologies have revolutionised how jewellery can be designed, produced, distributed and sold. The question remains as to whether these developments have democratised authorship and ownership, and if so, the extent to which this may have occurred. The potential for consumers to meaningfully contribute to design and production is mixed. Whilst company websites including Suuz, allow for design individualisation, the extent of customisation is somewhat limited, with consumers selecting from a palette of options to build a package. Increased consumer input is facilitated by the apps of companies such as Nervous Systems and Shapeways. However, setting the parameters of design is beyond the consumer. Instead, much of the creativity resides with those who programme the code to produce the apps, for they determine the parameters of aesthetics through which the jewellery can emerge. This even applies to the generative apps developed by Nervous Systems, which seemingly allow consumers to grow their own jewellery in CAD. The ‘look’ of the pieces is pre-defined, if not the details of size, material and precise geometry; so the consumer experience is still restricted by what the designers have conceived. That said, these apps do appear to put a degree of creative potential within reach of most consumers, without the need for acquiring extensive technical knowledge or making skills.

Overall, it may therefore be surmised that democratisation has begun, and for those willing to participate, there is potential for the amateur to seemingly act like the professional. These sites offer services that are the first steps towards broad consumer

participation in the design process. However, the notion of total customisation remains a mirage. If you wish to master design in the digital realm, you are required to develop an extensive skill set of digital modelling techniques.

In terms of production, digital manufacture has to a degree, induced what I describe as ‘technical liberation’. By which I mean that 3D printers’ ability to accurately replicate complex geometry can supersede the need for handicraft. Makers are liberated from the extents of their technical skills and bound only by their ability to model in CAD. This applies across the board to both professional users and amateur consumers. Indeed, the latter have amplified DIY jewellery through prosumerism: a cross between producer and consumer behaviour. Aided by online distribution, access to complex and expensive equipment has been facilitated through the collective usage of multiple individuals, be they amateur or professional.

It is perhaps for consumption that digital technologies have done most to democratise access: partly through the decreased cost per unit and partly through internet sales, distribution and promotion. Contemporary jewellers have sought to harness digital technology to extend the language of jewellery, as exemplified by Christoph Zellweger’s *Data Jewels* and Ted Noten’s *Wanna Swap your Ring*. Allied to the fiscal means to purchase, consumers have also benefited from easy access to new work through the websites of organisations like Chi ha paura...? or Shapeways. Each in their own way has also promoted contemporary jewellery to a wider audience, which itself is a form of democratisation. Shapeways has taken this further through their

community forums, where community creators can exchange ideas and tips for designing and making.

In conclusion, I maintain that the democratisation of authorship has commenced due to the advance of digital technology, yet its further progression relies on increasing the user-friendliness of CAD software. Otherwise, design will remain a collaboration between the consumer and those who create the jewellery app or software. In contrast, ownership has become more democratised and therefore leads the way to innovation, which authorship may follow in due course. Nonetheless, digital technologies appear to have democratised access to jewellery, its techniques and subsequent acquisition.

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https://dspace.lboro.ac.uk/dspacejspui/bitstream/2134/15865/5/AMN2014_Bernabei.pdf

Publication 6

This publication is composed by output 6.1 and 6.2. Each output is represented by one key piece of jewellery. Their selection was determined to demonstrate the application of the 3D printer in jewellery. The objective was to investigate the possibilities of adding images on concave and convex surfaces. This could be of plastic and generate forms with a minimal variation in thickness. In both cases the author investigated how rapid-prototyping may be explored to incorporate the maker's memories through imagery.

6.1 Castelli miniature, astri ed alchimia la Padova carrarese nel gioiello contemporaneo

The group exhibition, curated by Mirella Nalon-Cisotto, was held in Padua from the 14th of May until the 17th of July at Musei Civici, Oratorio S. Rocco, in 2011 in Italy.

The brooch *Self Awareness* (fig.13) was made in response to a peer reviewed call for jewellery exploring the art and culture of the Italian city of Padua during the time of Carrara Seignury. The exhibition venue was San Rocco Oratorio Padova's prestigious exhibition space, was part of the esteemed annual city council art programme and was documented through a 152 page catalogue.

The methods and process applied in this work, questioned how rapid-prototyping may be exploited to incorporate the maker's memories through imagery in non-planar three-dimensional objects. The brooch constitutes the culmination of a period of experimental research combining the rapid prototyping of jewellery archetypes with the simultaneous printing of surface imagery, using a Z-corp colour printer.

Imagery depicted in fig.13, responds to Giotto's use of blue to supersede gold in the representation of the heavens, as in the Scrovegni Chapel (Padua) and Basilica Inferiore (Assisi) frescoes. The brooch continues the dialogue surrounding the concept of sensitising materials, further progressing the language of jewellery through the integration of memories with nuanced 3D geometry imagery. As a result, Giotto's painted stars now follow the complex but subtle contours of the brooch's framed convex ellipse. Instead of trying to eliminate the texture that results from rapid-prototyping, as is the norm, it is exploited to reference the vaults in a chapel. What is distinctive about this artefact is that the technical progress derives from the synthesis of substrate and imagery, rather than relying on a painted image applied post-production.

The brooch represents two sides of the author's research investigation: the maker's somatic relationship with the making process manifested in the handmade pin and the mechanical execution of the body of the piece of jewellery. The maker's physical involvement was a conscious decision by the author to add her touch to sensitise materials.



Fig. 13 *Self-awareness*, brooch, composite material, gold, resin

Photo: Anna Fornari, 2011

Image available from:

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Publication of image with permission by Anna Fornari.

6.2 Mostra-concorso internazionale Premio Pinton - Homage to Donatello

In both exhibitions (outputs 6.1 and 6.2), the author was selected by curator Nalon-Cisotto amongst other international jewellers such as Mari Ishikawa and Robert Baines. The exhibition was held at the Oratorio San Rocco, from the 9th of May to 26th July in 2015 in Padua. The catalogue provides an insight into each participants' work, statement and curriculum vitae.

In *XXIst Century Bottega* (Fig. 14) the author questioned how computer assisted design, manufacturing technology and the application of the 3D printer determine the capacity to imbue the maker's memories in the jewellery. The shape of the work is inspired by the traditional concept of the Victorian locket to keep personal memories, an object that aims to keep memories safe, in constant touch with the human body and spirit. The author strived to imbue the memory into the object that refers her admiration of the Miracles of Saint Antony, a work by Donatello as being kept in the Basilica del Santo in Padua. The jewellery object blends together different layers that refer to Donatello's *schacciato* in his *bassorilievo*. The maker did not directly manipulate the three pendants to infer emotions; however she invested her emotions into the object when she joined the pendants together with a cotton thread to transform them into wearable objects.



Fig. 14 XXIst Century Bottega, pendants, nylon, cotton thread

Photo: Mike Shaw, 2015

Available from: <https://dspace.lboro.ac.uk/dspace-jspui/handle/2134/18964>

Publication of image with permission by Michael Shaw.

Publication 7

BERNABEI, R., 2011. **Contemporary Jewellers: Interviews with European Artists**, Bloomsbury (ex Berg), Oxford.

Monographic book, pages 268 (80,000 words)

The book demonstrates the author's overall knowledge through investigation into the context of contemporary jewellery. It provides a literature review and critical analyses of the European jewellery context. The author has also examined definitions of the jewellery art field by examining 'its treatment of content and how materials and aesthetic are frequently manipulated according to an underlying concept' (Bernabei, 2011: 234). She also examined the diversity of methods used by the 25 interviewed artists to imbuing content into jewellery (e.g. mnemonic qualities, emotions, autobiographical thoughts) (ibid, 2011: 235).

Amongst these factors the author also explored the role of memory, preciousness and wearability in jewellery practice. Finally, the author has initiated the presentation of her argument on sensitising materials with this publication.

Introduction [Contemporary Jewellers Interviews with European Artists]

The introduction aims to distinguish the objects we now refer to as contemporary jewellery from past examples of the medium. This entails clarifying some of the key characteristics of contemporary jewellery's approach to function, content and materials. These characteristics have then been used to distil the practice, ideas and philosophy of twenty-five of the most prominent European contemporary jewellers through the interview format. However, in order to understand what contemporary jewellery might be and its history, it is useful to commence by exploring the broader history of jewellery and how and why it came into being. Therefore, the first section of the introduction explores why humans have chosen to decorate their bodies with jewellery, whereas the second part focuses on a contextual and historical analysis of its production. Given the geographical locations of the participant jewellers, these discussions predominantly centre on the history of European practice. This is not however intended to diminish the role and influence of non-European and non-Western practice on the development of the jewellery language.

Decorating the Body

Without the curiosity, desire or need to decorate the body, jewellery would simply not exist. So, the original human act of placing some kind of pigment or object onto the body gave birth to jewellery. Beyond the initial curiosity of playful experimentation, the early motives prompting human adornment may well have entailed self-embellishment for its own sake or perhaps even to help procure a partner. Other innate reasons become manifest at an early age; it is possible to

observe in very young children their joy whilst creating impromptu bracelets by inserting their hands into open objects. They appear to enjoy the sensory pleasure of how the object moves when they move, its balance and momentum and the sensations it induces on the body. These reasons for body decoration extend into adulthood where sensual pleasure and embellishment combine with the role of communication.

Alongside the personal stimuli for wearing jewellery, an altogether more public, contextual and functional set of reasons have evolved whereby jewellery is explicitly about the transmission of meaning. Certain kinds of jewellery have conferred status; declared fidelity and betrothal; or manifested faith and belonging. In all these cases, the jewellery can set up expectations on both the wearer and observer of how they should respond. Accordingly, if the act of wearing jewellery can change us in some way, it then follows that through this act of adornment we also contribute to a transformation, subtle or otherwise, of the meaning carried by the object. This relationship becomes increasingly sophisticated in proportion to the intricacy and complexity of the communicative role that one demands of the piece of jewellery. Therefore, a symbiotic relationship between object, wearer and observer exists.

Evidently, throughout human civilisation and beyond, many reasons for wearing jewellery have developed, but when did this instinct commence? Current research supports an extremely long history dating back tens of millennia. In 2005, three ancient shell beads were found in two different locations; two at the Skhul Cave in Israel and one at a site in Oued Djebbana, Algeria.^{xxxvi} Each of the mollusc shells was pierced with a small hole to enable them, it is supposed, to be threaded into a necklace or bracelet. Analysis of fossils found in the same rock strata indicates a

chronology of between 100,000 and 135,000 years BC. This suggests that jewellery's nascent function and meaning is timeless.

As human civilisation gathered momentum a documented history began to emerge and can now shed light on the function and social significance of early jewellery. Generally, the latter has remained steadfast for centuries; with ongoing examples including the engagement and wedding ring and their service to betrothal. Other somewhat less venerable examples now include the ubiquitous diamond stud on the pop star or footballer's ear lobe. Yet, the latter is not so far removed from how ancient Roman gold rings glorified the wearer by confirming their status and power in society. For instance, in the late third century AD the right to wear gold rings was reserved for certain classes of citizens such as senators and knights, and not simply determined by one's financial ability to purchase.^{xxxvii}

Roman jewellery was not only inspired by symbolism and status, other more pragmatic functions existed including the key ring. It was a practical solution for securing one's keys; a tricky problem given togas had no pockets. Fashioned from bronze or iron, they enabled the wearer to access store rooms and strongboxes. Placing the key on the finger meant access was immediate and security was kept safe at hand. Jewellery has also protected wealth by serving as an investment; however the invention and broad dispersion of coinage eroded this function.^{xxxviii} Perhaps the most lasting Roman heritage is the engagement ring, which as Shirley Bury observes, marked a shift in thinking whereby; "gold rings came into increasing use not only as symbols of status and as seal-rings, but as tokens of betrothal."^{xxxix}

Whilst the betrothal ring was a Roman invention, using a ring to confirm one's identity is believed to have originated in Mesopotamia, prior to widespread adoption by the ancient Egyptians.^{xl} Seal-rings invariably consisted of a metal band holding a metal, stone or shell form on top, into which a moniker, symbol or image specific to the wearer was engraved or carved. These could then be used to sign and validate documents by mono printing or impressing them into clay tablets or soft wax. In other words, they stood for, and attested to, identity. Seal-rings became widespread in ancient Egyptian society, and were often engraved with scarabs that had a dual function of amulet and signet. Later, in Roman society they could also represent symbolic allegiances to aristocratic identity, and therefore bear a likeness of someone other than the wearer.^{xli}

Roman rings often signified the power of status; however, other pieces of jewellery ascribed higher powers. Certain jewels that included emeralds, rubies, sapphires and diamonds amongst others, were believed to have religious, spiritual or even magical powers that fortified the wearer.^{xlii} In this way, adornment exceeded mere decoration in favour of talismanic protection. For example, in traditional Italian jewellery, amulets containing red coral served this purpose, and even now the practice of protecting the newborn with gold and red coral jewellery continues.^{xliii} Alongside the more spiritual and quasi mystical manifestations, jewellery has also emblemised the teachings of religion. Since Christendom, biblical inscriptions have been engraved into jewellery to protect people, or in the case of Memento Mori, to remind them of the precious brevity of life, and the inevitable day of judgement.^{xliv}

There are therefore a broad range of reasons for wearing jewellery ranging from the socially complex to the purely decorative, from the talismanic to the commemorative, from investment to communication etc. Some of these reasons seem innate and others have developed due to social conditions. Certain motives are public and others private, but what remains consistent is the human desire to change or reaffirm appearance, identity, perceptions, expectations, behaviour and feelings through the use of objects that decorate the body.

Jewellery as personal expression

For jewellery to exist, someone has to create it; be it through the selection and adoption of a found object or entirely from scratch. This section of the introduction is therefore concerned with the realm of the maker and the potential for self-expression through jewellery. I contend the latter is one of the defining characteristics of contemporary jewellery and the following text therefore charts the history of makers in developing their creative identities. Central to this development was the recognition that the act of conceiving jewellery could be a distinct phase, separate from its subsequent manufacture. The factors contributing to this are complex and intertwined, and their occurrence over many centuries clouds matters further. One of the first catalysts of change was drawing, which became a vehicle for the artist's thoughts, a guide for craftsman and a means to communicate with any commissioner.

Drawing

During the Renaissance, drawing became an important research tool that aided understanding in science, as well as the arts. Its effect on jewellery led to developments in form generation, style and the juxtaposition of materials; thereby expanding the confines of the language.

The subsequent invention of the printing press was similarly influential because it enabled a broad dissemination of jewellery designs through print.^{xlv} The latter provided a stable and portable means of cataloguing designs, which were then collated into pattern books that formalised preconceived actions and individuated distinctly personal styles.^{xlvi} No doubt previous makers had given consideration to what they might make before picking up their tools, but these engravings bear first witness to what we would recognise today as evidence of a design process. In other words, a distinction between the thinking of planning and the action of making jewellery. A contention further supported by the recorded appearance of known designers throughout Europe, including Hans Colleart, John Hayward, Erasmus Hornick, Daniel Mignot, Jakob Mores, Virgil Solis and Pierre Woeiriot; alongside artists such as Albrecht Dürer, Hans Holbein the Younger, Hans Müllich and Giulio Romano, who also produced some designs for jewellery that are still in existence.^{xlvii}

Named Designers

An artist who consistently produced jewellery design of the highest calibre was Hans Holbein the Younger. His rendered designs were not those of the dilettante who lacks practical insight into the implications of actually producing the works. Quite

the opposite according to Hackenbroch, who maintains his drawings, “show Holbein’s complete understanding of the nature of precious materials and their handling.”^{xlvi} So much so that during his life his designs became popular with a number of London based jewellers including Hans of Antwerp, Cornelis Hayes and Peter Richardson.

Holbein was first and foremost a painter, and whilst it is difficult to establish the precise influence of painting on his design process some osmosis evidently occurred between Holbein’s documentation of existing pieces,^{xlix} his designs for fabrication and the jewels he sometimes invented to personalise a sitter’s portrait. Intriguingly, the challenges of downsizing from large scale portraiture to the micro dimensions and fine detailing required for jewellery would not have unduly perplexed Holbein, who being an accomplished miniaturist was capable of exquisite circular portraits not exceeding 5.5cm in diameter. Indeed, perhaps operating within such limited spaces influenced the reductive nature of Holbein’s jewellery designs, which are often characterised by elemental linear arabesques that sinuously twirl around a small number of stones, set in regular patterns, as in Fig. 1. In fact, his abstract designs might be described as compositionally compact, restrained and devoid of overtly decorative elements. Holbein evidently preferred to give prominence to the cut stones in their own right rather than making them the servants of narrative, as Erasmus Hornick did in his designs.

IMAGE NOT AVAILABLE DUE TO COPYRIGHT RESTRICTIONS

One of the most prolific designers of jewellery was Erasmus Hornick, who originated from Antwerp, but operated a workshop in southern Germany for many years.^l He published pattern books in 1562 and 1565, in which his pendant designs regularly featured asymmetric structures with human figures at the centre, all circumscribed by an architectonic framework, as in Fig. 2.^{li} The sides of the designs are limited by two columns, which are often adorned by precious faceted stones, as in the pendant in the style of Hornick, Plate 2. Stylistically, the designs are dense and geometrically complex, and may therefore be considered early forbearers of Baroque decoration. Through this complex geometry, Hornick sought to balance all the elements into harmonious compositions whose figurative content was derived from the designer's knowledge of mythology, literature, religion and science. This was significant because it meant the work could not be effectively improvised during its production, but was instead preconceived and driven by the intellect. In other words, it was a reassertion of the 'storytelling' that had previously featured in Classical and Roman jewellery, though with Hornick the narrative was conceptually formalised through drawing, before the making commenced: the mind, therefore preceded the hand.

IMAGE NOT AVAILABLE DUE TO COPYRIGHT RESTRICTIONS

In conceiving his designs, Hornick influenced the realisation of jewellery by the manner in which he deconstructed them into constituent components. Whilst the architectural framework was almost a structural given, the inner content could be personalised according to the client's desires.^{lii} In some ways, this might be considered a precursor to the Industrial Revolution, where objects were produced in series, with the possibility of interchangeable parts.

The aforementioned deconstruction of designs through drawing was taken further by Hornick's production and use of lead patterns, similar examples of which can be seen in Fig. 3 and 4.^{liii} These were either for complete works or parts such as pendant surrounds. The latter allowed greater input from the end user, because they could be moulded and recast enabling additional modifications, or simply used in their original form if so desired. Interestingly, working from one of Hornick's drawn designs still required a very high level of craftsmanship, whereas the use of a three dimensional pattern slightly reduced the required virtuosity because the base structure and its geometry was pre-established. In other words, the design possibilities during manufacture were reduced. In addition, the introduction of lead patterns around this time may have conceptually devalued the act of making, and by consequence increased the kudos and control ascribed to the originating designer.

IMAGE NOT AVAILABLE DUE TO COPYRIGHT RESTRICTIONS

In Germany, towards the end of the sixteenth century, a new approach to pendant design emerged that lessened the influence of Hornick's architectural motifs. Instead, lighter, spacious and more structurally open designs were championed by designers such as Daniel Mignot.^{liv} This reduction in physical mass may have been in part due to economic conditions that required materials be used more judiciously. Alternatively, experiments in drawing may have influenced the creation of the scrolling openwork jewellery, typified by linear explorations of objects in silhouette, all overlaying tendril-like linear patterns. Certainly, these designs would have enabled a relatively speedy translation from drawing to object, because the planar base of the pendant could almost be cut out of metal sheet or formed independently,

using the drawing as a direct template. Afterwards, any three dimensional figures could then be screwed in, to complete the composition. An example of this nimble touch and weightless suggestion of volume, can be observed in Mignot's design for Pendants, Medallions and Studs, 1593, Fig. 5. Whereas, the rear of Cupid Drawing an Arrow, C. 1600, a brooch in the style of Mignot, confirms the immediacy of transforming this kind of drawing into jewellery, Fig. 6. IMAGE

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The exploration of open skeletal structures may have emerged through drawing; most probably through printmaking because the sharp points of engraving tools would have inevitably lent themselves to the articulation of line. Further parallels between print and jewellery making can be identified, primarily through their shared use of engraving. Indeed, the technical skill required to achieve certain imagery would be virtually identical irrespective of whether engraving plate for printing purposes or the metal surface of a piece of jewellery. An example of this is Virgil Solis's design for pendants bearing a linear arabesque pattern, Fig. 7. In this case, one could envisage the means of creating the design, the engraved printing plate, actually becoming the work itself.

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Pattern Books

If drawing was becoming an important part of the jewellery making process, then the emergence of pattern books gave currency to the cult of personality. Pattern books were a drawn synthesis of a given designer's taste in jewellery; tantamount to a manifesto of their aesthetics, sensitivity towards materials and technical preferences. Consequently, they could also be devices for self promotion. For instance, according to Yvonne Hackenbroch, the jewellery designer Jakob Mores sent his sons from Germany to Sweden and Denmark to solicit new commissions based on his designs from 1593 – 1608; which were included in his book, *Das Kleinodienbuch des Jakob Mores*.^{lv} Pattern books therefore facilitated the commissioning process, whilst also accelerating the role of jewellery trader; a forerunner to the modern day gallery owner.^{lvi} Some of these traders even speculated by commissioning designs themselves, primarily as it was a cheaper and more secure alternative to keeping large stocks of actual jewellery.

The drawings of Mores present an interesting case because some of his designs were rendered in colour; this obviously indicated to the maker the colour of stones to be used in each piece. By contrast, jewellery designs made through engraving were monochrome and could therefore only prescribe form, proportion and surface decoration. Consequently, this left some scope for selecting materials and the colour of stones,^{lvii} whereas strict adherence to Mores's drawings would have meant the complete relinquishment of any choices during the making process. The completeness of the designs, as in Plate 1, gives them currency as conceptual substitutes for jewellery, whereby the draughtsmanship is sufficiently adept to make

them valued as works of art in their own right. The latter is important because it gives added impetus to the distinction between conceiving jewellery and the act of its making.

The vibrant qualities of Mores's chromatic drawings are indicative of the potential lustre and luminosity of metals and stones. The fact they remain appealing now, and indeed must surely have seemed even more striking in their day, derives from their lifelike portrayal. The potential for drawing to be a believable substitute for reality had already been aided by Piero della Francesca's invention of perspective and its subsequent diffusion. The illusory projection of three dimensional space could aid communication between any commissioner and the chosen craftsman, enabling design developments during the process of making. In fact, the importance of drawing is recognised by Cellini's discussions about a potential commission for a medal, recording how Michelangelo said, "I will gladly sketch you something; but meanwhile speak to Benevuto; and let him also make a model; he can then execute the better of the two designs".lviii

During the sixteenth century it already seemed accepted that a drawing was a complete entity, which could instruct how to complete a work. In other words, drawing became analogous with the process of making and thus evidence of the distinction between the act of conceiving an artefact and its subsequent execution. This meant that one person could design a jewel and another could manufacture it. Confirmation is again provided by Cellini, this time in the introduction to his treatise on goldsmithing techniques where he discusses the attributes of his various

contemporaries. One such individual was Antonio Pollaiuolo, of whom Cellini noted how he, “was likewise a goldsmith, and a draughtsmen too of such skill, that not only did all the goldsmiths make use of his excellent designs, but the sculptors and painters of the first rank also, and gained honour by them... This man did little else besides his admirable drawing.”^{lix}

This multiplicity of roles in the creative process had advantages and disadvantages for the emergence of self-expression in jewellery. From a positive perspective liberation from making meant that the designer was no longer necessarily inhibited by the extent of their own manual dexterity, but were instead free to lay down extravagant and complicated challenges to the eventual makers. As John Haywood suggests, Virgil Solis, “understood the needs of the goldsmith, and also how to tempt him to practice a surprising variety of techniques and to adopt new patterns.”^{lx} Naturally, there were also disadvantages from this division; mainly that makers might have become fabricators who just copied with little or no artistic input. So much so that we now have antique jewellery from this period that is not identifiable in relation to a particular country or school, let alone an individual. The stylistic homogenisation of jewellery was further encouraged by the standardisation of skills sought by the guilds.

Guilds

Whilst the advent of pattern books may have aided the burgeoning development of the jewellery language, an opposing force had sought its restriction. The inception of guilds throughout Europe gained precedence until the fifteenth century when their

influence increasingly began to promote the homogenisation of style and this inevitably had repressive consequences on the possibilities for personal expression in jewellery.^{lxi} The guilds sought to protect members' rights through monopoly; however, enrolment also carried responsibilities to conform to both technical and assay standards and relatively uniform aesthetics. The latter meant individual nuances were generally unwelcome and therefore any distinction between artist and artisan was also considered undesirable.

During the Renaissance, goldsmiths in Italy came under the auspices of the silk guild, together with practitioners of gold beating and gold thread making. Members underwent long apprenticeships which included training in multiple workshops, all organised by the guild to diffuse and guarantee technical skills. Progression would have required conformation to the guild's standards, which probably discouraged self-expression. Existence of the latter would have made an equitable distribution of work around the various workshops that much harder. To this end, guilds also limited the number of apprentices or journeymen a master might employ to control the quantity of work they could take on.

Counter to the guilds' stranglehold on style were alternate voices such as Cellini, who argued that practitioners should possess intellectual and theoretical competences, as well as the customary manual abilities.^{lxii} The desirability of this dual capacity seems borne out by the apprentice jewellers who eventually became painters or sculptors of note, such as Andrea del Verrocchio and Lorenzo Ghiberti.

Cellini further distinguished himself by ignoring the jealous guarding, prevalent to his age, of the secret knowledge of goldsmithing, which was normally restricted to

familial relationships. Instead, he openly described the intricacies of his technical expertise, perhaps admittedly for purposes of self-aggrandisement. However, the publication of this knowledge in a lengthy treatise on goldsmithing techniques,^{lxiii} whether altruistic or not, signified a relinquishment of technique as the prime value of artistic merit. Perhaps, by revealing everything about the ‘how’, might Cellini have been asserting that the creative driving force behind an artefact was the will and vision of the individual? Were this to be the case, it would have been another important step towards contemporary practice, where jewellery becomes a vehicle for self-expression.

As well as setting out his stall as a major theoretician, Cellini was a gifted virtuoso maker who according to John Hayward, introduced, “conceptions that are fundamental to Mannerist philosophy: the duty of the artist to express noble and beautiful ideas, the importance of the conception (*concetto*) underlying the work.”^{lxiv} Naturally, the latter is most important to the subsequent evolution of contemporary jewellery, though Cellini’s vision had to wait almost two hundred years to be realised with the industrialisation of Europe, which brought the next groundbreaking developments.

The Seventeenth Century

In the meantime, the wider dispersion of pattern books throughout Europe continued apace in the seventeenth century. This meant that a given style of jewellery could simultaneously become diffuse in many countries, leading to a greater homogenisation in the production of jewellery. This did however, spread the work

and influence of the originating designer. One example of this was the diffusion of the floral style schotenwerk, which was first documented in 1621 by the Strasburg jeweller Peter Symony.lxv The style originated in the low countries, having developed out of tulip-mania, but spread far beyond these geographical borders. Overall, pattern books became a visual story of the evolution of design and showed how jewellery had become ever more abstracted from the source of its inspiration, as in the 1626 designs for jewellery by Balthasar Lemercier.lxvi Even then, as now, these books would have provided a research tool for the study of jewellery, which in effect gave impetus to the medium and its history.

In contrast to this reduction in variety, was the continued existence of popular traditional and folk jewellery. The individuality of those items became stronger through the significance of their cultural identity, the latter fortifying their continued existence.

The Industrial Revolution

As with most trades, the advent of the Industrial Revolution influenced the production of jewellery in Northern Europe. The changes were initially most acute in Britain, beginning from the mid-eighteenth century and subsequently affecting manufacturing in France and beyond. The primary change was of course mechanised production, which enabled the mass production of jewellery. Combined with new techniques and the incorporation of hitherto unused materials, it assisted the boundaries of jewellery to rapidly expand. These developments were accelerated by the emergence of a middle class with disposable income; keen to purchase the latest

fashions of what became known as costume jewellery. The latter marked a significant shift in the values ascribed to jewellery from symbolic, economic or functional towards qualities more readily associated with fashion.

Whilst the transition towards aesthetics denoting value was a major shift in thinking, it was less likely to have incorporated self-expression. This was mainly because early machines were fairly rudimentary, requiring designs to be conceived accordingly. Therefore, any drawing had to be readable by the pattern maker or engineer and consequently explicit in form and dimensions. So, even though aesthetics had become one arbiter of value, it remained at the service of the machine. This stricture would no doubt have been enthusiastically enforced by the industrialist keen to ensure the efficacy of his workshop machinery. Design and its communication through drawing had to foresee and accommodate technical problems, both to minimise losses during production and to enable speedy manufacture. Inevitably, this resulted in some regression in the general virtuosity of craft artefacts.

Another development that could be perceived negatively was that unlike handicraft production, with the machine there would have been little or no opportunity for intuition and chance to intervene in the shaping of the finished object. What emerged was absolutely preordained during the design process, cementing the distinction between the design and manufacturing phases that had begun with Renaissance pattern books. An early example occurred in the 1750s, when the invention of transfer-printing was embedded into enamelling. Some of the resulting jewellery and

trinkets are still known as Bilston enamel after the Midlands town in England, which became a centre of production. The photographic reproduction of the source image meant that brushstrokes and the signs of the hand with all its warmth and idiosyncrasies were eliminated. Consider for example the chatelaine in Fig. 8, where the quality of enamelled image is pristine to the point of perhaps being soulless. Intriguingly, it is a decorated ornament, but not decorative. In fact, chatelaines were waist hung objects that contained a range of tools often including bodkins, tweezers, knives, nail files, toothpicks and other assorted sewing or grooming implements. These complex and functional assemblies were effectively tantamount to modern day Swiss army knives or travel sewing kits.

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Material Developments

The increasing mechanisation of many jewellery techniques broadened the range of materials available to jewellers and the ways in which they could be used. The most notable innovations included both cast and cut steel and the increasingly sophisticated application of glass paste stones in costume jewellery. This may have led to a kind of jewellery that I describe as having ‘metaphorical value’, whereby the metaphor was not sustained by a narrative or figurative equivalent, but rather stood in for a more precious material. Consequently, it signalled a re-democratisation towards jewellery’s earliest origins.

One example of this metaphorical jewellery aimed to simulate precious cut stones using highly polished faceted steel. Attempts to replicate the visual qualities of

diamonds and their response to light were central to this form of jewellery, which responded to the prevalent taste for diamonds in courtly jewellery during the eighteenth century. Commonly referred to as cut steel jewellery, it was inspired by the use of marcasite to substitute diamonds. Mechanisation greatly speeded its manufacture and enabled this hard alloy to be worked with surprising dexterity; as can be seen in the glinting and bejewelled head of the pin in Fig. 9. The designers of these pieces deliberately attempted to enable their steel jewels to sparkle brightly, thereby appearing to trap light in a similar way to diamonds. This dazzling effect was achieved by firstly cutting crude facets at varying angles, and then polishing the steel heads to a high sheen. This process, along with the close packing of multiple heads, meant that light could be directly reflected back to the observer or wearer from a variety of viewpoints; a phenomenon much enhanced by the movement of either party.

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The development of cut steel jewellery was aided substantially by advancing mechanisation. For example, according to Clare Phillips, the Birmingham firm of Matthew Boulton was the first to use steam power to drive the polishing machines in the 1770s.^{lxvii} Boulton was a new breed of design entrepreneur and industrialist, and the title he gave to his centre of production in Handsworth, Birmingham around 1765, gives an indication of the scale and ambition of his enterprise: namely, the Soho Manufactory.^{lxviii} Its professionalism was mirrored in the extensive pattern books developed over decades by the firm's designers. The delicate and beautiful drawings in these books, give valuable insight into the preconceived design of

objects; as well as the consequences of the separation of hand and mind.^{lxix} The designs for jewellery often included indications for the plethora of steel ‘gems’ to be used to decorate a piece, as can be seen in the brooches, buckles, buttons and pommels in Fig. 10. Boulton eagerly sought innovation to help refine his manufacturing processes, including those for jewellery. Whilst the steel ‘gemstones’ were initially produced individually, subsequent developments in machinery meant that multiple runs of heads could be produced in batches, thereby eliminating the laborious need for individually fixed rivets.^{lxx} This obviously accelerated the mass production of jewellery.

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A second example of ‘metaphorical value’ in jewellery involved the reintroduction of glass, albeit in a much more sophisticated manifestation than its previous incarnations. Glass had previously featured in Roman and Anglo-Saxon jewellery as threaded beads, but the type developed by George Frédéric Stras was particularly hard and therefore receptive to faceting and polishing.^{lxxi} This meant it could imitate the brilliance of precious stones and take the sophisticated cuts used on diamonds, all at a relatively low cost. Machine cutting meant that glass stones of regular form and consistent dimensions could be produced in large quantities, thereby providing real choices that consequently accelerated jewellery design as a profession. Indeed, according to Judith Miller, in France, “by the 1760s over 300 jewellers and designers belonged to the guild of faux jewellers.”^{lxxii}

Additionally, the mechanised production of glass paste stones at an industrial level reduced costs through economies of scale, with the result that this jewellery became affordable to a larger proportion of the population, especially the burgeoning and relatively wealthy middle classes. Of course, luxurious jewellery of the highest quality continued, as did symbolic jewellery that celebrated birth, baptism, marriage or marked acts of heroism, and ultimately death. Intriguingly, their continued existence partly liberated costume jewellery from fiscal, symbolic or investment responsibilities. This jewellery could be entirely for decorative purposes and the embellishment of one's appearance. With increases in consumer spending, designs could be updated more frequently, meaning costume jewellery became associated with fashion and clothing. The high turnover of designs and reduced expectation that the finished pieces should last a lifetime, helped liberate designers, encouraging them to be more experimental and extravagant.

Another relatively affordable material that was commandeered for the purposes of jewellery was iron. Berlin iron jewellery sought to replicate the geometry and qualities of one medium with another material: in this case, using cast iron filigree to simulate lace. The designs took inspiration from sources including architectural tracery, fruits, flowers and cameos. The delicacy, intricacy and sophistication of the resulting lattice designs meant that in order to successfully sand cast them the designer had to foresee the eventual placement of runners and risers and to moderate their designs accordingly to ensure the molten metal would flow throughout the mould.^{lxxiii} Subsequently, the sand cast components could be mechanically assembled and varying juxtapositions of parts could be made.^{lxxiv} This sophisticated production elevated a relatively cheap material through technical

mastery and the design process. This enabled the designs and artefacts of individual designers such as, Siméon Pierre Devaranne and Johann Conrad Geiss to become fairly widespread. Works such as Geiss's bracelet from about 1820 - 1830, Fig. 11, demonstrate the proficiency of casting that had been achieved and the effects resulting from combining voluminous forms and more delicate filigree elements. The willingness to pursue hitherto unseen designs in unusual materials through Berlin iron and cut steel jewellery, may partially have derived from their evolution from existing trades and the involvement of skilled craftspeople who were not originally trained as jewellers.

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As previously indicated, the invention of costume and steel jewellery marked a shift in thinking whereby the value of a piece was not exclusively defined in monetary terms. Rather, it subtly shifted to the veracity of the simulation of using one material to stand in for another, which therefore meant value was partially defined by what was done to a material. The production of, what I describe as, 'eye candy fakes' was also accompanied by events that almost seem like antecedents for the contemporary use of so called poor materials. A case in point was that of the renowned Berlin iron jewellery issued in Germany between 1813 and 1815. The Prussian royal family beseeched their subjects to surrender their gold jewellery to fund the uprising against Napoleon's occupation. Donations were met with exchanges of iron jewellery, sometimes inscribed on the back with Gold gab ich für Eisen (I gave gold for iron). Filigree iron pieces were transformed into symbols of loyalty and patriotism through their connection with gold. Similar looting of golden heirlooms has undoubtedly

persisted throughout history, but perhaps not without anything quite so symbolic given in return.

The Industrial Revolution obviously laid down vital foundations for contemporary jewellery by giving authority to jewellery design. What began centuries earlier with the emergence of pattern books was fortified by the advent of mechanisation, whereby the machine stood in for the human act of making in the distinction between mind and hand. The potential for design to blossom was also greatly accelerated by the mechanical production of a huge range of glass paste stones and the invention of the gold substitute, Pinchbeck.^{lxxv} These technological developments continued through the nineteenth century, further increasing possibilities through electro-plating and jet. It was also a period in which mechanised production meant it became advantageous to reinvigorate antique techniques such as filigree. The latter for example, meant that large quantities of voluminous and visually heavy gold jewellery could be produced quickly and from relatively small quantities of gold.

The consequences of these technological developments were widely disseminated throughout Europe through the growth of international expositions in the latter half of the nineteenth century. Notable amongst these were of course London's Great Exhibition of 1851, followed by the Universal Exhibition in Paris in 1867. These events provided a showcase for the promotion of new materials, forms and techniques across a broad range of crafts, design and industries; promoting new typologies such as mourning jewellery, initiating intercontinental trade and further

validating mechanised production. Notwithstanding these developments and the advances they brought in jewellery, the initial fascination and wonder for non-handmade 'authorless' products eventually led to concerns relating to authorship and ultimately rejection by some critics and makers, including John Ruskin and William Morris, followed by the protagonists of Art Nouveau.lxxvi

René Lalique

One reaction against the perceived lack of humanity of mechanised production in comparison to lovingly hand crafted artefacts was heralded by Art Nouveau in the 1880s. Its protagonists sought to elevate the decorative arts through a mastery of hand techniques. The jewellery of its leading light René Lalique was for instance the antithesis of the mass produced, and was instead the pinnacle of handmade and exclusive luxury.lxxvii Lalique excelled by uniting traditional goldsmithing with glass elements to incorporate translucency and light into fantasies of his personal virtuosity. The sinuous whiplash lines in his jewellery are symbolic of his visual language, which constituted the personal expression not of socio-political or autobiographical signifiers, but aesthetic preferences.

1920s and 1930s

In the late 1920s and early 1930s several jewellers in France including Gerard Sandoz, Raymond Templier and Jean Després evolved distinctly personal styles. Sandoz was particularly intriguing because he represented a new figure in jewellery: a champion that not only made jewellery, but also undertook research, created manifestos and wrote about its production. Admittedly, centuries earlier, Theophilus

Presbyter and Cellini had written treatises on goldsmithing,^{lxxviii} however these focused on technique and the ‘how’, whereas Sandoz was more concerned with context and the social role of jewellery. One of his contentions about the value of materials effectively pre-empts one of contemporary jewellery’s core principles; namely, that the object as an entity should guide the selection of its materials, rather than any canonical or economic prejudices. Sandoz wrote forthrightly on this matter in 1929, stating, “let us have no preconceptions as to materials. Personally, I consider that before everything else, one must think of the line and the general volume of the piece of jewellery to be created.”^{lxxix} This is mirrored in a broader context by the manifesto of Uniones Artists Moderne, a group of jewellery artists who counted Sandoz amongst their founding members, in which they asserted that, “a beautiful material is not necessarily rare or precious. It is above all a material whose natural qualities or whose adaptability to industrial processes are pleasing to the eye and to the touch, and whose value derives from judicious use.”^{lxxx} In other words, the value of jewellery could derive from the actions of a sensitive maker, irrespective of any intrinsic material worth.

Examining Jean Després’s jewellery, it seems he too, shared Sandoz’s opinion because the constituent materials appear to have been selected for their chromatic values and the compositional relationships they could establish. Després departed from the floral and curvilinear influences of Art Nouveau, inspired instead by his mechanical past as an aeroplane designer. The allusion to cogs, gears and other machine parts can be self evident, as in the Crankshaft brooch of 1930, Fig. 12, which features an asymmetric design atop a pitted surface that is synonymous with sand cast engine parts.

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One final figure of note during this period was the jeweller Naum Slutzky, who had worked in the precious metals workshop at the Bauhaus. The influence of Bauhaus design ideology is evident in the lack of ornamentation in his elemental pieces, which are often typified by movable parts. Central to Slutzky's innovation was his virtually unprecedented use of materials such as chromium plated or silver plated base metals. Aesthetically, his work seems synonymous with industrial units or prefabricated parts, where the repetition of an industrial tubular unit results in a refined and simple composition. This effect is visible in Slutzky's 1930 necklace, Fig. 13, where the simple geometry of the orthogonal pendant contrasts the angularity of its chain.

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Intriguingly, Slutzky's jewellery would seem to be acutely affected by being worn or not. So much so that dual states exist: when disconnected from the body it may seem cold and somehow jagged, yet this seemingly harsh appearance is softened by contact with the body. In fact, it actually provokes a dynamic contrast between the sinuosity of the body and the geometric rigidity of Slutzky's work. Much in the same way as a Renaissance grid provides a harmonic counterbalance between curve and orthogonal geometry; the straight, zigzag and dotted lines of Slutzky's work overlay

the body's fluid curvature. Whether simply a by-product of his fascination for the geometric and mechanical, or specifically intended, Slutzky produced pieces indicative of a jeweller concerned with corporeal relationships and how jewellery could shape them meaningfully. The latter is indicative of certain types of contemporary jewellery that followed.

What unites these jewellers is how their work seems to reflect the broader context of its time of manufacture. The movement of line and resultant geometry is dynamic and complements the accelerating velocity that permeated life in the machine age. However, whilst the imbuing of social resonance is another step towards the expressive ethos of contemporary jewellery, these pieces still appear conditioned by traditional precepts of what beautiful jewellery should be.

Post War Developments

The following section of the introduction explores the history of jewellery after the Second World War, prior to discussing how the jewellery practice that is generally considered to be 'contemporary' emerged from the rebuilding of Europe. Inevitably, the ravages inflicted by the war affected all aspects of society and creative production within it. Whilst the resurrection of physical infrastructures could be initiated almost immediately, the reconstruction of artistic pathways took somewhat longer. After the inevitably slow recovery an increase in makers occurred in the 1950s and a range of subtly hybrid works emerged. Nonetheless, certain key practitioners initiated an approach that diverged from the functional notions of jewellery being wearable, valuable and decorative.

Whilst expectations about jewellery were not fully subverted in the post war period, considerable challenges were laid down to traditional values. In the case of Sigurd Persson and Torun Bülow-Hübe, this often involved the production of sinuous abstract forms that were synonymous with Modernist sculpture and produced predominantly in silver rather than gold. Max Fröhlich also created abstract jewels; in his case through elemental, curvilinear and sometimes kinetic geometries that seem indicative of mathematical figures. The ‘value’ in these jewellers’ works derived from the geometry and qualities of their formal languages rather than the commodity of its materials.

Another subversive strand of activity came from the wide range of fine artists who began to produce works in jewellery in the decade following the war. Amongst these numbered Afro, Arp, Braque, Dalí, Fontana and the Pomodoro brothers. Being primarily painters or sculptors, these artists were not preconditioned by the rules of the medium, and this encouraged an expressive freedom and spontaneity of form in their jewellery. This, as in the case of the Pomodoro brothers, often manifested itself through the translation of the qualities of drawn, painted and sculpted marks into metal. Similar qualities are also evident in the jewellery of makers such as Ebbe Weiss-Weingart; her abstract jewellery during this period is often typified by fluid textural surfaces that allude to molten alloys or even scrunched up foil.lxxxix

As the 1960s progressed, the initial signs of a new kind of practice emerged in which the traditionally accepted norms of fiscal value, permanence, wearability, unrelatedness to the body, aesthetic beauty and decoration were directly challenged.

Jewellers such as Friedrich Becker, Hermann Jünger and Mario Pinton began producing jewellery that subverted these precepts. This led to a gathering momentum that achieved critical mass with the addition of other jewellers in the late 60s, who further confronted the previously sacrosanct characteristics of jewellery through content driven work; exemplified by Gijs Bakker. At this stage in history, the work of certain jewellers loosely coalesces to imply two distinct branches of evolution. The first projects self expressive content often relating to socio-political conditions, world events, body relationships or autobiography. The second group incorporates personal feeling, achieved through a sensitive manipulation of materials and the formal relationships within a piece. I describe these approaches as ‘Jewellery as Content’ and ‘Sensitised Jewellery’.

Jewellery as Content

As the title suggests, this category of contemporary jewellery is characterised by the meanings it encapsulates and projects. The integration of the makers’ ideas and sensibilities about socio-political conditions, world events or autobiographical musings became central to defining the work’s appearance; to the extent that some traditional values of jewellery, such as beauty and function, were almost discarded. Indeed, some of the jewellers appear to have deliberately adopted a confrontational and radical approach to the previously accepted norms of jewellery practice. That said, the reincorporation of content also returned body decoration back to some of its signifying origins, when jewellery communicated specific information such as rank, allegiances or acts of heroism etc. Generally, the constituent materials of ‘jewellery as content’ have been selected according to the underlying concept, and to facilitate its successful communication.

Consequently, as the range of meanings in the work diversified, so did innovation in the selection of materials. An exploration of the human body also began to condition the work, placing increased emphasis on the relationships between the piece and the wearer. This has often manifested itself through jewellery of large dimensions, which extended beyond the traditional comforts and convenience of small scale objects. A complementary exploration of jewellery for unexpected parts of the body has also persisted. The earliest exemplars such as Gijs Bakker, Emmy van Leersum and Peter Skubic, helped bring this new kind of jewellery to fruition from the mid to late 1960s onwards. They were swiftly followed by makers such as Onno Boekhoudt, Otto Künzli, Ruudt Peters and Bernhard Schobinger through to the more recent talents of Ted Noten and Christoph Zellweger. The following analysis of their works considers three themes: the body, value and jewellery as social commentary.

The Body

Central to the measured exploration of the body in contemporary jewellery was Gijs Bakker. Whilst his early work appears to show some influence of the modern jewellery designs of Sigurd Persson and Torun Bülow-Hübe; a significant departure was marked in 1967 by a series of large, almost oversize, collars which frame the wearer. They were raised from aluminium sheets, and whilst an unusual material choice, perhaps their most striking aspect is their sheer size. Conceived to assert the individuality of the bearer, pieces such as *Shoulder Piece*, 1967, were intended to focus attention on the wearer's face through dramatic framing. Similarly theatrical pieces were conceived and made in union with his wife Emmy van Leersum, who described how she, "wanted to give jewellery the same importance as clothing, I

made big objects which followed the shape of the human body. This resulted in the design of clothing as a unified whole.”lxxxii

Together, the two went on to collaborate on the frontier work *Clothing Suggestions*, 1969/70, Fig. 14, which consisted of several full body costumes with growth like protuberances projecting from various body parts, such as the knees or elbows.

Planar discs were also inserted into the body socks at differing heights to dramatically alter the profile of the body. The work commented on the role and value of clothing in ornamenting the body. van Leersum was actively aware of her radical approach stating, “I liberated myself from a number of restrictions concerning the traditional use of forms and materials... For me the idea is the most important element, the process of making the pieces comes second, too much emphasis has come to lie on pure craftsmanship in the course of time.” lxxxiii A comment which asserts how determined these jewellers were to breakaway from traditional approaches to jewellery.

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Taking a prompt from the *Clothing Suggestions*, van Leersum’s subsequent works considered the body to be composed of simplified geometric solids. She drew particular inspiration from the conical nature of the forearm, describing how, “the conic form of the arm intrigues me tremendously. The basic prefabricated tube is cylindrical, so I find systems to transform the cylinder into a conical form.”lxxxiv The resulting metal tubular jewellery from 1970-1975 was mathematically defined in advance by controlling the placement of subtle cuts, which then enabled tubes to be folded or bent into conical sections. Aesthetically, they appear very different from

her preceding jewellery, having little or no surface decoration and precise elemental geometry. This difference is heightened by the jewellery's resemblance to autonomous and singular sculptures, and also its apparent lack of functional elements. van Leersum rejected the latter stating how, "fastenings bothered me – they struck me as disturbing features, both technically and visually, so I either avoided them altogether or made them an essential part of the design as a whole."lxxxv Her production of jewellery from non-precious metals and transparent plastics meant more affordable pieces, through which she announced her rejection of the status symbol in favour of a more democratic everyday product.lxxxvi

In contrast to the physical presence of van Leersum's jewellery, Bakker's next notable innovation, and there are plenty, was his ethereal Shadow Jewellery of 1973, Fig. 15. An arresting work in which, the effect left by wearing the object is the 'work' rather than the object itself. A constrictive metal ligature is placed around the circumference of an arm, a leg or the torso, which upon its removal reveals its own imprint in the wearer's flesh and reddened skin. Significantly, it is an ephemeral work, devoid of the generational permanence of jewellery that commemorates or serves as an investment. Bakker states it originated from the, "wish to make an invisible piece of jewellery, at last to find a form on the body which makes a change to the body. The changed body has to be more visible than the piece of jewellery."lxxxvii

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Bakker's subsequent evolution concerned personalised jewellery, which was achieved by tracing the silhouette of a person's face, centrally, across its vertical and

horizontal axes. Therefore, in the case of Profile Ornament for Emmy van Leersum, 1974, the resulting skeletal cage is not just made for an individual; it only truly fits one person, who of course is, Emmy van Leersum. His concern for the body in specifics continued with the Bibs he created in 1976; these bore a photo of the wearer's naked chest, bringing the ordinarily hidden exterior to outside attention.

In some respects, Peter Skubic did the inverse of Bakker's bibs, taking what ordinarily remains external to the body and literally taking it inside. As the title suggests, his 1975 action Jewellery Under the Skin, Fig. 16, entailed the insertion of a stainless steel implant under the skin of Skubic's forearm. This took the role of the body as a location for jewellery to an extreme, before a subsequent operation seven years later reversed the procedure.^{lxxxviii} As well as referencing jewels that mutilate the body, Skubic's gesture also explored jewellery's frequent lack of visible presence. A matter about which he wrote: "Jewellery can be invisible, when either worn in a concealed place, buried, or locked in safekeeping, or even be surgically placed and worn under the skin surface... The physical state of jewellery can be achieved by means of injury, such as through ornamental scars, tattooing, the filing off of teeth and today even through piercing – and lastly through an operation such as surgically inserting a decorative element."^{lxxxix}

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In 1976, the following year, David Watkins dealt with the body in its entirety by producing large ornaments such as Hinged Interlocking Body Piece, Fig. 17. It interacts with and encapsulates the upper body, treating it as the fully three dimensional object it is. This contrasts the jewellery typologies that rest on the

surface of a specific body part as bracelets and necklaces invariably do. The hinged linear structure jerkily maps out the solid components of the body, passing around, over and behind the upper torso, taking jewellery on a journey around the body. This roving quality was further emphasised by the wearer's movement.xc

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Overall, these varied key works testify to the increasingly dynamic and charged relationship between the wearer, their body and the jewellery that began to emerge after 1967. Of major significance was how the jewellery actually started to do something physically to the body or affect the wearer's perception of their own body, rather than merely resting where it was placed.

Value

The jewellers that can be associated with this group appear quite aggressive in confronting the traditional value of precious metals and stones, and perhaps understandably so given the length of time they had been held sacrosanct. Bakker's previously discussed aluminium collars of 1967 were a portent of the relatively poor materials to follow. In fact, his Stovepipe Necklace of the same year was fabricated from standard units of industrial ventilation pipe, which to say the least subverted conventional expectations of what materials jewellery should be made from. The latter achieved a kind of apotheosis with Giuseppe Uncini's works from 1968, which feature silver cages that were oxidised to look like steel and then filled with concrete. Their rigorous aesthetic and materials derive from the reinforced concrete used in buildings.xci

Industrial materials are also crucial to the jewellery of Peter Skubic, who began working in stainless steel in the early 1970s. The constituent parts of the resulting works are often held together under the tension of springs, magnets and tied steel rope. These functional elements also give the work a theatrical nature and because there is no solder or welding, the act of making becomes a kind of conceptual revelation of its own production. Consequently, as interesting as his work undoubtedly is, it is not instantly recognisable as jewellery. It could easily be something else, and this is one of its distinguishing qualities. For example, consider the brooch *Münchhausen*, 1980, Fig. 18, which might well be a mechanical part or found object.

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Perhaps Lous Martin took the democratisation of jewellery to its inevitable conclusion by selling a jewellery kit that the purchaser had to assemble. *Do It Yourself*, 1974, consisted of a flat aluminium necklace and bracelet each with pre-drilled holes and a number of pipe cleaners. These were then to be threaded by the buyer to complete the jewellery according to Martin's instructions. Naturally, the owner could follow the suggested patterns or create their own.

In 1977, Bakker again contributed to developments with a series of large neckpieces that were each composed of a laminated photograph of a bejewelled queen; a process through which their sparkling and priceless jewels were transposed into almost throwaway materials, accessible to all. Bakker's work dryly chides, as he notes: "I went to a shop selling royal memorabilia and got photographs of reigning queens... I

then laminated the photographs in PVC and, for quite a reasonable price, you can have the feeling of royalty. You can be part of it.”^{xcii} Perhaps the most iconic attack on the status symbol in jewellery, and the indiscriminate use of gold, was Künzli’s *Gold Makes You Blind*, 1980, Fig. 19, which encapsulates a spherical bead of gold in an opaque black rubber bracelet. The patently cheap rubber contrasts the colour, lustre and value of that which remains hidden.^{xciii} Künzli describes the work as returning gold to the geological darkness from where it came.^{xciv} In some ways, it represents a re-appropriation of gold, but is also a sophisticated attack on preciousness; using gold to denigrate gold.

The durability of even relatively inexpensive materials still provides some sense of security. For example, whilst materials such as plastic or wood may not be indestructible or permanent they can last for a long time. So, perhaps in seeking to identify jewellery that actively opposes the notion of value, we should look to genuinely ephemeral works such as Pierre Degen’s self-explanatory *Ring in Bread, Jam, Elastic and Ribbon*, 1982. Other examples include David Watkins and Wendy Ramshaw’s paper jewellery and Susan Heron’s experiments with light projected onto the body. Finally, self-destructing works such as Bernard Fink’s ice ring *Eis*, 1996, or the *Siberian Necklace*, 2006, Fig. 20, by Ted Noten conclude the argument. Being made of ice they both melt when worn; the former disappears for good, whereas Noten’s necklace is irrevocably changed, revealing the mysterious content that was previously frozen within the giant beads of ice.

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Jewellery as Social Commentary

There are some makers for whom jewellery has become a vehicle for the delivery of content that often relates to prevalent social conditions, politics, major world events, philosophical questions or autobiographical documentation. Early protagonists of note include Bruno Martinazzi, Bernhard Schobinger, Otto Künzli, Manfred Bischoff and Ruudt Peters.

The first significant creator of this type of jewellery was Bruno Martinazzi. His jewellery often includes reconstituted fragments of the human body, which are combined with methods of measurement to infer philosophical themes. These have included the creation of man, god and man's intelligence for example. The bracelet *Homo Sapiens*, 1975, features a thumb and forefinger almost touching in a circle, as if pinching. The piece explores the evolutionary advantage man gained from having opposable fingers and thumbs, and how this has enabled us to create and use tools to shape the world around us. Martinazzi has also metaphorically used weights, rules and standard measures to stand in for geological timescales and molecular, continental and even cosmological dimensions, as in the necklace, *Misure*, 1977, Fig. 21. Literature has provided rich material too, including Greek mythology and tracts such as Homer's *Odyssey*, alongside science and Kant's writing on the sublime. These fertile and varied sources have influenced many of his pieces including the brooch *Mela*, 1972, which takes the form of an apple with a slice cut out. Figures, measurements and mathematical curves have been engraved into the polished inner faces. A complex work, it refers to notions of rationality and Newton's 'eureka' moment of discovering gravity; one imagines it may also symbolically relate to the forbidden fruit of Adam and Eve.

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The jewellery of Martinazzi appears to be nourished by a deep seated rationale; where the conceptual underpinning is implicit, rather than explicit. In contrast, the jewel as an idea was formalised by the League of Rebellious Goldsmiths (BOExcv) in 1973 through their boxed manifesto BOE Box, where on its lid was written: “The BOE is a group of four goldsmiths and one sculptor who wish, through the more personal presentation of their work, including the necessary information, to broaden the normal manner of exhibition, to make it a manifestation of ideas.”^{xvii} It was in part a reaction against the prevalence of the so called ‘smooth jewellery’ by jewellers such as Emmy van Leersum, which they believed to be characterised by restrained and minimal geometry.

There is certainly little reductive anonymity in the work of Bernhard Schobinger; rather he seems a potent mix of shaman, storyteller, soothsayer and comedian. His works can often seem visually confrontational and have variously incorporated found objects such as a bicycle pump valve, miniature paint pot, toothbrush, colouring pencils or computer parts (see Plate 23 and Fig. 85-87). His assemblages are frequently composed of items and materials not readily associated with jewellery, even going as far as to include meteorites, saw blades, broken bottles or shards of glass if they could potentially contribute to the manifestation of a given concept. Meditations on the contradictory and often violent world that surround us have included jewellery made in response to the Cambodian genocide for example. Yet, despite the gravitas of this content, many pieces exhibit considerable wit and

irony. The subject of his work can be as diverse as the materials that constitute it, including science, cosmology, belief systems and world events to name but a few. Overall, Schobinger's jewellery is challenging, elusive, romantic and thought provoking in equal measure.

Another jeweller whose works can be as politically charged is Otto Künzli; perhaps more of a social analyst, he uses jewellery as a vehicle for his thoughts. His expressive language took shape in the early 1980s, and is evidently the product of cognition and preconceived design, whereby everything about the work is put at the disposal of the idea. In other words, manufacture asserts the initiating idea. One early piece from 1980, *The Red Spot*, Fig. 22, commented on the pressures to sell in commercial galleries. Despite the technical excellence evident in his later works, on this occasion Künzli used an existing throwaway object in the form of a red drawing pin. The resulting object is disarmingly simple, but effective, with the work's production sustaining the idea of translating red dot sales stickers into jewellery. Künzli has also extensively questioned the role of jewellery and the generally accepted conditions of its existence, as with the *Ornament Brooches* from 1983, Plate 14.

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A distinct and individual language has also been developed by Manfred Bischoff, this time using a limited palette of gold, silver, coral and ivory to create metaphorical works that originate from drawing, as in *Il Mio Casa*, 1986. More recently, the role of drawing has become explicit with pieces of jewellery exhibited upon their

originating drawing. The latter, in combination with the work and its title combine to narrate the story Bischoff wishes to tell. This tends to include historical figures and events, and philosophical considerations often explored through universally recognisable symbols ranging from the infinity symbol through to a television set. Were it not for the ever present narrative content, his work could easily be associated with 'sensitised jewellery' given the exquisite range of surfaces and textures he achieves in gold and silver; consider for example the exterior of the brooch Kun, 2005, Plate 6.

Beyond the synthesis of form and content, what is also interesting about this group of jewellers is how they have dealt with traditional notions of beauty. For centuries, jewellery had been synonymous with joy and beauty, largely achieved through a blend of gold and brightly coloured luminous stones. Whilst not necessarily rejected outright, these jewellers are by no means blindly adherent to the aforementioned doctrine. For the first time, a lack of harmonious proportions, brilliant surfaces or luminous colours, or what might even be described as 'ugliness', could be considered a desired quality if it helped encapsulate the work's concept. In other words, even aesthetics was to be subject to capturing and communicating the source idea.

Sensitised Jewellery

Alongside the post war emergence of jewellers whose work is defined by the ideas it projects, a second group were developing another strand of contemporary jewellery. This second group is characterised by a mastery of technique; with the work often being self-referential. By which I mean that the content or ideas portrayed by the

work invariably, but not exclusively, concerns the internal relationships between its materials, colours and forms. Rather than being imbued with socio-political musings or autobiography as ‘jewellery as content’ can be, this work primarily deals with the sensitising of materials into poetic artefacts. It is less revolutionary and operates more in line with traditional conventions, particularly in terms of scale and the aesthetic values of proportion and harmony. Its senior practitioners include Friedrich Becker, Hermann Jünger, Reinhold Reiling and Mario Pinton; and subsequently Tone Vigeland, Giampaolo Babetto, Robert Smit and Wendy Ramshaw; alongside more recent jewellers such as Liv Blåvarp, Giovanni Corvaja, Karl Fritsch and Annamaria Zanella.

Friedrich Becker

One of the first major contributions to this category of contemporary jewellery comes through Friedrich Becker’s kinetic jewellery. Its first manifestation was described by Becker as ‘variable’ jewellery, which meant that by virtue of hinged and pivoting parts the wearer could manipulate and transform the appearance of the piece. The multipart works date from the early 1960s and could be configured into an almost infinite range of geometries. An example of this is the brooch *Variabler Ansteckschmuck* from 1962, Fig. 23, which consists of a series of circular gold discs that can be rotated in relation to one another by means of spindles, each marked by a ruby. Various configurations of crescents and circles can be revealed by moving the discs around.

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A subsequent development saw the kinesis in Becker's jewellery derive from the movement of the body; with parts of a piece moving according to the orientation and speed of the adorned body part. The delicate balance and weighting of the internal mechanisms were synonymous with the precision engineering of watch manufacture. Therefore, he clearly employed machine manufacture at the service of his ideas. That said, his work follows the conventions of aesthetically significant jewellery, being of convenient scale and often incorporating stones and highly polished metals. Where it diverges and innovates, is in enabling the wearer and to some extent the observer, to enjoy a sensory experience of motion and the interplay of parts through technical wizardry. According to Becker his jewellery involves, "freely swivelling pieces, turning on vertical and horizontal bearings, with centric and eccentric axes, with weights, with impulse balls of platinum; these are the constituents of my jewellery. As the wearer's body moves at random, the kinetic effect is heightened and new and varied sequences of motion take place."xcvii Perhaps most importantly for the advent of contemporary jewellery, they make the wearer an active and ongoing participant in how the work looks and behaves.

Hermann Jünger

Jünger's work is a paradigm of how materials may be sensitised; in his case, through the successful translation of the sensuous qualities of his watercolour drawings into metals and enamel.xcviii The link to drawing was reinforced in his brooches by his frequent use of a planar base from which additional elements were then built up on top, as in the brooch of Fig. 24. The resulting intersections of planes create a play of light and shadows that extend over the surface to animate the source drawing.

Jünger's jewellery demonstrates a poetic humanity, achieved I believe, through a combination of its proximity to the drawn mark and painterly signs, the use of non-rigid outlines and the frequent union of multiple and seemingly unrelated elements in one piece. This unusual, unfettered and playful quality is evident in the necklace composed by multiple hanging elements in Fig. 25.

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A cursory look at his jewellery may suggest it is allied to traditionally mercenary preferences for precious materials, given the frequent presence of gold and stones. However, whilst gold is indeed often present, Jünger's highly expressive touch subdues its appearance and softens its exuberance. This quality is often achieved through the application of enamel to gold surfaces. The resulting aesthetic, allied with the seemingly unrefined geometry and presence of imperfections such as holes, scratches and simulated wear, give an altogether different value from the merely economic or gold for gold's sake approach. My observation concerning the restrained qualities in Jünger's work appears to be confirmed by his following statement: "Agates, garnets or rubies, lapis lazuli, granite or haematite pearls... it is the traditional appeal of their colours that makes them so attractive... Provided one does not allow their commercial value to hinder an uninhibited choice of these materials in grouping them together, one can achieve a more colourful appeal than the sum total of high polish, carat weight and flawlessness."xcix

It seems as though all the materials in Jünger's work have yielded to his humanity and the sensitivity of his touch. Confirmation of Jünger's belief in, what might be described as, the 'poetic soul' in the making process is provided by his comments on technique, which he believed to be, "a far more complex matter than merely the practice and execution of perfect technique."^c He went on to assert that, "there are no formulae nor tables, not even recipes for the decisions which finally give an artistic quality to any work. Here everyone is on his own."^{ci} Jünger was also influential through his teachings at Munich Art Academy, and together with Reinhold Reiling, his pedagogic ethos encouraged self-expression and the projection of identity through the jewel. Significantly, this philosophy has permeated the jewellery of many of their students including Manfred Bischoff, Daniel Kruger and Otto Künzli.

Mario Pinton

As with Jünger, Pinton is another exemplar of the jeweller who, through the sensibility of their touch, brings materials to life. The animation of surfaces was a vital concern for Pinton throughout his career, and there is a warmth and haptic lightness to his jewellery; one feels with one's eyes that these are delicate objects. This is partly achieved through the sensitivity of mark making and delicate lines that often map his surfaces, shifting imperceptibly from the evident to the almost invisible. Despite their subtlety, these marks modulate light and shadow on the surfaces to make his pieces vibrate, as in the square brooch from 1988, Fig. 26. Similarly expressive qualities can also be seen in Pinton's drawings; consider for example, the exploratory sketches in Fig. 27.

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The geometric figure was invariably employed by Pinton either as a starting point or a framing device. Yet, he often instinctively exploited Gestalt psychology by intimating a shape and allowing the viewer or wearer to perceptually close the circle or square, for example. Other characteristic devices include the subtle distortion of regular shapes or their surface division. The placement of a stone or two onto his relief surfaces is also a common feature, orientated to assert a particular geometric configuration or to demarcate an axis or meridian. Despite them being precious stones, they have nothing to do with ostentation. Indeed, working with faceted stones can be challenging because their intrinsically rich colour and strong light are difficult to control, however Pinton, through subtle placement and the use of proportionally small gemstones, managed to stop the faceted stones from dominating.

In addition to producing jewellery, Pinton dedicated much of his life to teaching the subject. His influence therefore extended beyond the jewellery he made and into the practices of the students that passed through the school where he taught in Padua, Italy. His impact on the jewellers, collectively known as the School of Padua,^{cii} promoted the principle that design commences from basic geometric shapes and employs geometric structures to restrain or counterbalance the demarcation of shapes and spaces. This was in part transmitted by the use of grids to design two dimensional shapes and boxed structures to project three-dimensionality onto the page during the design phases. This approach can clearly be seen in the jewellery of Francesco Pavan and Giampaolo Babetto, where their work is often contained by, or refers to, a geometric figure or skeletal solid inferred by structural lines.

What unites the jewellery of Becker, Jünger and Pinton is a curiosity for materials and a desire to animate matter through the consequences of working their chosen materials. Whilst, their specific working practices differed, each contributed to new and rich possibilities in jewellery, seeking evolution from within, rather than through referencing external events or ideas. In other words, the work's subject or content is the work itself and the formal relationships that exist within it.

Summary

Several key events in the history of jewellery, such as the emergence of jewellery designs, pattern books and the Industrial Revolution in Northern Europe, appear to have helped set the stage for what is commonly referred to as contemporary jewellery. A brief synthesis reveals one major shift as the perception of value, which encompassed not only the commodity of precious stones and metals, but came to recognise that materials could be imbued with aesthetic, spiritual and narrative significance beyond their fiscal worth. This was prompted by costume and steel jewellery during the Industrial Revolution, and further postulated by Naum Slutzky amongst others in the 1930s. Another major shift was the gradual division of the goldsmithing profession into the jewellery designer and the jewellery maker. This was precipitated by the advent of printed pattern books during the Renaissance, in which jewellery designs were recorded and distributed via engravings. The existence of the jewellery designer was given further credence by the advent of mechanisation during the Industrial Revolution, which meant mass produced jewellery had to be pre-planned. This distinction between thinking and doing activities, which were not necessarily carried out by the same person, sowed the seeds for jewellery as personal

expression; because without some precognition the possibility to imbue work with personal meanings is usually diminished. The latter almost certainly became central to contemporary jewellery, enabling the form of each work to be the expression of the artist's concepts, irrespective of whether figurative or abstract. These ideas are then manifested through materials, which have been selected to accentuate the given concept, rather than for any monetary value.

Since the late 1960s, contemporary jewellery appears to have become manifest through two primary approaches: the sensitisation of materials and the imbuing of content. 'Jewellery as Content' reveals three primary subjects: the body, the perceived value of jewellery and its materials and finally socio-political, contextual and autobiographical meanings. 'Jewellery as Content' contains the most revolutionary work in terms of scale, medium, and technique, whereas the 'Sensitised Jewellery' operates closer to traditional precepts. The latter does however exceed these by heightening the investigation of internal formal relationships between geometry, colour, material properties and proportions.

Irrespective of which of the two aforementioned categories the jewellers adhere to, it is surely the case that contemporary jewellery commences when the expression of their concept, figurative or otherwise, becomes paramount. This means that the geometry, materials and aesthetic of jewellery is selected and developed with the sole intention of transmitting or capturing this concept.

I have discontinued my analysis of contemporary jewellery from the early 1980s onwards because my intention has been, as previously mentioned, to let the jewellers discuss these matters through their interviews. Therefore, readers seeking a more comprehensive chronology and critical analysis are recommended to consult the excellent anthologies by Peter Dormer, Helen Drutt or Ralph Turner that are detailed in the bibliography.

In the forthcoming section, consisting of the interviews, the reader can assess which jewellers, if any, share my contentions. As can be seen, these interviews commence by asking how and why each jeweller began making jewellery and then proceed to explore the working processes and techniques each jeweller favours. Whilst some questions are generic, others are focused towards the interviewee's practice; aimed at understanding the various manifestations of personal expression and the formal and metaphorical languages that have been created. The discussions feature questions about the relationship between the body and the jewel, the relative importance of function and preferred jewellery typologies. Sources of inspiration, techniques and research methods are also considered, as are the influence of educators and the act of teaching, before the interviews close by soliciting advice for students of jewellery.

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Publication 8

BERNABEI, R., 2017. **Jewellery Can Be Worn Too**. In: Myzelev, A., Exhibiting Craft and Design Transgressing the White Cube Paradigm, 1930-present, New York: Routledge, pp. 107-125. Refereed chapter.

This chapter explores the display of contemporary jewellery both on and off the body, focusing on the exhibition setting from the 1980s onwards. It discusses how contemporary jewellery artists have transformed traditional modes of display by challenging the orthodoxies of the showcase and mannequin; detailing where this evolution has expanded the language of jewellery. It considers how the innovative exhibition modes proposed by some artists have affected the dissemination of embedded jewellery. This analysis entails charting the move beyond display cabinets to less predictable means of presentation, including performative adornment by models and actors, alongside the contribution of installations.

Jewellery Can Be Worn Too

Introduction

Jewellery has a dual existence in that despite being made to wear, it spends much of its life not being worn. This paradox can also condition the display of jewellery when not shown on the body.^{ciii} Therefore, this essay will explore the display of contemporary jewellery both on and off the body, focusing on the exhibition setting from the 1980s onwards. It will discuss how contemporary jewellery artists have transformed traditional modes of display by challenging the orthodoxies of the showcase and mannequin; detailing where this evolution has expanded the language of jewellery.

This analysis will entail charting the move beyond display cabinets to less predictable means of presentation including performative adornment by models and actors, alongside the contribution of installations. Central to this analysis will be the approaches of leading jewellery artists such as Ted Noten, Ruudt Peters and Christoph Zellweger, for whom the aesthetics and means of theatrical installation can be an important element that frames the work. Investigations will explore other practitioners who have directly replicated the act of wearing in the display setting, as well as jewellery created with the aid of audience participation. The essay will also consider works that have stretched the conventions of what might constitute a showcase, including intrigues by Otto Künzli and Ted Noten. Finally, it will examine the role curators and institutions can play in developing innovative scenarios for exhibiting jewellery. The research has been based on primary source interviews with jewellers and curators, alongside the secondary sources of books, journal articles, websites and exhibitions reviews.

Consideration will be given to the motives for public display prior to ownership, including commercial needs, artistic prerogatives, curatorial programming and the institutional desire to communicate and educate. Establishing where innovations and developments have occurred requires the conventions of display to be charted, commencing within showcases and upon mannequins. Naturally, the showcase, or vitrine, places jewellery behind glass and in so doing, isolates the viewer from it. They do of course provide physical security for what are, more often than not, extremely valuable items. In contrast, a mannequin facilitates a more immediate connection with the physicality of the human body, whilst providing an indication of what it might be like to wear an item of jewellery or see it worn.

From The Showcase To Installation

Perhaps the most classic means of displaying jewellery is within a showcase, both in commercial and museum settings. Its origins lie in the human desire to acquire and preserve items of cultural and scientific worth, alongside the curiosities of everyday life from near and other, seemingly more exotic worlds. The wealth, breadth and age of present day museum holdings testify to the long history of the collecting imperative. The earliest acquisitions of the artefacts of others may well have occurred through force, as a result of war and sacking invasions, rather than trade. Conquest was heralded on the return home by displaying any pillaged wares. Concentrated modes of display took shape within Renaissance Europe; where learned, rich, powerful and sometimes noble men initiated the fashion for so called 'wonder-rooms' or 'cabinet of curiosities'. Initially, these were not items of furniture, but moreover, entire rooms filled with flora and fauna specimens, objects of scientific endeavour and the artefacts of

newly discovered continents and plundered colonies. An early example was amassed by Olaus Worm, a Danish physician. A year after his death in 1654, a catalogue *Museum Wormianum*, 1655, documented the collection and came with an etching showing the room full of objects.^{civ} Wonder rooms were intended to demonstrate the intellectual prowess of the owner and to impress their guests. Given visitors would be low in numbers and of high social standing, the need for security was less paramount. Therefore, most artefacts sat on shelves or the floor, rather than behind glass, which allowed objects to be freely handled.

A gradual shift towards security and preservation occurred with the philanthropic intents of 18th Century patrons, who sought to share their collections more broadly. This philosophical aspiration to disperse knowledge was allied to the Enlightenment and its rapid pace of scientific discoveries and technological developments. Another catalyst was the increasing number of British nobility and upper class North Europeans who indulged in cultural tourism through the so called ‘Grand Tour’ of Europe. In Great Britain, the physician and naturalist Sir Hans Sloane for example, collected over 71,000 objects during his life that he bequeathed to the British nation, leading in turn to the inauguration of the British Museum, which opened in London to the public in 1759.^{cv} This helped mark the advent of modern museum culture; thereby necessitating the protective function of the showcase as collections became the property of institutional and state entities.^{cvi}

The showcase gained further ascendancy in Britain with the proselytising zeal of the Victorians to educate Britain’s masses^{cvi}; leading to the vitrine-filled Victoria and Albert Museum in London in 1852. The museum built on the success of the 1851 *Great Exhibition*, itself held in the giant glasshouse cum

showcase of Crystal Palace, London. Similar institutions were being built throughout the industrialised world.^{cviii} In parallel, the growing industrial production of glass, rather than the previously hand blown production, increased the commercial usage of showcases in shops.

Given the pervasive history of the showcase, perhaps it was inevitable that jewellery artists seeking to reinvigorate Western jewellery practice through non-precious materials and the re-claiming of meaning from the 1960s onwards, would take exception to the norms of display. Above and beyond a rebellious catalyst, objections to the showcase are immediate, understandable and clearly explained by the curator and design historian Monica Gaspar: ‘The moment you put something behind glass, somehow you betray the nature of the object. You make it shareable... but the whole nature of use, and meaning and attachment with the owner or with the collector, somehow gets lost’.^{cix} Equally persuasive from the maker’s perspective is Ted Noten, who cites a corporeal rebuttal, ‘jewellery, which has a body related language, clearly has more possibilities than only the vitrine’.^{cx}

The showcase, for better or worse, provides a neutral environment where jewellery can be observed with few visual distractions. For this reason, it may actually be perceived as a non-space for jewellery; a place of isolation before it passes into the hands of a real person. However, it creates a neutral backdrop that can be manipulated by curator and jeweller alike if dissatisfaction provokes. The simplest way to reinvigorate the showcase, without its entire abandonment entails a contextual shift, so that the showcase becomes, in part, the subject of a work. This occurred in Christoph Zellweger’s installation *Ossarium Rosé*, in the ‘Sala do Veadó’ at the National Museum of Natural History in Lisbon, in 2005.

A large number of unidentifiable bones, probably from animals, that the jeweller had flocked with pink fibres were ‘displayed under a cold light and orderly classified inside the only remaining showcase that survived a fire which destroyed the museum in 1978’.^{cxix} Prior to the fire, the room was filled with tightly packed showcases displaying the bones of prehistoric deer. By reusing the last extant showcase and placing it back in the original room that housed the skeletons, Zellweger exploited the iconography of the vitrine; along with the aura of cultural worth that a museum bestows and seeks to preserve. Or, in the words of the artist, the pieces ‘acquire scientific credibility, the solemnity of the relic or the fascination of the wonder-cabinet’.^{cxii} Despite being a deft proponent of the staged setting or installation, Zellweger cautions that there is

no problem for me in presenting work as an installation if it is done well and makes a point about the work. If the jewellery work isn't strong, displaying it as an installation usually won't help. You can't 'upgrade' work just by making it look more ‘arty’.^{cxiii}

From the institutional perspective, showcases may be necessary because they mitigate the need to protect work from theft or accidental damage. Even so, with a sensitive approach, a certain work-specificity can be built into showcases, as underlined by Ursula Ilse-Neumann, the curator of jewellery at the Museum of Arts and Design, New York. She reveals how for the retrospective of jeweller Margaret De Patta in 2012, her team ‘built separate small cylindrical containers, individually lit from above, showing each single piece separately and allowing visitors to see the piece from all angles, enhancing the optical effects the artist sought’. In discussions, she continued to outline that when jewellery might ‘involve smell, hearing or taste’ she would seek to ‘create an open, visitor-

interactive space'.^{cxiv} It is therefore possible for curators and their institutions to be innovative in the creation of secure showcases, if desire and funds permit.

Another allied option entails the jeweller making some kind of prop that creates a protective envelope: spatial, conceptual, metaphorical or otherwise. A secondary object that gives setting and creates a protective aura, wherever the work goes on display. Sustaining this possibility are ring stands by Wendy Ramshaw that can take on great complexity of form, or the similarly protective, sculptural counterparts Marjorie Schick sometimes creates to cosset and display a jewel when not worn. Bruce Metcalf has specifically created objects to house jewellery. In his case, theatrical and architectonic backdrops for his humorous, cartoonish and often existentially anguished figures. Add to these, Esther Brinkmann's elaborate and highly crafted jewel boxes and the drawings of Manfred Bischoff displaying his jewellery and momentum is created. Ramshaw and Brinkmann's approaches are personalised versions of items already common to the commercial jewellery trade, whereas Bischoff's tactic is more idiosyncratic. When asked to explain his decision to show his jewellery in this manner, he responded by explaining how he 'saw that the pieces alone could not hold themselves within a space that is normally not a space. Therefore, I had to frame them, in a certain sense, through language and with drawing so that the viewer could have the possibility to enter from multiple points of view'.^{cxv} To achieve this, Bischoff places each piece of jewellery in an exhibition on a drawing that relates to the work or one that prompted its creation. A contextual framing is important to Brinkmann, who explains that a piece is 'finished only when it has its own box. The box positions the object. It prolongs and reinforces its character... The box can also be used as a display unit. The status of an

autonomous object that an unworn piece of jewellery acquires is thus emphasised'.^{cxvi}

Installations

Liberated from the institutional imperative to securely preserve, jewellers can play around with, or even disregard the showcase. Even in the 1970s, questions were being asked as to whether the ethos of the showcase was in keeping with jewellery that was increasingly being produced in non-precious materials. Early rebel Fritz Maierhofer noted in 1974 how 'generally speaking, I refuse to have my jewellery displayed in show-cases. This, I hate. It reminds me too much of 'valuables''.^{cxvii} It is unsurprising that the physical confines of the traditional showcase are perceived to be too restrictive; a reality subsequently overcome by Otto Künzli's installation *Swiss Gold and The Deutschmark*, shown in Munich in 1983. In the display of the two pieces of jewellery of the same name, the showcase effectively expanded into an entire room that housed two people. Visitors could not enter the space and were also 'acoustically separated from the couple by a pane of glass resembling a shop window'.^{cxviii} The couple, looking like suave bankers, were dressed in evening wear, drank champagne and chatted through the opening event; ignoring the audience. The woman wore the artist's necklace of 200 deutschmarks, whilst the man wore an oversize brooch in the shape of a gold bar, covered in chocolate foil wrappers. The observational nature of experiencing the installation shaped the jewellery's meaning, which according to Künzli referred to 'exhibitionism, voyeurism, reception, exposition, consumerist behaviour, the arbitrariness of moral concepts, exploitation, vanity and illusion'.^{cxix}

Künzli's theatrical installation preceded Ted Noten's 21st Century update by some thirty years. Invited to show in a visual arts exhibition at the Amsterdam Arts Club in 2004, the challenge for Noten, as he admits, was 'how to exhibit jewellery in such a way that you can break free from conventional solutions like showcases or wall mountings. If you want people to look at the work fresh and unbiased, the presentation itself has to sustain that approach'.^{cxv} Noten's ingenious solution was *Robot and a Ring*, in which a single plastic ring was hidden from view in a safe. The audience were kept at a distance by a glass viewing panel, from where, by pressing a button, they could summon the robot arm to open the safe and transport the ring to them for closer inspection. After a brief pause for viewing, the robot then returned the ring to the safe. The whole installation effectively became a giant showcase. The elaborate 'overuse' of high technology to present a deliberately simple ring, heightened the theatricality of the viewer's experience, whilst giving them some control over the course of events.

If the showcase continues to be required to meet a logistical need, then an alternate incarnation sees it removed from the gallery space. Which is exactly what Ted Noten did with *Be Nice To A Girl, Buy Her A Ring*, 2009. His intervention consisted of a vending machine placed in a shopfront in the red light district of Amsterdam. Display became less passive through a combination of surprise and quirky humour. It also heightened commercial possibilities by proffering lovers with the opportunity for a spontaneous romantic gesture for the bargain price of 2.50 Euros.

Beyond the Institution

The notion of display often implies a gallery or museum setting, but jewellers themselves are free to circumvent this dogma and the conventions of the showcase. The pop-up gallery, unexpected public interventions and impromptu happenings are common in the fine arts and increasingly so in the jewellery world. Perhaps the jeweller most noted for her guerrilla display tactics is Dinie Besems. Intriguing examples include *Jewellery for Men*, shown in the Museum Van Loon in Amsterdam 2003. Whilst admittedly within the confines of a museum, this show lasted for the single hour she could afford to rent the building. Continuing this ideology, Besems has also hosted shows and installations in her own home. Further examples of impromptu and innovative display come with the pop-up store *Op Voorraad*. Initiated in 2009 by Ineke Heerkens, Jantje Fleischhut and Jeannette Jansen in Amsterdam, the portable and changing shopping bonanza sought to address the somewhat staid notions of what ordinarily constitutes a gallery space for jewellery. Its unconventional means of display entailed appropriating the aesthetics of a hardware store, replete with perforated hardboard walls upon which the jewellery was displayed in blister packs, threaded onto metal hooks. Supermarket trolleys, cash tills and price labels completed the 'look'. The roster of artists changed according to the store's temporary location and limited edition runs of each piece on sale gave added impetus to the allure of the event. Commerce and display therefore found a common impetus in innovation. According to Ineke Heerkens, jeweller and co-founder, the temptation of purchase was heightened because being 'open for a short period is a way of being exclusive. It's now or never; no time to doubt whether to buy'.^{cxxi}

In the realm of guerrilla display, the lone individual is a kind of quick hit paradigm. At recent jewellery fairs and festivals such as Schmuck in Munich, several groups have been seen sporting handheld or wearable showcase bags that display the makers' wares. Alternately, a solo and unofficial example was made and transported by Diogo Alves, who walked around the 2104 edition of Schmuck wearing a showcase backpack. The rear fabric was cut away to reveal a transparent box frame with a piece of his jewellery within. This made a new kind of mobile showcase, accompanied by the jewellery's maker, who was able to discuss the work within. According to Alves, the backpack arose as a consequence of two prior projects. The first entailed him using 'the city as the 'body' of the jewel' and meant 'placing small showcases in public toilets with a piece of jewel inside along with a sign saying 'In case of personal desire, break the glass'''.^{cxxii} Whereas the second, a 'walking display' explored distinctions between public and private space. For the maker, part of its provocation was in ascertaining at which moment 'people can deny me entrance to places for what I'm wearing, indeed, how can they deny me entrance to a gallery if I wear the gallery'.^{cxxiii}

A recent institutional transgression of the museum's architectural confines involves the exhibition of jewellery in the wider public sphere; thereby simulating private ownership on a day to day basis. An exemplar is once again Ted Noten, with his dispersal of 300 limited edition brooches to the taxi drivers of Middlesbrough, in the UK. The intention of *Hermes Wings*, 2011, was for the drivers to act as ambassadors for Middlesbrough's Institute of Modern Art's jewellery collection and to encourage members of the public, who might not otherwise visit, to attend the museum. It was an innovative performance and

publicity vehicle, in which conversation promoted jewellery. The associated preview event included a ceremonial drive-through at the museum, whereupon the taxi drivers collected their individual lapel pin and dashboard brooch. The latter consisted of a winged form that stood on the driver's dashboard to augur safe and speedy transport; and moreover helped 'drivers engage passengers in conversation and debate'.^{cxix} Intriguingly, it was also a piece of jewellery for the car. Consequently, Noten's intervention challenged the conventions of display on various levels, including the transformation of cars into mobile showcases for jewellery and the substitution of a human wearer for a mechanical one.

Another example of jewellery exiting the museum building comes with Liesbet Bussche's street jewellery. One piece contributed to the exhibition *Jewellery Unleashed!* curated by Liesbeth den Besten at Museum voor Moderne Kunst in Arnhem, the Netherlands in 2011. *Urban Jewellery, (brooch)* transformed a tall post (holding up tram cables) into jewellery, through the addition of a giant pin. In so doing, Bussche decorated people's environment, rather than their bodies. Further interactions with street furniture such as bollards and the chains between them have furthered this line of investigation. Culminating in her witty installation *Pearl Necklace (tw)* in Taipei, Taiwan, 2011. It descends from a streetlight, using its spherical bulb as one of many in a luminous string of pearls. As well as transcending the confines of institution, Bussche's work induces a symbiotic relationship between content, site and mode of display.

No More Showcases

Having manipulated the contextual ramifications, size and physical location of the showcase, the ultimate confrontation meant completely removing jewellery.

Indeed, this act of abandoning the showcase effectively marked the emergence of installation as a *modus operandi* for jewellers to display their work. A pioneer was Ruudt Peters, one of whose early manifestations at Galerie Marzee in Nijmegen, the Netherlands in 1992, entailed each of the chalice-like necklaces from the *Passio* series being shrouded in dark purple gauze that was hung from the ceiling in low light. Resembling nomadic tents or veils, viewers had to seek an opening and push the fabric aside to enter and view the jewellery. Even more dramatic challenges were set in 1995, by the display of the *Ouroboros* jewellery high up in the rafters of Galerie Marzee. This required viewers to climb atop a series of stepladders placed around the gallery floor in order to see each piece of jewellery close up.^{cxxv}

For Peters, display has a defined purpose, revealing how he has ‘the philosophy of the work and I try, through the installation, to offer a little bit of where it comes from; but not too much’.^{cxxvi} Consequently, display becomes a potential key to understanding the work; but never an easy one for the viewer. The clues are there, but effort is required to arrive at the intended meaning. Peters is entirely open about the necessary commitment, explaining how viewers ‘have to do something to look at me. I demand something from the people’.^{cxxvii} Whichever scenario he conceives, certain factors are ever present and none more so than a human connection. He states how ‘it is very important that there is always a relationship with a human being, like the size of a human or a meditation pillow I used, where pieces were on top of it’.^{cxxviii}

Audience Participation

With jewellery having become complicit in installation, the viewer may become an active participant who, rather than standing still, mesmerised by the contents of a showcase, circumnavigates a space and the elements contained within. The activation of the audience can allow them to become agents in how the work is displayed, where it is placed in the setting and whether it is worn or not. Indeed, they can even become complicit in the production of the work, whilst on show.

In this context, Ted Noten continues to be an archetype of invention with various projects that co-involve the audience in the act of display; to the extent that public participation drives jewellery production. Consider for example, *The Ring Thief*, 2000, which subconsciously enticed visitors to hit a large clay punch bag that Noten had suspended at the EKWC, European Ceramic Work Centre in 's-Hertogenbosch, in the Netherlands. Seeking a jewelled solution for clay, the answer was impregnated in the impressions left by the fists striking the punch bag; with imprints of various engagement, marriage and casual rings driven into the wet clay. Similarly, production and display intertwine in his *Wanna Swap Your Ring* project, first revealed in Tokyo in 2010, but scheduled for further outings around the world. 500 pink, rapid-prototyped *Miss Piggy* rings were hung from nails that had been laid out in a gun-shaped silhouette. Visitors were then invited to swap one of their own rings, for a *Miss Piggy*. Thus, over the course of the exhibition, the uniformity of monochrome display gradually transformed into a colourful and multifaceted vision that evoked the city's identity through its jewellery. As the instigator acknowledges, the work is self-sustaining because the substituted rings will inevitably provide the raw materials for other pieces of jewellery.^{cxxix}

A slightly different premise permeates Noten's *Three Star Bomb General*, 2010, which magnanimously allows purchasers to adopt the guise of high ranking military personnel. The piece consists of a candle in the shape of a cartoon-like bomb. Replete with a generous wick protruding upwards, it contains three bronze star pins within; the kind synonymous with generals' epaulettes. What charms, is the wit of the conceit, along with the fact that at the time of purchase, the jewellery remains hidden. To reveal the general's stars, the purchaser must light the candle at a time and location of their choosing. Consequently, they become the arbiter of the final audience and the display context. One could imagine the event occurring in an intimate domestic setting, in which the revelatory performance prompts a more cogent awareness of the passage of time; as well as providing a conversation piece as the melting wax bomb slowly reveals its contents. Thus, the work's display shifts from the norms of the public realm to the private, personal and personalised.

If Noten's jewellery bomb jolts display out of the happenstance of the everyday to the private, then the low cost multiple embeds display in its essence. The absolute affordability of works such as Mah Rana's pin badge *Jewellery is Life*, 2000, or Benjamin Lignel's dual pin badge set, *Support Your Local Jeweller*, 2006, not only democratise and challenge the notion of the jewel as status symbol, they also ensure a wider means of dispersal to an expanded public. Clearly, in this context, sales become a self-fulfilling prophecy, leading to increased exposure. Therefore, the multiple is one more tactic for the jeweller to dissolve not only the physical boundaries of the showcase, but also the institutional, contextual and metaphorical confines. It sits alongside installation, item-specific packaging and audience participation as new modes of display;

with the humanity of the latter providing a bridge to an analysis of the mannequin's metamorphosis into performance.

From The Mannequin To Performance

If installation is considered a preconceived and static staging, then the inclusion of people instantly establishes animation, kinesis and a direct connection to the body through the act of wearing. In other words, performance provides a more lifelike form of display. To consider how this possibility has emerged and developed, it is salient to consider the premise of the mannequin and its challenges and opportunities in the display setting. In contrast to being placed on a stand or upon a shelf in a showcase, the mannequin roughly mimics the human body and gives an indication of what any item of jewellery might look like when worn. It can give three dimensionality back to jewellery, as in the chain element of a necklace whilst it moves over the shoulders and around the neck, or by establishing a sense of relative proportions in comparison to facial features and body parts. The opportunities do not end with the physical benefits, but also include the possibility of setting a scene with other props and clothing to infer social interaction. A foretaste may be created in the mind of the viewer of what it might be like to own, wear and be seen wearing the work. Consider Arline Fisch, who has been drawn to the use of more than one placed together because she 'can group the mannequins so they become a conversation piece, rather than an isolated pedestal kind of piece. If you walk into a room and there's a group of six mannequined people wearing different kinds of things, I think you can approach that group and imagine yourself there, and you could become part of that group'.^{cxxx}

Whilst mannequins can facilitate the humanised display of jewellery, not being alive, they lack the tactility of skin, and more importantly, the motion that can set jewellery free and animate it through changes in the light and shade falling on it. Furthermore, their industrial serial production means they want for nuance and the idiosyncrasies that different human bodies exhibit. It may be for these reasons that many jewellers have incorporated real people into the means of display.

Various jewellers have used living models, amongst them is Ruudt Peters. According to the art historian Liesbeth den Besten, Peters is a jeweller who ‘wants to make the work enticing to people through the manner in which he shows his jewellery’.^{cxxxix} His desire to captivate through a performance based experience of his work gained momentum in 1992. Brooches from the *Interno* series were pinned to the lapels of 15 men wearing black jackets. The men stood next to clothing hooks spaced out along a wall, and were forbidden from interacting with the audience during the opening evening at Spektrum Gallery, in Munich. As den Besten observed, these installations require the audience to choose whether to participate or not.^{cxxxix} Passive viewing, as is the norm, was not a given. The static catwalk scenario questioned whether audience members ‘dare step up to these men and look at the jewellery on their jackets as though they were nothing more than a vitrine?’^{cxxxix} Once the performance had concluded, the jackets were hung on the hooks with the brooches for all to see. Indeed, this final touch overcame in part, the temporal nature of performance, which can often mean the ‘main event’ is so short-lived as to not determine the aesthetics of an exhibition for its full duration. In Munich, the transience of the catwalk lived on through the placement of the jackets; as though someone could

have come in at any moment and put them, and the jewellery, back on. Through an analysis of Peters' exhibition installations, den Besten concludes her discussions by arguing that:

Ruudt Peters discovered what installations can do for jewellery: expanding the atmosphere already present in the jewellery through the right combination of materials, props, constructions and lighting. Therefore, the word installation can easily be exchanged for the word scenography, which is also aimed at provoking the correct atmosphere in order to understand the work.^{cxxxiv}

Other performances include Ted Noten's *Tedwalk*, 2008. A full blown fashion catwalk of models displaying his jewellery at the Stedelijk Museum in Amsterdam. With glitz and glamour, lights and music, all contributing to an overtly exuberant event, whose finale ceremoniously left the objects on an empty runway. They were subsequently exhibited under Perspex simulations of Victorian domed glass bell jars. Having occurred in the YouTube age of instant online video uploads, a film of *Tedwalk* will be preserved for posterity, as long as the servers remain switched on.^{cxxxv}

The inevitably transient nature of performance can lead to the accrual of memories and the building of what might be described as iconic momentum, sustained in part by the printed press, virtual blogging, photography and conversation. The displayed jewel becomes an event that lives longer in the mind, than it ever existed in reality. This, to a certain extent, is true of many

experiences of art and artefacts, unless one becomes the owner. Yet, if the perception of the event can be heightened by some means, outlandish or otherwise, then the psychological power of the work or event may grow exponentially.

Photographic Display

Many iconic examples of jewellery owe their elevation and exposure to photography. To sustain this viewpoint one only has to think of the striking images of Gijs Bakker's *Steel Profile Circle*, 1974, where the wearer, Fritz Maiehofer, has a Christ-like appearance.^{cxxxvi} Other examples include shots of Gijs Bakker and Emmy van Leersum's, *Clothing Suggestions*, 1970. The striking images of Peter Skubic's surgical intervention *Jewellery Under the Skin*, 1975-82, even include X-rays showing the implant inside the jeweller's body. Yet, in contrast to the significance accorded to photographs, the jeweller David Poston argued for the primacy of the object; believing that 'jewellery is for the wearer, not the spectator, since I believe that people should be involved in their own existence rather than the image of it'.^{cxxxvii} Counter to Poston's viewpoint is the fact that the vast majority of people can only know and experience most pieces of jewellery through the photograph. Indeed, its documentary capacity has had great value in anthropological and ethnographical studies; as well as recording the changing tastes and styles in jewellery around the world in varying socio-cultural circles. Prior to the invention of photography, painting held this role and painters exploited the presence of jewellery as a metaphorical device for communication. This continues to provide a valuable historical record, as much jewellery was melted or broken down into its constituent elements, with stones re-set in new pieces.^{cxxxviii}

The relationship between photography and jewellery was explored in *Eye Catch: Jewellery & Photograph*, an exhibition curated by the jewellers Warwick Freeman and Octavia Cook at Object Space in Auckland in 2011. The show explored the position, role and communicative functions of the adorned jewellery, as well as photography's potential within the jewellery maker's practice. Writing in the exhibition literature Frances Walsh asserts a symbiotic relationship between photograph and jewellery, noting that 'a photograph of an artefact is the next best thing to owning one, something that most of us will never do. Photography's job when it comes to artefact is to capture them'.^{cxxxix} From Freeman's perspective, the exhibition built on ideas he had already explored in his 1995 book *Owners Manual*, 'which was photographs of people who owned the work, wearing the work'.^{cxli} Photography can play an important role in the dispersal of jewellery.^{cxlii} Indeed, certain jewellers have made it a central feature of the wider distribution of their jewellery. Christoph Zellweger's book *Foreign Bodies*, 2007, exemplifies this approach, of which he explains: 'To me, the book is a work in itself, a form of displaying and showing my work in another format and adding more layers to the possible reading of the work. This book was a way of talking to the many rather than to the few who will make it to see a physical display'.^{cxlii}

Photography also provided the starting point for an innovation that graphically replicated the mannequin. In his 2011/2012 show, *Venus Adorned*, at the *Snyderman Gallery in Philadelphia USA*, Bruce Metcalf projected photographic images of friends and colleagues onto the walls at life-size and then painted their silhouettes grey. This created a frieze of shadow people, who seem caught in the act of conversing and socialising. To this cast of ghostly

figures, he pinned the brooches and necklaces of the show. Rather than being flush with the wall, the jewellery sat proud and projected their own shadows back onto the figures, as if to acknowledge and emphasise the disjunction between reality and imagination. Overall, a narrative of interaction and implied wearing was created through a cartoon style, which was entirely in keeping with the forms Metcalf produces. It may well be a first in terms of display. A hypothesis shared by the jeweller: ‘I’m surprised that (as far as I know) I am the first to use this device. In retrospect, it seems so obvious!’^{cxliii}

A Hybrid Descended From The Mannequin And Showcase

The penultimate typology of display is one where the descendants of the showcase and mannequin collide: an event where installation and performance merge through audience adornment. A prime example occurred with the *Touching Warms The Art* exhibition of jewellery at the Museum of Contemporary Craft, Portland, Oregon, USA, in 2008. Exhibitors were invited to participate on condition their works could be held, touched and worn during the show. Thereafter, all works would enter the museum’s teaching collection, where further physical examinations would ensue. Intriguingly, touching was not only possible, but actively encouraged with camera facilities and a booth that allowed viewers to photograph themselves wearing the work. Images were subsequently uploaded to an online photo repository. As well as wearing the jewellery, it also encouraged the intermediary occurrence; namely, the joy of holding jewellery, feeling its weight and rubbing its constituent elements between the thumb and forefinger. The institutional drive behind the work is explained by Namita Gupta Wiggers, curator of the show, who elaborates on its aims and conundrum causation:

It was intended to address the fact that within a museum you can't let people touch things, you can't let them try them on – only the privileged few get that opportunity. It's not possible to educate broader segments of the population to understand what it feels like to wear contemporary art jewelry... if they can't touch it, handle it, put it on and see what they look like in it... It was about saying, 'We need to find new models for presenting work that accommodates a haptic desire'. People have the desire and need for haptic engagement with certain objects. The museum environment – the White Cube environment – is not set up to offer that and it's a problem.^{cxliv}

Other museums and institutions extend the opportunity to hold and touch jewellery through the operation of lending schemes. One is run in Denmark by the Danish Arts Foundation and it permits items from their jewellery collection to be borrowed by state officials, those who participate in official events, and artists giving concerts, performances or exhibitions. The intention of the scheme is 'to provide Danes with an opportunity to become acquainted with jewellery of a high artistic quality'.^{cxlv} In this way, jewellery can leave the edifice of the collecting institution to be displayed in real life, and with living mannequins as models and advocates for the work.

Another interesting conjunction of audience, performance and installation was Monika Brugger's *Jeju*, 2000. It projected a daisy chain onto the viewer when

they stood in a certain position in an installation. People could effectively switch between being the viewer or wearer depending on their position in the space.

The work was a tender reminder of carefree youth and the joy of using flowers to make jewellery with friends and first sweethearts. Moreover, display and object became the same thing. In so doing, it permitted the viewer to briefly wear jewellery that would have otherwise been hidden away under showcase glass.

Digital Display

The final means of display that will be discussed pertains to the digital technologies of rapid prototyping and the internet. Many innovative jewellers have already set up their own webshops where clients can view and order work directly from the maker. The advent of 3D printing bureaus like Shapeways^{cxlvi} and other similar companies enable jewellers to further supersede the traditional gallery system by bringing display direct to the viewer, wherever they may be. Unlike the previous modality of production, display and sale, this new technology means display becomes the trigger to manufacture via on-demand ordering. Display, production and sale become united through the digital interface. However, much like the old school mannequin and showcase, the web, whilst democratising access in terms of time, geography and wealth to some extent, still prevents the viewer from handling and engaging with jewellery through their tactile senses. Whilst a powerful tool for the dispersal of jewellery imagery, it denies the physicality and sensuality of the act of wearing jewellery in the here and now.

That said, the digital realm can augment the audience for jewellery and in some ways, help reinvigorate its display. One such example was the recent

project #wearmima, 2012, at the Middlesbrough Institute of Modern Art (MIMA). Members of the public were invited to attend a casting day after which selected participants were filmed wearing and discussing jewellery from the museum's collection. The edited films were uploaded to *The Space*, a collaborative website from the BBC and UK Arts Council.^{cxlvii} Each film revealed nuances of the jewellery that might otherwise have remained hidden; with the wearers variously discussing prompts for its production, how it feels to hold and wear, what drew them to their chosen piece, how it fits them physically and psychologically, amongst other issues.

This approach has echoes of the aforementioned *Touching Warms The Art* project. However, given the limited numbers permitted to wear the work, the democratising element is lesser. The greatest innovation of #wearmima was in allowing viewers to see museum collection objects being handled and worn, all whilst the wearer talked about the jewellery. Seeing ordinary people, who were not necessarily trained in the jargon of arts and crafts 'speak', giving their responses was expansive and in contrast to the tightly controlled curatorial or artist's texts that invariably accompany exhibits.

As well as personal websites, many jewellers and interested parties run their own contemporary jewellery blogs or repositories such as *Klimt02* and the *Art Jewellery Forum*.^{cxlviii} Some of the most insightful come in the guise of conversational exchanges in which a visual and descriptive sketchbook accumulates to shed light on the inner workings of studio practice. One such example was instigated by the *Grey Area Symposium* in Mexico during 2010.^{cxlix} The blog charted various dialogues between pairs of jewellers, with one being from Latin America and the other having a European background. A similar

premise for exchange, the *Handshake* mentoring project in New Zealand, partnered up and coming jewellers with experienced makers such as Lisa Walker and Warwick Freeman.^{cl} The resulting blog and book charts each pair's blossoming relationship and gives insights into the practice of all participants. In this way, jewellery practice gains a virtual shop window onto the world through the internet.

Conclusions

It appears that contemporary jewellery practice since around the late 1980s has sought to challenge the conventions of display by dismantling the showcase to create expansive installations and by sidelining lifeless mannequins in favour of real people and performance. Much in the same way that jewellery itself has entered a realm where anything is possible in terms of materials, scale, form and content, so too, has its means of display. As jeweller Iris Eichenberg noted in 2006, 'there are no taboos left, so everything is possible: every subject, every material, every way of working'.^{cli} It would seem that the only limitations to display are those imposed by makers, curators, galleries and museums.

Consequently, the adventurousness of the individual is paramount to the continued evolution of display, but with jewellers such as Ted Noten acutely aware of the potential benefits, it should be an anticipated outcome. As the artist himself acknowledges, 'in order to 'open up', we should use more mechanisms, systems or tools that are known by people who are not familiar with modern jewellery'.^{clii} Ruudt Peters' approach also exemplifies innovation from the norms of display, something he considers vital, explaining that 'I don't want to be in a showcase. I never did that and I never want to do it. When I can't have an installation, I don't want to have an exhibition'.^{cliii}

One might even argue that display can become integral to the process of creating jewellery; as in the case of Christoph Zellweger, who notes how ‘the display and the communication and contextualization of my work matters a lot to me... Making my work goes hand in hand with creating a context for the work to be experienced, sensed or seen’.^{cliv} Equally, the curatorial and institutional perspective augers promise, when a curator such as Ursula Ilse-Neumann summarises an ideal means of displaying jewellery thus: ‘It should be shown within the context of various themes – accessible and if at all possible, not behind glass as in a fish tank’.^{clv} For Ted Noten, the general requirements are even more demanding; imploring that ‘display should challenge the viewer’.^{clvi}

There have been many examples of jewellery display to jolt the viewing public out of any supposed apathy, with the most striking including interventions by Otto Künzli, Ted Noten and Ruudt Peters. As well as a device to disturb the happenstance of normality, display has also become a tool in the armoury of the jeweller wishing to influence the meaning and self-expression that is often central to contemporary practice. At its best, display can poetically guide and inform the interpretation of jewellery’s content; smoothing comprehension without resorting to didactic means. It can also heighten the anticipation of viewing and confirm artistic reputation through memorable and iconic events. Tempering this enthusiasm can be the commercial imperative of conservative curatorial approaches. A reality not lost on Christoph Zellweger who observes that

gallery spaces in the field of jewellery are often designed to cater for the direct interaction between customer and a piece of jewellery for sale, but only a

few galleries are happy to help the artist to create a holistic display that allows a visitor to gain a larger experience beyond the individual artefact.^{clvii}

Whilst enabling a broader dispersal of contemporary practice, display innovations have also directly extended the language of jewellery. The jeweller Ted Noten is responsible for several of these developments, with *Hermes Wings*, 2011, making a strong case as an exemplar. The winged brooch for the taxi drivers of Middlesbrough, UK, was hung by some from the rear view mirror of their taxis. By seeking to use the brooch and individual taxi drivers as verbal ambassadors for the commissioning museum's jewellery collection, Noten invented a jewelled ornamentation for the car, whilst simultaneously converting it into a mobile showcase. Other examples whereby a mutually dependent relationship exists between the jewellery and its performance further substantiate the argument for display expanding the parameters of jewellery. Consider in this vein, Dinie Besems' performance *Logarithm of the Grotesque*, 2012, in which a monk-like man gradually put on over 200m of a single necklace of threaded beads.

The performed jewel and the jewel as catalyst for communication are but two strikingly different interpretations of display concerning jewellery; obviously others exist, many of which are indebted to one or even both of these interpretations. They include low cost multiples, installations, item-specific packaging and audience participation. Each has ingrained display either in the production or interpretation of jewellery. These innovations have primarily been driven by the jewellers themselves and demonstrate how evolving modes of

display can contribute to the extension of the jewellery language. Additionally, with certain curators also acknowledging the value of innovation, it is surely inevitable that evolving adventures in jewellery display will continue to surprise, delight and inspire.

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Publication 9

International jewellery projects between Italian and Portuguese jewellery makers in output 9.1 and Italian and Japanese jewellery makers in output 9.2. Both collaborations were fostered and organised by AGC (Italian Association of Contemporary Jewellery) in collaboration with PIN (Portuguese counterpart association) for publication 9.1 and JJDA (Japan Jewellery Designers Association) in the case of output 9.2.

The latter collaboration culminated in a travelling exhibition in Japan at Istituto Italiano di Cultura Tokyo, Yamanashi Jewellery Museum, and Shiinoki Cultural Complex, Ishikawa Prefecture. In Italy at Museum of Mediterranean Natural History in Livorno, Cominelli Raffaele Foundation in San Felice/Benaco, Oratorio San Rocco in Padua and Museum of Bijou in Casalmaggiore. The duration of the exhibitions spanned from the 3rd of July 2015 until the 15th of January 2017 and two catalogues complemented it.

In the following outputs 9.1 and 9.2, resulted from two international artist exchange projects. These are two examples of how the author has tackled research question A and B. In both collaborative projects each maker was selected by a panel of judges and was allocated a jewellery artist as a partner to create a work that responded to the partner's memory. Every participant through virtual conversations and an exchange of images had an assortment of visual imagery and personal stories that served as a stimulus to work with. In both outputs the author applied the maker's creative process although in Step 4 output 9.1 (Fig. 15) was made entirely by the author whereas in output 9.2 (Fig. 16) the work is almost exclusively made by the 3D printer.

The results have indicated that the act of forms generation through drawings has not been replaced by the digital intervention in both cases. In *Souvenir from Japan* the maker experienced the need to finish the jewellery with a manual touch by adding a cotton thread to add a minimal physical intervention. The narrative quality was inferred in both pieces of work but with different ‘force’. Therefore, embedding emotions was possible even though the digital aid replaced Step 4. In *No title* (Fig. 15), the body ornament was produced by the growing of an engraved line that has gradually described and created the decoration on the linoleum. The variation in the intensity of the force utilised by the maker in engraving the surface is also visible by the differences in the depths of the line. The imagery of the two pieces of work are directly inspired by Japanese fans for *Souvenir from Japan* and from a traditional Portuguese plough for *No Title* (Fig. 15).

9.1 4 Pontos de contacto entre Lisboa e Roma

The catalogue is available through the AGC (Association for Contemporary Jewellery, Italy).



Fig. 15 No Title, pectoral ornament, linoleum, leather

Photo: Roberta Bernabei, 2010

9.2 Dialoghi- AGC- JJDA

The catalogue is available through the AGC (Association for Contemporary Jewellery, Italy).

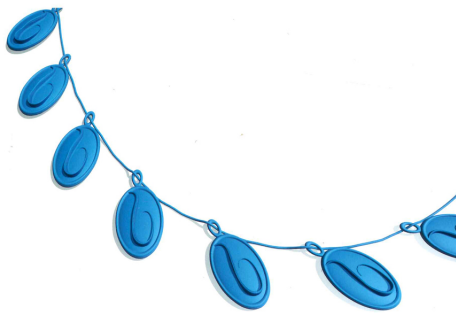


Fig. 16 Souvenir from Japan, pendant, nylon, cotton thread

Photo: Roberta Bernabei, 2015

Publication 10

The body of work presented in publication 10 consists of two participatory projects and exhibitions where the mnemonic and emotionally charged potential of jewellery was explored.

The first output involved adults' members of the local community of Loughborough Town. **10.1 Loughborough Jewels: Interactive exhibition to imbue memories with jewellery.**

The second output took place with residents of a nursing home for elderly: **10.2 Cedar House-Rothley: memory and jewels project.**

This body of work merged participatory design methods, 3D rapid prototyping, storytelling and jewellery making with community memories. The maker utilised an 'introspective approach', in which sensitising materials and narrative quality become manifest in the pieces of jewellery through a direct manipulation of materials such as engraving copper (Fig. 17) or painting an image like flowers (Fig. 19).

The originality of the project lies in the investigation and combinations of different approaches described above. As well as the application of various techniques including the utilization of 3D printer to make part of the artefacts to minimise the cost and open the project to a wider audience. The use of the 3D printer for the brooches initiated the process of democratizing the participatory design methods. The jewellery was complemented by traditional goldsmith techniques and the use of materials with associations of preciousness. The project highlighted the benefits of cross disciplinary approaches in craft and design

methods for participatory projects, aiding the practice of collaboratively working and when using an object as a trigger for memories or capturing emotions.

Findings also revealed the potential of this combination of techniques in jewellery as an aid for well-being, in specific to reaffirm the existence of elderly people in their familiar context in their later lives. The project involved participants from the local History and Heritage society, who reported on the project on their web page. <http://www.lboro-history-heritage.org.uk/loughborough-jewels-a-participatory-arts-project/>

The author was contacted by an Italian journalist for an interview on her research (output 10.2). This interview was published in one of the Italian daily newspapers *Avvenire* (2016 circulation 139,700 copies). Available from: <https://www.avvenire.it/mondo/pagine/terapia-britannica>

As a result of these two projects, the author was invited by director M. Häni to participate in doing research and to join HEART Healing Education Animation Research Therapy™.

The HEART collaboration has extended the use of the above approaches and added the animation and digital storytelling with the aim of animating jewellery as an aid for well-being. The initial investigation has already seen its first fruitful outcomes in an article published on *Animation Studies Online Journal* by SAS association.

The author was also invited to present findings of output 10.1 and 10.2 at the following conferences: *Florence Jewellery Week 2017*, Sala Capitolare, Chiostro Santo Spirito 23-25 May and as a key note speaker at the 2018 Metal Symposium at Texas Tech University, 4 October, Lubbock, USA. One of the pieces of work

(16) for the first Project was peer reviewed and published in the book *Narrative Jewelry. Tales from the Toolbox* by Mark Fenn, publisher Shiffer in 2017. The author's conference presentation title at Florence Jewellery Week was *Integrating Traditional and High-Tech Goldsmithing Techniques in Wearables and Jewellery that Aid Well-being*.

10.1 Loughborough Jewels: Interactive exhibition to imbue memory with jewellery

The workshop and exhibition took place in RADAR exhibition space, Carrillon Court Shopping Centre, 20-01-2016 to 31-01-2016, Loughborough.

The author was invited by curator Nick Slater, as the organiser of a year long art programme in collaboration with Charnwood Arts Centre, to design a collaborative project with the local community of Loughborough. Fifteen participants were recruited through an open call. Their memories were gathered through object led interviews. Subsequently, the author embedded participants' stories and author's experiences in personalised brooches. The project was completed with an exhibition and a focus group that included participants and the maker.



Fig. 17 Father and Son, nylon, copper, glass beads, iron

Photo: Roberta Bernabei, 2016



Fig. 18 Exhibition and focus group

Photo: Roberta Bernabei, 2016

Images available from: <https://dspace.lboro.ac.uk/dspace-jspui/handle/2134/20421>

10.2 Cedar House-Rothley: Memory and Jewels Project 2016

Output 10.2 followed the same research methods and approaches for output 10.1. This participatory project explored the possibilities of imbuing memories into brooches and used discussion as a collective analytical device to further explore these memories. The process of creation and the resulting works were presented through a private exhibition at the nursing home in Rothley, Leicestershire. The 15 brooches were presented to each participant and a group discussion took place to record their responses to the object. This presentation and further discussions with the home carers revealed the following findings: a- the sharing of personal memories is pursued through a seeing and touching experience; b- the participatory project acted as a catalyst for the participant /wearer to develop emotional ties to a jewellery object; c- pieces of jewellery were charged with emotions and memories by the participants and the maker, participants developed a strong sense of appropriation stimulated by the memories associated with the pieces of work and d- in some occasions, the jewellery objects were used by carers to interact with participants and test their ability to recall memories (note this has been reported by one of the carers to the author during the validation stage that took place in May 2016). One could argue that this discovery together with the recent work and study on digital jewellery as an aid for well-being has generated a kind of ‘jewellery therapy’.



Fig. 19 Flower Bed, nylon, copper, glass beads, pearl, iron, acrylic painting

Photo: Roberta Bernabei

Image available with permission by participant from:

<https://dspace.lboro.ac.uk/dspace-jspui/handle/2134/22257>.

Publication 11

BERNABEI, R., 2018. **The Poetry of Sensitising Materials.** In: Annamaria Zanella *The Poetry of Material*, Arnoldsche, Stuttgart, pp. 17-18.

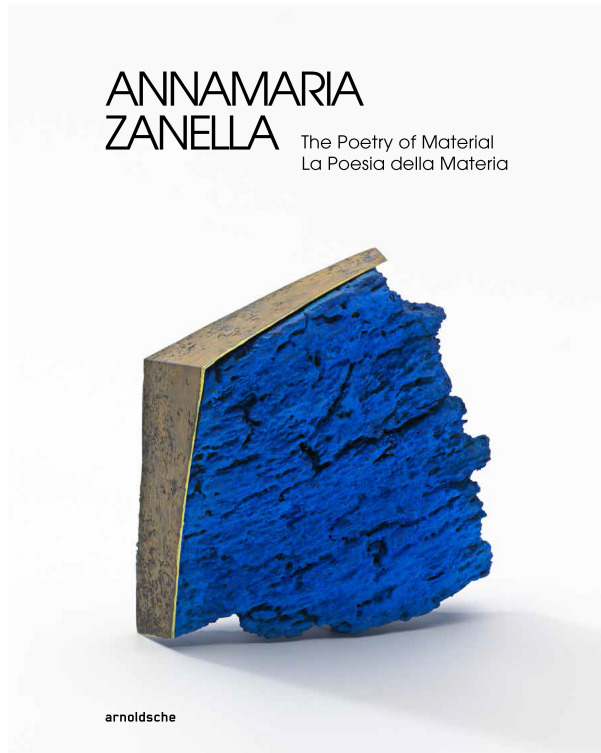


Fig. 20 Annamaria Zanella book cover, 2018

The author has expanded the application of the concept of sensitising materials with the invitation to write an essay on the work of an Italian art jeweller Annamaria Zanella who belongs to the School of Padua. This study responds to the research question A, its originality resides in the application of the sensitising materials concept to analyse the work of Zanella as well as the narrative quality approach utilised by the maker through the creative process.

Annamaria Zanella: The poetry of sensitising materials.

In Annamaria Zanella's early jewellery, one can observe an emerging desire to sensitise materials. Consider her works with iron from the 1990s, such as the brooch *Fern* (*cat. no. 3*, 1992), published in *Jewelry in Europe and America: New Times, New Thinking* by Ralph Turner.⁹ The recycled metal elements have been assembled into a dynamic composition, whereby small gold dots rivet the constituent parts together, one after another. This sequential joining reveals the jeweller's working method and underpins the somatic experience. Zanella focuses on juxtaposing different materials and the act of generating a form, while transforming them with tools and heat to redefine and animate the metallic and non-metallic surfaces. This process of form creation and surface manipulation is what I describe as 'sensitising materials'.¹⁰

The whole relationship that occurs between every action of the making process, including the growth of the work in collaboration with materials, is defined by the British anthropologist Tim Ingold, as 'narrative quality'.¹¹ Ingold argues that making is a process of 'growth' and that the maker is involved in a *morphogenetic* process: a confluence of forces and materials, where the maker engages in form generation

⁹ Ralph Turner, *Jewelry in Europe and America: New Times, New Thinking*. London, 1996.

¹⁰ Roberta Bernabei, *Contemporary Jewellers: Interviews with European Jewellers*. Oxford, 2011, pp 37-38.

¹¹ Tim Ingold, 'On Weaving Basket'. In: Fiona Candlin Raiford Guins (eds) *The Object Reader*, New York, 2009, pp 80-90.

together with the materials.¹² Ingold's theory was articulated more intuitively by the jeweller and teacher Mario Pinton (Maestro of the School of Padua) in 2011, when he asserted that 'a project is a creative act, it is an invention... the operation must not result from a mere rational process, but moreover a human act with all its gifts.'¹³ Pinton acknowledged the importance of considering the process of making, not only a rational fact, but as a collaborative action that generates 'the narrative quality'. One might argue that the gifts Pinton refers to can be identified in the ability of makers like Zanella to emotionally charge materials with poetic resonance. I contend this is partly achieved through the act of sensitising surfaces. In the jewellery of Annamaria Zanella, poetic resonances emanate from deep within to illuminate her chosen theme.

Zanella's dexterity in sensitising materials is matched by her judgements when selecting materials. These choices often embody deep sentimental attachments and aid personal narratives. The latter, in conjunction with the title, could define the work as narrative jewellery according to jeweller Jack Cunningham. He considers this to be 'a wearable object that contains a commentary or message which the maker, by means of visual representation, has the overt intention to communicate to an audience through the intervention of the wearer.'¹⁴ One example amongst many is *Fern*, which includes broken bits of windscreen and window glass from the car accident she suffered. This brooch was one of the first times Zanella was recognised in the context of European Contemporary Jewellery. Thereafter, her jewellery developed through

¹² Tim Ingold, *Making: Anthropology, Archaeology, Art and Architecture*, New York, 2013, p. 21

¹³ Bernabei 2011 (see note 2), p. 163.

¹⁴ Cunningham, J. *Contemporary European Narrative Jewellery*, available online at <https://www.jackcunningham.co.uk/chapter01.html> (last accessed 5.5.2018).

striking touches of colour that would help guide viewers towards a piece's intended feelings and content. In the brooch *Blue Cell*, (cat. NO. 17, 2003), she premiered the merging of strong colours with her innate interest in revaluing poor materials. This union of papier-mâché and a striking blue serves to further embed emotion into matter.

Intriguingly, this deep and resonating tone of blue spans Zanella's career: featuring in *Cell* and *Mother Cell*, (cat. No. 77, 2014), through to the recent body of work *Mediterranean* and *Blue Doors* (cat. nos 107/08 both 2017). The emotions invested in these pieces include a passionate celebration of creation in *Mother Cell* through to compassion, when exploring the flow of migrants arriving on Italian shores. To heighten meaning Zanella uses titles to reveal glimpses of concept with reductive force, in the same way a poet seeks to synthesise fleeting moments or complex concepts into a few words. There are further analogies with poetry in her practice; the physical engagement of making jewellery, with its various steps and process is somewhat akin to writing a poem, line after line. The simple filing of metal is repetitive, but the sum of its actions alters geometry – redefining shape or enhancing smoothness. Similarly, the building of intense colour requires the application of several layers of pigments in a rhythmic and sequentially additive process. In the case of *Mother Cell*, the stratification of pigments guides the viewer as though reading the verses of a poem. The title confirms reference to the female womb and the surprise that emerges in discovering the generative capability of lives formed within a female body.

Overall, Annamaria Zanella is a jeweller whose trajectory is sustained by consistent and rigorous research. Her distinctive creative voice differentiates her artistic language from other exponents of the School of Padua. Zanella's jewellery stands out thanks to her ability to unite sensitised materials, potent concepts and vibrant colours into a myriad of poetic visions.

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Available from: <https://dspace.lboro.ac.uk/dspace-jspui/handle/2134/36409>

Endnotes from Publication 8

ⁱ Bernabei, R. (2011) *Contemporary Jewellers: Conversations with European Artists*. Oxford: Berg. p2.

ⁱⁱ Cartlidge, B. (1985) *Twentieth-Century Jewellery*. New York, N. Abrams, Inc., Publishers. p75.

ⁱⁱⁱ Martin, L. (1995) *Lous Martin Simpelweg sieraden*, Amsterdam, Lous Martin. P52.

^{iv} den Besten, L. (2011) *On Jewellery: A compendium of international art jewellery*. Stuttgart, Arnoldsche.

p22.

^v <http://3dprintingindustry.com/2014/02/05/precious-project-moves-closer-refined-3d-printed-jewellery/> last accessed 31.10.2014

^{vi} Marshall, J., Dean, L.T. and Atkinson, P. (2008) *Automaking for the People. Crafts*. 212 (May/Jun), p42.

^{vii} www.jewlr.com last accessed 31.10.2014

^{viii} www.suuz.com last accessed 31.10.2014

^{ix} www.zazzy.me last accessed 31.10.2014

^x www.zazzy.me last accessed 31.10.2014

^{xi} www.mymo.is last accessed 31.10.2014

^{xii} www.shapeways.com last accessed 31.10.2014

^{xiii} www.makoojewels.com last accessed 31.10.2014

^{xiv} www.n-e-r-v-o-u-s.com last accessed 31.10.2014

^{xv} Jewellery production apps cannot only have an affordable price as their selling point; this needs to be combined with the ability to co-create the work, mirroring the fun making aspect to Lous Martin's earlier *Make Your Own Brooch*. In this way, the concept of the jewellery also encompasses the collaborative nature of its production.

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- ^{xvi} www.solidsmack.com/design/beauty-bytes-cad-generated-jewelry-nervous-system/ last accessed 31.10.2014
- ^{xvii} <http://blog.ponoko.com/2008/04/28/guest-designer-jesse-louis-rosenberg-on-algorithmic-design/> last accessed 31.10.2014
- ^{xviii} <http://blog.ponoko.com/2008/04/28/guest-designer-jesse-louis-rosenberg-on-algorithmic-design/> last accessed 31.10.2014
- ^{xix} Skinner, D. ed. (2013) Contemporary Jewellery in Perspective. New York, Lark Jewelry and Beading. p216-217.
- ^{xx} www.ponoko.com last accessed 31.10.2014
- ^{xxi} The possibility of ‘custom production’ through print on demand can also function in traditional manufacturing whereby jewellers such as GEM Montebello and collectives such as Chi ha paura produce on demand after purchase rather than producing large quantities of stock.
- ^{xxii} http://substratumseries.com/issues/algorithms/nervous_system/0 last accessed 31.10.2014
- ^{xxiii} Ober, J., Ed. (1978) *Francoise van den Bosch*. Naarden, Francoise van den Bosch Foundation. p24.
- ^{xxiv} Martin, L. (1995) *Lous Martin Simpelweg sieraden*, Amsterdam, Lous Martin. p52. Subsequently, another Dutch jeweller, Giijs Bakker went on to argue that even “if you see the same jewel ‘worn by several different people it is still intelligent design’. (den Besten, L. (2010) *Chi ha paura*. Stuttgart, Arnoldsche. p 15.) In other words, reproduction does not necessarily detract from the concept of a work.
- ^{xxv} In conversation with Christoph Zellweger via email.
- ^{xxvi} den Besten, L. (2011) *On Jewellery: A compendium of international art jewellery*. Stuttgart, Arnoldsche. p26.
- ^{xxvii} <http://www.stjamescrossrevisited.com> last accessed 31.10.2014
- ^{xxviii} www.kickstarter.com/projects/1627392371/human-chromosome-jewellery-collection last accessed 31.10.2014
- ^{xxix} www.kickstarter.com/projects/joshharker/anatomica-di-revolutis last accessed 31.10.2014
- ^{xxx} www.youmagine.com last accessed 31.10.2014

^{xxx} www.thingiverse.com last accessed 15.09.2014

^{xxxii} Maplin now sell plug and play 3D printers for under £700.

www.maplin.co.uk/p/velleman-k8200-3d-printer-kit-n82qg last accessed 31.10.2014

^{xxxiii} www.thingiverse.com/thing:290279 last accessed 31.10.2014

^{xxxiv} In conversation with Christoph Zellweger via email.

^{xxxv} In conversation with Christoph Zellweger via email.

^{xxxvi} Vanhaeren, M. et al, (2006) Middle Paleolithic Shell Beads in Israel and Algeria. *Science*. 23 June 2006, 312. p1785-1788.

^{xxxvii} “Towards the end of the Republic, the gold ring was bestowed on civilians”. Higgins, R. A. (1961) *Greek and Roman Jewellery*. London, Methuen. p179.

^{xxxviii} Hughes, G. (1972) *The Art of Jewelry*. London, Studio Vista. p23.

⁵ “At the formal betrothal ceremony at which the father or guardian of the bride made a solemn pledge of marriage, the prospective husband gave his bride a ring (annulus pronubis) as his own form of warranty.” Bury, S. (1984) *Rings*. London, Victorian and Albert Museum. p15.

^{xi} Hughes, G. (1972) *The Art of Jewelry*. London, Studio Vista. p19.

^{xli} Pliny noted how, “the emperor Claudius gave permission for people to wear his portrait engraved on a gold ring.” Higgins, R. A. (1961) *Greek and Roman Jewellery*. London, Methuen. p189.

^{xlii} See Voillot, P. (1998) *Diamonds and Precious Stones*. London, Thames and Hudson. p20-27. Other items also incorporated into settings were believed to have special properties, for example, “the power to counteract epilepsy and dropsy were attributed to ass’s hoof and toadstone”, respectively. Scarisbrick, D. (2003) *Finger Rings: ancient to modern*. Oxford, Ashmolean Museum. p44.

^{xliii} Coral was also used to symbolise the passion of Christ and also rebirth through association with the mythological Greek character Medusa, whose gushing blood is said to have become coral on contact with the sea. The protective qualities of coral were believed to derive from its form, which often resembles multiple lances. Balboni Brizza, M. T. (1986) *Gioielli: moda, magia, sentimento*. Milan, Museo Poldi-Pezzoli. p98.

^{xliv} Christianity was adopted as the official religion of the Roman Empire in 313 AD during the reign of Constantine. This slowly led to an open manifestation of personal faith through jewellery, and particularly the ring. See Lambert, S. (1998) *The Ring*. Hove, RotoVision. p49-51.

^{xlv} Many drawings were executed through engraving and the hatching used to define form in two dimensions influenced pieces of jewellery, such as the tabernacle possibly attributed to Erasmus Hornick, late sixteenth century. Several of the architectural details on the rear of the item were hatched using parallel lines, curves or symbols. These engraved lines and marks often served the dual purpose of giving purchase to the applied enamels and providing hints of stylistic flourish. Hughes, G. (1972) *The Art of Jewelry*. London, Studio Vista. p95.

^{xlvi} Pattern books can also bear historical testament to pieces of jewellery that were subsequently broken up for their constituent stones. Also, the fact that various custodians went to the trouble of conserving these books gives weight to the perceived value of the thinking constituted by the drawn jewellery designs.

^{xlvii} See Somers Cocks, A. G. (1980) *Princely Magnificence: Court Jewels of the Renaissance, 1500-1630*. London, Victoria and Albert Museum & Debrett's Peerage Ltd. p113-141. & Scarisbrick, D. (1979) *Pierre Woëriot: Livre d'Aneaux d'Orfevrerie*. Oxford, Ashmolean Museum.

^{xlviii} Hackenbroch, Y. (1979) *Renaissance Jewellery*. London, Sotheby Parke Bernet. p272.

^{xlix} Holbein's documentation of existing jewellery was an activity also undertaken by other artists including Hans Mielich. See Foister, S. (2006) *Holbein and England*. London, Tate Publishing. p83. Also Hackenbroch, Y. (1979) *Renaissance Jewellery*. London, Sotheby Parke Bernet, p272.

¹ Hackenbroch, Y. (1979) *Renaissance Jewellery*. London, Sotheby Parke Bernet. p157.

^{li} Digital scans of Hornick's designs for vessels and large hollowware can be viewed at http://mdzx.bib-bvb.de/codicon/Blatt_bsb00012873,00001.html?prozent=1 (Accessed 3rd January, 2010.)

See also Hayward, J. F. (1976) *Virtuoso Goldsmiths and The Triumph of Mannerism: 1540-1620*. London, Sotheby Parke Bernet. p243-251.

^{lii} Hackenbroch, Y. (1979) *Renaissance Jewellery*. London, Sotheby Parke Bernet. p160.

^{liii} Hornick was by no means unique in his use of lead patterns; it being a method in fairly broad usage at the time. See also: Hackenbroch, Y. (1979) *Renaissance Jewellery*. London, Sotheby Parke Bernet. p159.

^{liv} Hackenbroch, Y. (1979) *Renaissance Jewellery*. London, Sotheby Parke Bernet. p178-181.

^{lv} Stettiner, R. (1916) *Das Kleinodienbuch des Jakob Mores in der Hamburgischen Stadtbibliothek*. Hamburg, Staats und Universitätsbibliothek. See also Hackenbroch, Y. (1979) *Renaissance Jewellery*. London, Sotheby Parke Bernet. p209-210.

^{lvi} Somers Cocks, A. G. (1980) *Princely Magnificence: Court Jewels of the Renaissance, 1500-1630*. London, Victoria and Albert Museum & Debrett's Peerage Ltd. p128.

^{lvii} A strong parallel already existed between engraved jewellery designs and jewellery because the latter would often feature engraved surfaces that heightened surface decoration. In these cases, the tools and marks used to produce both were often virtually identical. However, the same cannot be said for the inked and watercolour drawings for which Mores became known.

^{lviii} Cellini, B. (1949) *The Life of Benvenuto Cellini*. Phaidon, London. p80.

^{lix} Cellini, B. (1967) *The Treatises of Benvenuto Cellini on Goldsmithing and Sculpture*. New York, Dover Publications. p2.

^{lx} Hackenbroch, Y. (1979) *Renaissance Jewellery*. London, Sotheby Parke Bernet. p151.

^{lxi} For detailed analysis on the guilds see: Hayward, J. F. (1976) *Virtuoso Goldsmiths and The Triumph of Mannerism: 1540 – 1620*. London, Sotheby Parke Bernet. p38-44.

^{lxii} Similar ideas were also elaborated by Cennino d'Andrea Cennini in his 'Book of the Arts'. Cennini, C.A. & Thompson, D.V. Jr. (1954) *The Craftsman's Handbook: "Il Libro dell' Arte"*. New York, Dover Publications.

^{lxiii} Cellini, B. (1967) *The Treatises of Benvenuto Cellini on Goldsmithing and Sculpture*. New York, Dover Publications. The third volume of Theophilus Presbyter's *De diversibus artibus*, C. 1100-1120, also focused extensively on goldsmithing.

^{lxiv} Hayward, J. F. (1976) *Virtuoso Goldsmiths and The Triumph of Mannerism: 1540-1620*. London, Sotheby Parke Bernet. p146.

^{lxv} Steingraber, E. (1965) *L'Arte del Gioiello in Europa*. Florence, Editrice Edam. p117.

^{lxvi} Steingraber, E. (1965) *L'Arte del Gioiello in Europa*. Florence, Editrice Edam. p121.

^{lxvii} Phillips, C. (2008) *Jewels and Jewellery*. London, V&A. p64.

^{lxviii} Mason, S. (2009) *Matthew Boulton: Selling what all the world desires*. New Haven & London, Birmingham City Council and Yale University Press. & Mason, S. (1998) *Jewellery Making in Birmingham: 1750-1995*. Chichester, Phillimore and Co. Ltd. p20-26.

^{lxix} Matthew Boulton archive, Birmingham Central Library, UK. The original pattern books of the Boulton and Fothergill firm (1762-1790) were eventually sold on to manufactures Elkingtons. They subsequently cut up the originals and reorganised them according to their needs, which has meant some of the contextual information and keys to the objects have been lost.

^{lxx} Bradford, E. (1953) *Four Centuries of European Jewellery*. London, Country Life Ltd. p169.

^{lxxi} According to Judith Miller, Stras, “explored the potential of a glass developed by an Englishman, George Ravenscroft.” Miller, J. (2003) *Costume Jewellery*. London, Dorling Kindersley. p20. Miller goes on to describe how paste stones, as well as precious ones, were often foil backed to force the reflection of light back through the gemstones to enhance their luminosity and sparkle. Stras was no exception in undertaking this operation, but he became so adept at working the substitute glass that his jewellery was valued in its own right; not simply perceived as a cheaper substitute for the real thing. So much so, that he was eventually appointed a court jeweller to the French king in 1734.

^{lxxii} Miller, J. (2003) *Costume Jewellery*. London, Dorling Kindersley. p20.

^{lxxiii} Clifford, A. (1971) *Cut-Steel and Berlin Iron Jewellery*. Bath, Adams & Dart. p31.

^{lxxiv} The distinctive colour of Berlin Iron Jewellery was achieved by applying linseed cakes to the piping hot parts upon their removal from the sand mould during the casting process. Phillips, C. (2008) *Jewels and Jewellery*. London, Victoria and Albert Museum. p72.

^{lxxv} Pinchbeck was invented by Watchmaker Christopher Pinchbeck in 1732. An alloy of copper and zinc, it was initially used to simulate gold in circumstances where theft might be a problem, such as stagecoaches. It eventually became valued in its own right. See: Bradford, E. (1953) *Four Centuries of European Jewellery*. London, Country Life Ltd. p169.

^{lxxvi} Perhaps the most famous objectors were John Ruskin and then William Morris, who, along with the wider Arts and Crafts movement, operated in parallel to the continuing production of costume jewellery. They rejected the anonymous look of repetitious forms to champion the role of the individual designer/maker in producing handmade artefacts. Many of the arguments central to their analytical debates were precipitated by the Great Exhibition in 1851, which showcased amongst other things, artefacts resulting from industrial mechanised production.

^{lxxvii} Gregoriotti, G. (1970) *Jewellery Through the Ages*. London, Hamlyn. p289.

^{lxxviii} The third volume of Theophilus Presbyter's *De diversibus artibus*, C1100-1120, focused on goldsmithing, reprinted in; Hawthorne, J.G. and Smith, C.S. (1963) *Theophilus: On Divers Arts*. Chicago, University of Chicago Press. & Cellini, B. (1967) *The Treatises of Benvenuto Cellini on Goldsmithing and Sculpture*. New York, Dover Publications.

^{lxxix} Raulet, S. (2002) *Art Deco Jewellery*. London, Thames and Hudson. p173.

^{lxxx} Raulet, S. (2002) *Art Deco Jewellery*. London, Thames and Hudson. p255.

^{lxxxi} Weiss-Weingart, E. (2006) *Ebbe Weiss-Weingart 1947-1998*. Hanau, Sammlung Deutsches Goldschmiedehaus. p22, 23.

^{lxxxii} van Leersum, E. (1979) *Emmy van Leersum*. Amsterdam, Stedelijk Museum. Unpaginated (p5).

^{lxxxiii} van Leersum, E. (1979) *Emmy van Leersum*. Amsterdam, Stedelijk Museum. Unpaginated (p2-3).

^{lxxxiv} Turner, R. (1976) *Contemporary Jewellery: a critical assessment 1945-1975*. London, Studio Vista. p160.

^{lxxxv} van Leersum, E. (1979) *Emmy van Leersum*. Amsterdam, Stedelijk Museum. Unpaginated (p5).

^{lxxxvi} van Leersum particularly valued stainless steel because of its resistance, and its capacity to be bent, whilst retaining that shape without solder. Turner, R. (1976) *Contemporary Jewellery: a critical assessment 1945-1975*. London, Studio Vista. p160.

^{lxxxvii} Turner, R. (1976) *Contemporary Jewellery: a critical assessment 1945-1975*. London, Studio Vista. p160.

^{lxxxviii} On removal the implant was inserted into the casket shaped bezel of a ring.

^{lxxxix} Drutt, H.W. & Florian Hufnagl, F. (2001) *Peter Skubic: Between*. Stuttgart, Arnoldsche. p133.

^{xc} Around this time, another jeweller had begun to extend the potential for jewellery to flow seamlessly around the body. Tone Vigeland constructed neckpieces and collars similar to chain mail. Consequently, her linked works adapt to, and move around the body's complex geometry, making light work of the complex joints that simultaneously move in multiple directions. Accordingly, it also follows that the wearer can modify the work by moving their body, thereby creating a symbiotic relationship between the work and any bearer. Therefore, Vigeland's pieces often seem a universal response to the 'body' as a paradigm, rather than being designed for a specific individual. The same cannot be said of Gerd Rothmann, who in contrast, appears fascinated by the characteristics and geometry of the individual. His early works, such as the *Ear Pieces* of 1983, fill the inner ear cavity, or extend the earlobe with prosthetic like appendages. The site of display and the content of the work therefore become one. Subsequent works systematically mapped body parts synonymous with identification such as fingers and hands, often cast directly from the commissioner. Eventually, signature works emerged where finger print impressions are cast from the client and translated into jewellery, albeit of a more conventional type.

^{xcⁱ} Giuseppe Uncini noted how, "my pieces of jewellery remain distinct from the imagery of my sculpture... However, this is not the rule for artists wishing to make jewellery. The works of major artists like... the Pomodoro brothers demonstrates this; the techniques and imagery of their sculptures is found in all the techniques and imagery of their jewellery." (My translation) - Cerritelli, C. & Somaini, L. (1995) *Gioielli D'Artista in Italia 1945-1995*. Electa, Milan. p163.

^{xcⁱⁱ} Joris, Y. & van Zijl, I. (2006) *Gijs Bakker and Jewelry*. Stuttgart, Arnoldsche. p160.

^{xcⁱⁱⁱ} Künzli's work has echoes of Yves Klein's performance work *Zone of Immaterial Pictorial Sensibility*, 1962. Klein sold a specially designed certificate to the buyer; he then bought gold with the money before finally throwing the flakes of gold back into the river Seine. It was a symbolic ritual, intended to return gold back to the earth from whence it came.

^{xc^{iv}} Künzli, O. (1991) *The Third Eye*. Amsterdam, Stedelijk Museum. p20.

^{xc^v} The founder members of *Bond van Ontevreden Edlesmeden* (BOE) included Marion Herbst, Onno Boekhoudt, Françoise van den Bosch, Karel Niehorster and sculptor Berend Peter Hogen Esch.

^{xcvi} Joris, Y. (2000) *Jewels of mind and mentality: Dutch jewellery design 1950-2000*. Rotterdam, 010 Publishers. p32.

^{xcvii} Becker, F. (1997) *Friedrich Becker: Jewellery - Kinetics objects*. Stuttgart, Arnoldsche. p89.

^{xcviii} See Jünger, H. (1996) *Hermann Jünger: Über Den Schmuck Und Das Machen Neue Goldschmiedearbeiten*. Munich, Anabas-Verlag.

^{xcix} Jünger, H. (1996) *Hermann Jünger: Über Den Schmuck Und Das Machen Neue Goldschmiedearbeiten*. Munich, Anabas-Verlag. p136-137.

^c Jünger, H. (1996) *Hermann Jünger: Über Den Schmuck Und Das Machen Neue Goldschmiedearbeiten*. Munich, Anabas-Verlag. p125. In the same statement, Jünger goes on to castigate the technical doctrines of Cellini's treatise on goldsmithing and Theopilus Presbyter's *Schedula Diversarium Atrium* because they both imply, "making is reduced to the technical application necessary to give body to the artefact." p126.

^{ci} Jünger, H. (1996) *Hermann Jünger: Über Den Schmuck Und Das Machen Neue Goldschmiedearbeiten*. Munich, Anabas-Verlag. p127.

^{cii} Grassetto, G. F. (2007) *The Padua School: Modern Jewellery from Three Generations of Goldsmiths*. Stuttgart, Arnoldsche.

^{ciii} The title of the essay is taken from an observation by Peter Skubic about the wearing of jewellery, in which he sagely and dryly notes:

'Jewellery does not only have to be worn, but also needs to live long. Most of all jewellery is not worn, but lays around in factories, sits in the showcases of goldsmiths, hangs on walls, lays around in drawers, is locked in security containers, lays in galleries or degenerates in museums. Jewellery is also buried, thrown away, lost and fused again; but jewellery can be worn too'.

Roberta Bernabei, *Contemporary Jewellers: Interviews with European Artists* (Oxford, 2011), pp. 203-204.

^{civ} Oliver Impey & Arthur MacGregor, Ed. *The Origins of Museums: The cabinet of curiosities in Sixteenth and Seventeenth Century Europe* (Oxford, 1985), pp. 123.

^{cv} For further information on the formation of museum culture in Britain, see Lisa Jardine, *Ingenious Pursuits* (London, 1999), Ch.6. This includes discussions of the Ashmolean Museum of Oxford University, an institution prompted by Elias

Ashmole's bequest of his cabinet of curiosities; itself comprising objects acquired from the earlier collection of John Tradescant the Elder.

^{cvi} Another striking example is the Teylers Museum in Haarlem, the Netherlands. Built at the behest of Pieter Teyler van der Hulst, whose will stipulated the establishment of a foundation to help promote the arts and sciences and their inter-relationships. The executors commissioned a building to house a museum. As well as bookshelves, its central oval room holds several large showcases to display the scientific and mineralogical holdings. Designed by Leendert Viervant in 1784/85, the strikingly long central display cabinet incorporates a stepped and sloping glazed top, as well as glass covered draws to augment display space. Two additional hexagonal glass and wood cabinets followed in 1792 to allow viewing in the round of the collection of celestial and terrestrial globes; along with pyramid cabinets for the display of mineral samples some 10 years later.

^{cvii} Tony Bennett, *The Birth of the Museum: History, theory, politics* (London, 1995), pp. 20-21.

^{cviii} See also the Pitt Rivers Museum in Oxford, with its plethora of elaborate draw-filled vitrines; an exemplar of public display under and behind glass.

^{cix} Kajsa Lindberg & Daniela Hedman (2006) *Jewellery Talk: Interviews 2006*. Film - www.jewellerytalk.se last accessed 15.05.2013

^{cx} Ted Noten via email to the author. 04.09.2012

^{cxii} Christoph Zellweger, *Christoph Zellweger: Foreign Bodies* (Barcelona, 2007), pp. 126.

^{cxiii} Christoph Zellweger, *Christoph Zellweger: Foreign Bodies* (Barcelona, 2007), pp. 126.

^{cxiiii} Christoph Zellweger via email to the author 14.01.2013

^{cxv} Ursula Ilse-Neuman via email to the author 26.07.2011

^{cxvi} Roberta Bernabei, *Contemporary Jewellers: Interviews with European Artists* (Oxford, 2011), pp. 63-64.

^{cxvii} Roberta Bernabei, *Contemporary Jewellers: Interviews with European Artists* (Oxford, 2011), pp. 79.

^{cxviii} Ralph Turner, *Contemporary Jewellery: A Critical Assessment 1945–1975* (London, 1976), pp. 126.

^{cxix} Otto Künzli, *Otto Künzli: The Third Eye* (Amsterdam, 1991), pp. 40.

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- ^{cxix} Otto Künzli, *Otto Künzli: The Third Eye* (Amsterdam, 1991), pp. 40.
- ^{cxx} Ted Noten, *CH₂=C(CH₃)C(=O)OCH₃ Enclosures and Other TN's* (Rotterdam, 2006), pp. 216.
- ^{cxxi} Ineke Heerkens via email to the author 13.01.2013
- ^{cxxii} Diogo Alves via email to the author. 26.02.2015
- ^{cxxiii} Diogo Alves via email to the author. 26.02.2015
- ^{cxxiv} www.museumaker.com/projects/modern-jewel last accessed 14.05.2013
- ^{cxxv} See also Ellen Lupton, 'Framing: The Art of Jewelry'. *Metalsmith*, 27/4 (2007): pp. 54-55.
- ^{cxxvi} Ruudt Peters in conversation with the author via Skype 21.05.2013
- ^{cxxvii} Ruudt Peters in conversation with the author via Skype 21.05.2013
- ^{cxxviii} Ruudt Peters in conversation with the author via Skype 21.05.2013
- ^{cxxix} www.tednoten.com/work/projects/wanna-swap-your-ring-tokyo last accessed 16.02.2015
- ^{cxix} Arline Fisch in conversation with the author via Skype 10.02.2011
- ^{cxxxi} Liesbeth den Besten, *Change* (Amsterdam, 2002), pp. 3 of essay *All is not What it Seems* – book is otherwise unpaginated.
- ^{cxixii} Liesbeth den Besten, *Change* (Amsterdam, 2002), pp. 4 of essay *All is not What it Seems* – book is otherwise unpaginated.
- ^{cxixiii} Liesbeth den Besten, *Change* (Amsterdam, 2002), pp. 4 of essay *All is not What it Seems* – book is otherwise unpaginated.
- ^{cxixiv} Liesbeth den Besten, *On Jewellery: A compendium of international art jewellery* (Stuttgart, 2011), pp. 52.
- ^{cxixv} www.youtube.com/watch?v=n7ufguFBBRE last accessed 16.02.2015
- ^{cxixvi} Gijs Bakker discussed the production of the work, noting: 'It was in the period around Easter time, so there were a lot of pictures in the newspapers of Jesus Christ. In those days Fritz Maierhofer often had long hair, a little beard and was very pale so he looked like Jesus Christ. And then and with great fun I made that piece, we took a photo and it came out in the local newspaper - it had a kind of title like 'Here is the

new Jesus!', or something like that'. Gijs Bakker in conversation with the author, 16.05.2008.

^{cxxxvii} Ralph Turner, *Contemporary Jewellery*, pp. 168.

^{cxxxviii} Stefania Macioce, *Ori nell'Arte: per una storia del potere segreto delle gemme* (Rome, 2007)

^{cxxxix} Frances Walsh, *Eye-Catch: Jewellery and Photography* (Auckland, 2011), pp. 6 – exhibition pamphlet.

^{cxl} Warwick Freeman in conversation with the author via Skype 15.02.2011

Warwick Freeman, *Owner's Manual* (Auckland, 1995)

^{cxli} This and associated issues, including the actual inclusion of photography as a material in jewellery and its role as a research aid, are extensively explored in chapter 2 of Liesbeth den Besten's *On Jewellery* (Stuttgart, 2011), pp. 33-45.

^{cxlii} Christoph Zellweger via email to the author 11.12.2012

^{cxliii} www.artjewelryforum.org/ajf-blog/original-display Last accessed 16.02.2015. See also www.youtube.com/watch?v=Lj9Qtz-K0hU last accessed 16.02.2015

^{cxliv} www.artjewelryforum.org/interviews/namita-gupta-wiggers-conversation Last accessed 16.02.2015

^{cxlv} <http://vores.kunst.dk/aboutjewelry> last accessed on 22.02.2015

^{cxlvi} www.shapeways.com last accessed 16.02.2015

^{cxlvii} <http://thespace.org/items/p0000hg6> last accessed 16.05.2013

^{cxlviii} www.klimt02.net & www.artjewelryforum.org last accessed 16.02.2015

^{cxlix} www.grayareasymposium.org/blog last accessed 16.02.2015

See also, Martha Lawrance Camargo & Analya Céspedes, *Gray Area Gris: contemporary jewellery and cultural diversity* (Mexico City, 2010)

^{cl} www.handshakejewellery.com last accessed 16.02.2015

See also, Peter Deckers & Mary-Jane Duffy, *Handshake: 12 contemporary jewellers connect with their heroes* (Wellington, 2013)

^{cli} Lindberg & Hedman, *Jewellery Talk, : Interviews 2006*. Film -
www.jewellerytalk.se last accessed 15.05.2013

^{clii} Ted Noten via email to the author. 04.09.2012

^{cliii} Ruudt Peters in conversation with the author via Skype 21.05.2013

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^{clvi} Ted Noten via email to the author. 04.09.2012

^{clvii} Christoph Zellweger via email to the author 11.12.2012