The imprint – unforeseeable and unaccountable

Florian Roithmayr

The Slade School of Fine Art

UCL

PhD

2017

I, Florian Roithmayr, confirm that the work presented in this thesis is my own. Where information has been derived from other sources, I confirm that this has been indicated in the thesis.

I want to acknowledge my gratitude to Sharon Morris, for starting this all by fuelling my curiosity seventeen years ago, and for stepping back in to shape this project, for her trust and encouragement, for being an inspiring teacher, artist and person: I feel immensely privileged to hear her voice, to be learning from her example and guidance.

I want to acknowledge my gratitude to Karin Ruggaber for so generously sharing her attention with me, for looking together, for walking along the different Lehrpfade together for a while, and for showing me how to find cracks in foundations.

I want to acknowledge my gratitude to Victor Buchli for encouragement and trust, for looking at details and the larger picture, for long discussions in the office, and for all those transformations.

Thank you to Hayley Newman for always giving the best advice, Stevania Gerevini for the miraculous and showing me lightness, to Susan Norris for the weather, to Nicole Hewitt, Kristen Kreider, David Williams, Patricia Pinsker and Declan Wiffen for questions, for advice and counsel, for reading and suggestions.

I also extend my gratitude to all who helped and supported these investigations, especially
Donna Lynas and Lotte Juul-Peterson from Wysing Arts Centre, Gareth Bell-Jones from Flat Time House, Gina Buenfeld, Sophie Williamson and Jenni Lomax from Camden Arts Centre, Matt Packer from CCA Derry-Londonderry, Rupert Norfolk from Bloomberg Space, Sam Basu from Treignac Projet, Guillaume Breton from Rowing Projects, Racheal Dann, Helen Wicksted and Melanie Jackson for taking me to Sudan, Carol Baugh, Laura Speranza, Claudia Corti, Chiara Nepi, Viorel Bratin, Ben Robertson and Andrea Felice for talking to me, the British School in Rome, Leonie Hannan and Kate Smith for the 100 Hours Project, Sara Cluggish and Laura Sillars from Site Gallery, Pavel Pys, Matthew Cheeseman, and the Order of the Third Bird.

ABSTRACT

This research project examines the imprint connecting mould and cast: the interstitial space hidden out of sight between materials, forms and shapes.

The questions I'm asking are how this interstitial space comes into existence, what takes place and what is produced there?

Mould and cast often appear as separate and distinct stages of form and counter-form within a sequence of events. This might be a consequence of postproduction symbolization, caused by attempts to fix the imprint through language, by singling out and arresting moments that are really part of flowing networks, or by an over-emphasis on resemblance and recognition.

I will formulate an alternative approach drawing on C. S. Peirce's triadic constellation of the sign, Alfred Gell's discussion of intention within relations, and Alexander Cozen's description of chance in blotting with ink: the ambition of this project is to research, generate and present the imprint as an occurrence in the interstice forming a third, miraculous and highly generative ground.

This research is generated through a practice-led methodology, though studio-based investigations of moulding and casting processes in a variety of materials, and through field-studies in archeological excavation, conservation and pedagogy. Starting with Cennino Cennini, I test the possibilities and limits of the description of imprinting techniques from the perspective of artists, makers, observers and historians, set in relation to my own accounts of approaching and describing activities involving materials.

As a contribution to the contemporary discussion of sculpture, this research aims to offer new ways of presenting the imprint occurring in the interstice between mould and cast as a result of formations and processes of transformation that cannot be named, but have instead the potential to accumulate and become sculpture.

Table of contents

Table of visual contents

I don't feel like it:
The Indifference of Objects
Camberwell Space, London

4 December 2012 – 25 January 2013

An exhibition at Camberwell College of Art, organised by Florian Roithmayr with Caroline Achaintre, Jacques-André Boiffard, Jess Flood-Paddock, Alex Heim, Hillary Koob-Sassen and Karin Ruggaber.

The artists invited to take part have in previous works referred to discarded car parts, biological or financial structures, animated clocks, Chinese rice crackers or Dalston night clubs.

Included in the exhibition are also seven photographs by Jacques-André Boiffard, which appear in the magazine 'Documents'. Boiffard's work is unusual in its close link with the magazine, and particularly with Bataille's writing, leaving no trace of an existence beyond it. The photographs seem to accompany the text in ways that tell how things appear – rather than what they mean.

The exhibition is accompanied by a publication with texts by Florian Roithmayr, published by Camberwell Press.

Altamira reproduction
Deutsches Museum, Munich

February 2013 – ongoing

Investigation of the casting process of replicating the ceiling of the cave of Altamira in the Deutsche Museum in Munich during the 1950s and 60s.
The fabrication process can be summarized into the following stages:
- the original ceiling in Altamira was measured using photogrammetric processes;
- the resulting stereoscopic photographs were translated into contour lines, and a map to the scale of 1:25 was produced;
- using a pantograph and router, the contour lines of the map were scaled up and transferred into one square metre plaster blocks, with each increment representing a 1cm contour difference;
- 45 plaster blocks were assembled on the floor to form the 45 square metre segment of the cave ceiling, but facing upwards, rather than downwards;
- a thin layer of plasticine was applied to register even more detail;
- the whole positive segment was moulded in silicone rubber and fibre strands;
- the silicone was stabilized with a plaster finish and a levelling wood construction;
- turned 180 degrees, moved into the correct position and raised to its intended height, the ceiling replica was cast into the mould using a concrete cement mixture that resembled the original Altamira rock minerals as closely as possible;
- the cast was de-moulded, and the surface painted with substances similar to those found in the Altamira cave;
- the mould and all necessary materials were shipped to Madrid, and the process was repeated there.

The preparation and execution of this project lasted over ten years. The replica in Munich was inaugurated and opened to the public in 1962. Research in the archives of the museum and investigation of the reproduction.

Arrest
Wysing Arts Centre
Cambridgeshire

March – April 2013

A two-month research project in collaboration with Ben Robinson, a professional car-wrapper at Cambridge-based *Ultimate Auto Tints*. This project was based on investigation and analysis of processes of applying specially developed vinyl to completely re-surface the body of cars and tint the windows. This research was based on observing the application process, participating in the specific working environment and engage in the scene surrounding car-wrapping or car-pimping.

This research was hosted and facilitated by Wysing Arts Centre, who also commissioned a new sculpture work: Arrest (2013), which transformed the centre's Renault Kangoo car.

Concrete Cosmetics

May – July 2013

A three months work placement as assistant of Viorel Bratu, who is the main concrete beautician of Luehn Bau GmbH & Co. KG, a German construction company based in North-West Germany. During this engagement, we worked together on 16 construction sites and travelled approximately 6000 kilometres. We worked together from Monday morning 4am till Friday afternoon 5pm. We lived together in container camps on the various sites.

Concrete cosmetics is a rendition of concrete cement surfaces in a post-production process: the demand for high quality, fair-faced and exposed concrete surfaces far exceeds the technical abilities of delivering such finishes, and concrete cosmetics is an alternative process of achieving an immaculate finish after the walls and ceilings in building sites have already been cast.

Concrete cosmetics, performed by a concrete beautician, is a post-production restoration treatment of concrete surfaces intended to remain untreated and un-rendered architectural elements.

Recent considerations in architectural planning acknowledge that an exposed concrete façade is a cost effective alternative to plastering. It has also seen an aesthetic revival following from the abundant use of exposed concrete between the 1950s and 80s. What differentiates this new attitude towards façade finishes to its precursors in brutalist architecture is the degree of finish: the concrete is expected to be a smooth, immaculately cast surface that almost resembles polished stone. This is called facing concrete, or fair-faced concrete. And in order to introduce a system of standardization, the degrees of finish have been divided into four categories, ranging from fair-faced 1 to fair-faced 4, with 4 being the highest possible degree of finish.

The demand for finish far exceeds what is – in most cases – technically achievable.

Nahal Mishmar Project
UCL

October 2013 – July 2014

The Nahal Mishmar Project was the first interdisciplinary research project between the two UCL departments: the Slade School of Fine Arts and the Institute of Archaeology. This research explored the lost-wax casting process through a detailed study of its first known application: the bronze cast objects dating from the Chalcolithic period forming the Nahal Mishmar Treasure.

The project involved Professors Ed Allington and Marcos Martinon-Torres, special advisors Melanie Counsell, Lilah Fowler, Ian Freestone, Yuval Goren, and technical advisor Giles Corby.

The collaboration was with research assistant Agnese Benzonelli from the Institute of Archaeology.

I don't feel like it:
The Indifference of Objects
Camberwell Space, London

Thursday 10 February 2013

This symposium is organized by Florian Roithmayr in spatial and temporal proximity to the exhibition.

Invited speakers include:

Asif Din, Eco Architect: 'The significance of embodied energy in buildings'.

Gregorie Currie, Professor of Philosophy, Nottingham University: 'Empathy for Objects'.

Roger Lemon, Professor at the Institute of Neurology, UCL: 'Mirror Neurons and Movement, Self and Other'.

Sharon Morris, Artist: 'Gospal Oak'.

Tim Spooner, Artist: 'Telescope'.

Altamira reproduction
Museo Arqueológico Nacional, Madrid

March 2013 – ongoing

Investigation of the casting process of replicating another copy of the ceiling of the cave of Altamira in the Museo Arqueológico Nacional during the 1950s and 60s. The replica in Madrid was opened in 1964 in a specially constructed underground chamber in front of the museum's entrance. The same building also houses the Biblioteca Nacional de España, where Dr. Jules Piccus discovered Leonardo da Vinci's Madrid Codices I–II (I – Ms. 8937 i II – Ms. 8936) in 1965, in which he develops detailed analysis of how to cast a horse.

All the materials to re-produce the cave ceiling in Madrid were transported from Munich to Spain. The silicone mould used was stored for several years in the basement of the Palacio de Cristal in Madrid, after which no more mention of the mould's whereabouts can be found.

Research in the archives of the Museo Arqueológico Nacional and the Palacio de Cristal.

Treignac Projet
France

July – September 2013

A three months residency in Treignac Projet, Limosin.
The art centre's buildings are surrounded on three sides by the Vézère river. I spent the time exploring caves in the Vallée Vézère, Grotte de Rouffignac, Lascaux II, Grotte de Font-de-Gaume, Abri de Cap Blanc, Gouffre de Proumeyssac, Les Grottes de Maxange, Gouffre de Padirac, Grotte de Villars, Grotte de Cougnac at Payrignac, Les Eyzies de Tayac.

100 Hours project
UCL

September 2013 – July 2014

100 Hours is an interdisciplinary project, which, over one year, will use innovative and collaborative methods to realise new research directions for the study of material things in contemporary and historical society. The 100 Hours research team will focus closely and individually on a selection of objects – chosen from UCL Museum collections – and through discussions with specialists will create a series of innovative research 'responses'. In harnessing the analytical power of individual 'close looking' and the intellectual versatility of collaborative research this project breaks new ground for the study of material culture: identifying future questions for object-centred research and offering methodologies capable of providing answers. The project is led by early career researchers, Leonie Hannan and Kate Smith, and advised by Margot Finn, Simon Werrett and Ludovic Coupaye and brings together a team of ten early career collaborators: Katy Barrett, Tullia Giersberg, Liz Haines, Elin Jones, Juliette Kristensen, Sarah Longair, Emily Marshall-Orr, Matthew Paskins, James Paz, and Florian Roithmayr. Collectively, the 100 Hours team represent 11 academic fields: History, History of Science, Anthropology, Geography, English Literature, Cultural and Critical Studies, Material and Visual Culture Studies, Philosophy, Fine Art, History of Art, and Design History and 13 organisations: the V&A, Science Museum, National Maritime Museum, British Museum, UCL, KCL, QMUL, RHUL, Goldsmiths, Cambridge, Princeton, Kent, the Shakespeare Institute, Birmingham.

My focus was on teaching models and the role empathy or even love could play in material knowledge transmission or exchange. I investigated foraminifera models from the Grant Museum of Zoology. I tried to articulate my interest in models used as teaching aids for demonstration and study purposes. I was testing a variety of different styles and forms of encountering, analyzing and describing.

Index reading group
UCL

September 2013 – September 2015

I started this reading group at the Slade School of Fine Art in September 2013, with a focus on close reading of writings by C. S Peirce, as well as references to his ideas in other writing.

International El Kurru Archaeological Project
Sudan

February 2014

The International Kurru Archaeological Project (IKAP) is a collaborative project co-directed by Dr. Geoff Emberling (University of Michigan), Dr. Rachael J Dann (University of Copenhagen) and Professor. Abbas Sidahmed Mohammed Ali (University of Dongola, Karima), and comprises three related components. Dr. Geoff Emberling's team have begun work to re-locate elements of the town site. Dr. Rachael Dann's team are investigating areas in and around the royal cemetery, and in particular the painted tombs. Professor Abbas Sidahmed Mohammed Ali has begun work to remove Reisner's spoil heaps, and re-excavate some of the royal tombs. In collaboration with the National Council of Antiquities and Museums (NCAM), and the people who live in the modern village at El Kurru, the team are working on a Site Management plan, to facilitate future access to the archaeological site, whilst protecting it the long-term.

The Art, Archaeology and Sensory Knowledge Project (AASK) is part of our interdisciplinary research, and has been running concurrently with the International Kurru Archaeological Project.

This work was established in collaboration with Dr Helen Wickstead of Kingston University, London. Melanie Jackson and Florian Roithmayr came to the site in 2014: Three weeks recording sounds of the excavation site and the archaeological practice and collecting conversation diary.

Freeman College
Sheffield

March 2014 – ongoing

Freeman College is an educational trust for students who do not fit into mainstream eduction, housed in a former cutleryworks and the nearby High Riggs market garden in downtown Sheffield. Students at Freeman draw upon the rich history of the area and learn the crafts of metallurgy and forging.
I work with students in the metal work, facilitated by curator Carol Baugh.

Andrea Felice
Rome

October – December 2014

Andrea Felice is a third generation plaster mould and cast maker, working in the family workshop on the outskirts of Rome and also as conservationist in the Musei Vaticani, Roma.
Several site visits and recorded interviews in the casting workshop.

Matter of Engagement
Site Gallery, Sheffield

4 – 29 MARCH 2014

Matter of Engagement, Florian Roithmayr's Platform residency, considers how we learn through action and experience rather than instruction. Florian is interested in the limits of language and the relationships of trust that people form when working side by side, sharing skills.

Last year, the artist worked as an apprentice to 'concrete beautician' Viorel Bratu on a number of construction sites in Germany. For his residency at Site Gallery, Florian invites Viorel to work with him on the construction of a delicate yet large-scale, 4 mm thick concrete wall in the gallery. This is a process similar to painting a mural or fresco, where a surface fantasy, a near flawless version of concrete, is strived for. Visitors will be able to see the evolution of the wall between 11 – 21 March, when Florian and Viorel will work together.

Before beginning construction, Florian will embark upon several field trips across Sheffield, talking to educators and researchers to explore a variety of alternative educational models. These conversations will be recorded and made available in a research room, adjoining the main gallery. This space is open daily to the public, with a large, circular table designed to encourage group discussion.
In the final week of the residency, museum professionals will lead discussions in the gallery focusing on historical objects from their collections. It is thought that these items were originally designed as teaching aids but in some cases their intended uses may have been misconstrued through the years. Join us as we collectively explore these tools of the learning process.

Michael Polanyi

July 2014 – ongoing

Observation plays an important part in different kinds of knowledge exchange. And often, the key to transmitting and acquiring specific procedural knowledge is not just observation, but to engage and participate fully, to copy, to imitate, a proliferation of gestures and conduct. Tacit concepts refer to expressions of knowledge by individuals as difficult to communicate to others via words and symbols, which Michael Polanyi has described as the ability to 'know more than we can tell' . 'Tacit knowledge' refers to abilities that might not be fully communicated, exchanged or articulated by verbal or written means: they operate outside of the symbolization of language, but might be embodied instead There are far reaching consequences to this model of knowledge and the mechanism of exchange they entail or exclude.

In co-operation with Dr Matthew Cheeseman, lecturer in English at Sheffield University, I investigate these consequences of 'tacit knowledge' through close reading of Polanyi's ideas and their relevance: We gave several presentations, group seminars and workshops together over the next three years, for example at Wysing Art Centre's FUTURE CAMP programme 2014.

service
MOT International, Brussels

January – March 2015

Florian Roithmayr's work explores a concern for activities and relationships that shape environments, supported by his investigation of empathy in various forms of production, including archaeology, conservation or pedagogy. He is known for a diverse practice often emphasizing the process of moulding and casting as both documentary and transitory exchange that leaves subtle traces. Central to these processes is the peeling open of layers to reveal the generative gap between shapes, surfaces and materials that form and yield another. In this hidden and unobserved space, the gesture of contact and touch continues to reappear and proliferate throughout the history of sculpture.

SERVICE refers to the inconsistency between intangible engagements that produce no concrete material results and the substantial inventory needed to assist and sustain exchanges or provisions. The set of actions and solutions to deliver services are often incongruous to any clear outcomes; their speed doesn't allow language to attach itself to their performance; and their benefits might be postponed indefinitely. The residues left by such activities often appear slight and indistinct.

The past years have seen Roithmayr's practice informed by long periods spent as apprentice in concrete restoration, in car alteration industries or on excavation sites in the Sudanese desert. For this exhibition of new works, Roithmayr draws on these secluded and intimate engagements. The work in this exhibition focus on the shifting materiality that facilitates and registers actions and solutions to perform the transfer of assistance or the delivery of repair and upkeep, and their combined transitive potential for art. These are slowed down forms of production; they often require intense attention and commitment without any definite aims.

Museo di Storia Naturale Sezione di Zoologia La Specola
Firenze

October – December 2014

Site visits and interviews with Dott.ssa Claudia Corti del Dipartimento di Zoologia del Museo La Specola di Firenze, with a focus on the wax anatomicals by Gaetano Giulio Zumbo and Clemente Susini, and especially in view of the recently re-discovered plaster moulds used to produce the wax anatomicals.

Museo di Storia Naturale
Università Degli Studi di Firenze

October – December 2014

Several site visits and interviews with Dr. Ciara Nepi, main curator of the Museo di Stroria Naturale, exploring the collection of plaster casts of mushrooms by Jean-Baptiste Barla, and the ceroplastici collection of casts of plants, fruits and vegetables by Gaetano Giulio Zumbo, Clemente Susini, Francesco Calenzuoli, Giuseppe Ricci, Luigi Calamai and Egisto Tortori.

Opificio delle Pietre Dure
Firenze

October – December 2014

Several site visits and interviews with Direttore del Settore Restauro Materiali ceramici e plastici Dott.ssa Laura Speranza and Direttore Tecnico Dott.ssa Rosanna Moradei, with a focus on the restauration of wax and plaster works.

Things That Tumble Twice
Tenderpixels, London

March – May 2015

The exhibition Things That Tumble Twice looks at the sphere of duality. It recalls ideas of juxtaposition, complementarity and interrelated parts (i.e. matter and its absence, light and darkness, signifier and significant, thesis and antithesis, animate and inanimate objects, 0s and 1s, yin and yang). On the other hand, and at the same time, the exhibition in its entirety is informed by the principle of multiplicity as becoming and unity - as something that cannot be described as the sum of its parts or qualities but simply as an irreducible whole (i.e. complex systems, hermeneutic circle, organicism, life, a cloud).

The works in the exhibition change, mutate, perish; they look for each other over space and time, subtly, inhabiting and influencing the perception of the gallery ambients. In other words, the pieces in Things That Tumble Twice articulate the possibilities between a hypothesis of infinite divisibility - or the absence of a continuum, and a concept of substance which is intended instead as multiplicity, and where essence is replaced by event. In this context, will meaning be created through reduction to minimal terms, sets and oppositions, or does it instead consist in the process of interconnectivity, the tension between more parts of an entity?
The works float in and out from all these different statuses, yet intertwining fields, becoming 'something that shows itself to the senses and something other than itself to the mind'.*

** – Augustine, 'Signum est quod se ipsum sensui et praeter se aliquid animo* osten-

with, and, or, without
Camden Arts Centre, London

December 2015 – March 2016

Florian Roithmayr presents a new body of sculptural works which observe material transformations in the processes of making. Capturing the unexpected gestures that occur in the interstice between mould and cast, the sculptures embody the consequences of one surface, material or body yielding another. The configuration of the exhibition changes daily at the inclination of the front of house team as Roithmayr sets up parameters before relinquishing control of the works.

Interested in labour that renders itself invisible upon completion, Roithmayr has undertaken intensive internships, shadowing engineering specialists such as a car surface decorator and a concrete beautician, who manipulate materials to perform beyond their physical expectations. The sculptures act not as discrete objects but as representations of an accumulation of research, process and production.

breath rider
Camden Arts Centre, London

March 2016

A shared live investigation of the acts of inscribing and evoking: two stone masons addess four pieces of rock through text, either in the act of inscribing the words or through evoking them:

do I write you
here
or draw on flying
dust

awoken by blows
open a mouth
and speak to me

do I write you
here
or draw on flying
dust

awoken by blows
open a mouth
and speak to me

ir re par sur
Bloomberg SPACE, London

January – April 2017

For this new commission, Florian Roithmayr has transformed the architecture of Bloomberg SPACE to present an aggregate of his research into material interactions at an unprecedented scale. Roithmayr's gestural sculptures curl and bend over themselves as if they might envelop the viewer's body. Poised between raw material and expressive form, these works articulate the tensions between their interior and exterior surfaces. This material precariousness produces inflections as indeterminate as the wordless prefixes that make up the exhibition title - ir re par sur.

Prague Quadrennial
Czech Republic

February 2016

I organised a four day retreat to share and to learn about curiosity. I invited the following participants to a castle in the Czech Republic, hosted and facilitated by the Prague Quadrennial:

Grahamn Burnett, Princeton University, New Jersey
Carin Goldberg, Cooper Union, New York
Rachael Dann, University of Copenhagen, Copenhagen
Stefania Gerevini, University Bocconi, Milan
David Williams, Royal Holloway, London
Nicole Hewitt, Zagreb Academy of Art, Zagreb
Katarzyna Kasia, Warsaw Academy of Arts, Warsaw
Gareth Bell-Jones, Flat Time House, London

Foreign Objects
CCA Derry - Londonderry

August 2016 – October 2016

Foreign Objects is an exhibition of works by Robert Anderson, Laura Eldret, and Florian Roithmayr; artists that are interested in the material consequences of the physical body and its social interactions.

Florian Roithmayr's sculptural work embraces the unexpected consequences of one material being set in relation to another. A range of materials with competing properties (foam, clay, steel, concrete, paper) imprint themselves upon one another through processes of moulding, casting, dry-setting and gravitational contact. Among his works for Foreign Objects are sculptures that have been produced on-site at CCA over an 8-day period, which – like other works in the exhibition – carry the traces of human-object and inter-object exchange that has been shaped over time.

PREFACE

The ambition of this project is to research, generate and present the imprint as an unforeseeable and unaccountable occurrence in the interstice connecting mould and cast.

By imprint I mean the meeting and separation of several elements, the production in this encounter of one form or configuration through another, the potential of a direct physical transfer; the shared, existential, or conventional connections established between a model, the mould taken from it, and the shape, surface and volume it calls forth in the cast produced in it; the consequences of touch, reaching out, being in contact; the possibility to proliferate, be distributed and form genealogy. The operation or performance of the imprint indicates an approach, an adjustment and a separation, similar to making marks or leaving traces behind. The imprint, in short, is the drive, action and consequence of one surface, material or body, yielding another.

By unforeseeable I mean surprising, unexpected and unpredictable developments. There are no prophecies to be found. Progress is disordered, interrupted, non-linear: it is difficult to establish, and recapitulate a chronological or sequential trajectory. As an operation, there are not always clearly identifiable precursors, and one cannot immediately imagine successors; aims and objectives are postponed indefinitely; results remain to be seen at a later stage. The motivation is often based on heuristic discovery rather than recognition. Evaluation based on resemblance appears inappropriate. Situated in the dark, underground, or the periphery, the unforeseeable is often secluded, withdrawn to the point of invisibility, and has its own kind of public.

By unaccountable I mean occurrences and events that develop and unfold so quickly that words cannot be attached to them. Words might appear afterwards, though the delay opens a kind of gap. Sometimes this occurs in silence, possibly unheard-of, often outside of language, or symbolized without the use of language. Here, within the space of such occurrences and events, often appear intuitive and speculative responses that seem impossible to translate to a space without. There, without, the operation is difficult to observe, sometimes impossible to witness. The unaccountable, in short, is the speechless figure within, who is a figure of speech without.

By interstice I mean a third space created by the coming-together and then coming-apart again of two materials, shapes, or figures. As a temporary, fleeting and improvised negotiation, the interstice causes lasting transformation and re-adjustments in its constituents through their succumbing to change – subtle as it might be. As a ground for invisible and silent surrender, the interstice is the miraculous and generative potential outside language and sight.

This written report traces and follows the questions motivating my research, the activities and investigations that informed their development, as well as the conversations and interviews I have conducted with archaeologists, educators, conservators, and artists. I'm reporting in three parallel strands consisting of the reports of facts, artefacts and artworks I encounter and gather, reporting what I'm doing, my actions and reflections, and reporting remembered dialogues. The text is written from top to bottom on each double page spread, in three distinctly formatted columns, which correspond and interlink with each other.

Description

how to...
and
know-how

Towards the end of the fourteenth century, Cennino Cennini, an Italian painter working in Tuscany, compiled a manuscript called *Il Libro dell' Arte o Trattato della Pittura*, which has been variously translated as *Book of the Arts*, *The Craftsman's Handbook*, or *Treatise on Painting*[01]. It forms a technical manual describing recipes and instructions arranged in nearly two hundred chapters that attempts to provide an insight into art techniques and materials for "all those who want to enter this profession"[02]. It frames a view into art practices – a view of its time at the advent of the Quattrocento.

Reading through the surviving transcriptions of Cennini's writing, it becomes clear that the painter turned author seemed to have followed his interest in fresco, tempera and early oil painting, with the inclusion of drawing, gilding, and of ornamentation of wood, textiles and glass. A short section towards the end of the manual, however, which was given the numbering chapter 181 to chapter 189, narrates descriptions of moulding and casting processes in various materials, either from life, using animals or the human figure as models, or as impressions of reliefs and medallions.

For moulding and casting faces, the handwritten transcript of Cennini's instructions for the human life model is clear, if only on the second attempt:

> *...il viso fagli tenere labboccha ~~e cchogli~~ e gli occhi serrate.*
> *...make sure he keeps his mouth and eyes shut.*[03]

And in the previous chapter Cennini specifically describes the methods and devices designed to enable a person to stay alive while the face is covered in plaster: the aim here is to facilitate a system for the model to breathe even when every orifice is underneath a heavy layer of fast-setting material. These are, essentially, instructions on how to stay alive while being inside the mould, instructions for survival. To become part of moulding

01 Cennini, Cennino D'Andrea (1954) *The Craftman's Handbook*. Thompson Jr., Daniel V. (Trans.). New York: Dover Publications.
Cennini, Ceninno (1899) *The Book of the Art*. Herringham, Christiana Jane (Trans.). London : G. Allen & Unwin.
Cennini, Cennino (1844). *A Treatise on Painting*. Merrifield, Mary P and Tramboni, Giuseppe (Trans.). London: Edward Lumley.
02 Broecke, Lara (2015) *Cennino Cennini's Il libro dell'arte : a new English translation and commentary with Italian transcription*. London: Archetype Publications Ltd, p. 21.
03 Broecke (2015) p. 252-253.

Donatello (1457-1464) *Judith and Holofernes*,
bronze, 236 cm. Palazzo Vecchio, Firenze.

and casting, to participate in the process of form giving and form taking, the human model – being alive and breathing – has to close eyes and mouth. Nothing shall be seen, and nothing shall be said. It seems that for living models to become complicit in the processes of moulding and casting, to enter into or surrender to the mould, we enter into a place outside visibility and language, provided we want to stay alive. To survive the moulding process requires a moment of forfeiture of speech and sight.

And yet Cennini clearly felt compelled to find words to describe the invisible and unspeakable passage from life model via mould to a finished cast. Maybe he struggled to put into writing what he knew in practice. And still, something made him use words in addition to pigments and gesso. What compelled him?

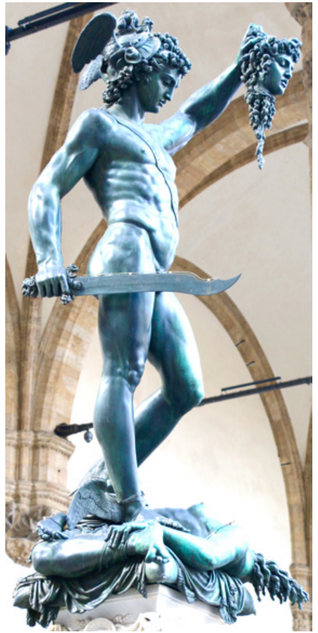
150 years after Cennini, in 1550, Giorigio Vasari published *Le Vite de' più eccellenti pittori, scultori, ed architettori* (Lives of the Most Eminent Painters, Sculptors, and Architects). It is essentially the first encyclopaedia of artists' biographies as they were known in the Cinquecento Renaissance, a term Vasari himself uses in his compendium. Vasari was a painter in the services of the Florentine Medici family, and it is to Cosimo de' Medici, the first of a long line of Medici patrons of learning and the arts, that *Le Vite* is dedicated.

Vasari included a prefix to *Le Vite*, which is now often called *On Techniques*, and which comprises an "introduction to the three arts of design, architecture, sculpture and painting"[04]. Vasari's introduction far exceeds in scope and detail Cennini's earlier compendium: it is an advanced manual, giving detailed descriptions of techniques, processes and the sourcing and transformation of materials in various fields of application. The section on sculpture includes modelling in several materials and in different scales and proportions.

There is a decisive shift in the content of the descriptions from Cennini's early Quattrocento to Vasari's Cinquecento. But there is also an astonishing consistency in the language of the description, despite the 150 years separating them.

This shift from Cennini's description of casting from life to Vasari's descriptions of producing perfect castings is indicative of a far reaching change in attitude towards the fashioning of mouldings and castings. Imprinting techniques at the time of Cennini, that is, at the early Quattrocento Renaissance, were part of an engagement with nature that also included practical cosmological applications: body parts were cast as ex-voto offerings in wax or other easily available materials like cartapesta (papier-mâché); this included death-masks of recently deceased family members. Reproductions and reproducibility were only for private mourning. By the middle of the Cinquencento however, fashioning moulding and casts became part of a public display, an outward direction, less motivated by spiritual reasons, and – as a tool of propaganda – directed towards early forms of securing political power and influence. Many of the Medici family members, for example,

04 Vasari, Giorgio (1960) *On Technique, being the introduction to the three arts of design, architecture, sculpture and painting, prefixed to the lives of the most excellent painters, sculptors and architects*. Maclehose, Louisa S. (Trans.). New York: Dover Publications.



Cellini Benvenuto (1545-1554) *Perseus with the Head of Medusa,* bronze, 519 cm (with pedestal). Palazzo Vecchio, Firenze.

had their facial features captured in plaster moulds that could generate endless reproductions to guarantee visibility, even if they themselves were temporarily absent (because of political exile or injuries)[05]. It is necessary to start this present discussion of the description of moulding and casting processes with this fundamental shift in attitude expressed in the transition from Cennini's transcript to Vasari's manuscript.

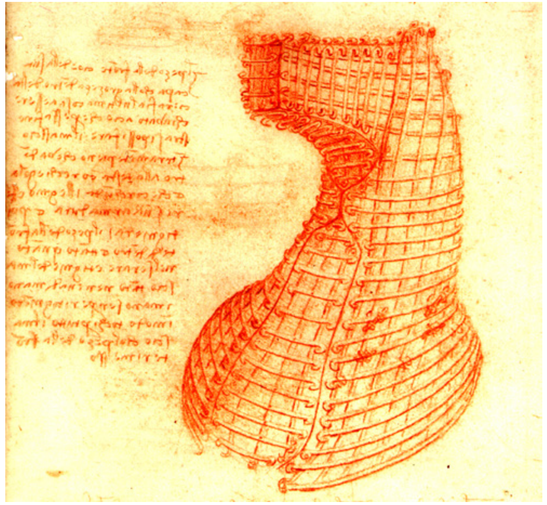
Cennini is concerned with survival and the continuous well-being of his life models: he describes breathing devices in bronze or silver, suggests rose-oil scents to sweeten the proximity of his models to plaster, and offers remedies for the inflictions of red-burning skin caused by the moulding processes.[06]

In Vasari's manual, there are no practical references to casting from life (except a short paragraph on advanced methods in casting leaves, herbs and flowers, without giving any specific details of the procedure[07]). Instead, Vasari introduces categories of difference between a successful and an unsuccessful casting process: in paragraph 66, his descriptions account for possible defects[08] in the casts of bodies, but he expresses no concern for the living bodies themselves.

The accounts, instructions and descriptions referring to causes and remedies of imperfections aim at technical quality, but do not show any concern for human wellbeing. Vasari's focus is on bronze casting based on the lost-wax method, in which a wax model encased in clay or plaster is heated to evaporate the wax as gas, leaving behind a hollow cavity within the clay or plaster case, which is then filled with molten metal. Vasari's description of the moulding process is more technically advanced, which means it is no longer based on destroying the mould to access the cast, but instead is done through producing multiple pieces of moulding, allowing the removal of these individual pieces from the model, and subsequent re-assemblage, leaving both the initial model and mould intact, allowing for repeated castings from the same piece-mould (§ 55. - § 71.).

Vasari was certainly not the first narrator describing the method of lost-wax casting method and by the time of his writing, Renaissance Italy, and especially Florence, had seen a large amount of bronze work cast through the lost-wax methods: Donatello had piece-cast his *Judith and Holofernes* (no earlier than 1453), Andrea del Verrocchio's *Cristo* and *Bartolomeo Colleoni* had been cast (1483 and 1493), and Benvenuto Cellini had achieved to produce his *Perseus with the Head of Medusa* (1545) in one single casting.

05 See, for example, Panzanelli, Roberta (2008) 'Compelling Presence, Wax Effigies in Renaissance Florence'. In Panzanelli, Roberta (Ed.) *Ephemeral Bodies, Wax Sculpture and the Human Figure*. Los Angeles: Ghetty Research Institute.
Kohl, Jeanette (2013) 'Casting Renaissance Florence: the bust of Giovanni de' Medici and indexical portraiture'. In Motture, Peta, Jones, Emma and Zikos, Dimitrios (Eds.) *Carvings, Casts & Collectors, The Art of Renaissance Sculpture*. London: V&A Publishing.
06 Broecke (2015) p. 250-252.
07 Vasari (1960) p. 166.
08 Vasari (1960) p. 164.



da Vinci, Leonardo (1491-1505) *Mould of the head made by tesserae with external armature*, in 'Madrid Codex II', f. 157r, Biblioteca Nacional de España, Madrid.

What connects Vasari to Cennini however, despite their clearly different ambitions and despite their different working methods and applications, is a certain linguistic similarity, even over the 150 years separating each publication: What Cennini and Vasari share is an astonishing consistency in words.

Cennino Cennini:

> *CAPITOLO CLXXXI*
> *Come sia cosa utile l'improntare di naturale.*[09]
>
> *Chapter 181*
> *How to make use of casting from life.* [10]

Giorgio Vasari:

> *Cap. XI.*
> *Come si fanno i modelli per fare di bronzo le figure grandi e picciole, e come le forme per buttarle; come si armino di ferri e come si getti no di metallo, e di tre sorti bronzo; e come, gittate, si ceselino e si rinettino; e come, mancando pezzi che non fussero venuti, s'innestino e commettino nel medesimo bronzo.*[11]
>
> *Chapter 11*
> *How to make models for large and small bronze figures, with moulds for casting them in their armatures of iron; and how they are cast in metal and in three sorts of bronze; and how after they are cast they are chased and refined; and how, if they lack pieces that did not come out in the cast, these are grafted and joined in the same bronze.*[12]

In Vasari's section on sculpture techniques, comprising chapter 8 to chapter 13, all but one include this wording:

> *Come si…*
> *How to….*

50 years before Vasari compiled his manuscript, Leonardo da Vinci wrote his notes on mechanics, on statistics, geometry and also on major engineering principles and fortifications. This work, named *Madrid Codices Volume I* and *Volume II*, after they were discovered by chance in the Biblioteca Nacional de España in Madrid in 1965, also contains a section on how to cast a bronze sculpture of a trotting horse using the lost-wax method, together with detailed preparatory drawings of the methods and processes. The horse was never cast, but Da Vinci exhibited a large clay model in 1492 in Milan, which

09 Cennini, Cennino (1954) *Il Libro Dell'Arte o Trattato Della Pittura*. Firenze: Felice Le Monnier, p. 135-143.
10 own translation
11 Vasari, Giorgio (1550/1986). *Le Vite*. Firenze: Lorenzo Torrention. Edizione di reiferimento a cura di Luciano Bellosi e Aldo Rossi. Torino: Enaudi, 1986, p. 60.
12 own translation

Vasari describes in his Vite:

> *... those who saw the large model that Leonardo fashioned in clay thought they had never seen anything more beautiful or superb...*[13]

Benvenuto Cellini published his ***Due*** *trattati* (Two treatises, 1568)[14] on goldsmithing and sculpture, which included casting from life in a variety of metals, just the same year as Vasari published his second edition of the *Vite*.

In 1555, an Italian physician and alchemist writing under the pseudonym Alessio Piemontese published his *De' secreti del reuerendo donno Alessio Piemontese*, an enormously popular collection of writing that went through multiple editions and translations across Europe.

Piemontese's *De' secreti,* followed by Giambattista Della Porta's *Magia Naturalis* (Natural Magic, 1558), and Isabella Cortese *Secreti* (Secrets, 1564), initiated a long line of publications that lasted into the eighteenth century, which were expression of a deep fascination with secrets and wonders combined together with a tendency to collect, to own and to accumulate, and sometimes also to publish these secrets. The choice of the word *secrets* is interesting here, because the intention to publish seems to contradict the title printed across the cover of the manuscript.

In most cases, these secrets were fast accumulations of many different kinds of practical applications, which in the case of Piemontese meant that amongst recipes of jams and candied fruit, of cosmetics and remedies, he reveals recipes for pigments and also gives detailed instruction on how to cast in gold and silver using moulds:

> *To make a water called Magistra, wherewith the said earths to make mouldes, is tempered and moisted, againe at euerie Casting and Founding*. ...[15]

The first German transcription of Piemontese's *Secreti,* published in 1588, was titled *Kunstbuch Des Wolerfarnen Herren Alexil Pedemontani*, and it followed in style the direction of publications called *Kunstbuch*, *Kunstbüchlein* or *Illuminierbuch*[16], a field of artist manuals influenced by early publications by Albrecht Dürer[17].
In 1594 England, Hugh Plat published his collections on husbandry, distilling and

13 Vasari, Giorgio (1991) *The Lives of the Artists*. Conaway Bondanella, Julia, Bondanella, Peter (Trans.). Oxford: University Press, p. 291.
14 Cellini, Benvenute (1811) *Due trattati*. Milano: Della Societá Tipografica de' Classici Italiani.
15 Piemont, Alexis (1595) *The Secrets of the reverend Maister Alexis of Piemont*. Ward, William (Trans.). London: Peter Short for Thomas Wright, p. 107.
16 Helmreich, Andreas (1563) *Ein gründlichs und köstlich kunstbüchlein.* Eisleben: Gaubisch. Vogtherr, Heinrich (1538) *Ein Frembds und wunderbars kunstbüchlin.* Straßburg: Christian Müller. Boltz von Ruffach, Valentin (1546) *Illuminierbuch. Wie man allerlei Farben bereiten, mischen und auftragen soll. Allen jungen angehenden Malern und Illuministen nützlich und förderlich.* Basel: Jakob Kündig.
17 for example, Dürer, Albrecht (1525) *Underweysung der Messung, mit dem Zirckel und Richtscheyt, in Linien*, Ebenen unnd gantzen corpore. Nürnberg: Hieronymus Andre.

WA1888.CDEE.S19 Workshop of della Robbia, possibly Giovanni della Robbia (ca. 1500-1520) *A citron*, tin-glazed terracotta, 24 cm (length). Image © Ashmolean Museum, University of Oxford

Piccolpasso, Cipriano (ca. 1557) *I tre libri dell' arte del vasaio*, detail showing plaster moulds pen on paper. National Art Library, Victoria and Albert Museum, London, MSL/1861/7446[f.55]

moulding in the collection titled *The Jewell- House of Art and Nature conteining divers rare and profitable Inventions, together with sundry new experimentes in the Art of Husbandry, Distillation, and Molding.*

Amongst Plat's many instructions on

> *10. How to harden leather…*
> *12. How to roast meat more speedily…*
> *20. How to walk safely upon a high scaffold…*
> *68. How to tell the just number of apples, nuts, shillings, &c, as they lie in bulk to gether*
> *141. How to preserve Damsons, Cherries, Pear plums….*

one can also find

> *142. The art of moulding and casting*[18].

In France, Piemontese's *Secreti* was translated into French as *Les Secrets de Révérend Signeur Alexis Piemontois* by Christofle Plantin and published in Anvers in 1557.

Around the same time in Italy, the potter Cipriano Piccolpasso started to compile his manuscript called *Le tre libri dell'arte del vasajo*[19]. The *Three Books of the Art of the Potter* gives an account of manufacturing processes of maiolica or istoriato-ware, a highly colourful tin-glazed ceramic production.

Piccolpasso narrates a form of producing glazes for pottery that continued in finish the work of the Della Robbia family workshop, producing three-dimensional, highly colourful ceramic works. Whereas the Della Robbia family never published their skills, Piccolpasso instead does not hesitate to narrate his knowledge, including a description of fashioning plaster moulds for casting in clay, which were essentially press-moulds. What might be one of the first instances of a description of plaster moulds explicitly for fashioning clayware is, however, explicitly kept short by Piccolpasso himself. He states that all credit for detailed accounts of making plaster moulds, single or in multiple pieces, should be given to someone else:

> *I will not extend myself much on this matter, because in the PIROTECHNIA of Signor Vannuccio Beringuccio, a nobleman of Siena, in the 8th book, where he treats of the moulding of various reliefs, all that can be said about making moulds is to be seen. And so whoever wishes for full knowledge of it may have recourse to the studies of this gentleman where he will find all he desires. … Accordingly, I will pass briefly over the making of moulds, seeing that so worthy a gentleman has taken his trouble from me. In his work can be seen how to work with plaster and without, and likewise what should be done where no plaster is to be found; how you make moulds for reliefs, and*

18 Plat, Hugh (1653) *The jewel house of art and nature*. London: Bernhard Alsop.

19 Piccolpasso, Cipriano (1857). *I tre libri dell' arte del vasajo nei quali si tratta non solo la pratica, ma bravemente tutti i secreti di essa cosa che persino al dì' d'oggi è stata sempre tenuta acosta, del cav. Cipriano Piccolpassi durantino*. Roma, dallo stabilimento tipografico, via del corso num. 387.

Palissy, Bernhard, or one of his followers (c. 1580-1600) *Dish*,
earthenware and coloured glazes, 40.6 x 53.3 x 4 cm, 2.76 kg. Victoria & Albert, London, no. 7169-1860.

> *how for intaglios, how you make piece-moulds, and, in short, all that can be said. At the moment it is enough for me to show you the manner of moulding in clay.*[20]

Piccolpasso does not hesitate to look and show and tell in a quest for full knowledge of *how to*….

His reference is to Biringuccio's practical encyclopaedia describing processes with various metals, which had been printed in Venice ten years earlier. One chapter on moulding called *Modi di formare diversi rilievi* (Chapter 5 of Book XIII)[21] gives a very detailed and practical description, just as Piccolpasso acknowledges.
Not long after Biringuccio, Agricola published his *De Re Metallica* in 1557, which is also, just as Biringuccio's *Pirotechnia*, a richly illustrated source book with practical instructions focussing on metallurgy.

Piccolpasso's manuscript *Le tre libri dell' arte del vasajo* was not published until the nineteenth century, but a transcript travelled to France in the sixteenth century, where, after a short while, in 1580, Bernhard Palissy published his *Discours admirables, de la nature des eaux et fontaines, tant naturelles qu'artificielles, des metaux, des sels et salines, des pierres, des terres, du feu et des maux (Admirable Discourses, 1580)*, a collection of writings on natural phenomena including water, springs and ice, writings on minerals, rocks and earths, together with his accounts of clay and the production and application of glazes.[22]

Palissy was a self-taught potter and natural historian, who spent several decades attempting to learn how to produce porcelain ware. Even though he never discovered the recipes for imitating Chinese Porcelain, his interest in natural science and geology led him instead to develop a rustic style of pottery that is abundantly ornamented with cast reproductions of river, lake and sea animals, placed amidst vegetation, all glazed in rich and deep colours. Palissy developed intricate procedures for moulding in plaster for casting fish, crustacean, snakes and salamanders, shells, frogs and dragonflies. He placed these reproductions next to casts of clay ferns, leaves and paddles.[23].

20 Piccolpasso, Cipriano (1980) *Tre libri dell' arte del vasaio: a facsimile of the manuscript in the Victoria and Albert Museum, London*. Lightbown, Ronald and Calger-Smith, Alan (Trans.). London : Scolar Press, 1980, p. 42.

21 Biringuccio, Vannoccio (1558) *Pirotechnia. Li diece libri della pirotechnia, nelli quali si tratta non solo la diuersità delle minere, ma ancho quanto si ricerca alla prattica di esse: e di quanto s'appartiene all'arte della fusione ouer getto de metalli, e d'ogni altra cosa à questa somigliante*. Composta per il s. Vannuccio Biringoccio, nobile senese. p. 121.

22 Palissy, Bernhard (1580) *Discours admirables de la nature des eaux et fontaines, tant naturelles qu'artificielles, des métaux, des sels et salines, des pierres, des terres, du feu et des émaux*. Paris: Martin le Jeune.

23 for a detailed description of the relationship between Palissy's techniques and theories see: Shell, Hanna Rose (2004) 'Casting Life, Recasting Experience: Bernhard Pailissy's Occupation between Maker and Nature'. In *Configurations*, Vol. 12(1), p. 01-40.

In Palissy's writing, *Theory*, allowed to begin the conversation with *Practice*, asks to be shown and taught skills:

THEORIQUE COMMENCE.
...de me monstrer à faire des fontaines aux lieux les plus stériles d'eaux.[24]

Theory begins.
...to show me how to make fountains in places most barren of water.[25]

Here, as before with Cennini and Vasari, the *how to....* begins the mediation of the topic.

Palissy has structured his specific mediation in the form of a dialogue between *Theory* and *Practice*. *Theory* is repeatedly asking to be explained how something is done, demanding instruction and demonstrations[26]. *Theory* becomes the student seeking a master, but refuses to engage through anything other than words, either written or spoken. *Practice* is clearly the master, has the knowledge of experience and wants to pass this on. The problem Palissy unfolds throughout the dialogue is that *Practice* does not believe in passing on knowledge through words. *Practice* praises one's own experimentation, trial and error, failure, and eventual rewards. *Theory* wants immediate and direct insight.

Palissy's *Practice* makes it clear, however, that not everything can be shown and told:

> *Theory*
>
> *If you will please teach it to me, I promise I will keep it as secret as any man to whom you could teach it.*[27]
>
> *Practice*
>
> *Even if I used a thousand reams of paper to write down all the accidents that have happened to me in learning this art, you must be assured that, however good a brain you may have, you will still make a thousand mistakes, which cannot be learned from writings, and even if you had them in writing, you wouldn't believe them until practice has given you a thousand afflictions.*[28]

And still, Palissy is writing, despite his distrust of words.

24 Palissy (1580) p. 01.
25 Palissy, Bernhard (1957) *Admirable discourses.* La Rocque, Aurèle (Trans.). Urbana : University of Illinois Press, p. 29.
26 for example Pallisy (1957) p. 64-65.
.27 Pallisy (1957) p. 190.
28 Pallisy (1957) p. 192.

Come si…
How to….

How does one start to approach descriptions of the processes of moulding and casting?

Cennini's *Libro dell' Arte* starts a long line of manuscripts, treatises, codices, sourcebooks and compilations of writings, which together established the technical treatise as literary form in the Renaissance. Over the following centuries, some of these manuscripts and publications observe and describe moulding and casting as part of a focus on art practices, but more often publications included recipes and instructions on moulding and casting amongst a huge variety of subjects, ranging from alchemical experiments to engineering, medicine, agriculture and theology to name just a few.

The technical manual, giving written accounts of the making of objects and the procedural shaping of the surrounding material world formed part of one formula to estimate and approximate an explanation of nature and its workings: being able to make something, and then being able to pass on this ability, was one way to imagine knowledge, a practical knowledge based on skills in techniques and understanding of materials, and it was the attempt to narrate this knowledge, and so to share, exchange and make it available, that ushered in the proliferation of writing on making.

The Renaissance artists were beginning a line of inquiry, accumulating methods and techniques, collecting and disseminating instructions and recipes, and publicising discoveries. Not that the wonders and mysterious workings of nature became any less mysterious: being able to copy, to imitate and produce the same effects as nature, albeit in different materials, was not to diminish the awe these natural wonders inspired. But being able to copy and reproduce, being able to imitate nature also entailed managing the mystery, and so the possibility to extend, or maybe even to make it yielding.

As much as copying and imitating were attempts to imagine knowledge, it also made not-knowing bearable, which in turn inspired more curiosity. This meant that even if one couldn't answer the question as to *why* something comes into being, one could at least answer *how* it does. Here, description was an essential narrative strategy to develop and extend the speculative conjunction into a literary device. Meaning was generated not through the revelation of hidden workings, but through drawing attention to the procedural and material developments leading to the appearance of an object, a technical or chemical process that unfolds over time and involves activities, tools, and materials, which all need to be accounted for. Narratives and descriptions followed these developments[29].
Even if knowledge of reproductive techniques did not automatically and immediately offer complete and full comprehension, it made the absence of full knowledge less

29 Eamon, William (1994) *Science and the Secrets of Nature*. New Jersey: Princeton University Press.

WA 2013.1.81 Jamnitzer, Wenzel, or workshop or circle of (ca. 1550-1580) *Cup*, silver-gilt, creatures & plants cast from life. Image © Ashmolean Museum, University of Oxford

threatening. It became possible to tolerate incomplete explanations and mediate the lack of comprehension through an approximation achieved in the descriptions of technical and material processes, which became just as awe inspiring, because they were now performed by human hands, and could offer – at least as ambition – the possibility to exchange the procedural knowledge and repeat it at different times and different places.

The process of moulding and casting has a particular place in the line of such procedural descriptions found in technical manuscripts and published manuals that attempt to disseminate knowledge and expertise: one of the powers of moulding and casting often evoked in these manuals is the potential to reproduce likeness. Vasari already set the standard for what constitutes a good casting, and what he meant was that good casting resembles and looks deceivingly like the original – and it is to the end of achieving this convincing likeness that the skill of the person performing the casting is often evaluated. Producing successful casts – being able and skilled enough to reproduce the likeness of an object, person, a small animal, or a plant – has been considered to entail skill, mastery of materials and tools, and often an imagined grain of the power of creation. Being able to produce a convincing likeness of something was almost as powerful as making the thing itself.

One can understand the abundant inclusion of small animals cast in metal in the surface decoration of cups and vessels for salt in this sense: through an assumed transfer, the life energy of the animal is conveyed in the process of life-casting to the metal object resulting from this procedure, which then, assembled into the device, continues to animate whatever is contained within: drink or salt alike. During the sixteenth and early seventeenth century, South German silversmiths and metal workers like Wenzel Jamnitzer, Wolff Christoph Ritter or Heinrich Jonas produced very intricate metal works through casting directly from life, developing processes in which small animals like salamanders were dipped into plaster, into which the hot molten metal was then injected, burning their corpses out of the mould, and filling the cavity left behind[30].

The assumed transfer of anima, a kind of metempsychosis of energy or power of a creature facilitated through a process of moulding and casting from life and captured and contained in the final metal cast, established a strong and powerful relationship between the representation and the represented, a relationship assumed both on the basis of likeness as well as the connection established between the model's material and various subsequent moulding and casting materials entering a network of contact and touch, in which

30 Smith, Pamela H. and Beentjes, Tonny (2010) 'Nature and Art, Making and Knowing: Reconstructing Sixteenth-Century Life-Casting Techniques'. In *Renaissance Quaterly*, VOl. 63, No. 1 (spring 2010), p. 128-179.

the animal entering the mould had to surrender its life[31]. The creature itself does not live to tell the tale. Instead, its sacrifice is assumed to animate the previously inanimate material.

A similar link between representation and the thing represented can be found in the format of the description itself: the narratives accounting for the coming-into-being are standing in for the activity. Words recreate that which can be evoked or that which can be described: both voice and scripture can conjure and manifest renditions and animate impressions through imagination, similar to the way a mould might yield a cast. The narrative itself can also be read as a conversion of the material of activities though a translation into the material of words, which is similar to a cast as the translated material of a model converted through the process of moulding.

As useful as the technical treatise became in imagining and managing knowledge, however, it was also apparent to many authors that a transfer and exchange through words was not the same as through actions, that descriptions and instructions, as powerful as they could be, nevertheless also opened a gap between doing, writing, and reading.[32]

Early thinkers and practitioners of the powers of transfers like Paracelsus were very clear

31 Georges Didi-Huberman has drawn attention to both iconic or indexical resemblance and animated or in-animated resemblance, and formulated several descriptions of this network of touch based on contact and direct transfer between bodies and materials, manifesting in such diverse objects as reliquaries, ex-votos, seals, life-casts and death-masks, the Shroud of Turin, exuviae, phasmatodea, etc.:
Didi-Huberman, Georges (2002) 'L'air et l'empreinte'. In Papet, Edouard (Ed.) *À fleur de peau. Le moulage sur nature au XIX^e siècle.* Paris: Réunion des Musées Nationaux.
Didi-Huberman, Georges (1998) *Phasmes : essais sur l'apparition.* Paris : Editions de Minuit.
Didi-Huberman, Georges (1997) *L'Empreinte.* Paris: Centre Georges Pompidou.
Didi-Huberman, Georges (1984) 'The Index of the Absent Wound (Monograph on a Stain)' Repensek, Thomas (trans.). *October*, 1 July 1984, Vol.29, p.63-81.

32 For a detailed analysis of technical descriptions and material processes during the early Renaissance, especially with regards to moulding and casting from life, the assumed generative potential of these processes, as documented in early manuscripts and transcriptions, see:
Smith, Pamela H. (2014) 'Between Nature and Art: Casting from Life in Sixteenth-Century Europe'. In Hallam, Elizabeth and Ingold, Tim (Eds.) *Making and Growing: Anthropological Studies of Organisms and Artefacts.* Farnham: Ashgate.
Smith, Pamela H. (2013) 'Making Things: Techniques and books in early modern Europe'. In Findlen, Paula (Ed.) *Things.* London: Routledge, p. 173-203.
Smith, Pamela H. (2012) 'In the Workshop of History: Making, Writing, and Meaning' in *Shaping Objects: Art, Materials, Making, and Meanings in the Early Modern World. West 86th: A Journal of Decorative Arts, Design History, and Material Culture, 19* (2012), p. 4-31.
Smith, Pamela H. and Beentjes, Tonny (2010) 'Nature and Art, Making and Knowing: Reconstructing Sixteenth-Century Life-Casting Techniques'. In *Renaissance Quaterly*, VOl. 63, No. 1 (spring 2010), p. 128-179.

in their view that direct experience – as opposed to the study of texts – was an essential ingredient of the apprehension of insights, and many followed Paracelsus' view that there are decisive differences between scripture and nature.

There appears a material trajectory linking model, mould and cast, binding what can be seen as visual resemblance of representation to the thing represented, but also acknowledging a gap opening in between the descriptions attempting to account for this process and the words used to narrate this.

It is worth attempting to open this gap a little further.

PLASTER

U

I cut a shape out of brown cardboard. The cardboard is a long rectangular piece, triple layered with two corrugated layers in between. Cutting through these layers poses some difficulty, and makes for not so even and neat cuts of brown cardboard. I am not concerned with evenness, nor with neatness. I have my mind set on the shape. I place the cut out shape on the table. Depending on where I stand, the shape could look like the letter U, very elongated.

U

I cover the top of the brown cardboard shape with brown packaging tape and trim off any acess.
I cut long strips of brown corrugated cardboard from the off-cuts. I cover these strips with brown packaging tape and trim off any access. I attach these like a wall around the cut out shape and fasten the wall to the shape with brown packaging tape. I work quickly and methodically, attempting to complete the wall on the outside and the inside of the shape as quickly, but also as sturdily, as possible. The brown packaging tape sometimes sticks to itself, sometimes doesn't stick down so well, sometimes sticks wrong ends together, sometimes doesn't hold the walls to the shape so well. I am not concerned with these happenings. I do not see them as errors or imperfections. The cut out shape now resembles a low walled, hollow, concave form in the shape of an elongated letter U.

What is a mould?

A *hollow containing form*[01] referred to as *concavity*[02], which is sometimes also referred to as a *container for empty space*[03], or which is sometimes referred to as a *shell-like impression*[04] or simply a *shell*[05], is also sometimes called a *negative*[06], or a *negative volume*, *void*, or *vessel*[07], or *negative shape* or *form*[08], and which is often specifically called ***mould***, is sometimes also called *negative*[09], or more specifically *negative mould* or *negative type mould*[10], and sometimes *negative containing mould*[11], or *concave mould*[12], and sometimes it is called *matrix*[13] *or matrice*[14], and sometimes it is called *female* [15]or *mother*[16], and sometimes it is even called *negative casting mould*[17], or *containing mould*[18] or simply *container*[19], and sometimes it has been called an *envelop*[20], or else *case mould* or just *case*[21], *skin* or *jacket*[22].

And sometimes, to differentiate cases of a casting made over the mould or without the mould, rather than within, this mould is then also called a *positive mould*, or a *convex mould*[23], which on occasions is also called a *male mould*[24] or just *male*[25], or a *pattern*, or, properly, a *form*, as it is said to constitute a shape over which another shape is built up[26].

01 Piccolpasso (1980) p. 44.
02 Andrews, Oliver (1988) *Living Materials: a sculptor's handbook*. Berkeley : University of California Press, p. 57.
03 Andrews (1988) p. 49.
04 Rich, Jack C. (1961) *Materials and methods of sculpture*. New York: Dover Publications, p. 90.
05 Butler, Vincent (1997) *Casting For Sculptors*. London: A&C, p. 27.
06 Verhelst, Wilbert (1973) *Tools, materials and techniques*. Hemel Hempstead: Prentice-Hall, p. 12.
07 Mills, John W. (1990) *Encyclopedia of sculpture techniques*. London : Batsford, p. 159.
08 Mills, John W. (1966) *The Technique of sculpture*. London: Batsford, p. 157.
09 Rich (1961), p. 18 & Mills (1990), p. 32.
10 Andrews (1988) p. 57.
11 Rich (1961) p. 18.
12 Mills (1990) p. 57.
13 Andrews (1988) p. 59.
14 Vasari (1960) p. 167.
15 Mills (1965) p. 53.
16 Rich (1961) p. 90.
17 Rich (1961) p. 18.
18 Rich (1961) p. 90.
19 Andrews (1988) p. 49.
20 Vasari (1960) p. 161.
21 Butler (1997) p. 32-35.
22 Mills (1990) p. 15.
23 Verhelst (1973) p. 56.
24 Piccolpasso (1980) p. 44.
25 Andrews (1988) p. 57.
26 Andrews (1988) p. 57.

Moulds are said to have to be good and suitable[27]. Their main objective is said to be to hold the shape of the model so that a cast can be made[28].

Moulds are categorized according to varying parameters, some of which differentiate primarily between rigid moulds and flexible moulds[29], others which differentiate between waste moulds, jelly moulds, and piece moulds[30] (which is similar to differentiating between waste moulding, flexible moulding, and piece moulding[31]) and others which divide into porous, non-porous, and flexible types[32], or others divided into four basic types of moulds, which are one piece, two piece, open or reinforced types of moulds[33].
Flexible moulds could be further divided into hot setting moulds and cold setting moulds, although it would be more accurate to specify this as hot setting mould material and cold setting mould material.

Other materials and substances used for moulds include Plaster of Paris, glue or gelatine, rubber, plastics, agar compositions, baked sand, clay, wood, metal, concrete[34], paper, cardboard and fabric, and there are many more possible moulding materials.

The selection of material for creating a mould is said to depend on:

The physical nature of the model.
The casting material.
The desired number of castings[35].

The suitability of a moulding process is said to depend on:

Suitability to ultimate casting media.
Number of castings desired from single mould.
Suitability to form being cast.
Accuracy desired in reproduction of pattern.
Accuracy desired in surface detail.
Handling; weight of mould.
Cost of moulding materials.
Availability of materials.
Time involved in mould technique.
Feasibility in relation to studio and equipment available.[36]

27 Mills (1965) p. 62.
28 Wagner, Victor H. (1963) *Plaster Casting for the Student Sculptor*. London: Tiranti p. 03.
29 Rich (1961) p. 90.
30 Wagner (1963) p. 07.
31 Mills (1990) p. 160.
32 Percy, H.M. (1965) *New materials in Sculpture.* London : Alec Tiranti, p. 39.
33 Percy (1965) p. 100.
34 Rich (1961) p. 18.
35 Rich (1961) p. 18.
36 Verhelst (1973) p. 12.

Mould types

In general, one can find that there are

waste moulds, which are sometimes also called *lost moulds*[01], and which are said to be usually made of a single or a small number of layers of Plaster of Paris[02], which have to be kept thin, and which sometimes have a coloured initial first layer to indicate proximity to the cast[03], and which have to be chipped or prized open to free the final casting produced in it[04], which is a course of actions that is said to destroy both the models and the moulds[05], which is described as a process of wasting, from which the name derives[06], which makes them a one-off process[07]. Waste moulds are said to be the simplest and most economical form of a mould[08]. They are said to have the advantage of never producing mould lines[09] if made of a single wasted mould, but are also described as possibly consisting of several mould sections, which would then leave mould lines[10], and which also have the advantage

01 Marchand, Eckhart (2010) 'Plaster and Plaster Casts in Renaissance Italy'. In Frederiksen, Rune and Marchand, Eckhart (Eds.) *Plaster casts : making, collecting and displaying from classical antiquity to the present*. Berlin : De Gruyter, p. 75.
02 Mills (1966) p. 53.
03 Andrews (1988) p. 53.
04 Mills (1989) p. 219.
05 Butler (1997) p. 11.
06 Wagner (1963) p. 07.
07 Butler (1997) p. 11.
08 Verhelst (1973) p. 12.
09 Toft, Albert (1929) *Modelling And Sculpture*. London: Seeley, Service & Co. Limited, p. 90.
10 Butler (1997) p. 11.

Repetition

I keep cutting shapes out of brown cardboard and wrap them in brown packaging tape. On the following days, I repeat this activity, but each time differently.

of being very simple, and have the ability to reproduce very complex shapes[11], and which can also convert non-permanent materials into permanent materials[12], but which have the disadvantage of producing only a single cast[13] before they are destroyed;

and there are **piece moulds**, which are also called *multi-part moulds*[14], which consist of several sections or a number of small pieces[15] or *caps*[16], which are sometimes called *tesserae*[17], which often accommodate overhangs through undercuts[18], which determine and regulate the size and number of the individual pieces and sections, which should fit together[19] and offer good alignment[20] through what are varyingly called *locating keys*[21] or *case keys*[22], *registers*[23], *register holes*[24], or *register notches*[25], which are a number of notches, depressions, grooves or shallow holes on the seams of a piece of the mould, which are used to connect to the seams of another piece and keep all the adjacent pieces in position[26], which is mostly achieved through indentations made during the moulding process to allow for subsequent correct registration between additional mould sections[27], which are then all held together in what is called a *jacket*[28], a *case*[29], a *template*[30], or *mother mould*[31] which is an additional mould layer of the same or similar moulding material locking them together[32] in a sequence that should be numbered[33]. It is said that building a piece mould is fundamentally the same as building a waste mould[34] but has the advantage that the original can be preserved undamaged[35] and the mould is not wasted but can be kept indefinitely[36] and can be used for multiple and repeated casting[37], which is also said

11 Andrews (1988) p. 52.
12 Butler (1997) p. 11.
13 Rich (1961) p. 90.
14 Percy (1965) p. 106.
15 Wagner (1963) p. 77.
16 Mills (1965) p. 52 & Butler (1997) p. 18.
17 Butler (1997) p. 27.
18 Rich (1961) p. 90.
19 Wagner (1963) p, 77.
20 Andrews (1988) p. 57.
21 Mills (1965) p, 59.
22 Mills (1965) p. 56.
23 Andrews (1988) p. 57.
24 Butler (1997) p. 20 .
25 Butler (1997) p. 23.
26 Percy (1965) p. 85.
27 Percy (1965) p. 106.
28 Mills (1965) p. 15.
29 Butler (1997) Butler 32.
30 Mills (1965) p. 57.
31 Andrews (1988) p. 57.
32 Wagner (1963) p. 07.
33 Andrews (1988) p. 57.
34 Verhelst (1973) p. 15.
35 Toft (1929) p. XV.
36 Rich (1961) p. 90 & Wagner (1963) p. 07.
37 Wagner (1963) p. 07.

to be a great advantage over jelly moulds, which deteriorate over time[38]. Piece moulding is said to be a highly specialized process[39];

and there are **fibreglass moulds**, which can be constructed according to the same principles as plaster moulds[40], and which are said to be used in place of plaster piece moulds[41], which is probably due to the strength of the material and the ease of handling, which is mainly because fibreglass is said to be light and strong and slightly flexible. Fibreglass moulds have the advantage that there can be fewer and thinner sections than in a plaster mould[42], and which is also said to allow for contours that a plaster mould cannot accommodate[43], but have the disadvantage of exothermic heat developing during polymerisation[44], which might affect models made of heat sensitive materials;

and there are **metal-casting moulds**, which can be made out of a variety of materials and through different processes, which, however, are all based on similar principles and posses similar terms and features[45], some of which are called *bottom boards*, which serve as platform on which to build the mould, and on which are placed the *pattern boards*, which are used as a surface on which to seat the model in constructing the drag section of the mould, and sometimes a feature called *core*, which is the inner mass that maintains the wall thickness of the casting, which is different from what is called *backing* or *backup* material on the other side of the mould, which is additionally coated with *facing*, which is a fine material to assure maximum reproducibility of the model, and some which are called *flasks, which are* used to hold the mould material during mould construction, and between which there are *parting lines* that form the points of separation for the mould, and some which are called *pouring basins, boxes,* or *cups* used to receive molten metal for the mould, and features which are called *spruces*, which are vertical shafts used to direct the molten metal into the mould and which leads into a *sump* before a feature called *runner*, which is a horizontal feed running from the spruce to the mould cavity, and some which are called *chokes* used to control the flow of metal and trap *dross*, which are accumulated metal oxides, fluxing materials and impurities building up on the surface of molten metals, and some which are called *gates*, which are openings at the end of the runners used to control the speed at which the metal feeds into the mould cavity, and features called *feeders* used to supply additional metal to the mould cavity, and some features which are called *risers* used to provide additional molten metal to compensate for shrinkage, and some which are called vents, which provide a means for air and gas to escape the mould as it fills with metal;[46]

38 Wagner (1963) p. 77.
39 Wagner (1963) p. 80.
40 Andrews (1988) p. 61.
41 Verhelst (1973) p. 15.
42 Andrews (1988) p. 61.
43 Verhelst (1973) p. 16.
44 Mills (1965) p. 76.
45 Verhelst (1973) p. 20.
46 Verhelst (1973) p. 20 - 22.

and there are **investment moulds**, which could be either one of a variety of different materials, which are all said to add strength, bulk, and porosity to the mould[47], which allows for thinner and more intricate castings, but which has the disadvantage of lacking permeability, which results in a need for more complex venting[48], which is specifically the case when pouring metal into investment moulds, after which the moulds themselves are removed, chipped away, and destroyed to free the cast, which makes building investment moulds an effort that is undertaken knowing fully well that the mould will need to be broken;

and there are **sand moulds**, which are based on very old techniques[49] said to generally consist of sand (or sometimes plaster) and a binder compacted around a mould in sections stacked on top of each other[50], from which the mould is then retrieved and saved for the next moulding, which means there is little deterioration, which allows for repeated usage, which means that sand moulds are often used in industrial production[51] as metal-casting moulds;[52]

and there are **ceramic-shell moulds**, which are said to be moulds for investment casting processes[53], and are said to be particularly simple and practical approach to invest wax-patterns, due to their high strength with comparatively thin walls[54];

and there are **flexible moulds**, which are said to be essential either if more than one casting is desired from complex patterns or in the preparation of complex hollow models for lost-wax techniques[55]. Flexible moulds are also said to have memory, which allows them to reform into their moulded shape when pulled off a model or cast[56];

and there are **gelatine moulds**, which are sometimes called *glue moulds*[57], which are also sometimes called jelly moulds[58], which are made with material derived from boiling organic tissue in water[59], which sets into flexible mould material which is often stabilized and supported by an additional plaster jacket[60]. Gelatine moulds are said to show a lot of

47 Verhelst (1973) p. 24.
48 Verhelst (1973) p. 24.
49 Mill (1965) p. 84.
50 Rich (1961) p. 142.
51 Rich (1961) p. 141.
52 Verhelst (1973) p. 20.
53 Mills (1990) p. 61.
54 Verhelst (1973) p. 24.
55 Verhelst (1973) p. 17.
56 Birks, Tony (1998) The Alchemy of Sculpture. Chalford: Pangolin Editions and Yeovil: Marston House, p. 25.
57 Rich (1961) p. 101 & Andrews (1988) p. 60.
58 Wagner (1963) p. 07.
59 Rich (1961) p. 101.
60 Mills (1966) p. 53.

resilience[61] and elasticity[62], and are said to have superseded piece moulding because of their flexibility[63] (but have been superseded by polyvinyl rubber in turn[64]), which allows them to accommodate overhangs without the need for undercuts, or which will allow undercut parts to draw easily out of the material, which will spring back ready for the next cast[65], which is due to their gelatinous content, which is also the reason they can only be kept a short period of time before they deteriorate[66] and a new mould is necessary[67], which is also why they smell terribly after a few days when the gelatine is of the cheap kind[68], but which also allows for many casts in this period[69] (although it is said that good details will last for not more than four castings, which are even as few as and not more than two when no hardening agent is painted onto the mould surface[70]). Wax casts (which are used to make bronze casts through a process of lost-wax casting), which are said to often be made in gelatine moulds[71], might often also be the end of gelatine moulds, as the heat of the wax melts the gelatine;

and there are **agar moulds**, which are sometimes also called glue moulds[72], which are like gelatine moulds but use a vegetable derivative from marine algae native to the Pacific and Indian Ocean, which is a colourless substance soluble in water, which may be useful for fashioning life castings, as it is non-toxic, but cannot be stored too long before it deteriorates;[73]

and there are **silicone moulds**, which cure chemically at room temperature, in anywhere from 24 to 48 hours[74], and which are made of compounds that are said to be the costliest but also of the highest quality[75];

and there are **rubber moulds**, which are said to be the result of two basic approaches, which is either to cast the moulding material around the work, which is practical for small works and is frequently used by industry, or to brush on the moulding material and build it up in layers, which is more applicable to sculpted forms too large for the cast approach[76];

61 Wagner (1963) p. 07.
62 Wagner (1963) p. 67.
63 Mills (1965) p. 53.
64 Mills (1965) p. 58.
65 Wagner (1963) p. 67.
66 Wagner (1963) p. 77.
67 Wagner (1963) p. 07.
68 Wagner (1963) p. 67.
69 Rich (1961) p. 320.
70 Mills (1965) p. 61.
71 Mills (1966) p. 53.
72 Andrews (1988) p. 60.
73 Rich (1961) p. 97-98.
74 Verhelst (1973) p. 17.
75 Verhelst (1973) p. 17-18.
76 Verhelst (1973) p. 17.

and there are **cold rubber moulds**, which are also called *cold molding compounds*[77], which cure without heat, which is why they are also called *cold curing rubber moulds*, and which is why they can be used on or filled with model or casting materials that might otherwise be affected by higher temperatures[78]. Cold rubber moulds are said to be synthetic rather than natural rubbers, and are also referred to as *RTV (room temperature-vulcanizing) compounds*[79], which are said to set by catalytic action, which makes them set faster than natural materials like latex, which is also said to give them better shelf-life and more variable degrees of elasticity[80];

and there are **latex moulds**, which are made of the naturally fluid, water-soluble sap of the rubber tree[81], which is said to dry in the air to a tough but flexible and elastic film, and which is stipulated to be build up in successive layers, which dry slowly without the use of catalytic additions, and which normally are said to need a supporting case of plaster or fibreglass backing[82];

and there are **vina moulds**, which are sometimes called *polyvinyl moulds*[83], which have superseded gelatine or glue moulds in mould making processes[84] (but might have been in turn supersede by polyurethane moulds themselves), which are based on vinyl resin[85], which are hot-melt material moulds, and which may be melted down and re-used indefinitely[86], and which have very high melting points, some of which as high as 170 ° C, which makes them ideal for castings with materials that produce heat or are hot, some of which are Plaster of Paris, cement, wax or thermosetting resins[87], some of which in turn are used as materials for strengthening mould jackets to support the vina mould;

and there are **containing moulds**, which are sometimes called *case moulds*[88] or *jacket moulds*[89] or simply a *shell*[90], which have a sole purpose, which is to support moulds made of more elastic and flexible material, which are sometimes called *skins*[91], which have not enough stability in themselves, and which therefore need a more rigid backing[92], which is achieved through what is usually a two- or three-piece plaster mould on small works, or

77 Andrews (1988) p. 60.
78 Mills (1965) p. 53.
79 Andrews (1988) p. 60.
80 Andrews (1988) p. 60.
81 Rich (1961) p. 114.
82 Andrews (1988) p. 59-60.
83 Mills (1966) p. 53.
84 Mills (1966) p. 58.
85 Percy (1965) p. 69.
86 Percy (1965) p. 38.
87 Percy (1965) p. 70.
88 Butler (1997) p. 33.
89 Mills (1965) p. 15.
90 Andrews (1988) p. 59.
91 Mills (1965) p. 15.
92 Verhelst (1973) p. 17.

a fibreglass piece mould for larger works[93]. V-shaped keyholes are sometimes cut into the containing mould to fix the flexible inner mould in position[94];

and there are **mother moulds**, which have also been called *casings*[95], or *main cases*[96], which are described as being similar to containing moulds except that they do not support flexible insertions, but which instead contain a large number of smaller piece moulds, so numerous in fact, that their quantity necessitates the mother to hold them together[97]. Sometimes, however, mother moulds are described as the bigger half of a two-piece mould[98], to which the smaller one will be joined; or the mother mould is describes as the main piece of a mould, to which numerous smaller sections are added[99]. In both cases, the additional smaller pieces are called *minor sections* or *caps*[100]. In the case of the mother mould being the main supporting part of numerous additional mould sections, it is said that in order to support the mother in holding all the numerous additions, another further addition called a *cradle* is sometimes needed, which might be constructed from vertical and horizontal wooden spars[101];

and there are **fabric moulds**, which are sometimes called cloth moulds[102], which are said to have inherent possibilities for sculpture, and can be made of cloth using a sewing machine, or which can be made of polyethylene or vinyl sheeting, which turns them more into plastic moulds[103], but which in any case are also said to work well for concrete castings, producing fine textures and rendering wrinkles very well[104];

and there are **inflatable moulds**, which have the possibility to be deflated, and which can therefore be withdrawn very easily, which is said to make them particularly useful for making negative spaces or cavities within the boundaries of a sculpture, but which are also said to be adaptable to architectural applications[105];

and there are **wax moulds**, which are said to reproduce fine forms, and which are fine for moulding small delicate forms[106], and which are excellent for small and very much undercut relief work[107], which is the reason they are said to have been used extensively

93 Verhelst (1973) p. 17.
94 Toft (1929) p.129.
95 Rich (1961) p. 100.
96 Mills (1965) p. 171.
97 Andrews (1988) p. 57.
98 Butler (1997) p. 11.
99 Butler (1997) p. 17.
100 Butler (1997) p. 22.
101 Butler (1997) p. 18.
102 Andrews (1988) p. 64.
103 Andrews (1988) p. 55.
104 Andrews (1988) p. 64.
105 Andrews (1988) p. 55.
106 Mills (1965) p. 78.
107 Toft (1929) p, 119.

by Victorian sculptors, especially using micro-crystalline wax[108], which can be fashioned by simply dipping the original into the molten wax , which can then be further supported by waxed bandages, and which can then be even further reinforced yet by wood laths[109] (which is sometimes also reinforced by a plaster jacket with additional support from embedded iron bars[110]). Wax moulds are said to be opened by cutting into the wax and releasing either the model or the casting, or simply warming the wax and peeling it away[111], which, in the case of a supporting plaster jacket with embedded iron bars, is only possible after the plaster has been chipped away[112]. Some methods of wax moulding are said to be used to fashion castings of faces, hands or small and delicate objects such as fruits, flowers, small animals, coins or medals[113];

and there are **sulphur moulds**, which are said to be built from a sulphur and iron mix melted to a liquid state, which has been described as being a mould material like Plaster of Paris[114], and which are sometimes, but infrequently, used to fashion impressions from very delicate surfaces found on coins and medallions[115];

and there are **wood moulds**, which are said to be made as a hollow carved piece of wood[116], and specifically of fir or other wood that can be split evenly, and which are also said to be usable as often and as much as one wishes[117];

and there are **paper moulds**, which are also called *papier-mâché moulds*, or *carta pesta moulds*[118], which are also sometimes called *direct moulds in paper* or *cardboard*[119], which are said to be a cheap method, and which are said to be made by pasting a number of coats of paper on top of each other[120];

and there are **plastic moulds**, which are made from vinyl or polyethylene materials in powder, pellet, or shredded form[121], which are said to be suitable when working with ma-

108 Mills (1990) p. 228.
109 Mills (1965) p. 61.
110 Toft (1929) p. 120.
111 Mills (1965) p. 61.
112 Toft (1929) p. 121.
113 Fredericks, F. F. (1927) *Plaster Casts and how they are made*. New York: W. T Comstock Co. quoted in Rich (1961), p. 123.
114 Biringuccio, Vannoccio (1990), *The Pirotechnia of Vannoccio Biringuccio: The Classic Sixteenth-Century Treatise on Metals and Metallurgy*. Stanley Smith, Cyril and Teach Gnudi, Martha (Trans.). New York: Dover Publications, p. 90.
115 Rich (1961) p. 122.
116 Penny (1993) p. 167.
117 Theopilus (1979) *On Divers Arts*. Hawthorne, John G. and Smith, Cyril Stanley (Trans.). New York: Dover Publications, p. 70.
118 Penny (1993) p. 306.
119 Verhelst (1973) p. 16.
120 Wagner (1963) p. 92.
121 Verhelst (1973) p. 20.

terials that can withstand temperatures of up to 200° Celsius[122], and which are described as particularly useful reliefs or forms that are not exceedingly complex[123];

and there are **foam moulds**, which can be made of either polystyrene foam (Styrofoam) or urethane (or polyurethane) foam, which might both appear similar, but which have important differences between them, and which are supplied as either solid blocks, sheets, and bars, or as liquid two-parts systems[124], which are said to offer many possibilities as direct-mould materials[125], and which are also said to offer distinct possibilities for angular or rectangular forms or unusual textural surfaces[126], and which are both said to be mould material that can be either dissolved or simply torn away, which is specified as commensurate excitement and involvement[127].

and there are **lead moulds**, which are used for casting phenolic resin, and are fashioned by dipping a model, which is usually a precisely machined steel arbor into molten lead, which is then cooled by dipping it into cold water[128];

and there are **iron moulds**, which are fashioned out of two flat pieces of iron that have been engraved on the facing-sides, and which, when aligned and filled with molten lead, are said to turn out as a single casting[129];

and there are **metal moulds**, which sometimes also doubled up with slightly smaller twin positives, give perfect results when squeezed together with material like papier-mâché between them, but which are described as expensive, owing to the cost of making the metal moulds[130];

and there are **split moulds**, which produce separate or partly dis-assembled castings[131], which are then joined together, or the cast is fashioned by joining two half moulds on the seams[132], which then produce one whole cast[133], which is also called *intact* cast[134];

and there are **press moulds**, which are said to have been used for many centuries[135] and are sometimes as simple as a receptacle, into which clay is pressed, which, on occasion, is

122 Verhelst (1973) p. 20.
123 Verhelst (1973) p. 20.
124 Andrews (1988) p. 157.
125 Verhelst (1973) p. 16.
126 Verhelst (1973) p. 17.
127 Mills (1990) p. 38.
128 Rich (1961) p. 354-355.
129 Theophilus (1979) p. 67-68.
130 Wagner (1963) p. 92.
131 Andrews (1988) p. 58.
132 Percy (1965) p. 44.
133 Percy (1965) p. 42.
134 Andrews (1988) p. 58.
135 Mills (1990) p. 34.

also hammered into the mould[136], It's stipulated that press moulds have to be open-ended (to allow the hand access for pressing the clay), that they be bone dry, and that they be kept dust-free[137]. It is said that tiles are often fashioned in press moulds, but that press moulds may also be employed for hand-forming or squeezing clay in the architectural terra-cotta industry[138];

and there are **clay moulds**[139], which, on the one hand, are said to have the advantage of functioning as flexible moulds when unfired, even though this might be within limits[140], and which, on the other hand, are also used as fired-clay moulds[141] when made of well-beaten clay, which then replace plaster moulds in bronze casting[142], in which case they might even have a clay-invested core for casting hollow bronzes[143]. Clay for clay moulds, on occasion, is said to be mixed with dung[144], and sometimes it is said to be mixed with grog filler, which can then be used both as mould and core filler for high temperature castings[145];

136 Piccolpasso (1980) p. 46.
137 Mills (1990) p. 36.
138 Rich (1961) p. 40.
139 Penny (1993) p. 195.
140 Stone, R. E. (1981) *Antico and the Development of Bronze Casting in Italy at the End of the Quattrocento.* Chicago: University of Chicago Press on behalf of the Metropolitan Museum Journal, 1 January 1981, Vol.16., p. 107.
141 Frederiksen, Rune (2010) 'Plaster Casts in Antiquity'. In Frederiksen, Rune and Marchand, Eckhart (Eds.) *Plaster casts : making, collecting and displaying from classical antiquity to the present.* Berlin: De Gruyter, p. 22-23.
142 Biringucchio (1558) p.231.
143 Vasari (1960) p. 163.
144 Theophilus (1979) p. 132.
145 Penny (1993) p. 302.

Scale

I cut longer and wider shapes out of cardboard and cover them in brown packaging tape. They no longer fit on the table. I roll out plastic sheeting and place the cut out shapes on the floor. The shapes are now longer and wider than me. I can step through the shapes easily or lie down in between. I start to extend the cardboard strips with other cardboard strips to make even longer shapes. I wonder when to stop. One day, I cannot lift the cardboard shape without it breaking in the middle: it is too long. I pause.

Mixing

I mix plaster into water.

Roithmayr, Florian (April 2010) *field of gypsum*,
photograph, White Sands National Monument, New Mexico, USA.

What is plaster?

Plaster is said to be an extremely versatile material, an accommodating and abundant sculpture medium with appealing characteristics[01], with engaging qualities described as soft and adaptable, which is said to be an excellent study material, and also an economical material[02], or a most basic, simple-to-handle, and inexpensive studio material[03], which is said to have to be bone dry[04].

Plaster is said to be applicable in dribble, in icinglike flows, in buttery slabs, in smooth mounds, in brittle crusts[05], through pouring[06], through spatter, brushing, or thin coating[07].

Plaster is said to have consistencies varying from *soft* to e*xceptionally hard*[08] or *puttylike*[09].

It is said that the setting of plaster can be accelerated, retarded, or the plaster can be killed[10].

01 Andrews (1988) p. 33.
02 Andrews (1988) p. 34.
03 Verhelst (1973) p. 42.
04 Butler (1997) p. 26.
05 Andrews (1988) p. 40.
06 Andrews (1988) p. 33.
07 Verhelst (1973) p. 13.
08 Verhelst (1973) p. 42.
09 Verhelst (1973) p. 13.
10 Wagner (1963) p.04.

Knowledge

One could know that plaster was made from the solid and crystalline gypsum through dehydration and decrystallisation, which is also called calcining process.

One could know that gypsum deposits were formed through the evaporation of seawater, leaving behind crystalized salts comprising calcium, calcium sulphate, silicates and carbonates.

One could know that through the addition of plaster to water, the plaster rehydrates and recrystallises to return to its original gypsum state. One could also know that plaster might also be made with lime instead of gypsum, or even cement, all through a process of crystallization in an exother-

Unbeknownst

At this point, I do not know that plaster is a highly manufactured and processed material.
I could have known, but I did not know yet.

mic reaction.

One could know that when lime is used, water is added to a white powder called slaked lime (calcium hydroxid), which is produced from quicklime (calcium oxide), which in turn is produced through heating limestone (calcium carbonate). One could know that lime plaster is said to be water resistant, and was often used for fresco painting.

One could also know that gypsum, which is also called regular gypsum, or hydrated calcium sulphate, or rehydrate Plaster of Paris, all have the chemical formula $CaSO_4$ $2H_2O$.

Similarly, one could know that burnt gypsum, or calcined gypsum, or dehydrated gypsum, which became known as Plaster of Paris, mined in the quarries of the Montmartre district of Paris, has the chemical formula $2CaSO_4H_2O$.

One can read that gypsum is derived from the Latin gypsum, which is derived from Greek word γύψος (gypsos), meaning "plaster" or "chalk", which became the German word Gips and the Italian word gesso.
One cn also read that plaster (English) and plâtre (French) derive, like the word Pflaster (German) from emplastrum (Latin), meaning '(wound) plaster', which was originally a paste to dress a wound with a medicated or protective dressing, which in turn derived from the Greek emplastron, which derived from emplassein, which means to daub over, or to mould. This in turn derived from en, as in 'on' or 'into', together with plassein, which means 'to form', or 'to shape'.

One can then also read that the double meaning in the original indicated both healing and building as in 'to shape' or 'to form', but also 'to mould', to 'daub over', to 'smear on', to 'cover (a hole)'.

How to cast plaster

The plaster is said to be sprinkled[01], scattered[02], or sifted[03] into the water until it floats, which is described as forming a dry film on top of the mix. The mixture is said to stand for a few minutes to allow lumps to dissolve, after which it is said to be completed by mixing either with hand or a drill and mixing blade.

01 Verhelst (1973) p. 42.
02 Rich (1961) p. 62.
03 Johnson, Lilian (1960) *Sculpture, the basic methods and materials.* New York: David McKay Company INC., p. 36.

Filling

I fill plaster mixed with water into the cavities formed by the small walls around the cut out shapes. The white liquid mixture flows along the brown edges of the cardboard and spreads out evenly in between the hollows formed by the walls surrounding the cut out shapes.

The liquid mix is then said to be poured[04], or the mould, which is said to have been treated with a release agent[05], is said to be charged[06], or the plaster is said to be flicked against the clay[07]. The pouring is said to be done gently, steadily and at one pace. It is said to best avoid pouring the plaster too quickly.[08] When pouring plaster into the mould it is said to be advisable to have a helper standing by with clay to plug any occurring leak and preventing the plaster from spilling.[09]

The mould is then said to be vibrated, which is said to release all air bubbles and assure a dense surface. Vibration is said to be achieved by tapping the mould with the hand, which is said to be the simplest and most common approach, or by placing the mould on a vibrating table, or by inserting an air-operated vibrator into the plaster mass. [10]

When the mould is full, any excess is said to have to be trimmed off and the mould is said to be left to set.[11]

The mould is said to be supported during the casting in a bucket of sand or in a wooden or cardboard box, or in the case of large moulds, supports are said to be built into the mould to make it self-supporting.[12]

04 Verhelst (1973) p. 42.
05 Verhelst (1973) p. 42.
06 Rich (1961) p. 63.
07 Johnson (1960) p. 36.
08 Mills (1966) p. 62.
09 Mills (1966) p. 64.
10 Verhelst (1973) p. 42.
11 Mills (1965) p, 64.
12 Verhelst (1973) p. 42.

Uncontainable / Excess

I mix more plaster than needed. Often I do not know precisely how much plaster is needed: maybe the content of one black rubber plaster mixing bowl with 2.5 liter capacity provides enough plaster for one medium sized U-shape. This is a guess. Maybe I could start to calculate future quantities based on the experience gained by previous attempts. I mix more plaster than needed, so as not to be caught out with too little plaster. I mix more plaster than needed because it is difficult to fill the plaster neatly into the U-shape. I am under pressure to work speedily so that the plaster does not set before the work is completed. I experience a conflict between wanting to fill the mould as evenly as possible, but also as quickly as possible, and I often accidentally pour plaster to the sides of the U-shape, sometimes the U-shapes overflow, some plaster escapes through crevices and the level has to be topped up. The plaster is leaking out. The plaster spills over. I pour the plaster and let it overflow and leak, filling the U-shape with more than is needed, and then gently tap the U-shape to release all trapped air bubbles to the surface of the plaster. I level out the excess plaster with the edge of a left-over strip of brown cardboard, and let plaster drip down the outer sides of the cardboard covered in brown packaging tape. The inside of the U-shape is now filled with just enough plaster. All excess - leaked or over-flown - clings to the outside of the cardboard, forming a kind of growing outer layer, similar to a crust of plaster, an

Armature

An armature is said to support materials[01], and has been called the *internal support*[02], or *reinforcing*[03], or specifically a *butterfly,* when it is a wooden cross supporting a clay pattern[04].
Armatures have been compared to the steel framework of a building[05], a bridge[06], or the skeleton in human and animal forms[07];

armatures are described according to varying specifications, which range from sufficient rigidity to carry weight, precisely corresponding proportion to the piece, careful planning and construction[08], to a transfer of stresses to give stability[09];

armatures are said to be made from any materials that will provide the needed form and support[10], such as wood, usually fir or yellow pine, polystyrene foam, galvanized pipe, concrete reinforcing rod (re-bar), wire mesh[11], steel, iron lead or aluminium rods with

01 Verhelst (1973) p. 02.
02 Mills (1965) p. 156.
03 Mills (1990) p. 180.
04 Verhelst (1973) p. 02 & Mills (1965) p. 156 & Rich (1961), p 30.
05 Verhelst (1973) p. 01.
06 Verhelst (1973) p. 02.
07 Mills (1990) p. 23.
08 Verhelst (1973) p. 81.
09 Verhelst (1973) p. 02.
10 ibid.
11 ibid.

encrustation, or forming little pools of leakage on the table around the shapes, like solidified pools. I know that too much plaster has been used – more than is needed to fill the hollow cavities. I have given up any attempts to contain leakage and overspill: I resign myself to the fact that filling the cavity is a messy, uncontainable, unpredictable leakage or overspill creating overabundant excess.

The plaster starts to set. The plaster starts to get warm.

Support

Following my curiosity I want to enlarge the cardboard U-shape more and more. I am also aware that the longer the U-shape, the more likely it is to break. At a certain point, I start to integrate internal support within the plaster. The cardboard U-shape has become so large that the inherent strength of the plaster would not be enough to support its shape on this scale. The plaster needs support to resist breaking under tension. The plaster's tensile strength is no longer sufficient to support the length I intend for the shape. If I proceed, the plaster will need additional core strength. The without of the plaster exceeds the within, which needs artificial support to withstand my intention. The incorporation of support allows the rendition of an impossible within, created through the incorporation of an invisible without.

copper wire[12], or in the case of mediums like clay, the internal support is said to be compressible materials such as crushed newspapers, foam rubbers, bunches of leaves, grass or corn husk[13];

wood armatures are said to need a coat of shellac for water-proofing[14], and metal armatures are said to need a layer of rust-inhabiting primer, although it is also said that this might not be necessary[15]. In other instances, wood or iron for clay armatures have been said to be best avoided, as they are said to cause the clay to crack open or break up[16], since they are not compressible, and are also said to constitute a foreign body within, which might also lead to what has been called *splitting of the form*[17].

12 Rich (1961), p. 29-30
13 Andrews (1988), p. 19
14 Verhelst (1973), p. 02
15 Verhelst (1973), p. 02
16 Vasari (1960), p. 149-150
17 Rich (1961), p. 31

Separator

A *separator*[01], which is sometimes called a *parting agent*[02], and sometimes a *lubricating agent*[03], *release agent*[04], *mould release*[05], or *parting compound*[06], is said to mainly function in preventing two materials from permanently sticking to each other, for example concrete (or any other filling material) and plaster (or any other moulding material)[07], or plaster and plaster when fashioning a multi-part plaster piece mould.
Separators are sometimes divided into two category types, with the first type being surface separators and the second type being area separators.

Surface separators are superficial pore-sealing substances or surface lubricants, which prevent one material from adhering to another material, or one material to itself, and which are used to support and facilitate the subsequent removal of a mould from a model

01 Butler (1997) p. 11 & Rich (1961) p. 91.
02 Percy (1965) p. 12.
03 Rich (1961) p. 94.
04 Verhelst (1973) p. 03.
05 Andrews (1983) p. 64.
06 Verhelst (1973) p. 22.
07 Percy (1965) p. 128.

Removal

I start to remove the cured excess plaster: at first, larger pieces, formed during the overspill or leakage, are broken off and easily lifted from the rolled-out plastic sheeting on the floor. Then pieces attached to the outer side of the cardboard covered in packaging tape are easily removed. Then I remove the cardboard covered in packaging tape. The plaster is sharp like the shell of molluscs. I occasionally cut a finger. Plaster pieces fall to the floor and break. As I remove the excess plaster and cardboard covered in brown packaging tape, the room rings with the sound of shattering plaster.

or from the cured or hardened casting[08].

Surface separators are said to be solutions employed on one surface of a substance[09]– or what is also sometimes called the *interface*[10] between substances – from sticking to another. Parting agents guarantee that two substances will remain two separate substances and do not bond, even when brought into direct contact with each other. They can be as simple as rape seed oil, graphite or French chalk[11], or plastic such as fluoro carbons (Teflon®), silicones, polyethylenes, polyvinyl alcohol[12], soft soap[13] or liquid detergents[14], though the results are said to be not uniformly satisfactory[15], beeswax, white or yellow, combined with carbon tetrachloride, shellac in alcohol, or mixes of shellac, borax, hot water and water-soluble aniline dye, lard[16] or tallow[17], clay-water or clay-slip[18], PVA[19] or wax-turpentine solutions, sweet oil, mineral oil, or petroleum jelly[20], talk or silica flour[21], and sometimes it can be as simple as the model, or residues of the modelling material on the inside surface of the mould, serving as a separator for the casting. And sometimes, mould materials and filling materials do not need parting agents when the combination of materials does not produce adhesion.

Separators dividing areas into sections are said to be made by inserting either a wall of metal, which are called *shims*[22] *(sometime made of brass*[23]*)*, or adding a wall of clay strips[24], both of which are also referred to as *fences*[25], *mould dividers*[26], or *barriers* (which are said to have keys)[27], or simply *parting lines*[28].
Clay wall separators are said to be made one section at a time, with indentations serving as registration marks, are also said to have the advantage of having better mould alignment, leaving few seam marks and so producing better castings[29] compared to metal shims.

08 Rich (1961) p. 92-93.
09 Mills (1990) p. 183.
10 Andrews (1988) p. 58.
11 Mills (1990) p. 187.
12 Verhelst (1973) p. 39.
13 Percy (1965) p.128.
14 Mills (1990) p. 184.
15 Rich (1961) p. 94.
16 Rich (1961) 94.
17 Mills (1990) p. 187.
18 Butler (1997) p. 11.
19 Percy (1965) p. 38.
20 Rich (1961) p. 95.
21 Verhelst (1973) p. 22.
22 Mills (1990) p. 169.
23 Butler (1997) p. 18.
24 Verhelst (1973) p. 13.
25 Glass, J. F. (1929) *Modelling and sculpture, a practical treatise for students, with a brief history of the arts*. London: B. T. Batsford, p. 83.
26 Rich (1961) p. 91-95.
27 Andrews (1988) p. 57.
28 Butler (1997) p. 18.
29 Verhelst (1973) p. 13.

d'Orbigny, Alcide; Fric, Vaclav; Reuss, Anton; or workshop of (ca. 1850s) *Foraminifera plaster models,* plaster, paint, woor. iron rod, dimensions variable. Grant Museum of Zoology, UCL.

Foraminifera

In the Special Collection of UCL, partly housed at the Grant Museum of Zoology, is kept an incomplete set of foraminifera plaster models. These marine microorganisms are an extensive order of rhizopods, consisting of a chambered shell of calcium carbonate. Many of them have various openings or holes in their shell through which pseudopodia extend, giving them their name: foramen, which can be translated as 'hole bearer'.

In the nineteenth century, leading scientists disseminated sets of foraminifera models reproduced in plaster to promote the study of Palaeontology. Alcide D'Orbigny (1802-1857), for example, based at the Museum National d'Histoire Naturelle in Paris, sculpted over 100 different specimens of these microfossils in limestone, and then moulded and cast them in plaster. They were distributed in fasciculi comprising 25 models each, accompanied by printed illustrations[01].

Around the same time, Leopold Blaschka, and later his son Rudolf, started to produce glass-spun models of marine invertebrates, which were distributed to leading science museums. Not much later, the German biologist Erich Haeckel published his lavishly illustrated enlargements of lithographs and autotypes called *Kunstformen der Natur* (Art Forms of Nature) collectively in two volumes. Haeckel produced over 1000 illustrations of various organisms.

The collection at the Grant Museum is incomplete and consists of several plaster models, which have clearly been taken from the D'Orbigny sets, mixed with models from other micropaleontologists. Judging by abbreviations on their labels (for example *d'Orb* or *F&R*), these other sets could have been from Anton Reuss (1811-1873) and Vaclav Fric (1839-1916).

01 Bowden, A. J. , Gregory F. J. and Henderson A. S. (Eds.) (2013) *Landmarks in Foraminiferal Micropalaeontology: History and Development.* London: The Geological Society, p. 17.

Dismemberment

I remove more and more brown cardboard covered in brown packaging tape. I experience a conflict: part of the process of plaster casting engages me in a process of destruction. I deliberately and systematically dismember, tear apart, pry open, pull and divide pieces of cardboard, brown packaging tape, and plaster. Some parts I break in half, others shatter into many fragments. The debris accumulates on the floor. I am walking over increasing amounts of scattered pieces of cardboard, packaging tape and plaster.

The mass grows.

The volume seems disproportionate – but I struggle to say in relation to what?
I experience a shock by this infliction.
The mind is set to break down and open up.
I start to question my real intention here.

d' Orbigny, Alcide; Fric, Vaclav; Reuss, Anton; or workshop of (ca. 1850s) *Foraminifera plaster model,* plaster, wood, irod rod, 12cm height. Grant Museum of Zoology, UCL.

A visit to the Grant Museum

I remember her coming to the Grant Museum in London with me to look at small white plaster pieces.

- I begin to consider these models as sculpture, and, taking this viewpoint, they appear totally understated – unconvincing – simple – absurd – brazen – mute – modest – slightly daft – romanticized – or humble even. From this viewpoint they seem like very basic, primary forms – Ur-Shapes, an idea rather than a reality. The model standing in for something else. They could be included in the sculptural category relating to scale, to alteration, enlargements, the making visible of what wouldn't be visible otherwise.

- Do you wonder how they are made?

- Do you mean what material, or how the material was shaped?
It's difficult to reconstruct. What is clear is that these models were produced using a whole palette of different processes, techniques and materials, mixing traditions of imitazione, idea and disegno with procedures based on contact and touch. They appear simultaneously cast and carved. It seems that the materials and techniques didn't matter as long as the end result achieved something, and this something lies entirely outside of the model, outside of what it is meant to represent and presents instead, outside of what it consists of, outside of how it came into being.

- How do you separate outside from inside?

- Instead of outside, I could as well say without. This would then mean something like: that which the model is meant to represent lies without its coming into being. Sometimes the without doesn't correspond to the within. Actually this is often the case. Here, the within is said to be made out of plaster, which leaves many possibilities: lots of different materials were mixed together and then called plaster. To start with, there probably was a model, made in clay, or even in plaster already. From this was taken a mould and then a casting with plaster, possibly followed by a process of carving. Casting is a process of addition, of accumulation, of building-up. Carving is a process of subtraction and reduction, of taking-away. They are, however, never as exclusive as they are made out to be: often they are performed almost simultaneously or are part of a flow of activities that do not appear as separate, distinct or contradictory acts during their performance. Some material is added and some is removed. Retrospectively one might be tempted to speak of additions and subtractions. In the moment of operation, these words do not necessarily register quite the same way as what appears as appropriate, or even necessary, activities. Modeling, in clay or in plaster, is a hybrid of both addition and subtraction.

- What about the black markings?

- Here, what might suggest the foramen, the holes giving them their name, seems not to have been part of the modeling, casting or carving process, but appears to have been applied in paint, as small black dots at numerous sides. Maybe even with something as crude as a black marker pen. These little plaster casts show obvious traces of being handled, parts have broken off and were repaired, then painted over again, with several different layers appearing at various ends that have chipped off and reveal subcutaneous layers. They are presented mounted on metal sticks attached to small wooden plinths, though similar models I have seen at the Natural History Museum are kept in wooden drawers, or small crates, not mounted. All of this happened before they ceased to be teaching-aids and became artifacts instead.

- How do you approach them?

- If you don’t mind, I would prefer if we consider these plaster works as teaching aids for now. For this is what they once were, before they were taken out of circulation. I start to wonder what it is they aid, what and how they assist? What do they teach? What do they demonstrate? Of course they simplify, reduce and abstract as much as they present and make concrete. They are shaped by their sculptural properties of scale and material transformation as much as by faith in visionary thoughts, faith in the capacity to disseminate, process and then retrieve information, perceptions, and knowledge. Shaped by a need for classification. Formed by a will to instruct. Multiplied through moulding and casting and dispersed by the ambition to exchange and disseminate knowledge.

- How do you account for the number?

- Here in front of us are enough of them to suggest there could be more. A sameness that also suggests endless variations. Fragmentary resemblances, but also deterioration through touch. The unique exception, and also an endless proliferation.

- And you in front or amongst them?

- As a group they totally exclude me, throw me back unto myself. They continuously show me what I know, what I recognize, and how I try to make sense. The only thing I really notice for certain is myself, my knowledge, my attempt to approach them, but nothing new they might be intended to show.

- Where does this lead you?

- I’m going round in circles. At precisely this point I fail entirely to get over myself. These little models appear to refuse my interpretations and projections – my knowledge of sculpture, my training in looking, detecting and interpreting doesn’t touch them. And so I become aware, less of the army

The model

Sometimes a casting is made in a mould taken of an existing model.

Sometimes this is described as a transfer from a non-permanent material like clay to a more permanent material like plaster or concrete[01].

It happens on occasions that in this conversion the model, which is sometimes also called the *original image*[02] or the *original form*[03] or the *original three-dimensional model*[04], gets destroyed and superseded by a single duplicate of this now lost original.

At other times, however, the model is itself also a cast, for example a wax model used in the lost-wax bronze casting process is often cast itself before it is lost. If this is the case, then it is called *indirect cast*, or *inter-model*[05], which is also sometimes known as *counter model*, although it has been suggested that this implies a negative of the model[06], which it is not.

Sometimes, the model is also called a *master copy*[07], *master*[08] or simply referred to as *the work*[09], and sometimes the material of the master is also the material used for the mould jacket (if it is a flexible mould, or multipart mould), and most likely also the material for the casting.

Sometimes the modeling material can be reused as casting material.

01 Andrews (1988) p. 49.
02 Butler (1997) p. 11.
03 Andrews (1988) p. 50.
04 Rich (1961) p. 23.
05 Broecke (2015) p. 258.
06 Stone (1981) p. 95.
07 Mills (1990) p. 127.
08 Percy (1965) p. 80.
09 Verhelst (1973) p. 17.

of plaster models I'm looking at, and more of my own faculties, ambitions and skills. What I connect to is myself and these little assistants appear to aid this connection. There is nobody else yet: they are not a portal to a maker, a teacher, another. They certainly don't teach me anything I don't already know.
Just me and them – and then me even more than before. There seems to be too much of one kind of knowledge, and too little of another.

- What are you going to do?

- It's not really any longer just them and me. I have invited you here as well. It's us now - them, you and me.

At other times the model is also called *prototype*[10], which serves for the production of future moulds, which then implies that the castings made from it are multiple and numerous. Sometimes, the model is also just simply called the *original*[11], which also implies that there will be numerous others that are to come afterwards.

In some of these instances, the importance of the model as the master is transferred to a cast, which then becomes the master cast for moulding future models, which might then in turn be moulded to produce an *edition*[12] of casts. In cases of limited editions, all moulds are said to be destroyed upon completion of the set number of casts to preserve the edition's integrity[13].

In other instances, the model is an existing cast, from which a mould is taken, which is then called *original cast*, or sometimes *replica*, which one could then also call a *copy* or *reproduction*, which in some instances are authorized by an artist or an artist's estate[14]. Sometimes, the model is also called the *definitive pattern*[15], and the original model is also called *original plaster pattern*[16] when it is made in plaster, or *clay pattern*[17] when it is made in clay, which suggests that it can be used for further mouldings. And sometimes the model has been just called a *pattern*[18], without reference to its material, in which case it is unclear if it is intended for moulding at all.

Sometimes the model is not destroyed in the moulding process, and is instead re-worked afterwards, which will allow subsequent mouldings of the altered model, which would then produce different casts which are then called *versions*[19]. The same applies to inter-models.

The desire to produce either a single, unique, and authentic piece, or multiple, various and numbered proliferations, often creates uncertainty: it is said that the distinction between an original and a reproduction is confusing when a number of originals are cast from the same mould[20]: it is often difficult to foresee how many results will spring from one source. It is difficult to foresee the fidelity of the results to the original.

10 Penny (1993) p. 171.
11 Mills (1965) p. 53.
12 Butler (1997) p. 51.
13 Birks (1998) p. 35.
14 Andrews (1990) p. 50.
15 Verhelst (1973) p. 01.
16 Butler (1997) p. 33.
17 Mills (1990) p. 13.
18 Vasari (1960) p. 148.
19 Butler (1997) p. 14.
20 Andrews (1988) p. 50.

A visit to the plaster workshop Felice Calchi

In my memory, Andrea Felice and myself are meeting in a plaster workshop near Ciampino Airport on the outskirts of Rome:

- For me, with sculptural processes, you need a mould. You start to model in

clay, and then you have to transform it into another material. So you need a mould. Of the clay model you make a mould in plaster, called lost mould, or fast mould. So you make the mould on the clay, then you take off the mould. And your clay model is destroyed. At that point, you have lost your sculpture, because you don't have anything. Your work was very difficult, you suffered trying to produce something, you worked hard. You had to think a lot for that work, and at that point you don't have your work. You have just the mould, and you have to hope that your mould maker was skilled. Because if the mould was not good, you have lost your work completely. So that time is a magic time for you.

- This is a magic time for you. This might also be a magic space for you. The mould, touching the model, then losing the model, and hoping to touch the material being filled into the mould. You hope for the best. You don't see your work anymore, and you cannot foresee the future outcome. You hope that these materials touch, but never fully combine. You hope that they yield to each other, and you hope that they yield to each other in return. But you hope that they never become one. You hope that here is always a small space between them, as close as they might get to each other, because you hope they will come apart again. So you hope, like you said, for something magical - time or space. But also a kind of space you can't go in, so you don't see what happens there. It's magical for you, but also hidden from you, it's absent, you can never fully see this space. The minute you form this space, it becomes invisible to you. You can try to think it, or you can attempt to imagine it. But you can't see it, as if you are working in the dark, as if you work blindly and you don't actually see what you are doing.

- Some months ago, I wanted to create an experience for myself. I asked my father to make a life cast of my face. But not so that I would simply have the cast of my face, but because I wanted to live inside a mould. I wanted to know what happens during a moulding process. I make a lot of moulds. And I wanted to know what it would feel like when I am inside a mould. So, during the work, I can hear the sounds of the process. I can appreciate the smell of the plaster, and every one of these sensations makes me cautious of the situation, of the process.

- Do you mean you were very aware of the sensation of being inside the mould?

- I was both inside and outside. I can feel the rubber alginate on my face I can feel my father move, and move around me. I know the timing of each step. The noise of the tools amplified inside the mould like inside a box. The warmth of the plaster as it sets and how long it takes. Before my closed eyes, I can see every movement of my father, at every moment, because I know what he is doing. I was two persons at the same time.

- Do you mean you were both your father and yourself in this moment?

- No, but I was in the mould and also outside looking, looking at the work.

Geoffrey-Dechaume, Adolphe-Victor (1859-1880) *plaster casts from life of friends & Louis Steinheil,* plaster, dimensions variable. Musée d'Art et d'Histoire Louis Senlecq, l'Isle-Adam, France © Courtauld Institute of Art, London.

How to make a face mould from life

Casting from a living head, casting a face from life, or fashioning a face mould has been described as being carried out with plaster, with plaster bandages, or with agar, either as a single one-piece mould, or through a two-piece mould.

In making a cast from a living head with plaster bandages, the ears need to be sealed with lubricated cotton wool[01]; The nostrils are said to remain uncovered, and sometimes straws or small plastic tubes[02] are inserted, or sometimes quills with fine wool fitted into the nostrils are said to allow the subject to breathe[03], or breathing tubes are to be inserted, for the subject to continue to breathe[04]. Sometimes, a frame is placed in position and fastened to the subject's head where the mould is to end[05], or a cloth is tied around the model's head to act as a barrier[06]. The model is kept in a horizontal position to facilitate the application, which is specified in most cases. Separators are said not to be required when using agar compositions[07], but are needed when using plaster or plaster-bandages.

It is stipulated that a death mask is carried out in a similar fashion, except that quills are not needed, and the eyes can be left open[08].

01 Rich (1961) p. 100.
02 Mills, John W. (1991) *The Technique of Sculpture.* London: Batsford, p. 77.
03 Wagner (1963) p. 84.
04 Rich (1961) p. 100.
05 Rich (1961) p. 99.
06 Wagner (1963) p. 84.
07 Rich (1961) p. 100.
08 Wagner (1963) p. 84.

Sequence

I am concentrating and working methodically:

cutting, cutting, folding, taping, mixing, pouring, supporting, tapping, tapping, waiting, breaking, peeling, prying, lifting, turning

or left to right ~~U~~:

excess plaster, brown packaging tape, brown cardboard, brown packaging tape, plaster, support, plaster, brown packaging tape, brown cardboard, brown packaging tape, excess plaster

..... gap .....

excess plaster, brown packaging tape, brown cardboard, brown packaging tape, plaster, support, plaster, brown packaging tape, brown cardboard, brown packaging tape, excess plaster, ...

Roithmayr, Florian (2015) *with, and, or, whithout,*
concrete, tape, cardboard, plastic, felt, 486 x 42 x 4 cm. Camden Arts Centre, London.

Charles Sanders Peirce

Peirce's semiotics is formed through the triadic relation of a sign to an object leading to an interpretant. The flow in Peirce's semiotics, the process of semiosis, is the flow of signification through the relationship of sign, interpretant, and object, which then becomes the new interpretant. The interpretant needs to be fully formed and recognized for it to function as a sign, through continuous and on-going processes of engagement or through shifts in language or conceptualizations.

Peirce extends the triadic nature further to the sign in regards to the function of its representative condition consisting of iconic, indexical or symbolic types, corresponding to firstness, secondness, and thirdness, which Peirce called qualities, forces and mediations[01].

In Peirce's aesthetics, the first and second interpretant are formed before an interpretative thirdness arises, that is before known meaning is attachable.

01 Peirce, C. S. (1931) *Collected Papers of Charles Sanders Peirce, Volume I.* Hartshorne, Charles and Weiss, Paul (Eds.). Cambridge, Massachusetts: Harvard University Press, 1.356-1.359, p. 183-185.

or

something – relating to something else – and in between appears a third space, which appears empty, when indicating a relation to its sides, or it appears empty, when indicting a relation to its future filling.

Supervision

In my memory we are sitting together at a table.

I say the notion of a dialectic relation seems to be insufficient or problematic when thinking the flow of processes in moulding and casting.

> She says you could instead introduce thirdness. Through Peirce's semiosis, it becomes a triadic relation, of sign, interpretant, and object, which then becomes the new interpretant, etc. Peirce offers the possibility to think the formation of meaning, the process of semiosis, not as a binary or dialectical negotiation of form and counter-form, of mould and cast, of signifier and signified. It's not the two sides of a coin. Peirce introduces the interpretant, or thirdness, as an element that continues, drives and extends the chain of signification.

I say it is interesting to give rise to meaning through the primacy of process and flow, which can also arise through breaking the process.

She says that this might be also what Peirce describes as metaphysical shifts of firstness to thirdness, and the need for the interpretant to be fully formed and recognized for it to function as a sign.

She says this is very interesting, because this is a process we are engaged in. There is another way of describing this through a shift in language or a shift in conceptualization.

I say in working with materials and processes of moulding and casting, it has become apparent that what was initially fascinating was to produce something that looks like something else, sharing a resemblance, something that establishes an iconic relationship. Then I realized that the indexical or existential relationship between two forms, shapes or materials demands more engagement, that there is a powerful relationship and connection based on touch and contact, even if, and especially when, they do not resemble each other. And now it is as if the qualities we attach to the materials takes centre stage. I mean plaster remains the same material with the same behaviour. It doesn't change the way it gets warm when it starts to set, whether it is doing this in the Renaissance or now. But how we think of it changes, the meaning we attribute to this warmth changes, what, if any, emotional responses are triggered changes.

She says in Peirce, meaning is formed through the interpretant. You move through firstness and secondness to arrive at thirdness. This is the flow of signification, this is semiosis and the formulation of meaning.

She says you have to allow for the formation of the first and second interpretant before you start to make an interpretative thirdness. That is before you start to attach known meaning to something. You have to allow the factual, your feelings, your responses, your theological responses.

I say often recognition starts to interfere too soon.

I say two materials come together: but there is also something in between them that exist because of their coming-together, which in the moment of encounter exceeds them both. It is the additive or accumulative process of putting two things together. But also the fragmentary, subtractive, disintegrative process of coming apart.

She says it becomes very interesting, because this space in-between is like a space-of-the-unknown.

I say it is hidden, it exists as a relation across the two entities, but some part of it, a new part that starts to exist, also remains unknown and cannot be named yet.

Miracle

The word *miracle* derived from the Latin word *miraculum*, with the sense of 'object of wonder,' which derived from *mirari*, with the sense of 'to wonder at, marvel, be astonished,' or figuratively 'to regard, esteem,' which derived from *mirus* meaning 'wonderful, astonishing, amazing,' and the earlier *smeiros*, which derived from the Proto-Indo-European word *smei*, meaning 'to smile.'

She says what we are talking about is the unknown: something is coming into being and we are not sure how and why.

I say the origin of this is really quite strange. It is almost like an emergent property of the process itself. And what is its signification? I mean it is indicative of something. It is indicating something that is arising without an origin as an aspect of the process.

She says something was created by putting those two together.

I say they both create each other the moment they are put together. But there is a sudden additional indication: an invisible, ephemeral, allusive, un-nameable form of some peculiar sort, possibly continuously yet to come. Which is to say: this space is miraculous, in the sense that it makes us smile.

CEMENT

A box

A space is delineated – marked, enclosed. Surrounded on all sides by wooden limits, it confines an area on a horizontal and vertical axis. Sideways, upwards, downwards starts to have limits. My foot, my knee, my leg, up to my hips, along the chest, to my shoulders, and back again. Width and length.
Less than a cubic meter, but more than a cubic foot perhaps.

Cement and sand are turned and mixed and become one. Equal measures – one to one proportions.

A little water is added, a little at a time, and cement, sand and water become one.

This fluid, wet mixture is transferred into the box. It fills the space just about half-way, or a little less than up to my hips. Two volumes, one empty, the other full. Or three volumes, two half volumes and one entire volume, comprising the two half volumes.

Through a long nozzle, expanding foam is inserted into the cement-sand-water mixture, and it becomes a cement-sand-water-expanding foam mass.

Or so it appears.

The foam comes out of a canister under high pressure and enters the cement-sand-water mixture like a jet. The nozzle dances through the wet mixture, driven by the pressurized force, bouncing of the sides of the box. The cement-sand-water-foam-mass starts to erupt. The level rises. There is great tension between the wet mixture and the expanding foam.
A battle is taking place. Both materials attempt to fill the space there is, pushing each other out of the way. The box is the only cavity there is. It determines the available space for both the cement-sand-water mixture and the foam.

The place is the confined space, delineated by the edge of the box.

The taking place happens within, two conflicting forces are fighting for dominance: the cement-sand-water mixture and the foam each want to fill what space there is. They work against each other: The foam, expanding, the cement-sand-water mixture, resisting. The battle rages until the foam is done with expanding, and the cement-sand-water mixture is done with resisting. An agreement has been reached and each one settles into its claimed space.

The space, no longer a space as much as a filling, both a volume and edges, though inseparable at present, is resting.

The whole lot, volume, mixture, foam and edges are turned upside down and the edges are peeled back. The top and the bottom of the box are taken off. The four sides are taken off. Only the volume remains – a mass of cured cement-sand-water mixture with strata of foam.

A cast

A cast is sometimes called *male*[01], and sometimes it is called a *positive cast*[02] or *positive form*[03], and sometimes it is referred to just as *positive*[04], and sometimes it is called *impression*[05] as well.

Casting is sometimes called a means for imitation or reproduction through mechanical transformation, with the intention to create more rigid, substantial, durable, permanent, economic, accurate or numerous results[06], which is a description of an intention directed towards identified objectives, and specifically an intention to convert into different material registers, and which, it could be argued, might also entail an intention to translate into different sensorial regimes.

Sometimes casting is described as an act of filling (which is also called *charging*[07]) with material to reproduce volume and surface detail from something else[08], which is also described as contact of the cast material with the interface or contact face of the mould, which will result in the cast bearing the same texture[09], both of which are descriptions of an intention to convey and transfer properties or characteristics from one entity, material or surface to another.

The essence of casting is said to be the creation and filling of empty space[10], which, as an ensemble of the activities of creating and filling, leads to a description of the casting process as divided into two fundamental stages or phases, which are firstly the fashioning of an impression or negative mould from the original (creating empty space), and secondly the positive result or reproduction of the original object from the negative impression (filling of empty space)[11] (although the term *casting* is often specifically used to only de-

01 Mills (1966) p. 53.
02 Rich (1961) p. 90.
03 Mills (1990) p. 32.
04 Rich (1961) p. 18.
05 Rich (1961) p, 90.
06 Rich (1961) p. 17.
07 Andrews (1988) p. 58.
08 Mills (1990) p. 32.
09 Andrews (1988) p. 57.
10 Andrews (1988) p. 49.
11 Rich (1961) p. 17-18.

The foam is removed. It is separated from the cement-sand-water mixture that is now concrete. The foam is pulled away and discarded on the floor. The foam is piled up until it is moved to another site. The concrete is stripped of the foam and is left intact – as far as this is possible. It is left behind. The box is reassembled and the isolated concrete is placed on top of the box. Both are moved into a different space.

But several times this didn't happen, or only some of this happened, or something else happened as well.

scribe the second stage), and with said two stages described as either a series of multiple creative steps resulting in a single object, or, conversely, as a system for producing multiple copies of a single object, which are two different objectives towards which casting is said to be able to be directed, and which seem to imply, in the first instance the characteristic of uniqueness and distinction (which has also been called *innovative*), and in the second instance, the characteristic of proliferation and the formation of a series (which has also been called *reproductive*)[12].

12 Andrews (1988) p. 49.

Dust

I prepare another box and fill it with foam and cement-sand-water mixture.
I'm covered in dust. My clothes bear cement dust. I have a cement dust shirt. My eyebrows, my hair, my shoes, my hands are grey. My lungs start to be cast from the inside. I swallow dust. I'm turning into cement.

In return, I start to spit into the cement-sand-water mixture . I drop a few hairs in. Nail clippings. I piss into cement-sand-water mixture.
I'm trying to break even with concrete, measure up to it, keep pace with it.

I'm still encased in cement dusts.

I will have more spit.
My hair will grow back.
My nails will grow back.

But even after all that, there will be concrete, all around, it will outlast a lifetime.

Opening of a box

The box is removed: the four sides and the bottom are unscrewed and lifted off. They reveal a smooth block of concrete and foam mixture packed together tightly.
The foam starts to be removed: first the larger pieces are carved out, the pieces that are easy to reach. I scrape, tear, scratch, stab at the foam. Once removed, some foam reveals more foam, or reveals foam surrounding smaller pieces of concrete. Some removed foam reveals concrete, or concrete interrupted by smaller pieces of foam.

When the foam is peeled, lifted or scratched away, I do not know what is behind the removed piece, I do not yet know what will be revealed. I expect concrete. I hope for concrete. If it is concrete, I do not know what form the concrete has, what shape, what size, and how – if still – it is connected to other forms or shapes of concrete.

I continue to remove foam and there appear smaller and harder to reach pieces. Steel dental tools

Archaeology

During an excavation season on the bank of the river Nile, where, for a while, it flows back south again instead of north, before it returns to its original direction, an international team of archaeologists, geologists, structural engineers and artists found two ceremonial amphorae buried in the sand in the recently uncovered entrance to what was then believed to be a subterranean funerary temple.

Unusually, the vessels were found upside down, and their base, which now formed the top, had been crudely severed off.

First, the team of trench-workers discovered the cut vessels protruding from the sand. They then carefully worked downwards to remove layers of debris and free the amphorae of sand, which had to be removed from around as well as from inside the containers. When about two thirds of the vessels were exposed, two archaeologists carefully lifted these upside-down hollow volumes from the sand: what remained were two concave impressions in the sand, their surface surprisingly patterned and colourful.

Over several millennia, the pigmentation of the amphorae had transferred from the vessels to the surrounding layer of sand and once the empty containers were removed, the

can reach into the smallest cavities and crevices. The concrete, now cured and hard enough, stays behind. The concrete remains. It is a remainder. Or some of it remains.
When the foam is peeled or scratched away, I do not know what is behind, I do not yet know what will be revealed. I expect concrete. I hope for concrete. I do not know what form the concrete has.

I peel, I remove, I lay bare, I uncover, I expose.

I open the mould.
I remove the mould.

As I work and scratch the foam away, I become aware of the archaeological characteristic of this activity. It is as if I'm performing an excavation.

Excavation

I work methodically: the intention is preservation, but the ambition is informed by a desire to reveal and make available. Sometimes, the reality is different, and intention, ambition and situation do not correspond. When this is the case, the desire to reveal and uncover brings with it destruction and concealment.

pigments remained behind, forming a kind of mirror-image of the coloured pattern found on the vessels now appearing on the exposed sand surface.

This instance, however, lasted no longer than several seconds. The arid climate immediately evaporated all moisture from the exposed sand, and the wind carried away both dry sand grains and pigments. The concave impressions collapsed and dispersed.

Opening of the mould

The opening of the mould has been variously described as *freeing the sculpture within*[01], *revealing the finished cast*[02] or *stripping off*[03], *removing the mould*[04], or the mould *gently*

01 Andrews (1988) p. 58.
02 Johnson (1960) p. 34.
03 Andrews (1988) p. 58.
04 Verhelst (1973) p. 13.

From: Rachael Dann
Subject: RE: checking in
Date: 14 December 2016 18:13:25 GMT
To: Florian Roithmayr

Dear Florian,

Great to hear from you! Yes, Paris is wonderful - I love being here!

Congratulations on being close to submission - it seems like you've been very quick. When is the deadline? Is the exhibition open to the public, as I'd love to come and see it if that's possible. I'm so glad that you found some good source material and some fruitful experiences in Sudan. The texts you sent me are more than passable: I enjoyed reading them, and they brought back memories: I remember the pots in the mortuary temple. It is actually quite fascinating to read the passages, as I feel a sort of intimacy in them: for me they reference so much, but I think you've captured many layers (pun intended) of praxis and meaning about the past, the archaeological process and the various processes of creation that we're involved in.
Not trying to look I'm correcting your efforts! We've decided that it was a mortuary temple. Mortuary temple is more technically correct (or more Egyptological). I'd say 'excavators' rather than 'trench-workers', and just to be picky - they weren't amphorae (amphorae have a very particular shape and handles). If you want a more descriptive term you could use 'round-bellied pots'.

All good wishes from Paris,
Amities,

Rachael

Associate Professor, Egyptian & Sudanese Archaeology
Department of Cross-Cultural & Regional Studies
Karen Blixens Vej 5
Copenhagen S

eased off[06], or else *removal of the cast from the mould* or *the model from the mould*[06], which is also called the *withdrawal of the model*[07], or *peeling back the waste*[08].

It is said that in opening the mould, one has to be cautious[09], take great care[10], work gently[11], use careful leverage [12], not hurry[13], have patience and not get flustered[14].

Commence chipping[15]:

A waste mould – as the name indicates – is said to be chipped away[16], or, from the perspective of the cast, it is a process of chipping-out[17]. In all cases, the mould without is destroyed (wasted) to reveal the cast within.

Often, the mould material is thin enough to be chipped away, whereas the casting material should be harder than the moulding material[18]. The mould needs to be damaged, the cast should not be damaged.

In most instances it is said that the chipping is done with a chisel and a wooden mallet, which has been described as an old carving tool that has served its time[19], or a blunt joiner's chisel[20], but sometimes with a hammer[21] instead.

Chip the plaster away with a hammer and chisel[22]***:***

Sometimes the chipping adopts a strategy, which might be to start from the top and work down[23], or it is said that there are parts which are best chipped out first, and others which are said to be better left awhile[24], or it is said that it is best to start whenever possible by

05 Glass, J. F. (1929) M*odelling and sculpture, a practical treatise for students, with a brief history of the arts*. London: B. T. Batsford, p. 83.
06 Percy (1965) p. 45.
07 Wagner (1963) p. 07.
08 Mills (1965) p. 65.
09 Butler (1997) p. 47.
10 Butler (1997) p. 47.
11 Verhelst (1973) p. 13.
12 Butler (1997) p. 13.
13 Glass (1929) p. 82.
14 Glass (1929) p. 81.
15 ibid.
16 Percy (1965) p. 142.
17 Butler (1997) p. 15.
18 Andrews (1988) p. 52.
19 Mills (1990) p. 127.
20 Mills (1965) p. 65.
21 Butler (1997) p. 13.
22 Andrews (1988) p. 62.
23 Butler (1997) p.13.
24 Glass (1929) p. 73.

revealing a high point through the mould, and chip away carefully and methodically [25].

The chipping is said to be done into the mass of the mould and cast and not across it, carefully and methodically[26].

Sometimes, the first layer of mould material – i.e. the layer immediately covering the model or casting – is coloured to announce the immanent revelation of the cast during the opening of the mould process. These are sometimes striking colours of blue, red, green or yellow pigments added to plaster or concrete, which has been described as marking the proximity of the sculpture underneath[27], or as a warning that we are nearing the surface of the cast[28].

In the case of a two, or multi-part mould, the chipping is said to be limited to opening the seams joining the mould parts to expose what on the one hand has been called the *separation lines*, which is said to then be followed by tapping wooden wedges into the seams to separate the sections and open the mould[29] along what is also on the other hand variously called the *parting lines*[30].

The parts of the mould are then said to come apart because of *draft* – which is described as the slight angle provided on the sides of the patterns to allow the mould to be readily removed from the said pattern[31].

Sometimes the opening of the mould requires different techniques to chipping, which depends on the mould material. These range from carving away[32], deflation[33], dissolving or tearing[34], to scraping out[35]. It follows that sometimes the mould is not opened at all, but instead undergoes a process called *pattern-removal*, which is also called *de-waxing* (if the material to be removed is wax), or *de-foaming* (if the material to be removed is foam), which in both cases could be through a process called *burnout*[36], or *burning out*[37], or as it is most often the case, *loosing* (as in lost-wax casting, which is also called *cire perdue*[38]), which, in a way, could also be called wasting.

25 Mills (1965) p. 65.
26 Mills (1965) p. 65.
27 Andrews (1988) p. 53.
28 Butler (1997) p. 13.
29 Verhelst (1973) p. 13.
30 Butler (1997) p. 18.
31 Verhelst (1973) p. 22.
32 Andrews (1988) p. 55.
33 Andrews (1988) p. 55.
34 Mills (1990) p. 38.
35 Penny (1993) p. 131.
36 Verhelst (1973) p. 32-37.
37 Stone (1981) p. 102.
38 Mills (1965) p. 81.

Instability

I open another box. I open the four sides and the bottom and lift them off. They reveal a smooth block of concrete and foam mixture packed together tightly.

I start to remove the foam.

Once the foam is removed, there is no longer any support. What was a smooth faced block of foam and concrete packed tightly together, an enclosed entity of protection and an upholding unity, now becomes one-sided, top-heavy and unstable.

The removal of some of the foam reveals more foam encasing a twisted series of cured concrete shafts.

Once the foam is removed, the previously reached equilibrium is forfeit.

What were once secure parts become unsecure and precariously unbalanced. It might be that small streaks of concrete can no longer support the weight above them, behind them or adjacent to them. What appeared to be a unity, a solid and smooth faced block of concrete and foam starts to disintegrate and fall apart with the removal of the foam.

Supervision

In my memory we sit facing each other in his office.

I say to him that the work has become very unstable.

> He says to me that he hasn't really thought of it as an inherently fragile space. He says that it certainly is a kind of magical, or quasi-magical space, but not inherently unstable. He says that it is perhaps in regards to the fragility of the mould that I see instability.

I say to him that the transitional space of shifting from one form or material to another is inherently unstable and fragile. I say that these kinds of fragilities or instabilities are often required to be covered up for the sake of presenting a stable and coherent framework. I say that otherwise they cannot be accessed and evaluated through established institutional channels. I say that this remains the case unless I also establish a stable premise for accessing instability.

> He says that it is in the sense of a transgression of boundaries. He says that declaring something as sculpture creates a kind of foreclosure. He says that suddenly there is an unstable space.

I say that fragility is entailed within the process of letting go and with passing on responsibility.

He says that a mould involves a process of letting go.

I say it is a kind of sacrifice or surrender. I say this already starts in the studio - from an observational level - with the making of a model; I say I enter a compromise knowing fully well that this is not it.
I say from the start I enter an agreement that what I do might not be the end; I say I might spend time making a model, and then build a mould from it; I say I will have to invest time and effort into them knowing that I will discard both, that I will break them, that they will be wasted. I also know I will make something else; I say much of what I make will be thrown away; I say I acquire many materials and manipulate them over time, knowing fully well that I will have to break them, tear them open, and throw them away in order to allow something else entirely; I say my drive and participation registers and leaves marks; I say there is an ongoing series of sacrifices being made; I say they accumulate, they build up and appear uncontainable; I say this accumulation of referred responsibility, of abandonment and surrender, corresponds to the transformation of material at the moment of imprinting; I say this accumulation proliferates and spills over and exceeds the material; I say it becomes sculpture.

He says letting go, the moment of surrender, is also the moment of care, and brings the implications of care; he says there are certain kinds of moral impositions; he says these processes instigate complicity within the articulation of a moral obligation in relation to the work being produced; he says there might appear an imperative to engage in a highly moral arrangement and relationship with the material world; he says the vulnerability and the fragility that is entailed, that is put on view, also produces a second charge; he says it creates a certain sense of communitas on the basis of fragility and the moral imperative of care;

I say we are entering a highly unstable but productive space of transitioning; I say it is a space that can be full of risks; I say this space between might translate and catapulte itself outwards - from within to without; I say it becomes sculpture.

Fragility

Cracking, breaking, falling apart, disintegration: I can imagine the part that falls off to be still sculpture, imagine two sculptures, three, proliferating quantities of ever smaller sculptures, to the point where what is sculpture, and what is not sculpture, becomes indistinguishable.

It becomes dust.

I can imagine the whole lot together as one sculpture consisting of many parts, continuously unstable, broken, or with the possibility of breaking down and scattering, some parts, which are present, some parts, which have separated off, parts that have been removed and exist elsewhere, a network of scattered parts forming one sculpture, barely holding on to any kind of autonomy, or instead, abandoning autonomy for community.

Casting defects

Sometimes, there are irregularities in a casting process, some of which can be corrected, some of which are said to be repairable, some of which have to be removed, some of which have to be eliminated or disposed of[01].

Sometimes, there are irregularities which are so severe, they result in fragmentation, and sometimes there are irregularities which are not visible, some of which because they are below the surface, some of which are very visible, some of which can occur only in one specific kind of casting process and are then process specific, and some of which can occur in any kind of casting process.

Irregularities result from different causes, some of which have solutions, some of which can in turn be cause for another kind of effect, some of which are given different names and some of which are included in conflicting nomenclature, some of which result in misunderstandings, some of which add complications in the casting process, and some of which are the result of needless and avoidable efforts.[02]

These irregularities are sometimes classified into different categories, some of which relate to filling, some of which relate to shape, some of which relate to thermal changes, some of which relate to appearance.[03]

There are also other possible classification systems, some of which distinguish between defects caused by irregularities in the moulding and irregularities in the casting, or some of which distinguish between gas porosity, shrinkage, mould material, pouring and metallurgical defects[04].

Some defects are caused by shrinkage, some of which are open shrinkage defects, some of which are closed shrinkage defects, which are sometimes called *shrinkage porosity*[05], some of which are shrinkage cavities[06], some of which are shrinkage cracks[07].

Some defects occur because of gas porosity, some of which is the formation of bubbles during the cooling process of the cast, some of which may occur on the surface of the cast, and some of which might occur within the material.

01 Andrews (1988) p. 58.
02 Institute of British Foundrymen (1946) *Atlas of defects in castings.* Manchester: IBF, p. 02
03 Rajkolhe, Rajesh and Khan, J.G. *Defects, Causes and Their Remedies in Casting Process: A Review*. International Journal of Reseacrh in Advent Technology, Vol. 2, No. 3, March 2014, p. 375-383.
04 Rao, Posinasetti Nageswara (1999) *Manufacturing technology: foundry, forming and welding*. Tata McGraw-Hill, p. 195.
05 Atlas (1946) p. 32-33.
06 Atlas (1946) p. 29-30.
07 Atlas (1946) p. 31.

Some defects are caused by pouring irregularities, some on the one hand could be caused by impurities in the pouring material itself, which are called *inclusions*, and also some that are either partially filled moulds, which are called *misruns*[08], or are partially bonded filling materials, which are called *cold shuts*, both of which are due to lack of fluidity or premature setting, and then, on the other hand, some of which that are the result of poor pouring activity itself, some of which can be the result of casting material forcing itself into the mould material, which is called *penetration*, and some of which that can be the result of casting material leaking out of the mould, which is sometimes called a *run out*, and then also some of which caused by moulding material coming loose and dropping into the casting material during the pouring process, which is called *drops*[09].

Extremely high temperature in pouring materials can sometimes cause small indentations in the surface of the mould material, some of which is a thin line indentation, which is then called a *rattail*, and some of which is a broader indentation, which is called a *buckle*, and which sometimes is also called a *pulldown*, some of which can also cause in turn the formation of a thin layer of excess metal sitting proud of the cast, which is called a *scab*[10], and sometimes the joints of the multiple sections of a piece mould leave lines or seams on the casting[11], which are the results of a leakage of excess casting material into the worn-out parting lines of a mould[12], which are sometimes called *flash*[13], and sometimes *seam flashing*[14], or sometimes *fins*[15], and which are similar to the marks of excess material left along the parting lines in injection moulding processes, which are called *witness marks*, or sometimes *witness lines*[16].

Sometimes, moulding material sticks to the casting material after de-moulding. This is the case, for example in cement casts of plaster moulds. The plaster left behind is called *bloom*, and is said to resemble the bloom on a grape[17].

Some defects are the result of mould failure, a flaw which, in the first instance, is either due to worn-out mould parts[18] (some of which show tears and some of which show material fatigue), or the displacement of mould material as the pouring material travels through it, which is generally called *mould erosion*, and which is sometimes specified as a *sand hole*[19], and which sometimes might also be called *swell*[20], but all of which results in unwanted rough surfaces and excess material, or a flaw which, in the second instance,

08 Atlas (1946) p. 23.
09 Rao (1999) p. 197.
10 Atlas (1946) p. 28.
11 Rich, (1961) p. 91.
12 Andrews (1988) p. 59.
13 Mills (1965) p. 65.
14 Mills (1990) p. 68.
15 Percy (1965) p. 143-144.
16 Toft (1929) p. 90.
17 Percy (1965) p. 128.
18 Andrews (1988) p. 59.
19 Atlas (1946) p. 27.
20 Atlas (1946) p. 34.

is the consequence of inaccurately aligned mould parts, some of which are sometimes called *shift*, some of which are caused by twisting parts or decentered locating pins on pattern plates[21].

Both pouring irregularities and mould failures are often cause and effect of each other.

Some defects are metallurgical defects, some of which are called *hot tears*, which are also called *hot cracking*, or some of which that are called *hot spots*, which are different, but which are all caused by inconsistent cooling or setting.

In some sculptures, mould defects are left as they appear, which is variously seen as an indication of the method of making the work[22], or they are said to be left according taste[23].

21 Atlas (1946) p. 16
22 Andrews (1988), p. 59
23 Mills (1965), p. 65

Roithmayr, Florian (2015) *with, and, or, whithout,*
concrete, wood 280 x 80 x 160 cm. Camden Arts Centre, London.

Disintegrating bodies

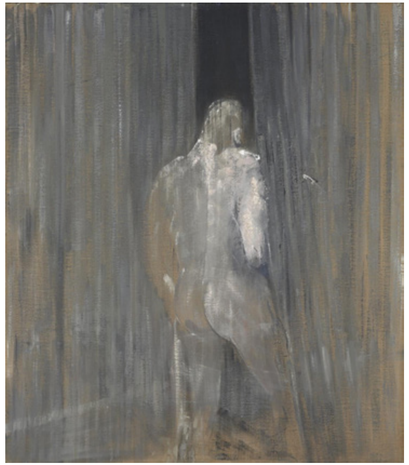
The *Cristo Velato*, a marble rendition of a veiled figure carved in marble in 1753 by Giuseppe Sanmartino and displayed in the Cappella Sansevero in Naples, Italy, depicts the dead body of Christ laid out on pillows. Cloth, or a cloak, surround the figure, shrouding

Another box

I make another box and then fill it with expandable foam and cement-sand-water mixture. Particular attention is given to:

Preparation
Materials
Tools and Equipment
Methods
Observations and Notes
Further Notes
Precautions
Advantages and Disadvantages
Failures
Results
Further Uses
Further Reading

Sanmartino, Giuseppe (1753) *Cristi Velato,*
marble, 450 x 80 x 180cm. Cappella Sansevero, Napoli.



Bacon, Francis (1949) *Study from the Human Figure,*
oil on canvas, 147.2 x 130.6 cm. National Gallery of Victoria, Melbourne.

it, flowing around the body, flowing over and around its form, cascading in many folds and drapes

Francis Bacon's painting *Study of the Human Figure* from 1949 depicts the cropped figure between and surrounded by hanging cloth: the male body, partly obscured, is either in front or behind the curtain, a drapery that might be called something like a *device*[01].

Ecce Puer (Behold the Boy), also called *Impression of a Child*, is a series of different versions of the same subject by Medardo Rosso, all presenting the larger than life-size head of a young boy. Reiterated in different materials and varying finishes, the portrait shows Alfred William Mond with his face pressed against the drapery of a curtain: *Ecce Puer* is said to have been a commission for the bust of a young child – the story goes that Rosso spent weeks trying to find the right impression of the boy, as he spent his time living with the family who ordered the work. Then one evening as guests were gathering in the house, the boy sheepishly hid behind a curtain, and Rosso saw his veiled face. The boy's contours blurred by the drapes and folds of the curtain as he moved behind and between them[02].

Rosso, it is said, modelled in clay, and made later wax versions by casting the wax in gelatine moulds, sometimes backed by later plaster supports[03].

Ecce Puer exists in the following known versions:

Wax: Private Collection, Milan .
Wax: Museo Medardo Rosso , Barzio .
Wax: Collection of Lady Balzarotti.
Wax: Galleria Nazionale d'Arte Moderna, Roma.
Wax: Collection of the painter Pastorio .
Wax: F. Rosso, Milan.
Wax: Galleria d'Arte Moderna Ricci Oddi, Piacenza (1906).
Wax over plaster: Philadelphia Museum of Art (1906-1907)
Wax over plaster: Galleria d'Arte Moderna Achille Forti, Verona (1906)
Plaster: Galleria d'Arte Moderna, Milano (1906)
Plaster: National Galleries of Scotland (1906)
Bronze: Galleria d'Arte Moderna, Venezia.
Bronze: Wallraf-Richartz Museum , Cologne
Bronze: Musée d'Orsay, Paris (1906)

01 Sylvester, David (2012) *Interviews with Francis Bacon.* London, New York: Thames and Hudson.
02 Ardengo Soffici (1909) *Il caso Medardo Rosso: preceduto da l'impressionismo e la pittura italiana*, Firenze: B. Seeber.
03 Hecker, Sharon (2008) 'Fleeting Revelations', in *Ephemeral Bodies.* Panzanelli, Roberta (Ed.) Los Angeles: Getty Research Institute, p. 136-137.

Rosso, Medardo (1906) *Ecce Puer,*
wax over plaster, varnish, 48 x 44 x 22 cm. Museo d' Arte Moderna, Verona.

Festa dei serpari di San Domenico,
annual procession in Cocullo, Italy.

The *Festa dei serpari di San Domenico* (Feast of the snakes of Saint Domenico), held annually in the beginning of May in the small village of Cocullo in the Abruzzo mountains in Italy, is a processional ceremony in which the statue of San Domenico is carried from the church and through the streets covered in live snakes.

Disclosing bodies

There is a line from Sanmartino, via Medardo Rosso and on to Francis Bacon and even the processional display of San Domenico covered in writhing snakes: a line of figures, obscured, disintegrating and falling apart, of bodies in proximity to draperies, cloth, curtains and moving snakes, figures in proximity

A visit to the Opificio delle Pietre Dure

In my memory Laura Speranza and Stefania Agnoletti are showing me wax and plaster pieces in the Opificio delle Pietre Dure / Settore restauro materiali ceramic e plastici in Florence.

- So we have here the Medardo Rosso work with all the other things: this is not what you came to ask me about but also shows you the difficulty in our restoration work. This work here – it's called *Ecce Puer* – is gesso and cera. Plaster and wax, or wax over plaster, right? The wax is on the outside of the plaster.

- I have seen many different versions of this work before.

- Yes, so this is from Verona and it needs cleaning but it is showing big cracks. And this is the difficulty here with this work and our work.

- I thought the cracks might have been there with intention.

- This is what we are trying to find out. But we also know that Rosso made a very complicated mixture of materials here that do not really work together. They work against each other.

- Can you explain this?

- You came here to see the wax casts of flowers and fruits by Susini and Calamai we are restoring for the Museo di Storiala Naturale. These are possibly cast with just wax. We are still trying to find out if there might be some fabric on the inside of the plant leaves. We know there is wire inside the wax stems. But the Rosso work here is wax over plaster. And this is a problem: Wax becomes plastic and expands in warm environments and contracts and becomes hard in cool environments. Plaster does the opposite. It contracts when it is warm and dry and expands when it is cool and humid. Wax and plaster work against each other. When the plaster contracts, the wax expands and the force between them shows as cracks, the plaster breaking the wax over it. It's a difficult combination from our view of conservation.

to what might have been called devices, that both obscure and demonstrate something in this concealment.

In the *Cristo Velato*, the flowing and folding cloth intended to contain and hold the broken body produces and presents the figure of a body instead of hiding and cloaking it, presenting an otherwise impossible form: by removing the body from sight, the cloth, wrapping itself around flesh, produces a figure that disintegrates, falls apart, runs and oozes out of its shape. Everything seems to be in flow: the flesh, released from arrest, is made fluid and collapses into fragile drapery. The form, liquid and in motion, no longer adheres to any contours.

In the moment of disintegration, the veil, surrounding the body it is meant to contain, reveals in this concealment an entirely different, uncontainable body: a revelation of that which it is meant to hide.

Here – in this space of extraordinary concealment, a disintegration, a dis-closure is taking place.

Ecce Puer shows the marks of Rosso working the soft clay, but it does so as reproduction, as copies of versions of reworked casts that reproduce earlier process marks in their translation. There are marks from moulding processes left untouched, resulting in the work showing lines where the multi-part mould would meet, bearing the imprint of the casting, running over, criss-crossing and traversing the reproduction of the initial marks of modelling the soft clay.

The same can be observed on the back of this plaster and wax version of *Ecce Puer*, where the mould lines seem to cascade down the sculpture like a mountain ridge, and the patination seems to add yet another layer that presents material processes while obliterating representation of resemblance. In this case, formal (a body, a head) and material (mould lines, modelling marks, patination) disintegrations combine to produce disclosure of something else appearing in the obscurity of disintegration. At the same time, tactile care seems to envelop this boy's head: as if he succumbs to the caress extended by Rosso. In the painting with curtains or drapes, and the sculpture with snakes, it is the addition of an extra element that acts both as that which contains through concealment, and also discloses in this obscurity.

Notes

I'm building a box and fill it with sand-cement-water mixture.
I start to take notes.
I collect them in a box.

I test this word and that, weigh this sentence against that sentence. Their weight is never quite as heavy as cement, or sand. Is never quite as wet as cement-sand-water mixture.

I scratch out the words weight and wet and write the word allegory underneath. I scratch out the word allegory and write metaphor underneath. I scratch out metaphor and write word underneath.

What is concrete?

Concrete, which is also called *cast stone*[01], which is also sometimes called *artificial stone*[02], consists of cement, aggregate like sand or gravel, and water.

Cement can be divided into two kinds or two categories, which are either based on calcium aluminium silicate, which is the main component of Portland cement types, and alumina, which are the main component of aluminous cement.[03]

Concrete is a material that is said to involve applications like high fidelity casting[04], and been said to possess qualities like plasticity, workability, adhesiveness, strength and durability[05], resistance to the effects of water and temperature change[06].

Concrete is also a material that is said to have great compressive strength, but no tensile strength, which is instead supplied through reinforcement[07], which is then called *reinforced concrete*, or sometimes *ferroconcrete*[08].

Cement is said to have different kinds of speeds, which are specified as a setting speed, a hardening speed, and a curing speed[09].

The initial change from a fluid to a solid condition is sometimes called *setting*. The strength developing time after setting is sometimes called *hardening*. The period of maintaining the development of strength in the solid is sometimes called *curing*[10].

01 Verhelst (1973) p. 43.
02 Rich (1961) p. 314.
03 Mills (1966) p. 66.
04 Mills (1990) p. 68.
05 Andrews (1988) p. 73.
06 Rich (1961) p. 317-318.
07 Mills (1990) p. 68.
08 Andrews (1988) p. 73.
09 Mills (1966) p. 66.
10 Mills (1990) p. 70.

Further notes

I start to copy the notes from the box together on a sheet of paper.
I write about the process of combining cement-sand-water mixture with expandable foam.
I write a description of the process of combining cement-sand-water mixture with expandable foam.
I write many descriptions of combining cement-sand-water mixture with expandable foam.
I write as many descriptions of combining cement-sand-water mixture with expandable foam as I make combinations of cement-sand-water mixture with expandable foam. They are all different. Both the descriptions and the combinations.

Many pages describe materials, like cement, sand, water and foam.

But instead of writing about the box, I go on for pages writing about moulds and matrices, which also enclose something like a place, and which also bear many other things emerging from that place.

I start to omit certain facts and focus on other facts instead. I stress attributes, and how one thing leads to another.

Duration

Wenn ein Punkt Bewegung und Linie wird, so erfordert das Zeit. Ebenso, wenn sich eine Linie zur Fläche verschiebt. Desgleichen die Bewegung von Flächen zu Räumen. Entsteht vielleicht ein Bildwerk auf einmal? Nein, es wird Stück für Stück aufgebaut, nicht anders als ein Haus.
Und der Beschauer, wird er auf einmal fertig mit dem Werk? (Leider oft ja.)[01]

When a point becomes movement and line, it requires time. So does a line, when it stretches out to become a plane. Likewise with the movement from flat plane to space. Is it that a painting comes into existence all at once? No, it's built up piece-by-piece, not different from a house.
And the viewer, does he (she) respond to the work all at once? (Often yes, sadly.)[02]

01 Klee, Paul (1920), 'Schöpferische Konfession' in Edschmid, Kasimir (Ed.) *Tribüne der Kunst und Zeit, Eine Schriftensammlung*. Berlin: Erich Reiß Verlag, p. 33.
02 own translation

Time

Back then, the box arrived. Then arrived the mixture consisting of cement, sand, and water, stirred together. Then arrived the expanding foam.

Then the box went.
Then the expanding foam went.

Then the box returned and was placed underneath the cured mixture consisting of cement, sand, and water.

Then both box and mixture consisting of cement, sand and water, went.

Sharon Morris 24/1/17 19:09
Comment: HAVING SEEN YOUR CAMDEN EXHIBITION I WAS VERY STRUCK BY time, how I imagined the process of making and how I was also witnessing the ongoing processes of 'decay'. Something more here about entropy?

Florian 25/1/17 07:02
Comment: I was wondering for a long time whether I had completely misunderstood Smithson's interpretation of entropy. Somehow, what I imagined didn't match what I was reading. It seemed to me that Smithson didn't particularly like entropy, that he used the word in connection to his descriptions of artworks he was not particularly fond of. He seemed to think of entropy when speaking about Donald Judd.
I was always fascinated by what I thought entropy means. I thought it means that systems are not stable, that they are striving towards chaos rather that equilibrium and stability. I was imagining artworks that evolve and change and remain non- static. I thought sculpture full of entropy was unpredictable, never closed, always different and challenging.

A friend suggested I should watch Brian Cox.

Then I screened Robert Smithson's 16mm film documentation 'Asphalt Rundown' to a group of students. I hadn't watched the film in a long time. The film documents one of the 'flow'-works Smithson staged, this particular one in a sand pit outside Rome. Nancy Holt's voice-over narrates the activity. At some point she describes the asphalt to coagulate when it stops flowing. She says this is: "entropy made visible".
I started to think that Smithson was referring to the moment when a material is curing, or setting, like plaster or concrete cures and sets. A moment of material transformation when one particular state is reached, when the material takes on a form that is irreversible. I started to understand Smithson apprehension of such a moment. I could share this apprehension of the irreversible moment, which Nancy Holt called entropy made visible.
I always though that it was one of the amazing capacities of sculpture to include reversibility, rather than be irreversible.

I still don't know precisely what entropy means. I still have a lingering idea that it means chaotic, dispersed unstable systems, something similar to a sculpture that accidentally has a particular shape, but in the next moment falls apart and gets broken into many pieces, which are carried away.
I still cannot reconcile one idea of entropy with another.

Correlation

The time it takes to make something is different from the time it takes to look at it, which is different from the time it takes to write the words describing it, which is different from the time it takes to read about it. One hardly corresponds to the other.

This means precisely:
On average I type 37.51 WPM with 79.52% accuracy.
I hand write 33.78 WPM with 100% accuracy, but often limited legibility.

I read 161 WPM reading out aloud, and I read 284 WPM in silence when reading *Huckleberry Finn*, 266 WPM when reading *Dracula*, 311 WPM when reading *The Adventures of Sherlock Holmes*.

I cannot combine and mix sand, cement and water within a minute. But I can write the words combination, mixture, cement, water, sand, several times over even, and then still include the word minute, all within a minute.

But...
what material per minute?
what activity per minute?
what sculpture per minute?
what text per minute?

Abandonment

At the end, the expanding foam didn't make it. The canisters emptied of foam didn't make it. The bags holding the sand didn't make it, and the bags holding the cement didn't make it. The cement-sand-water mixer didn't make it and the buckets to move the cement-sand-water mixture didn't make it either. The small tools to remove the expanding foam didn't make it, and neither did the tools used to gather the removed expanding foam bits into garbage bags. Even the box didn't make it – or didn't make it most of the time. All of these didn't make it, even though at the time they seemed like the most essential parts, and nothing would have come of it without them.

Unforeseeable – unaccountable

I write, but I do not write what is really happening inside the box:
I do not write anything about what it is like when expanding foam touches cement-sand-water mixture.

I leave out that it is still not clear whether the foam shapes the cement-sand-water mixture or the mixture is responsible for the formation of the foam. Or if, really, they enter a constellation in which form-giving and form-receiving become indistinguishable in the process of formation. Certainly the box gives shape to both, but what is happening inside the box?

I only hint at my uncertainty as to whether the concrete can become a sculpture, or the foam is the sculpture, or both, one a hard, lasting, and visible present sculpture – the other soft, to be removed, an invisible absent sculpture once it has been removed

I go to great length to describe causes and consequences, but always stay outside the box.
I also leave out that after all, the formation of the concrete might not be as accidental as I make it out to be, since the size of the box is carefully chosen, the cement-sand-water mixture makes up half of the

Donatello (1432) *Busto di Niccolò da Uzzano,*
painted terracotta, 46×44 cm. Museo nazionale del Bargello, Firenze.

workshop of Thutmoses (ca. 1340 BC) *Mask from Amarna - Portrait of a Man,*
gypsum, 18 cm. Neues Museum, Berlin.

Opening of the eyes

The long established practices of taking a facial impression of a recently deceased person, also known as a death-mask, or of a living being through a life-cast, has been accompanied by the additional practice of articulating eyelids and pupils in the oval form of the closed eyes shown in the cast, which has been called a reworked death-mask[01], a reanimation[02], retouching, or opening of the eyes[03]. The cast is sometimes inserted into a fully modelled bust, with the additional attachment of ears.

Amongst early Renaissance busts to incorporate a death-mask with opened eyes and ears is Donatello's 1433 terra cotta portrait of Niccolò da Uzzano[04]. These were followed by busts attributed to the Benintendi workshop collaborating with Andrea del Verrocchio, or those of Pietro Torrigiani, and many others made in wax, terracotta, plaster or cartapesta throughout the Renaissance.

The practice of opening the eyes of a face cast goes much further back in time, however, and was already in use in Egypt during the reign of Akhenaton and Nefretiti in the fourteenth century BC.

01 Schuyler, Jane (1986) 'Death masks in Quattrocento Florence'. In *Notes in the History of Art*, Vol. 5 No. 4 (summer 1984), p. 4.
02 Kohl, Jeanette (2007) 'Gesichter machen: Büsten und Masken im Florentiner Quattrocento'. In *Marburger Jahrbuch für Kunstwissenschaft*, 34. Bd (2007), p. 79.
03 Kohl, Jeanette (2013) 'Casting Renaissance Florence: the bust of Giovanni de' Medici and indexical portraiture'. In *Carvings, Casts & Collectors, The Art of Renaissance Sculpture.* Motture, Peta, Jones, Emma and Zikos, Dimitrios (Eds). London: V&A Publishing, p. 67.
04 Schuyler (1986) p. 3.

volume of the box, and exactly the amount of expanding foam is injected to make up the other half of the volume. I do not really stress the point that much control goes into not controlling the outcome, much is planned to allow chance.

I attempt to give an account of the concrete and foam, try to account for them, but I cannot write on their account.

I am becoming aware that I am becoming an unreliable witness. Maybe because I am still looking, maybe because I want to stay alive: in either case, I remain outside the box. I do not enter, do not immerse myself within. I do not close my eyes and mouth, even though I remember that the best witness is supposed not to see. The best witness is supposed to be blind. And to enter into the box, which is to say, to enter into the space of the mould, I would have to close my eyes in order to be there, unless I do not want to stay alive, which would render this live cast into my death mask.

Form

The formation is known, the form is not: I know what I want the material to become.
I do not know what the material will become.
I mistrust the material.

I know what the material has become before.
I know what the material could become.
I believe I know the material.

Roithmayr, Florian (2015) *water damaged wall,*
photograph taken of the PhD room, Slade School of Fine Art, UCL.

Alexander Cozens

In his treatise entitled *New Method of Assisting The Invention in Drawing Original Compositions of Landscape*, Alexander Cozens, cites the authority of da Vinci in favour of the accident. He quotes:

> Among other things, I shall not scruple to deliver a new method of assisting the *Invention; which tho' trifling in appearance may yet be of considerable service, in opening the mind, and putting it upon the Scent of new Thoughts; and 'tis this; if you look at some old Wall covered with dirt, or the odd appearance of some streaked Stones, you may discover several things like Landscapes, Battles, Clouds, uncommon Attitudes, humorous Faces, Draperies, &c. out of this confused Mass of Objects, the Mind will be furnished with abundance of Designs, and Subjects, perfectly new.*[01]

What Cozens adds is a development of chance processesby way of circumnavigating the need for an 'old wall covered with dirt'. These walls may not always be so easy to come by. Instead, Cozens suggests a method of blotting with ink, a complex interplay between imitation and invention:

He describes his method like this:

> *A true blot is an assemblage of dark shapes or masses made with ink upon a piece of paper, and likewise of light ones produced by the paper left blank. All the shapes*

01 Leonardo da Vinci, quoted in Cozens, Alexander (1952) 'A New Method of Assisting the Invention in Drawing Original Compositions of Landscape' in Oppé, A. P. *Alexander and John Robert Cozens.* London: Adam and Charles Black.

I trust the material.
I start to recognise the material.
I make the material into something I know already.
I make the material into something that it has already been made into before.
I start to make the material.
I trust myself.

I do not know the material.
I make the material into something I do not know yet.
I start with the form and manipulate the material into the form.
I start with the form and look for the material most suitable, or that lends itself best, or is the easiest way to realize this form.
I start with the material and do not know the form.
I start with one material and end with another one.
I start with one form (box, rectangular angles, 90 degrees) and end with another one (flow, round, drip, droop)

The formation is known, yet the form is still not.

are rude and unmeaning, as they are formed with the swiftest hand. But at the same time there appears a general disposition of the masses, producing one comprehensive form, which may be conceived and purposely intended before the blot is begun..[02]

The blot has to be true. And this blot is an intended artificial blot. And the intended accidental ink blot partakes of the artifice of the accident only as much as intention permits the accidental, since it is precisely not caused by an accidentally spilled pot of ink. This accident here is a contingency, or, what Cozens calls a small 'degree of design':

An artificial blot is a production of chance, with a small degree of design; for in making it, the attention of the performer must be employed on the whole, or the general form of the composition, and upon this only; whilst the subordinate parts are left to the casual motion of the hand and the brush.[03]

And let's not forget that all of this happens in the service of inventing landscapes – Cozens already knows what he wants to find, what he is looking for – and where to look.

02 Cozens (1952) p. 169.
03 ibid.

Alfred Gell

In several propositions regarding the question what constitutes an art object, the anthropologist Alfred Gell has introduced intention embodied within objects that come out of or are found within relationships or networks, for example, a trap embodying intention within the relationship between men and animals, or materials registering intention accumulated through procedural manipulation and interaction with the materials.[01]

01 Gell, Alfred (1992) The Technology of Enchantment and the Enchantment of Technology. In J. Coote and A. Shelton (Eds.) *Anthropology, Art and Aesthetics*. Oxford: Clarendon, p. 40–66.
Gell, Alfred (1996) 'Vogel's Net, Traps as Artworks and Artworks as Traps'. In *Journal of Material Culture*, 1996, 1:5, p. 15-38.
Gell, Alfred (1998) *Art and Agency: An Anthropological Theory*. Oxford: Clarendon.

Accidents

The cement-sand-water mixture meets the expanding foam. They are introduced to each other – and into each other – and start a certain interaction within a specific-sized box.
But I do not see that, or only see the result once the sides of the box are taken-off and the foam is removed. In the darkness of the box, something is taking place that happens on its own: I might initiate it, delineate it, intend it, but the outcome partakes of a certain degree of chance.

It is by contingency that the formation takes place, and takes place unbeknownst.

Supervision

In my memory, we are sitting together at a table.

> She says it becomes apparent that you have a lot of intention here. In a way you could say that what is happening in the box is full of intention.

> > He says here, intention might also depend on the meeting or joining together of different elements at different times, a coming together that is not revealed until a later stage.

I say to produce chance by means of constructing it is a strange procedure. Chance might exclude intention or intent; One does not presuppose the other. The intention to produce chance seems irreconcilable in anything other than an artwork.

> She asks does intention drive or propel the formation of mould and cast?

> > He asks where on the ground connecting mould and cast I want to locate intention?

I say there are associated intentions accumulating, and this accumulation leads to the formation of a mould, which starts to correspond with the intention of filling: something is created so it can be filled.

I say there are associated intentions accumulating, and this accumulation leads to the filling of a mould, which starts to correspond with the peeling open of the mould: something does the filling so it can be release as a cast produced in a mould.

I say there are associated intentions accumulating, and in this accumulation they lead to the peeling open of a mould to release the cast produced in it, which corresponds with the presentation of the result to someone else.
Intentions drive, extend and produce each other, even if they are not yet clearly formulated, identified or known: they appear as something yet to come, giving a direction and creating and accumulating into a flow of intentionalities.

I say this flow of intentionality starts to have a direction and starts to move everything along in this direction. It is towards and for someone or something that intention is directed. The model is made for the mould, the mould is made for the cast and the cast is made for you, is peeled from the mould to be shown to you. Every moment of production is an accumulation of intention that propels me and what I do –via mould and cast– towards you.

Invocation

I start to talk to cement, start to address it with my voice speaking cement.
There is no answer.
I try speaking the word cement in different languages.

I pronounce it /*sĭ-mĕnt*/ or
/*səmɛnt*/ or
/*'simɛnt*/ or

I pronounce it *se.mə̂*\ or
I pronounce it /*tsĕment*/ or

I pronounce it /*ʧe'me:nto*/.

There is no answer.

I try speaking different names.

There is no answer.

I address it with the word cement:
I say cement to it.
I call it with the word cement.
I whisper cement.
I yell cement.
I scream cement.
I'm barely whimpering cement.

Monologue

But there is no answer to my voice.
I'm drawing up a list with possible answers for why there is no answer:

The cement hears something but does not know it was me talking.
I hear the cement answer but do not understand its language.
I hear something but do not know it was the cement talking.

We do not speak the same language.
We do not both speak.

Only one of us speaks.
We both speak and I cannot hear.
Only one of us hears.

Nothing is spoken that I could hear – or – I cannot hear what is being spoken.

What is spoken is audible to anybody other than me.
What is spoken is not spoken to me
or,
not speakingly.

I do not understand.
No speech reaches me.
Not audible.

Inscription

I start to write cement, start to address cement with my script spelling cement.
There is no answer.

I write in different languages:
cement
cément
Zement
Cement

There is no answer.
I start to write the word cement into cement dust. I start to write cement with cement dust.
There is no answer.

I start to write the word cement onto cement. I start to write the word cement onto clay. I start to write the word cement onto plaster.
There is cement, there is clay, and there is plaster.

Silence

But there is no answer to my script.
These are the possible answers I could find for why there is no answer:

I can’t read cement.
The cement can’t read me.
The cement reads me but doesn’t understand my language.
Clay does not turn into cement. Plaster does not turn into cement.

I cannot inscribe cement.

Figure of speech

Here are more answers for why there is no answer:
I am not this figure speaking. The figure of speech is not speaking to me. The figure of speech of (i.e. describing) speech is not really speaking. Or it only speaks in Italics. Or I should add quotation marks.
I cannot speak matter.
I’m a figure.

Matter is not a figure of speech.
Matter isn’t even a speechless figure.
I have speech. I’m made of language.

Matter doesn’t have grammar.

When I look for myself in matter, I find nothing but myself, but I won’t find matter.

Supervision

In my memory ...

I say to her that I have been trying to speak and write to cement.
I say to her that I have been trying out different names.
I say to her that I have been trying different languages.
I say that I didn’t hear an answer.
I say that the suggested dialogue between material and maker, that this dialogue apparently for the enlightened ones, might not be a dialogue after all.

She says that this was a figure of speech.

I say that only me was speaking
I ask her if I was this figure speaking.

Supervision

In my memory….

I say to him that there is no dialogue, that nothing is said nor written between matter and me.

He says that this is unusual as often a dialogue between materials and humans is evoked.

I say that to assume language in approaching another matter, thing, or person, is to level what is in front of me to my status as a human using human made language. I say that to assume I will recognise what I'm looking for is to predicate recognition. I say it establishes an engagement based on a hierarchical relationship before I even start to approach what is in front of me. I say that I do not need to ask what I will encounter when I already place my knowledge in front of me.

When I look using my knowledge, I will probably see nothing but my knowledge.

When I speak using my knowledge, I will probably hear nothing but my knowledge.

To approach what is in front of me, to approach another, I would probably have to leave everything I know behind. I would probably have to die (somewhat, or a little at least). I would approach the box and enter together with cement-sand-water mixture and foam. I would fashion myself a death mask.

Instead, I can only keep my eyes and mouth closed.

Instead, there is silence.

Instead, there is nothing.

COPPER

Eleven spoons

A long flat piece of copper is placed on a wooden board.

Another long flat piece of copper is worked with a ball-peen hammer, the noise is ringing around the room, the hammer is pecking and working the metal, the metal sound is changing in pitch. The copper block is now longer and the upper part is wider. The block is now also placed on a wooden board.

Another long flat piece of copper is worked with a ball-peen hammer, the noise is ringing around the room, the hammer is pecking and working the metal, the metal sound is changing in pitch. The copper block is now longer and the upper part is wider. The block of copper is worked again with a ball-peen hammer, the metal sound is changing in pitch, and the block of copper is now even longer and the upper part even wider than before. The block is now also placed on a wooden board.

Another long flat piece of copper is worked with a ball-peen hammer, the noise is ringing around the room, the hammer is pecking and working the metal, the metal sound is changing in pitch. The copper block is now longer and the upper part is wider. The block of copper is worked again with a ball-peen hammer, the metal sound is changing in pitch, and the block of copper is now even longer and the upper part even wider than before. The block of copper is worked again with a ball-peen hammer, the metal sound is changing in pitch, and the block of copper is now much longer with a thin lower part and an upper part starting to curve out from the middle. The block is now also placed on a wooden board.

Another long flat piece of copper is worked with a ball-peen hammer, the noise is ringing around the room, the hammer is pecking and working the metal, the metal sound is changing in pitch. The copper block is now longer and the upper part is wider. The block of copper is worked again with a ball-peen hammer, the metal sound is changing in pitch, and the block of copper is now even longer and the upper part even wider than before. The block of copper is worked again with a ball-peen hammer, the metal sound is changing in pitch, and the block of copper is now much longer with a thin lower part and an upper part starting to curve out from the middle. The block of copper is worked again with a ball-peen hammer, the metal sound is changing in pitch, and the block of copper is now much thinner where the upper part has been spread outwards, and thicker at the bottom. This block is now cut in half and also placed on a wooden board.

Another long flat piece of copper is worked with a ball-peen hammer, the noise is ringing around the room, the hammer is pecking and working the metal, the metal sound is changing in pitch. The copper block is now longer and the upper part is wider. The block of copper is worked again with a ball-peen hammer, the metal sound is changing in pitch, and the block of copper is now even longer and the upper part even wider than before. The block of copper is worked again with a ball-peen hammer, the metal sound is changing in pitch, and the block of copper is now much longer with a thin lower part

and an upper part starting to curve out from the middle. The block of copper is worked again with a ball-peen hammer, the metal sound is changing in pitch, and the block of copper is now much thinner where the upper part has been spread outwards, and thicker at the bottom. This block is now cut in half and also placed on a wooden board but this time in an upright position, showing what could be called its side rather than its front.

Another long flat piece of copper is worked with a ball-peen hammer, the noise is ringing around the room, the hammer is pecking and working the metal, the metal sound is changing in pitch. The copper block is now longer and the upper part is wider. The block of copper is worked again with a ball-peen hammer, the metal sound is changing in pitch, and the block of copper is now even longer and the upper part even wider than before. The block of copper is worked again with a ball-peen hammer, the metal sound is changing in pitch, and the block of copper is now much longer with a thin lower part and an upper part starting to curve out from the middle. The block of copper is worked again with a ball-peen hammer, the metal sound is changing in pitch, and the block of copper is now much thinner where the upper part has been spread outwards, and thicker at the bottom. The block of copper is worked again with a ball-peen hammer, the metal sound is changing in pitch, and the block of copper is now longer with a flat curving upper part, and a pointing thicker lower part. The block is now also placed on a wooden board.

Another long flat piece of copper is worked with a ball-peen hammer, the noise is ringing around the room, the hammer is pecking and working the metal, the metal sound is changing in pitch. The copper block is now longer and the upper part is wider. The block of copper is worked again with a ball-peen hammer, the metal sound is changing in pitch, and the block of copper is now even longer and the upper part even wider than before. The block of copper is worked again with a ball-peen hammer, the metal sound is changing in pitch, and the block of copper is now much longer with a thin lower part and an upper part starting to curve out from the middle. The block of copper is worked again with a ball-peen hammer, the metal sound is changing in pitch, and the block of copper is now much thinner where the upper part has been spread outwards, and thicker at the bottom. The block of copper is worked again with a ball-peen hammer, the metal sound is changing in pitch, and the block of copper is now longer with a flat curving upper part, and a pointing thicker lower part. The block of copper is worked again with a ball-peen hammer, the metal sound is changing in pitch, and the block of copper is now much longer, with an elongated lower part giving way into a curved and rounded upper part. The block is now also placed on a wooden board.

Another long flat piece of copper is worked with a ball-peen hammer, the noise is ringing around the room, the hammer is pecking and working the metal, the metal sound is changing in pitch. The copper block is now longer and the upper part is wider. The block of copper is worked again with a ball-peen hammer, the metal sound is changing in pitch, and the block of copper is now even longer and the upper part even wider than before. The block of copper is worked again with a ball-peen hammer, the metal sound is changing in pitch, and the block of copper is now much longer with a thin lower part

and an upper part starting to curve out from the middle. The block of copper is worked again with a ball-peen hammer, the metal sound is changing in pitch, and the block of copper is now much thinner where the upper part has been spread outwards, and thicker at the bottom. The block of copper is worked again with a ball-peen hammer, the metal sound is changing in pitch, and the block of copper is now longer with a flat curving upper part, and a pointing thicker lower part. The block of copper is worked again with a ball-peen hammer, the metal sound is changing in pitch, and the block of copper is now much longer, with an elongated lower part giving way into a curved and rounded upper part. The block of copper is worked again with a ball-peen hammer, the metal sound is changing in pitch, and the block of copper is now even more round at the top, with a circle forming inside the edge, and is slim and elongated at the lower part. The block is now also placed on a wooden board.

Another long flat piece of copper is worked with a ball-peen hammer, the noise is ringing around the room, the hammer is pecking and working the metal, the metal sound is changing in pitch. The copper block is now longer and the upper part is wider. The block of copper is worked again with a ball-peen hammer, the metal sound is changing in pitch, and the block of copper is now even longer and the upper part even wider than before. The block of copper is worked again with a ball-peen hammer, the metal sound is changing in pitch, and the block of copper is now much longer with a thin lower part and an upper part starting to curve out from the middle. The block of copper is worked again with a ball-peen hammer, the metal sound is changing in pitch, and the block of copper is now much thinner where the upper part has been spread outwards, and thicker at the bottom. The block of copper is worked again with a ball-peen hammer, the metal sound is changing in pitch, and the block of copper is now longer with a flat curving upper part, and a pointing thicker lower part. The block of copper is worked again with a ball-peen hammer, the metal sound is changing in pitch, and the block of copper is now much longer, with an elongated lower part giving way into a curved and rounded upper part. The block of copper is worked again with a ball-peen hammer, the metal sound is changing in pitch, and the block of copper is now even more round at the top, with a circle forming inside the edge, and is slim and elongated at the lower part. The block of copper is worked again with a ball-peen hammer, the metal sound is changing in pitch, and the block of copper is now showing a debit in the upper part and a bend where it curves into an elongated thin lower part with curved edges. The block is now also placed on a wooden board.

Another long flat piece of copper is worked with a ball-peen hammer, the noise is ringing around the room, the hammer is pecking and working the metal, the metal sound is changing in pitch. The copper block is now longer and the upper part is wider. The block of copper is worked again with a ball-peen hammer, the metal sound is changing in pitch, and the block of copper is now even longer and the upper part even wider than before. The block of copper is worked again with a ball-peen hammer, the metal sound is changing in pitch, and the block of copper is now much longer with a thin lower part

and an upper part starting to curve out from the middle. The block of copper is worked again with a ball-peen hammer, the metal sound is changing in pitch, and the block of copper is now much thinner where the upper part has been spread outwards, and thicker at the bottom. The block of copper is worked again with a ball-peen hammer, the metal sound is changing in pitch, and the block of copper is now longer with a flat curving upper part, and a pointing thicker lower part. The block of copper is worked again with a ball-peen hammer, the metal sound is changing in pitch, and the block of copper is now much longer, with an elongated lower part giving way into a curved and rounded upper part. The block of copper is worked again with a ball-peen hammer, the metal sound is changing in pitch, and the block of copper is now even more round at the top, with a circle forming inside the edge, and is slim and elongated at the lower part. The block of copper is worked again with a ball-peen hammer, the metal sound is changing in pitch, and the block of copper is now showing a debit in the upper part and a bend where it curves into an elongated thin lower part with curved edges. The block of copper is worked again with a ball-peen hammer, the metal sound is changing in pitch, and the block of copper is now curved, rounded and polished all over. The block, which is now a spoon, is now also placed on a wooden board.

A visit to Freeman College

In my memory, Carole Baugh and myself are meeting in a metal forge in Freeman College in Sheffield.

- In order to get from here to here, you have to have memory, which is a problem for a lot of our students. Generally memory is a difficult thing.

- So there are one, two, three, four, five, six, seven, eight, nine, ten, eleven stages.

- Well no, because it’s a flow.

- Right, so these are arrests. They are fictitious in a way?

- Yes.

- But you say memory because you have to remember the flow?

- No, you have to remember, because there is no mould... you see, these objects, and sometimes when I do a talk...

- That’s interesting. Are you saying you have to remember the future of the piece of metal in front of you.

- Yes.

Chaîne Opératoire

Chaîne Opératoire is the concept of establishing an operational sequence employed in anthropological and archaeological studies to achieve a chronological, segmented overview, often in post-event recapitulation, in order to establish a seemingly organised progression of actions and mental processes within technical procedures.

- And the fictitious future - because it doesn't exist yet - has to overlap with the memory of a real spoon from a previous experience.

- And you need to use imagination to see how from here, this object becomes this here. So it's not that you have to have a single memory, which through imagination has brought it to the future. But you are constantly engaged in this process of both memory and imagination, whilst you are physically beating a piece of metal, which you have to learn by sharing motion, movement, willed intention, which is shared with the master craftsman.

- You must be in tune with your muscle, with holding the hammer, because hammer too much, use the hammer too much...

- And also, you do not get to here by beating a piece of metal without regard. So, in fact, to get from here to here, whoever does it, but in our case our students, they go through multiple, cognitive decision making processes.

Supervision

In my memory I sit at the table and have a few papers in front of me. She sits at the same table and has a few papers in front of her.

I say I encountered a wooden board, with eleven pieces of copper in different stages of manipulation mounted on it: a block of copper as it comes out of the forge on the left, and on the right a finished and polished copper spoon. The nine stages in between depict a transformation unfolding from material into a shaped spoon. Moving from left to right, from one stage to the next stage, it becomes apparent that these are imaginations and future speculations.

She says what is interesting here is that there is an ontological dif-

ference.

I say yes, an ontological and material difference. But every step we are presented with here is an artificial pause based on memory and the recollection of the previous moment, and a fantasy of the future instance just about to happen. The eleven stages do not really exist. And there are not eleven spoons either. There are moments of more or less work. There are moments of abandoned work. Some work has been done eleven times. Some work has been done ten times. Some work has been done nine times, and so on. The pausing, separating and dividing into eleven is an artifice, as the relationship between passed stage and future stage is always in the imagination. How do you determine that one stage is sufficiently different from the previous and following one to warrant being classified a stage? These spoons only exist when you stop, when you pause.

I say that the opposition of form and counter-form, of mould and cast, or absence and presence, are theoretical problems that do not stand up to the experience of material processes in the studio.

She says that the studio as site of practical research has solved the theoretical problem of form and counter-form.

I say that problems of this kind only appear retrospectively.

I say they are post-production mythologies, that is, broken processes, often verbalized, or undergoing another shift in symbolization, or at least a change of signs. The signification arising between mould and cast is not binary, however, but constantly shifts into this third space between them, which can only be seen within the process of its fabrication. It cannot be isolated from it, none of these parts can be severed from the process which produces them as en ensemble.

She says that I have made a research discovery relating mould and cast. She says I should write about this.

I say I will, though I'm not sure which of the three she is suggesting I write about: what I'm saying, what she is responding, or what we are saying because we are sitting on the same table together.

In my memory we sit at the same table, not opposite each other, but next to the other, because she is writing and drawing on my papers.

CLAY

Clay facts

Clay, which is sometimes called *earth-clay*[01], or *plastic earth*[02], is also called *terra-cruda*, as long as it has not been fired, or simply *green clay*[03], which is also sometimes called *terra secca*, specified as unbaked or air-dried clay, as opposed to what is called *terra cotta*, specified as baked or fired clay[04].

Clay is said to be an exceptionally weather proof but breakable[05], abundant[06], plastic and

01 Rich (1961) p. 25.
02 Rich (1961) p. 23.
03 Mills (1990), 217.
04 Goldschneider, Ludwig (1952) *A Survey of Michelangelo's Models in Wax and Clay*. London: Phaidon Press, last page (not numbered).
05 Andrews (1988) p. 09.
06 ibid.

Start

A sheet of paper is placed flat on the ground or on a wooden surface.

Size

Another sheet of paper is placed flat on a ground. This is a sheet with specific size: perhaps DIN A0, 841 mm by 1189 mm. Sometimes, it is much larger. It is a roll of paper 1189mm wide, which is cut into individual parts. At other times, the size is smaller, longer and narrower, like a strip, or else almost square.

Clay

Another sheet of paper is placed flat on a ground. This is a sheet with specific size. 25 kg of clay is used to cover the surface of the paper. Sometimes 25 kg of clay is made up of two packs of 12.5 kg each. Sometimes it is a single pack of 25 kg. It depends on the supplier of the clay and the way the supplier distributes the product. This is of importance only for a short period of time.

ever changing, moulding and fermenting[07], freely yielding[08], soft[09], workable[10], heavy and soggy[11], transitory or preliminary[12], non-permanent[13] material, that can be made permanent, and that is also said to be inexpensive, easy to process and good for beginners[14].

Clay, it is said, can be thrown, interlocked, built in coils or slabs, modelled[15], cast through pouring slip, or pressed into moulds[16], or stamped[17].

In addition to cracking, splitting and breaking up, clay is also said to fissure[18].

07 Andrews (1988) p. 11.
08 Rich (1961) p. 23.
09 Penny (1993) p. 165.
10 Rich (1961) p. 25.
11 Andrews (1988) p. 09.
12 Rich (1961) p. 21.
13 Butler (1997) p. 11.
14 Andrews (1988) p. 09.
15 Andrews (1988) p. 14-23.
16 Verhelst (1973) p. 38.
17 Penny (1993) p. 165.
18 Rich (1961) p. 32.

Clay bodies

Clay is said to be made into a body, which is also called *ready-to-use*[01], or *prepared clay*[02]. A clay body is said to have a balance of qualities such as plasticity, green or unfired strength, porosity and texture, which make it suitable for a particular application[03]. The individual components of clay bodies can consist of varying quantities of sand, coarse sand, flint, kaolin/ china clay, ball clay, bentonite, grog[04], quartz and feldspar[05].

01 Andrews (1988) p. 11.
02 Andrews (1988) p. 14.
03 Andrews (1988) p. 11.
04 Mills (1990) p. 218.
05 Rich (1961) p. 26.

Spreading

Another sheet of paper is placed flat on a ground. This is a sheet with specific size. 25 kg of clay is used to cover the surface of the paper. The malleable and plastic clay body is spread from the centre outwards: lengthwise along the middle first, forming a kind of spine, and then sideways, similar to the arrangement of bones found in some fish. The spreading is done quickly. All the clay should be used evenly. This consideration hovers somewhere between the amount of clay already spread out and the amount of clay still to be used, and the changing proportion between those two amounts.

Evaporation

Another sheet of paper is placed flat on a ground. This is a sheet with specific size. 25 kg of clay is

Testing clay for shrinkage

It is said that clay is tested for shrinkage by fashioning a mass of the material into a solidly packed cube, with the surfaces of the cube said to be marked off in units of 100, which are said to be 10cm divided by 100 in each direction. The surface calibration is said to be made with a fine needle and ruler measuring both horizontally and vertically on the cube, which is said to be permitted to dry out slowly once it has been marked till it is thoroughly air-dried, which is then said to be checked for measurements, which show the percentage of shrinkage as 1 percent for every 1 mm of shrinkage.[01]

01 Rich (1961) p. 27.

used to cover the surface of the paper. The malleable and plastic clay body is spread from the centre outwards. Over several days the paper covered in clay rests in its place. If left exposed in an environment that is considerably dry and warm, the liquid (water) starts to be separated from the solids (clay particles) through mass transfer also called evaporation. The liquid (water) leaves the solids as vapour and enters the environment, disperses or is carried away as humidity. The gradual separation of liquid (water) from the solids (clay particles) has visual, material, spatial, and sometimes even topological consequences.

Shrinkage

Another sheet of paper is placed flat on a ground. This is a sheet with specific size. 25 kg of clay is used to cover the surface of the paper. The malleable and plastic clay body is spread from the centre outwards. Over several days the paper covered in clay rests in its place. Water evaporates. As consequence of water evaporating, the clay starts to dry and solidify. The malleable and plastic clay body is now stiff

and brittle clay.

Matters of facts

At a certain moment in time, I read that clay shrinks by so and so many percent.

So and so many percent of water leave the clay, and so and so many percent remain. This state is called such and such, and it was a reversible state, which meant the clay could reabsorb water and be returned to a plastic and pliable material. Only firing – as a synthesis – stops this process and eliminates the rest percent of so and so many percent of water in the clay, and after this, the process is no longer reversible as the clay had chemically transformed and a new synthetic crystal structure had formed.

I'm not sure if I did anything different after reading this.

re-

re- is a word-forming element or prefix, with the meaning of 'back to the original (place); again, anew, once more' and with a sense of 'undoing' indicating a return to a previous condition.
From Old French and directly from Latin *re-* with the meaning 'again, back, anew, against.'
From Indo-European *wret*, a variant of *wert*, with the meaning 'to turn'.

ir - / re- versible

Robert Smithson, taking a tour through Passaic, New Jersey, in 1967, describes the situation like this:

> *Picture in your mind's eye the sand box divided in half with black sand on one side and white sand on the other. We take a child and have him run hundreds of times clockwise in the box until the sand gets mixed and begins to turn grey; after that we have him run anti-clockwise, but the result will not be a restoration of the original division but a greater degree of greyness and an increase in entropy.*[01]

01 Smithson, Robert (1996) *Robert Smithson, the collected writings*. Flam, Jack (Ed.). Berkeley; London: University of California Press, p. 74.

I'm not sure what reading this changed in the way I worked.
I know that after reading this, I sometimes thought about so and so many percent of water leaving the clay, and I thought of the speed of this departure.

I sometimes looked at the paper and saw that over the last twelve hours, the clay was shrinking by so and so many centimetre. I tried to see if so and so many percent of water has an equivalent to so and so many centimetre of shrinkage.

I started to make little marks on the floor where the paper clay combination was drying, after one day, after two days, after three days, and so on.

I started to see how much it was rising up, whether there is a correspondence between gaining volume and loosing liquid.

Supervision

In my memory, we are sitting together at a table.

I say to her unfired clay has the capacity to be returned to a malleable state when ground up and mixed with water. It can be re-used many times. It's only

Rodin, Auguste (ca. 1911) *Movement D,*
clay, 33.5 x 10.4 x 9.5 cm. Musée Rodin, Paris.

Alphabet

In the catalogue accompanying a recent exhibition of Rodin's series *Movements de Danse*, a section drawing attention to his working methods describes two headless plaster casts, called *alpha* and *beta* by the writers[01], of which plaster piece-moulds were taken. The plaster casts themselves are described as castings from a mould taken of an earlier, unfired clay model.

Arms, legs and torsi of alpha and beta are moulded separately, and in combination with another piece mould of the *Head of the Slavic Woman*, previously used on the *Gates of Hell*, Rodin is said to have combined constituent mould parts of alpha, beta and head, to create the entire series of *Movements de Danse*, press-moulding terracotta body parts, re-arranging and merging them in various configurations, adding and subtracting clay as needed.

01 Blanchetière, François, Cascio, Agnès and Lévy, Juliette (2016) 'A material and technical approach to Rodin's Movements de Danse'. In *Rodin and Dance, The Essence of Movement*. Gerstein, Alexandra (Ed.). London: The Courtauld Gallery, p. 61-76.

Folding

Another sheet of paper is placed flat on a ground. This is a sheet with specific size. 25 kg of clay is used to cover the surface of the paper. The malleable and plastic clay body is spread from the centre outwards. Over several days the paper covered in clay rests in its place. Water evaporates. The clay – drying and shrinking – is prevented by the paper on which it is spread out to do so. The clay, bonding to the paper underneath, cannot follow the regular course of action, which is to shrink and contract evenly. As a consequence, the edges of the paper start to lift of the ground. Both paper and clay start to shrink, and the only way left to do so is to start folding in on themselves. Both paper and clay are no longer flat: together, they curl and fold and start to take on volume. Together, they delineate a body.

when clay is fired that it undergoes a synthetic transformation and is fixed beyond return.

She asks does this have sculptural consequences?

I say it has structural consequences: air-dried clay is brittle, fragile, and breaks easily. Firing clay is a transformation into a stronger and more permanent material state.

I say it has consequences for care: a demand is being made bearing on my comportment in relation to the work. One could say this implies a moral imperative.

I say it has consequences impacting on the experience of the present moment.

I say all of these can also be considered sculptural consequences.

Topologies

Flat flat square
Flat round circle
Round flat block
Round round ball

Carl Andre
Art Of Sculpture
1963[01]

01 Quoted in Fer, Briony (2009) *Eva Hesse: studiowork*. Edinburgh: The Fruitmarket Gallery.

Roithmayr, Florian (2015) *with, and, or, whithout,*
paper, air dried clay. 140 x 40 x 40 cm. Camden Arts Centre, London.

Clay – writing – paper

Another sheet of paper is laid flat on a ground. This is a sheet of paper that has been written on before it is covered with clay.

I write the word paper on the paper.
Then cover the paper with clay.

The word is no longer visible.
Nor is the paper for the time being.

I write the word clay on the paper.
Then cover the paper with clay.

The word is no longer visible.
The clay is visible.

I write repeatedly the words clay and paper on the paper.
Then cover the paper with clay.

The words are no longer visible.
Neither is the paper for the time being,
The clay is visible.

I write with a pencil. Most pencils today contain a core composed of a mixture of graphite and clay. By varying the clay-graphite ratio, hardness or softness of the pencil core is regulated.
I write the word clay with clay on paper and cover the paper with clay.

Some clay is no longer visible.

Duvivier, Julien (1936) *Le Golem*,
filmstill. France, Checkoslovakia. © National Film Archive, Prague.

(3100-3000 BC) Early Writing Tablet recording the allocation of beer,
clay, probably from southern Iraq, 52 x 48mm. British Museum, London © Trustees of the British Museum.

The Golem

The Golem is a mythical creature in Jewish folklore. In most versions of this legend, the anthropomorphic being is shaped out of clay, and animated through either the inscription of the word shem (a hidden name of god consisting of various letter combinations) into the forehead of the Golem, or though a piece of paper with the word shem written on it, which was inserted into the mouth of the Golem. Animated through the word, the Golem itself however cannot speak.

> Wenn du den Körper machst, nennst du die Gestalt *aleph* mit ihren Buchstaben, wie ich es dir gezeigt habe. Und wenn du die Eingeweide machst, kombiniere den Buchstaben *mem*; und wenn du den Kopf machst, kombiniere die Gestalt schin; und wenn du den Mund machst, kombiniere den Buchstaben *bet*; für das rechte Auge die Gestalt *gimel*, für das linke Auge *he*; für die rechte Nase *kaf*, die linke Nase *pe*; das rechte Ohr *resch*; das linke Ohr *taw*; die rechte Hand *he*, die linke Hand *waw*; der rechte Fuß *sain*, der linke Fuß *chet*; die rechte Niere *tet*, die linke Niere *jod*; Leber *lamed*; Galle *nun*; Magen *ain*; Speiseröhre *zade*; Bauchnabel *kof* […][01]

> When you make the body, you call the form *aleph* with their letters, as I have shown you. And when you make the intestines, combine the letter *mem*; And when you make your head, combine the figure *schin*; And when you make the mouth, combine the letter *bet*; For the right eye, the form *gimel*, for the left eye *he*; For the right nose *kaf*, the left nose *pe*; The right ear *resch*; The left ear *taw*; The right hand *he*, the left hand *waw*; The right foot *sain*, the left foot *chet*; The right kidney *tet*, the left kidney is *jod*; Liver *lamed*; Bile *nun*; Stomach *ain*; Esophagus *zade*; Navel *kof* […][02]

01 Transcript from a collection of manuscripts, anonymous, Aschkenas, mid 17th century. Quoted in Bilski, Emily D. and Lüdicke, Martina (2016) *Golem*. Berlin: Jüdisches Museum, p. 46.
02 own transltion

Cuneiform

Clay is a very versatile material. In ancient Mesopotamia (modern Iraq and eastern Syria) and Anatolia (modern Turkey), clay was used for making bricks, pottery, tools, figurines and for recording information. In southern Mesopotamia, from around 3400 BC, half-dried clay tablets were incised with split reeds to form images and numerals as part

of a complex system of recording. This developed into the cuneiform (wedge-like) script, used to write about all aspects of life. Earliest clay tablets relate to stock taking and the exchange of goods. Later ones relate to contracts, loans and depts. Most tablets were sun dried and were never meant to be fired.

Penone, Giuseppe (2004) *Lo spazio della scultura, corteccia,*
bronze and leather, 135 x 194 x 15 cm. Frith Street Gallery, London.

Giuseppe Penone

In 2004, Giuseppe Penone presented a work titled *Lo spazzio della scultura, corteccia* (The space of sculpture, bark) at Frith Street Gallery in London. It consisted of a rectangular, upright bronze of a flattened piece of tree bark, and a slightly larger rectangular piece of leather embossed onto the bronze. The two materials do not fully overlap, but where they do, the leather embossed onto the bronze takes on the relief of the bark pattern underneath. The leather seems to derive from a different circulation to the bronze, or had a previous function: the un-embossed parts show marks of having been folded, and the upper edge is cut in haphazard manner, bearing holes from previous stitching.

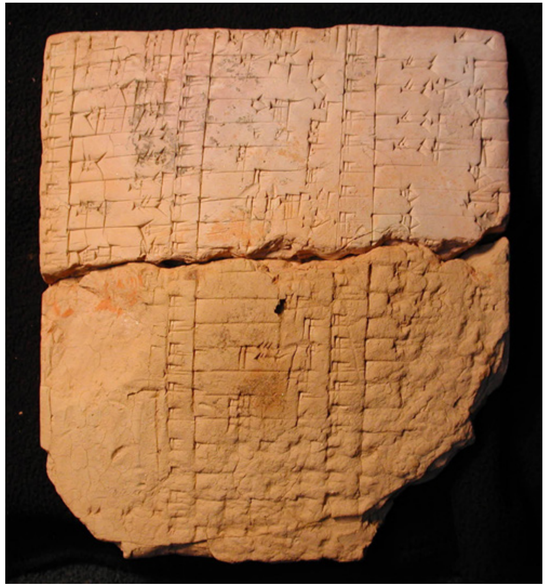
A similar but larger work appeared at FIAC in Paris the following year, this time the bronze rectangle was suspended lengthwise, and the leather showed holes and haphazard cutting across the bronze.

Penone often includes *Lo spazzio della scultura* as part of titles. For example *Lo spazio della scultura. Pelle di Cedro* from 2001, which consist of a bronze cast resembling tree bark and many pieces of embossed leather surrounding it, or *Lo spazio della scultura pelle di cedro – chiodo*, a work from 2001 containing bronze reproduction of a tree bark and iron supports.

The space of sculpture

I try to imagine the force needed to make the leather take on the relief topology of the bronze cast underneath, the tools, the effort and labour. I also try to imagine the force needed to strip a large piece of bark of a tree and flatten it out.

At this point, I become aware that I have applied my thinking in reverse: my imagination worked from the application of the leather to the preparation of the bark, from what is closest to me to what is further away or behind. This seems a kind of reversal of what would have taken place. But maybe the bark never existed, and what appeared like bark was really modeled in clay and reproduced as bronze cast via the lost-wax process. I also become aware that the answer to this question has no consequence for my experience of the two materials made to bear on each other. Of course in the overlapping of (bronze) bark and (leather) skin, one covers the other, but I cannot say which of the two does the covering. One yields to the other. The leather certainly doesn't hide the (bronze) bark: if anything, I'm even more aware of the (bronze) bark because of the (leather) skin. Something yields to something else, but



Broken clay tablet (3100-3000 BC),
clay, probably from southern Iraq, 86 x 42mm, British Museum, London © Trustees of the British Museum.

Symbolon

A symbolon, σύμβολον, which often means tally in the sense of something that corresponds to something else, was, in ancient Greece, a clay tablet, sometimes with writing on it, broken into two halves. It formed the physical assurance of a contract. Each party kept one half of the broken tablet. Each half was a material indication representing a form of identification: when the contract had to be fulfilled, it was only those specific two halves fitting together to form a whole, and it was only the parties in possession of the specific halves that were able to fulfil the contract. The symbolon was inherently transferable, as anyone presenting one of the halves was able to fulfil the agreement.

The symbolaion represented an agreement or contract (for example over a loan), whereas the term symbola often referred to inter-state agreements, and was used for individuals travelling across borders as a form of legal protection against seizure of property.

Plato spoke of the symbolon as that, which forms one half of a unity:

> *Each of us, then, is but a tally (*σύμβολον*) of a man, since every one shows like a flat-fish the traces of having been sliced in two; and each is ever searching for the tally (*σύμβολον*) that will fit him.*[01]

01 Plato (1925) P*lato in Twelve Volumes, Vol. 9*. Fowler, Harold N. (trans.). Cambridge, MA: Harvard University Press; London, William Heinemann Ltd., Symposium 191 -E.

I cannot say which of the two does the yielding. The space here is one of surrender and production.

Interstice

What is this space of sculpture?
Here, it is a very particular place created by the imprint of one material onto another. A reversal, a moment of peeling away reveals the passing of a place infinitely small as it were, an interstice between two forms or shapes, between two materials.
It is in-between. On a material level, this space of the imprint manifesting in the interstice appears more defined by what constitutes its sides and borders, than by what it is in itself. It is temporary – an invented improvisation lasting no longer than necessary, always with the possibility of coming apart again. It is a hypothetical space. It cannot be entered and what takes place there, lies outside of observation. Any attempt at peeling it open also dissolves this space and in the moment of encounter, it disappears.

Supervision

In my memory we sit together at a table…

I say to her that two materials come together and in this coming together, a third entity appears that was in neither of the two original materials.

She says do you mean a threshold?

I say in as much as each constituent component in a comming-together is always already a threshhold in view of all the other components: it is itself plus the potentiality of everything else.

Opening of the Mouth Ceremony

The making of Egyptian statuary was accompanied by a ritual called *The Opening of the Mouth Ceremony*. In several steps, the rock is identified in the quarry and the priest/sculptor, who is also called the *embracer*[01], looks, in a state of trance, forward or into the rock to identify the likeness of the person the statue is to stand in for. In the following stages, the embracer then looks into the rock to identify all four sides of the statue, marks the contours, and starts to reveal the form within. Using several ritual tools, the embracer then performs the ritual of the Opening of the Mouth, in which the statue is animated through words, and the statue begins to breathe and consume nourishment. At this stage, the statue ceases to be a representation and starts to be embodied[02].

In a later transfer of the ritual from statuary to mummies, this ritual starts to be used to animate the physically preserved corpse in order that it could receive nourishment, hear, breathe, and in order that an element of the soul in the form of a bird, (the *Ba*, represented as a bird with a human head) could fly out of the tomb and return each night, re-connect with the body, and gather nourishment from it. The physical corpse, mummified, doesn't pass into the underworld, but rather hovers in a liminal space between this world and the next, forming a connection between them. The ritual word is the main catalyst that allows reanimation and facilitates breathing again, the exchange of air.

Descriptions of these ritual practices as well as the necessary invocations are collected in the so called *Book of the Dead*, which is transliterated as *rw nw prt m hrw*, which might be translated as *Book of Coming Forth by Day*, or T*he Book of Emerging Forth into the Light*: It forms a collection of manuscripts written by numerous priests collected over the course of several centuries with the intention of speaking them out loud: Egyptians believed in the creative act of speaking – the power of the spoken word – for pronouncements to become real: one version of Egyptian creation narratives has a god speaking things into existence.

(ca. 600 BC) *Opening of the Mouth ceremony,*
wall painting, Queen Qalhata's tomb, El Kurru, Sudan © Sarah Duffy

01 Assman, Jan(2001) *Death and Salvation in Ancient Egypt*. Ithaca, N.Y.; London Cornell University Press, p. 312.

02 Fischer-Elfert, Hans-W. (1998) *Die Vision von der Statue im Stein: Studien zum altägyptischen Mundöffnungsritual.* Heidelberg : Universitätsverlag C. Winter.

Tearing

Another sheet of paper is placed flat on a ground. This is a sheet with specific size. 25 kg of clay is used to cover the surface of the paper. The clay is spread from the centre outwards. Over several days the paper covered in clay rests in its place. Water evaporates. The clay starts to shrink and the paper makes it shrink into one direction only. Both clay and paper are more or less bonded together. They do not come apart so easily. Their inherent properties are in conflict rather than complimentary, which results in tension. The stress on both paper and clay is enormous. The stress is sometimes too much and the paper tears and the clay cracks. Sometimes the tears and cracks are so severe, both paper and clay come apart, the volume they created collapses, and clay and paper fall back on themselves.

In my memory...

I say to her that the Opening of the Mouth Ceremony as a narrative describes several aspects that place it at the advent of a particular way to imagine the making of sculpture. It describes an approach to art based on foreseeing and prophecy: as the priest / sculptor looks at the quarried piece of rock he identifies the features of the statue within.

She says this reminds me of Michelangelo foreseeing the slave within the marble he intends to liberate.

I say this is an approach towards form that precedes any transformation, and predetermines the outcome.

I say here everything becomes known before the start.

She says this pushes back the idea of art making into a much more distant past, and one that is Near Eastern (or specifically Egyptian - maybe Nilotic) in origin: well beyond the boundaries in space and time that would normally be associated with this kind of art production.

I say the beginning of the Opening of the Mouth Ceremony coincides with the early use of Hieroglyphic characters, and that the word is essential in the ritual itself.

I say the shift from orality to literacy required the word as a part of the creation of statues. And not just any kind of statues, but precisely statues that at the point of the encounter or application of the word cease to be representations and become the thing or person it was meant to stand in for.

I say here the ritual word facilitates an excess by determining the representation as the thing itself.

I say I wonder if this shift from representation back to the represented – also then used to animate the corpse, the mummy – is not also imaginable in the hieroglyphic sign itself?

She says I should explain this more.

I say what is also fascinating is that the descriptions of the rituals were written down, over centuries and by different priests. An early collection of manuscripts describing in words how to use words. As if the word is not only the tool for animating the thing, but also the way this animation is mediated.

(ca. first century BC) *Belvedere Torso,*
marble, 159 x 68 x 79 cm. Musei Vaticani, Museo Pio-Clementino, Roma

Torsi

At the beginning of the fifteenth century, on a property belonging to the aristocratic Colonna family, a piece of marble was discovered, 1.59 metre high and weighing 2.2 tons. The Italian word *torso*, and in plural *torsi*, initially referred to the unusable parts of vegetables: cabbage stalks for example. This initially probably scornful description of the unearthed piece quickly established itself as acceptable art-historical terminology.

In a film produced 400 years later, a voice-over written and spoken by Roland Schaer describes both the *Belvedere Torso*, displayed since 1520 in the Papal collections, now in the Vatican Museums, as well as a description of another torso, the *Belvedere Apollo*[01].

01 For a transcript of the voice over, see *Le corps en morceau* (1990), Paris: Musée d'Orsay.

She says she wonders how I use words in relation to processes, or sculpture.

I say a sign – whether linguistic, material or visual – comes into being to mediate something else. We, that is human beings like you and me, enter into a contractual consent that something we both agree upon will from this moment forth stand in for something else in different capacities or sensorial regimes.

We, that is, humanity has developed the capacity to not only mark that relationship and make it visible through signs, but far more importantly than creating visibility for relational networks, humanity has – in the invention of signs – made these relationships communicable and exchangeable as well, and so created the possibility to mediate the sensation as something that can be shared and exchanged. What was my own private and individual experience could now be shared and experienced together, with you, with others.

The material and visual potency of sculpture has, like the linguistic sign, the capacity to create visibilty. But it does so with and for someone else as well. It has the potential to give the experience of relations a direction, make it exchangeable. It hase the potency to become a communal and shared experience. Autonomy, which might be lost in a process from model to mould to cast, is replaced with community, and the present moment is experienced within a network of tenses, spaces, and participants.

I say what makes the Opening of the Mouth Ceremony so relevant is that here the linguistic sign of the word, the visual sign and the material sign of sculpture come together. The word, created through the human capacity to control neck muscles, and so modulate the air of the breath into sounds, enters through the opening of the mouth into the thing and brings life and grants survival. The word – a breath rider – animates the material as sculpture, which starts to be, with and for us.

Rodin, Auguste (ca. 1900-1905) *Assemblage : Nu féminin (?) à tête de femme slave, dans un vase*
plaster and ceramic, 22.1 x 12.5 x 14.7 cm. Musée Rodin, Paris

Between the sixteenth and nineteenth century, the most famous antique works in Italy were restored, and it was common practice to supplement missing parts with new additions. The Renaissance artists were busy replenishing legs and feet, adding new heads, arms and hands. At the same time, scholars provided new identities: to complete the figures, names were added and the fragments were given new narratives. And so one fragmented torso received new parts, bodily or otherwise:

A new left hand
and
a new right arm
and
a new name (word)
became the *Belvedere Apollo*
and
entered a new life proliferating as an entirely different entity.

The other torso remained a fragment as nobody added narratives or body parts, and is still to this day known as the *Belvedere Torso* – its name and story never went beyond a description of its body in situ.

Stalk vegetables: cime di rapa, not cauliflower but maybe asparagus?

Assemblage

Roland Schaer's twentieth century description sees the torso in relation to August Rodin's working methods, which he relates to three distinct procedures, or practices of the fragment:

From parts to a whole, which is the practice of composition, and which might never be fully finished. Instead, the completion might be postponed to a later moment.

From a whole to parts, which is the practice of mutilation, and which does form a completion. Instead of being a transitional step, the partial body is the endpoint.

From parts to parts, which is the practice of assemblage, and which always remains fragmentary. Instead of re-forming unity, assemblage invents an embrace through connecting disparate parts.

Embrace

I start with a distinctive act performed by a particular person. Clearly under specific circumstances, and to a certain end. Deliberate. Intentional. And, without doubt, not done out of habit.

Manufacture Francaise d'Armes et Cycles de Saint-Etienne (1913) catalogue page
reprinted in D'Harnoncourt, Anne and McShine, Kynaston (Eds.) (1989) *Marcel Duchamp*. Munich: Prestel.

Marcel Duchamp

In a side note, written while compiling Marcel Duchamp's papers, Michel Sanouillet observed an "affinity" between the use and depictions of all sorts of moulds in Duchamp's work and "the sportswear presentation" found in a 1913 catalogue from the company Manufacture Française d'Armes et Cycles de Saint-Etienne[01].

01 Sanouillet, Michel (1989) 'Marcel Duchamp and the French Intellectual Tradition' in *Marcel Duchamp*. D'Harnoncourt, Anne and McShine, Kynaston (Eds.). Munich: Prestel.

But one is not enough and I need a process of combining different materials.

What is being produced is made up of natural matter or manufactured materials, often with their own conflicting motivation and intention.
Can this already be seen as repair, remake or reconfiguration, an extension of one material through another?

What happens in this space where two entities meet and are made to embrace each other?
What takes place when they start to complement each other, or contradict each other? When they have oppositional tendencies and pull and tear?
A moment of over spill, over determination, and contamination.
A kind of impurity and imperfection – one infects the other and continuously spoils the advent of a resolution.

Any kind of logic is reversed, or circumnavigated, pushed to extremes or turned on its side.

Composite creatures:
A bird man;
A human head with antlers;
A god with a lion's head and human limbs;

Or in this case: a clay body held by paper.
Absence

I'm wondering what holds up these shirts, if nobody is underneath? Or another way: whose torso does the shirt mould itself around, if there is nothing but air inside? If it's not air, the answer is: the torso of an invisible dummy. The shirt becomes a virtual lineament describing a missing part.

Outlining it.
Delineating it.

Marking it.
Something is indicated, even though the part that does the indicating is missing. Or just not quite present; Absence depicted as a temporary or spatially material property.
Back in five minutes.
This then outlines the possibility of an assemblage; a flow between scattered parts; parts that are inconsistent to the point of missing entirely. Here the materiality of a hole can consist of everything that is not the hole.

The economy of the hole.
The governance of the hole.

Or more precisely: there is an awesome paradox in how a cast can mould the absent body, can surround it, and in this embrace, produce it, call it forth.

And it's not just specific materiality that indicates and marks this journey. This is to say, there are specific narratives as well as practices of the imprint that allow the arrest and fixation of the hole to be postponed as sculpture.

Body

A sheet of paper is laid flat on a ground. It is a sheet with specific size: perhaps DIN A0, 841 mm by 1189 mm. But it is also possible that the sheet of paper corresponds to the circumference and height of my torso, is indeed UK size M. I start to build myself a body. The sizes then are as follows...

when I exhale:
Shoulders: 107cm.
Chest : 92cm.
Waist: 87cm.

when I inhale:
Shoulders: 114 cm.
Chest : 99 cm.
Waist: 94 cm.

My breath accounts for seven centimetres more paper.

I'm building myself a body.

Over several weeks, the clay starts to evaporate and shrink by seven centimetres.
The clay evaporates my breath and exhales.

Roithmayr, Florian (2016) *studio works*
clay, paper, each ca 130 x 40 x 40 cm. Wysing Arts Centre, Cambridge

Upright

Another sheet of paper is laid flat on a ground. This is a sheet with specific size. 25kg of clay is used to cover the surface of the paper. The clay is spread from the centre outwards. Over several days the paper covered in clay rests in its place. Water evaporates. The clay starts to shrink. Paper and clay start to fold in on themselves. When most of the water is evaporated, the paper and clay folded in on themselves are turned and lifted upright. It is now positioned on one of their sides that forms an edge similar to a horse shoe. The weight of the clay presses this edges firmly against the ground on which it is resting. The weight of the clay pressed against the ground stops this edges from changing its shape any further. Because of the new position of the paper covered in clay the stress and tension between paper and clay is redistributed and gravity starts to have a very different effect on the folded ensemble. The new forces start to work on both paper and clay. Sometimes, the edge that is now on the top starts to unfold again and open up. This is similar to the consequences visible in the shoulders and upper chest of someone taking a deep breath: both shoulders and upper chest expand and open up; the new arrangement appears even more upright, the back of the paper seems to curve even more like a spine. The ensemble seems to stand to attention.

The simple adjustment from a horizontal orientation of the ensemble on the floor to an upright orientation has material, visual and topological consequences:

I am raising the ensemble .
I am no longer looking down.

I am lifting the ensemble.

I'm seeing eye-to-eye /
the ensemble is seeing eye-to-eye /
we are both seeing face-to-face.

I thought I was building myself a body.

But I was really building another body.

Postscript

I still do not see where I am looking.
I still cannot speak when I am doing.

These are blindspots, in my vision or when putting the pen onto paper and forming a spot of the unknown.

In these blindspots, something can become sculpture, but does no longer need to be named.

BIBLIOGRAPHY

Andrews, Oliver (1988) *Living Materials: a sculptor's handbook*. Berkeley : University of California Press.

Ardengo Soffici (1909) *Il caso Medardo Rosso: preceduto da l'impressionismo e la pittura italiana*. Firenze: B. Seeber.

Assman, Jan(2001) *Death and Salvation in Ancient Egypt*. Ithaca, N.Y.; London: Cornell University Press.

Blanchetière, François, Cascio, Agnès and Lévy, Juliette (2016) 'A material and technical approach to Rodin's Movements de Danse'. In Gerstein, Alexandra (Ed.) *Rodin and Dance, The Essence of Movement*. London: The Courtauld Gallery.

Bilski, Emily D. and Lüdicke, Martina (2016) *Golem*. Berlin: Jüdisches Museum.

Biringuccio, Vannoccio (1558) *Pirotechnia. Li diece libri della pirotechnia, nelli quali si tratta non solo la diuersità delle minere, ma ancho quanto si ricerca alla prattica di esse: e di quanto s'appartiene all'arte della fusione ouer getto de metalli, e d'ogni altra cosa à questa somigliante*. Composta per il s. Vannuccio Biringoccio, nobile senese.

Biringuccio, Vannoccio (1990), *The Pirotechnia of Vannoccio Biringuccio: The Classic Sixteenth-Century Treatise on Metals and Metallurgy.* Stanley Smith, Cyril and Teach Gnudi, Martha (Trans.). New York: Dover Publications.

Birks, Tony (1998) *The Alchemy of Sculpture*. Chalford: Pangolin Editions and Yeovil: Marston House.

Boltz von Ruffach, Valentin (1546) *Illuminierbuch. Wie man allerlei Farben bereiten, mischen und auftragen soll. Allen jungen angehenden Malern und Illuministen nützlich und förderlich*. Basel: Jakob Kündig.

Bowden, A. J. and Gregory F. J. and Henderson A. S. (Eds.) (2013) *Landmarks in Foraminiferal Micropalaeontology: History and Development.* London: The Geological Society.

Broecke, Lara (2015) *Cennino Cennini's Il libro dell'arte : a new English translation and commentary with Italian transcription.* London: Archetype Publications Ltd.

Butler, Vincent (1997) *Casting For Sculptors.* London: A&C Black (Publishers) Ltd.

Cellini, Benvenute (1811) *Due trattati*. Milano: Della Societá Tipografica de' Classici Italiani.

Cennini, Cennino D'Andrea (1954) *The Craftman's Handbook*. Thompson Jr., Daniel V. (Trans.). New York: Dover Publications.

Cennini, Ceninno (1899) *The Book of the Art*. Herringham, Christiana Jane (Trans.). London : G. Allen & Unwin.

Cennini, Cennino (1844). *A Treatise on Painting*. Merrifield, Mary P. and Tramboni, Giuseppe (Trans.). London: Edward Lumley.

Cennini, Cennino (1954) *Il Libro Dell'Arte o Trattato Della Pittura*. Firenze: Felice Le Monnier.

Cozens, Alexander (1952) 'A New Method of Assisting the Invention in Drawing Original Compositions of Landscape' in Oppé, A. P. *Alexander and John Robert Cozens*. London: Adam and Charles Black.

Didi-Huberman, Georges (1984) ''The Index of the Absent Wound (Monograph on a Stain)' Repensek, Thomas (Trans.). *October*, 1 July 1984, Vol.29.

Didi-Huberman, Georges (1997) *L'Empreinte*. Paris: Centre Georges Pompidou.

Didi-Huberman, Georges (1998) *Phasmes : essais sur l'apparition*. Paris : Editions de Minuit.

Didi-Huberman, Georges (2002) 'L'air et l'empreinte'. In Papet, Edouard (Ed.) *À fleur de peau. Le moulage sur nature au XIXe siècle*. Paris: Réunion des Musées Nationaux.

Dürer, Albrecht (1525) *Underweysung der Messung, mit dem Zirckel und Richtscheyt, in Linien, Ebenen unnd gantzen corpore*. Nürnberg: Hieronymus Andre.

Eamon, William (1994) *Science and the Secrets of Nature*. New Jersey: Princeton University Press.

Fer, Briony (2009) *Eva Hesse: studiowork*. Edinburgh: The Fruitmarket Gallery.

Fischer-Elfert, Hans-W. (1998) *Die Vision von der Statue im Stein : Studien zum altägyptischen Mundöffnungsritual*. Heidelberg: Universitätsverlag C. Winter.

Frederiksen, Rune (2010) 'Plaster Casts in Antiquity'. In Frederiksen, Rune and Marchand, Eckhart (Eds.) *Plaster casts: making, collecting and displaying from classical antiquity to the present*. Berlin: De Gruyter.

Gell, Alfred (1992) The Technology of Enchantment and the Enchantment of Technology. In J. Coote and A. Shelton (Ed.) *Anthropology, Art and Aesthetics*. Oxford: Clarendon.

Gell, Alfred (1996) Vogel's Net, Traps as Artworks and Artworks as Traps. In *Journal of Material Culture,* 1996, 1:5.

Gell, Alfred (1998) *Art and Agency: An Anthropological Theory*. Oxford: Clarendon.

Glass, J. F. (1929) *Modelling and sculpture, a practical treatise for students, with a brief history of the arts.* London: B. T. Batsford.

Goldschneider, Ludwig (1952) *A Survey of Michelangelo's Models in Wax and Clay.* London: Phaidon Press.

Hecker, Sharon (2008) 'Fleeting Revelations', in *Ephemeral Bodies*. Panzanelli, Roberta (Ed.). Los Angeles: Getty Research Institute.

Helmreich, Andreas (1563) *Ein gründlichs und köstlich kunstbüchlein, wie man auff Marmelstein, Kupffer, Messing, Zihn, stahl, Eisen, Harnisch und Waffen etc. Etzen, und künstlich vergülden soll, mit vorgehendem bericht. Wie man Dinten, Presilgen, vnd alle Methalfarben, zum schreiben, als Lasur, Zinober, Aurumpigmentum etc. Mancherley Farben, Pargement vnd Federn zu ferben, alle Methaln, Als Gold, Silber, Kupffer, Messing, Zihn, Stal vnd Eisen etc. aus der federn zu schreiben, Gold vnd Silber Fundamentlein, vnd Goldwasser auff allerley Ballirey, dergleichen noch viel hie nicht garausgedruckt, machen vnd temperirn soll, zu dienst vnd ehren allen schreibern, auch den vnerfarnen der Etzkunst*. Eisleben: Gaubisch.

Institute of British Foundrymen (1946) *Atlas of defects in castings.* Manchester: IBF.

Johnson, Lilian (1960) *Sculpture, the basic methods and materials*. New York: David McKay Company INC.

Klee, Paul (1920) 'Schöpferische Konfession' in Edschmid, Kasimir (Ed.) *Tribüne der Kunst und Zeit, Eine Schriftensammlung*. Berlin: Erich Reiß Verlag.

Kohl, Jeanette (2007) 'Gesichter machen: Büsten und Masken im Florentiner Quattrocento'. In *Marburger Jahrbuch für Kunstwissenschaft*, 34. Bd (2007).

Kohl, Jeanette (2013) 'Casting Renaissance Florence: the bust of Giovanni de' Medici and indexical portraiture'. *In* Motture, Peta, Jones Emma and Zikos Dimitrios (Eds.) *Carvings, Casts & Collectors, The Art of Renaissance Sculpture*. London:V&A Publishing.

Le corps en morceau (1990) Paris: Musée d'Orsay.

Marchand, Eckhart (2010) 'Plaster and Plaster Casts in Renaissance Italy'. In Frederiksen, Rune and Marchand, Eckhart (Eds.) *Plaster casts: making, collecting and displaying from classical antiquity to the present*. Berlin: De Gruyter.

Mills, John W. (1966) *The Technique of sculpture*. London: Batsford.

Mills, John W. (1990) *Encyclopedia of sculpture techniques*. London : Batsford.

Palissy, Bernhard (1957) *Admirable discourses.* La Rocque, Aurèle (Trans.). Urbana : University of Illinois Press.

Palissy, Bernhard (1580) *Discours admirables de la nature des eaux et fontaines, tant naturelles qu'artificielles, des métaux, des sels et salines, des pierres, des terres, du feu et des émaux*. Paris: Martin le Jeune.

Panzanelli, Roberta (2008) 'Compelling Presence, Wax Effigies in Renaissance Florence'. In Panzanelli, Roberta (Ed.) *Ephemeral Bodies, Wax Sculpture and the Human Figure.* Los Angeles: Ghetty Resesarch Institute.

Penny, Nicholas (1993) *The materials of sculpture.* New Haven, London: Yale University Press.

Peirce, C. S. (1931) *Collected Papers of Charles Sanders Peirce, Volume I*. Hartshorne, Charles and Weiss, Paul (Eds.). Cambridge, Massachusetts: Harvard University Press.

Percy, H.M. (1965) *New materials in Sculpture*. London : Alec Tiranti.

Piccolpasso, Cipriano (1857). *I tre libri dell' arte del vasajo nei quali si tratta non solo la pratica, ma bravemente tutti i secreti di essa cosa che persino al di' d'oggi è stata sempre tenuta acosta, del cav. Cipriano Piccolpassi durantino*. Roma, dallo stabilimento tipografico, via del corso num. 387.

Piccolpasso, Cipriano (1980) *Tre libri dell'arte del vasaio: a facsimile of the manuscript in the Victoria and Albert Museum, London.* Lightbown, Ronald and Calger-Smith, Alan (Trans.) London: Scolar Press, 1980

Piemont, Alexis (1595) *The Secrets of the reverend Maister Alexis of Piemont*. Ward, William (Trans.). London: Peter Short for Thomas Wright.

Plat, Hugh (1653) *The jewel house of art and nature*. London: Bernhard Alsop.

Rajkolhe, Rajesh and Khan, J.G. *Defects, Causes and Their Remedies in Casting Process: A Review*. International Journal of Reseacrh in Advent Technology, Vol. 2, No. 3, March 2014.

Rao, Posinasetti Nageswara (1999) *Manufacturing technology: foundry, forming and welding*. Tata McGraw-Hill.

Rich, Jack C. (1961) *Materials and methods of sculpture*. New York: Dover.

Sanouillet, Michel (1989) 'Marcel Duchamp and the French Intellectual Tradition'. In D'Harnoncourt, Anne and McShine, Kynaston (Eds.) *Marcel Duchamp*. Munich: Prestel.

Schuyler, Jane (1986) 'Death masks in Quattrocento Florence'. In *Notes in the History of Art*, Vol. 5 No. 4 (summer 1984).

Shell, Hanna Rose (2004) 'Casting Life, Recasting Experience: Bernhard Pailissy's Occupation between Maker and Nature' in *Configurations*, Vol. 12(1).

Smith, Pamela H. (2014) 'Between Nature and Art: Casting from Life in Sixteenth-Century Europe'. In Hallam, Elizabeth and Ingold, Tim (Eds.) *Making and Growing: Anthropological Studies of Organisms and Artefacts*. Farnham: Ashgate.

Smith, Pamela H. (2013) 'Making Things: Techniques and books in early modern Europe' in Findlen, Paula (Ed.) *Things*. London: Routledge.

Smith, Pamela H. (2012) 'In the Workshop of History: Making, Writing, and Meaning' in *Shaping Objects: Art, Materials, Making, and Meanings in the Early Modern World*. West 86th: A Journal of Decora-

tive Arts, Design History, and Material Culture, 19 (2012).

Smith, Pamela H. and Beentjes, Tonny (2010) 'Nature and Art, Making and Knowing: Reconstructing Sixteenth-Century Life-Casting Techniques'. In *Renaissance Quaterly*, VOl. 63, No. 1 (spring 2010).

Smithson, Robert (1996) *Robert Smithson, the collected writings*. Flam, Jack (Ed.). Berkeley; London: University of California Press.

Stone, R. E. (1981) *Antico and the Development of Bronze Casting in Italy at the End of the Quattrocento*. Chicago: University of Chicago Press on behalf of the Metropolitan Museum Journal, 1 January 1981, Vol.16.

Sylvester, David (2012) *Interviews with Francis Bacon*. London, New York: Thames and Hudson.

Theopilus (1979), *On Divers Arts*. Hawthorne, John G. and Smith, Cyril Stanley (Trans.). New York: Dover Publications.

Toft, Albert (1929) *Modelling And Sculpture*. London: Seeley, Service & Co. Limited.

Vasari, Giorgio (1960) *On Technique, being the introduction to the three arts of design, architecture, sculpture and painting, prefixed to the lives of the most excellent painters, sculptors and architects*. Maclehose, Louisa S. (trans.). New York: Dover Publications.

Vasari, Giorgio (1986). *Le Vite*. Torino: Enaudi.

Vasari, Giorgio (1991) *The Lives of the Artists*. Conaway Bondanella, Julia, Bondanella, Peter (Trans.). Oxford: University Press.

Verhelst, Wilbert (1973) *Tools, materials and techniques*. Hemel Hempstead: Prentice-Hall.

Vogtherr, Heinrich (1538) *Ein Frembds und wunderbars kunstbüchlin allen Molern / Bildschnitzern / Goldschmiden / Steinmetzen / Schreinern / Platnern / Waffen un Messerschmiden hochnutzlich zu gebrauchen*. Straßburg: Christian Müller.

Wagner, Victor H. (1963) *Plaster Casting for the Student Sculptor.* London: Tiranti.

IMAGE LIST OF VISUAL DOCUMENTATION

(CD on following page)

(1) *I don't feel like it: The indifference of Objects* (2013)
installation view of exhibition organized by Florian Roithmayr, with contributing artists Caroline Achaintre, Jacques-André Boiffard, Jess Flood-Paddock, Alex Heim, Hillary Koob-Sassen and Karin Ruggaber. Camberwell Space, Camberwell College of Art, London

(2) *I don't feel like it: The indifference of Objects* (2013)

(3) *I don't feel like it: The indifference of Objects* (2013)

(4) *I don't feel like it: The indifference of Objects* (2013)

(5) *I don't feel like it: The indifference of Objects* (2013)

(6) *I don't feel like it: The indifference of Objects* (2013)

(7) *I don't feel like it: The indifference of Objects* (2013)

(8) *I don't feel like it: The indifference of Objects* (2013)

(9) *I don't feel like it: The indifference of Objects* (2013)

(10) *untitled (moat)* (2013)
cast concrete, 44 x 28 x 12 cm

(11) *untitled (study for moat)* (2013)
cardboard, 42 x 22 x 8 cm, Laure Gennilard Gallery, London

(12) *grotto* (2013)
fabric, aluminium, steel, dimensions variable, Laure Gennilard Gallery, London

(13) *grotto* (2013)
fabric, aluminium, steel, dimensions variable, Laure Gennilard Gallery, London

(14) *pear fur* (2013)
cast concrete, brown packaging tape, 48 x 28 x 6 cm, Wysing Arts Centre, Cambridge

(15) *the y* (2013)
towels, moving blanket, concrete. 25 x 32 x 45cm, Rowing Projects, London

(16) *t-shirt (gradient blue)* (2013) & headphones (2013)
folded photograms 25 x 11 x 3 cm, and 28 x 12 x 3 cm, screenprint 130 x 90 cm, Wysing Arts Centre, Cambridge

(17) *headphones* (2013
folded screenprint, each 12 x 5 x 5 cm

(18) *headphones* (2013)

(19) *lightbulbs* (2013)
folded screenprint, each 4.5 x 4.5 x 9 cm

(20) *lightbulbs* (2013)

(21) *t-shirt (gradient turquoise)* (2013)
screenprint, 130 x 90 cm

(22) *frieze* (2013)
cast concrete, dimensions variable, Treignac Projet, France

(23) *frieze* (2013)

(24) *gradient* (2013)
digital print of vinyl, 460 x 80 x 40 cm, Treignac Projet, France

(25) *gradient* (2013)

(26) *contact lens* (2013) & *inhaler* (2013)
digital print on PVC, cast concrete, each 80 x 14 x 205 cm, Carl Freedman Gallery, London

(27) *ear plugs* (2014)
digital print on PVC, concrete, each panel 80 x 14 x 205 cm, Wysing Arts Centre, Cambridge

(28) *EndStart* (2014)
cast oncrete, copper, carpet, wood, plaster, plastic mesh, 860 x 120 x 190 cm, BSR, Rome

(29) *service* (2015)
cast concrete, wood, mixed media, 180 x 8 x 42 cm, MOT International, Brussels

(30) *service* (2015)
installation view installation view

(31) *EndStart no 03* (2015)
cast concrete, plastic tubes, 68 x 28 x 21 cm, MOT International, Brussels

(32) *service* (2015)
towels, moving blanket, cast concrete, dimensions variable

(33) *service* (2015)

(34) *service* (2015)
papier-mâché, iron, dimensions variable

(35) *service* (2015)

(36) *EndStart no. 05* (2015)
plastic mesh, 86 x 42 x 16cm, MOT International, Brussels

(37) *EndStart no. 05* (2015)

(38) *EndStart no. 6* (2015)
plastic mesh, 16cm x 48 x 18 cm, MOT International, Brussels

(39) *service* (2015)
oil screen print on paper, mounted on MDF, 96 x 68 x 3 cm, MOT International, Brussels

(40) *service* (2015)
oil screen print on paper, mounted on MDF, 96 x 68 x 3 cm, MOT International, Brussels

(41) *EndStart no. 07* & *EndStart no. 08* (2015)
cast concrete, rubber, pigments, steel rod, dimensions variable, Tenderpixels, London

(42) *EndStart no. 07* (2015)
cast concrete, rubber, pigments, steel rod, dimensions variable, Tenderpixels, London

(43) *EndStart no. 08* (2015)
cast concrete, 89 x 38 x 18 cm, Tenderpixels, London

(44) *EndStart no. 09* (2015)
cast concrete, dimensions variable, Tenderpixels, London

(45) *EndStart no. 10* (2015)
cast concrete, pigments, dimensions variable, Tenderpixels, London

(46) *EndStart no. 10* (2015)

(47) *EndStart no. 10* (2015)

(48) *EndStart no. 10* (2015)

(49) *EndStart no. 10* (2015)

(50) *EndStart no. 10* (2015)

(51) *EndStart no. 10* (2015)

(52) *EndStart no. 10* (2015)

(53) *with, and, or, without* (2015)
installation view Camden Arts Centre

(54) *with, and, or, without* (2015)

(55) *with, and, or, without* (2015)
cast concrete, wood, steel, detail

(56) *with, and, or, without* (2015)
cast concrete, wood, steel, detail

(57) *with, and, or, without* (2015)
installation view

(58) *with, and, or, without* (2015)
clay, paper, 110 x 48 x 42cm

(59) *with, and, or, without* (2015)
cast concrete, pigments, dimensions variable

(60) *with, and, or, without* (2015)
installation view

(61) *with, and, or, without* (2015)
installation view

(62) *with, and, or, without* (2015)
steel, paint, cast concrete, rubber, dimensions variable

(63) *with, and, or, without* (2015)
installation view

(64) *with, and, or, without* (2015)
cast concrete, Duct tape, plastic mesh, cardboard, felt, detail

(65) *with, and, or, without* (2015)
detail

(66) *with, and, or, without* (2015)
detail

(67) *with, and, or, without* (2015)
cast concrete, steel. wood, paint, 200 x 28 x 140cm

(68) *breath rider* (2015)
documentation of life performance with two stone masons, Camden Arts Centre

(69) *breath rider* (2015)

(70) *breath rider* (2015)

(71) *breath rider* (2015)

(72) *breath rider* (2015)

(73) *breath rider* (2015)

(74) *breath rider* (2015)

(75) *breath rider* (2015)

(76) *breath rider* (2015)

(77) *breath rider* (2015)

(78) *forma no. 02* & f*orma no. 03* (2016)
installation view CCA Derry-Londonderry

(79) *forma no. 02* (2015)
cast concrete, pigments, 68 x 35 x 35 cm, Herbert Read Gallery, Caterbury

(80) *forma no. 03* (2015)
cast concrete, pigments, 76 x 36 x 36 cm, Herbert Read Gallery, Caterbury

(81) *studio works* (2016)
clay, paper, each c. 45 x 45 x 120cm

(82) *EndStart no. 11* (2016)
foam, wood, cast concrete, steel, Duct tape, 260 x 48 x 187cm, CCA Derry-Londonderry

(83) *EndStart no. 11* (2016)

(84) *øø*
ø
ø (2016)
clay, paper, dimensions variable, CCA Derry-Londonderry

(85) *forma no. 01* (2016)
cast concrete, pigments, 36 x 24 x 16cm, CCA Derry-Londonderry

(86) *ir re par sur* (2017)
installation view, plaster, carbon fibre, pigments, steel, air dried clay, paper, dimensions variable, Bloomberg Space, London

(87) *ir re par sur* (2017)

(88) *ir re par sur* (2017)

(89) *ir re par sur* (2017)

(90) *ir re par sur* (2017)

(91) *ir re par sur* (2017)

(92) *ir re par sur* (2017)

(93) *ir re par sur* (2017)

(94) *ir re par sur* (2017)

(95) *ir re par sur* (2017)

(96) *ir re par sur* (2017)

(97) *ir re par sur* (2017)

(98) *ir re par sur* (2017)