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Drawing a Hypothesis

Figures of Thought

A Project by Nikolaus Gansterer

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Preface

DRAWING A HYPOTHESIS

Nikolaus Gansterer

The idea for this book originated during a two-year research project at the Jan van Eyck Academie in the Netherlands. My long-held fascination for diagrams, maps, networks and the graphical forms of visualising complex associations prompted me to approach the field from an artistic point of view. This book has arisen from a five-year exchange with theoreticians, scientists and artists on the question of the hypothetical potential of diagrams.

I began intuitively, collecting, ordering and studying diagrams from books and the internet. Looking to understand how information is visually constructed within these representations, I internalised this language of images for myself by redrawing it. From this emerged a comprehensive archive which is still growing. The longer I worked with the material, the more I found myself asking how these figures were to be read, given their ambivalent nature between image, symbol and drawing. Moreover, how do they in turn configure our thought processes? What narrative forms can be found in these drawn *figures of thought*? And what happens when figures are removed from their original context? What action potential is then liberated?

Thinking Drawing – The pool of diagrammatic images and symbols is a permanent part of our daily perception. The cognitive act of perceiving, translating and allocating occurs continuously when we compose thoughts and receive or process information. This process always happens through the establishing of relations and through drawing connections: the structures of the semantic relationships embodied in the anatomical organisation of our brains allows us to interact with others through language and behaviour. Since drawing can mediate between perception and reflection, it plays a constitutive role in the production and communication of knowledge. From my perspective, the genesis of ideas is often directly connected with graphical thinking:[1] On the one hand, many theories genuinely

1) For example, Ludwig Wittgenstein originally developed his *Tractatus Logicus* in a parallel fashion, both graphically and in words, with hundreds of diagrammatical figures; the theories of Charles Sanders Pierce are also deeply interlinked with his graphical figures.

did and do begin with a quick draft to capture an idea (to place it for oneself or others); on the other hand, hardly any thesis rejects the forms of visual representation when communicating its contents. The drawing of figures thus reveals itself to be one of the oldest of all mankind's cultural techniques, and remains to this day a fundamental instrument in any kind of artistic or scientific praxis.

Reverse Engineering of a Theory – It was soon clear to me that I would have to open up my archive of figures to make them accessible to others, so opening the path to research into the potential of drawings. The figures I had drawn myself served as a starting-point for the here collected hypotheses. They quickly became associative catalysts of an animated exchange with the most varied people from the most widely differing fields (artists, writers, scientists).

I sent my drawings to various interpreters with a request for a written interpretation (*micrology*[2]), so that in turn I could react to their texts with diagrammatic drawings. The process worked until the potential for action was exhausted.[3] Through this intensive process and exchange of thoughts, the most varying ideas, hypotheses, theses and interrelations developed, eventually achieving the form of captions, (sci-fi) stories, and longer essays on the themes of figure, drawing, hypothesis and diagram. The resulting contributions are of very different kinds, reflecting their authors' particular fields of knowledge in the fractious borderland between art, science and fiction.

Out of this has emerged a comprehensive compendium of *figures of thought* which straddles the border between scientific representability and artistic means. Without pretension to completeness, it reveals a rolling line which touches, penetrates and goes beyond significant aspects of the diagrammatic. The figures it contains should always be understood – and here I would like to take up Karin Harasser's reference to Roland Barthes' thoughts[4] – as something moving, changing, living, flexible and fluid in themselves. Through their ambivalent character, they

2) By the concept of *micrology* I mean a small model and theoretical structure, in itself coherent, that is informed by or stamped with the author's particular background knowledge, but without dictating formal criteria for the text.

3) The experiment didn't always work. Some of the authors I approached were not prepared to get involved in a process of this kind, or the *micrologies* got bogged down after a while. This book documents only a selection of these interpretations and communications processes.

4) See Hypothesis #7, p. 110

reveal to us an enticing glance into the (rear-view) mirror of our consciousness, of the possible mental spaces between recognising and naming.

Index of Figures – The figures themselves and the diverse ways of reading them are the protagonists of this publication. All the figures given in this book were drawn by hand by me. Many of them were sent to more than one person, for parallel interpretation. Consequently, these appear in several places in the book. To ensure easy tracking, each figure has its own number. The numbering follows the logic of their creation and indicates their placing in my sketchbooks. The identifying number is given beside each particular figure as (Fig. XXX). An index and collection of all figures used in the publication can be found at the front. This provides both a visual list of contents and an orientation guide. The reader is invited to navigate through the book, to leaf through and read into it, with the help of the Index of Figures.

The coloured image parts (Plates I-III) are divided into three sections. Inspired by Aby Warbug's *Mnemosyne Atlas*, associative images are collected which emerged in the course of the project as a visual response to the contributions. These draw associative references between my own artistic work and the figures found. At the end of the book is a removable folding map (→Questions of Order and Relational Characteristics of Figures of Thought) which places key figures of thought within an ordered system.[5]

Acknowledgments – I would like to express my thanks here to all the authors for their fascinating interpretations and contributions, and for taking part in this experiment. Particular thanks are due to Simona Koch, for investing so much love, inspiration, and time into the project, and for bringing it to fruition with me, in the form in which you now hold it in your hands.

I would also like to express my gratitude to the Jan van Eyck Academie, Maastricht,[6] the University for Applied Arts, Vienna, and Bm:ukk (the Austrian Federal Ministry for Education, Arts and Culture), for the moral, financial and active support which has made this project possible.

Nikolaus Gansterer, Vienna, 2011

5) This broadly follows the approach of Gerhard Dirmoser (see Hypothesis #12). I would like to thank him for the inspiring and encouraging conversations which we shared in Vienna and Berlin.

6) A detailed list of acknowledgments can be found on p. 349.

Map: Questions of Order and Relational Characteristics of Figures of Thought
(→removable folding map at the end of the book)

→Map sections a+b, p. 26; Map section c, p. 27

HYPOTHESIS #1

“A Line with Variable Direction, which Traces No Contour, and Delimits No Form”*

Susanne Leeb

* Gilles Deleuze, Félix Guattari, *A Thousand Plateaus*, Minneapolis, University of Minnesota Press, 1987, p. 499.

Fig. 06-12

There are currently at least two opposing ways of understanding the term ‘diagram’. Some see diagrams above all as an aid to systematisation – “problem solvers, because they ‘automatically support a large number of perceptual inferences, which are extremely easy for humans’”[1] –, while others see them as “proliferators of a process of unfolding” or “maps of movement”[2]. If in the former case the visual diagram is regarded in terms of the potential for order and visualisation, for example in mathematics, economics, statistics or pedagogy, in the latter case it is rather the structural possibility of putting relationships in the foreground, so conceiving of the diagrammatic as something which describes the alignment of words, shapes, objects and persons. If the first concept of the diagram is retrospective – by means of diagrams, a complex thought process or argument can be composed or a set of circumstances systematised – the second concept is projective, with vectors pointing in unknown directions. And while in recent years much attention has been paid to the first concept of the diagram in semiotics and image, but also in the science of cognition, the second concept of the diagrammatic has been marked by the power and subject theories of Michel Foucault as well as Gilles Deleuze and Félix Guattari. It is not a question, however, of two fundamentally different types of diagram; rather, this oscillation between systematising and openness is inherent in the diagram. Kenneth Knoespel calls to mind the Greek etymology of the word *diagramma*, whose roots suggest not only that “which is marked out by lines, a figure, form, or plan, but also carries a secondary connotation of marking or crossing out”. Correspondingly, diagrams would not only take care of “order and stability” but would also be a means to “destabilisation and discovery”[3].

The same ambivalence also applies to those passages of text in which a more recent preoccupation with diagrams has its origin: for Foucault, the panopticon, with its specific structure of supervision, is a prototypical diagram which establishes a particular structure and sees to a smooth functioning of the

1) cf. John Mullarkey, *Post-Continental Philosophy. An outline*, New York, continuum 2006 in the chapter *Thinking in Diagrams*, here: p. 162.

2) Ben van Berkel and Caroline Bos, *Diagrams: Interactive Instruments in Operation*, in: *Any, Vol. 23*, 1998, pp. 19-23, here: p. 22.

3) Kenneth Knoespel, *Diagrams as plotting device in the work of Gilles Deleuze*, in: *Litérature, Théorie, Enseignement No. 19*, 2001, pp.145-165, here: p. 146.

HYPOTHESIS #4

Grapheus Was Here

Anthony Auerbach

(→PIII/02a-f)

Fig. 15-03a

Untangling drawing and theory reveals a knot which cannot be undone historically. While cutting it is considered the sign of progress in mathematics, the knot doesn't relinquish its primordial status all that easily. Euclid's first postulate, "To draw a straight line from any point to any point," is the graphic hypothesis on which is founded the notion that there are drawings which may be considered to all intents and purposes equivalent to abstract thought. By literally *drawing a hypothesis*, the postulate at once recruits drawing to the cause of deductive reasoning and furnishes *quod erat demonstrandum* with an image; it warrants a line to draw a conclusion (a theorem) and the *a priori* to compel reality as surely as a geometer constructs figures.

Drawing thus enacted the isomorphism of geometry and its image as a law of nature, and signed the expedients – that is to say, authorised the departures from the strict domain of mathematics – that we associate with the names, for instance, Alberti, Galileo, Newton.

The point is not to insist on the purity of mathematics, which would be bound to anachronism: the truths which mathematics claims to be timeless remain so, but, whereas the antique fell short of its ideal only by modern standards, the modern refuses to realise antique expectations. Better to note that while mathematics admits no contradiction, in history, contradictions abound. The period when pure mathematics came to be defined by the elaboration of arbitrary hypotheses, free from intuitive and realistic content or meaning, was also the period of the accelerating expansion of the domain of applied mathematics. The types of mathematics that were applied and the fields of knowledge to which they were applied multiplied, along with the number and variety of drawings imagined as embodying *demonstration* on the Euclidean model (*construction* in the Kantian version). Let us call such drawings diagrams. The burgeoning of the scope of mathematics along with its graphic counterparts may also have prompted the revival of interest in philosophising *ad more geometrico*, albeit not according to the old method.

My approach may be called pragmatic because it is concerned with the meaning produced, transferred and transmitted by the *use* of diagrams: content not reducible to the abstractions in which diagrams purport to deal, nor necessarily derivable from the hypotheses on which diagrams rest, more or less

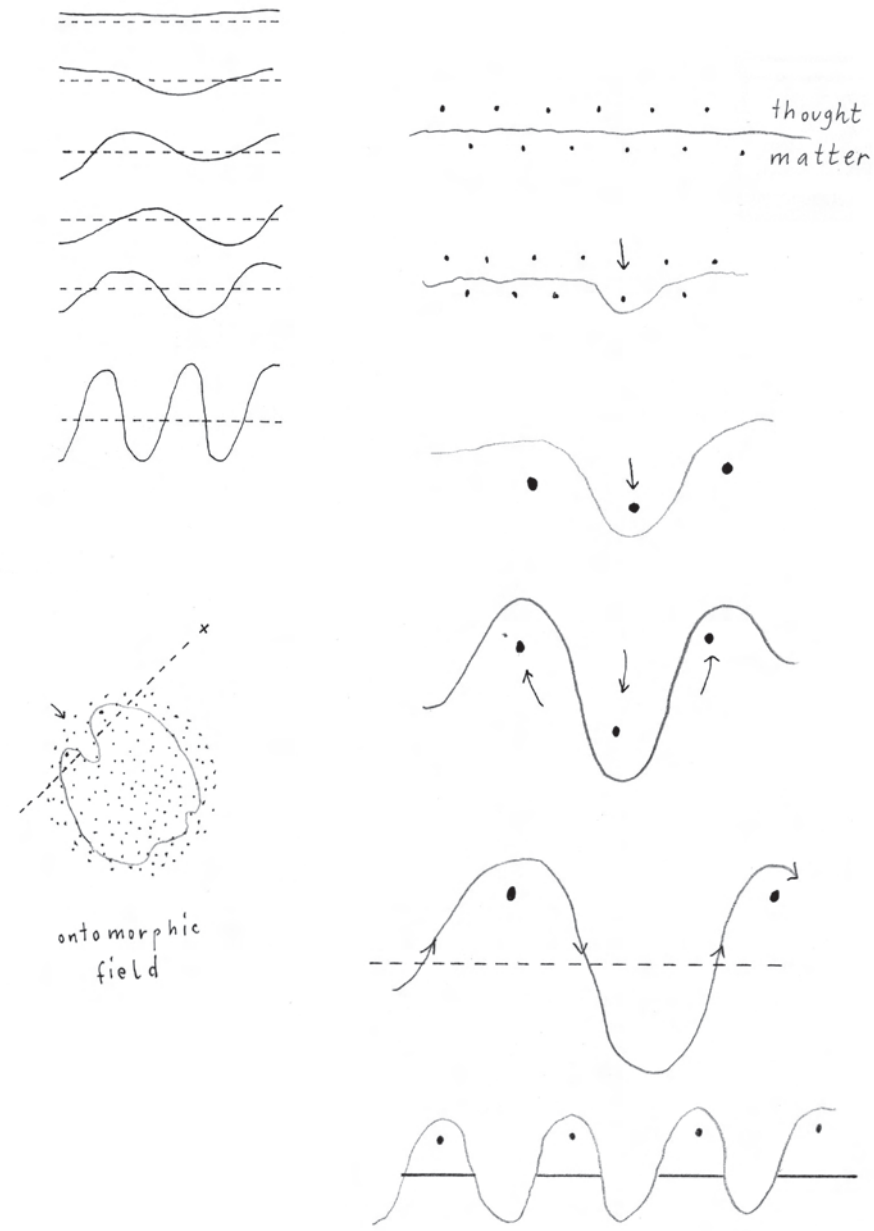


Fig. 15-09

feed on ardour, Madagascar, hermaphroditism, truth, error, madman's hands, limpidity, vernal vagina, to cite only a few of Picabia's indices. They are vivid in the context in which they appear: a book of dull poems exhibiting the Dada strategy in its pure form: sabotage meaning! (Not that Dada has no cargo of meaning, only that it is going to explode.) Half image, half sentence, the drawings by "the girl born without a mother" are no image and no sentence. The blanks which reason does not leap gape for association, the tentative and anxious web spun by the interpreter who exists to make sense of signs.

VIS-À-VIS is inscribed, "That which disfigures measurement". Even as it appears to discredit and deform reason, Picabia's drawing hints at a discipline. The line of reasoning which can be traced through projective geometry (the science of properties and relations preserved under projective deformations), and which finds its most general expression under the term *topology*, could be called geometry without measurement. Topology stands for thinking from which all constraints of measure and matter have been rigorously subtracted, and hence preserves (in altered form) the promise of necessity that made Euclidean geometry so compelling. While Picabia's drawing, in a book dedicated to "tous les docteurs neurologues en général" and to his own psychotherapists in particular, is a comic play on the script of analysis (to distort Monge's terms a little), it is Lacan's affectation for diagrams which draws the consequences, in all seriousness, of Dada logic.

(→PII/04a-d)

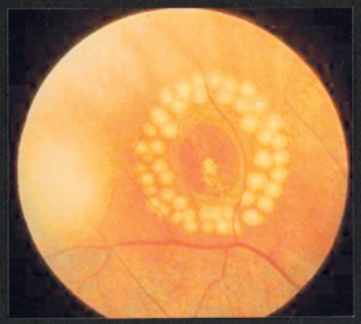
JACQUES LACAN: LA LOGIQUE DU FANTASME

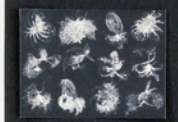
(→PIII/02k)

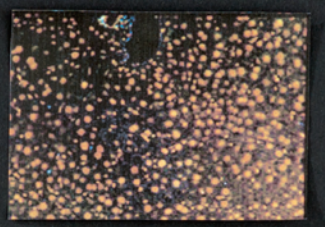
It is as if the headline "Dada signifies nothing", which interrupted Tristan Tzara's manifesto[5] with a typographic pointing finger, were condensed into twenty years of weekly seminars in front of the blackboard of the École normale. Lacan posits his geometric origin at a double crossing: a hybridisation and a crossed purpose. His zero-setting of subjectivity identifies a supposed Freudian subject with a subject he claims originates with Descartes. "What does that imply?" Lacan asks rhetorically,

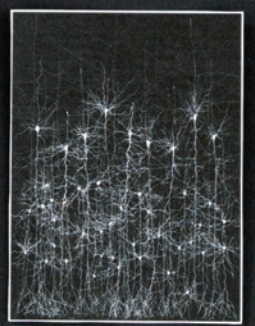
5) Tristan Tzara, *Manifeste dada, Dada, 3*, 1918.

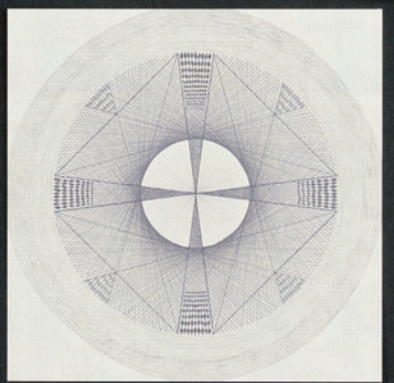
Fig. 15-04











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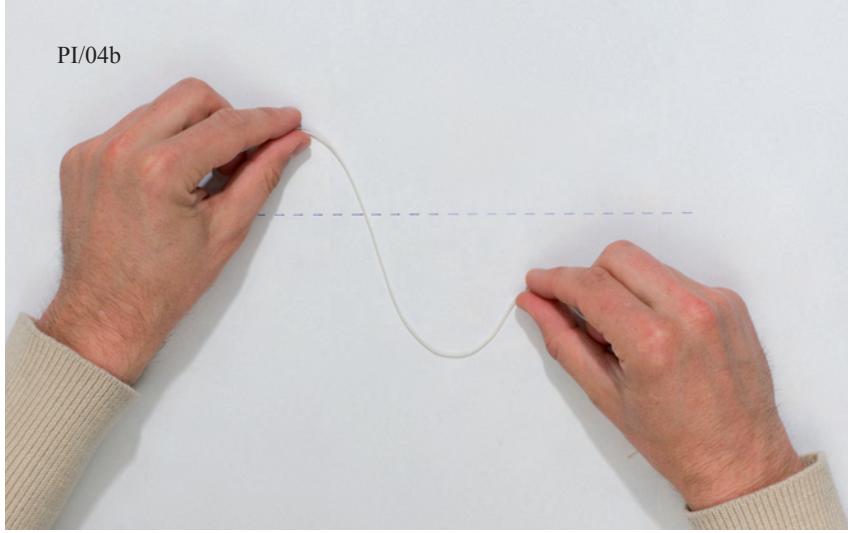

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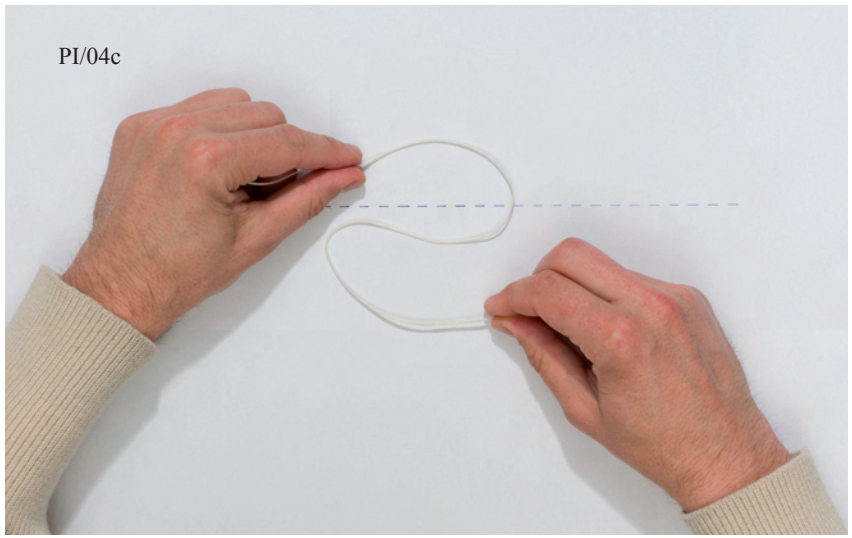

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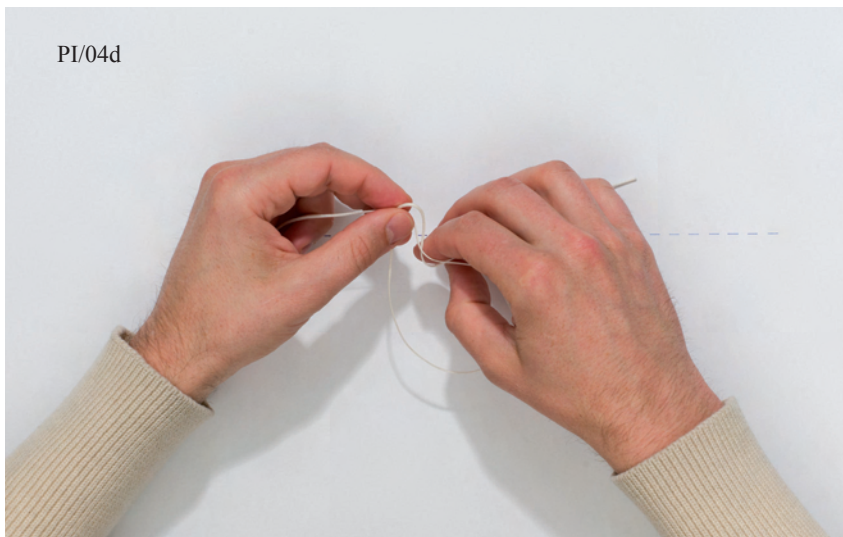

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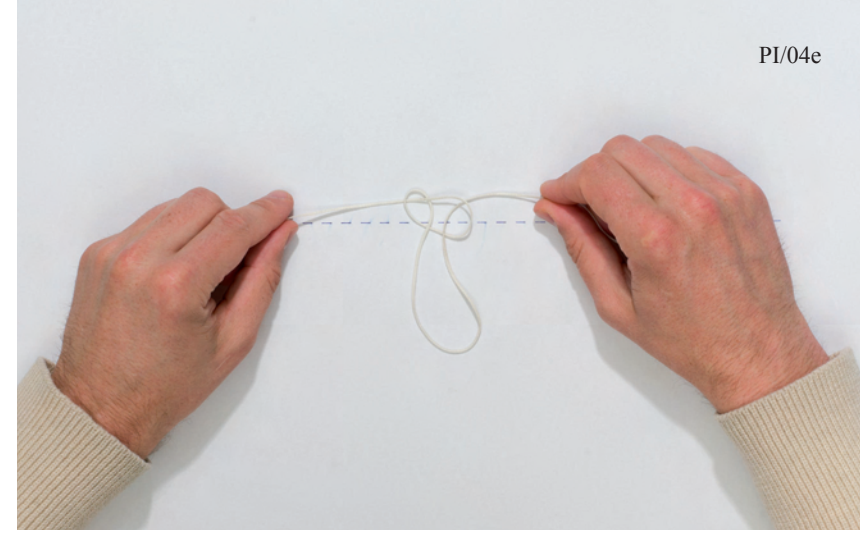

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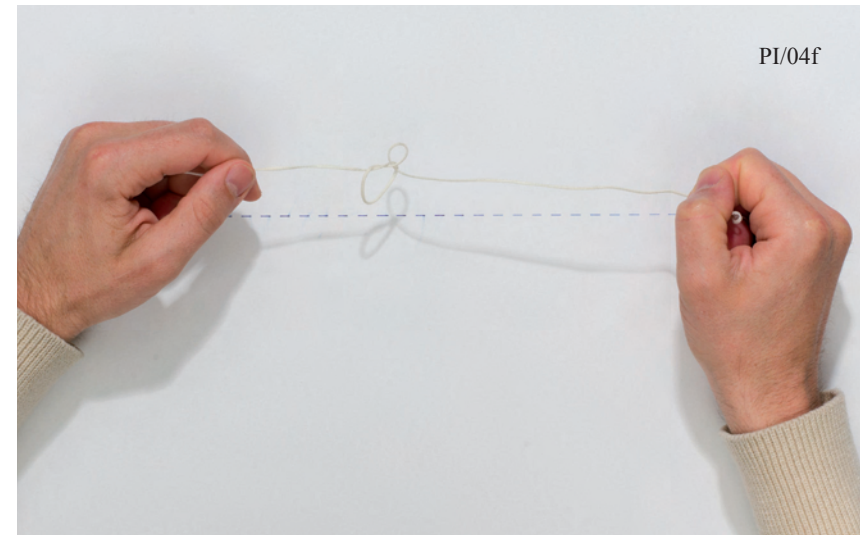

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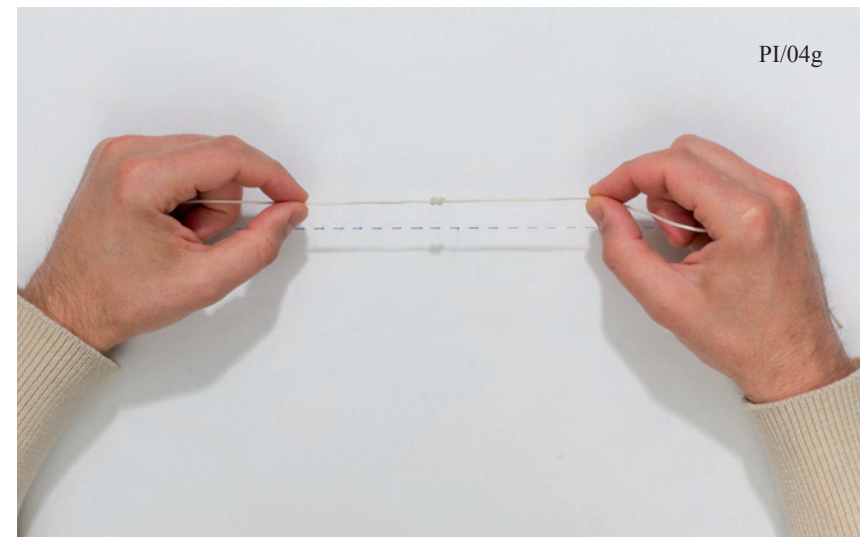

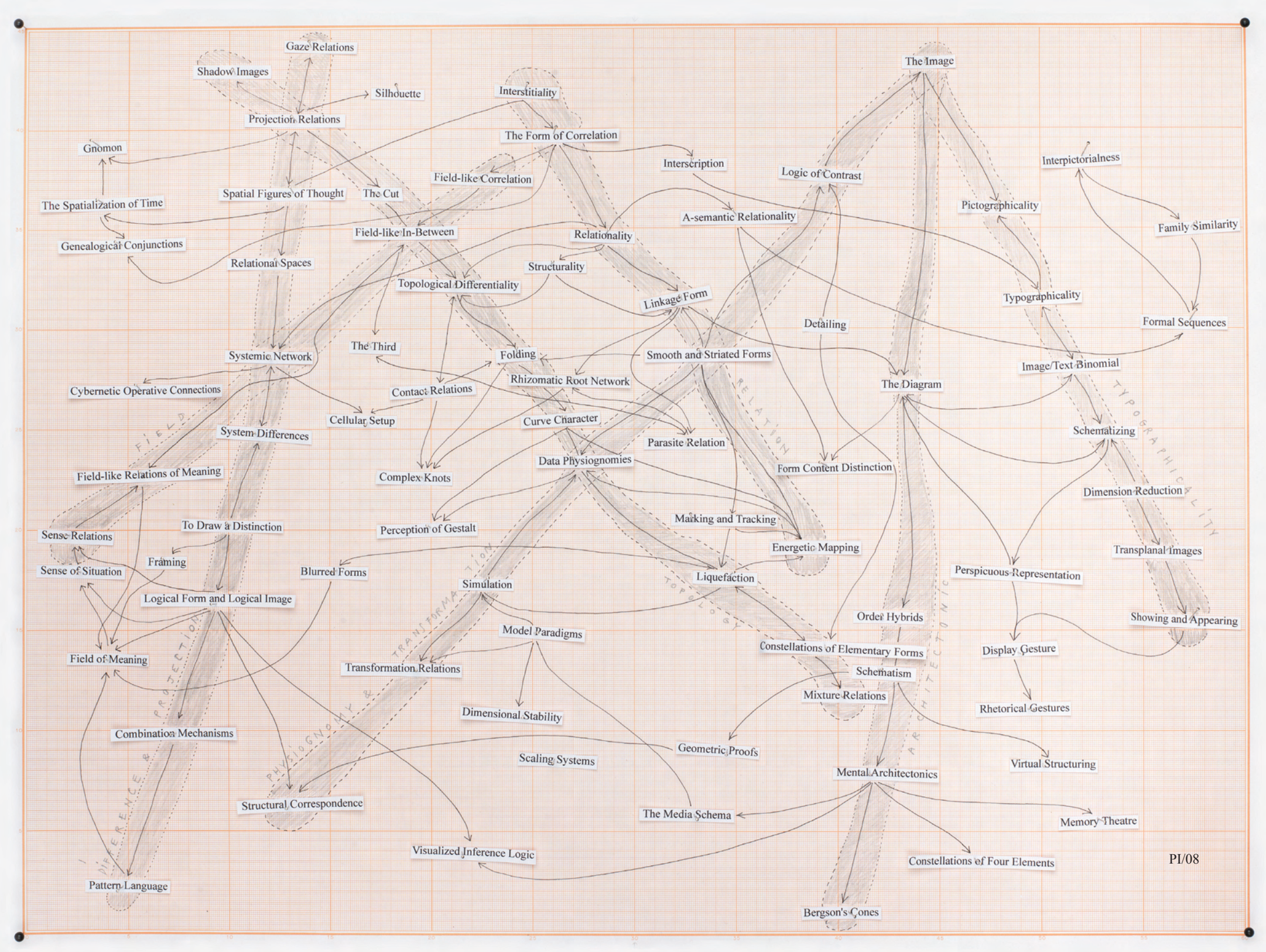
Gaze Relations
Shadow Images
Silhouette
Projection Relations
Interstitiality
The Form of Correlation
Gnomon
The Spatialization of Time
Spatial Figures of Thought
The Cut
Field-like Correlation
Interscription
Logic of Contrast
The Image
Interpictorialness
Pictographicality
Family Similarity
Genealogical Conjunctions
Relational Spaces
Field-like In-Between
Relationality
A-semantic Relationality
Structurality
Topological Differentiality
Linkage Form
Typographicality
Formal Sequences
Detailing
The Third
Folding
Smooth and Striated Forms
Systemic Network
Rhizomatic Root Network
Image/Text Binomial
Cybernetic Operative Connections
Contact Relations
The Diagram
Cellular Setup
Curve Character
Schematizing
System Differences
Parasite Relation
Data Physiognomies
Form Content Distinction
Field-like Relations of Meaning
Complex Knots
Dimension Reduction
Marking and Tracking
To Draw a Distinction
Perception of Gestalt
Transplanal Images
Sense Relations
Energetic Mapping
Framing
Perspicuous Representation
Sense of Situation
Blurred Forms
Liquefaction
Simulation
Logical Form and Logical Image
Order Hybrids
Showing and Appearing
Model Paradigms
Constellations of Elementary Forms
Display Gesture
Field of Meaning
Transformation Relations
Schematism
Mixture Relations
Rhetorical Gestures
Dimensional Stability
Combination Mechanisms
Geometric Proofs
Virtual Structuring
Scaling Systems
Mental Architectonics
Structural Correspondence
The Media Schema
Memory Theatre
Visualized Inference Logic
Constellations of Four Elements
Pattern Language
Bergson's Cones
FIELD
RELATION
TYPOGRAPHICALITY
DIFFERENCE & PROJECTION
TRANSFORMATION
TOPOLOGY
PHYSIOGNOMY &
ARCHITECTONIC

PI/08

NOTES ON PLATES I

PI/01: Atlas of correlations – Plate I/similarity – difference study
(The broken multi/dimensional/eye/space/pinguine/memory/complex)

PI/02: Collection of Lines I-III (striated/curved/discreet)

PI/03: Fallen experiments study a-c

PI/04a: Phase I: A line is a line. High tension act.
PI/04b: Phase II: The wave/sign/particle question
PI/04c: Phase III: The reflexive curve position
PI/04d: Phase IV: The intersection tangent
PI/04e: Phase V: The grapheus knot a
PI/04f: Phase VI: The infinity loop hole
PI/04g: Phase VII: The nodal point record

PI/05: Collection of curved complexities

PI/06: Special vis-à-vis constellations (a, b)

PI/07: Diagram of probability study (animal discontinuity)

PI/08: Collection of figures of thought (wall chart I) after Gerhard Dirmoser

PI/09: Mnemocity: Figures of Thought a+b
Two states of intertextuality (installation view)

PI/10: Collection of Figures of Thought II
(Mnemoseum index card – www.memoseum.net)

HYPOTHESIS #6

Distancing the If and Then

Emma Cocker

The term hypothesis describes the gesture of supposition, the event of supposing. Taken as a suggestion, it is a proposal towards the possible but not yet known, towards that which is conceivable but still unverified. It is an act of thinking, believing or imagining something about the world in the absence of having the available evidence or facts to hand, a provisional statement served to the inquisitive as provocation for further exploration or investigation. A hypothesis is the leap of an idea performed by the curious when existing explanations no longer suffice. Like the pioneer who pushes at the edges of territorial frontiers, its statements skirt the boundary or limit of existing knowledge(s), the point at which a known reality slips towards the indeterminacy of unchartered waters. Akin to the returning traveller, the hypothesis offers a tentative account of those phenomena witnessed along the borderlands of the encyclopedia or map; its explanations remain as the line drawn in wet sand – indefinite, susceptible to change. In the realm of scientific method, the hypothesis would seem to be considered potentially suspect; it must be tested through experimentation, subjected to rigorous review. Here, perhaps, the hypothesis reveals the location of a troubling grey area – or *terrain vague* – disturbing the smooth landscape of what is already named and known. It is the site of some uncertain doubt. The hypothesis sets in motion a process of enquiry that hopes to clarify matters by settling things one way or the other. The unknown or unexplored situation that the hypothesis identifies as its subject is taken as an inhibitory rupture or break, which needs to be carefully filled or bridged by the production of new knowledge. It is an invitation towards decisive action, where frontiers are extended, gaps closed.

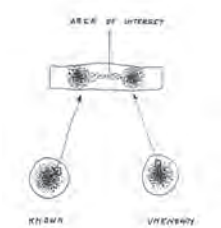

Fig. 01-01

The hypothesis is often considered as a preliminary or preparatory phase within a given enquiry; it creates the premise for something to follow, where it is perceived as being always antecedent to something else. However, the hypothesis may also be considered preliminal, since it marks the entrance of a threshold zone between the known and the unknown. The hypothesis signals a transitional state of being between, where things are neither yet proven nor disproved. It is a double-headed arrow. Like Janus, its glance is double-facing, for it always looks towards the conditions of the present-past for stimulus, whilst gesturing forwards to the future, to the (imagined) arrival of clearer understanding, towards the moment of realisation. For

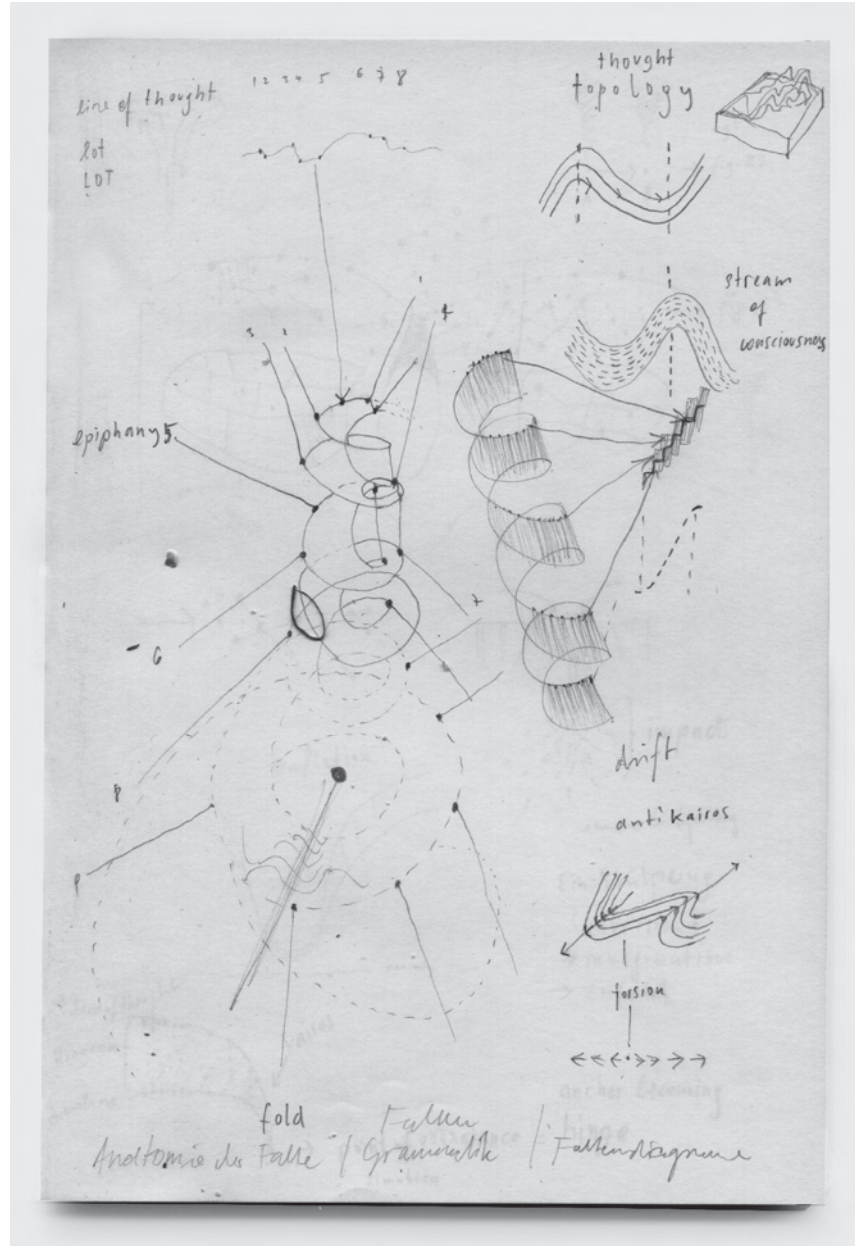

Fig. 12-21

the scientist perhaps, the hypothesis anticipates a period of experimentation that – like a rite of passage – attempts to affect a transformation in status. Through the ritual of the experiment, the researcher practises the alchemical turning of the unknown into what can be known, the making consistent of what has hitherto lacked form or definition. Yet, thresholds can be crossed in both directions, where what is known can as easily be transformed into what is no longer recognizable or certain. Here, another logic emerges wherein the hypothesis might perform differently, operating according to the terms of an alternative structure of experimentation and enquiry, less concerned with expanding the limits of what is known than with increasing the spaces of indeterminacy along its borders. This other logic is not a critique of the scientific method but neither is it the wholesale borrowing of its terms. Rather, it is the emergence of a concurrent way of knowing that reveals moments of porosity or elasticity within existing structures of knowledge, taking a certain pleasure in inhabiting these perceptual or cognitive gaps. Here, the hypothesis no longer identifies the presence of a temporary glitch in the fabric of knowledge such that it may be apprehended and its run stalled. Rather, it is the inquisitive finger that finds holes in anticipation of teasing them further open, for the pleasure of pulling at their loose threads.

(→PI/06a)

Within an art practice, the hypothesis emerges as autonomous critical activity, no longer bound by the repetitious cycles of testing and validation to which is it subjected in other fields. Its mere conjecture is rescued from the pejorative, recast as the pleasurable reverie of the thinking mind engaged in nascent speculation. Released from the stranglehold of teleological knowledge production, it is possible to discern specific properties or characteristics within the hypothesis that, in turn, point to certain critical operations at play within the practice of drawing. Drawing is the language through which the hypothesis is shaped within art practice, since it too has been habitually designated as a preliminary activity, always coming before, rarely taken for what it is in itself.[1] Like the hypothesis,

1) The idea of drawing as the 'hypothesis of sight' is explored by Jacques Derrida in *Memoirs of the Blind, the Self Portrait and other Ruins*, trans. Pascale-Anne Brault and Michael Naas, University of Chicago Press, Chicago and London, 1993. Derrida's ideas around the hypothetical or conjectural properties of drawing are further explored in *Drawing Now, Between the Lines of Contemporary Art*, Downs, Marshall, Sawdon, Selby and Tormey, I.B. Tauris (eds.), London and New York, 2007.

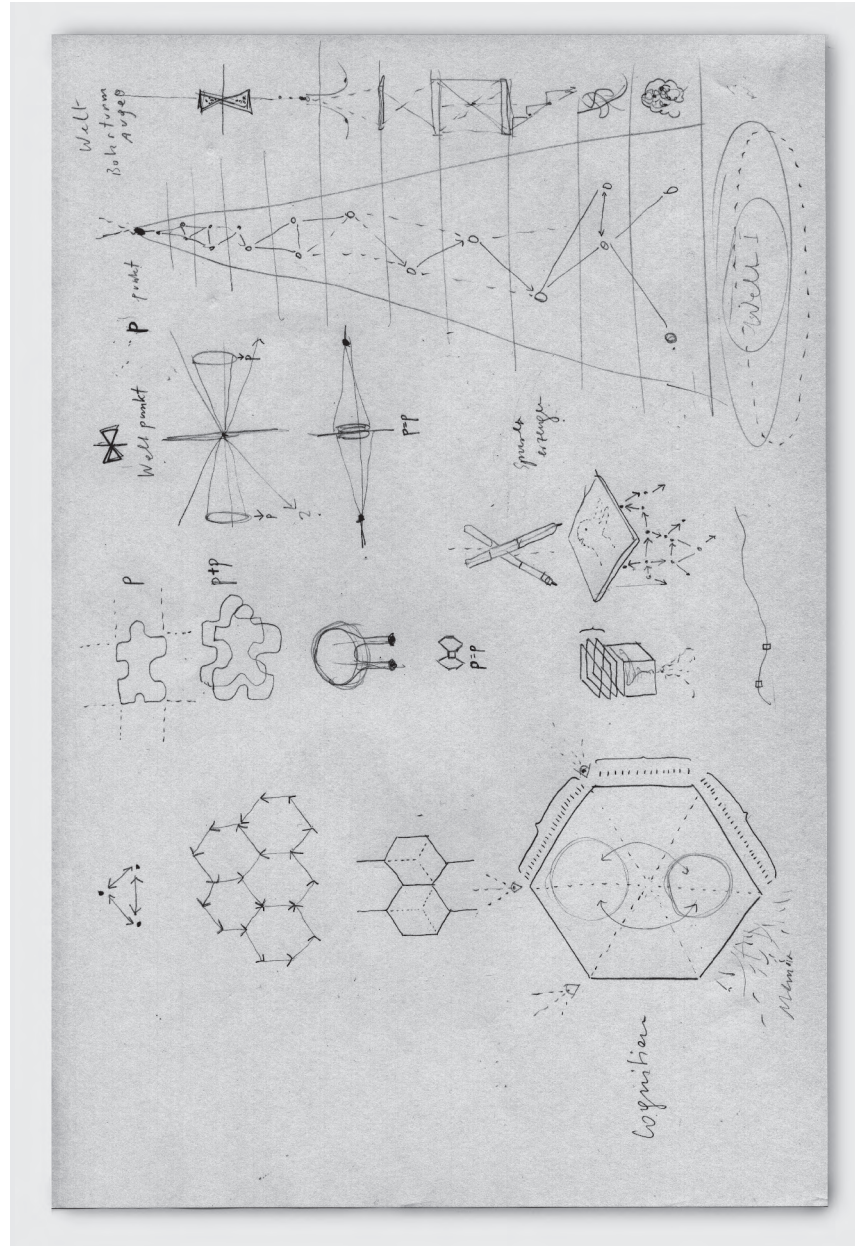

Fig. P01-03

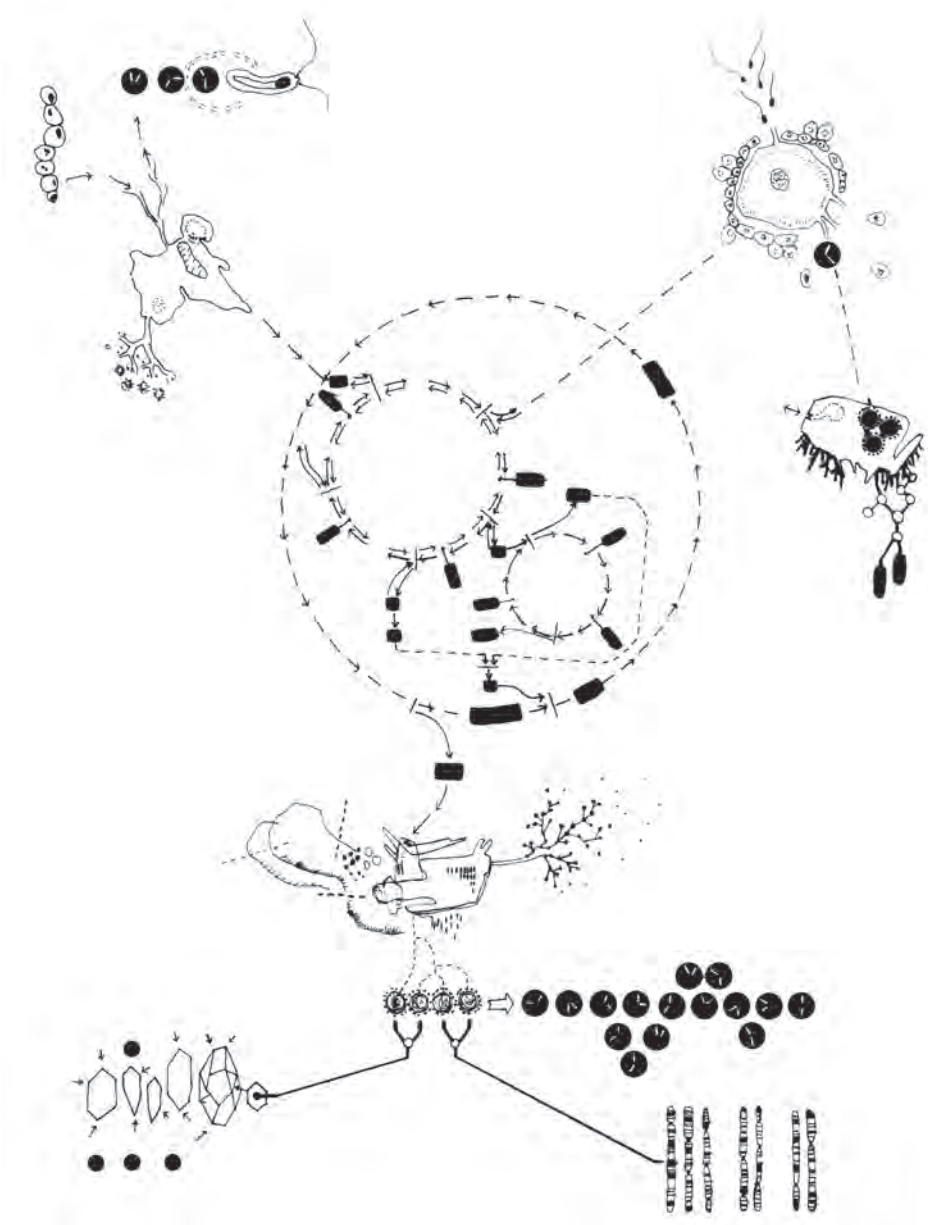

Fig. X07

RECORDING VITALITY

Fig. X04

With the discovery of life as an object of research, questions of representation shifted: how can something be recorded if in its nature it is permanently changing? Techniques which facilitated the mapping of, for example, the human body, originally relied for that very reason on corpses: only corpses remained still long enough to be captured on paper. In this way, anatomical drawing developed parallel to embalming techniques until the eighteenth century, when techniques were developed to sculpt wax cast replicas of alive bodies. Nonetheless, this was not enough to visually reproduce the specific vitality of bodies: movement sequences or progressions of development and growth could only be depicted as discrete states shown one after another. Time-lapse photography (e.g. Muybridge's and Marey's motion studies) is the high point and the turning-point of documentation techniques of this kind, since film allowed the discrete states to be merged back into a moving image. It is the point when it is necessary to turn to different technique for representing vitality, which represents the vital processes not through moving images but through vectors and the technical alienation of perception.

Since Lamarck and Darwin, biologists have understood vitality as a specific relation of the life-form to its environment. In contrast to, for example, a stone, a living being behaves flexibly in relation to its environment: it adapts to environmental conditions. It maintains an active relationship to its environment. In the 1920s, in his *Theoretical Biology*, zoologist Jakob von Uexküll developed an idiosyncratic vocabulary for this: he developed a theory of animals' relationship to their 'Umwelten' (environments): their directedness, interestedness, and functionality within it. He developed a schema whereby animal behaviour could be interpreted as a feedback system of organism and environment, of the world as perceived and the world as acted on. Uexküll conceptualised the organism's relationship to its environment as a process of meaning-making: within its surroundings, the organism interprets what it perceives and modifies its behaviour accordingly. 'Meaning' is thus above all functional. Organisms assess their surroundings according to four functions: is the environment a facilitator/a medium, a friend, food or a sexual partner? Uexküll depicts the circular

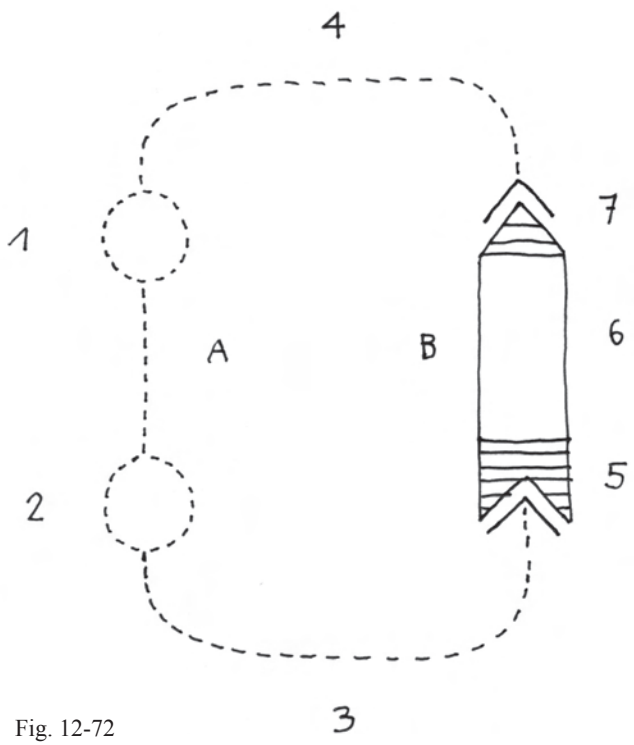

Fig. 12-72

	FUNKTIONSKREIS = FUNCTIONAL CIRCUIT	
1	Merk-Organ	= Sensor
2	Wirk-Organ	= Functor
3	Wirkwelt	= World as Acted On
4	Merkwelt	= World as Perceived
5	Wirkmal-Träger Effektor	= Functional Trait Carrier Effector
6	Gegengefüge	= Opposing System
7	Receptor Merkmal-Träger	= Receptor Trait Carrier
A	Innenwelt des Subjektes	= Subject's Inner World
B	Objekt	= Object

Table 1

decision-making processes of perception and readjustment with the help of forces a.k.a. vectors.

On the one hand, Jakob von Uexküll conceived of animal bodies, in the physiological tradition, as assemblages composed of smaller entities which fulfill a particular function: perception follows from the sensor, physical movement from 'walk-drivers' (*Laufwerke*); generally speaking, the organism's relationship to its environment is determined by its 'act-drivers' (*Wirkwerke*). This vocabulary refers explicitly to the motor and mechanical aspects of the organism's physical organisation. But Uexkülls theory of a radically subjective relation of organism and 'Umwelt' also makes him a neovitalist. He assumes that the relation of a living body to its environment is a process of meaning-making, and that vitality exists precisely in the flexible fit between organism and environment, that organ and environment create each other reciprocally: "On the one hand, the body is the creator of meaningful symbols, populating its garden, and on the other hand it is the creation of the same symbols which influence the body's own construction."[1] In Uexküll's conception, the mechanical thing, the machine, the single organ have only one limited, specific, goal-oriented function; the different 'subroutines', as it were, cannot adapt to an environment, while the organism is conceptualised as a control unit ('the machinist') which prompts the whole body to continually reassess its environment and imbue it with meaning. Living things adapt to their environment and mould themselves to it, making use of continually changing conditions to develop or lose organs: "It is tempting to assume that an animal is nothing but a selection of adapted sensors and tools bound into a whole by a control apparatus, which remains a machine despite being adapted to execute the living functions of an animal. Indeed, this is the view of all machine theorists, whether they think along the lines of rigid mechanisms or plastic dynamic entities. By this reasoning, animals are regarded as pure objects, and it is forgotten that from the very beginning the most important thing has been suppressed, namely the subject that is served by these means, which perceives and acts with them." (p. 21)

Fig. 06-05

Environment and organism are related and mediated by

1) Jakob von Uexküll & Georg Kriszat, *Streifzüge durch die Umwelten von Tieren und Menschen. Ein Bilderbuch unsichtbarer Welten. Bedeutungslehre*, Rowohlt, Hamburg, 1956, p. 158.

> "For whatever is not deduced from the phenomena must be called a hypothesis; and hypotheses, whether metaphysical or physical, or based on occult qualities, or mechanical, have no place in experimental philosophy. In this philosophy particular propositions are inferred from the phenomena, and afterwards rendered general by induction."
> (Isaac Newton, *Philosophiae Naturalis Principia Mathematica, General Scholium*; translated by Bernard Cohen and Anne Whitman)

> "Everyone wants to understand art. Why not try to understand the song of a bird?"
> (Pablo Picasso)

Imagine a medieval book, written in an elegant, unique script that has puzzled scholars, cryptanalysts and historians for centuries. Imagine an incomprehensible book, illustrated with figures of unidentifiable plants, magical symbols and what seem to be sketches depicting bizarre rituals. Now you will have a faint idea of how hypotheses sometimes grow into legends.

That book is called *The Voynich Manuscript*, named after the antiquarian book dealer Wilfried Voynich, who rediscovered it in 1912.[1] It may serve as a paradigm for an object prompting analysts to generate wild hypotheses: these range from absurd speculations about the "lost civilisation of Atlantis" to the *hoax hypothesis*, confirmed (but not proven) by contemporary computer-aided pattern matching analysis. However, this is not an article about the Voynich manuscript, although its intriguing properties may provide the proper starting point for focusing on a question of much higher impact: what is a hypothesis?

In 1799, Napoleon Bonaparte is said to have asked the famous French mathematician and astronomer Pierre Laplace why his new book *Mécanique Céleste* made not a single mention of God. Laplace replied: "Sire, I had no need of that hypothesis." As always, mathematicians give the most precise answer: a hypothesis (a *conjecture* as they call it) is a logical statement for which neither a proof nor a counterexample has yet been found. As soon as a conjecture is proven it becomes a *theorem*, and then the true magic of pure mathematics unfolds: *theorems* are valid, literally,

1) Gerry Kennedy and Rob Churchill, *The Voynich Manuscript,* Orion, London, 2005.

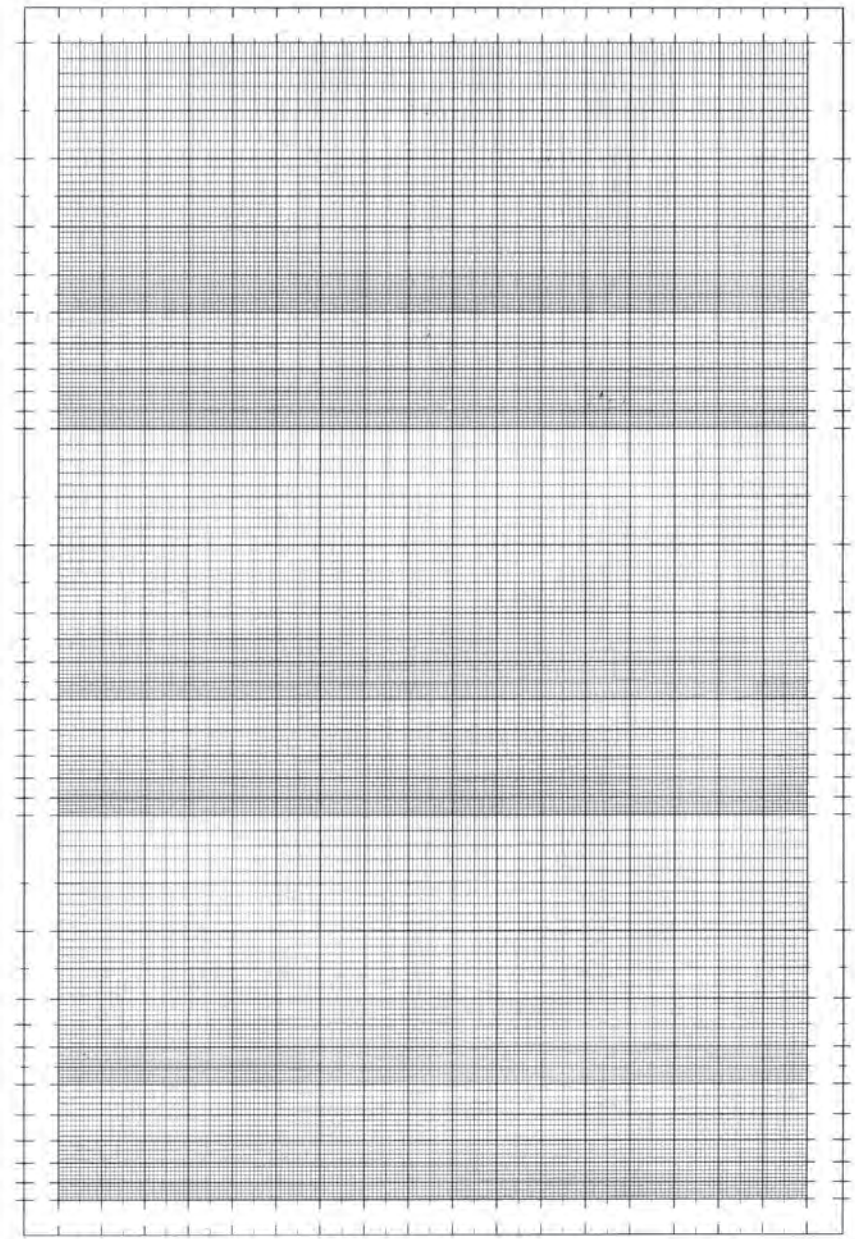

Fig. N01-03

that is hard to grasp (= not illustrative), we shift this process (to the outside) to a piece of paper and now observe this decelerated thinking process in a drawn implementation. In a sense, we watch ourselves over our own shoulder while 'thinking in drawing'. Cf. C. S. Peirce[8]: "In his diagrams he sees means for slowing down, controlling and revealing the motion of thinking."

Fig. DF-D4450

Figures of thought can be located in different layers of abstraction. I do not want to start here from mathematically abstract operations of thought or those that can be followed purely verbally, but rather only include formulations that can also be grasped in a drawn implementation as a concrete description of the operation (or description of the procedure). At the same time, familiar entities (such as framework, relations, fields, cuts, knots …) should be addressed to enable an illustrative implementation or mental visualisation. The use or application of these figures of thought (as specified earlier) thus leads to forms that can be grasped (in drawing).

What does this mean for the study cited in the beginning? The concrete result forms (i.e. order forms, order shapes, order figures, order formations or order patterns) are assembled in the diagram study *Form Questions – as Questions of Ordering*. The forms named in the diagram are the result of operatively applied figures of thought. In their application, or as they are captured in drawing, these figures of thought lead to diagrams. This is also congruent with A. Reichert's approach: "… It is the reality of movements of thought and figures of thought. They can be recorded in diagrams …"

(→see Folding Map)

Figures of thought are also applied in the visualisation of measurement data in the conception (and programming) of measurement arrangements. The (measurement data) graphs resulting in the course of measuring or simulating can be called data figures. In general, the figures of thought applied can no longer be directly comprehended in these data figures. I think the field is now sufficiently prepared that a set of figures of thought can be discussed in detail.

Thanks to A. Schmidt-Burkhardt, S. Krämer, D. Mersch, E. Schürmann, D. Offenhuber, G. Hasenhütl, K. Mayer, A. Reichert, S. Bogen and N. Gansterer.

COLLECTION OF

Figures of Thought

Gerhard Dirmoser

(→This collection is related to PI/08)

A-semantic Relationality
as a Figure of Thought
(G. Dirmoser, D. Mersch, G. Kubler)
In analyzing diagrammatic and graphemic formations, it was previously very fruitful to take a-semantic positions for as long as possible. It is only in this way that the structural aspects come into view which are too often covered up by semiotic/symbolic approaches. G. Kubler: "Structures can be perceived independently from meanings."

Blurred Forms as a Figure of Thought
(G. Gamm, W. Ulrich, P. Garnier)
In some technical/natural science disciplines, fog-like structures are studied and visualised. This involves the visualisation of density relations and the calculation of artificial entities by smoothing or calculating artificial surfaces. In the course of considering these transient forms, it becomes clear that these dynamic, fluid, fog-like structures can facilitate key questions in terms of perception. Briefly outlined: Our perception evinces a tendency to 'produce' forms. Every 'correlation' prompts us to see forms. Our perception evinces a tendency to 'spatially comprehend' visual offers. In detail, see the experimental arrangements described by G. Bateson.

Cellular Setup as a Figure of Thought
See: **Systemic Network / Cellular Setup**
as a Figure of Thought

Combination Mechanisms
as a Figure of Thought
(R. Lullus, A. Kircher, C. Alexander, G. W. Leibniz)
Olaf Breidbach: Athanasius Kircher developed "… the principles of an art of combination, which is to be found through the depiction of all possible references of the basic terms he found for describing the world." Even before Athanasius Kircher, it was Raimundus Lullus in his *Ars Magna*, who laid the foundation for an *ars combinatoria*, which was consequently taken up by others, including G. W. Leibniz in his *Dissertatio de Arte Combinatoria*. Leibniz wanted to create (following Rene Descartes) an alphabet of human thinking. For the field of architectural design, Christopher Alexander developed a 'pattern language', which as an elementary system was intended to serve the parameterisation of every kind of useful architecture. This concept inspired computer scientists to develop object-oriented programming languages and database concepts.

Complex Knots as a Figure of Thought
(J. Lacan, M. Epple)
A very special concept of knots is pursued within the framework of knot topology. Knots are found visualised in specialist literature, which belong to the same knot group or are topologically equivalent, but which are visually dissimilar to a degree that an amateur can find no basis for comparison and becomes more uncertain about the form question as well. For details, see Moritz Epple: *The Emergence of Knot Theory*. From the view of the form question, we can expand the list of rows, chains, trees and networks with topological knots, plaits and stitch structures, even though they often only serve to visualise the theme of 'complexity' as such in concrete diagram application. (→PI/05)

Constellations of Elementary Forms
as a Figure of Thought
(R. Descartes)
Descartes' form theory is the foundation for his theory of matter. See: C. Zittel *Theatrum philosophicum*. A highly contemporary form of the treatment of visual data is described in Bela Julesz' *Texton Theory*. Through the application of elementary primal text fragments, any amount of image data can be transferred to contour drawings. These algorithms also make it possible to calculate spatial constellation through lines of flight following the calculation of object contours.

Fig. DF-S4587

Constellations of Four Elements
as a Figure of Thought
(Empedocles / four-element theory)
The semantic exception (to the a-semantic limitation rule) is listed here to represent many other figures charged with the history of culture. This figure has been used (independently from content) in countless variations.

Contact Relations as a Figure of Thought
(G. Dirmoser)
Topology as contact relations: "I first realised the power of the contact view in treating the topology concepts. Through the analysis of foldings, I noticed that the concept of 'contact' (or 'touching') can be considered as the counter-pole to 'interstitiality' (contact thus as an extreme case of interstitiality). In topology, the 'touch' relationship is also addressed as 'meet'. 'Touch' also forms the foundation for 'connectedness'. Overlaying, superimposing and permeating, in other words 'overlap' and 'cross' are also based on touch or contact. This also applies to many cases of encasing, as long as the casing touches what is encased."

Contextuality as a Figure of Thought
See: **Sense of Situation / Contextuality**
as a Figure of Thought

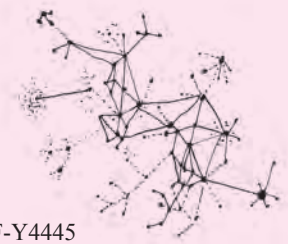

Fig. DF-Y4445

Curve Character as a Figure of Thought
(G. Lynn, G. W. Leibniz)
Since continual lines and complexly curved planes do not (may not) have any instability at their disposal, the question arises of how "continual correlation" can be used in terms of techniques of representation. Here it should be briefly mentioned that maxima, minima, zero crossings, turning points, curvatures (as a character of the curve), saddle points, etc. have a number of things to offer for scientific visualisations. Looking at the 'curves discussion' in mathematics, the view of folds (and clothoids) becomes even more fascinating. The first derivation of differentiation provides the minima and maxima of continual implementations. The second derivation of differentiation provides the turning points. The third derivation enables grasping the character of the curve. This means that there is a powerful approach to the view of turning points and clothoids that can be mathematically described.

The Cut as a Figure of Thought
(Relations of overlaps)
(B. Nieslony, G. Dirmoser)
This approach involves grasping diagrammatics and graphematics as the art of cutting (this approach covers topology and projection). "It is not the topological detail observation that first makes it clear that the view of cutting has something to offer for diagrammatics. When different media come together (touch, overlap or permeate one another), then visually comprehensible borderline processes occur. Purposely placed framework positionings and cuts mark an inside and outside. With virtual cuts one imagines landscapes dug out and marks each position as a contour line. Or one imagines the contour lines as marking a water table (as though a river were flooding a valley)."

Cybernetic Operative Connections
as a Figure of Thought
(S. Krämer)
Sybille Krämer writes in her thesis paper *Travesties of Cybernetics …*: "Just as the early modern quantification is unimaginable without the conjunction of scripturality and visualisation (of the invisible: e.g. null), cybernetics is rooted in the conjunction of diagrammatics and visualisation (of the invisible, e.g. the black box). What the lacuna made representable through visualisation means for early modernity (vanishing point, central perspective, null, vacuum), is disruption, white noise for the cybernetic flow diagrams of communication. Cybernetics is thus also a field of realisation of the – as yet still unrecognised and neglected – role of the diagrammatic. Can cybernetics be reconstructed as diagrammatology?"

Data Physiognomies
as a Figure of Thought
In conjunction with the complex curved smooth forms, it is meaningful to speak of physiognomies. Our perception tends to grasp physiognomies as expressive entities. This results in issues that are interesting for scientific visualisations (e.g. the emotional effectiveness of data figures and the aesthetic consequences of colour attribution).

Detailing as a Figure of Thought
(W. Pichler) ("figures of the details")
Wolfram Pichler addresses "discontinuities that found meaning", which provide starting points for semantic interpretations in complex images. He describes the etymological connections between 'cut' and 'detail' in a way that is diagrammatically informative. See his article *Details of the Image* in: *What Falls out of the Picture – Figures of Detail in Art and Literature*

The Development of Graphematics
as a Figure of Thought
(side by side with diagrammatics)
In conjunction with atmospheric studies, through articles by Hans-Jörg Reinberger I stumbled across the concept of 'graphematics', for which the background is found in Derrida's grammatology. Rheinberger's articles made it clear then that diagrammatics (and also my own diagram collection) has hardly anything to add in relation to natural sciences and technical disciplines – in other words for the field of 'technical images'. In December 2005 I made an initial attempt to place graphematics alongside diagrammatics. On a starting point diagram (for a lecture

ing a line offers an approach to subjecting spatiality and temporality to a common view. I am indebted to S. Krämer and J. Schülein for the following quotation from Fichte (§5 of the *Foundations of Natural Right*): "… the I that intuits itself as active intuits its activity as an act of drawing a line. That is the original schema for activity in general, as will be discovered by anyone who wants to awaken that highest intuition within himself. This original line is pure extension, that which is common to time and space and from which they first emerge through differentiation and further determination. This original line does not presuppose space, but rather space presupposes it." See also: **Gnomon as a Figure of Thought**

Fig. DF-A2231

Structural Correspondence
as a Figure of Thought
(C. S. Peirce, L. Wittgenstein)
S. Bogen and F. Thürlemann quote C. S. Peirce: "Many diagrams resemble their objects not at all in looks; it is only in respect to the relations of their parts that their likeness consists." Elsewhere Peirce accordingly defines the diagram as an icon, "in which the relations of the parts of a sign are represented by analogous relations in parts of the sign itself." (→PII/10a-b)

System Differences as a Figure of Thought
(N. Luhmann)
Even though Luhmann cannot be directly associated with diagrammatics, his foundation in approaches from Spencer-Brown suffices for him to be named. Luhmann's programme concept, the explicit visualisation of system boundaries (in other words, their interfaces) and the outlined interplay of subsystems offer models that can also be made productive in applied diagrammatics. His famous file card system (as a complex networked structure) should also be mentioned.

Systemic Network / Cellular Setup
as a Figure of Thought
(S. Ulam, J. von Neumann, T. O. Roth)
Cellular automatons serve the modelling of spatially discrete dynamic systems.

The Third as a Figure of Thought
See: **Relationality as a Figure of Thought**

Text Binomial as a Figure of Thought
See: **Image/Text Binomial as a Figure of Thought**

Topological Differentiality
as a Figure of Thought
(M. Heßler, D. Mersch, W. Pichler, W. Kemp)
Spatial Differentiations (II) (→PIII/03-04)
Topology (as a branch of mathematics) provides important concepts to describe position relations (as qualitative space reference) in more detail. Topology is abstracted here from all metrics. Basic topological concepts can help to grasp the proximity of elements, describing whether the elements touch or permeate one another (and are thus connected), whether elements are surrounded by something or themselves surround something else. Mersch/Heßler (Logic of the Pictorial): "Furthermore, the structure of image knowledge is characterised by a logic of contrast, which is indebted to 'spatiality', the 'interstitial' constitution of visual media, as well as (by) a 'topological differentiality' that virtually provides the formating of the picture space." See also: article by W. Pichler, *Topologische Konfigurationen des Denkens und der Kunst* in: *Falten, Knoten, Netze, Stülpungen in Kunst und Theorie*

Tracking as a Figure of Thought
See: **Marking and Tracking** as a Figure of Thought

Transformation Relations
as a Figure of Thought
(D. Mersch, H. J. Rheinberger, P. Galison)
In his article *Knowledge in Images*, D. Mersch writes: "However, the strategies of visualisation and visibility that are used are themselves highly disparate. Although they cannot be sharply separated from one another, they can be provisionally ordered in three basic classes: First, those modes of representation, the essential function of which is witnessing and which use the visual as proof. Second, those which arrange knowledge on abstract tableaus and first generate it as such, sometimes transforming it in reference to a foundational data set into logical or calculable figures. And finally third, things and their surfaces such as preparations and the like." In the same article, D. Mersch writes: "Sometimes cartographic approaches come into play here to impress on them directions, distributions or spatial arrangements, but regardless of what they are rooted in, what they are 'traces' or 'imprints' of (Heßler …), they do not reveal anything real, but at the most a mathematical topology or relations, which cannot be taken as samples or proof of 'something', but must be read, independent from their aesthetics, as abstracts, on which properties such as symmetry or structural similarity and the like are noticeable. Consequently, they also assume no representational or denotative status, but rather a 'diagrammatic' or

'graphematic' status. Rather than being 'imprints' or 'indexes', they represent ordered syntaxes, whose epistemic function is not found in the proof of existence – as is still the case for analogue scientific photography and x-ray technology – but rather in the digital 'sculpture', the virtual modelling of figural forms that remain entirely immaterial." See also the theory articles for the exhibition: "See This Sound".

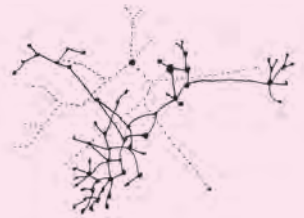

Fig. DF-V6788

Transplanal Images as a Figure of Thought
(J. Schröter)
In any case, the formulations 'spatial correlation' and 'interstitiality' already suggest that there is no point in limiting diagrammatic and graphematic forms of order to the plane. This can be easily comprehended through the field of exhibition design and the field of 'diagrammatic architecture' (taking the examples of P. Eisenmann, G. Lynn, B. van Berkel and C. Bos, et al.). J. Schröter's line of reasoning – in his book on the concept of 'transplanal images' – also clearly goes in this direction. See: *On the History, Theory and Media Aesthetics of the Technically Transplanal Image*. (→PII/04a)

Typographicality as a Figure of Thought
(S. Krämer, Graduiertenkolleg "Schriftbildlichkeit")
Since writing processes are carried out on a surface or in space, this extensive field of research can also be used as a figure of thought that can be concretely realised. See also: **Interscription as a Figure of Thought**. In a recently realised observation of typographical designing, I first became conscious of how close to one another diagram and writing actually are. I am therefore convinced that it will be possible for research on 'typographicality' to be used directly in more precisely to be defined 'diagrammatics'.

Virtual Structuring as a Figure of Thought
(A. Reichert)
The following text passage by A. Reichert in the abstract *Diagrammatics as Virtual Politics* for a conference in Leipzig reads, "Politics as the intervention of the individual in the whole, as a confrontation with the circumstances and as an arrangement of order, is located for Deleuze and Deleuze/Guattari in the virtual. … It is the reality of movements of thought and of figures of thought. These can be recorded in diagrams, whereby every recording is also a striking through (Greek meaning of *diagrammein*). Virtual reality is thus essentially diagrammatic, which means: 1. structuring does not lie behind the phenomena, but rather in them, 2. it is local and not universal, and 3. structurings do not depict anything, but are instead characterised by interventions. The diagram forms the flaring space, in which the most diverse interventions can be developed: interventions in other structurings of the possible, as well as interventions in actualisations. Unfolding and varying this play of interventions is the task of political diagrammatics. In a first step, I want to develop the concept of the diagram as virtual structuring along the ideas of Foucault (the diagram as plan and map), Serres (the diagram as a model of thinking), and Deleuze/Guattari (the diagram as an abstract machine)." On the meaning of *diagrammein*, see also P. Gehring (**Interscription as a Figure of Thought**)

Visualised Inference Logic
as a Figure of Thought
(C. S. Peirce, S. Bogen, F. Thürlemann)
S. Bogen and F. Thürlemann quote Peirce: "'All necessary concluding is diagrammatic.' Peirce draws a conclusion from this statement and deals in his later writing, which revolves around the essence of conclusions, primarily with diagrams. He develops a system for diagramming statements, which is intended to illustrate the course of thinking and exactly represent it. He calls his diagrams a question about the nature of logical relations." On this, cf. Wittgenstein (See also: **Logical Form and Logical Image as a Figure of Thought)**. S. Bogen and F. Thürlemann on Peirce: "In his diagrams he sees the means of slowing down, controlling and revealing the movement of thinking." "An approach of this kind implies a very broad diagram concept: No static graphical forms are called diagrams, but rather their construction phases and the accompanying process of reception. The producer (also called graphist by Peirce) produces the graphical form according to general rules and changes it."

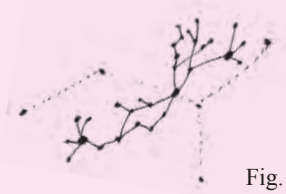

Fig. DF-R2224
(→PI/10)

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HYPOTHESIS #13

Radical Cartographies

Philippe Rekacewicz

Fig. 06-01

This holy site, probably from the palaeolithic period, appears at first sight to be chaotically organised. But when we look more closely, we see that it has been very carefully built. On the left-hand side, all the "houses" or "apartments" lie together, closely linked with one another, with a few gardens at the back. The really important meeting place is in front, in the Forum (or a social place where exchanges take place), which is also the departure point for four pathways leading to other important public places. Two of these lead to places of worship, where people could also probably rest, and two others are paths leading away from the community by the east and the south. The holy hill lies to the south, while the tombs of the ancestors (symbolised by concentric arrows) lie to the north, as if in a mirror effect.

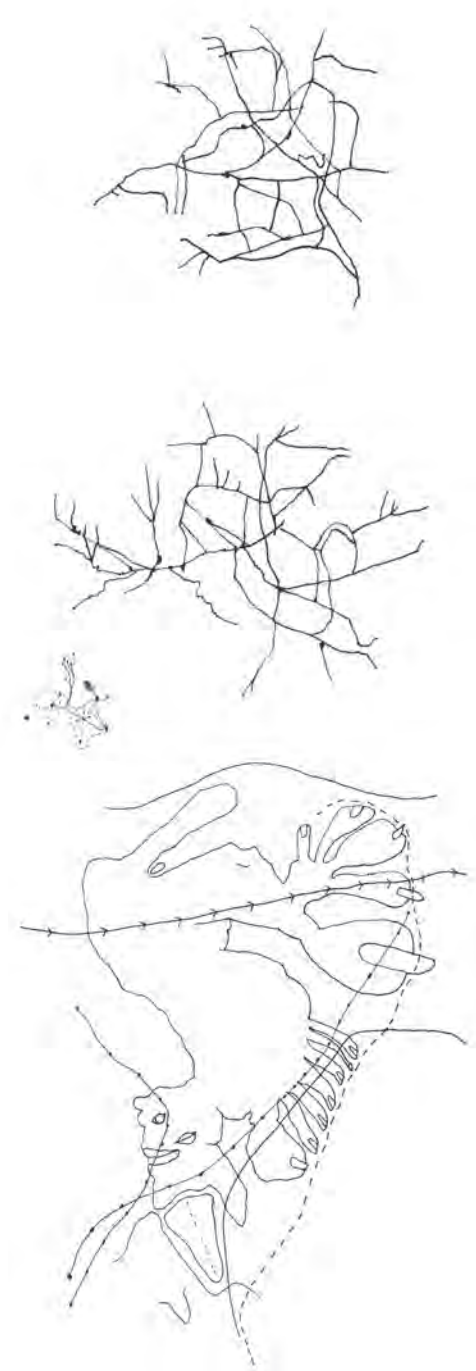


Fig. 06-02

In fifty years, the network has changed radically. It has been greatly simplified. The old network (bottom of drawing) from 1850 showed imprecise directions, and the construction of numerous pathways had not even been completed, whether owing to lack of money or lack of will, or perhaps simply prevented by the riots which occurred at the end of January 1951. In 1900 (top of drawing), paths and roads are somewhat straighter, and many of them have finally been completed. Those still ending in dead-ends open onto parks and gardens. Note that some tracks have vanished, to be replaced by built-up areas. Note also that the "multi-centre community" of the mid-19th century has disappeared, to regroup in one unique centre five decades later. Concentration, globalisation, standardisation, and the drive for efficiency had already begun at the dawn of the 20th century.

Fig. 06-05

It is always very difficult to find a practical way of building any kind of network on mountainous or uneven terrain such as this. The isoline clearly shows deep slopes which require numerous bridges and tunnels so that the road doesn't become too dangerous. On the other hand, for the two gas pipelines, it's easier: they can be laid whatever the structure of the land. The narrow plateaux are like long, thin fingers pointing to something hidden in the landscape, while in the south, two small sandy basins are like two mouths about to kiss.

easy to entirely do away with ideology in the face of simulation, as Baudrillard concludes, but it also seems that simulation offers a slightly different route. Most importantly, the paradox of a 1:1 scaled map is based on a conception of static projection.

The relation to reality that is maintained by all kinds of simulations is not a direct link between a sign and a signifier, but aims to capture that which exists between signifiers and, on a different level, between signs. What is mimicked or represented is not the thing but the behaviour of a system and in this sense that which interconnects things, concepts, signs and programmes. In this sense, the practice of digital simulation does indeed introduce a slightly more complex equation into the old balancing act between world and image. Some read this shift as an implosion which interweaves all the elements in this equation, leading towards a suspension of meaning and a breakdown of orders. One could also step into this field from the other side, as cybernetics and system theory have done, by focusing on the immanence of constructivist notions of self-contained worlds whose organisational principles then become the centre of attention.

Another way to interpret the qualitative change brought about by simulation could be to recognise more fully the hybrid character that underlines these forms of image production. If relations between elements belonging to different categories such as technology, nature, politics or economy have become what is represented, it could be useful to try and develop a slightly different notion of those categories as well as of the internal logic of separation. Of course, the kind of subterranean fear set free by the proliferation of aleatoric combinations between entities, perfectly brought to life in the ending sequence of the Japanese Animation classic ‘Akira’, is the horror in the face of a boundless maelstrom that has instigated the production of drawings in order to ban, demarcate and limit perception. Thus, at present, a practice of drawing engendered with such a drive towards deliberate limitation of information seems to provide a viable subjective counter-measure to networks of automated hybrid image production.

HYPOTHESIS #15

Dances of Space*

Marc Boeckler

*Dancing is what scientists do. They don’t master their material, no, never, rather they engage in “open-ended and performative dances of agency”.[1] They are trying this and that with the world, finding out what the world will do and responding to the world’s reactions. So, what if the visual is not a visualisation of the seen, what if a graph or a map is not a representation of the world, but instead is perfoming a space for the unseen, causing the unwritten to be written, generating knowledge no one ever wanted to have. So then, who will be dancing? How do we respond? How do we go on from here?

1) Andrew Pickering, *The Mangle of Practice: Time, Agency, and Science*, University of Chicago Press, Chicago, 1995.

THE NETWORKED SUCKER

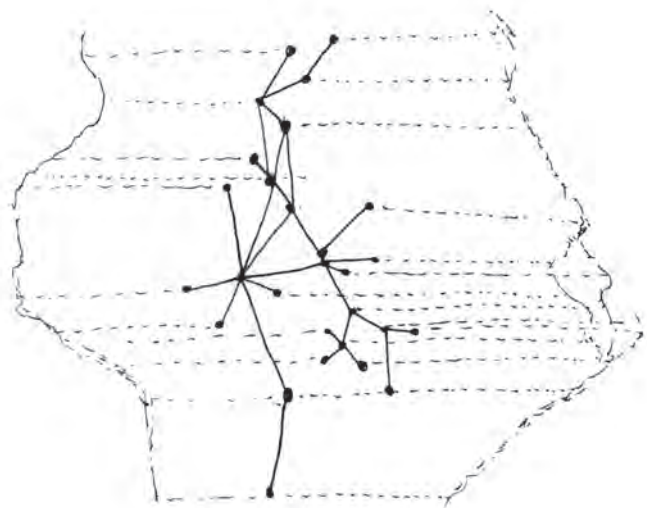


Fig. 05-10

Figure 05-10 exemplifies spatial homeomorphism in processes of territorial learning. The black dots indicate the topographical location of single firms in a high-technology cluster, and the continuous black lines constitute the topology of social connectivity between firms. The left and right borders of the graph demarcate the cluster's territory and the length of the dotted horizontal lines expresses the amount of localised knowledge (= local buzz) accumulated within a single firm. The graph conveys two revolutionary insights. First, the firm with the highest 'betweenness centrality' and 'degree centrality' is always located where the cluster reaches its largest spatial extension. Second, this firm (center left) emanates no buzz lines of its own. Centrality, therefore, is the performative effect of the suction of other firms' sense of locality.

THE EVOLUTIONARY NOTHING

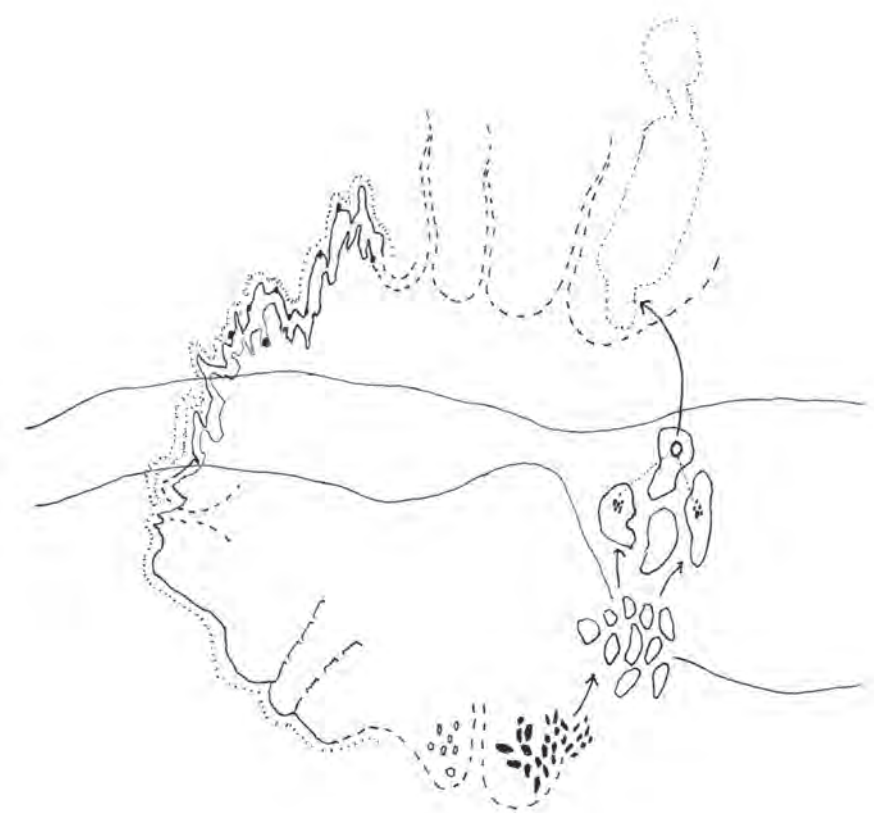
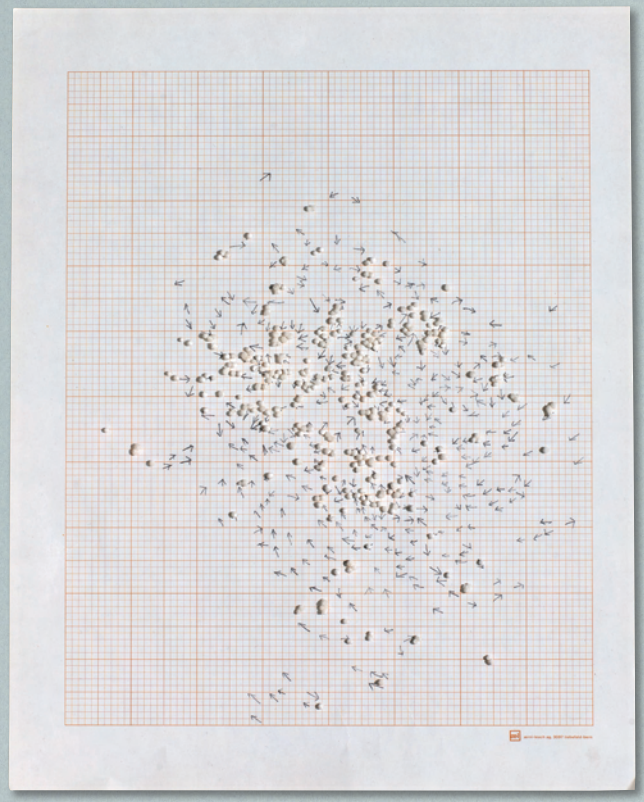


Fig. 06-07

Across the life cycle of a territorially clustered population, different modes of spatial evolution emerge as a function of political intervention. The horizontal corridor crossing the adaptation circle delineates the average space of political interference in the natural selection environment of so called cultural industries. The figure shows how a creative population is initially zigzagging through the gene pool of a specific urban landscape (upper left) with a high degree of innovative creativity and productivity. Due to special incentive programmes, the genetic drift comes to a sudden halt and the evolutionary progress enters a phase of path-dependent stasis with very little variation (lower left). The punctuated equilibrium is only exposed to rapid change again (lower right) only after a small series of entries and exits allows for alternative gene flow inducing new speciation processes. At this point political intervention exercises severe selective pressure that results in the survival of only two distinct industries with a high potential for place based branding. After a short period of regional economic growth, the sharply reduced variation in the gene pool leads to the inevitable extinction of the creative species. The remains enter an embryonic phase of progressive indifference (upper right). So called incubation waves may set new evolutionary dances in motion, or they may just just fail to do so. …



PII/09a

PII/09b

PII/09c

PII/09d

PII/10a

PII/10b

NOTES ON PLATES II

PII/01: Atlas of correlations – Plate II
(The social/intelligence/blind/spot/cognition/figure)

PII/02: Field of attraction (between flat and folded spaces)

PII/03: Collection of aide-mémoire – class IV
(Sammlung der Gedankenstützen Gruppe IV)

PII/04a: Folding spaces – surface relational study

PII/04b-k: From linearity to complexity. The permanent inside/outside interstition.

PII/04l: Potential state of inbetweenness

PII/05: 3 Models of thought for thinking of self-containedness

PII/06: Projecting the world

PII/07a: State of contingencies
PII/07b: Impact attack
PII/07c: Embedding of an idea

PII/08: Conic intersections

PII/09a: Cluster of contingencies (in reference to swarm intelligence)
PII/09b: Field like relations I
PII/09c: Field like relations II
PII/09d: Field like relations III

PII/10a: Chain reaction as spatial structures (before)
PII/10b: Chain reaction as spatial structures (after)

HYPOTHESIS #19

The Afterthought of Drawing

6 Hypotheses

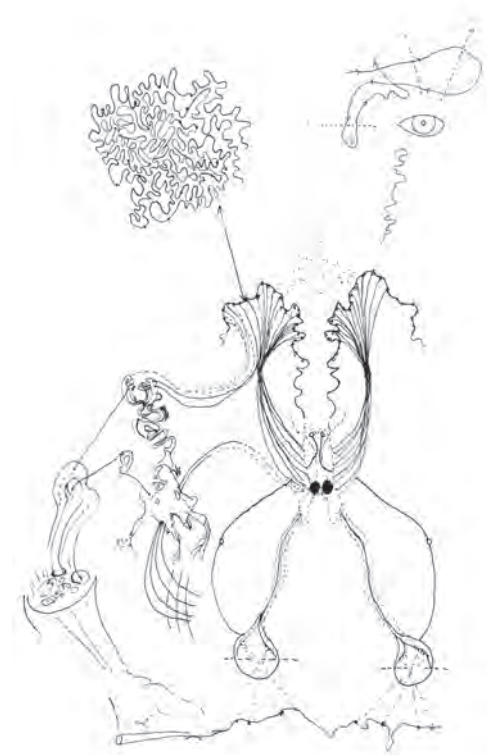
Jane Tormey

This text is essentially concerned with the response to drawing and its subsequent description. My interest is in the discursive possibilities of description and the relationship between the drawing and how we can 'read' the drawing. Before formulating a number of hypotheses – some methods for response. I will first recall some themes discussed in *The Thought of Drawing*, which introduced *Drawing Now: Between the Lines of Contemporary Art*, a collection of drawings with an emphasis on the performative and speculative characteristics of the subjective and conceptual (2007). Second, I will consider some key writings, which address, question and speculate on drawing and pictures, by Jacques Derrida, Michael Baxandall, and John Berger. Underlying this exercise is the aim of avoiding a resolved description that precludes all others, exploring instead how the respondent can perform in a continuous play of possibilities. I am aiming for responses that derive from reflection and speculation rather than objective interpretation.

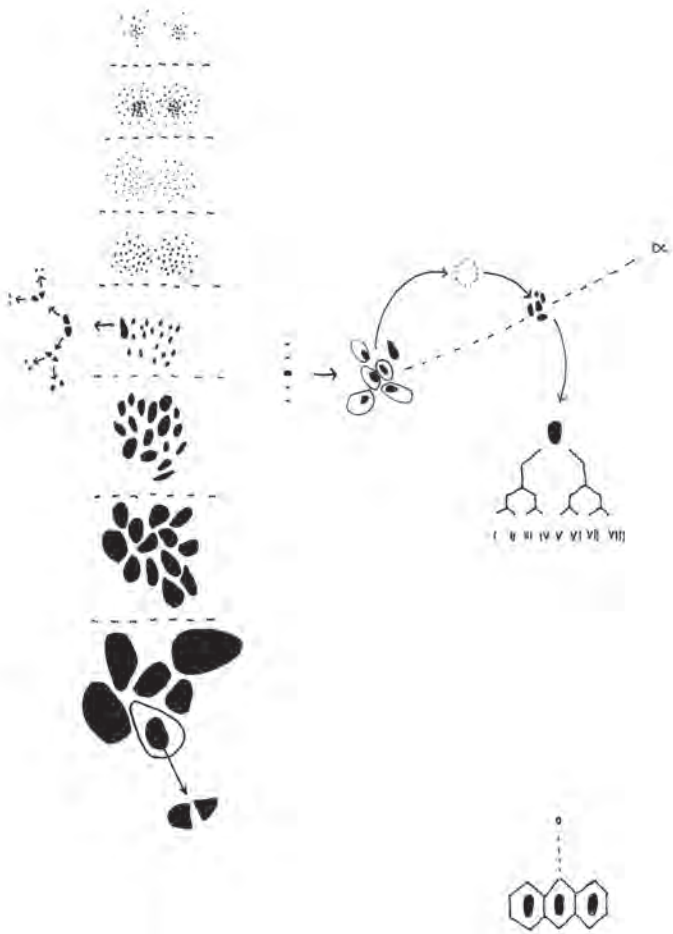
I will pick up threads that I introduced in *The Thought of Drawing* (2007) and play with some key points of discussion prompted by Derrida's *Memoirs of the Blind*, which accompanied an exhibition of drawings (1990-1) chosen from the Louvre Museum.[1] Derrida's assumption about drawing in *Memoirs of the Blind* is one of looking and copying, and concerns the conflation of the fleeting certainty of sight with the imitation of what can be seen. He exploits the theme of blindness as both subject matter and the object of the drawing in the many literal translations of blindness and its transcendental extension in metonymy and narrative (Derrida 1993: 41). He takes blindness (and sight) as a central metaphor for the phenomenon of vision and themes relating to it – blindness and sight; visible and invisible;[2] mindful and mindless; forethought and afterthought, seeing and drawing, tracing, copying, imagining, remembering and forgetting in memories or memoirs. Previously, I considered this metaphor of blindness from the point of view of the act of drawing, both from observation and imagination and the

1) The exhibition *Memoirs of the Blind* was held from October 1990 to January 1991 and was the first in a series entitled *Taking Sides* which invited 'personalities known for their critical abilities' to initiate a discourse prompted by their choice of drawings.

2) Derrida cites Maurice Merleau-Ponty, *The Visible and the Invisible*, 1968, p. 257.



Hypothesis I (→Fig. 13-12) If I enter the drawing and start living in this world, I can describe this other reality as if I were looking at the 'scene' as it unfolds before me. If I imagine this scene, I imagine also a possible paradigm of thinking. As the drawing is not derived from sight but from thought, my sight of it is rooted in thought. And as I don't want to translate this drawing in a literal way, which is reliant on appearance from without, I translate it as if from within. Instead of looking in from the outside, I am looking from within. The eye does not watch me – [it] is neutral, thin and seems preoccupied with its position. [It] is a figurehead only, merely a motif with little influence. [It] is in fact distant from and far above me, and does not determine my fallopian flowering. It is not possible for me to see [it], anyway. I sense something but do not believe [it] has any value or influence. [It] is insubstantial – two-dimensional. The space is ambivalent. I am the centre and the eye is supplementary – always – and nothing to me. *And* I am vehemently denying [its] centrality. I am not in any one place, but in many, surveying the mountains below and the maze above. I want the mountains but am directed to the maze. But I daresay to go there would be folly for it has blind spaces and I would soon become lost and cliché. So I will ignore it, as it is of limited dimension. The more I think of myself here, the more dimensions I accumulate. I look /move / project forward, sideways, over, under, every way possible. I stand astride/ hover above. I am distracted to my right by a lot of activity that deviates away from my purpose, which is twofold – to be solid and certain, and to be open and possible. I am interested in these elements and their activity which is unclear and over which I have no control. I cannot firmly grasp them – I am g[r]asping and letting go simultaneously. It is as if they are separate and independent and yet under my protection. Their properties are various – tracking, wiggling, whisking, winding, shooting, spurting, springing – upwards, downwards in my chamber and without – without clear direction and messy but emergent.



Hypothesis II (→Fig. 02-10) In this possibility of nothing completed, I offer a momentary clip from a continuous state of becoming. I suppose, I redraw as if from the same logic – a specular falling back into thought – a supplementary essential. I confine myself to physical concerns such as 'large' and 'larger', which never reach their destination of largeness because they are in a constant state of getting larger. Deleuze's use of grammatical analogies – those of the infinitive, the comparative adjective and the present participle – offer subtly different nuances as to how we might understand condition or event. He refers to the changing condition of 'becoming', encapsulated by the perpetual state inherent in the sense of the infinitive, and the imminent difference implicit in the sense

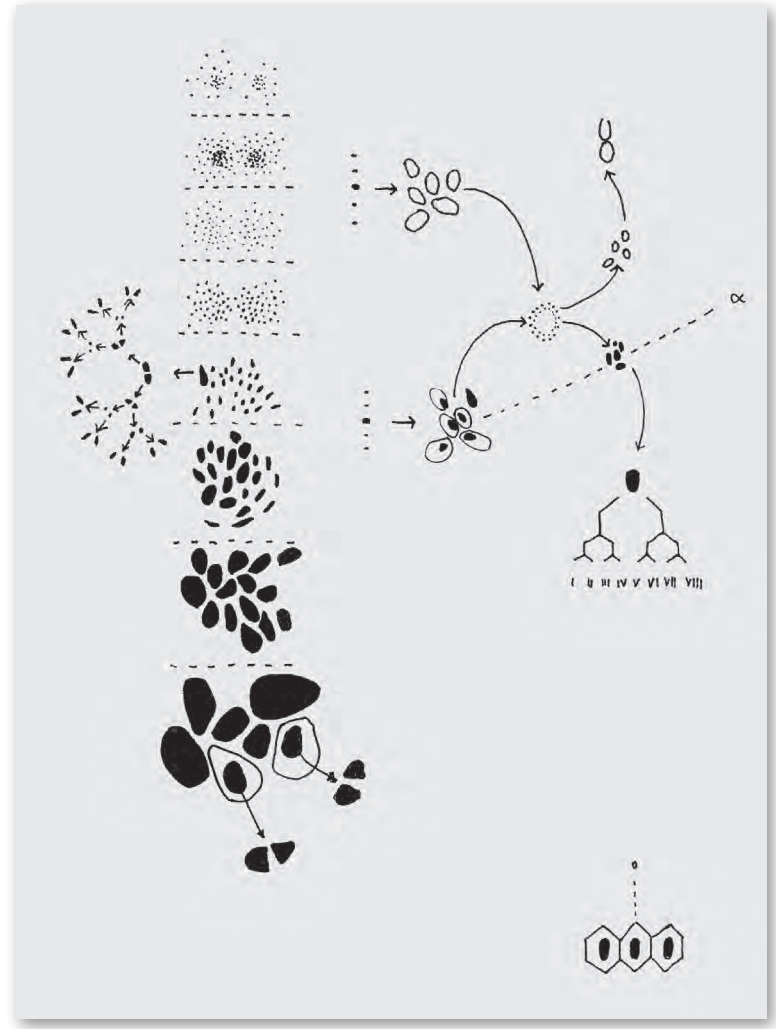


Fig. 02-10a (with drawn response by Jane Tormey)

of a comparative adjective, such as 'larger' or 'lighter'. If we remove the object, which a comparative adjective ('larger') might refer to, then that condition constantly becomes larger and therefore 'eludes the present' (Deleuze 2003: 3). 'Larger' never stops where it is but is always going toward somewhere larger, whereas definite quality is something that has stopped and is fixed. The condition can never finally become where it is going and is in a perpetual state of becoming larger (4). In encountering glimpses such as the action of something getting larger, we are caught up in possibilities. A predicate functioning as a 'manner of being' replaces the essential attribute and is incorporeal and not fixedly aligned – it is in this sense virtual and not actual.

Bion´s Grid – a space for thinking about thinking processes

	Definitory Hypothesis **(1)**	φ **(2)**	Notation **(3)**	Attention **(4)**	Inquiry **(5)**	Action **(6)**	**... n.**
β-elements **(A)**							
α-elements **(B)**							
Dreams, Thoughts / Dreams, Myths **(C)**							
Pre-conception **(D)**							
Conception **(E)**							
Concept **(F)**							
Scientific Deductive System **(G)**							
Algebraic Calculus **(H)**							

Table 2

The psychoanalyst Wilfred Bion created a hypothetical 'grid' for thinking about thinking processes. It looks like this: Starting down the vertical axis which describes the contents of progressive mental activity we begin with A) β-Elements, undigestible bits of experience ("Ow, this hurts, fucking shit!") on to B) α-Elements ("This is my experience, how to deal with it?") to C) Dreams and Myths ("Let it tell a story of some kind") to D) Pre-Conceptions ("There will be a breast to feed me!") on to E) a Conception ("Breast-feeding is now occurring") to F) a Concept ("Maternal nurturing is a fact of life") on to G) or Scientific Deduction ("The mammary glands are secreting according to stimulus from a sucking reflex in the infant, which seems to be pleasurable for both parties") on to, in some further cases, a form of H) Algebraic Calculus.

Starting from the top left corner there is a horizontal axis defining developmental process and progress in cognitive mental activity, from 1) a definitory hypothesis ("Have to start somewhere!") onward through 2) emotional psychic activity ("???") and then on to 3) Notation ("Yes, make a note of that!") to 4) Attention ("Yes, I'll concentrate on this") to 5) Inquiry ("Let's look into this further!") leading to Action 6) ("Yes, we can do this!").

So any one square on this grid is a position you might be in, while engaged in mental activity. A6 could be hitting someone because you don't like his face, while E5 might constitute and inquiry into the nature of a preconception ("Why do I always think, Why does this always have to happen to me?") and C1 might be a definitory hypothesis on the nature and structure of a myth.

In this system you could be pawn or king, whatever square you happen to be on.

Fig. 02-01

that we ‘know’, but for any variety of reasons, cannot actually think about. They may be things we’ve forgotten or have an intuitive or felt sense for that we desperately struggle to put into words. Much of the content of the unthought known obtains from experiences in utero on and up through the first three years of our lives. Memories of these experiences are a kind of unthinkable recollection. This is Bollas’ hypothesis.

A hypothesis is something that is useful for thinking but some hypotheses may actually be simply a part of a paranoid system. There is much room for confusion here.

Clarity is a necessary but not a sufficient condition for a hypothesis. The poet Antonio Machado once wrote: “I have seen in my solitude/ Many clear things/ That were not true.”

So how do we go about it? Boldly, tentatively, discreetly, passionately? Is a myth a hypothesis? Is a mathematical formula? A map is not a hypothesis. A piece of music cannot be a hypo-thesis. This is of course a hypothesis.

HYPOTHESIS #22

Processing the Routes of Thoughts

Kerstin Bartels

Fig. 03-09

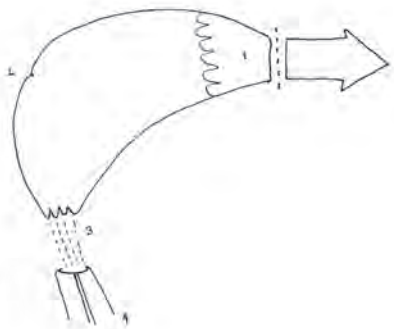


Fig. 03-12

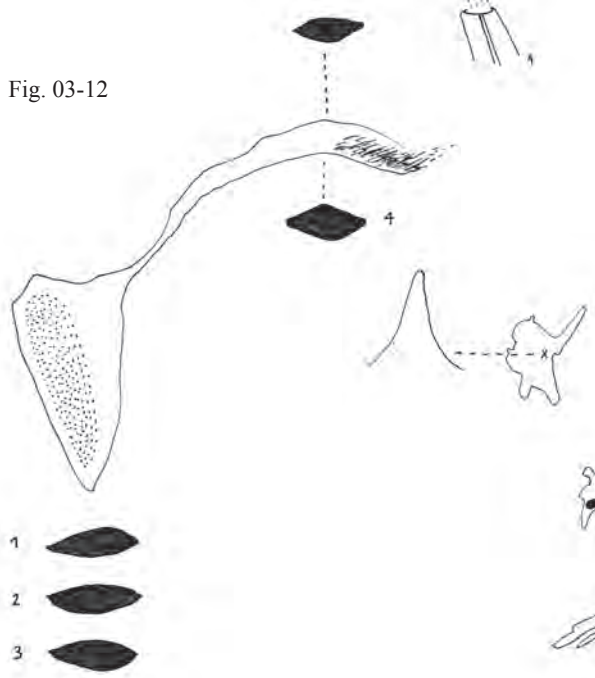


Fig. 02-26

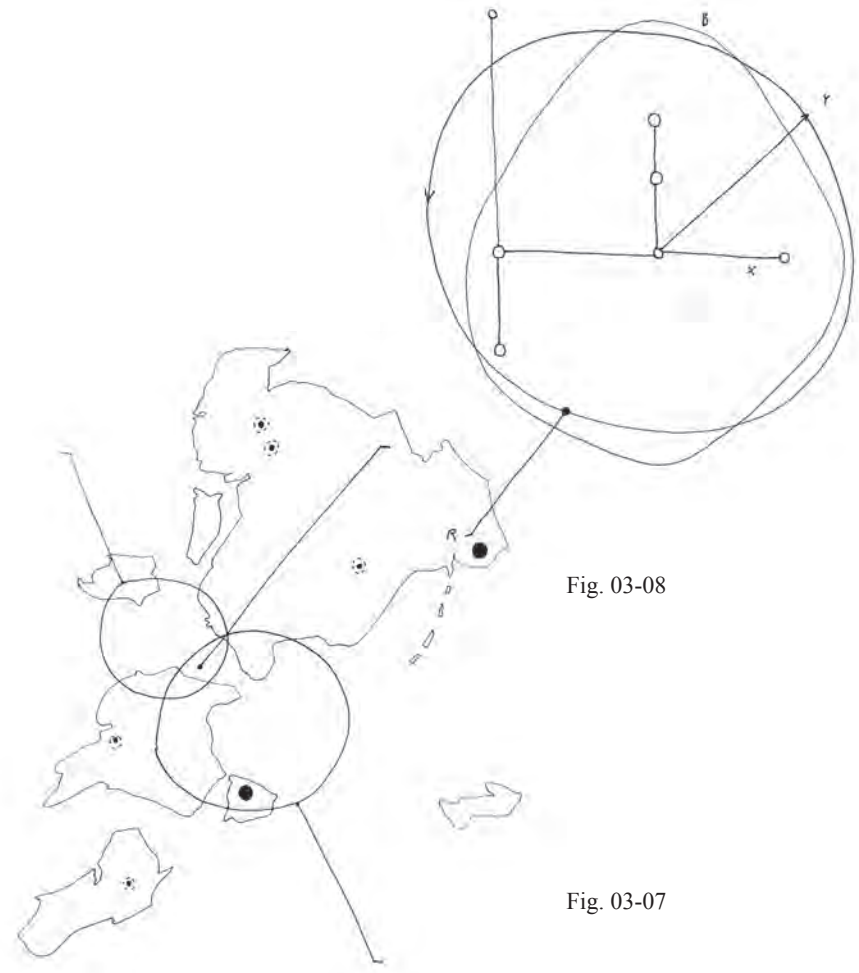


Fig. 03-08

Fig. 03-07

Fig. 03-09
Shown here is the middle phase of the processing of impressions. The outer impressions exert pressure on the cognitive processing and lead to the expansion of the area. The information is transmitted once the pressure is relaxed.

Fig. 03-12
This figure shows the first phase of sense perception without classification of the information. The perception stimulates sensations; it works playfully, in a revolving movement, and juggles with creativity. The imagination, free from cognitive processing, has as yet no direct, deforming influence. An inner pressure balance is operating over a natural outlet.

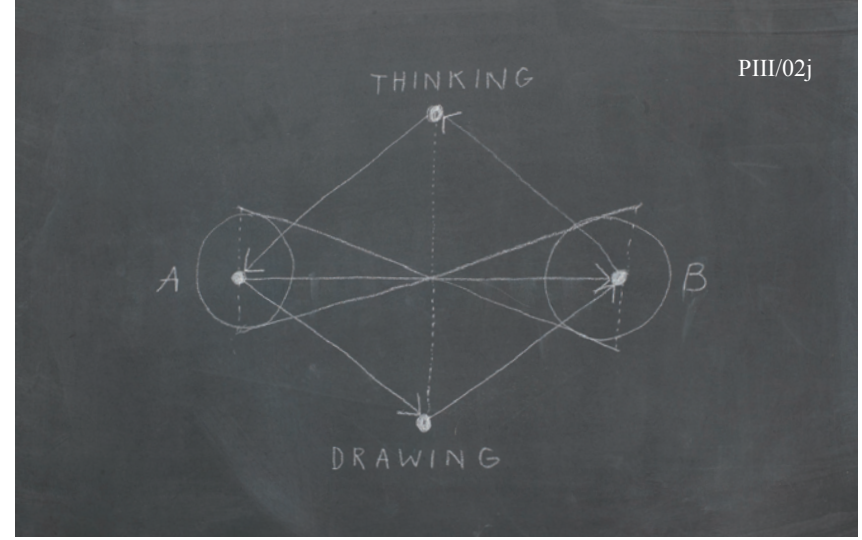
Fig. 02-26
This figure shows human perception and the processing of impressions in three phases. While in the graph above, the first sense perception phase executes without interference from the cognitive apparatus (→compare Fig. 03-12), in the middle graph a deformation of the impressions occurs pursuant to cognitive processing. The impression is formed by processing the impression, or by aligning itself with its own potential processing curve. In phrase three, the processing frequency increases but the amplitude decreases, which is mirrored in the form of the processing process.

Fig. 03-08
This figure shows a cognitive process in which classification with vectors proceeds in a near circular form. The little circles represent stopping points in this process; they are centres for new synapses. The outer point and the line define the possible extent of a temporary deforming.

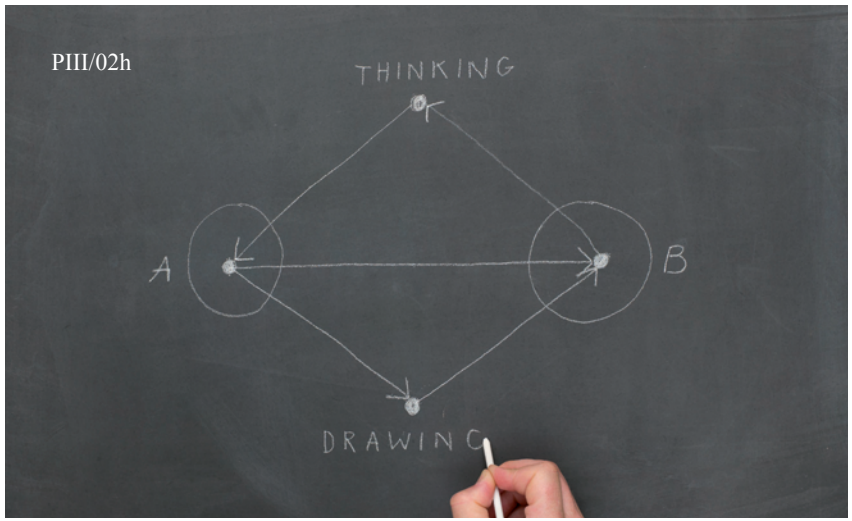
Fig. 03-07
Shown here is the topographical representation of the deformation phases. New alignments, spaces and clusters are being constructed.

PIII/02g

PIII/02j



PIII/02h



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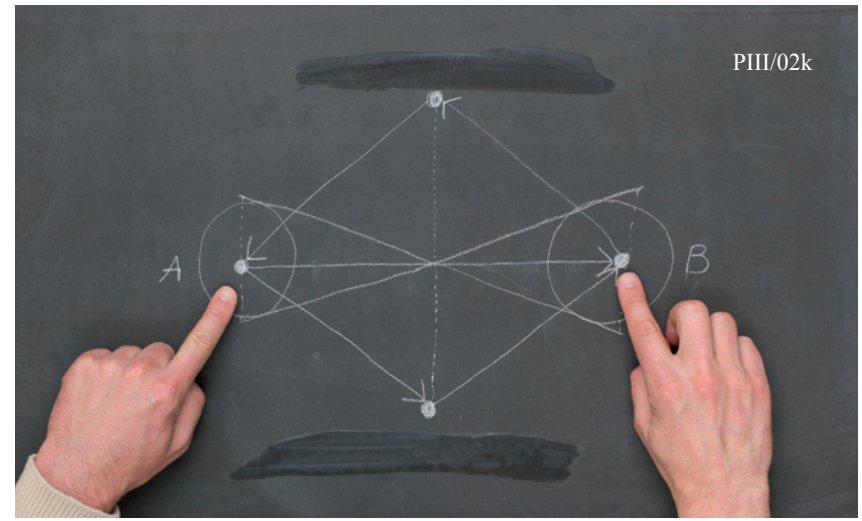
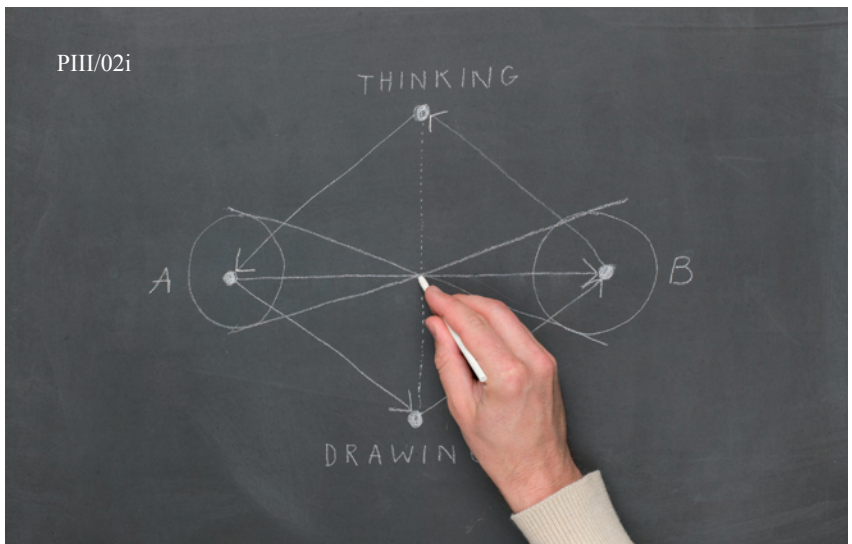


PIII/02i



PIII/02l

NOTES ON PLATES III

PIII/01: Atlas of correlation – Plate III
(The ego/geo/world/insight/line/cone/recognition/pattern)

PIII/02: Translecture on thinking><drawing><thinking
PIII/02a: To mark a point of reference
PIII/02b: To draw a connection
PIII/02c: To point out for the third
PIII/02d: The element of four
PIII/02e: To mark through gesture
PIII/02f: The image/Text binomial
PIII/02g: To mark a point of reference through language I
PIII/02h: To mark a point of reference through language II
PIII/02i: To draw a distinction
PIII/02j: Lines of sight
PIII/02k: The points of reference gesture
PIII/02l: To extinguish fleeting forms

PIII/03: The linkage form

PIII/04: Shadow appearances

PIII/05: The urban alphabet (a-z)

PIII/06: Wahrscheinlichkeitsnetz I (probability field)

PIII/07: Atlas of correlations – Plate IV
(The authors'/head/eye/ball/oblivion/graph)

HYPOTHESIS #24

The Line of Thought

Hanneke Grootenboer

Fig. 06-04

As the story goes, the history of image-making started when the daughter of a Corinthian potter traced on a wall the outline of the shadow cast by the face of her sleeping lover. Stealing his silhouette, she secretly and silently followed his profile with her writing implement. Image-making thus originated when a line was drawn, separating insignificant parts of a blank wall from meaningful ones. The product of the daughter's art was probably not a full-blown image as we know it, as she may have traced her lover's shadow in one stroke, leaving a meandering line marking the empty wall as if it were a crack. Recognizable as a portrait in her eyes, her mythical marks may not have differed much from what we now call a diagram, likewise a figure marked out by lines (→Fig. 06-04).[1] We could say, then, that, like the diagram, the 'image' made by the potter's daughter was perhaps closer to writing than to the figurative arts. The sketched line resembling a fracture is the image, its outline as well as its shape. The potter's daughter would have 'read' this mark as a statement of love as much as recognised it as an actual face.[2] In contrast to the first-ever image, the diagrams that make up this book consist of recognizable elements such as lines, arrows and dots; however, we, as readers, will be less sure than the potter's daughter about the statement they illustrate. Somehow, these diagrams, while brimming with symbols, pointers, signs and indicators, resist reading.

Let's look at (→Fig. 01-20) on the right. We see shapes, lines and numbers forming one whole picture that clearly illustrates something. The legends at the bottom right and top left suggest as much. Perhaps our first thought is the happy expectation that this may be the map of a treasure hunt, and that we are seeing an unknown part of the world. Are the small formless shapes islands just off the coast of some virgin territory? If so, are we supposed to navigate this *terra incognita* in the direction of the black dots marking a kind of location? Yet, if we take the two forceful arrows into account, our navigation toward the island comes to a full stop. We have to take something else into account. The map transforms itself into a geographical figure explaining

1) See the definition of 'diagram' in the Oxford English Dictionary.

2) Fig. 06-04 is particularly apt here: the two intertwining lines form a profile but of an unknown rather than a known head.

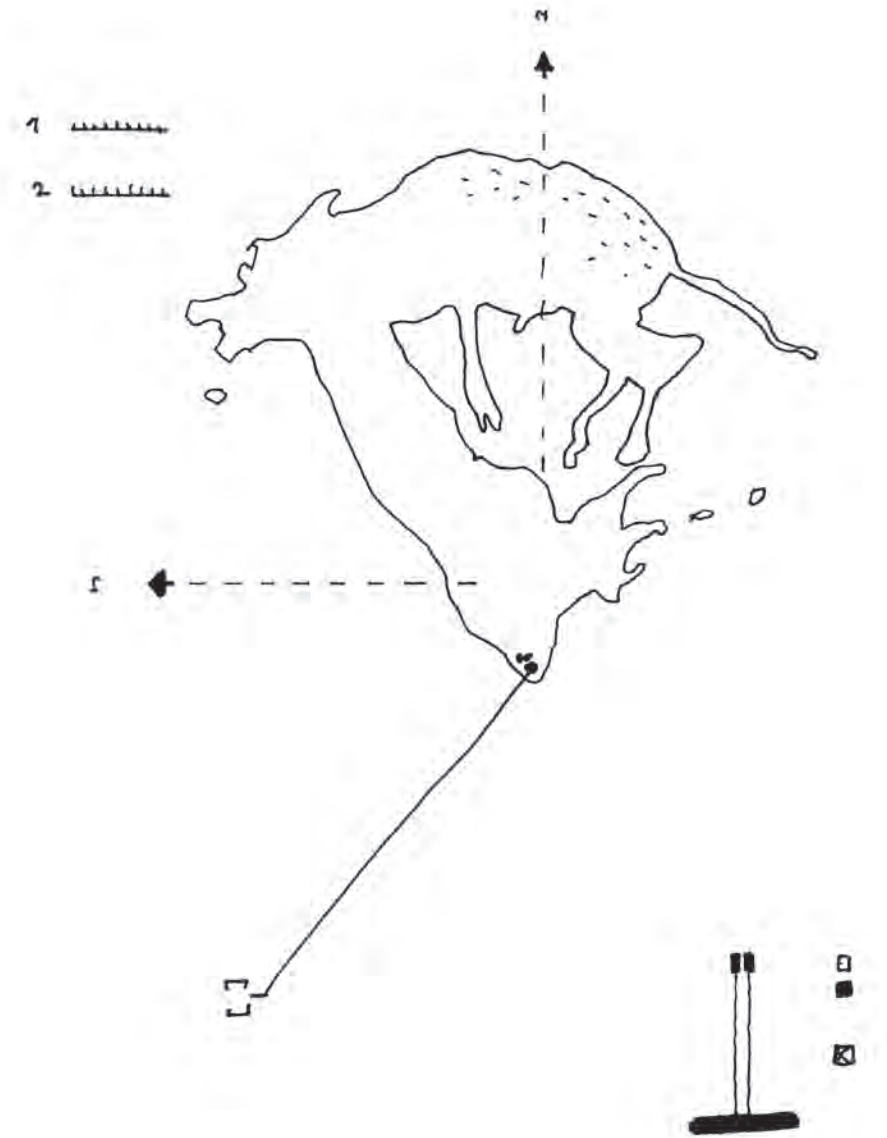


Fig. 01-20

Reverie. During moments of profound earth gazing, the "floating ideas" (as John Locke phrased it), indicative of inconsistency, start mimicking drifting continents once their contours have slowly started to stretch, increasing the void between them.

the drift of continents. Evidently, something is expanding here. The measuring scales 1 and 2 clearly indicate a kind of growth, the vectors pointing toward its direction. A further line brings our eye to what seems to be a location, or rather, a small collection of dots on the southern point of the continent: do these dots symbolise an agglomeration of small villages, or the hiding place of the treasure chest? While we ponder the significance of the dots, a second, more iconic image emerges from the diagram. What if we look at a collection of forensic evidence: the circumvention, in chalk, of a dead animal (a boar?) laying in a pool of blood, the arrows now referring to witness marks and collateral damage?

We can't help reading this diagram (or is it an image?) even though our attempt does not quite reveal what seems to be illustrated here. Despite its various clues, the diagram cannot be decoded. (→ Fig. 02-45) is equally puzzling. Again, the process of reading starts automatically and immediately. Trained

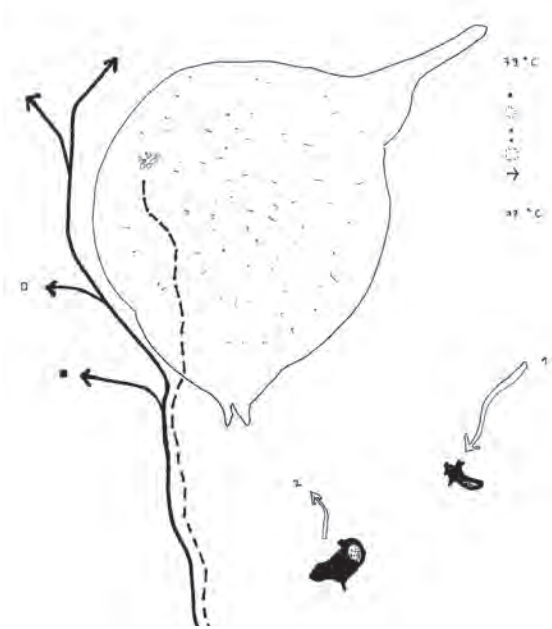


Fig. 02-45

Affect. Once the trajectory develops in various directions, the affect increases its original intensity and starts to swell, a process that has been called becoming. Traces of social organisation or systems of prohibition – labeled 1 and 2 respectively – are left behind powerless.

by histograms and flow-charts in text books, pie charts and function graphs in news programmes, and exploded views in manuals, our eyes start interpreting in their restless quest for meaning. Following the outlines of the large curved shape, we begin to make connections: do we see a balloon or do we see a map of a pond in a recreation area? Does the continuing black line indicate a walking path with various directions (will there be picnic tables?), whereby the dotted line suggests that a second main path has been flooded? Again, we are confronted with a code in the upper right corner dictating the way to decipher this diagram as a system in itself. Like (→ Fig. 01-20), something is flooding, expanding, inflating, transgressing its limits here. What do these minimal signs of excess tell us? What kind of beyond do they seem to imply?

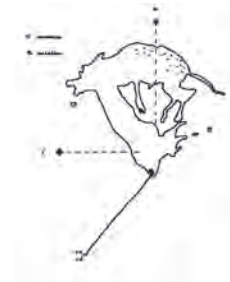


Fig. 01-20

These readable yet undecipherable diagrams have been balanced between the figure and the letter, between writing and representation, and between a motivated and an arbitrary sign. Though they suggest *illustrating* something, they are confusing because they ultimately do not refer back to a model or an original text. Rather, the lines and points move us forward. Clearly, in almost all diagrams is a sense of direction and movement. Our eyes follow a trajectory that we are keen to follow in order to figure out what it tells us. However, the trajectory leads us not to a mode of understanding, but into the realm of blank paper devoid of further signals. Just as the *tabula rasa* of the potter's wall broken by the crack of the traced profile made it possible for the silhouette to stand out, the marks in the diagrams should be read by virtue of the white empty space that surrounds it. But contrary to the potter's wall, the empty space surrounding the constellation of signs exceeds its function of mere support. The lines reinforce ideas of expanding, inflation or targeting which all suggest that their signification does not lie in the drawing, but goes beyond its marks – as the arrows lead us into a state of becoming. The diagrams do not exemplify a statement that has been made, but one that still needs to be formulated. They do not figure an assertion that has been made, but point to the unfigurable. The pathways set out for our eyes ultimately lead us into the realm of the unknown.

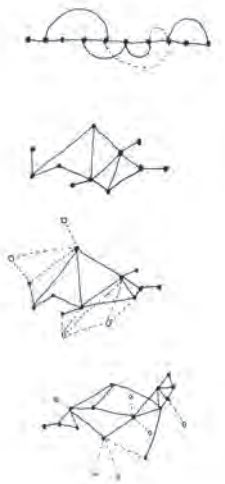


Fig. 04-09

If a diagram is a figure composed of lines serving to illustrate a definition or statement (as the Oxford English Dictionary has

Fig. 05-09

it) the question arises as to what exactly these line-drawings configure. Independent of a text book or otherwise explanatory texts, these diagrams are not exactly illustrative of something else. What they first and foremost configure is *space*, a diagrammatical space, neither abstract nor figurative nor strictly geometrical, which is characterised by the fact that it is 'trajectorable' by our eyes. In our attempt to read the lines that make up this diagrammatical space, forces operate that push our eyes left and right in an attempt to scan this apparent field of knowledge in which, ultimately, nothing is known. The individual elements in the diagrams constantly play with the notion of outside and inside, and marked and unmarked space. Where does the diagram stop and our uneasy steps into the unknown begin? We are on a trail: following the dots, sticking to arrows, and crossing lines eventually allow us to trespass into undelineated space. But where do we go from there? Is there or is there not a relation between the inside and the outside of the diagram? Are we supposed to find a referent in the real world for the symbols we see dispersed over the white page? As there is no explanatory text, what exactly is it that these diagrams show, and what do they demand from us in terms of their interpretation? If diagrams usually facilitate the transfer of information in a simplified, abstract way, what kind of knowledge can we possibly gain here? Or are we instead led toward this space devoid of graphs, a no-man's-land which is illustrative of the infinity of outer space as well as of the limited capacities of our faculty of understanding? Without realising, a conflation has taken place between brooding over the meaning of the spatial configuration of the diagrams, and the space it has taken up in our head. Our puzzlement over inside and outside, the interval and the demarcation line, has been internalised. What we have followed all this time are the lines of our own thought. What we stare at is an image of thought. And where will it lead us?

Gaston Bachelard once claimed that profound metaphysics is rooted in implicit geometry which, whether we like it or not, confers spatiality upon thought.[3] If there is one thing that the diagrams demonstrate, it is how spatiality is bestowed upon thought.

3) Gaston Bachelard, *The Poetics of Space: The Classic Look at How We Experience Intimate Places*, Boston, 1994, p. 212.

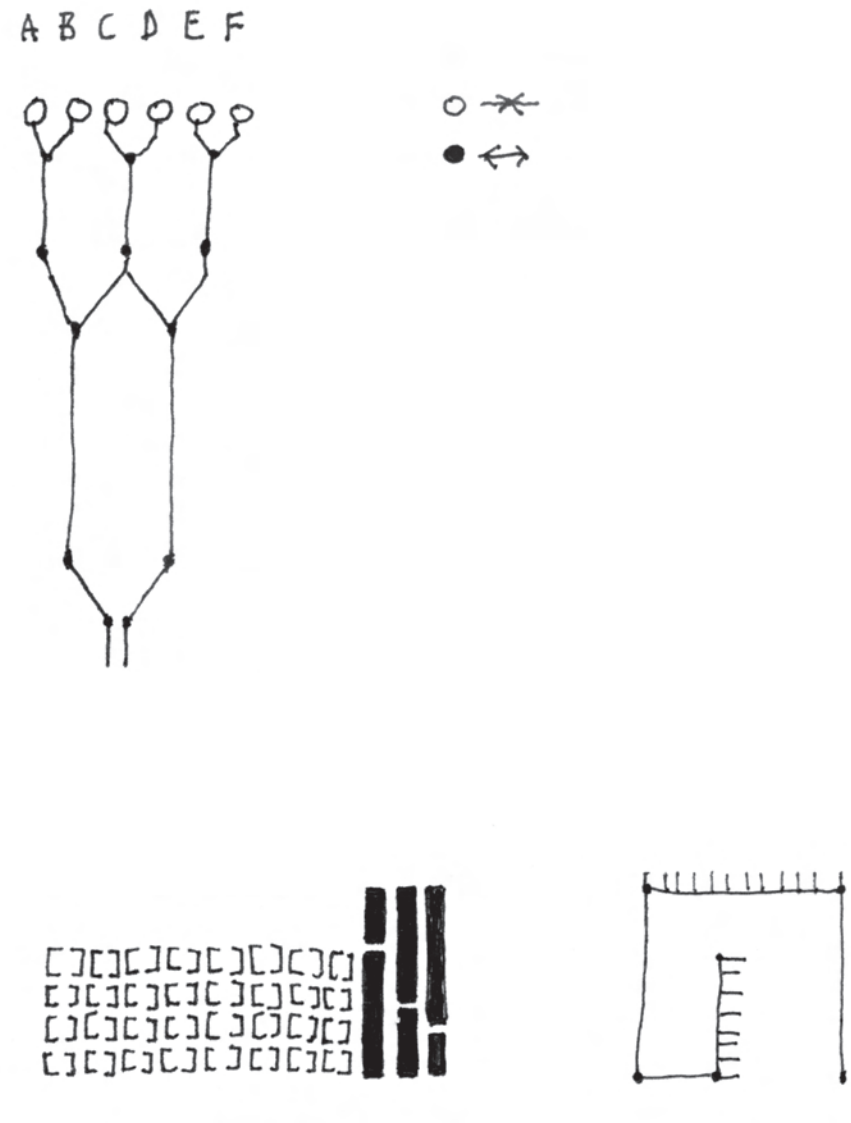


Fig. 01-29

To Ponder. When weighing matter or words before (a) reaching a conclusion or (f) making a decision, various stages such as reflection (c) and consideration (d) are processed gradually. As indicated here, in pondering, a balance is seldom found.

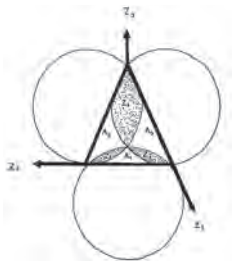


Fig. 12-65

falling into self-pity, and I must admit I've already grabbed one or two didiograchts out of the thin air and squashed them with my own hands. I'm turning into a barbarian. Fuck the parentheses: Drump, you old citation swine.

What does Figure 12-65 tell me about the economy of my desire? How does the kindergarten representation of a singularity relate to the relations of production in the asteroid business? Who's running the galactic bureaucracy, and how? – it can't be that it's got no more than three axials and three intersections?! Colleagues! The intractor is sputtering. The didiograchts and the local FG population are building four-minute empires in muffled harmony. This sunset is lasting too long for me. I'm running out of air, never mind the ball bearings. Two axials and my job's gone to hell in a handbasket. One more arrow and one crisis will turn into the next.

Emptiness all around, a vector won't help, either. March on, protons! Kessler Syndrome galore!

Yesterday (i.e. 25 weeks ago) I painted a picture with the modest means at my disposal. It doesn't look that good, but it's for a friend, and I wrote something at the bottom: DEATH RAYS NOT OK.

My name is Willi Tobler, former press officer for the sixth star fleet. I am the mockery of the Western Galaxy. They've sent me unusable charts; I'll stay here and try to last out the winter.

(End of translation)

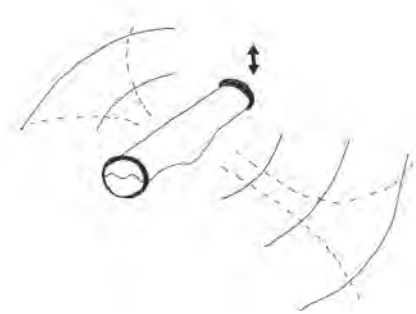


Fig. 01-43

Appendix

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GANSTERER, Nikolaus – lives and works in Vienna and Berlin. He studied art at the University of Applied Arts in Vienna and completed his post-academic studies at the Jan van Eyck Academie at Maastricht in The Netherlands. He is cofounder of the Institute for Transacoustic Research and currently lecturer at the Institute for Transmedia Art in the University of Applied Arts in Vienna. He is active internationally in performance and exhibitions. As an artist, Nikolaus Gansterer is deeply interested in the links between drawing, thinking and action. In his visual work, he focuses on mapping processes emerging out of cultural and scientific networks, unfolding their immanent structures of interconnectedness. www.gansterer.net

GROOTENBOER, Hanneke – is a University Lecturer in History of Art and Fellow of St Peters College at the University of Oxford. She works on vision and early modern painting. The author of *The Rhetoric of Perspective: Realism and Illusionism in Seventeenth-Century Dutch Still Life Painting* (University of Chicago Press, 2005), she is currently preparing *Treasuring the Gaze: Intimate Vision in Eighteenth-Century British Eye Miniatures*. Exploring the overlapping fields of art history, critical theory and philosophy, Grootenboer is currently working on a project on painting as a form of thinking, entitled The Pensive Image.

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KRÜMMEL, Clemens – studied art history and philosophy at the University of Bonn, training and voluntary work at the Karl Ernst Osthaus-Museum, Hagen; 2000-2007 editor and co-publisher of the periodical *Texte zur Kunst*, Berlin; co-curator of the exhibition *Tauchfahrten - Zeichnung als Reportage* at the Kunstverein Hannover/Kunsthalle Düsseldorf, and founding member of the Melton Prior Institute for reportage drawing in Düsseldorf (both with Alexander Roob); co-publisher of the *Polypen* series at b_books, Berlin. Lives in Berlin, working as critic, translator, visiting lecturer and curator.

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MAYER, Ralo – born on the Austrian side of the Iron Curtain, lives and works in Vienna. Artistic interests include the Science Fictions of post-Fordism, higher dimensional geometries and outer space as a giant projection screen for rather mundane salmagundi; works most often lead to breeding unruly monsters in various substrates like film, performance, installation and text. Since 2007 translation of the novel *The Ninth Biospherian*, about "Biosphere 2", a closed ecological system in the desert of Arizona in the 1990s, now a recent ruin of the space age.

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REDER, Christian – was born in Budapest, Hungary. He is a writer, consultant and professor at the University of Applied Arts in Vienna (Head of the Centre of Art and Knowledge Transfer). He is editor of the book series Edition Transfer at Springer Vienna/New York, and co-editor of the newspapers *Volltext* (literature) and *Recherche* (science) in Vienna. Principal topical book projects for 2011/12 are: *Zeichnung als universelle Sprache/Drawing as Universal Language*, and *Kartographisches Denken* (*Cartographic Thinking*). www.christianreder.net

REKACEWICZ, Philippe – has dual French and American nationality. He is a geographer, cartographer and journalist (permanent contributor to the international newspaper *Le Monde diplomatique*, with responsibility for cartographic production). He particularly follows issues such as demography, refugees, statelessness and displaced persons, as well as migration, and, more broadly, geopolitics and geostrategy, as well as social territories, and public and private space. He also works on a number of other projects which bring together cartography, art and politics, especially studying how communities, political or economic powers produce the cartographic vision of the territories on which they operate, and how they can manipulate and lie through the use of maps. Since 1988, he has published more than 2000 original thematic maps, 15 atlases, and a number of written articles which reflect research and thinking about cartography and how the world is represented. He also often participates in exhibits linking cartography to art in Europe.

ROTH, Moira – holds the Trefethen Chair of Art History at Mills College, Oakland, California. She has written extensively on a wide range of contemporary art, and her first volume of collected essays, *Difference/Indifference: Musings on Postmodernism, Marcel Duchamp and John Cage*, was published in 1998. Currently she is at work on her second volume, *Travelling Companions/ Fractured Worlds*. In recent years, Roth has increasingly devoted herself to writing poetry, fiction and plays. Among her current projects are a series of plays (produced in Tokyo and Kyoto, Japan, Potsdam, Germany and San Francisco), poem cycles (*From Far Away, 2003-*), together with a narrative about Rachel Marker, a fictional 100-year old Czech Jew, and *The Library of Maps*, a set of 41 texts about a fictional library and its inhabitants.

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SECTION.A – has worked for nine years at the intersection of economics, art and design. Working with clients in various areas, section.a develops tailor-made concepts for strengthening company identities, accompanying internal processes and supporting company communications, internally and externally. A knowledge of the many-layered potential of art is the basis of all section.a's considerations. To engage with complex content and connections and to bring them to emotional tangibility are the defining elements of the work of this curators' collective, whose members are Katharina Boesch, Christine Haupt-Stummer, Alexandra Feichtner, Andreas Krištof. www.sectiona.at

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www.stockburger.co.uk

TORMEY, Janey – lectures in Critical and Historical Studies at Loughborough University School of the Arts. Her research explores the exchange of ideas between art practice and other disciplines and the ways in which conceptual and aesthetic traditions can be disturbed by and through photographic/filmic practices. She is co-editor of the book series *RadicalAesthetics-Radical Art* (I.B.Tauris) and its companion series of symposia. She has been part of the editorial team for the electronic journal *Tracey Drawing and Visualisation Research* since its inception in 1999. She co-edited the collection of essays *Telling Stories: Countering Narrative in Art, Theory and Film* (CSP 2009) and has work published in *Drawing Now* (I.B.Tauris 2007), *The State of the Real* (I.B. Tauris 2005), and *Masquerade: Women's Contemporary Portrait Photography* (Ffotogallery 2003). She is a member of the editorial board for the peer-reviewed journal *Art and the Public Sphere* (Intellect).

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COLOPHON

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