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respect to human inputs. This is the 'imagination' step, where the software creates its own contributions to the artwork. Because the system adopts its own persona based on initial human art inputs, bright colours will elicit a jovial response; amorphous shapes and a lack of human effort would make the computer contribute in a sombre manner; and rough strokes, for example, would signal hostility and the computer artist would in turn become aggressive.

To give the computer different personalities, we created a labelled dataset of images corresponding to different human emotions and artistic aesthetics. This repository acts as a source of artistic motivation for Tandem, so that the system takes up personality traits based on the inceptive human art or as determined by the human. The output of the 'imagination' step is passed through a CNN-based system,⁶ modifying image inputs based on different emotions to create the output.

CONCLUSION

Tandem tries to challenge and tackle a different kind of artistry, expression and communication between the audience and the machine, mixing algorithm with affection, interweaving intentions with imaginations. With the rise of artificial intelligence and the general notion of machines taking over human activities prevalent throughout science fiction discourses and increasingly in mainstream culture, through Tandem we hope to give the audience a more utopian view of the future by engaging them with something that comes as naturally as drawing juxtaposed with the ultimate in artificiality: artificial intelligence.

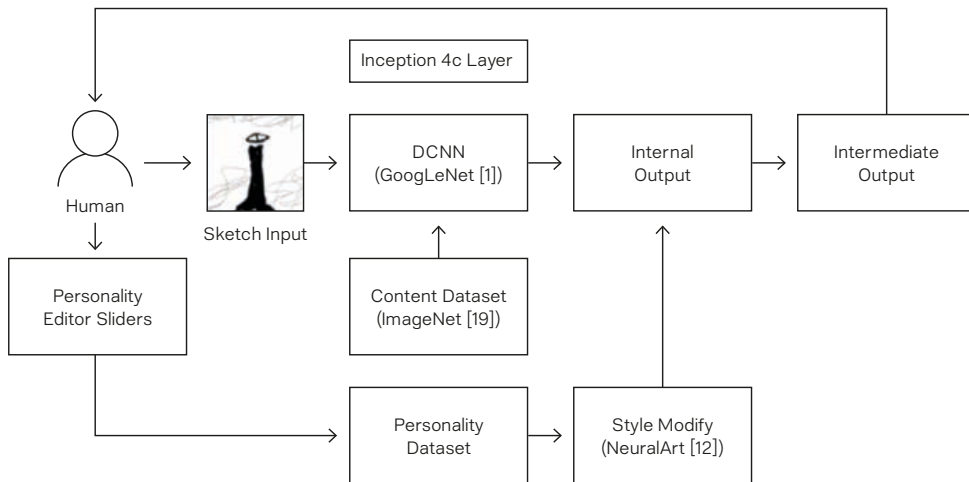


Fig. 5: Schematic. Tandem's software implementation can be elucidated as sequential steps. The system is built as modular deep learning methods.

Inscriptive Practice as Gesture

Ray Lucas

A PROVISIONAL TAXONOMY OF GESTURES

Modelling my argument after Flusser's collection of *Gestures* (2014), I propose to add a number of accounts that elaborate the gestures involved in various types of drawing. It is often unspoken or unnoticed that the role of the hand is quite different according to the various technologies used; in this instance, the definition of technology remains broad: pencil and paper constitutes a technology every bit as much as the latest PC running the latest software.

The exercise of cataloguing or producing a taxonomy is not a neutral one, of course – it consists of a series of judgments and decisions, an editing and selection. Like the archive, not everything is kept: some things are weeded out and discarded.

What is interesting in the technology of architectural drawing, however, is that each earlier iteration has an afterlife, an impact on the development of inscriptive practices where good solutions can be seen to persist. Iterative development is the order of the day, and revolutionary attempts to reimagine architectural representation are often held up as noble failures, as stable or curious forms of diagramming and notation which do not usurp the dominant conventions. The function of the drawing convention is, after all, that it is a common language, a shared understanding of what each line or combination of lines means. I should note here that drawing consists of more than lines, however much the literature might celebrate the line.

Elsewhere, I have asserted that the drawing is not an image.¹ If drawings are not images, then what are they? One answer is to understand the drawing as a record of a gesture. Not all gestures have the same aim, though, and it falls to media theorist Vilém Flusser to describe a great many human movements in his collection on gestures.

Flusser, writing on the gesture of painting, describes gestures as enigmas rather than problems:

"One analyses problems to be able to see through them, and so to get them out of the way. Problems solved are no longer problems. One analyses enigmas to enter into them. Enigmas solved remain enigmas. The goal of an analysis of the gesture of painting is not to clear painting out of the way. Rather, it consists of entering into the *enigma* of painting more deeply so as to be able to draw a richer experience from it."²

Contrast this with his account of photographing (notably not photography):

"A photograph is a kind of 'fingerprint' that the subject leaves on a surface, and not a depiction, as in painting. The subject is the cause of the photograph and the meaning of painting. The photographic revolution reverses the traditional relationship between a concrete phenomenon and our idea of the phenomenon. In painting, according to this tradition, we ourselves form an 'idea' to fix the phenomenon on the surface. In photography, by contrast, the phenomenon itself generates its own idea for use on the surface. In fact, the invention of photography is a delayed technical resolution of the theoretical conflict between rationalist and empirical idealism."³

The gesture of drawing is different again, offering greater precision at times than the enigmatic painterly gesture – while some of the best architectural drawing maintains this uncertainty and lack of prescription, offering a palimpsest of lines drawn, undrawn and suggested: dividing surfaces into those to be perceived as figure and those that are ground.

Further nuance in this definition of 'cause' and 'meaning' from Flusser helps with this discussion. Take, for example, the act of making a copy by using tracing paper. The drawing in this case has more in common with Flusser's description of the gesture of photographing: the source is copied selectively by placing tracing paper over the top of it and picking out lines. Sometimes all the lines are replicated, other times only some of them. The gestures involved in tracing are quite different to those of an original drawing. The trace is more definite, more assured, as there is a line to follow. The traced line is akin to Bergson's speculative problem.

THE GESTURE OF RULING

The ruler, the T-square, the set square and other tools allow us to produce certain kinds of lines. The manner of drawing with a ruler is significantly different to a freehand line. Too often this is results-driven, the apparent perfection of the ruled line compared with the imperfections and autographic nature of the unruly freehand line. To an extent, the origins of such tools can be traced to the medieval stonemason's templates, where knowledge of arches and complex geometry was jealously guarded. Turnbull (1993) and Shelby (1971, 1972) document the use of templates by stonemasons in the construction of these grand pieces of architecture, used both for inscribing into surfaces in a drawing action and for guiding the hand when cutting stone.

Practically, the ruling of a line necessitates a certain stability in the drawing surface. In the twentieth-century model, this would consist of a drawing board with parallel motion, T-square or drawing head. The mechanical drawing board is a large item, a tool requiring skilled operation in conjunction with the paper, pencils, pens and so on: it is simultaneously a *tool* and a *context* for drawing which generates a set of gestures.

Those trained in mechanical drawing will remember the difficulty in coordinating these movements at first, but eventually a fluidity is achieved. The gesture I would like to focus upon here is the gesture of making a mark according to a template, such as a ruler. The steadiness of hand is focused on maintaining a stable angle for the drawing instrument against the template; the speed of the mark is also steady, as is the pressure applied. The character of the ruled mark is evenness and consistency; altering the angle part-way through will cause imperfections in the line and applying greater pressure might cause brittle mechanical pencil lead to snap or a drafting pen to apply an unintentional spot of ink. The beginning and ending of such lines is therefore fraught and risky: some opt for a gradually increasing pressure, feathering the line at the beginning, and a corresponding decrease at the end; others might place the instrument definitely – a dot at the termini of the line; a convention which emerged was the extension of the line, a deliberate additional length to each line, giving corners a characteristic crossing of lines. An argument is made for the precision of such practices, but this is somewhat contentious.

Other forms of guide could fall into a similar category were the focus not on gestures. Graph and gridded paper, for example, are forms of template applied directly to the support, the paper. My own preferred drawing practice uses a dot-grid which effectively disappears from vision once there is something more interesting on the paper to look at. The gesture here is quite different from the ruled drawing, however, and is more akin to the freehand drawing despite the assistance in achieving accurate lengths, angles and straight lines.

THE GESTURE OF TRACING

Tracing is a related drawing practice, of course, owing much of its existence to the technologies noted for the gesture of ruling above. As an operation, tracing demands more attention, as it is a particular and notable set of gestures which help us to unpack that drawing is about *intention* as much as it is about the embodied action. One of the earliest references to tracing paper is about its preparation, in Cennino Cennini's *Craftsman's Handbook* (from the mid-fifteenth century), which instructs the reader to copy the artists with the best reputations, lest you pick up the bad habits of lesser artists by copying them.

The aim of tracing is to copy – in architecture, this is often used to select and edit, but all with direct reference to an existing drawing or other source. By reproducing the

drawing, iterative alterations can be introduced, and it is in this feature that tracing finds its great utility within the design process.

Gesturally, tracing can involve more manipulation of the paper. It is essential to tape the paper to the board securely, with the tension in the paper ensuring that the layers beneath can be seen. With the appropriate weight of paper, one can see several layers down: paper is no longer a singular condition but something multiple, with depth and temporality embedded into it. Finding lines to follow is the first task of the gesture of tracing, followed by the decisions about which lines to keep and which to discard: again the metaphor of the archive, where only the essential elements are kept.

The key gesture is the drawing itself, following the line rather than determining it. By tracing blurs, for instance, the manner of the inscriptive practice is complicated, so that a traced drawing shifts constantly between speculative and creative acts.

When I draw observationally, I am selecting and editing, focusing on some qualities over others. Sometimes innovating and sometimes following a path, I move from Bergson's speculative problems to creative ones and back again throughout the course of a drawing. When I am not drawing, I am often thinking about drawing, constructing ideas for drawings I would like to do: planning or even dreaming them ahead of time without producing a fixed image or plan of work.

"But the truth is that in philosophy and even elsewhere, it is a question of finding the problem and consequently of positing it, even more than of solving it. For a speculative problem is solved as soon as it is properly stated. By this I mean that its solution exists then, although it may remain hidden and, so to speak, covered up – the only thing left to do is to uncover it."⁴

The truth of Bergson's statement of speculative and creative problems is more nuanced when tested against an established practice such as drawing. One frequently moves from one mode to another, fluidly following and driving the process.⁵

Following is an important aspect of the gesture of tracing, and a key distinction drawn by Ingold with reference to navigation and wayfaring:

"The maze-walker, we could say, is a navigator; the labyrinthine path-follower is a wayfarer. In the carrying on of the wayfarer, every destination is by the way; his path runs always in between. The movements of the navigator, by contrast, are point-to-point, and every point has been arrived at, by calculation, even before setting off towards it."

It is important to refute, once and for all, the commonplace fallacy that observation is a practice exclusively dedicated



Fig. 1: Photograph of tracing workshop held at the 'Knowing From the Inside Kitchen' event at Comrie Croft, Perthshire. Participants are tracing drawings by other workshop participants, varying the media used in order to interrogate the original drawings.

to the objectification of the beings and things that command our attention and their removal from the sphere of our sentient involvement with consociates. As should be clear from the foregoing, to observe is not to objectify; it is to attend to persons and things, to learn from them, and to follow in precept and practice."⁶

While in some instances Ingold uses 'wayfarer' as a pejorative here, rather than 'navigator', I argue that these modes co-exist much more happily within drawing practices, offering two poles for a spectrum of responses. Each mode of inscriptive practice occupies multiple positions within this overall territory, shifting according to the phase of practice engaged in at any given point (Fig. 1).

THE GESTURE OF INKING

A footnote to the gesture of tracing is the gesture of inking. Another *following* practice, the gesture of inking still has some flexibility and possibility for editing. Simply stated, inking is the selection of which lines drawn in a lighter medium such as pencil are to be retained. Additional prominence and permanence is given by the application of ink to the surface (Fig. 2).

THE GESTURE OF SKETCHING

Sketching fulfils a range of purposes from collection⁷ to preparatory work for a more substantial piece. The writer Nelson Goodman tackles the topic of sketching

within a tripartite framework of score, sketch and script in his work in *Languages of Art*.

"Because a painter's sketch, like a composer's score, may be used as a working guide, the crucial difference in their status may go unnoticed. The sketch, unlike the score, is not in a language or notation at all, but in a system without either syntactic or semantic differentiation."⁸

This linguistic analogy runs through Goodman's work on art and the graphic practices used in the production of artworks. Here, he notes that sketching has a more confused relationship to this language-based structure, and that – unlike notations, which have a clarity of communication – sketches are internal processes: intended largely for the sketcher themselves rather than an external audience. That sketches can sometimes be understood by others is interesting, and something to be discussed, but the original intention of many sketches is to understand something, develop an idea and otherwise to think.

Sketching is not a standardised activity with rules common from one practitioner to another.

"In short, the sketch – as a sketch – differs from the score not in functioning as a character in a language of a different kind but in not functioning as a character in a language at all. The notational language of musical scores has no parallel in a language (notational or not) of sketches."⁹

Goodman, as an aside, exhibits a useful way of considering any form of representation you might want to analyse. That is, to form a comparison between that kind of drawing or mapping or whatever else, and some stable form of practice you know well and can understand the qualities of. By comparing sketching to musical notation,¹⁰



Fig. 2: As yet uninked drawing from the *Graphic Anthropology* of Sanja Matsuri series.

we instantly form an understanding about something we might easily take for granted. Sketching is so familiar to us that we do not question it, but it is interesting to really consider what it is that we do when we decide to take a pencil or other inscribing tool and make marks on a surface. This act, where we can translate something observed into a series of lines and tones on a piece of paper, is a complex activity requiring a vast apparatus of understanding, artifice and transfiguration from a lively scene of real life to a captured image.

The differences in Goodman's thinking between these inscriptive practices can be expressed as belonging to either the autographic arts or the allographic. Autographic arts are simply those where the work of the original hand is necessary, where an exact replica of the work does not stand for the work in any way and is considered a forgery. This is a complex issue, but is further illuminated by Goodman's example:

"Let us speak of a work of art as autographic if and only if the distinction between original and forgery of it is significant; or better, if and only if even the most exact duplication of it does not thereby count as genuine. If a work of art is autographic, we may also call that art autographic. Thus painting is autographic, music nonautographic, or allographic."¹¹

This distinction is not used to make a judgment on the relative merits of one form of art over the other; the performance-based arts represented by Goodman's allographic arts are every bit as valid as the autographic arts. The manner in which the distinction is measured by Goodman is, however, curious, and throws up one of the interesting inconsistencies in his argument. This inconsistency far from invalidates his argument, but rather complicates and makes it interesting.

The case of the architectural drawing can be considered as both/either allographic and/or autographic in nature. An original drawing by the hand of a famous or influential architect is inherently valuable in a way that a reproduction of it is not. The autograph: the quality of that individual's handwork is present in the drawing. This aura of the original persists despite the intention behind that drawing, which is often allographic. The allographic nature of the drawing relates to it being a set of instructions for the construction of a building.

What of the gestures inherent to sketching? These are open and varied, arguably to a greater degree than other modes of inscriptive practice, but an internal consistency remains important. A family of marks and gestures are used in the sketch as a form of internalised communication. The sketch is often produced without the implied audience of other drawings, allowing for shortcuts and efficiencies that might render it impossible for others to read. The internal consistency allows each sketch to compose its own logic, a logic that might not necessarily apply to the next sketch in a series.

THE GESTURE OF ERASURE

Often overlooked in treatises on drawing and related to the elision of lines within tracing practices is the process of erasing lines. Tools for this include the eraser – various types of which can be used for different media – and also the scalpel blade to scratch inked lines from paper. It is not until digital drawing becomes widespread that erasure becomes complete: the erased line leaves no trace or mark; even the chain of 'undo' actions is limited to a certain number of actions once another branch of decisions are taken.

Related to erasure is masking. More common in painting practices such as watercolour, the eraser becomes a tool of the drawing itself here, removing a shaded ground through a mask or shield in order to produce a mark: a negative mark, but a mark nonetheless. As such, the gesture of erasure here refers to the intention to remove marks rather than the production of a mark by using an eraser.

In practical terms, the erasing instrument is rarely as accurate as the drawing instrument – and more than intended might be erased, leading to repair work on the lines that were unintentionally removed. Erasing a mark denies its existence and validity within the overall scheme, representing everything from a simple mistake or slip of the hand through to changed plans and altered intentions. This reinforces the idea of drawing as a process of selection, as a temporal and spatial more than a visual phenomenon.

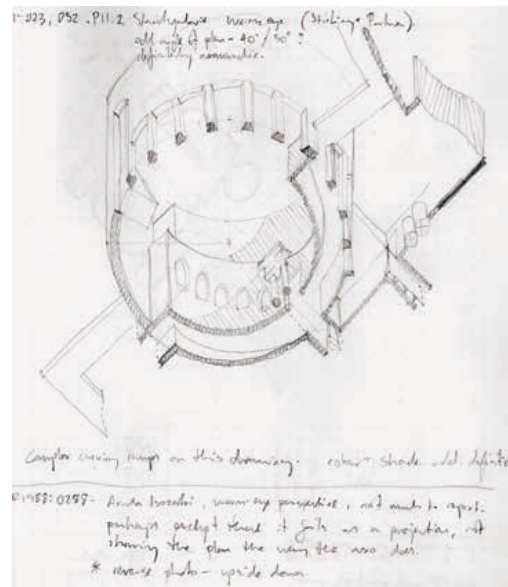


Fig. 3: Drawing from *Drawing Parallels: Knowledge Production in Axonometric, Isometric and Oblique Drawing*.

CONCLUSION: DRAWING AS PERFORMANCE

If a drawing is a record of a gesture, then that set of gestures can be understood as a performance. Whether in public, for an audience, or the architect drawing in front of their client as a way of communicating and describing an intention, the sequence of acts that constitute a drawing are performed.

Where a score is present (and performance suggests a script of some sort), this can give instructions which govern the performance, allowing variations within a set of parameters. This could be Ruskin's exercises for drawing, my own notations describing a drawing or any number of fine art practices. This could include drawings I copied at the CCA¹² or the artefacts I drew in a visit to the British Museum.¹³

Performance can suggest dance, particularly the professionalised dance designed for an audience to appreciate within a theatrical setting. The Russian filmmaker Sergei Eisenstein himself makes this connection in his essay 'How I Learned to Draw (an essay on my dancing lessons)'. Published by the NY Drawing Centre in a collection of Eisenstein's sensuous and mystical drawings, he describes drawing and dancing as being "branches of the same tree".¹⁴ The gradual transformation from learning steps in order towards learning the response and interaction involved in dancing are most instructive here.

In many ways, a parallel practice can found in the practice of improvisational dance described by Maxine Sheets-Johnstone:

"In view of its unique appearance, it is not surprising that a dance improvisation is commonly described as an unrehearsed and spontaneous form of dance. What is not commonly recognised, however, is that that description hinges on the more fundamental characteristic suggested above, namely, that in a dance improvisation, the process of creating is not the means of realising a dance; it is the dance itself. A dance improvisation is the incarnation of creativity as a process."¹⁵

Sheets-Johnstone's concept of thinking in movement is crucial to any study of drawing and, as a result, the design process itself. The description of improvisational dance given above could easily refer to the close integration of drawing with the architectural design process. Thus, the process of creating is not the means of realising a design; it is the process of design itself – to draw is to design. In this way, thinking in movement is understood not as the transcription of a pre-formed mental image, but instead "thinking is itself, by its nature, kinetic"¹⁶

Further work in this field brings the argument back to actual human bodies rather than the kind of theory that finds presence, movement and actual people too messy, preferring to abstract us out of the picture entirely. A call to arms on this is made in strong terms by Brenda Farnell:

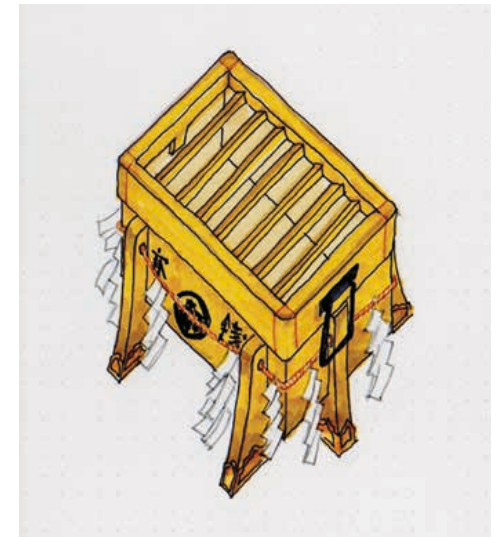


Fig. 4: Drawing from *Graphic Anthropology of Namdaemun Market, Seoul*.

"Central here is the idea that the way human agency works is in terms of the signifying enactments of moving persons. This position is commensurate with Ingold's dwelling perspective (2000) and his use of Gibson's environmental theory of perception (1966, 1979). The varied discursive practices that constitute meaning-making processes (semiosis) are performatively grounded in, and conventionally a structuring of, a suitable region of the mindful body that serves the purposes of socio-cultural living – such regions as the mouth and lips in speech, the hands in sign languages, and the whole body in forms of dance, ceremony, or practical skills of various kinds (Farnell, 1999). The human actions that constitute speech-act systems, action-sign systems, and any other form of semiosis are the creative outcome of a primary generative act – signifying enactments from the body (Farnell, 1999; Williams, 2003). While Csordas proposed a paradigm of the experienced body, for the 1990s, Williams, Varela and I are proposing a paradigm of the moving body for the beginning of the twenty-first century."¹⁷

Defining what drawing is or can be is a more fruitful way to proceed. Institutions from London's V&A Museum to the Drawing Centre in New York struggle with pinning this down, of course, veering from the vagueness of 'works on paper' to a wide-ranging discussion of the various intentions which lie behind an assemblage of lines.

My research agenda addresses one possible approach. Dealing with a range of inscriptive practices, I discuss the idea of what qualities each practice possesses at length. Nelson Goodman is increasingly important as I continue to work in this area: his clear-minded descriptions of

scripts and scores, allographic and autographic marks serve as a model for how to describe, rather than as stable categories which I would subscribe to unswervingly. The conclusion is that any given inscription can simultaneously possess a range of qualities, speaking to different audiences according to their knowledge and ability to understand each quality. Thus, an architectural drawing can have an aesthetically pleasing pictorial quality at the same time as being a set of instructions: a notation for the construction of a building.

Recent projects have brought me back to drawing more consistently.

Most of the attention in architectural drawing literature is spent on the emergence of perspective or the dominant modes of orthographic projection of plan, section and elevation. Axonometric, isometric and other forms of oblique or parallel projections are the poor relations, however. My mode of inquiry is to copy and to redraw. Spending several weeks in the Canadian Centre for Architecture's library and drawing collection, I selected works by twentieth-century architects who had made distinctive uses of parallel projection. Through careful copying, redrawing, retracing the steps, I found that my understanding was enhanced enormously through this act of retracing, re-enacting. That is not to say that

I could place myself entirely into the context in which each drawing was made, but a deeper understanding is possible through practising the relevant form of knowledge production: drawing.

I am also producing drawings as forms of *graphic anthropology*, a deliberate play on visual anthropology that prefers lens-based media to the neglect of drawing, diagramming, mapping and notation. Recent visits to Tokyo have been timed to coincide with the Sanja Matsuri, a three-day festival in May which involves a vast disturbance to the everyday life of the Asakusa district of the city. The festival involves a constellation of temporary and mobile structures, the most celebrated being the *mikoshi* – portable shrines which are boisterously carried through the streets; the effort and weight involved giving a real practical presence to this radical and traditional architecture. Drawing is an important way of understanding the spatial implications of this event and its various stages, so the project will include a series of axonometric drawings, long sections and Laban movement notations.

A similar *graphic anthropology* is also underway to describe Namdaemun Market in central Seoul: another socially produced space with a great many lessons for architects.



Fig. 5: Drawing from *Graphic Anthropology of Sanja Matsuri, Tokyo*.

- ¹ Ray Lucas, "Why a Drawing is not an Image (and why that might not be a problem)" in *Beyond Perception*, edited by Peter Loovers et al. (London: Routledge, publication forthcoming).
- ² Vilém Flusser, *Gestures*. Translated by Nancy Ann Roth (Minneapolis: University of Minnesota Press, 2014), 65.
- ³ *Ibid.*, 72.
- ⁴ Henri Bergson, *The Creative Mind: An Introduction to Metaphysics*. Translated by Mabelle L. Anderson (New York: Citadel Press, 1992), 51.
- ⁵ Ray Lucas, "Towards a Theory of Notation as a Thinking Tool" (PhD diss. University of Aberdeen, 2006), 169.
- ⁶ Tim Ingold, *The Life of Lines* (London: Routledge, 2015), 133 and 157.
- ⁷ Ray Lucas, "The Sketchbook as Collection: a Phenomenology of Sketching" in *Recto-Verso: Redefining the Sketchbook*, edited by Angela Bartram, Nader El-Bizri and Douglas Gittens (Farnham: Ashgate, 2014).
- ⁸ Nelson Goodman, *Languages of Art*. (Indianapolis: Hackett Publishing Company, 1976), 192.
- ⁹ *Ibid.*, 194.
- ¹⁰ In Ray Lucas, "Taking a Line for a Walk: Flânerie, Drifts, and the Artistic Potential of Urban Wandering" in *Ways of Walking: Ethnography and Practice on Foot*, edited by Tim Ingold & Jo Lee Vergunst (Farnham: Ashgate, 2008); and Ray Lucas, "Gestural Artefacts: Notations of a Daruma Doll" in *Fieldnotes and Sketchbooks: Challenging the Boundaries Between Descriptions and Processes of Describing*, edited by Wendy Gunn (Oxford: Peter Lang Publishers, 2009).
- ¹¹ Nelson Goodman, *Languages of Art* (1976), 113.
- ¹² Ray Lucas, *Drawing Parallels: Knowledge Production in Axonometric, Isometric, and Oblique Drawings* (Farnham: Ashgate, publication forthcoming 2017).
- ¹³ Ray Lucas, "The Sketchbook as Collection: a Phenomenology of Sketching", 2014.
- ¹⁴ Catherine De Zegher (Ed.), *Drawing Papers 4: The Body of the Line: Eisenstein's Drawings* (New York: The Drawing Centre, 2000), 26.
- ¹⁵ Maxine Sheets-Johnston, *The Primacy of Movement* (Amsterdam: Philadelphia: John Benjamin's Publishing Company, 1999), 485.
- ¹⁶ *Ibid.*, 486.
- ¹⁷ Brenda Farnell, *Dynamic Embodiment for Social Theory: I Move Therefore I Am* (London: Routledge, 2012), 17.

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