Setup conditions

$$
\begin{array}{r}
4201.0 \\
7\overline{)29413} \\
28 \\
\hline
14 \\
14 \\
\hline
01 \\
13 \\
7 \\
\hline
50
\end{array}
$$

etc.

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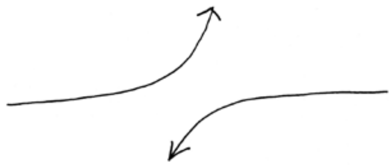
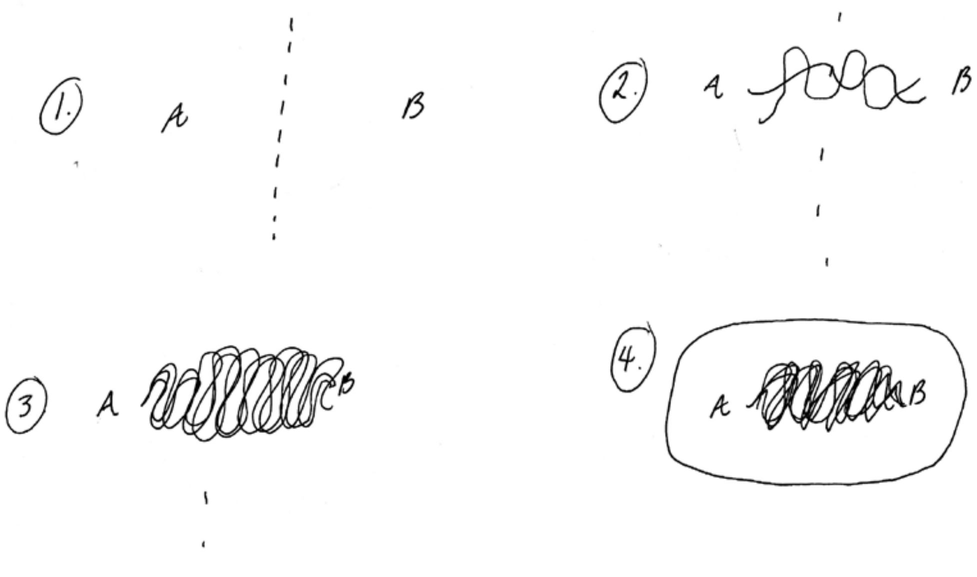
Cover image: An overhead projection

Recently I attempted to work through a long division problem, live, on an overhead projector in front of an audience. The idea was to demonstrate the two-fold process of "setting up" a situation, then "letting it run," but in a fit of nerves I forgot the sum I'd taken considerable care to memorize. As the pen squeaked and slipped over the acetate it seemed that the memorized answer and the memorized working-out had fallen out of sync.



Although I knew the result had a repeating decimal 3, I couldn't manage to contrive its existence. Finally, in confusion and frustration, I just wrote "etc." and pushed on with the rest of the talk.

Someone later pointed out that this fumbled sum was actually useful in engaging the audience. They were suddenly complicit. It must be difficult, of course, for an audience NOT to automatically follow the process in their heads, or at least try to. Long division, after all, is joyous. But while I'd intended the sum merely to serve as an illustration, it seemed to have become something else altogether. Inviting an audience to participate in a live mental struggle, I realized, creates a strange subjective space.



1. DIVISION

Last week I helped a friend's child with her homework. She was learning short division, and asked me to write out some sums for her to practice. At first, I wrote out some sets of random two or three-digit numbers.

$$7\overline{)63}$$

She attempted them, but was confused about what to do when a single digit "wouldn't go" into a single digit: i.e., 7 "won't go" into 6, or 6 is not divisible by 7. (Here we must remember we are dealing with simple whole numbers, not fractions or decimals.) I was at a loss to explain that, if a single digit won't go into a single digit, what you should do is get a single digit to go into a double digit. So, if 7 won't go into the 6 of 63, you move along and ask whether 7 goes into 63.

As I struggled for a way to express this visually, the child remembered what she had been taught to do. "You build a bridge in-between them," she said.

$$\begin{array}{r} 9 \\ 7\overline{)\underbrace{63}} \end{array}$$

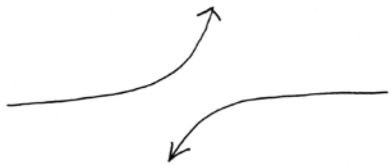
After fluently solving other such problems, she asked for longer sums. Now, it is possible to divide longer sums by this bridge-building—the only problem is, what do you do when you have "a remainder," when a number doesn't divide perfectly and there's something left over?

$$\begin{array}{r} 9 \\ 7\overline{)64} \end{array} \quad r\,1$$

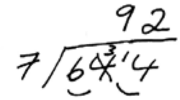
With long division this sort of process is clearly laid out, as you drop down all your subtractions below the sum.

$$\begin{array}{r} 92 \\ 7\overline{)644} \\ -63 \\ \hline 14 \\ -14 \\ \hline 0 \end{array}$$

This was the only way I knew of laying out the problem. My memory of short division is so utterly overcoded by the long form that I'm no longer able to comprehend how else a sum might be visualized. Where long division expands, unfolds, and clarifies, short division compresses, folds, and abstracts. We had reached a stalemate: fearing that I might pre-empt some carefully constructed step-by-step course, I didn't want to teach her long division—and yet I couldn't explain how to do short division.

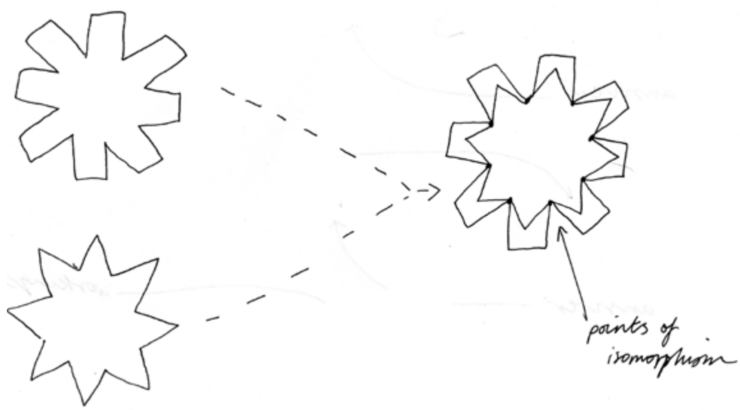


After a few minutes of us both staring fiercely at the page, she suddenly remembered how her teacher had taught her to "carry over" the remainder of each sum.

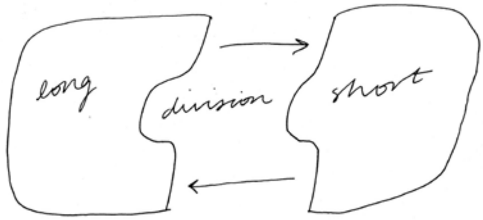


You can see that this method combines elements of both bridge-building and carrying-over—and also that the child learned short division despite our mutual inability to communicate what we didn't understand. I'm interested here in the correspondence between myself and the child. Correspondence can be read as "isomorphism," a term Douglas Hofstadter defines in *Gödel, Escher, Bach: An Eternal Golden Braid* as

When two complex structures are mapped onto each other in such a way that to each part of one structure there is a corresponding part to another structure.[1]



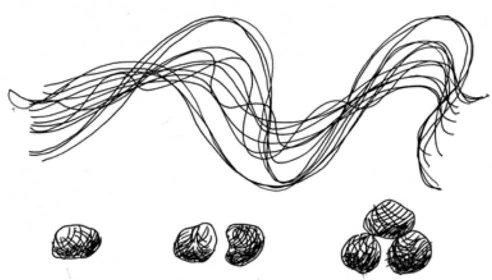
The isomorphism between myself and the child was based on the shared understanding of the basic concept of division—that "you can divide one number by another number with a more or less neat or messy result." From there we could clumsily map bits of knowledge on to each other's understanding, or, more elegantly, find a way of communicating and learning in an area we both half-recognize.



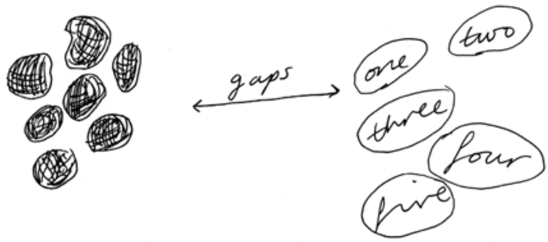
I always felt an odd disjunction between counting as words in English and counting as piles of objects in space—I suppose because words and more-or-less piles of objects seem arbitrarily matched. In fact, counting aloud is really just a word-rhyme, as Steven Pinker elaborates:

Counting is an algorithm, like long division or the use of logarithmic tables—in this case an algorithm for assessing the exact numerosity of a set of objects. It consists of reciting a memorised stretch of blank verse ("one, two, three, four, five ...") while uniquely pairing each foot in the poem with an object in the spotlight of attention, without skipping an object or landing on one twice. Then, when no object remains unnoticed, you announce the last foot you arrived at in the poem as the numerosity of the set.[2]

In other words, we learn to match analogue swathes of words with discretely changing piles of objects—a pile of stones that has, each time, one more stone added somehow matches the sounds "one," "two," "three," and so on.

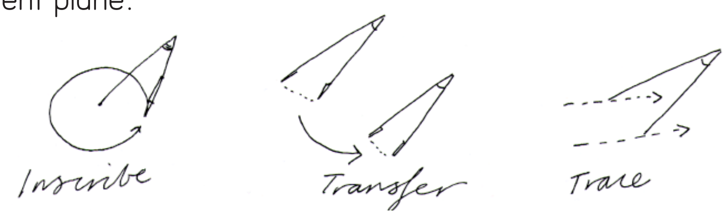


Clearly there has to be some kind of isomorphism between the number of physical stones and the stretch of number-words articulated as continuous sounds, because the two phenomena must CORRESPOND with each other in order to create meaning in our minds. In this case, however, I'm not sure immediately what the "shared feature" might be. Perhaps learning to count piles of stones is a question of repetition—saying "one, two, three, four, five," until a connection is forged. Or maybe it is rather a question of SEGMENTATION, for there is a breath between each word in the stream of speech, just as there is a spatial gap between each individual stone (and between piles of stones). In other words, a corresponding segmentation is created by a kind of mental carving, when gaps between words match gaps between stones.



2. ARTICULATION

When set to the appropriate radius, a draughtsman's compass draws circles, arcs and waves. In order to measure a distance on a map —when planning a journey, for example—one enacts the wave-formation of the obliquely-running compass. One leg of the compass is fixed while the other is mobile. The hinge collapses both qualities: fixed when the screw is wound, mobile when unwound. The compass can also inscribe, which means "to draw a circle" as well as "carve into wood" (in fact, it collapses writing and sculpture, both of which are etymologically rooted in the verb "to carve"); it can quickly transfer a measurement from one plane to another; and it can trace an angle by running one leg of the compass along one edge while mirroring the same degree with the other on a different plane.



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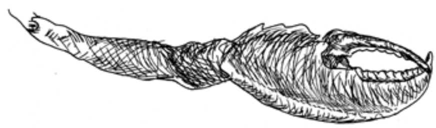
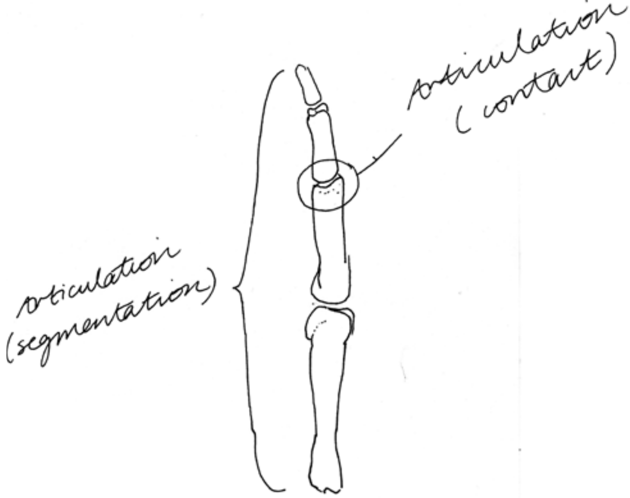
In both anatomy and mechanics, articulation refers to the contact between two surfaces, as well as the joining of two surfaces. One definition of the adjective "articulate" is (of sound and speech) "having clearly distinguishable parts"; another is "having joints."

On one hand, then, articulation describes the quality of having discrete parts: distinction, separation, segmentation. This is a holistic view of, say, an elbow joint in the context of the whole arm. If asked to imagine an articulated joint, you'll almost certainly picture a complete arm, finger, or lobster claw.



On the other hand, articulation equally describes what happens between two discrete parts: contact, tension, potential energy. And so, in sum, articulation is rather a GESTALT: a macro-level view of segmentation AND a micro-level view of contact.



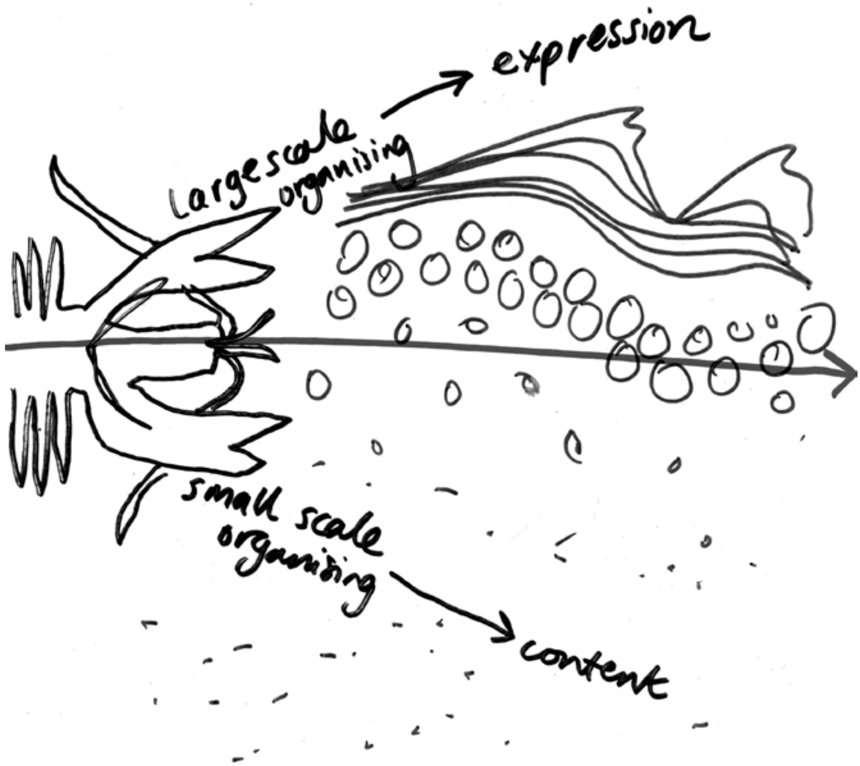
American and European lobsters have two distinct claws: a crusher and a pincer. The crusher is the larger of the two, used to pulverize the shells of the lobster's prey. The pincer is then used to hold and tear the flesh. This natural asymmetry is the subject of a chapter in Gilles Deleuze & Felix Guattari's *A Thousand Plateaus*:

3. 10,000 B.C.: The Geology of Morals
(Who Does the Earth Think It Is?)

Double Articulation

The lobster is an icon and demonstrator of "double articulation," a typically vast, elastic concept that Deleuze & Guattari apply to many phenomena—God, for example. My narrower understanding of the term is foremost as an organizing principle, particularly when articulated by way of geology.

The first arm (or first articulation) selects from minute and unstable particles (rocks) on a micro level, upon which it imposes forms and order (ground up rocks moved by a river as rock flour and layered as sedimentation in the bedrock of the Rocky Mountains). The second arm (or second articulation) then organizes these forms on a macro-level, creating a stable functional structure for the formation of new layers (or strata). Think of this as the tectonic plates crushing the bedrock together, folding sediment in a stable process that turns it into sedimentary rock, and eventually the mountains themselves.



Initially, I thought the lobster was doubly articulated merely because it had two articulated arms (i.e., elbow joints), each with an articulated claw, and that these essentially identical arms performed different tasks; only later did I understand that one claw is *specifically articulated* to crush and the other to select and tear. Here's where the real world usefully mirrors philosophy, and vice versa. In terms of visualizing the obtuse notion of "double articulation," I can more readily follow Deleuze & Guattari's metaphysical point: it's the process of linking AS the process of learning.

There's something else happening here, too. In focusing on moral and spatial "plateaus," Deleuze & Guattari seem to circumvent the linguistic

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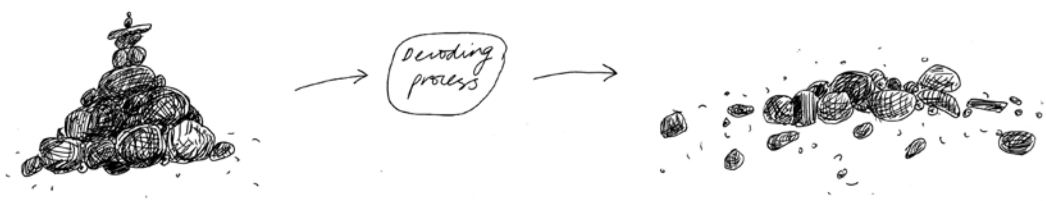
potential of double articulation, yet in the process of linking up old and new thoughts—in trying and re-trying to understand double articulation—I quoted myself. I used my own material, which I then folded and abstracted into more significant material. As such, this passage is doubly articulated.

3. TRANSLATION

I've been thinking about how function (or creation) and interpretation (or criticism) are not as discrete and binary as they are generally conceived to be. For example, the word "function" implies some physical change, like an artist using material X to create an artwork Y, while the word "interpretation" implies a change of perspective or orientation, like a critic looking at artwork Y and theorizing Z about it.

In fact, these two binaries—of interpretation and function—are united by the process of CODIFICATION. When something is translated into code, the original information remains embedded in the coded version, and all that is required to extract the original information is a decoder. There's no fundamental change of substance, only of the surface arrangement.

Imagine an artist arranging a pile of stones into a tower or a cairn: the material (stones) remains the same, yet the arrangement is different, and the information (stones) can be decoded (reassembled back into their original state) by a decoding device (a swift kick).



When an interpreter comes along to interpret the tower of stones, the information is preserved in a similar way. She says: "This tower of stones on a hill signifies man tracking and marking the natural landscape. The careful stacking is a childlike gesture, and the placement of stones in order that very few gaps appear an architectural one. The height of this tower of stones—3 feet across at base and 2 feet tall—signifies man's insignificance in comparison to nature. Finally, the tidy arrangement

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speaks of obsessive pattern making, and man's desire to impose order on the natural world ..."

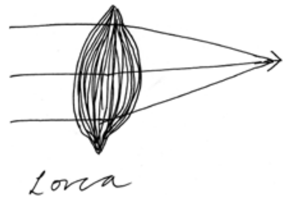
The interpreter doesn't only interpret the information, she also describes it (and "the information" here refers not only to the material itself, but also to the style of its arrangement). Despite having imposed an extra layer of information in her analysis, however, the original information remains intact, and all that is required to unpack it is a decoding device: a human brain. The artwork is a tower of stones stacked in a particular way.

In both processes of function and of interpretation, then, information is preserved, and united under the umbrella notion of coding. From a high enough vantage point they might even appear to be a single phenomenon.

I spent yesterday trawling *The Collected Books of Jack Spicer*, particularly his first published collection, *After Lorca*. The book consists of poems and letters: the poems were Spicer's translations of poems by Federico Garcia Lorca, and the letters were written "to" the dead poet. The rich and wild ways Spicer employed these two concepts—of translation and of correspondence—amount to a distinct poetics, by which I mean more than the standard definition of "a theory of poetry." Specifically, I mean to circumscribe the fact that "poetics" is rooted in the Greek "poeisis" —making, or creating. There's something particularly TANGIBLE about Spicer's poetics—something active and transformative, very much rooted in the quotidian, and particularly in objects. This fragment is exemplary:

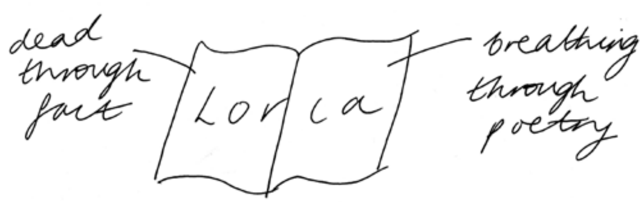
I would like to make poems out of real objects. The lemon to be a lemon that the reader could cut or squeeze or taste—a real lemon like a newspaper in a collage is a real newspaper. I would like the moon in my poems to be a real moon, one which could be suddenly covered with a cloud that has nothing to do with the poem—a moon utterly independent of images. The imagination pictures the real. I would like to point to the real, disclose it, to make a poem that has no sound in it but the pointing of a finger.[3]

The book's title embodies this poetics perfectly. There are two meanings attached to both words. When I first read *After Lorca*, my initial "soft" or "indirect" sense was of "what happened after Lorca"—of elegaic temporal consequence , given that Lorca died in 1936. Now, there's obviously a "period of Lorca" and a "period after Lorca," but less obviously a "period before Lorca," too. By "less obviously," I mean that anyone who lived before Lorca obviously wouldn't KNOW they lived before Lorca; whereas I, being "post-Lorca," can reasonably conceive of a "pre-Lorca." In doing so, I'm using Lorca The Dead Poet as a lens.



The second sense of *After* is a comparatively "hard" or "direct" notion of homage. The convention, of course, is to give a work of homage a discrete title, then suffix it as being emphatically "After" the art or artist in question. Spicer's homage, however, is at once direct and oblique. The title IS the homage, and at the same time, the whole work is ABOUT the process of consequence.

After Lorca is perhaps best described as title squared, not least because there's a double meaning contained the second half of the title too, which could also be divided in terms of "hard" and "soft." In the hard or direct sense, *Lorca* signifies a poet who was born 1898 and died 38 years later, and in the soft or indirect sense, *Lorca* signifies a poet who continues to breathe through his work.



You *could* categorize these meanings as "hard" and "soft," but for me these terms are feelings, sensations, and don't comfortably translate as direct/indirect or concrete/abstract, or at least not as directly or indirectly or factually or abstractly as those terms imply. Furthermore, as we sidestep these various binaries,[4] it's worth remembering that they are already unified—or at least oscillating—within the title, and so within the work: a strange subjective space.

*

1. Steven Pinker, *The Stuff of Thought: Language as a Window into Human Nature* (London: Penguin, 2005)

2. Douglas R. Hofstadter, *Gödel, Escher, Bach: An Eternal Golden Braid* (London: Penguin, 2000)

3. Jack Spicer, *The Collected Books of Jack Spicer* (San Francisco: White Rabbit Press, 1970)

4. "Logically enough, the way to move beyond a pair of binary opposites is to triangulate. It's obvious when you think about it in terms of simple geometry, and it invokes a baseline metaphor about the development of ideas. Two points in opposition form one axis. To get beyond, therefore, one adds a second dimension, the simplest structure of which is a triangle."
– Domenick Ammirati, "Structure, Metaphor, Contemporary Art," *Art Lies* no. 68 (Spring/Summer 2011), cover