Abstract Body, Abstract Machine:
Alan Turing's Drama of Difference

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In order to prove that mathematics cannot be exhausted by a finite set of procedures, Alan Turing conceives, in 1936, of an abstract machine[1]. The machine makes its debut in "On Computable Numbers with an application to the *Entscheidungsproblem*," his first major mathematical paper[2]. A close reading of this machine's dynamic will show that Turing's thought in the field of mathematics is a consciously embodied thought that contemplates its own incompleteness. By examining Turing's machine through the lens of incompleteness, this project will reveal how, through his extension into abstraction, Turing engages in a paradoxically intensive movement that reveals his body as inextricably enfolded in thought. To understand this radical act of contemplation, Turing must be situated within a history of thinkers working against totality, because in thinking his own incompleteness, he refutes the idea that systems are defined by completeness, or that the unfolding of something is circumscribed by that something as goal. This constellation of thinkers includes Kurt Gödel, before Turing, with his Incompleteness Theorem[3]; it also includes Gilles Deleuze, with his explanation of how meaning gets made in *The Logic of Sense*,[4] and Michel Foucault, with his formulation of meaning's dissolution in "The Thought of the Outside."[5] Brian Massumi then ushers this tradition into the present by defining the limit of a human being as immanent to that being in *Parables for the Virtual*.[6] Massumi grounds his theory in Deleuzeian and Foucauldian concepts, themselves built from Turing's legacy of lived thought, which in turn is grounded in Gödel's theorem. Explaining these writers' relation to Turing's work on incompleteness will reveal the way in which systems of meaning are always torn between their own constitution and dissolution; this state of being torn will clarify, in turn, the movement of Turing's mathematical body.

To understand the paper for which Turing conceives his abstract machine, it must be positioned in relation to Gödel's *On Formally Undecidable Propositions*, or his Incompleteness Theorem.[7] Gödel writes this theorem in 1931 to disprove the first two of three claims that David Hilbert made in 1928.[8] Hilbert's first claim is that mathematics is complete, or that every statement can either

be proved or disproved [9]; his second claim is that mathematics is consistent, or that a statement is either true or false, and that therefore mathematics is free of contradiction. [10] Gödel manages to prove, for a particular calculus system, that unprovability is the founding kernel of that system. [11] This means that there are always propositions in the system that can neither be proved nor disproved. This neither/nor situation means that something can be paradoxically true and not true at the same time. This impossibility means, for Gödel's system, that the system will always be incomplete. While he only proves this for a single system, his method is so powerful that it stands for every formal system capable of representing arithmetic. [12]

Turing introduces his theoretical machine in 1936 in order to disprove the third of Hilbert's contentions: that there is a definite method that can be applied to a statement to decide whether it is provable. [13] Turing tries to imagine a machine that can decide the provability of any assertion, basing it on what he claims a human computer does when working out calculations. Accordingly, it is composed of three parts: the *executive unit* carries out operations such as reading and writing, the *control* ensures that instructions are correctly carried out, while the *store* is a store of information, and corresponds to a human computer's unlimited supply of paper, whether this is paper on which she does her calculations or that on which the book of rules that determine her behavior is printed. [14] This imaginary machine can therefore write, read, and erase symbols on a moving paper tape that he specifies should be of infinite length, though in reality any such tape has to be finite. [15] Through this formulation, Turing writes the description for a "universal

machine" that can do the work of any other machine, provided it can be fed a description of the task in the form of a coded table.

Turing discovers a way to finitely express an infinite number: for any number defined by a rule, he can make a table explaining the rule. If he feeds the table to his machine, the machine will produce the number theoretically, that is, it will take infinity to do so. [16] For example, if he wants to express, he creates a table defining the rule that produces the infinite decimal 3.14…. The machine effectively consists of these tables that Turing creates: it manifests as finite abstractions that express infinite sequences. [17] Turing calls any number that he can create a table for a "computable number," because his theoretical machine can produce the number in its abstract space. [18] His machine is configured to produce every computable number, that is, every number for which one can write a table explaining its rule. [19] To show that there is no definite method to discover whether a given statement is provable, Turing applies a method invented by Georg Cantor to his computing machine. [12] Cantor originally used this method, called his Diagonal Proof, to prove that the set of all real numbers is greater than the set of all rational numbers. [21] The Diagonal Proof shows how no list of real numbers can contain all the real numbers, because any seemingly complete list reveals, through a certain diagonal method, yet another number not included in the list. [22] This paradox demonstrates how the rational gives rise to the irrational and the finite (or complete) to the infinite (or always incomplete). [23] When Turing applies this method to his machine, with its seemingly complete account of all computable numbers, he shows that just as

the rational gives rise to the irrational, the computable can give rise to the uncomputable, and an uncomputable number constitutes an unsolvable problem. But more important for the current project of showing how Turing's machine stands as an expression of his own incompleteness, Cantor and Turing's results clearly indicate that a seemingly complete set or system will always reveal itself as incomplete. Thus, Turing concludes, there is no definite method to decide whether assertions are provable, since unsolvable problems will always reveal themselves. Therefore, mathematics cannot be exhausted by any finite procedure.

This proof situates Turing, along with Gödel, in a constellation of mathematicians and philosophers working against totality. The move away from the conceptualization of a system (be it a calculus, a language or a world) as a totality with a complete, definable set of elements is crucial because this move allows for the existence of pure difference: something always differing, always else, always excluded. The refutation of totality is a move away from dialectics and it embraces proliferation and openness. In this vein, Turing's machine demonstrates that any system, or for our purposes, any determinate thing, is always in relation to indeterminacy, and that one never really knows what this realm of indeterminacy will produce. The non-existent abundance of this realm's potential productions is like a shadow or underside to the actual world. It does not consist of anything that one can point directly at, but it instead looms, just outside the frame, maintaining that nothing is ever quite set; instead, uncomputable newness subsists in everything.

The philosopher Gilles Deleuze also figures into this constellation of anti-totality thinkers. In *The Logic of Sense* in 1969, Deleuze proceeds from Gödel and Turing to elaborate the movement of "sense" as a subsistence that enables meaning to cohere.[24] Deleuze's work complements an understanding of Turing's abstract machine because Deleuze is concerned with how meaning gets made. Turing uses his machine to reveal the potential excess that haunts a system's meaning; Deleuze continues this project, and an explanation of how he does so will help to unpick how thought functions in Turing's work. The key concepts we need to take from Deleuze are his definition of sense as a subsisting immanent limit, his differentiation of the corporeal and incorporeal, and his use of series to explain the proliferation of meaning. These three concepts will help to show the always-embodied nature of Turing's contemplation of incompleteness.

Deleuze distinguishes between the corporeal, which consists of bodies, words and things that exist, and an incorporeal realm of becoming, which subsists or inheres.[25] Sense is an incorporeal entity[26] that gives meaning to discourse.[27] It is made up of pure becoming or infinite identity: it always moves in both directions at once, which means that it is not limited by the physical or the personal.[28] Sense is a movement of difference: the differing of a thing from itself as well as what is not itself, differing from its own differing and always diverging from itself. This difference is the movement of change: pure newness; in its differing, it enables relation. Sense is not the signifier or the signified, but the relation between them;[29] it traverses the gap between words and things, constituting their border.[30] Sense

is like an empty place that results from a constant inadequacy between the signifier and the signified.[31] Systems of meaning are always incomplete because sense is partly absent, like a phantom that enables the entire world.[32]

Deleuze uses the idea of series, based on the mathematical concept of recursion, to explain the cohering movement of sense.[33] He describes sense as a self-displacement: as the entity that enables meaning to manifest, it is constantly moving in its role as incorporeal glue.[34] Recursion is the enabling of what comes next in a related string of numbers (or of anything else, for example, words, colors or ideas). In his introduction to Gödel's theorem, R.B. Braithwaite explains,

> *Recursive definition enables every number in a recursively defined infinite sequence to be constructed according to a rule, so that a remark about the infinite sequence can be constructed as a remark about the rule of construction and not about a given infinite totality.*[35]

Recursion enables knowledge, experience or reality to snowball or to differ indefinitely, and it allows one to conceptualize this differing in terms of its "rule." In other words, the movement of a series can be understood as an expression of its rule of construction; the logic of something can be understood in terms of the way it moves, as opposed to its destiny in a given telos.

Sense links the variables in a series together, manifesting as the linking movement of the recursive. Deleuze explains,

> *Sense is always presupposed as soon as I begin to speak: I would not be able to begin without this presupposition. In other words, I never state the sense of what I am saying. But... I can always take the sense of what I say as the object of another proposition whose sense, in turn, I cannot state..*[36]

In other words, a series is like a chain: the beginning of each link is presupposed but unidentifiable until it is taken as the basis for the next link. This two-step process of first, the name that denotes something and second, the name that denotes the sense of the first name, is the minimal condition for the proliferation of meaning.[37] Making sense the object of the new proposition amounts to what Deleuze calls "taking care of the sense."[38] Therefore it is the care, and not any total outcome, that determines meaning.

Meaning's recursive movement is propelled by sense as it circulates, weaving signifiers and signifieds together, constituting their collective incompleteness. What is in excess in a given signifier is, Deleuze writes, an empty square, an always-moving place without an occupant. What is lacking, on the other hand, in the signified is an unknown occupant without a place - something always displaced. This excess and lack are two uneven sides of the same thing.[39] Systems of meaning are always incomplete because one side of sense is always absent from the other. It has a curious flip-flopping personality: its excess always refers to its own lack. This is how the meaningful world is constructed; it consists of ever-proliferating corporeal series, enabled by incorporeal, flip-flopping sense.

Recursion is relevant in a discussion of Turing's thought for two linked reasons: it clarifies the nature of his machine's movement and, as we will see, reveals a parallel between this movement and Turing's own dynamic as he contemplates difference. The theorem in which his machine is expressed (and which the machine itself expresses) is dependent on recursion to show how mathematics can never be exhausted by any finite procedure. His machine proves that any seemingly complete system will proliferate, producing more numbers that, while they are in excess of the system, are technically also part of the system. Their coming-into-existence simultaneously completes the apparently complete system, and extends the system further, poising it for the next recursive move as it anticipates its own unformed difference.

The paper tape on which Turing's machine inscribes its calculations and from which it derives its rules is the surface on which the machine's difference moves. While the strings of symbols inscribed on the tape are finite, they theoretically continue for infinity; while these symbols constitute a form of representation, they also demonstrate that representation's limit. A sensual transgression of the machine's own limit occurs on the tape's surface as the paper moves in and out of the machine's parts. While all three parts of the machine are essential for its functioning, the paper strip both holds the logic-as-movement for the machine itself and reveals its incompleteness as always recursive. While the strings of digits physically inscribed on the tape play out each computable number's logic-as-movement, the inscription of these digits leads to the thesis that none could be the final string, that none could

constitute the completing factor of their system (in this case, the imagined complete set of computable numbers): that each one's role is to make way for the next surprise.

In standing as an expression of its own recursion, the machine points to the difference that is excluded in totality: the constant proliferation that meaning could not function without. One-sided and endless, the paper tape is the surface this difference fleetingly frequents, in between inscribed digits, hovering over each decision, each symbol marked, erased or passed over. The machine refers to the pure difference that enables, indeed forces, its system to remain open, to forever reveal new numbers: it refers to its own difference. Of course, in a way, anything, as actual and finite, both refers to its difference and expresses its incompleteness and transitoryness. In this sense, everything is a performance indexing both its own imminent disappearance and its recurrent change. Deleuze cites the interlacing of this disappearance and newness of change when he says that sense always refers to its own lack, flip-flopping between an empty space without an occupant and an occupant without a space to inhabit.[40] Turing's machine differs from any other given thing that carries with it its own incompleteness because the machine purposefully plays difference's drama out on its surface- its mechanism points explicitly (as explicitly as is possible to point to something unlocatable) to the process through which meaning gets made. Thus the paper tape lights itself up as a surface of difference, like a motion-activated security light.

While Deleuze's constructive formulation of meaning helps to show the machine's

recursive movement, Foucault offers a contrasting theory of meaning's dissolution in "The Thought of the Outside" in 1966. Like Deleuze's logic of sense, Foucault's theory is built on Gödel's Incompleteness Theorem, and it offers two important elements for our project: it further clarifies the abstract machine's self-revealing movement as going toward absence and impossibility, and it relates this movement more explicitly to the action of thought than does Deleuze's elucidation of sense.[41] Gathering these two elements and adding them to the three we gained from Deleuze will enable us to make the jump from Turing's machine to Turing *himself*: to shift our focus from the machine's movement to the specifics of Turing's radical contemplation.

Foucault wants to set up a kind of thought that articulates its own end, one that can illuminate its dispersion at its own limit. He describes this, his thought's action, as

> *taking in only its invincible absence…*
> *in order to regain the space of its*
> *unfolding, the void serving as its site,*
> *the distance in which it is constituted*
> *and into which its immediate*
> *certainties slip the moment they*
> *are glimpsed.*[42]

In other words, he wants to practice a thought that immerses itself in its own absence and impossibility, writing, "What counts in men's thoughts is… the non-thought that systematizes them from the outset."[43] (Here one sees the similarity to Deleuze's formulation of sense as that crucial non-entity which enables the corporeal realm.) He calls this "the thought of the outside," describing it as using "language

about the outside of language, speech about the invisible side of words."[44] This discourse of the outside is "a listening less to what is articulated in language than to the void circulating between its words, to the murmur that is forever taking it apart."[45]

In the image of the outside as the void circulating between words, one sees clearly the link between Foucault's outside and Deleuze's formulation of sense as an always circulating, self-displacing empty place.[46] But here also one finds a seeming difference between them: while Deleuze emphasizes the constitutive role that sense plays in its weaving together of words and things, Foucault instead emphasizes the process of meaning coming undone. By reading Deleuze's formulation of sense alongside Foucault's outside, one lays bare the mixed pleasure and danger of meaning being made and unmade. Considering the contemporaneous constitution and dissolution of meaning, or the entering and falling of the pre-discursive into and out of discourse, reveals that the "next" of recursion is simultaneously a birth and death. Neither action could exist without the other, and they are in fact one and the same process: that of pure difference shifting. The constitution and dissolution of meaning occurs as difference breathes in and out or shifts in the night; this, difference's movement, manifests as meaning entering into and being destroyed at the limit of discourse.

The outside is like a mouth that both offers up the abstract machine's strings of numbers and swallows them in a single movement (except that it is not single, but rather pure and everywhere, although of course it is also nowhere). What the machine expresses is

that the infinite (or the machine's difference from itself, that which (it) is not and can never be) serves as the un-centered core of its system's meaning. This, the machine's expression, is crucially related to Deleuze and Foucault's theories of meaning because, in it, the machine acknowledges the outside as, to revisit the above quotation, "the void serving as its site." This realm of infinity is "the distance in which [the machine] is constituted…" and "into which its uncertainties slip the moment they are glimpsed…;" in other words, what the machine renders certain (i.e. the computable numbers) immediately slip into the outside at the precise moment that they are rendered.

Foucault explains one manifestation of what he calls "the pure, most naked experience of the outside"[47] as a kind of attraction.[48] Outlining this "attractive" contemplation of the outside will help to show how Turing enacts it. This attraction is, for Foucault, a contradictory voyaging toward the dissolving nothing that constitutes the outside. Foucault describes the dynamic of this attraction:

> *The outside cannot offer itself as a positive presence… but only as an absence that pulls as far away from itself as possible, receding into the sign it makes to draw one toward it, as though it were possible to reach it. Attraction… has nothing to offer but the infinite void that opens beneath the feet of the person it attracts, the indifference that greets him as if he were not there, a silence too insistent to be resisted and too ambiguous to be deciphered and definitively interpreted…*[49]

Thus attempting to follow or express the outside is a paradoxical experience. Turing's machine approaches that which can only offer itself "as an absence that pulls as far away from itself as possible," and when Foucault writes that this non-entity "[recedes] into the sign it makes to draw one toward it," we can see that even as the outside forms the machine's computable numbers, and even as we are drawn toward these signs, "as though it were possible to reach [them]," it dissolves into them and leaves us grasping the air, empty-handed. Foucault describes the attracting yet dissolving nature of a movement toward the outside as

> *going toward the light in negligence of shadow, until it is discovered that the light itself is only negligence, a pure outside equivalent to a darkness that disperses, like a blown-out candle, the negligent zeal it has attracted.*[50]

As well as standing in for the outside, Foucault's image of the dispersing blown out candle represents the movement of recursion illuminated by Turing's machine. In other words, Turing's articulation of incompleteness constitutes a thought of the outside: the machine indicates the infinitely expanding space between digits, sequences and things, a nonexistent space constitutive of all meaning, all discourse. The expansive void of the outside, located, for Foucault, in between words, is the abyss Turing conceptually tightrope walks the edge of by thinking it in "On Computable Numbers."

It is important to note carefully Foucault's emphasis of meaning's unraveling nature; stopping at the observation that Turing, like

Deleuze, formulates recursive movement as building the next link from the one before, would inhibit our consideration of Turing's contemplation, in that the consideration would be merely constructive, or unidirectional. In order to go further in our analysis, pure recursion must be considered to encompass both constitution and dissolution, because meaning depends on the simultaneity of these processes to maintain itself, ever poised, flickering at its own limit. The Gödelian notion that incompleteness lies at the core of any structure suggests that a given series of digits or, for example, images or musical notes is dependent on the yawning fact of its uncertainty for its meaning. The incompleteness both courses through a series as its links and surrounds that series as its limit; each aspect of this incompleteness constitutes the series in its very being. The outside is not simply outside, which is to say that it is not simply a gaping abyss that looms, waiting for one to die, outside the borders of being. It is precisely every being's immanent limit, the limit that we carry with us, which constitutes us as meaning beings. It is here, in Foucault's hinting at the outside's immanence to a system or being, that his debt to Gödel (and perhaps his similarity to Deleuze) is most evident. Thus in its grappling with incompleteness, Turing's thought of the outside teeters at this point of simultaneity where meaning comes together and falls apart.

The aim of this project is ultimately to map a link from the abstract machine to Turing himself: to expand from the machine's movement of meaning to Turing's own relation to the outside. In order to do this, it is necessary to zoom out from the restricted

notion of "thought" to that of "embodied thought." The theories outlined thus far have helped elucidate Turing's machine's position as simultaneously being constituted and dissolving at its own limit as strings of infinite numbers continue to reveal themselves. But to what degree can one apply this supposition regarding the movement of meaning to thinking, embodied human beings? The question now becomes: to what degree does Turing himself recur; to what degree is he coming apart? How is Turing, as an embodied thinker, always undone as he teeters at his own discursive limit? As we shall see, he not only expresses the machine's difference from itself, but in a kind of opening onto himself, he also references his own difference. What Turing finally accomplishes is a tweaking or antagonizing of his own immanent limit, marked by the simultaneity of constitution and dissolution, in order to reveal how meaning forms. However, to consider the recursive movement of a thinking human body such as Turing's, and to explicitly describe the relation of this movement to a human's immanent limit, a recon-ceptualization of the mind/body split is necessary.

Brian Massumi offers a fresh problematization of this routinely attacked split. His theory of embodment encompasses Foucault's notion of meaning's unraveling; carefully laying out Massumi's theory will help relate this unraveling motion to the embodied thinker's own situation in meaning. Massumi builds his argument on all three of Deleuze's concepts so far outlined: the immanent limit of sense, the recursion of series and the corporeal/incorporeal duality. Deleuze assigns the minded body to the realm of the corporeal, while this minded body's ungraspable,

cohering relation to itself belongs to the realm of incorporeality.[51] Massumi proceeds from this distinction by relating corporeality to abstraction in two ways. First, he radicalizes the relation by asking the question: What if the space of the body is really abstract?[52] What if the body is inseparable from dimensions of lived abstractness, dimensions that it envelops yet which enable its existence? He proposes that the body's ultimate innards are as abstract, as incorporeal, as the insides of and space between atoms or neurons: the atomic and subatomic particles that make up "matter" are separated by voids larger than they themselves are, and each particle's own insides are un-solid, virtual, abstract.[53] The space in which atoms relate to each other is infinitely divisible; another way of saying this is that there are immeasurable gaps between things, the ungraspable nature of which gaps allows them to gain meaning as things.

This suggestion of constitutive immeasurability is akin to the paradoxical proposition of infinite divisibility advanced by Zeno in his Dichotomy: that (1) between two sides of the same street there are infinitely many points, (2) thus the street is uncrossable because one could never reach an infinity of successive points in a finite time, yet (3) one is able to cross the street.[54] This abstract space between the two sides of Zeno's street is a virtual space of potential that enables the finite street to cohere as such.[55] Thus the body, Massumi posits, is,

> the holding-together of…
> virtual innards as they fold out,
> recursive-durationally, in the loopy
> present, in determinate form and
> configuration, always provisional
> because always in becoming.[56]

In other words, a minded body is a perpetual unfolding of itself. The abstract inside of the body is constantly becoming; it is constantly actualizing as graspable matter.

When Massumi uses the word "abstract" in this context, he is referring to habits, memories and tropisms: the recursive thought-perceptions that make up a person.[57] In this first sense, "abstract" means the relations that enable the body to cohere. The inside of the body does not consist only of intestines and bones, but also of the ungraspable relation of the body to itself. The body's recursion lies in its perpetual self-generation, which is enacted in its relation to itself. This self-relation is the "self-disjunctive coincidence of a thing's immediacy to its own variation,"[58] or the continuity of sameness and heterogeneity (or, Heidegger would say, identity and difference).[59] To clarify this notion of "self-disjunctive coincidence," we need only to recall the abstract machine's contemporaneous inhabitation of its current state and its next recursive move. Consequently the body is simultaneously itself and what it is becoming, as well as what it will have left behind. This is the body in series: its recursive self-differing movement from virtual to actual and back again.

In his second consideration of the body's relation to abstraction, Massumi formulates that there are two aspects to the body's self-conscious recursion: thought and perception are two poles of a single continuum. Perception, or feeling, is the anticipation of a next action in relation to the current and last one, while thought unfolds itself from feeling

into concrete possibilities.[60] Perception senses potential, while thought is a systematic simplification of potential into possibility: thought turns anticipation into predictability. Abstraction is a separating out of thought from perception; the ability to abstract distinguishes human intelligence.[61] But abstraction paradoxically also intensifies perception, because "objectivity" makes more possibilities more anticipatable, thus more accessible as "nexts" or "mores." A perception's generalization or systematization returns to it as an augmentation of its singular multiplicity; its loss returns in the form of a gain.[62]

The inextricability of experience and extension into possibility ensures that every perception is also an analysis, and every concept that is grasped is also felt. Sensation is the name Massumi gives to a limit of experience that is immanent to every step of thought-perception along the continuum (his debt to Deleuze's formulation of sense as a linking subsistence is most evident here).[63] Sensation is the point of conversion where perception unfolds into thought and thought infolds into perception. It is "the registering of the multiplicity of potential connections in the singularity of a connection actually under way" (again, one may recall the abstract machine, poised in anticipation of its next indication of incompleteness)[64] Thanks to this pure sense of multiplicity over singularity, the thought-perception continuum operates recursively: intelligence itself consists of the reality of an excess over the actual, which means that there is always a "next" or a "more." A given moment extends beyond itself in a way that is both thought and felt, anticipated, in the form of a yearning or tending.[65]

In the first sense of the word "abstract," then, Massumi means the virtual: Deleuze's incorporeal realm. This abstract realm can also be called the outside. Abstract refers to the infinitely divisible space between things, to a thing's relation to itself. When Massumi says that the inside of the body is really abstract, he doesn't mean that the center is abstract, but rather that there is neither center nor "complete" body; instead, the body in series unfolds *because of* the infinite non-substance that courses through it. This "coursing" doesn't actually exist: instead, like Gödel's incompleteness, Turing's unprovability, Deleuze's sense and Foucault's outside, it subsists, thus enabling what we think of, and live, as a minded body. In the second sense of the word "abstract," Massumi is talking about thought activity: conceptualization, generalization, and problematization. In the second sense, abstraction simplifies things, charting them out.

The first kind of abstraction, as pure virtuality, is the immanent limit of the second kind, as the extension of embodied thought. The incorporeality of sense can be thought of as pure meaning that follows thought's recursion, threading together perception and thought. But while it is always subsistent, it is also unlocatable: it never actualizes as itself, as pure sensation. Because of their perpetual folding into each other, thought is always sensual and feeling always conceptual; although thought both extends away from perception and links back to it, always passing through the intensity of sensation, thought can never actually access that enabling sensation (notice here the similarity to Foucault's paradoxical attraction). Thought's role in the recursive "next" of intelligence is inseparable from embodied

perception; sensation, as pure abstractness, is what binds thought and embodiment together as inseparable.

This embodied movement of pure abstractness further indicates that Foucault's outside is as much within us as outside us. The theoretical abyss that constitutes Foucault's outside is immanent to the self; it constitutes the self by constantly displacing itself, or as both Deleuze and Foucault put it, "circulating." While Turing's machine references the outside from which it enters into discourse and into which its digits plunge as they recur, his thought itself functions as a macrocosm of the machine, flickering at the point between the self and its limit, at that point of simultaneity where the outside violently stitches together and meticulously pulls apart meaning. Massumi's limit of pure sensation folds in and out as a single surface, constituting meaning as it moves, just as the outside constitutes and dissolves discourse in a continual movement of making things mean. This immanent outside is one's difference from oneself, the difference that Deleuze and Massumi have elaborated as the un-centered core of meaning.

From this un-centered core, Turing folds out into himself, into series, into thought. Massumi's supposition that intelligence is the reality of an excess over the actual further indicates that Turing's abstract machine's movement echoes the nature of thought, in that the machine is constantly posed, in its singularity, at a junction of multiplicity. Turing's mathematical activities strain toward pure meaning (or to use Massumi's word, sensation), but via the recursive movement so crucial to his proof, he simultaneously marks as evident the current, inevitable absence of this cohering entity. This unfolding of recursion is at the same time an "out-folding," or a coming apart. In this way, Turing and his machine are constantly disintegrating at their respective limits: their constitution as systems of meaning ensures this. Thus the idea of intelligence as recursion, as an excess over the actual of any given moment, idea or image, illuminates the nature of Turing's thought to be a straining movement toward that abstractness which constitutes and courses through it, but can never be accessed.

Therefore if, following Massumi, the inside of Turing's body is really abstract, then this straining that constitutes his most extensively abstract activities is also a highly intensive movement, in two ways. First, his thought activities in mathematics fuel the folding of new possibilities back into perception, which in turn feels out pending potential before delivering it back to thought to sort out. The thought extension that folds out from the a-center of Turing's body runs seamlessly into and constitutes the abstract realm he studies, like a Möbius strip made from thought. Secondly, Turing strains, through his machine, toward the abstract realm of the outside. Because this realm is unlocatable, his is an a-directional straining. In his thought-extension, he touches upon the virtuality that makes the world have meaning, but simultaneously reaches for both his own virtual inners and their holding-together, the pure abstractness of his own self-relation.

This straining movement characterizes the suffering of a thought that approaches difference. Turing realizes that any system intended to catalog every element of that system will inevitably fail, because other

elements will always be revealed. Therefore what Turing's theorem in fact expresses is the acute inadequacy of expression itself to account for a thing's logic. Expression's failure is precisely that it is an account: a formulated representation of movement-as-logic (the very idea of movement-as-logic is a static representation). The closest Turing's machine comes to expressing the suffering failure of thought is that it echoes the incompleteness of the world in its own inadequacy to grab hold of the enabling entity behind meaning's constitutive process. Even the expression of a thing's movement, which emphasizes its change, is a cataloguing of that movement. In considering the machine's expression of its own inadequacy, one essentially witnesses expression shooting itself in the foot, which is the best it can do, under the circumstances (the best, at least, from the point of view of a philosophy approaching difference), because this self-mutilating act gives way to the refutation of totality, the fragmentation of representation and the proliferation of absolutes. This is the closest one comes to being able to think difference: a weak echo of inherent incompleteness is, so far, the strongest philosophical tool. Turing's straining is akin to what James Bernauer calls Foucault's "cry of spirit"- his expression of a desire to inhabit the limit of thought in order to think difference.[66] What expression needs is a way to gallop alongside the proliferation of sense or the disintegration of the outside while retaining self-consciousness, but this is practically impossible, so one instead holds on for dear life to the (representational) idea of every thing and system's perpetual role as fragment.

This, Turing's radical form of contemplation, constitutes, as do Gödel, Deleuze, Foucault and Massumi's theories, a pleasurable but dangerous kind of "playing with yourself": a toying with one's immanent limit in order to provoke oneself into going further. This "further" is a voyage of Foucauldian attraction into one's abstract depthlessness (rather than plunging into one's depth, it is a discovering of the most pure, unfolded patch of the outside's surface). It is in this topological sense that the question of thinking difference is a sensuous epistemological question: thinking is always sensuous to the extent that it is in constant contact with its own surface, the surface that ripples as discourse is constituted as such. This notion of "its own surface" evokes the abstract machine's endless tape that indicates its own incompleteness. Further, it recalls the thought extension that runs seamlessly from the a-center of Turing's body into the abstract realm he studies, forming a continual surface of thought. Explicitly trying to think difference simultaneously folds this surface further and straightens it out in order to see the outside: it is a flurried, multiplicitous movement in both directions at once, an attempted coming to rest in pure movement. Searching for one's own constitutive incompleteness can pull the thinking self apart: thought never quite reaches the pure orgasm of sensation, since in order to be thought it must either be about to pass or have just passed through the outside. For thought to reach its climax, for it to reach it and to rest there, would be to inhabit death. In this sense thought is always a tease: always promising a climax but fundamentally unable to follow through. Practicing a philosophy of difference is pleasurable precisely because it borders on danger: the danger of self-effacement, of (becoming) nothing. To think the outside is to connect to

one's own incompleteness; in straining toward this "silence too insistent to be resisted and too ambiguous to be deciphered," one searches for one's own obliteration.

Thus Turing's machine is a mathematical expression of the way in which the self is always torn between her own constitution and dissolution. By reading Turing and his machine through Deleuze, Foucault and Massumi's theories of meaning, it becomes evident that it is precisely this torn-ness that makes meaning possible. The subject and action of Turing's radical contemplation is the way in which, as a system of meaning himself, he carries infinity with him, a barely perceptible, potentially debilitating, constitutive feature of his being. This means that as far as Turing can think, pure abstraction is just beyond him, enveloping him and bordering the furthest he can reach. His work in pure mathematics attempts to follow, and is followed at every turn by, its own incompleteness. This, Turing's movement of following or "attracting," communicates an intimate link between meaning, birth and death: meaning as a sort of dance around the outside, or the outside as pure movement, pure internal sensation, and meaning as its residue. For this volatile purity is also located inside Turing himself: it is his relation to himself. This, finally, is Turing's mathematical body: a body inextricable from its mindedness, folding out from and toward pure abstraction, in constant struggle with its own difference from itself.

Afterward

Rather than simply treating the theme of anti-totality, I have tried in this project to take the recursive thematic on as methodology, by considering Turing's own rule of construction, as opposed to expressing what Turing and his work might mean in terms of their coming to rest in a final goal. Besides the logic that Massumi offers above, I would like to emphasize that Turing's rule of construction consists, crucially, in his antagonizing of his own limit in order to execute his hermeneutics. Because of this self-antagonizing, Turing and his work remain recursively poised, in that they intrinsically anticipate further and further modification, of which this project is only one example. The question I must now ask myself turns out to be, Assuming that I have succeeded in realizing this recursive methodological position, how have I constructed my remark about Turing's infinite sequence? In considering this, I recall Deleuze's assertion that the process by which one expresses the meaning of one's last sentence in the current one, thereby linking them, amounts to "taking care of the sense." Following this remark, I position myself with Turing as I endeavor to enact this care on several levels, not only through the current project but also in a more mundane, everyday sort of caring, a mode of living thoughtfully that mimics his. Both modes of care are dependent on opposition to the notion of a "finished" work: I do not intend to present Turing's work as a completed oeuvre, or, indeed, to deem my own project's state as finished. Instead, I want to think and write about openness: the continually open state of a system, Turing's opening onto his own limit as he thinks the latter, and my own opening onto myself as I contemplate all three. In this project, I have tried to trace these links in order to explore what it means to consciously inhabit that junction of simultaneity at which one is always recursively poised, the one that

Turing's machine illustrates so clearly. In tracing these links, one discovers a preliminary position from which to define Deleuze's "care" by consciously enacting it.

[1] Alan Turing, "On Computable Numbers, with an application to the *Entscheidungsproblem*" (Proc. London Mathematical Society: 2, 42: 1937), 230-265/http://www.abelard.org/turpap2/tp2-ie.asp.

[2] Andrew Hodges, *Alan Turing: The Enigma* (London: Vintage: 1992), 90-110.

[3] Kurt Gödel, *On Formally Undecidable Propositions of Principia Mathematica and Related Systems*, trans. B. Meltzer (New York: Dover: 1992) (1931), 32.

[4] Gilles Deleuze, *The Logic of Sense*, trans. Constantin V. Boundas (London: Continuum: 1990/1969).

[5] Michel Foucault, "The Thought of the Outside," in *Essential Works of Foucault 1954-1984, Volume 2: Aesthetics*, ed. James [5] D. Faubion, essay trans. Brian Massumi (London: Penguin: 1998/1966), 147-169.

[6] Brian Massumi, *Parables For the Virtual: Movement, Affect, Sensation* (Durham, North Carolina: Duke: 2002), 93.

[7] R. B. Braithwaite, "Introduction" to *Undecidable*, 7.

[8] *Enigma*, 91.

[9] *Enigma*, 91.

[10] David Foster Wallace, *Everything and More: A Compact History of Infinity* (New York: Norton: 2003), 282-85.

[11] "Introduction" to *Undecidable*, 32.

[12] "Introduction" to *Undecidable*, 7.

[13] *Enigma*, 93.

[14] Alan Turing, "Computing Machinery and Intelligence." (Mind: LIX, 236: 1950)/http://www.abelard.org/turpap/turpap.htm.

[15] "Computable Numbers," 231.

[16] *Enigma*, 100.

[17] *Enigma*, 100.

[18] *Enigma*, 100.

[19] *Enigma*, 100.

[20] *Enigma*, 101.

[21] *Everything*, 246-257.

[22] *Enigma*, 101.

[23] Here I mean that any finite system is seemingly complete until its irrational extension is revealed.

[24] *Logic*, 19.

[25] *Logic*, 5.

[26] *Logic*, 21.

[27] *Logic*, 51.

[28] *Logic*, 3.

[29] *Logic*, 48-49.

[30] *Logic*, 22.

[31] *Logic*, 51.

[32] *Logic*, 41.

[33] *Logic*, 35.

[34] *Logic*, 35.

[35] "Introduction" to *Undecidable*, 12.

[36] *Logic*, 28.

[37] *Logic*, 29.

[38] *Logic*, 31.

[39] *Logic*, 49-50.

[40] *Logic*, 49-50.

[41] as represented here.

[42] "Outside," 150.

[43] James W. Bernauer, *Michel Foucault's Force of Flight: Toward An Ethics For Thought* (New York: Humanity Books: 1990), 56.

[44] "Outside," 154.

[45] "Outside," 154.

[46] *Logic*, 51.

[47] "Outside," 154.

[48] "Outside," 151.

[49] "Outside," 155.

[50] "Outside," 157.

[51] Deleuze does not state this explicitly in *Logic*. However, through his elaboration of sense as an enabling relation, Deleuze implies that the system of the human body, like all other systems, gains meaning only through sense's incorporeal coherence. Therefore the human body's relation to itself subsists as the incorporeal.

[52] *Parables*, 177.

[53] *Parables*, 177.

[54] *Everything*, 47-59.

[55] This last sentence is not Zeno's precise reading but my reading of him. It should be noted that I am not attempting an Aristotelian reading of Zeno by writing the infinite off as merely possible or potential. Instead, I want to acknowledge this potential as a constitutive abstractness.

[56] *Parables*, 205.

[57] *Parables*, 205.
[58] *Parables*, 8.
[59] Martin Heidegger, Identity and Difference trans. Joan Staumbaugh (New York: Harper & Row: 1969), 17.
[60] *Parables*, 91.

[61] *Parables*, 92.
[62] *Parables*, 93.
[63] *Parables*, 92-3.
[64] *Parables*, 93.
[65] *Parables*, 92-3.
[66] *Force of Flight*, 182.

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