Unweaving Weaver from Contemporary Critiques of Machine Translation[1]

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Abstract:
Recent trends in media theory have reconceived of cultural production and exchange in terms of 'data processing' and translation. Material practices by which data—linguistic or otherwise—are moved through media apparati and networks are characterized by process, not meaning, and increasingly conceived as relying on both human and machine agents. Despite enthusiasm in media theoretical corners for rethinking the materiality of language as something that necessarily includes machinic treatments, critical media-textual analyses exhibit a strong aversion to Machine Translation (MT) techniques and technology. In this domain, it is Warren Weaver's solo memorandum, "Translation" (1949), that serves as founding document; it proposes that cryptographic techniques, along with Claude Shannon's probabilistic and statistical methods, be used for translation. The memo also serves as critical focal point for skepticism with regard to the automatic translation of natural languages. is often held up as evidence of the folly and ethical dubiousness involved in the development of specifically Machine Translation (MT) techniques and technology. This paper reconsiders these criticisms in light of media theoretical receptiveness to information theory, its attention to the materiality of language, and with the recognition that Weaver's 60 year old theoretical postulations have been recently realized with dramatic practical results. It suggests that theoretical convergences between media studies and translation studies have rendered oft-cited statements from Weaver's memorandum unconvincing as a case against MT.

Keywords:
materiality, machine translation, Warren Weaver, media theory, interdisciplinarity

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Leave it to Weaver

As those who follow debates and discussions around Machine Translation (MT) well know, most accounts of the technology cite the following lines somewhere:

> When I look at an article in Russian, I say: 'This is really written in English, but it has been coded in some strange symbols. I will now proceed to decode'. (Weaver 2003:14)

The notorious quotation was penned by Warren Weaver, then-Director of the Natural Sciences Division of the Rockefeller Foundation, in a 1949 Memorandum entitled "Translation," now largely regarded as the founding document of modern MT. In what follows, we will consider why, in certain disciplinary corners, this quotation has come to serve as shorthand for criticism of MT. While critiques in which Weaver's quote features endeavour to equate his vision for MT with a misguided search for an impossibly perfect "universal" language, to what extent do Weaver's preliminary proposals actually correlate with such a search? Furthermore, are the theoretical and analytical trajectories that lead to the contemplation of such questions—concern for the materiality of language—actually reflected in the conclusions? Or are other tendencies and competing concerns more forcefully driving these analyses?

Materiality: From Interpretation to Language Processing

A number of recent currents in the study of culture and communication have shifted their attention away from textuality and interpretation and towards mediality and the material; broadly speaking, cultural analysis has experienced a "material turn." As Winthrop-Young & Wutz note in the Introduction to Friedrich Kittler's influential *Gramophone, Film, Typewriter*, "a widespread interest cutting across all disciplinary boundaries started to focus on the materialities of communication" (1999: xiii). The primary focus has become the technologies, the machines, and the social and institutional networks which shape, direct and process various forms of cultural expression and exchange, rather than the hermeneutic interpretation of texts. Kittler's work in particular demonstrates how the analysis of literary forms is actually an engagement with the history of data processing, storage and transmission, and has inspired newfound interest and alternate approaches to interrogating the material aspects and networks of cultural

production—much of which might now, in Kittlerian terms, be considered a matter of 'language processing'.[2]

Scholars who have engaged with this new material turn, but whose objects of focus are still textual in that they involve linguistic symbolic expression, have thus been grappling (to various extents) with the materiality of language. The general premise, which is hardly debatable, is that meanings are specific to the physical forms and material channels by which messages are inscribed and transmitted, insofar as they are a product of these forms and channels.[3] Despite efforts to establish continuity between the symbolic and the material realms (rather than privileging one over the other), analyses of forms and processes involving language—such as translation—find themselves at an awkward theoretical and methodological juncture. Scholars have stepped back from language, particularly in its post-structural incarnation with its endless play of signifiers, in order to anchor themselves within the study of material forms. However, as Celeste Condit has noted in her discussion of the materiality of rhetoric, this move is sometimes more than a step back, but rather, amounts to a "'common-sense' dismissal of language by many people on the grounds that it is immaterial—mere words, nothing but air vibrating, the opposite of 'deeds' or the real" (1999: 326). This dismissal can be said to extend to the way translation figures into this material turn in media-cultural theory. While translation has acquired conceptual prominence in the two most influential materialist media theories (e.g. Kittler's materialities of communication, also referred to as "information materialism" and Marshall McLuhan's newly-revived brand of media materialism), the version of translation so adopted is vague and metaphorical. Translation, in Kittler's and McLuhan's media frameworks, is more akin to generalized data flow and is of a universalist character, characterized as a form of

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[2] In addition to Gramophone, Film, Typewriter, see Kittler's Discourse Networks 1800/1900 (Stanford: Stanford University Press, 1990).

[3] Though this idea was not always so instinctive. Chartier (2001: 181) explains that the traditional *dissociation* of the material production of texts and the texts they transmit was fuelled by "the permanence of the opposition between the purity of the idea and its corruption by matter" The recognition of the materiality of language was largely inspired by Jacques Derrida's deconstructionist critique of logocentrism, as elaborated in Of Grammatology (1976). He demonstrated that the division between 'matter' and 'idea' relies on a 'metaphysics of presence,' the belief that writing denotes an absence and is a 'corrupt double' (mere representation, exteriorization) of speech—original, interior, present—and that this purity of thought, meaning and truth is thus attainable through language. Derrida's deconstruction of the sign demonstrates that writing and speech (matter and meaning), in fact, constitute the condition of possibility for one another; both are, at one and the same time, interior and exterior, present and absent.

"universal consciousness" (McLuhan) or a process of "universal translatability" (Kittler). Emerging as an idealized and continuous feedback loop suggestive of pure, unbroken intermediality, this view of translation is coincident with the rise of new (electronic) programmable and networked media, whose language of operation, significantly, is "universal" digital code.

At the same time, the emphasis on symbolic inscriptive forms themselves as media of communication—from writing, to programming code, to musical notation, to scientific imaging—has emphasized the extent to which languages are rendered meaningful through systematization, regularization and regulation, much like any domain of cultural activity. And much of the work done in media and cultural studies that emphasizes this fact has strong counterparts in translation studies. For instance, studies by Lydia Liu (1999[4]), Lawrence Venuti (1995) and Theo Hermans (2007) emphasize the historical and cultural conditions that precipitated particular translations and ways of translating, foregrounding the fact that equivalence is always produced, not natural, or given.

The relationship between 'materiality' and the practice of translation is thus an intriguing one, particularly when it comes to attitudes regarding translation performed automatically by computer, or with digitally-enabled assistance, as these emerge in theoretical and critical work across disciplines. In the humanities, by and large, the drive to develop Machine Translation (MT) technology is regarded as just one more misstep in the parade of doomed linguistic projects littering the history of human language since the alleged Babelian 'confusion of tongues'. Read as an audacious search for antidotes to linguistic (and semiotic) multiplicity, the move towards mechanization suggests universalist and absolutist aspirations. Umberto Eco sums it up well in reminding us that "the story of the search for the perfect language is the story of a dream and a series of failures" (1995: 19).

It is with this context in mind that we will begin to consider the mobilization of 'the Weaver quote,' in scholarly contexts that are shaped by and building upon this constellation of theoretical concerns. We will consider what happens when thinking about language as material collides with translational technique, when translation-as-language-processing is analyzed together with the networked and programmable software, machinery, institutional and corporate

[4] See especially Liu's Introduction, "The Question of Meaning-Value in the Political Economy of the Sign."

systems designed to perform it. In doing so, we will consider the ways *types of* language and *kinds of* translation practices might permit or resist 'material' readings. In other words, we will contemplate what might become—theoretically speaking—of the hard-won recognition of the visibility, heterogeneity and historical specificity of translational practice when, as Kittler emphasizes, "all data streams flow into a state *n* of Turing's universal machine" (1999: 19).

Memorandum: The Making Of

The Memorandum is largely a product of Weaver's wartime activities and collaborations. Leaving his Rockefeller post to dedicate himself to US defense initiatives, Weaver offered his services to Vannevar Bush, head of the National Defense Research Committee (NDRC).[5] Bush first placed him in charge of the NDRC fire-control section, which was working on what Bush referred to as the 'antiaircraft problem,' to which mathematician *cum* cybernetician, Norbert Wiener, was a contributor. Weaver was then transferred in 1942 to oversee the newly developed Applied Mathematics Panel (Hutchins 2000: 17), which, consisting of several hundred mathematicians set up in groups at ten US universities (Rees 1987: 517), allowed Weaver to make the acquaintance of many mathematicians who would become influential in computer and related developments. Weaver's work for the NDRC also led to his acquaintance with Claude Shannon of Bell Labs—the company was one of the research groups contracted to work on the gun control issue, telephone communication, aircraft movement and ballistics by this time being regarded as analogous matters of signal manipulation and control. While the electronic digital computer's number crunching applicability to math and physics problems was in evidence at war's end, the potential for non-numerical applications was less obvious. Hutchins pinpoints the earliest suggestions that computer technology be enlisted in the translation of natural languages in 1947, in Weaver's discussions with British engineer and physicist Andrew D. Booth and in correspondence with Wiener.[6] These discussions culminated in a Memorandum by Weaver, written on July 15, 1949, and sent to 200 acquaintances for whom MT may have been of some interest. In it, Weaver advances the notion that cryptographic techniques, which had proven so

[5] The NDRC was an organization set up in 1940 at Bush's urging to direct and coordinate scientific research on matters related to US military defense.

[6] Hutchins (1986: 26) also notes that computer pioneer Alan Turing, in a report written for the National Physical Laboratory (1948) on potential uses for computers in which 'intelligence' would be demonstrated, listed "The learning of languages" and "Translation of languages", in addition to (and yet separate from) "Cryptography."

successful in the decryption of intercepted Axis messages during WWII, be usefully applied to the translation of texts. Hutchins speculates that the Memorandum would have been the first exposure, for the bulk of recipients, to the notion of using computers as translators (Hutchins 1986: 28).

After opening with a caveat, in which Weaver (or rather, "W.W."—Weaver refers to himself in the third person throughout the document) admits that the ideas advanced in the Memorandum "will surely be incomplete and naïve, and may well be patently silly to an expert in the field—for the author is certainly not such" (Weaver 2000: 13), he provides some background as to how he had arrived at the conception of translation as a task that could be handled in a computerized manner. He includes an excerpt from a letter he had written on March 4, 1947, to Wiener, "as a linguist and expert on computers" (ibid), about the potential application of cryptographic techniques to problems of translation:

> Recognizing fully, even though necessarily vaguely, the semantic difficulties because of multiple meanings, etc., I have wondered if it were unthinkable to design a computer which would translate. Even if it would translate only scientific material (where the semantic difficulties are very notably less), and even if it did produce an inelegant (but intelligible) result, it would seem to me worth while…(ibid)

A passage from Wiener's response is also cited, in which the mathematician remains skeptical[7] about the proposition, namely since "the boundaries of words in different languages are too vague and the emotional and international connotations are too extensive to make any quasi mechanical translation scheme very hopeful" (Weaver 2000: 14). While Wiener's disinterest is deemed "exceedingly discouraging" (ibid: 15), it does not deter Weaver, who goes on to note serious consideration of computerized translation elsewhere, namely preliminary work on mechanical dictionaries by Andrew Booth and Richard H. Richens in the UK. Still, Weaver concludes the introductory section capitulating about the limited usefulness of a translation procedure that relies upon one-to-one word correspondence. At the same time, he offers up "technical writing" and "technical material" as more "straightforward and simple in style," a

[7] It should be noted that contemporary histories of cybernetics research emphasize Wiener's humanism and advocacy of scientific caution, evidenced by his refusal to accept military funding for his work after WWII (see, for example, Noah Wardrip-Fruin & Nick Montfort, *The New Media Reader* (Cambridge: MIT Press, 2003), 65) and his outspoken proclamations on scientists' social responsibility. See "A Scientist Rebels," *The Atlantic*, January, 1947.

genre potentially more conducive to translation using mechanical means (ibid). He closes with an example of writing on mathematics, a context in which "one can very nearly say that each word […] has one and only one meaning" (ibid).

Weaver uses the remainder of the brief (3573-word) Memorandum to forward four related ideas to support the idea that computers be considered for use in translation tasks. First, the problem of ambiguity, of multiple meanings, might be solved by looking at words in context, examining words "through an opaque mask with a hole in it" (ibid), lengthening the slit to *'N'* words to either side of the one in question to better select from a range of possible meanings. Second, Weaver draws a comparison between formal characteristics within language and their treatment by machines that operate according to recursive loops in making deductions. Here, Weaver admits that there are alogical aspects to language (he lists "intuitive sense of style" and "emotional content"), still concluding that translation is "formally solvable" he suggests, "insofar as written language is an expression of logical character" (ibid: 16).

The third aspect relates specifically to the suggestion that word and letter frequencies and statistical methods[8] be applied to the problem of translation. Weaver again alludes to a foreign text as an encoding of an English one, though the exemplar has now switched from Russian to Chinese.[9] In line with Claude Shannon's then recently elaborated information theory, a "perfect" translation would be unattainable; Weaver emphasizes instead the attainability of "processes" containing a certain, presumably limited, *'x'* percent error (ibid). Weaver's fourth conviction, and, in his view, the one with the most potential,[10] is that such investigations may help to uncover linguistic universals, perhaps bypassing the problem of translating between individual languages, and instead, moving through some basic, underlying universal form. Here, Weaver relies on metaphor to illustrate his point, individual languages represented by closed towers,

[8] A mathematician himself, Weaver had success with the 1963 publication of *Lady Luck: The Theory of Probability* (Garden City, NY: Doubleday), which focused on his specialization, probability theory.

[9] This quote is not cited with as much frequency as the Russian quote, is more tentative and seems indicative of a translational "hypothesis": "*it is very tempting* to say that a book written in Chinese is simply a book written in English which was coded into the "Chinese code." If we have useful methods for solving almost any cryptographic problem, may it not be that *with proper interpretation* we already have useful methods for translation?" (ibid, italics mine.)

[10] Indeed, Weaver feels that the application of cryptographic methods to translation, understood not just as a statistical operation, but as an integration of statistics with semantics, is related to the fact that translation procedures rely on universals, in Weaver's words, "that translation make deep use of language invariants" (ibid).

communication between them amounting to shouting voices back and forth between the tower tops. The notion there might be a "common base of human communication" that could be fruitfully explored is represented by a "great open basement, common to all the towers" (ibid: 17).

Dream Weaver

It's interesting how differently the quotation is leveraged in opposite corners of the academy. When the quotation is cited by computational linguists, computer scientists or statisticians, it is often presented unqualified; evidence of a "eureka" moment signaling a new way of approaching an old problem. In fact, it is often claimed that the shift to statistical techniques is responsible for both the recent dramatic explosion in MT development and radical improvements in output quality. These circumstances are connected to Weaver's 60-year-old forecast in terms that interpret the move towards statistical methods as long overdue. For instance, in an influential paper on early statistical translation models, computational linguists Peter F. Brown *et al.* start out noting that Weaver's initial proposals had been "abandoned for philosophical and theoretical reasons," but go on to connect this abandonment of research to the lack of computing power at that time. While any such approach was previously "doomed to computational starvation", now they insist that "the fruitful application of statistical methods to the study of machine translation is within the computational grasp of anyone with a well-equipped work station" (1993: 264). Computational linguist Kevin Knight acknowledges in a seminar abstract that "the 1990s actually saw Weaver's language translation idea picked up." "Since then," he asserts, "there has been tremendous progress in statistical language translation".[11]

And, in the other corner, in studies from the humanities, oftentimes those that emerge at the interdisciplinary interstices of media studies, literary criticism, cultural studies and translation studies, this quotation has been mobilized in three other ways. First, the link to Weaver exposes the more sinister aspects of early MT research—the fact that its conceptual and operational components were military in origin and that early development enjoyed elite establishment funding and support. Second, the statement is ethnocentric and Anglocentric; the implication that a text in a foreign tongue be approached as if it were a variety of English

[11] The abstract can be found at http://www.speech.sri.com/seminars/talks-2008.html. The talk, entitled "Language Translation as Code-Breaking," was to be delivered on August 12, 2008, at SRI's Speech Technology and Research (STAR) Laboratory Seminar Series.

attaches the objectives of MT to the project of Western imperialism. Third, the statement itself reveals the unethical and idealist folly that continues to permit the advancement of the cryptographic analogy for translation and linguistic exchange. Taken together, the idea that MT might support linguistic diversity in practical, and admittedly imperfect, ways is eclipsed by these other implications. Instead, through Weaver's words, connections and legacy, these characteristics have been 'written into' both the history and the technological infrastructure of automated translation systems and protocols.

One of the most contemptuous of Weaver's stated proposals is cultural critic and digital artist Warren Sack. "Perhaps, fifty years later," he states, "it's time to admit Weaver's folly: translation is not a task of decryption" (2005: 10). He thinks MT is a 'pseudo' problem, a waste of time, money and effort, a technological 'fix' that relies on misguided propositions about translation and communication. Sack has collaborated with Sawad Brooks to produce an online art project entitled *Translation Map* (2003), which visualizes the translation process, depicting it as a collaborative means of achieving shared understanding. The program invites users to work together, transmitting messages from person to person and language to language, usefully emphasizing the act of re-writing, the crossing of borders and interpersonal networks, and revealing disjunctures between linguistic and geographical territories as they relate to translation. Overall, however, the project seems more critical of specific ways the Internet is conceived of and used. Sack writes that "computers and networks should be used to facilitate collaborative work between people, rather than as a magic black box that Weaver's translation-as-decoding problem implies" (2005: 10). This implication makes quite a leap. Not only did computer networking not exist in Weaver's time, but Weaver speaks of translation techniques, not proxies. Furthermore, computers and networks *are* used to facilitate collaborative work between people, a great deal of which involves research into the kinds of ideas that Weaver tentatively, even humbly, articulated 60 years ago.

Sack and Brooks' attempt to link Weaver's early proposals to their distaste for present-day networking that values speed, transparency and efficiency is questionable on another level as well. On the *Translation Map* website, Sack invites users to test the automatic translation services available on the web: the results of "half a century of sustained work on Weaver's translation-as-decoding problem".[12] Not only is Sack mistaken in assuming a continuity in MT

[12] See http://translationmap.walkerart.org/how.html.

research over these fifty intervening years, but his reliance on what is assumed to be a dearth of progress achieved in MT to demonstrate Weaver's alleged misstep severely weakens the argument. Not only would different, that is, increasingly transparent and therefore better, results suggest Weaver was actually right… but poor results also achieve some of what Sack & Brooks have set out to demonstrate in their own project—'bad' MT actually provides an excellent visual representation of the complexity of the translation process.

Rita Raley provides a much more nuanced and influential exploration of Weaver's role and early proposals as they are reflected in the ongoing development of MT and communications technologies. Still, she exaggerates Weaver's plans for MT, claiming he envisioned "a super-computer that would apply the cryptographic techniques acquired during WWII to *all* translation" (2003: 291). For her, MT—in Weaver's day and in ours—represents a reduction in the value of language—the choice is deciding whether MT fosters a "new utilitarianism" or imposes the same functionalist logic that continues to maintain the imagined scope and false uniformity of a much-hyped Global English (Raley 2003: 293). Such concerns, however, seem somewhat out of line with media-cultural criticism on the material nature of language, which can no longer assume that value lies somewhere in language, understood as an abstract category; rather, it's necessary to uncover the mechanisms by which inscriptions—of specific types, in certain genres and produced by certain people—*come to be assigned and have* value.

The notion that MT could be of practical benefit is read as a negative attribute; Raley characterizes the scientifically and communicatively oriented uses that Weaver posits as potential benefits for the MT project as "utilitarian." She then draws connections between these aims and the corporate, technocratic and imperialist-minded structures that were, and are, invested in supporting them. These are the same forces that are exerting technological control in their spread and maintenance of English linguistic dominance and other technological means of linguistic and communicational standardization. For example, Weaver's Memorandum suggests that language modeling work similar to that done in the 1930s by Ogden & Richards in developing BASIC, a simplified English used for international ESL instruction, would be necessary before embarking on any mechanized translation work. Raley responds to Weaver's call for linguistic research by reframing BASIC English and MT as analogous projects with equivalent functionalist and universalist goals (2003: 294-295).

In his Memorandum and in other writings, Weaver makes sure to set apart the poetic and

aesthetic qualities of human linguistic expression as those that would never be subject to machine processing or control, counting himself among the reasonable in his belief that "no reasonable person thinks that a machine translation can ever achieve elegance and style" (1955: vii). However, Raley criticizes this imposition of a "functional dichotomy" between "basic meaning and instrumental communicative action, on the one hand, and the poetic, literary, or figurative, on the other" (2003: 295). It's unclear how Raley would have rather had Weaver handle these reservations regarding the capacity for MT to deal with literary works. In accordance with approaches to language that recognize its materiality, Weaver correlates specific genres of writing to equally particular translational treatments, which succeeds in emphasizing the situated and historicized nature of different varieties of cultural expression. Raley's reading, however, which uncharacteristically ignores these specificities within translation and within language, implies that the former be conceived of as a single, monolithic task, and the latter as a monumental, indivisible entity.

In any case, this functional dichotomy, inherent in MT now and since its inception, is then used to make a metaphorical connection between automated linguistic translation and any programmable data exchange. Her key concern is to blend the history of machine translation, as envisioned by Weaver, with a much broader understanding of translation-by-machine that positions the computer as both dominant writing tool and cultural clearinghouse of the digital age. Her main anxiety relates to ways in which language, as cultural knowledge, is made manipulable for easy digital processing. A disdain for general "functionality," the "communicative" and the "informatic" runs through Raley's discussion. She states: "Because the global communicational apparatus insists on a basic legibility for its transmissions, functionality and performativity are the premium values of language technologies and translation systems" (2003: 306). While there are clear relationships between the twin developmental trajectories of MT and computer technology, it seems unwarranted to attribute the functionalist logic of the digital information age to Weaver's exclusion of aesthetic expression from the application of statistical methods.

But honing in on and demonizing this dichotomy provides a useful frame for Raley's argument: in much broader terms, she is fearful that the type of linguistic standardization that networked and programmable media demands in order to operate, represents an assault on language and languages, namely languages other than English. Examples of this Anglo-

orthodoxy abound, and can be seen in English-language commands and terminology in programming languages and software (as discussed by Raley 2003, Apter 2003: 226-240, Hayles 2003 and Golumbia 2003) and are tied to international coding protocols such as ASCII and Unicode. Lockard (1996) rallies resistance against "cyber-English", Wark (1996) and Lovink (1997) deliberate over the viral spread of Euro-English, Englishes and other languages on the Net, while Apter delves more deeply into the implications of Netlish—"the language of the Internet," and "the language that [this] code 'speaks'"—which she sees as embodying a contentious mélange of informatic and technological sensibility, global capitalism, as well as the universality of digital code alongside linguistic hybridity (the latter shaped by "the Net's indulgence toward ungrammaticality and outsider aesthetics") (2003: 226).

While Raley's critique sheds important light on issues of linguistic diversity on the net, similar to Sack & Brooks, she confuses her critique of MT with complaints about corporatization and control over computer technology, and the languages and codes that become compatible with these infrastructures. "What is to be resisted," Raley insists, "is the insistence on immediate and basic legibility" (2003: 307). At the same time, as Wark, Apter and several code theorists have suggested (Mateas & Montfort 2005, Dibbel 2000), the hybrid forms and code and language experimentation emerging from and inspired by these new technologies and methods are producing new kinds of legibility, if not altered perceptions about the boundaries of national and specialized languages and their permeability. While such language play clusters at the cultural margin, it exploits both the charms or frustrations provoked by alleged translational failure—illegibilities and irregularities, whether translational missteps or purposeful missives, that translation scholars and practitioners have long explored. Instead, what's really at stake for Raley, is control over the translational apparatus. Essentially, a focus on the materiality of communicative and translational channels—which recognizes a range of outcomes—is fused with, then superseded by, a concern for the historical and dialectical materialisms of Marxist cultural critique. At one point, Raley points out that Weaver's view diverges radically, "theoretically and practically, from linguistic, philosophical, and cultural theories of translation" (2003: 296). Weaver's approach, it seems, is suitably "illegible," it just hails from the wrong centre: from the scientific establishment. This observation, though predictable, is jarring in a text of cultural criticism, in which radical departures from traditional theories, views or methods are usually met with interest rather than derision.

Raley's critical account of MT from the standpoint of Global English is exceedingly sophisticated in terms of the scope of issues addressed, including materiality and technology, models of translation, language attitudes and linguistic and political hegemony. She calls for critical reflection on the issue of MT, "since we face a possible future when automated translation might very well function in a basic manner for all discourse". Significantly, Raley points out that the discourse of MT needs to be brought together with that of translation criticism, since MT continues to reflect the types of non-realizable translational ideals that have already been scrutinized in depth by translation theorists. As mentioned, MT possesses a "functionalist logic" (292), it "tries to posit a kind of universality and transparency to translation" (293), it gives us "a renewed utilitarianism; a renewed appreciation for the basic and easily translatable (the non-figurative, the non-literary)" (ibid). While the call for critical attention to MT is warranted, it is less certain whether present-day MT instills such ideals. Warranting consideration in this regard is therefore also the ways in which idealistic conceptions of language and translation prior to, and outside of, machinic treatments are informing and, indeed, framing, such readings.

Raley's strongest direct criticism of the Weaver quote is that his view of translation-as-decoding exposes an ethnocentric view on language, one that privileges English over linguistic others and promotes the continued erasure (by replacement) of non-Latinized scripts. More damaging is the assumption of semantic equivalence that underlies and motivates such a position, which, according to Raley "requires a belief in a universal signified" (2003: 297), that is, belief in the idea that language conceals or "contains" an informational essence, which, when foreign and more obviously encrypted, is revealed by stripping away the puzzling and problematic packaging. Raley is supported in this view by Alan Melby, himself a former MT developer. "He was suggesting," criticizes Melby, "that a text in a human language is the result of encoding the message behind the text" (1995: 17). Melby sums up Weaver's untenable stance as one in which "The message is the same for all languages; only the encoding system differs" (1995: 17). While this criticism on its own has merit, especially in the context of post-colonial and post-structuralist theory and concerns, Raley's attempt to link this privileging of English to all of digital information processing is less convincing. A similar effort is made by Lydia Liu, who sees computer code's original sin first in English hegemony—through Claude Shannon's work with English letter frequencies—and then in mindless cryptographic technique. She writes,

"With the English code being named the original code, Printed English was poised to become the first universal ideographic system with respect to which all other languages of the world would turn into translations" (2006: 541).

Cognitive scientist Douglas Hofstadter, a linguaphile who has pondered the question of translation in depth on many levels, cultural, cognitive and computerized, is critical of Weaver's statement, yet more charitable, allowing that "If taken at face value, this is a brazen remark that has long since been utterly discredited." He goes on to surmise that "Weaver knew full well how silly this sounded, and was simply being deliberately provocative" (1997: 521). In fact, it is clear from surveying Weaver's many interests that he was very sensitive to the intricacies and labours of the translation process. He was a devotee of Lewis Carroll's *Alice in Wonderland* and had amassed a personal collection comprising 160 copies in 42 languages (Weaver 1964, 67). Parts of his rather delightful monograph, *Alice in Many Tongues*, resonate with the type of historical detail that is vital to scholars interested in the materiality of language and translation. Weaver's account is very much a material history of translation practice as it intersects with print culture. Weaver fills a couple of chapters with fascinating and often humorous details excerpted from Lewis Carroll's letters to his publishers. Topics include finding skilled translators, translating proper names and the most idiomatic of songs and poems, problems arising due to variations in page length in different language editions and the idea of publishing foreign language selections for use in language lessons. Weaver's intent is certainly not to deconstruct any aspect of 19th century print culture or overturn assumptions regarding authorship, literary or translation conventions. All the same, it is difficult to thumb through this volume, and conjure up the same Weaver who seems so intent on the wanton destruction—by mathematical constraint, simplification, standardization or effacement—of the free, creative potential of the world's many languages.

Towards a Materiality of Translation Practice

What this necessarily brief overview demonstrates is that cultural analysis—despite its appeals to material and historical specificity—is still very much a matter of interpretation. The objective here is not to rehabilitate Warren Weaver or defend his vision for MT, but rather to consider how different disciplinary framings and allegiances might result in radically different readings, despite being undertaken in an analytical climate receptive to a version of materiality that sees

language as *always already* programmed or "machinically" inscribed. Those critical of Weaver have of course drawn important links between translation, technology and multilingualism; however, dismissing MT at its inception, by situating it beneath the ominous figure of cryptography in ethnocentric form, both simplifies and obscures the complexity of MT in its present incarnation. Scholars and developers are not blind to such issues and are working to address problems such as the representation and balance of languages and language pairs in translation software, the building, sharing and ownership of parallel corpora, translation memories and databases, and new social and collaborative translation practices, on an ever more polyglot Internet, that employ a combination of human and machine techniques—and all of which are similarly open to materially situated readings. By sidestepping the insights of translation scholars with specific regard to translation practice—both *as* technology and *in interaction with* technology—media-cultural analyses of MT which appear to be robust and nuanced critiques are revealed, in many cases, to be simply reinscribing the most commonsensical, even newly romanticized, assumptions about translation and language.

References

Apter, Emily. The Translation Zone: A New Comparative Literature. Princeton: Princeton University Press, 2003.

Brown, Peter E, Stephen A. Della Pietra, Vincent J. Della Pietra, and Robert L. Mercer. "The mathematics of statistical machine translation: Parameter estimation." Computational Linguistics 19(2) (1993): 263-311.

Chartier, Roger. "Afterword: Materiality and Meaning," Word & Image 17(1 & 2) (2001): 181-183.

Condit, Celeste. "The Materiality of Coding: Rhetoric, Genetics, and the Matter of Life," Rhetorical Bodies. Madison: The University of Wisconsin Press, 1999, 326-356.

Derrida, Jacques. Of Grammatology. Baltimore: Johns Hopkins University Press, 1976.

Dibbell, Julian. "After Babelfish." FEED (July 26, 2000): http://www.juliandibbell.com/texts/feed_babelfish.html

Eco, Umberto. The Search for the Perfect Language. Oxford & Cambridge: Blackwell, 1995.

Golumbia, David. "Metadiversity: On the Unavailability of Alternatives to Information." In

Electronic Mediation of Social Change, edited by Marc Bousquet & Katherine Wills, 85-98. Alt-X Press, 2003.

Hayles, N. Katherine. "Translating Media: Why We Should Rethink Textuality," The Yale Journal of Criticism, 16(2), 2003, 263–290.

Hermans, Theo. The Conference of the Tongues. Manchester: St. Jerome Publishing, 2007.

Hofstadter, Douglas R. Le Ton beau de Marot: in praise of the music of language. New York: Basic Books, 1997.

Hutchins, W. John, ed. Early Years in Machine Translation: Memoirs and Biographies of Pioneers. Amsterdam/Philadelphia: John Benjamins Publishing Company, 2000.

----------. Machine Translation: Past, Present, Future. Chichester: Ellis Horwood; New York: Halsted Press, 1986.

Kittler, Friedrich. Gramophone, Film, Typewriter. Stanford, Stanford University Press, 1999.

----------. Discourse Networks 1800/1900. Stanford: Stanford University Press. 1990.

Knight, Kevin and J. Graehl. "Machine Transliteration," Computational Linguistics, 24(4) (1998): 599-612.

Liu, Lydia H. "iSpace: Printed English after Joyce, Shannon, and Derrida". Critical Inquiry, 32 (Spring), (2006): 516-550.

----------. Tokens of Exchange: The Problem of Translation in Global Circulations. Durham: Duke University Press, 1999.

Lovink, Geert. "Language? No Problem." Nettime (1997): http://www.medialounge.net/lounge/workspace/nettime/DOCS/ZKP4/DOCS/1/61.htm

Lockard, J. "Resisting Cyber-English." Bad Subjects (1996): http://bad.eserver.org/issues/1996/24/lockard.html

Mateas, Michael and Nick Montfort. "A Box, Darkly: Obfuscated Code, Weird Languages, and Code Aesthetics," Proceedings of the 2005 Digital Arts and Culture Conference, Copenhagen (2005), 144–153.

Melby, Alan K. The possibility of language : a discussion of the nature of language, with implications for human and machine translation. Amsterdam, Philadelphia: J. Benjamins, 1995.

Raley, Rita. "Machine Translation and Global English." The Yale Journal of Criticism, 16(2) (2003): 291-313.

Rees, Mina. “Warren Weaver: 1894-1978,” Biographical Memoir. Washington, D.C.: National Academy of Sciences, 493-529. 1987.

Sack, Warren. “Public Space, Public Discussion and Social Computing,” Working Papers Series, Center on Organizational Innovation, Columbia University (August 2005): http://www.coi.columbia.edu/pdf/sack_pspdsc.pdf

Sack, Warren and Sawad Brooks. Translation Map (2003): http://translationmap.walkerart.org/

Venuti, Lawrence. The Translator’s Invisibility: A History of Translation. New York & London: Routledge, 1995.

Wark, McKenzie. “Englishes.” Nettime (1996): http://www.medialounge.net/lounge/workspace/nettime/DOCS/ZKP4/DOCS/1/60.htm

Weaver, Warren. “Translation.” In Readings in Machine Translation, edited by Sergei Nirenburg Harold Somers and Yorick Wilks, 13-18. Cambridge, MA, and London: The MIT Press, 2003.

----------. “The Tower of Anti-Babel.” In Machine Translation of Languages: Fourteen Essays, edited by William N. Locke and Andrew D. Booth, v-vii. New York: Technology Press of the Massachusetts Institute of Technology and Wiley, 1955.

----------. Alice in Many Tongues. Madison: The University of Wisconsin Press, 1964.

Winthrop-Young, Geoffrey & Michael Wutz. Translators’ introduction to Gramophone, Film, Typewriter, by Friedrich Kittler, xi-xxxviii. Stanford, Stanford University Press, 1999.