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Enemies, Parasites, and Noise: How to Take Up Residence in a System Without Becoming a Term in It

This essay outlines some common properties of channels, infrastructure, and institutions. It analyzes the tense relation between channels and codes, on the one hand, and circulation and interpretation, on the other. It compares the assumptions and interventions of three traditions: cybernetics (via Claude Shannon), linguistic anthropology (via Roman Jakobson), and actor-network theory (via Michel Serres). By developing the relation between Serres's notion of the parasite and Peirce's notion of thirdness, it theorizes the epi-function served by the menagerie of entities who live in and off infrastructure: enemies and noise, meters and sieves, pirates and exploits, catalysts and assassins. By extending Jakobson's duplex categories (shifters, reported speech, proper names, metalanguage) from code-sign relations to channel-signer relations, it describes four reflexive modes of circulation that any network may involve: source-dependent channels, signer-directed signers, self-channeling channels, and channel-directed signers. And it relates the commensuration of value to the enclosure of disclosure. [media, infrastructure, circulation, translation, enclosure.]

Classic theories of channels, infrastructure, and institutions are eerily convergent. Each is understood as a kind of bridge that delimits a landscape, facilitates a passage, and forestalls a loss. For example, channels relate speakers to addressees, enabling the interpretation of meaning as much as its signification (Malinowski, Shannon, Jakobson). Infrastructure relates producers to consumers, enabling the realization of value as much as its creation (von Thünen, Marx, Marshall). Institutions relate selves to others, enabling the recognition of identity as much as its performance (Hegel, Mead, Goffman). Facilitating passage, each allows displacement in space, through time, between persons, and across possible worlds. Delimiting landscape, each helps constitute the poles so related: speakers and addressees, producers and consumers, selves and others. Finally, forestalling loss, each ensures that some medium endures—that words won't fade, that goods won't spoil, that personas won't wither.

In short, these three terms have been traditionally conceptualized by means of a single trope: the metaphor of a bridge that gathers the banks of a river around it. This is somewhat ironic because nothing seems to fit this metaphor more perfectly than codes, and representations more generally—those cognitive, social, and technological bridges that gather together what otherwise seem to be the most ontologically unbridgeable of banks: signifier and signified, sign and object, mind and world, experience and event. Framed as such, channels and codes, or circulation and interpretation more generally, seem to partake of the same substance.

Taking off from Roman Jakobson, and working through theorists like Claude Shannon and Michel Serres, this essay develops some of the consequences of this trope, while simultaneously undermining some of its presumptions. Broadly speaking, it has three goals. First, it attempts to bring the channel back into focus within the discipline of linguistics and anthropology, and critical theory more generally; to develop the relation between channels, infrastructure, and institutions; and to describe some key relations between circulation and value, on the one hand, and enclosure and disclosure, on the other. Second, it returns to two foundational texts in linguistic anthropology, Jakobson's analysis of duplex categories and his essay on speech events, by reading them in a marked way. And third, it shows the tense relationship between Jakobson's framework, Shannon's mathematical theory of communication, and Serres's theory of the parasite. In this way, it uses the foundational texts of three paradigms to map out some hidden passageways (and pitfalls) lying between cybernetics, linguistic anthropology, and actor-network theory.

More narrowly speaking, and perhaps more suggestively, by showing the similarities between Serres's notion of the parasite and Peirce's notion of thirdness, it carefully theorizes the epi-function served by the menagerie of entities who live in and off infrastructure: enemies and noise, meters and sieves, pirates and exploits, catalysts and assassins. And by extending Jakobson's notion of duplex categories (shifters, reported speech, proper names, metalanguage) from code-sign relations to channel-signer relations, it describes four reflexive modes of circulation that any channeling, infrastructing, or instituting system may involve: source-dependent channels, signer-directed signers, self-channeling channels, and channel-directed signers.

In some sense, then, this essay is about two kinds of translation (or "mediation") that may be loosely characterized as material translation (or channeling between signers and interpreters, qua circulation) and meaningful translation (or coding between signs and objects, qua interpretation). That is, just as codes relate signs to objects (or messages to referents), channels relate signers to interpreters (or speakers to addressees). As will be seen, Jakobson, Shannon, and Serres share a set of assumptions regarding the need for, and difference between, both kinds of translation. As will be argued, each is an attempt to see relations between relations, or thirdness proper, in terms of two analogous, but otherwise distinct, relations. This essay highlights this tension. It shows some of the ways these thinkers creatively circumvent it, and some of the ways they get stymied by it. In so doing, it builds bridges between them, and the kinds of scholarship they inspired—using each to extend the insights of the others.

Channel, Infrastructure, and Institution

Jakobson (1990a) famously argued that any speech event involves six constituent factors: speaker, addressee, message, referent, code, and channel. Moreover, each of these factors, when foregrounded, gives rise to a particular function: expressive (focus on the speaker), directive (focus on the addressee), poetic (focus on the message), referential (focus on the referent), metalinguistic (focus on the code), and phatic (focus on the channel). Finally, any given utterance may differentially focus on multiple factors of the speech event, and thereby simultaneously serve different kinds of functions.

For present purposes, four interrelated shifts may be made from this schema. First, we may abstract away from speech events *per se*, to semiotic events of any kind. In this way, we may focus on the following six factors: signs (whatever stands for something else), objects (whatever is stood for by a sign), codes (whatever relates a sign to an object), signers (whatever expresses a sign), interpreters (whatever interprets a sign), and channels (whatever relates a signer to an interpreter, such that a sign expressed by the former may be interpreted by the later).

As argued in the introduction, and made ethnographically visible in the work of scholars like Elyachar (2005, 2010), Larkin (2004, 2008), Star (1999), and von Schnitzler

(2008), channels are usually inseparable from infrastructure and institutions. To go back to our opening example, the three components of a semiotic process (sign, object, interpretant) map onto entities as seemingly diverse as identities (role, status, attitude) and commodities (use-value, value, exchange-value), among other things.¹ Bear in mind, then, that “messages” (and intentional communication *per se*) are at best the tip of a semiotic iceberg. In short, the fact that channels, institutions, and infrastructure are eerily similar as to their facilitating, delimiting, and forestalling functions is, in part, a simple consequence of the generality of semiotic processes.

Whereas Jakobson understood channels to turn on physical conduits and psychological connections, they should also be understood as turning on social conventions. As an example, we may turn to what is perhaps the most emblematic of semiotic events: joint attention, or looking where another points. Such an event has three key components: a sign (your gesture that directs my attention), an object (whatever you are pointing to: say, that pen over there), and an interpretant (my change in attention). Within such a framing, an object is simply that to which we can jointly attend—however vague it is, or misaligned we are. In some sense, the figure is the object, *qua* information, and the ground is the channel (infrastructure and institution) that allows you and I, as signer and interpreter, to intersubjectively relate in this way (by relating to this object) within a relatively isolated event. In part, this channel turns on a physical contact (e.g., a transparent medium in an illuminated enclosure, with open lines of sight, etc.). In part, it turns on a psychological connection (e.g., I treat your movement as an intentionally communicative gesture, I desire to know what you desire to make known to me, etc.). And, in part, it turns on a social convention (e.g., who is normatively permitted to direct whose attention, in what kinds of contexts, to what kinds of objects). Such a process is perhaps the originary form of objectification. Within a particular kind of enclosure, or clearing, something is disclosed (Kockelman 2007b).

And finally, as grounded in these abstractions and extensions, we may return to the fundamental symmetry of Jakobson’s system: just as codes relate signs to objects, channels relate signers to interpreters. Both kinds of translation may be understood as paths (or bridges, as *per* the introduction) that lead from an origin to a destination. But before we exploit this symmetry, by developing its repercussions in relation to Jakobson’s duplex categories, I want to undermine this symmetry—and indeed, undermine the notion of a channel (institution or infrastructure) as a bridge between banks, a relation between entities, an edge between nodes, or an action between agents. In what follows, then, we first move backwards from Jakobson to a more famous model of communication, that of Shannon. We then move forward to an alternative reading of Shannon provided by Serres. We return to Jakobson and generalize his duplex categories from sign-code relations to signer-channel relations. And finally, we link these concerns to more traditional senses of infrastructure, circulation, and value.

To foreground one arch of the following argument, note from our example of joint attention how difficult it is to distinguish codes and channels (in their traditional sense) from each other, or to separate them from *semiosis per se*, or to isolate a solitary sign event from the hurly-burly of interaction in the first place. In a Peircean idiom, we might say that classic understandings of codes and channels take a mode of thirdness (*qua* relation between relations), itself artificially isolated from a nexus of thirdness (*qua* interrelationality *per se*), and reduce it to one of two simple relations, or modes of secondness. In particular, framing thirdness from the standpoint of actions or products, the relation between signs, objects and interpretants get reduced to a relation between signs and objects (*qua* meaningful translation, or “interpretation”). And framing thirdness from the standpoint of actors or producers, the relation between signers, objectors and interpreters get reduced to a relation between signers and interpreters (*qua* material translation, or “circulation”). One key theme of this essay is the conditions for, and consequences of, such reductions.

Jakobson and Shannon: Enemies and Noise

Along with Norbert Wiener, Claude Shannon was a central figure in the cybernetics movement; and his contributions still form part of the backbone of computer science and information theory. In *The Mathematical Theory of Communication* (Shannon and Weaver 1963 [1949]), his most influential work, Shannon offered a diagram that showed five key elements of any communicative event: a source of messages (e.g., a speaker producing an utterance), a transmitter of signals (e.g., a telephone that takes in the sound waves produced by the utterance and puts out electrical pulses), a channel along which signals are sent (e.g., the wires linking one telephone to another), a receiver of signals (e.g., another telephone that takes in electric pulses and puts out sound waves), and a destination for messages (e.g., an addressee listening on the other line).

This model is very close to Jakobson's model, with a few key differences. First, note the difference between messages (whether spoken or heard) and signals (whether transmitted or received). Relatively speaking, messages are designed by and for some human mind; whereas signals are designed by and for some mechanical apparatus. Second, the transmitter is essentially an encoding device (message to signal); and the receiver is essentially a decoding device (signal to message). While both such devices involve inputs and outputs, the crucial function served by each is a kind of translation, *qua* mapping, between the signs in one code (say, English) and the signs in another code (say, Morse). And finally, the signal sent by the transmitter is not necessarily identical to the signal received by the receiver, for there is another element (not numbered, but named) in Shannon's diagram: noise. In particular, *noise* relates to the relation between the transmitter and receiver (which itself mediates between the source and the destination). It interferes, such that what is received is not the same as what was sent. Note that one reason it is not presented as its own element in Shannon's exegesis is because it is very possibly the key element. In particular, the channel may be defined by its capacity to fail, in the sense of introducing noise into the system, and thereby interfering with the signal and garbling the message. This is probably the key movement from Shannon's mathematical theory of information to actor-network theory, via a famous text by Michel Serres, *The Parasite*, to which we will return below.

In his *Communication Theory of Secrecy Systems* (circulated in 1946, but only declassified in 1949), Shannon offered a similar diagram. Again, there was a message source and message destination; and again there was a channel. However, the transmitter and receiver were replaced by an encipherer and a decipherer; and the notion of a signal was replaced by the notion of a cryptogram. That is, an encipherer takes in a message and turns out a cryptogram (by means of some code), and a decipherer takes in a cryptogram and turns out a message (by means of some inverse of this code). Finally, there is again an element that relates to the relation between the encipherer and decipherer (which itself mediates between the source and destination), but here it is labeled "enemy cryptanalyst" instead of "noise." As Shannon explains in a footnote, "The word 'enemy,' stemming from military applications, is commonly used in cryptographic work to denote anyone who may intercept a cryptogram" (Shannon 1949: 657). In some sense, then, the enemy is precisely that which the system is designed for (or rather against). Though less important to Serres's analysis, the enemy, no less than noise, is both parasite on (relating to a relation), and aporia of, such communication systems.

Notice, then, that the central issue for Shannon was efficient encoding and safe encryption given the presence of noise and enemies, and hence turned on taking into account the capacities and limits, or functions and failures, of channels. That is, it was a proper encoding or encryption (meaningful translation, or "interpretation") that led to proper channeling (material translation, or "circulation"). Such encoding and encryption is, to be sure, a kind of translation in a very particular sense. It is not a relation between sign and object, or between message and referent, as it was in Jakobson. Nor is it even a relation between a sign and an interpretant, as mediated by an object, as in semiosis proper—recall the example of joint attention. Rather it is a

relation between a sign in one code (say, that of English) and a sign in another code (say, that in Morse, ASCII, or Enigma), understood as a formal mapping, or function, that transforms a domain into a range. In short, just as Jakobson tries to account for sign-object relations without reference to interpretants (a reduction that is mitigated, as we will see below, by his introduction of duplex categories), Shannon tries to account for sign-interpretant relations without reference to objects. Thus, while both theorists are interested in codes and channels, or meaningful and material translation, they each conceptualize codes in different ways. Nonetheless, in the terms introduced at the end of the last section, both engage in a similar kind of reduction.

To conclude this section, several small ironies should be noted. For Shannon, the channel was the key condition for, and limit on, information. And his central theorem was about the information capacity of a channel (given a particular encoding). In contrast, Malinowski's understanding of the channel (which, in large part, Jakobson inherited) emphasized affiliation (or social relations) over information. Indeed, for Jakobson, the referential function (focus on referent, or object) was the locus of information; whereas the phatic function (focus on channel) was the locus of psychological connection and physical contact between speaker and addressee. Similarly, Shannon's model is often criticized for focusing only on messages and signals (i.e., signs), and thereby eliding meaning and referents (i.e., objects), as well as the receiver's response to them (i.e., interpretants in the proper sense). However, what led to information in Shannon (the separation of forms from their meaning) gave rise to precisely the poetic function in Jakobson (with its focus on the sensual properties of signs). In short, Jakobson's approach simultaneously takes up and undercuts Shannon's model, showing how the very same objects (message and channel) can be theoretically framed in different ways. With the tiniest of perturbations, then, mathematics and information morph into aesthetics and affiliation.

Serres and Peirce: Parasites and Thirddness

In *The Parasite* (2007 [1980]), Serres begins by noting the multiple meanings of the word *parasite* in French: biological parasite, social parasite (in particular, the guest/host), and noise. From such humble beginnings, he goes on to theorize more lofty topics, with a scope comparable to Hobbes' *Leviathan*: the origins of society, the nature of evil, the essence of work, the conditions for value, the location of sovereignty, the foundations of property, a theory of networks, and so forth. Serres's work has been enormously influential in sociology and science and technology studies; indeed, it is tempting to make the analogy that as *The Parasite* is to *Leviathan*, so actor network theory is to classical sociology.

In what follows, I will focus on the ways in which Serres's understanding of the parasite—as a relation to a relation, derived by generalizing the properties of enemies and noise—introduces a host of caveats to classic understandings of the channel, many of which resonate with Peirce's definition of *thirddness*. Only by both incorporating and critiquing such caveats, and exploring such a resonance, can a more robust account of channels be provided. What follows, then, is a concise and analytic overview of this work, so far as it bears on the concerns introduced above.

First, rather than focus on channels in the stereotypic sense, Serres opens up the analysis to relations more generally. On the one hand, such relations should be understood as psychological connections and social conventions as much as physical contacts. On the other hand, such relations should be understood as infrastructure and institutions as much as channels. More generally, we might think of them as actions between agents, edges between nodes, relations between beings, bridges between banks, or mediation per se. Indeed, generously read, it may be argued that what Serres is really interested in is akin to Peirce's notion of thirddness in its multiple guises. Indeed, this resonance is so great that it is worth quoting both authors at length. As Serres puts it:

I mean the intermediary, the milieu. A trunk, the tail, and the head: the trunk of the relation between head and tail. The milieu, the mediate. What is between, what exists between. The middle term. The means and the means to an end. The means and the tool; the tool and its use; the means and the use. [Serres 2007(1980):65].

And as Peirce put it, one hundred years before:

By the third, I mean the medium or connecting bond between the absolute first and last. The beginning is first, the end second, the middle third. The end is second, the means third. The thread of life is a third; the fate that snips it, its second. A fork in the road is a third, it supposes three ways; *a straight road, considered merely as a connection between two places is second, but so far as it implies passing through intermediate places it is third.* [1955:80; italics added].

For Serres, any relation between two beings (or any edge between two nodes) is itself part of a larger whole, or system, composed of many interrelations among many beings. "Stations and paths together form a system. Points and lines, beings and relations" (10). In comparison, the schemata of Shannon and Jakobson focus on a part at the expense of a whole, or two nodes and one relation at the expense of the system. On the one hand, this critique is technical: communication rarely employs fixed, point-to-point channels. Rather, in addition to broadcast, many modern channels are networked, with various topologies: daisy chains (rings and lines), stars, mesh, and so forth. On the other hand, this critique may be understood in (post-)structuralist, or even Boasian terms: the part (qua node) gets its value in relation to the whole (qua network), even if only through the projection of an imagined totality. (Readers who balk when they hear the word *system* are advised to just substitute the word *assemblage*—which would be in keeping with the spirit of Serres.)

Any relation between two beings, or edge between two nodes, or bridge between two banks, is itself a whole that may be decomposed into parts; and our designating it a basic unit, what Serres termed a "black box," with relatively predictable relations between inputs and outputs, is grounded in our own ignorance of its inner workings. Indeed, Serres calls such systems "fractal" (73): when any part is looked at closely, it too turns out to be a system composed of relations and beings. We consider something a simple relation only when we are ignorant of its inner workings, or when it works so perfectly that it disappears from view. Both ignorance and knowledge may thereby reduce a third to a second, or a mediator to an intermediary. Serres is again worth quoting at length:

I thought that the exchangers were intermediaries, that interference was on the fringe, that the translator was between instances, *that the bridge connected two banks*, that the path went from the origin to the goal. But there are no instances. Or more correctly, instances, systems, banks, and so forth are analyzable in turn as exchangers, paths, translations, and so forth. The only instances or systems are black boxes. When we do not understand, when we defer our knowledge to a later date, when the thing is too complex for the means at hand, when we put everything in a temporary black box, we prejudice the existence of a system. When we can finally open the box, we see that it works like a trace of transformation. [Serres 2007(1980):73; italics added].

While we may think of a channel as that which translates material across space and time from one node to another, the channel may also be understood as a translator which takes in some kind of input (say, a sign) and puts out some kind of output (say, an interpretant). Thus, Serres is just as interested in nodes that link two relations as relations that link two nodes. In the broadest sense, then, the relations that interest Serres are not just things like channels, infrastructure and institutions, but also the selves and others, producers and consumers, speakers and addressees—and signers and interpreters, or semiotic agents more generally—who stand at the ends of such conduits, or at the banks of such bridges. Phrased another way, he is interested in both senses of translation: on the one hand, material translation along a relation between two nodes, qua signer and interpreter; on the other hand, meaningful translation by

a node situated between two relations, qua semiotic agent transforming signs into interpretants. Serres, like actor-network theory after him, and Geertzian anthropology before him, takes Hermes to be its key figure (Serres 2007[1980]:43). Recall that, with some caveats addressed in the last section, this is precisely the symmetry we found in Jakobson and Shannon between circulation and interpretation, or channel and code.

The essence of a channel, as a relation between two beings, is really a relation to this relation. As Serres puts it, "The parasite has a relation with the relation and not with the station" (2007[1980]:33). That is, the channel should be understood in terms of its capacity to fail, in the sense of being subject to a variety of parasites (e.g., interference and interception, among other things). Thus, to go back to Shannon, the fact of enemies and noise was the condition of possibility for the design and functioning of the channel. In some sense, this may be the key point of Serres's system, and perhaps the most original claim of the book: "Systems work because they do not work. Nonfunctioning remains essential for functioning" (Serres 2007[1980]:79). Here it is worth recalling Peirce's description of paths, or channels, as secondness (merely a connection between two places) and as thirdness (as a series of potential places). As Serres puts it, "Every relation between two instances demands a route. What is already there on this route either facilitates or impedes the relation" (2007[1980]:150). Serres, then, managed to treat channels, or material translation more generally, as thirds rather than seconds.

Given this idea that the channel's function is defined by its failure, and given our designation of the parasite as failure, the parasite can be much wider in scope than simple noise and enemies. The parasite is any perturbation of a relation: whatever deflects the achievement of an aim, for better or for worse, and whatever disturbs a third, no matter how large or small in magnitude. As Serres puts it, "The parasite brings us into the vicinity of the simplest and most general operator on the variable of systems. It makes them fluctuate by their differential distances" (2007[1980]:191).

What counts as channel and parasite, or information and noise, or relation and relation to relation, is a function of position or perspective. In some sense, it may be argued that what Serres is really doing here is extending Mary Douglas's famous insight: just as dirt is matter out of place, we may say that noise is information out of place. Phrased another way, the parasite is really a joker, or wild card, who takes on different values depending on its position in a system. This means that the relation between relations is really a triad, with each node able to play the role of parasite to the relation between the other two nodes. As Serres puts it, "In the system, noise and message exchange roles according to the position of the observer and the action of the actor, but they are transformed into one another as well as a function of time and of the system. They make order or disorder" (2007[1980]:66).

Because of this joking nature, the parasite can be positive as much as negative. The exemplary parasite may not be noise or an enemy, but perhaps a catalyst that drives an otherwise slow reaction. Indeed, Serres goes so far as to see the parasite as both the stochastic process that generates variation (think interfering noise), as well as the sorting process that drives selection (think intercepting enemies). In this way, Serres also sees the parasite as a source of life, and at the inception of complex systems more generally. We might extend this to think of the parasite as including both sieving and serendipity.

Having summarized the key claims of Serres's essay, one key critique is now in order. Despite his repeated invocations of Hermes, and despite a sophisticated understanding of the varieties of translation, Serres spends very little time on interpretation (or code), focusing his efforts on circulation (or channel) instead. And so, while he brilliantly brings something like thirdness to circulation, his understanding of interpretation stays close to secondness—in a way that is reminiscent of Shannon's mappings between messages and signals (or cryptograms). If Serres had done for the sign-interpretant relation (via the notion of an object—if only in the role of an

"objection" or "obstruction") what he did for the signer-interpreter relation (via the parasite), the ramifications of the text would be much greater. (Whether or not such a critique holds for actor-network theory more generally, I'll leave to the judgment of my readers.)

So, in the spirit of extending his insights to include the menagerie of beasts who live in and off interpretation (or "codes/representations") as much as circulation (or "channels/infrastructure"), as well as material culture more generally; in the hopes of foregrounding the relation between parasites and thirdness, or the ideas of Serres and those of Peirce; and with the aim of succinctly theorizing what may be called, somewhat paradoxically, "the parasitic function"; let me end this section with the following definition:

An object (action or sign) considered as a means to an end (or infrastructure considered as a path to a destination) is a second (or intermediary), but insofar as it implies (embodies or indexes) other ends it might be diverted to serve, or indeed implies any way it may fail to serve an end (whether original or diverted), it is a third (or mediator).

The parasite is whatever inhabits such implications.

Jakobson and Serres: Four Reflexive Modes of Circulation

In some sense, then, Serres capitalized on—or parasited—an insight that was latent in Shannon (and explicit in Peirce): the idea that the channel, as a relation, was itself best understood in terms of a relation to this relation (enemies, noise, and disturbances more generally). We might say that he used Shannon to overcome Shannon. Jakobson did something similar with Saussure. In particular, while he inherited a Saussurian model of the code (qua sign-object or signifier-signified relation), he also managed to use Saussure's categories to overcome Saussure. In particular, through his notion of duplex categories, he brought context and history, or parole and diachrony, into a theory of signs—and thus understood language, as an ensemble of sign-object relations, in terms of practice as much as structure, transformation as much as stasis, context as much as code—or, in the idiom of actor-network theory, mediator as much as intermediary. To conclude this essay, then, I want to review his arguments concerning such categories and extend them from codes to channels, thereby bridging some of the distance between Serres and Jakobson.

As part of his celebrated essay on grammatical categories in Russian (1990b; Lucy 1992), Jakobson theorized the relation between four seemingly unrelated kinds of signs: reported speech (e.g., "John said, 'I'll go'"), meta-language (e.g., "'mutt' is a pejorative synonym for 'dog'"), shifters (e.g., "I," "here," "now"), and proper names (e.g., "Jake"). See Figure 1. To understand such "duplex categories," he systematically related messages and codes, understood in their most general Saussurean sense as *parole* (token, practice, context, utterance) and *langue* (type, structure, convention, sentence). In particular, reported speech is a message that makes reference to a message (M/M), and metalanguage is a message that makes reference to a code (M/C). Here "makes reference to" (/) means "stands for" or "refers to." That is, such messages (qua signs) have as their referents (qua objects) messages or codes. The other two duplex categories are a little more complicated. In particular, proper names are codes that make reference to codes (C/C), and shifters are codes that make reference to messages (C/M). Here "makes reference to" (/) is best understood as "decoded using" or "interpreted with." That is, the interpreter cannot get from the message to the referent without knowing something about either the message (qua sign token) or the code (qua relation between sign type and object type). In the case of proper names, for example, one cannot figure out who the name "Mary" refers to without knowing who it referred to in the past (i.e., "Mary" means that woman over there [in this sign event] because "Mary" has meant that woman over there [in past sign events within this semiotic community]). Similarly, in the case of shifters, one cannot

M/M	(Reported Speech)
S/S	(Signer-Directed Signer)
M/C	(Meta-Language)
S/Ch	(Channel-Directed Signer)
C//C	(Proper Names)
Ch//Ch	(Self-Channeling Channel)
C//M	(Shifters)
Ch//S	(Source-Dependent Channel)

C=Code, M=Message, Ch=Channel, S=Signer	
/ = “Stands for” (C, M) or “Directed to” (S, Ch)	
// = “Decoded with” (C, M) or “Guided by” (S, Ch)	

Figure 1
Duplex Categories Revisited

interpret a sign like “I” or “now” without knowing something about the speech event in which it was uttered: in particular, who said “I,” or when “now” was said.

Jakobson’s original characterization of such duplex categories was important not only because it provided a unified account of four important kinds of signs (proper names, reported speech, metalanguage, and shifters), but because—with the benefit of hindsight (and from the standpoint of his predecessors)—it identified four functions that all signs serve to some extent. With Kripke and Putnam, for example, we learn that all words are a little bit like proper names. With Bahktin and Goffman, we learn that all utterances are a little bit like reported speech. With Peirce, we learn that all symbols have an indexical component, and so are shifter like. And with Mead and Austin, we learn that all signs are a little bit self-grounding and world transforming. The ramifications of these facts for our understanding of the relation between language, social relations, and critical theory have been enormous. This is what I meant above when I said that Jakobson used Saussurian categories (code and message, or langue and parole) to move past Saussure’s categories. His actual understanding of codes, and thus interpretation, was thus much more nuanced than his original message-referent schema would suggest.

If we move from codes (as relations between signs and objects) to channels (as relations between signers and interpreters), we may derive four new duplex categories, which may be loosely described as signer-directed signers, channel-directed signers, self-channeling channels, and source-dependent channels. And, as with Jakobson’s categories, the point is not to identify four kinds of channels per se, but rather to identify four reflexive functions that any channel may serve—or, better, four reflexive modes of circulation that any channeling, infrastructing, and/or instituting system may involve. Such categories are thus to circulation what Jakobson’s categories are to interpretation.

In particular, many signs (in the guise of actions or identities, instruments or commodities, utterances or images) are oriented to channels (infrastructure or institutions), and thereby open up or close off the possibility for others to engage in semiosis (channel-directed signers). Many signs are oriented to interpreters that are themselves signers, or are immediate means to more mediate ends (signer-directed signers). Many signs, by traversing certain paths, enable subsequent traversals of similar paths (self-channeling channels). And many signs only get where they’re going as a function of where they begin (source-directed channels). After formally defining these functions, I will conclude this section by comparing them to Serres’s understanding of the parasite. In particular, while the first of these is similar to the parasite, the others also constitute beasts that live in and off of infrastructure.

As with Jakobson's duplex categories, these four categories break up into two pairs, depending on how the phrase "in reference to" is interpreted. See Figure 1. First, there are signers that make reference to signers (S/S), and signers that make reference to channels (S/Ch). For these two categories, the phrase "makes reference to" (/) may be understood as "addressed to" or "directed towards." (Compare "refers to" in the case of Jakobson's original duplex categories.) The focus, then, is on the interpreter or destination: not how a sign gets somewhere, but where it is going.

In particular, a signer-directed signer (S/S) addresses another agent (or directs signs to it more generally) because of that agent's capacity as a signer. (Compare reported speech, or M/M.) Loosely speaking, one speaks to another in order to control what is subsequently said; or one causes an effect that is itself a cause of effects. Signer-directed signers are thus oriented to interpreters who are themselves signers (be they persons, things, or anything in-between), such that the second agent's interpretants of the first agent's signs are themselves signs—but of a different nature, and thus with different powers than the first agent could have produced on its own. That is, one directs one's signs to another so that they will live on in the interpretants of the other, precisely because of how this transforms or preserves their efficacy as signs. For example, such addressed others may function as relays (transporting signs into new domains of space, time, person, and possibility), amplifiers (transforming the quantity or intensity of the original sign's qualities), stabilizers (reducing the disorder of a sign), editors (improving a sign's grammaticality, felicity, etc.), filters (transforming the contents of signs), ciphers (recoding signs), and transducers (remediating signs), among other things. In each case, the key relation is between a sign event (E^S) and an interpretant event (E^I), where this relation is itself inseparable from Jakobson's more famous relation (1990b) between the sign event (E^S) and the object event (E^O). Many interesting questions arise as to the reversibility and predictability of such processes: the degree to which one can recover the original sign given the interpretant, or predict the subsequent interpretant given the sign. In particular, irreversible processes (and simply difficult to reverse processes) project an inexorable historicity onto semiotic processes. And such modes of address may therefore enable not so much the disclosure of value, as the foreclosure of return.

A channel-directed signer (Ch/S) addresses another agent because of that agent's capacity as a channel. (Compare metalanguage, or M/C.) Loosely speaking, one speaks to another in order to control who is subsequently spoken to; or one directs the effects of a cause that one did not effect. In particular, channel-directed signers are oriented to interpreters who are themselves channels (infrastructure or institutions), such that the second agent's interpretants of the first agent's signs are transformations in the paths taken by other signs (themselves expressed by other signers). Working at the origin, they may transform the signs that are sent: capping and refracting. Working at the destination, they may transform the signs that are received: shielding and deflecting. And working anywhere along the path, they may transform the signs that are moving: routing, bridging, dead-ending. As famously theorized by Nietzsche in *The Genealogy of Morals* and Freud in *The Interpretation of Dreams*, the blockage of any message-qua-impulse often leads to a rerouting (through other channels) and an enciphering (through other codes) of the message. Indeed, such unintended effects of controlling channels are often more interesting than the control of the channel per se. In some sense, then, channels, infrastructure and institutions are themselves subject to dreams, obsessions, and parapraxes (qua "slips of/on the path"). As will be discussed below, this function is closest to Serres's parasite.²

And second, there are channels that make reference to channels (Ch//Ch), and channels that make reference to signers (Ch//S). For these two categories, the phrase "makes reference to" (/ /) may be understood as "guided by." (Compare "interpreted with" in the case of Jakobson's original duplex categories.) The focus, then, is on the channel or route: not where a sign is going, but how it gets there.

In particular, a self-channeling channel (Ch//Ch) leads to a certain destination, or takes a certain route, only because it has led to a certain destination, or taken a certain

route. (Compare proper names, or C//C.) Loosely speaking, a signer has access to an interpreter because a signer has had access to an interpreter; or a message arrives at its destination because similar messages have arrived at similar destinations. Pathways, when understood as channels (moving signs and objects) as much as infrastructure (moving people and things), are famous for having this property (Bourdieu 1996; Elyachar 2010). Indeed, we might characterize the essence of the phenomenon as follows: past movements leave indexical traces which channel future movements in iconic ways: from footprints to river banks, from wheel ruts to worm holes. As an embodied phenomenon, habits are the exemplary site of this process (as understood by scholars from Hume to Peirce)—especially habits that condition the conveyance of signs so far as they were conditioned by the conveyance of signs. (More generally, any technique of the body [mind, self, ear, or tongue] may partake of this process insofar as it plays a role in the transmission of a message and persists because of the transmission of messages.) As with proper names (Kripke 1980; Putnam 1975), self-channeling channels have baptismal events, and a performative dimension more generally. For example, just as one can coin a term (or rather coin a code: by establishing a relation between a sign and an object), one may forge a bond (or rather forge a channel: by establishing a relation between a signer and an interpreter). Usually coining codes and forging channels go hand in hand: that which is coined circulates along that which is forged. Moreover, all the usual issues present in the coinage of codes (such as standardization), and top-down versus bottom-up regimentation (e.g., “state” vs. “market”), have their doppelgangers in the forging of channels.

A source-dependent channel (Ch//S) leads to an interpreter because of where it begins. (Compare shifters, or C//M.) Loosely speaking, where one departs from determines where one arrives at; or whoever interprets a sign is determined by whoever expresses a sign. In a narrow sense, source-dependent channels are like passports (in the context of messengers traveling along infrastructure) and spam-filters (in the context of messages traveling through channels): such entities may be permitted or prohibited from going certain places because of where they have come from (or what IP address sent them). In this regard, there are two complementary ways for the channeling agent to know where signs have come from, such that it can use this information to permit or prohibit future passage. First, the signs can be tracked or surveilled: their movements and positions, senders and peregrinations, can be logged in some way. (And this is itself directly related to what might be called a critique of semiotic reason: what are the limits of what can be known about the paths of signs and the processes of semiosis, and how does this affect the possibilities of governance.) And second, one may infer where a sign has been by its current properties. In other words, the features of a sign may themselves be indexical signs that point to the origins or history of the sign—who sent it, where it’s been, and how it got there. The issue here is not using signs to engage in forensics or surveillance, but the need for a forensics and a surveillance of signs *per se*. Of course, if we remember that most channels consist of people (at least at the nodes, if not along the paths, *qua* messengers) who not only send and receive signs, but also interpret and resignify—and thus both affect and are affected by the signs they send and receive—then few signs, as it were, can ever travel the same channel twice. In other words, channels may be transformed by their channeling, such that these forms of regimentation become utopian.

To return to Serres, both signer-directed signers and channel-directed signers turn on a relation to a relation. In particular, one agent relates to a relation between two other agents. In the case of signer-directed signers, the first agent is “in line with” the other two agents. In the case of channel-directed signers, the first agent is “orthogonal to” the other two agents. In either case, whatever action the first agent undertakes (e.g., expressing a sign) has an effect on the relation between the other two agents (e.g., their modes of signification and interpretation). See Figure 2, top half.

In particular, signer-directed signers are fundamentally system-internal agents who leverage their position within a system. Woven directly into a system of agents

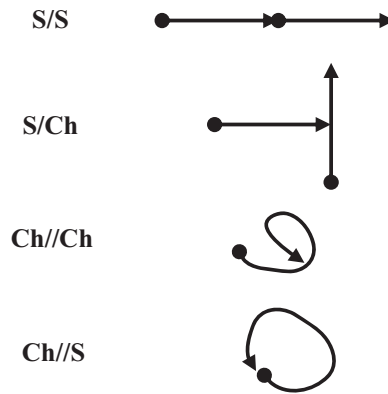


Figure 2
Topology of Duplex Categories

and actions, or entities and relations, they act locally (expressing a sign to be interpreted by a nearby agent) in order to have extralocal effects (so far as the interpretant of the nearby agent will itself be a sign to a more distal agent). In contrast, channel-directed signers are fundamentally system-external agents who are well positioned outside a system. Standing outside of a system of agents and actions, or entities and relations, they make and break (strengthen and weaken, conduct and obstruct) already existing relations between nodes in order to control flows (which signs go where to what effect). If the first are immanent to an assemblage, the latter are transcendent.³

Above, we identified channel-directed signers as closely akin to parasites. In some sense, however, Serres's parasite stands between both these functions. While his focus was on system-external agents, he was aware that what is external to a system can quickly become internalized (via ideas like perturbation and invitation). And he was aware that what is internal to a system can quickly become externalized (via ideas like excrescence and banishment). Indeed, in some sense, these two functions relate to each other as signal and noise, in that one and the same agent may be framed as one or the other depending on the scale at which a system is examined.

The remaining functions, source-directed channels and self-channeling channels, have no obvious analog in Serres. Indeed, they do not turn on the relation between a (signifying and interpreting) agent and a relation between two other such agents. Rather, source-directed channels turn on the relation between the second part of a journey and the first part. That is, where something has just been mediates where it will now go. More generally, the channeling of this sign depends on how it has been channeled. And self-channeling channels turn on the relation between the current journey and prior journeys. That is, where things like this have gone mediates where this thing will go. More generally, the channeling of this sign (token) depends on how this sign (type) has been channeled. See Figure 2, bottom half.

In some sense, both these functions turn on something like memory, history, habit, or disposition—whether grounded in the habitus or memory of an individual, in the culture of a group (qua intersubjectively held habitus or memory), or in the regimenting environs of individuals and groups (qua affordances, laws, protocols, waste-products, and so forth). Relatively speaking, if the first two functions were spatial; these two functions are temporal. If the first two deal with being assemblage, these two deal with becoming assemblage. And roughly speaking, if the first two have technological emblems (logic gates, computers, and internets), the latter two have biological emblems (neurons, nervous systems, and populations).

One may speculate on the reasons for this elision in Serres, and the repercussions of it. Indeed, one may wonder whether the relatively anti-Durkheim (and anti-Mauss

and anti-Bourdieu) stance of actor-network theory is, in part, a reflection of this bias: individual bodies (habit) and collective histories (culture) are arguably two of the most reviled enemies of this paradigm. Or, framed another way, by making the parasite a “wild card” (able to be anything anywhere anytime), and making the hurly-burly a “system” (composed of nothing but an endless stretch of endlessly swappable and scalable nodes and edges), Serres did away with most forms of traceable identity (or self-channeling channels, qua proper names) and grounded locality (or source-directed channels, qua shifters).

The Burning of Bridges

In short, just as Jakobson built on Saussure to overcome Saussure, Serres built on Shannon to overcome Shannon—each exploiting insights that were latent in the systems of their predecessors. And just as Jakobson thereby produced a more nuanced notion of codes (via his understanding of duplex categories), Serres produced a more nuanced understanding of channels (via his understanding of parasites). Each thereby transformed what seemed to be a second into a third; and each thereby recovered some of the richness that existed prior to an otherwise widespread reduction.

Moreover, in extending Jakobson’s notion of duplex categories from the relation between codes and signs to the relation between channels and signers, we have seen that Serres’s system had something like metalanguage (the parasite per se), and perhaps even reported speech (the parasite when perturbed), but nothing like proper names and shifters. Finally, just as we used Jakobson’s extension of Saussure (regarding codes) to extend Serres’s extension of Shannon (regarding channels), we might also use Serres to extend Jakobson—exploring the contours of codes through the perturbations of parasites. But that is another essay.

Of course, part of the arc of this essay’s argument is not just that circulation and interpretation have been all too often reduced to seconds (qua “code” and “channel”) rather than thirds, except in the capable hands of Jakobson and Serres. It has also argued, more or less implicitly, that circulation and interpretation are themselves just two facets of thirdness that get separated for the sake of an analytic framing—one seen from the standpoint of signifying and interpreting agents, the other seen from the standpoint of significant and interpretable entities.

Such reductions are conditioned by, if not concomitant with, this separation. And, indeed, for this primary separation to occur, a framing also needs to arise—one that distinguishes between signs, objects and interpretants (qua products or actions); or between signers, objecters, and interpreters (qua producers or actors). How the hurly-burly gets framed, separated, and reduced in these ways—and then analytically recombined for the sake of some theoretical exegesis, in the approving context of some epistemic community—is part and parcel of this process, but not my focus here.

That said, the general move from hurly-burly proper to “circulation” and “interpretation” (or, worse, to “channel” and “code”) seems to have all the trappings of a classic Heideggerian—and, before him, Peircean—anti-Cartesian argument. In other words, some might argue that terms like *interpretation* and *circulation* are the ontological equivalent of “subject” and “object”—theoretical constructs that are not adequate to any referent, but really only evince the reductive imaginary of the analyst. The real parasites would then be those who effect these framing, separating, and reducing perturbations.

The Enclosure of Disclosure and the Commensuration of Value

Let us return to the description of joint attention offered above, and thereby relate some of the foregoing ideas to more conventional understandings of circulation

and value. In particular, the object that we jointly attend to (i.e., the pen) may itself be or become a sign. And this sign may be further interpreted in a variety of ways, each of which involves the projection of value. For example, one may wield the pen (as a sign) to write a letter (as an interpretant), and thereby construe the pen in terms of use-value. One may give the pen to someone else for something else (e.g., a pencil), and thereby construe it in terms of exchange-value. And one may represent the pen with an utterance (e.g., by saying, "this pen is out of ink"), and thereby construe it in terms of semantic meaning or "truth-value."⁴ In a metaphor that obscures as much as it illuminates, we might think of value as the shadow something casts from a light-source outside of itself—where the thing is a sign, the shadow is an object, and the light-source is an interpretant. And here we have characterized three common kinds of light-sources—the instrumental, the economic, and the linguistic—which cast shadows like functions, prices, and concepts.

In this context, infrastructure is not just the conditions of possibility (physical contacts, social conventions, psychological connections) for actors within an event to attend to the same object; nor is it just that which relates a signer to an interpreter, such that a sign expressed by the former may be interpreted by the latter; nor is it merely something that serves our original delimiting, facilitating, and forestalling functions; nor is it simply that which relates to information as ground to figure, or the tacit to the occurrent. (Not to mention all the parasitic ways each of these can go awry.) It is also a condition of possibility for the relative comparability of value judgments across actors within a community who are using, exchanging, and representing things during semiotic events that are relatively displaced from each other in space, time, and person.

As is well known to theorists of modern social formations, each of the three kinds of evaluative projection is subject to intensification (through processes like quantification and abstraction) and extension (over historical time and across geographic space). On the one hand, a more originary form of use-value gets framed in terms of "technology," exchange-value in terms of "economy," and truth-value in terms of "science." On the other hand, these three kinds of values are co-articulated: means and ends, investments and returns, premises and conclusions become mutually implicated. In these ways, the three kinds of projections become part and parcel of a single project. Here infrastructure might be understood as not only a condition of possibility for the relative comparability of value-judgments across all events of wielding, exchanging, and representing (within a community). It also becomes a condition of possibility for the relative commensurability of value judgments across all communities of wielders, exchangers, and representers.

In all three cases above we focused on the conditions of possibility for there to be objects (attention), understood as having different kinds of values (projection), which may be more or less commensurate with each other, across events and groups (intensification). At some point, perhaps concomitantly with the above processes, these conditions of possibility themselves—that is, infrastructures themselves—become the object of joint attention, are subject to evaluative projection, and undergo extended intensification. The ground, qua conditions of possibility for the foregoing processes, becomes figured—and thereby reflexively becomes both the means and ends of such processes. Infrastructure (channels and institutions), as an assemblage of material, social and cognitive affordances, becomes itself the object of technology, economy, and knowledge. The end result is knowledge about (science), power over (technology), and profit from (economy) the conditions of possibility for knowledge, power, and profit.

Optimists might think that by enclosing the conditions for disclosure in this way we have built a bridge to carry bridges across banks, such that we might one day cross more distal waters; whereas pessimists might worry that we are in danger of damming the river.

Notes

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1. Kockelman (2006, 2007a, 2010) makes these points in greater detail.
2. Though narrower in scope than the parasitic function per se.
3. Elyachar's notion of "phatic labor" (2010) is relevant in both respects.
4. It has already, and perhaps more primordially, been construed in terms of "interactional value" via the ongoing dynamics of the joint-attentional event itself that brought it into inter-subjective focus in the first place.

References

- Elyachar, Julia
 2005 *Markets of Dispossession: NGOs, Economic Development, and the State*. Durham, NC: Duke University Press.
 2010 Phatic Labor, Infrastructure, and the Question of Empowerment in Cairo. *American Ethnologist* 37(3):452–464.
- Jakobson, Roman
 1990a The Speech Event and the Functions of Language. In *On Language*. L.R. Waugh and M. Monville, eds. Pp. 69–79. Cambridge, MA: Harvard University Press.
 1990b Shifters and Verbal Categories. In *On Language*. L.R. Waugh and M. Monville-Burston, eds. Pp. 386–392. Cambridge, MA: Harvard University Press.
- Kockelman, Paul
 2006 A Semiotic Ontology of the Commodity. *Journal of Linguistic Anthropology* 16(1):76–102.
 2007a From Status to Contract Revisited: Modality, Temporality, Circulation, and Subjectivity. *Anthropological Theory* 7(2):151–176.
 2007b Enclosure and Disclosure. *Public Culture* 19(2):303–305.
 2010 Value is Life Under an Interpretation: Existential Commitments, Instrumental Reasons, and Disorienting Metaphors. *Anthropological Theory* 10(1):149–162.
- Kripke, Saul
 1980 *Naming and Necessity*. Cambridge: Harvard University Press.
- Larkin, Brian
 2004 Degraded Images, Distorted Sounds: Nigerian Video and the Infrastructure of Piracy. *Public Culture* 16(4), 289–314.
 2008 *Signal and Noise: Media, Infrastructure and Urban Culture in Nigeria*. Durham, NC: Duke University Press.
- Lucy, John A., ed.
 1992 *Reflexive Language: Reported Speech and Metapragmatics*. Cambridge: Cambridge University Press.
- Peirce, Charles Sanders
 1955 *The Principles of Phenomenology*. In *Philosophical Writings of Peirce*. Justus Buchler, ed. Pp. 74–97. New York: Dover Publications.
- Putnam, Hilary
 1975 The Meaning of 'Meaning'. In *Philosophical Papers: Mind, Language and Reality*, vol. 2. Pp. 215–271. Cambridge: Cambridge University Press.
- von Schnitzler, Antina
 2008 Citizenship Prepaid: Water, Calculability, and Techno-Politics in South Africa. *Journal of Southern African Studies* 34(4):899–917.
- Serres, Michel
 2007 [1980] *The Parasite*. Minneapolis: University of Minnesota Press.
- Shannon, Claude
 1949 *Communication Theory of Secrecy Systems*. Declassified Document.

Shannon, Claude and Warren Weaver

1963 [1949] *The Mathematical Theory of Communication*. Urbana: University of Illinois Press.

Star, Susan Leigh

1999 The Ethnography of Infrastructure. *American Behavioral Scientist* 43(3):377–391.

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