

AAA Chicago, November 2013

## What should an anthropology of algorithms do?

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*Unpublished draft. If you find this useful or interesting, please let me know: [nseaver@uci.edu](mailto:nseaver@uci.edu)*

### I. ALGORITHMS ARE TAKING OVER THE WORLD

“Algorithms are taking over the world,” we are told (Steiner 2012a). High-frequency trading algorithms have changed the nature of the stock market, accelerating the pace of trading and producing so-called “ultrafast extreme events,” in which swarms of automated traders cause stock prices to crash and boom in millisecond intervals. Compression algorithms shape all of our digital signals, sent over wire or air, reducing their size so they can be packed ever more tightly and stored in ever larger sets. After fundamentally changing stock trading and the technical basis of digital communication, these bits of computer code are moving into what we might consider more “cultural” domains: Algorithms now shape decisions in the writing rooms of television studios, they assess the popularity of topics in public discourse, they power search engines, and they contour markets for books, movies, and music with personalized recommendations.

Christopher Steiner, the author of the popular book *Automate This: How Algorithms Came to Rule our World*, argues that “We are not always shaping the algorithms, they are shaping us. They shape our culture, they shape what we see, they shape what we hear, they shape how we live” (Steiner 2012b). The increasing influence of algorithmic systems in our cultural lives raises some worrying questions: Are algorithms too inscrutable or uncreative to take on the tasks to which they have been set? What happens to “culture” when it is mediated by and taken as an object of analysis for algorithms?

This is, by now, already an old story. Algorithms have become matters of popular and academic concern well beyond the world of computer science and commercial software engineering. Across the social sciences and humanities, we might identify an emerging, interdisciplinary “Critical Algorithm Studies,” populated by conferences, research programs, papers, and books on “Governing Algorithms,” “Algorithmic Culture,” “Algorithmic Living,” “The Politics of Algorithms,” and so on. This interest in

algorithms is primarily shaped by a worry about what happens when their supposedly rigid, quantitative logics tangle with the often fuzzy, qualitative logics of our traditional objects of study: culture, society, the public sphere, interpretation, politics, and so on. Algorithms, we worry, are too explicit, too formal, too quantitative — ill-suited for the messy, human, cultural phenomena to which they are being applied.

In my own fieldwork with the developers of algorithmic music recommendation systems, this antagonism is particularly evident. These systems, like Pandora Radio, apply algorithms to their users' listening history to predict what music they will like. However, even among engineers who design these tools, the very idea that taste, that thing which "there's no accounting for," might be predicted by algorithms sounds strange. It sounds like, as one of my engineer interlocutors put it, "postmodern madness."

## II. THE OPERATIONALITY OF SOFTWARE

What are algorithms? It is something of a ritual to quote a dictionary definition of the word to drive away the sinister connotations it has acquired in use, like this one from *Merriam-Webster Online*:

*n.* a step-by-step procedure for solving a problem or accomplishing some end

The apparent straightforwardness of this definition points to both the appeal and the threat of algorithms. They are, we understand, essentially simple things: they can be used to break down problems and processes into manageable constituent parts, but they always carry the risk of *over-simplification*, of misrepresenting that which they simplify.

Delving further into strategies for dealing with difficult words, we can look to *algorithm's* etymology. *Algorithm* shares its roots with *algorism*, the system of Arabic numerals and arithmetic procedures that most numerate people today take as the basic stuff of mathematics. Both words take their names from the ninth-century Persian mathematician Muḥammad ibn Mūsā al-Khwārizmī, whose writings, translated into Latin in the twelfth century, are credited with kicking off modern Western mathematics. The word *algebra* is derived from the word *al-jabr*, or "restoration" in Arabic, a word from the title of al-Khwārizmī's magnum opus on procedures for balancing the sides of equations. It is from this history that we get the idea of algorithms as a kind of recipe or process, as well as their close relationships with mathematics. The techniques schoolchildren learn when they learn to "do math" are in fact simple algorithms for producing sums, differences, products, and quotients.

Today, “Introduction to Algorithms” is a foundational course in any Computer Science department, covering topics such as the relative efficiency of various algorithms, the computability of particular problems through algorithmic methods, and the relationship between algorithms and the data on which they operate (see e.g. Leiserson and Demaine 2005). As Adrian Mackenzie has written, algorithms now “epitomize the operationality of software” (Mackenzie 2006:43), coming to stand for what many see as computing’s distinctive features: a combination of rigid procedurality, formalism, and quantification — the abstract concreteness of computation.

### III. FULL-BLOODED DESCRIPTION

Anthropology, as we might expect, first encountered the related concerns of algorithms, formalization, and mathematics through the study of kinship. E.B. Tylor’s 1889 paper “On a Method of Investigating the Development of Institutions” is one of the earliest recognizably anthropological attempts to adopt statistical methods. In it, he quantifies and visualizes such kin practices as marriage by capture, the levirate, residence, and avoidance. Beyond simple statistical counts, kinship also seemed to offer a domain well-suited to formal analysis: determining whom one was related to and what to do about it was simply a matter of applying the appropriate cultural algorithm to the appropriate socially-defined categories.

Yet this enthusiasm for formal models of kinship was not universally shared. Malinowski, writing in 1930, bemoaned what he called “the bastard algebra of kinship.” Formal treatments of kin relations seemed to neglect the lived details of relatedness. He wrote,

Kinship is a matter of flesh and blood, the result of sexual passion and maternal affection, of long intimate daily life, and of a host of personal intimate interests. Can all this really be reduced to formulas, symbols, perhaps equations? (1930:19)

The “spuriously scientific and stilted mathematization of kinship” (1930:20), as Malinowski described it, seemed to miss the point. While proliferating types and exceptions, these approaches failed to produce what Malinowski called “full-blooded descriptions” (1930:20) of the phenomena in question. Here, Malinowski casts a set of old and overlapping divides in the idiom of kinship: the distinction between *naturwissenschaft* and *geisteswissenschaft*, the quantitative and the qualitative, or, as Clifford Geertz would later contrast, “an experimental science in search of law [and] an interpretative one in search of meaning” (Geertz 1973; see Carrithers et al. 1990 for more debate on the topic).

Malinowski's call for "full-blooded description" may remind you of Geertz's later and much more famous argument for "thick description," and it should: they have more in common than an idea about what description should be like. Both pose good ethnographic description explicitly against the thinness of formal analysis. Where Malinowski took issue with the "bastard algebra" of kinship equations, Geertz defined "thick description" — that quintessential concept of contemporary ethnographic practice, especially among non-anthropologists — explicitly against what he described as the "ethnographic algorithm": mid-century formalist approaches, such as ethno-science, that used computational and linguistic tools to study culture as a set of rules for action.<sup>1</sup> Interpretively-minded cultural anthropologists thus have a long tradition of defining our descriptive richness against the thinness of formal, quantitative, and algorithmic analyses.

This tendency has continued into the present, where such formal analyses have intensified: they are not only carried out by subgroups of anthropologists working out bastard algebras and ethnographic algorithms; they are also the basis for a growing industry that builds algorithmic ways of knowing culture into influential infrastructures. The recommenders, search engines, and filters I mentioned earlier provide a foil for critiques that carry on in the tradition exemplified by Malinowski and Geertz. Where algorithmic systems of knowledge production pretend, as Geertz criticized, "to enable us to understand men without knowing them" (1973:30), qualitative ethnographic work seems better able to get at what culture *feels* like.

Among critics and advocates of algorithmic knowledge projects alike, it is now commonplace to hear that even the most algorithmic systems depend on human *insight* or *interpretation* to work effectively. So, the current state of the anthropology of algorithms: We hear either the critique that algorithms provide poor explanations for cultural phenomena or the compromise that they only provide part of the picture, needing ethnography to fill in the gaps. Our descriptions, thick and full-blooded, either fight for authority with algorithms or enter into scripted relationships with them. I now turn to the question of how these methodological relations are deemed legitimate or illegitimate — some notes toward a study of the kinship of method.

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<sup>1</sup> Geertz's position on the analogy between culture and the computer shifted over time: here he suggests the inadequacy of an algorithmic understanding of culture (on the grounds that it lacks interiority). In "The Impact of the Concept of Culture," he claims that culture can be seen as "a set of [exterior to the mind] control mechanisms — plans, recipes, rules, instructions (what computer engineers call 'programs') — for the governing of behavior" (1973:44). In "After the Revolution," he argues that computer programs are too easily written down and thus separated from the processes in which they are involved, making "them less useful as models for the interaction of cultural patterns and social processes" (1973:250). The issue is not so much whether computers per se are appropriate tools or metaphors for a given task or problem, but rather that computers can be understood in a variety of ways.

#### IV. BASTARD ALGEBRA

While anthropologists have examined at length the implications of “full-blooded description” (e.g. Bouquet 1993:118–120) and “thick description” (e.g. Love 2013), I want to focus on their subalterns — the “bastard algebras” and “ethnographic algorithms” against which interpretively-minded cultural anthropologists have made sense of their own descriptive practice over the course of the twentieth century. Since at least Malinowski’s time, we have come to understand what interpretively-minded cultural anthropology is by distinguishing it from its quantitative, formalized other. As I have been outlining, this opposition has remained compelling for anthropologists into the twenty-first century, where it configures a substantial amount of anthropological attention towards algorithms. I want to suggest that the anthropology of algorithms might move beyond re-enacting this old dualism and instead take the production of the dualism itself as an object of study.

To elaborate, let’s pause over Malinowski’s term “bastard algebra.” In what sense are these formal analyses “bastards”? Malinowski seems to be suggesting that these methods are the illegitimate offspring of two clans of inquiry — the mathematical and the anthropological. Mathematicians would not claim this algebra as their own, and “the average anthropologist,” as Malinowski writes, would not either. To this day, many cultural anthropologists remain uneasy about this mixture, and to borrow another bit of kinship terminology, we tend to establish avoidance relationships with mathematics, when we are not dismissing it outright.

Malinowski’s choice of metaphor should make us squirm: what is this anthropology that rejects bastards and advocates for “full-bloodedness”? As we’ve learned from the anthropology of kinship, bastards and other exceptions to the rules are usually the norm. Instead of bemoaning the illegitimacy of bastard analysis and trying to purify our methodological bloodlines, the anthropological thing to do, it seems, would be to examine the rules and practices that legitimate particular kinds of relation and not others. To do so, we might draw on more recent studies of kinship, especially studies of queer kinship (e.g. Weston 1992) and kinship with new reproductive technologies (e.g. Strathern 1992), which do not take relatedness as a matter of natural orders, culturally interpreted, but rather as a topic characterized by “contradiction, paradox, and ambivalence” (Peletz 1995:360).

#### V. THE ULTIMATE DISSOLUTION OF “ALGORITHMS”

Interpretively-minded cultural anthropologists are not the only ones concerned with regulating their methodological kinsmen. As we know from the STS literature, people

involved in the formal production of knowledge of all kinds often systematically elide the “sociocultural” aspects of their practice — moments of choice, interpretation, and flexibility, the influence of contextual factors that are not supposed to be there, and so on. Engineers, like cultural anthropologists, are expected to stick with the clan. The engineers with whom I conduct my fieldwork provide an interesting counterpoint to this tendency. As they design algorithms meant to recommend music to listeners, they constantly work to mediate between deeply held ideas about the subjectivity of “cultural” materials and the objectivity of algorithms. Put crudely, they are professional bastard-makers, producing unauthorized offspring from cultural and algorithmic clans.

The constitution of these “clans” is, of course, culturally specific. As you may have noticed, I have shifted awkwardly across a number of terms in referring to these two groups. On the one hand, we have the quantitative-algorithmic-formal-mathematical-*naturwissenschaft*, and on the other we have the qualitative-interpretive-descriptive-cultural-*geisteswissenschaft*. These are not discrete groups so much as loose confederations, and each of these terms emerges from particular debates and contexts. To borrow a term that Wittgenstein used to describe the various practices assembled under the name “mathematics,” these groups are “motleys.” Even within our putative clans, we’re in a situation of mixture, hybridity, and ill-defined ancestry.

We might note that the anthropology of technology and the study of kinships both queer and technologically-aided have something in common: they share a concern with choice, flexibility, and ambiguous boundaries in domains where such qualities are often thought to not exist. An anthropological engagement with algorithms found out in the field might draw on both the anthropology of technology and the queer anthropology of kinship, questioning the disciplinary boundaries which many take as foundational, seeking not the essences of pre-given methodological clans, but rather the details of choice and flexibility. To do so would be to lower our interpretive weapons, to allow that hybridity and involution are the norm, and to suspend our obsession with “full-blooded description.” Following Alfred Gell, who made this point about art, we might say that an anthropology of algorithms should aim at the ultimate dissolution of “algorithms” — to denaturalize the idea that “the algorithmic” designates an essentially unified clan of methods that is everywhere the same.<sup>2</sup> Complementarily, we might examine how our own ideas about method rely on such preconceptions about what algorithms are like. The anthropology of algorithms should remain open to both the generative potential and the inevitable ubiquity of methodological bastardy.

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<sup>2</sup> “The ultimate aim of [the anthropology of art] must be the dissolution of art, in the same way that the dissolution of religion, politics, economics, kinship, and all other forms under which human experience is presented to the socialized mind, must be the ultimate aim of anthropology in general” (Gell 1992:41).

## Works Cited

Bouquet, Mary

- 1993 Reclaiming English Kinship: Portuguese Refractions of British Kinship Theory. Manchester University Press.

Carrithers, Michael, Andrew Bary, Ivan Brady, Clifford Geertz, Roger M. Keesing, Paul A. Roth, Robert A. Rubinstein, and Elvi Whittaker

- 1990 Is Anthropology Art or Science? [and Comments and Reply]. *Current Anthropology* 31(3):263–282.

Geertz, Clifford

- 1973 *The Interpretation of Culture*. New York: Basic Books.

Gell, Alfred

- 1992 *The Technology of Enchantment and the Enchantment of Technology. Anthropology, Art, and Aesthetics*. Coote and Shelton, eds. Oxford: Clarendon.

Leiserson, Charles and Erik Demaine

- 2005 6.046J Introduction to Algorithms (SMA 5503). MIT OpenCourseWare: Massachusetts Institute of Technology. <http://ocw.mit.edu/courses/electrical-engineering-and-computer-science/6-046j-introduction-to-algorithms-sma-5503-fall-2005>.

Love, Heather

- 2013 Close Reading and Thin Description. *Public Culture* 25(3):401–434.

Mackenzie, Adrian

- 2006 *Cutting Code: Software and Sociality*. New York: Peter Lang.

Malinowski, Bronislaw

- 1930 Kinship. *Man* 30:19–29.

Peletz, Michael

- 1995 Kinship Studies in Late Twentieth-Century Anthropology. *Annual Review of Anthropology* 24:343–72.

Steiner, Christopher

- 2012a Algorithms are Taking over the World. TEDxOrangeCoast. [http://youtu.be/H\\_aLU-NOdHM](http://youtu.be/H_aLU-NOdHM).

- 2012b *Automate This: How Algorithms Came to Rule Our World*. New York: Portfolio/Penguin.

Strathern, Marilyn

1992 *After Nature: Kinship in the Late Twentieth Century*. Cambridge: Cambridge University Press.

Tylor, Edward Burnett

1889 On a Method of Investigating the Development of Institutions; Applied to Laws of Marriage and Descent. *The Journal of the Anthropological Institute of Great Britain and Ireland* 18:245–272.

Weston, Kath

1992 *Families We Choose: Lesbians, Gays, Kinship*. New York: Columbia University Press.