‘Tortoises all the way down’:
Geertz, cybernetics and ‘culture’ at the end of the Cold War

Introduction

In the second essay of *Interpretation of Cultures* — the essay entitled 'The Impact of the Concept of Culture on the Concept of Man' — Clifford Geertz ([1965]1973: 44)* offers an early, beguiling account of his culture concept:

> Culture is best seen not as complexes of concrete behavior patterns — customs, usages, traditions, habit clusters — as has, by and large been the case up to now, but as a set of control mechanisms — plans, recipes, rules, instructions (what computer engineers call 'programs') — for the governing of behavior.

This claim, that culture is analogous to computer programs, is curious given Geertz's centrality to the 'cultural turn' (Bonnell and Hunt, 1999; Chaney, 2002; Cook et al, 2012). To contemporary readers, 'control mechanisms', 'rules' and 'programs' are more likely to signal authoritarian or highly prescriptive practices, rather than the open, interpretative and agential social interactions associated with Geertzian culture.

'The Impact of the Concept of Culture on the Concept of Man', first published in 1965, inhabits an interstitial moment within Geertz's larger body of work. It appears between his earliest ethnographic writings on Indonesia and his now famous exposition of 'thick description' as the hermeneutic method for unpacking culture as a public, social artifact. In this largely overlooked essay, Geertz ([1965]1973: 44) claims that his theory of culture was predicated on a broader concept of man: 'man' he explains 'is the animal most desperately dependent upon such extragenetic, outside-the-skin control mechanisms, such cultural programs, for ordering his behavior'. According to him, a number of important mid-century developments 'within

anthropology, and in other sciences (cybernetics, information theory, neurology, molecular genetics)' had furnished more precise definitions and greater empirical support for this view of man, as an incomplete animal desperately in search of rules, algorithms and instructions, and of culture, as a type of operational software or programming.[1] What is more, the information networks that created and circulated culturally 'significant symbols' were not buried inside the minds of individuals, but circulated socially, in plain sight. For Geertz ([1965] 1973: 45), this ' "control mechanism" view of culture' is useful because 'it begins with the assumption that human thought is basically both social and public — that its natural habitat is the house yard, the marketplace, and the town square'.

How should contemporary audiences parse references to cybernetics and information theory in the middle of this account of culture? How did cybernetics — the study of feedback-driven, self-regulating systems — inform Geertz's notion of culture as constructed meaning? Readers might recall Geertz's ([1967] 1973: 351) tart criticism of Levi-Strauss' *La Pensee Sauvage,* a text he ridiculed for its 'exultant sciencism', cobbled together from 'structural linguistics, communications theory, cybernetics, and mathematical logic'.[2] Was Geertz guilty of the same quasi-scientific embellishments? These questions are further muddled by the location of *The Interpretation of Cultures* within Geertz's career and more broadly within the trajectory of postwar American social thought. Published in 1973, the collection emerges on the scene just as the cybernetics movement – an important driver of postwar American science and innovation – starts to wane, losing some of its broad appeal.[3] Moreover, within Geertz's career, *The Interpretation of Cultures* is widely

seen as a turning point, the moment when interpretation — freed from the baggage of Parsonian systemic totalities, psychological determinism and Levi-Straussian structuralism — enters the scene of American cultural theory. Or at least, this is how Geertz's culture concept is received, not only in anthropology, but in other disciplines, where, by the late 1970s, the notion of interpretation appeared more broadly commensurate with renewed commitments to the centrality of the human agent and of social contingency — of meaning and context rather than structure and form (Hunt, 1989; Ortner, 1999; Bonnell and Hunt, 1999). The reference to cybernetics in the second essay of his famous volume appears strangely anomalous.

Was the reference to cybernetics simply a voguish citation, leftover from an earlier time period? *The Interpretation of Cultures* is, after all, a compilation of Geertz's earlier pieces. With the exception of the introductory essay, 'Thick Description', each of the chapters had been published before.[4] The vast majority of the works were written in the 1960s, when cybernetics and information theory were still very popular, both in scholarly circles and in popular discourse. A closer examination of the text and its history, however, dispels such easy dismissals. In fact, *information*, as a central problem and mechanism for human understanding, animates much of Geertz's writing from the late 1950s through to the 1973 publication of *Interpretation of Cultures*. Seen in this context, the cybernetic references in the 'Impact' essay form part of a long and well laid out agenda within his writing on culture. As this essay will demonstrate, cybernetics and information theory were significant sources for Geertz's account of human self-fashioning – a process by which humans 'complete' themselves through the creation of socially sourced cultural

instructions. This 'informatic ontology', as I label it here, depends upon feedback loops connecting social and biological processes. Precipitated by the global political volatilities that Geertz and his colleagues witnessed in the 1960s, cybernetic theory helped him grapple with and significantly reformulate midcentury debates on human cultural diversity. In the process, his new account of culture successfully shifted scholarly focus from the stability and self-regulation of social life, towards new interests in indeterminacy, historical contingency and the flexibility of recursive social processes.

Rather than enclose the innovations of cybernetic thought within the seeming cul-de-sac of Cold War science, new scholarship has begun tracing its legacy and impact on contemporary knowledge practices. By the end of the 20th century, cybernetics had been largely dismissed by scholars as a neo-mechanistic computational practice, tied to the aspirations of American defense interests and the conceptual reductions of war games, rational choice theory and missile guidance science (Galison, 1994; Johnston, 2009). However, a wide range of new research has started to reconsider the historical context of late Cold War cybernetic science and its influence on later innovations in linguistics, computational science, warfare, psychology, architecture, art, social theory and business management (Geoghegan, 2011; Halpern, 2014; Kline, 2015; Liu, 2010; Martin, 2005; Mirowski, 2003; Pickering 2010). Using cybernetics as a starting point allows contemporary scholars to write new historical genealogies of our present techno-scientific investments. As the bitter and acrimonious battles of the science/culture wars begin to recede, contemporary social science must struggle with new theoretical horizons, which position culture and

nature not as opposing forces, but as parts of a single matrix – making visible new, post-human ontologies of the subject (Braidotti, 2013; Descola, 2005, Hayles, 2008; Wolfe, 2003). Less persuaded by the sureties of earlier social theory, scholars are increasingly encouraged to pay attention to the contingent, emergent and indeterminate properties of social phenomena (Collier and Ong, 2005; Roitman, 2014; Tsing, 2004). These concerns, driven by the impact of automation, the harsh realities of post-work economies and the growing reach of digital communications and networks, have renewed scholarly interests in cybernetics, network societies and the history of modern information infrastructures. In revisiting Geertz's notion of culture, we follow one nodal point towards this present, and in the process can better understand how the legacies of postwar cybernetics continue (albeit transformed) to shape our understanding of humans as subjects embedded in complex information systems.

Such work also provides an important conceptual bridge, re-connecting recent scholarly interest in anthropological ontologies with their midcentury precursors. In his review of anthropology's recent 'ontological turn', John Kelly draws on the writings of Phillipe Descola to explore a three-fold distinction between ethnography, ethnology and anthropology. For Descola, ethnography serves as the lowest (primary) level of anthropological research, constituted by the immediacy of the ethnographic encounter. Ethnology, situated at one level of conceptual distance from ethnography, provides tools for comparative work across different subjects and contexts. The third and final level of scholarship, 'anthropology' proper, is a philosophical field that explains 'more generally how particular beings, humans,

operate, detect, and transform their environments, with remarkable but not infinite diversity, and thus how worlds are composed' (Kelly, 2014: 261). According to Descola, '[t]here are few people – Levi-Strauss is one of them – who do anthropology in [this] sense' (Descola, 2014: 9). Descola contrasts philosophical anthropology with Geertzian 'thick description', which, he argues, engages in the production of dense cultural prose in the service of ethnography, but does not tackle the larger question of how humans produce ontological relationships.

Though Descola reassures readers that ontology never completely disappeared from anthropological concerns, the discipline's recent 'ontological turn' presumes a significant scholarly shift in the last decades of the 20th century towards epistemology as the only available terrain for explaining social differences. Yet, the essay, 'The Impact of the Concept of Culture on the Concept of Man', with its midcentury references to cybernetics, information theory and molecular biology, demonstrates a different historical trajectory for our modern culture concept. As historian and cultural theorist William Sewell explains, Geertz built his theory of culture on an 'impressive ontological foundation' (1999; 46), in which biology, human self-fashioning and cultural symbols are mutually dependent and connected by recursive, feedback driven processes of development and adaptation. This 'informatic ontology' does not always provide the detailed, rich account of world-making found in current writings associated with the 'ontological turn', but there are nevertheless important overlaps. Both accounts deliberately connect natural and cultural worlds within a single sphere of analysis, and shift theoretical emphasis away from merely mental 'understandings' towards tracing densely mediated, emergent forms of human and

social organisation. Ontological notions, rather than disappearing from anthropology in the late twentieth century, have been lurking at the back of anthropological hermeneutics for a long time.

A deep historical investigation of Geertz's culture concept also provides new traction on questions and problems that have long plagued the reception of his hermeneutic method. Despite its immense popularity, which stretched far beyond the field of anthropology, scholarly assessments of Geertzian culture frequently raise as many questions as they answer. Many of the significant critiques of Geertz point out that his theory of interpretation elides questions of power. Whose cultural interpretations are authorized and whose are rendered mute or ineffective (Asad, 1983; Marcus and Clifford, 1986; Rosaldo, 1989; Bonnell and Hunt 1999; and Ortner 1999)? Was Geertz's notion revolutionary or reactionary? Was he an essentialist or a social constructivist? Is culture something humans *do*, or something they *are* (Wedeen, 2002)? Is this idea of culture attentive to human difference in a way that eschews racism, or does it fall back on racialized stereotypes (Trouillot, 2003)?[5] Given Geertz's extraordinary impact, not only on anthropology but a wide range of related fields in the social sciences and humanities, how do we begin to understand and disentangle his theory from its broader reception? Which conceptual questions or thorny problems did this concept 'solve', such that it brought so much newness to history, literature and politics (Scott, 1992; Scott, 2002)? Sorting through these dilemmas requires a close re-examination and an excavation of the intellectual milieu in which it was produced — one that goes beyond the euphoria of rupture surrounding the cultural turn.

Re-examining the 'Impact of the Concept of Culture' essay, paying particular attention to its reliance on notions of cybernetic feedback and control, untangles some of the central questions that have long plagued the reception of Geertz's culture concept. It allows contemporary critics to better situate the concept within the turbulent politics of the 1960s, framing that moment more clearly and with greater distinction from the 'cultural turn' of the 1970s and the 1980s. Uncovering such conceptual genealogies helps reconnect Cold War anxieties to the theoretical concerns that animate current anxieties about global information societies. In his book *Machine Dreams*, the economist and economic historian Philip Mirowski argues that cybernetics and its many related fields (such as computer science, informatics, rational choice theory, operations research and game theory) served as a backbone of American social science in the post-War period. Mirowski (2002: 6-7) describes how the computer, as metaphor and instrument, remakes the field of economics around the powerful idea of quantifiable 'information', and suggests that this provides a broader template for thinking about many related postwar spheres of knowledge production. When Geertz says that culture serves as a control mechanism for human action (just as programs guide computers), we get a sense of just how deeply this structure of thought ran.

A Cybernetic Geertz: Culture as Information

'The Impact of the Concept of Culture on the Concept of Man' was first delivered as a lecture at the University of Chicago on May 10, 1965 (University of Chicago Press Office, n.d.). It was commissioned as part of a series of public talks,

titled the 'Monday Lectures,' that were presented before a live audience and also broadcast on radio. Spearheaded by the biophysicist John R. Platt, the series gathered scholars across various disciplines:

> The idea was to attempt once more, in the light of new scientific and philosophical and humanistic ideas, to answer the eternal questions, 'Where do we come from? Who are we? Where are we going?' (Platt, 1965: 3).

The organisers believed that robust dialogues across the humanities and natural sciences had become increasingly urgent in the context of expanding American power and technological might. Platt, in his editorial introduction to the collected lectures, writes, 'Today we are in the midst of a transitional crisis as we move with halting steps through a time of great danger, unsteadily but surely in the direction of a high-technology world society' (Platt, 1965: 4). The terms 'crisis' and 'danger' had multiple possible referents. The Monday Lectures were first published in the *Bulletin of the Atomic Scientists*. From its inception in 1945, the *BAS* was concerned with the power and enormous peril posed by nuclear energy and the atomic bomb. The magazine is best known for creating the Doomsday Clock in 1947 to highlight the imminent threat and devastating consequences of nuclear warfare.[6] At the same time, the 'crisis' of the American academy referred to a growing unease, which undermined many of the conceptual totalities operative within discrete fields of knowledge between the mid-1960s and mid-1970s. Partly connected to wider political unrest and tied to the emerging civil rights and campus student movements, this rising turbulence would many unsettle established disciplinary and social boundaries in the years to come.[7]

The Monday Lectures were held at the University of Chicago during the winter and spring quarters of 1965.[8] The entire series was published twice between 1965-1966 — first, in serialized and abridged articles in the *Bulletin of the Atomic Scientists* and later, in the collected volume *New Views on the Nature of Man.* Between the spring of 1965 and its eventual appearance in *The Interpretation of Cultures*, 'The Impact of the Concept of Culture on the Concept of Man' appeared in publication at least six times. Geertz was a prolific re-publisher. In addition to its publication in the *BAS* and the collected volume of Monday Lectures, the essay also appeared in the journal *Social Education*, in a psychiatry magazine titled *Reflections* and in two more edited volumes – Yehudi Cohen's *Man in Adaptation* and Eugene Hammel's *Man Makes Sense* (Geertz, n.d.b). Prior to the publication of the *Interpretation of Cultures*, it stood out for nearly a decade as Geertz's singular statement on the culture concept.

In his 1965 Monday Lecture, Geertz explains that understanding man — his nature, potential and limitations — is a necessary precursor to understanding the concept of culture. He contrasts two opposing views of man and his relationship to culture. The first (which Geertz calls the stratigraphic view) is based on Talcott Parsons's action system theory, and sees culture as just one particular layer of structuring determinants (alongside biology, psychology and society) that together explain the complexity of human action (Geertz, [1965] 1973: 37). He explains:

> In this conception, man is a composite of 'levels,' each superimposed upon those beneath it and underpinning those above it. As one analyzes man, one peels off layer after layer, each such layer being complete and irreducible in itself, revealing another, quite different sort of layer underneath (Geertz, 1973: 37).

Parson's action theory recognized culture as a crucial aspect of human life. However, it turns the study of culture into a search for universals, much as the disciplines of biology, psychology, and sociology sought commonalities across human experience, irrespective of history, location or other specificities. This stratigraphic view encouraged a search for 'empirical uniformities that, in the face of the diversity of customs around the world and over time, could be found everywhere in about the same form' (Geertz, [1965] 1973: 38).

The quest for such 'bloodless universals', explained Geertz, failed to grasp or appreciate the importance of human diversity. Moreover, the relationship between cultural factors and non-cultural factors remained obscure. He worried that once 'culture, psyche, society, and organism have been converted into separate scientific "levels," complete and autonomous in themselves, it is very hard to bring them back together again' (Geertz, [1965]1973: 41). In his undergraduate lecture notes from this same period, Geertz complained that Parsons's complex taxonomies veiled the relationship between different levels of social phenomena. He (n.d.a, emphasis added) explained that personality, society and culture each "have […] varying patterns of integration, [so that] what are *values* at the cultural level are *needs* at the personality level and *role expectations* at the social'. Parsonian social theory, however, quite often failed to clearly explicate the connections between cultural (symbolic) values and psychological needs or social obligations. Such frustrations lead him to propose a more streamlined account of human action. Geertz wanted a model that was capable of integrating social, psychological and biological factors into

a singular, ontological account of man, while still being able to account for the wide-ranging, constitutive nature of human cultural variation.

It is in this context that Geertz proposes a different culture concept, one that sees culture as a set of 'control mechanisms — plans, recipes, rules, instructions (what computer engineers call 'programs') for the governing of behavior'. His view of culture rests on his view of man as being 'precisely the animal most desperately dependent upon such extragenetic, outside-the-skin control mechanisms, such cultural programming, for ordering his behavior' (Geertz, [1965] 1973: 44). This new theory, rather than stressing underlying social and biological commonalities, was concerned with how humans negotiated variation and indeterminacy. According to Geertz ([1965] 1973: 44), 'we all begin with the natural equipment to live a thousand kinds of life but end in the end having lived only one'. What explains the choices and actions that come to define the lives people actually lead? Here lay culture's real explanatory potential. Lower animals can rely almost entirely on their biological programming to guide their actions, but human biology is sorely 'incomplete' (Geertz, [1965] 1973: 47).

Geertz outlines a slow evolutionary process by which crucial human activities (hunting and gathering, tool making, the creation of social structure) arose alongside symbolic structures (language, art, myth, ritual). Geertz explains that '[b]etween the cultural pattern, the body and the brain, a positive feedback system was created in which each shaped the progress of the other'. Biology and culture were mutually dependent forces; understanding their interplay accounted for the emergence of complex human behavior and its wide-ranging potential:

> By submitting himself to governance by symbolically mediated programs for producing artifacts, organizing social life, or expressing emotions, man determined, if unwittingly, the culminating stages of his own biological destiny. Quite literally, he created himself (Geertz, [1965] 1973: 48).

In turning to cybernetics, Geertz gives his readers an informatic ontology, one in which cultural symbols supplement biological programming by giving specific shape and form to the very indeterminate, vague possibilities into which humans are born. 'We are, in sum,' explained Geertz, 'incomplete or unfinished animals who complete or finish ourselves through culture — and not through culture in general but through highly particular forms of it' (Geertz, [1965] 1973: 49). While all humans are biologically equipped to speak, we are only equipped by our culture to speak English.

The specificity of cultural production was not mere embellishment or elaboration, but a human necessity. At a very fundamental level, we would simply cease to function without these vitally important cultural codes. Humans 'without culture would not be the clever savages of Golding's Lord of the Flies thrown back upon the cruel wisdom of their animal instincts', he argues. Rather they would be 'unworkable monstrosities' (Geertz, [1965] 1973: 49). This central lesson — that culture provides vital, socially-constructed programming and instructions, without which humans would be dysfunctional — was largely forgotten, after the publication of *Interpretation of Cultures*, whose reception centered around the agency of interpretation, rather than the underlying ontogenetic co-constitution of man and culture. Interpretation, and Geertz's hermeneutic approach, offered readers greater scope for exploring social choice and agency — setting human action free from the

staid determinations of social structure and biological necessity. In the process, we forgot that cultural interpretation was itself a necessary component of human life. Without it, we would be as 'unworkable' as a computer without a program.

While references to cybernetics recede from Geertz's writings after the publication of the *Interpretation of Cultures*, the underlying ontologies never disappear from Geertz's account of culture. In his essay, 'Culture, Mind, Brain/Brain, Mind, Culture,' published in 2000 in the collection *Available Light*, he writes:

> [The] co-evolution of body and culture, the functionally incomplete character of the human nervous system, the ingredience of meaning in thought and of thought in practice—suggests that the way toward an improved understanding of the biological, the psychological, and the sociocultural is not through arranging them into some sort of chain-of-being hierarchy.

Here, Geertz revisits his old objections to Parsons's 'stratigraphic' model. The path forward, he explains, had already been suggested by other fields, where we have become 'used to dealing with distributive, partially connected, self-organizing systems, especially in engineering and biology, and in computer simulations of everything from ant hills and neuron assemblies to embryonic development and object perception' (Geertz, 2000: 206-7).[9] This is merely an update of the concepts and language found in this original 1965 lecture. 'Self-organizing systems' and 'parallel distributed processing' represent areas where the lasting legacies of mid-century cybernetics continue to impact contemporary conceptual landscapes and sites of technical practice. In this late essay, Geertz laments the disciplinary distance between psychology and cultural anthropology, and reminds readers that analyzing

the partial, constitutive connections between biology, psychology and sociology provides the key to understanding humans, as a species, and their on-going development. He writes (2000, 205), ' Our brains are not in a vat, but in our bodies. Our minds are not in our bodies, but in the world. And as far as the world, it is not in our brains, our bodies, or our minds: they are, along with gods, verbs, rocks, and politics, in it'. These claims attest to the ontological nature of Geertz's theory, in which his famous hermeneutic method of 'thick description' sits atop an account of how humans materially create themselves, their societies and the world around them, through on-going informatic processes that connect brains, minds and socially-embedded symbols. They also evidence Geertz's faith in the open-ended processes of self-fashioning that characterised his more discontinuous model of social systems, in contrast to an older, Parsonian emphasis on social stability and order.

The Biography of an Essay

The key to understanding Geertz's ontological formulation lies in his use of the term 'information', which consistently animates his writings from the 1960s. It is a term that Geertz borrows from Parsonian systems theory, but one he re-appropriates to launch a new account of culture – as recursive, emergent and highly contingent. Witnessing growing political unrest on US campuses as well as rising ethnic tensions in the 'new nations' of the formerly colonized world, Geertz turns to information theory to better understand social discontinuity and instability within social forms. The 'Impact' essay presents the most developed account of culture as 'programming', but it was not an isolated statement. Similar arguments (of culture as a set of codes,

rules, recipes and programs), grounded in postwar techniques for mathematically analysing information, can be found throughout Geertz's essays of this period. In his college lecture notes from this period, Geertz writes:

> Culture […] is to be understood not as a mere instrument for practical ends […], nor as a mere reflection of social arrangements […] , nor yet as a mere means of knowing, in the purely cognitive sense […], but rather culture is to be considered as a set of, to introduce a new term, *information sources* in terms of which men order their behaviour (Geertz, n.d.a, emphasis added).

In 'Impact', he summarizes the human condition by arguing that we 'live in an 'information gap' (Geertz, [1965] 1973, 50). Since our biological programming is insufficient for navigating a complex and unfamiliar world, we must learn and manipulate socially meaningful symbols to create instructions that supplement our genetic heritage. We depend on what Geertz, in various essays from this period, describes as 'extragenetic information'. Lesser animals largely rely on instinctual response mechanisms coded into their genetic make-up, but we humans, with our expansive intellects, agency and varying capacities, biologically evolved hand in hand with our ability to forge, follow and transform cultural imperatives and logics.

Geertz fleshes out this theory in his 1966 essay, 'Religion as a Cultural System'. He explains that, unlike genetically coded instructions, extragenetic information is located 'outside the boundaries of the individual organism', residing instead in the social, 'intersubjective world of common understandings into which all human individuals are born'. Cultures should be understood as 'sources of information' (like genes), because 'they provide a blueprint or template' for guiding human action

(Geertz, [1966b] 1973, 92). This language is nearly identical to the earlier 'Impact' essay, but here Geertz goes further, explaining that, just '[a]s the order of bases in the strand of DNA forms a coded program, a set of instructions, or a recipe, [....] so culture patterns provide such programs for the [...] social and psychological processes which shape public behavior' (Geertz, [1966b] 1973, 92). Geertz is keen to explain that the comparison between genes and cultural symbols is 'more than a strained analogy'. Between the two, there is

> actually a substantial relationship, for it is precisely because of the fact that genetically programmed processes are so highly generalized in men, compared with lower animals, that culturally programmed ones are so important; only because human behaviour is so loosely determined by intrinsic sources of information that extrinsic ones are so important' (Geertz, [1966b] 1973, 92-93).

Geertz's writings of this period rearticulate the Herderian view of man as an 'incomplete' animal within the emerging conceptual terrain of genetics, molecular biology and information studies, to argue that human genes are supplemented by symbolic codes and instructions. In 'Ideology as a Cultural System', Geertz ([1964] 1973, 217-8) reiterates that man is a 'self-completing animal'. An 'agent of his own realization, he creates out of his general capacity for the construction of symbolic models the specific capabilities that define him'. People must fill the 'information gap' they are born into by creating roadmaps, poems and other cultural forms that transform uncertainty into highly specified possibilities and actions.

Geertz developed some of these ideas in an earlier essay, entitled 'The Growth of Culture and the Evolution of the Mind' (1962). Based on the writings of Sherwood L. Washburn and William W. Howells, Geertz ([1962] 1973, 67-8) explains that the human brain, with its enormous processing capacity, developed alongside the ability to create symbols and forge durable social structures (see also Sewell, 1997, 43-4). He explains to readers that during the Pleistocene, human neural development expanded significantly, aided by a rapidly changing cultural setting:

> The Ice Age appears not to have been merely a time of receding brow ridges and shrinking jaws, but a time in which were forged nearly all the characteristics of man's existence which are more graphically human, his thoroughly encephelated nervous system, his incest-taboo-based social structure, and his capacity to create and use symbols.

This, argued Geertz, was not merely a question of historical ordering (whether neural development preceded culture or not), but suggested a relationship of mutual dependence. Humans, with their impressively large brains, would have been utterly dysfunctional without culture (an idea that he reiterates in the 'Impact' essay):

> Rather than culture acting only to supplement, develop, and extend organically based capacities logically and genetically prior to it, it would seem to be ingredient to these capacities themselves. A cultureless human being would probably turn out to be not an intrinsically talented but unfulfilled ape, but a wholly mindless and consequently unworkable monstrosity (Geertz, [1962] 1973, 68).

Cultural 'information', seen in this context, is not immaterial or 'idealist', as some critics of Geertz have claimed (see Roseberry, 1989). Rather, it is as necessary for human functioning as breathing. William Sewell, summarizing Geertz, explains that 'semiotic systems are not unworldly or ghostly or imaginary; they are as integral to the life of our species as respiration, digestion, or reproduction' ([1962] 1999, 45).

Geertz's 'Growth of Culture' essay bridges developments in the postwar behavioural sciences (including psychology and sociology) with scholarship in the philosophy of mind. By the 1960s, the behavioural sciences were suffused with concepts and vocabulary borrowed from cybernetics and information theory. Irwin Pollack's 1968 entry for 'Information Theory' in the *International Encyclopedia of the Social Sciences* demonstrates the extent of this borrowing:

> The very verbal descriptive fabric of the behavioural sciences has become thoroughly interlaced with informational concepts: individuals or groups are described as 'information sources' or 'receivers'; skilled performance is described as 'information processing'; memory is described as 'information storage'; nerves are described as 'communication channels'; the patterning of neural impulses is described as 'information coding'; the brain is described as 'an information complex,' etc. (Qtd in Kline, 2017, 10)

The widespread usage of 'information' throughout the human and computational sciences speaks to a broader set of historical transformations, signaling an emerging global 'information era' during the later half of the 20th century (Castells, 1996; Castells, 1997; Castells, 1998; Kline, 2015; Gleick, 2011). Starting in the immediate postwar period, innovative work in engineering, applied mathematics and

communications began to frame 'information' as a crucial feature of all dynamic processes – central to feedback, regulation and learning, in both biological and artificial systems. These ideas formed the core principles of cybernetics, a postwar 'interdiscipline' popularized by the 1948 publication of Norbert Wiener's *Cybernetics – Or Control and Communication in the Animal and the Machine* (Wiener, [1948] 1961; Galison, 1998). Wiener and his colleagues began their cross-disciplinary study of feedback loops in the 1930s, but found greater impetus for their work after the war, when new, general-purpose electronic computers became widely available for research.

This work also coincided with the formal development of information theory, pioneered by Wiener and Claude Shannon.[10] Shannon's mathematical analysis of data transmission (as the relationship between signals and noise) inspired scientists in numerous fields, including sociology, molecular biology, applied mathematics and robotics, in their investigations of the informatic exchanges that drive metabolism, growth and development (see Ashby, 1960; Wiener et al, 1943; Wiener, 1948; Shannon and Weaver, [1949] 1964). Citing recent work by Lily Kay (2000) and Evelyn Fox Keller (1995), Ronald Kline (2015, 94) explains that 'life scientists, especially molecular and developmental biologists, readily embraced cybernetics in the 1950s because of its promise to mathematically model living organisms and break the genetic code'. When Geertz frames culture as rules, recipes and codes for behaviour – and references innovations in cybernetics, information theory and molecular genetics – readers begin to appreciate the range and significance of these

vast, but rapidly converging conversations. 'Information' was a vital part of advanced biological systems, and brains and their 'programs' formed inseparable wholes.

This period also witnessed important new breakthroughs in the development of transistors, microchips, semiconductors and fibre optic cables (Braun and McDonald, 1982; Gertner, 2012; Hecht, 1999). During the early decades of the postwar period, 'information' as an object of analysis and scholarly work underwent significant change. By the end of the 20th century, the term 'information' did not merely signify immaterial thoughts, ideas and facts – as it had a century prior. It now referenced a new, highly modern material artifact that took up space (in bits and bytes), was protected by data and privacy laws and required increasingly significant amounts of global energy to create, store and reproduce – even as it became economically cheaper to process and transmit.

Geertz repeats this central claim, that genes and symbols are mutually dependent sources of 'information', across a wide range of essays in the 1960s, but he was not the first to make this argument. He borrows this formulation, of culture as a source of 'information', from Parsons, who was deeply interested in the operational similarities between cultural symbols and genetic codes. Following the work of the insect biologist, Alfred Emerson, who argued for 'a functional equivalence' between 'the gene' and the 'the symbol', Parsons stressed that 'the genetic constitution of the species' and 'the cultural heritage of social systems' were not two opposing and incommensurate sources of human behavior, but rather that biology and culture should be seen as distinct but interpenetrating levels, or sub-systems (Parsons, 1970:

850). The innovations of cybernetics and information compounded these claims, by flattening the difference between biology and culture into commensurate sources of 'information'. For Parsons, the fact that genes and symbols both carried decodable instructions helped explain how such equivalences operated in different, but connected domains, of human activity.

Given Parsons's deep theoretical commitment to the functional similarities of genes and symbols – a notion that he derived partly from midcentury cybernetics – it is curious that Geertz would also lean so heavily on cybernetics and information theory when framing his concept of culture. At first glance, it appears a strange choice for constructing an account of man (and his culture) that stood in opposition to Parson's stratigraphic model. In order to understand and appreciate the contrast between these different theories of human activity, it is important to recognise that Geertz and Parsons engaged different aspects of cybernetic research, mobilizing information theory for starkly distinct purposes. Parsonian systems theory was centrally committed to understanding the mechanics that undergird social stability and coordination. Parsons wanted to explain how complex societies – marked by conflicting groups and interests – functioned as stable wholes, despite the ceaseless tugs of social pressures and historical forces. Geertz, on the other hand, was far more interested in exploring the open-ended processes of self-fashioning that characterized diverse human lives.

These contrasting models investigate distinct social processes, with the first focusing on societal homeostasis (self-regulation and stability) and the later exploring self-organisation (learning and adaptation). The two diverging projects were

available from the earliest stages of cybernetics research, but as we shall see in the next section, the differences between them were political in nature, as well as conceptual. Geertz's informatic ontology forms part of a complicated conversation with his own training in Parsonian social theory, the failures of postwar American social science and the stark, new political conflicts of the 1960s, as these emerged both in the US and in the postcolonial world. Geertz unveils his new concept of culture, as an *information source*, during a crucial period in postwar history, in which information was being rapidly transformed into a new material artifact of American communications engineering, property law and industrial automation. Geertz believed that a renewed theory of culture would help social scientists navigate this increasingly uncertain world, as the promises and expansive ambitions of American thought, forged in the immediate wake of the second World War, start to fade. Reiterating John Platt's (1965: 4) introduction to the published volume of Monday Lectures, Geertz's culture concept was created to help answer the challenges of 'a transitional crisis', in which American social scientists moved with 'halting steps through a time of great danger, unsteadily but surely in the direction of a high-technology world society'.

Parsons and Geertz: Cybernetics, Culture and the Limits of *Pax Americana*

In a series of autobiographical essays, Geertz describes the heady experience of approaching academic social science in the aftermath of World War II (1995: 96-145; 2000: 3-20; 2010: 185-99). The GI Bill brought a new generation of students to campus. At the same time, senior anthropologists and professional social scientists were returning to academic research, after spending the war years immersed in

planning work and government propaganda efforts. Having acquired a taste for policy-driven research, a range of figures (including Talcott Parsons, Clyde Kluckhohn, Margaret Mead, Geoffrey Gorer, Gregory Bateson, Erik Erikson and Cora DuBois) began to outline a broader role for the social and behavioral sciences in the postwar world, to assist reconstruction and development goals across Europe, Japan and the newly independent countries of the colonised world (Price, 2008; Mandler, 2013; Heims, 1991: 164-200). As Geertz (2010: 187) explains, this was an expansive and optimistic moment for American anthropology:

> What had been an obscure, isolate, even reclusive, lone-wolf sort of discipline, concerned mainly with tribal ethnography, racial and linguistic classification, cultural evolution, and prehistory, changed in the course of a decade into the very model of a modern, policy-conscious, corporate social science.

After receiving his undergraduate degree from Antioch College, Geertz joined the Department of Social Relations at Harvard as a PhD student in 1950. Social Relations, founded under the leadership of Talcott Parsons in 1946, combined training in social anthropology, sociology and psychology to create a new, multi-disciplinary approach to the modern social sciences.[11] Social Relations, in those early decades, was founded on the conviction that postwar reconstruction would require a highly capacious but fundamentally systematic form of social science. Geertz's early work was supported through fellowships at Harvard and MIT, where students eagerly experimenting with a wide range of methodologies, from 'group dynamics, learning theory, and experimental psychology to structural linguistics, attitude measurement, content analysis, and cybernetics' (2010: 188).[12]

The last of these approaches, cybernetics, rose to general prominence in the1950s and 1960s, and flourished in this same academic and political context that led to the creation of Harvard's department of Social Relations. Pioneered and popularized by MIT-based mathematician, Norbert Wiener, its influence was felt most strongly on the east coast of America — in universities, such as Harvard and MIT, as well as private institutions, including Cold Springs Harbor, IBM, Bell Labs and the Rockefeller Foundation. With funding from the Josiah Macy Foundation, Norbert Wiener and his interlocutors hosted a series of conferences from 1946-1953 to share on-going work on servo-mechanical models of the brain and the dynamics of homeostatic systems. After an initial meeting in May of 1946, Paul Lazarsfeld organized a second, sub-conference in September — this time more narrowly focused on research in the social sciences. Parsons and Kluckhohn — in the midst of organizing and launching Social Relations at Harvard that fall — both attended this special session, along with Margaret Mead, Gregory Bateson, the sociologist Robert Merton and educator Lawrence K. Frank.[13] For Parsons, this second conference provided critical access to Wiener's theories of cybernetic control two years before the general publication of *Cybernetics*.

Parsons was sympathetic to the broad, multi-disciplinary form of inquiry initiated by the Macy conferences from the very start. In the 1930s, he — along with Merton and Kluckhohn — had been a keen participant in the intellectual circle that centred around Harvard-based biochemist, L. J. Henderson and his physiologist colleague, Walter Cannon (who famously coined the term *homeostatis* to refer to the maintenance of steady-states in living organisms). After this early exposure to

systems thinking, grounded in the theories of the Italian economist Vilfredo Pareto, Parsons came to believe that social development and biological development were not just analogous – as Durkheimian structuralists assumed – but, were in fact mutually-dependent, interrelated processes.[14] This work also highlighted for Parsons the importance of control, or the maintenance of order, since 'living systems are open systems, engaged in continual interchange with their environments'. The ongoing, interactive nature of a system could pose challenges to stability, if it is not well regulated. For Parsons (170: 850), this later problem of control within social systems was finally clarified 'by the emergence, at a most strategic time, of a new development in general science—namely, cybernetics and information theory'. The September 1946 Macy sub-conference, titled 'Teleological Mechanisms in Society', gave Parsons new conceptual tools for framing concerns about social order and regulation with renewed vigor. According to Parsons, the 'cybernetic perspective helped to open new possibilities for dealing with the vexing problems of stability and change in action systems'. These new theoretical frameworks helped explain the mechanics of self-regulation, by which societies remained stable, integrated wholes, while also being subject to on-going, dynamic processes of change and development. According to Parsons (1969, 32), high-energy subsystems (such as our metabolic processes) were controlled by low-energy, high-information systems (such as neural networks). Likewise, culture, as a high-information subsystem, helped to regulate lower subsystems, including the impulsive desires of human psychology. Such hierarchies of control were crucial to Parsons's account of social stability, developmental change and purposive human action.

It was at this critical juncture in Parsons's larger theoretical project that the Macy conferences provided an exciting, new language that social scientists could share in common with mathematicians, information engineers and physicists. As historian Steve Heims explains in his book, *The Cybernetics Group*, this framework was political as well as conceptual. For Parsons, the self-regulation of homeostatic systems offered an important alternative to ideological control and other violent political forms. A strident anti-totalitarian, Parsons turned to cybernetics as a basis for theorizing non-coercive models for maintaining social order, in contrast to both Marxism and fascism. Clyde Kluckhohn, who attended three of the Macy conferences, likewise believed that cybernetics could help frame a democratic response to the challenges of the twentieth century. Kluckhohn expressed hope that an understanding of cybernetic feedback would enable policy makers and social scientists to create a lasting peace in the Cold War era, by modeling principles of inter-cultural understanding and cooperation:

> 'The prime problem of the century is whether world order is to be achieved through domination of a single nation that imposes its life ways upon all others or through some other means that does not deprive the world of the richness of different cultures . . . The anthropologist's solution is unity in diversity' (Qtd in Heims, 1991:186).

For both Parsons and Kluckhohn, cybernetic models of complex self-regulating systems served as political allegories for an American-led global order, one that recognized and managed global cultural differences harmoniously, like an 'orchestra' (Qtd in Heims, 1991: 186).

Such 'democratic' aspirations were coupled with teleological visions of global development and international peace and security under the new Pax Americana. In

the aftermath of WWII, a more optimistic brand of American social science envisioned societies as stable, structured totalities, whose development could be charted and — given adequate advances in social theory — possibly even forecast and engineered. According to Nils Gilman (2004), underlying these efforts was the faith that Western modernity possessed a 'coherent, unitary, uniform, and worthwhile quality, [which] had to be apprehended by a social science that shared these qualities'. Under the tutelage of Parsons and Kluckhohn, Geertz and his colleagues at Harvard and MIT attempted to pin down the factors that would either aid or hinder the critical work of political and economic development in the newly formed Third World. Such efforts were seen as important, not only for promoting economic growth and social progress, but for maintaining a US-led global order, in which large-scale transformation could be managed in a manner that minimized global conflict and political instability (Gilman, 2004; Heims, 1991).

Trained by Parsons and Kluckhohn, Geertz was shaped by this expansive vision of a capacious postwar social science, and many of its central ambitions persist as traces within Geertz's later writings. Indeed, the success of his culture concept, and its reach beyond anthropology, can be partly explained by a lifelong ability to straddle disciplinary conversations — a talent honed in the remarkably multi-disciplinary environment fostered by the Department of Social Relations.[15] At the same time, Geertz's new culture concept explicitly interrogates the core assumptions and political claims of postwar American social science. The 1960s brought new challenges for social theory, as the optimism surrounding the economic boom of the previous decade began to fade. Geertz experienced the turbulence of the period from his new post at

Chicago, where the campus witnessed 'teach-ins, marches, strikes; the administration building was occupied, professors were physically attacked' (Geertz, 1995: 110). Such upheaval was not limited to the US. During his final fieldtrip to Indonesia in 1958, Geertz and his then wife Hildred were briefly stranded in West Sumatra while an armed rebellion swept through region. The uprising was brutally crushed by the military. It was a small foreshadowing of the violence that would follow, culminating in the CIA-backed massacres of 1965-66, in which more than 500,000 leftist activists were killed by the Indonesian military and its supporters. The rise of Suharto brought an end to the promises of Bandung, dampening postcolonial aspirations for democratically led growth. Most of Geertz's work on the culture concept belongs to this period, in the interim between his Indonesian fieldwork and his later research in Morocco.

Geertz spent the first five years of this turbulent decade chairing the University of Chicago's Committee for the Study of New Nations. By 1959, nearly 50 newly independent countries had joined the world stage. Initiated by Edward Shils and David Apter and funded by the Carnegie Foundation, the Committee set out to produce '[r]ealistic, sympathetic studies' of these emerging nations. In his inaugural essay, Shils articulated the aspirations and commitments of the group, arguing that good research could dispel the myths and fears that surrounded new nations, and could usefully guide their progress and development (Qtd in Geertz, 1995: 112-3). However, the following decade saw renewed and heightened conflict across the globe. As Geertz (1995: 113) reminds his readers, it was 'the time of Katanga, the Tonkin Gulf, Kashmir, and Biafra', and Shils's aspirations for an 'enlightened' and

'sympathetic' American foreign policy remained unfulfilled. In the midst of unsettled projects and failing theoretical certainty, Geertz reworked the idea of culture to answer a new set of questions, prompted by an altered political horizon.

As part of his work for the Committee on New Nations, Geertz spearheaded the 1963 publication of an edited volume, *Old Societies and New States: The Quest for Modernity in Asia and Africa.* In his editorial essay, 'The Integrative Revolution', Geertz explains that recent events had clearly demonstrated that nations were not the stable, culturally integrated wholes once imagined. An astute political ethnographer, Geertz's writings on Indonesia from this same period strongly emphasize the importance of division, tension and conflict in fashioning everyday political and social life (Geertz, 1963a; Geertz, 1963c). Squabbles in the market place, discord between traditional political rituals and modern party rhetorics – these were important, if potentially unsettling, aspects of developmental processes. While all nations struggled to reconcile the politics of group identity with larger civic order, such conflicts were even more acute in postcolonial nation-states, or so he claimed. According to Geertz ([1963b] 1973: 259), 'the new states are abnormally susceptible to serious disaffection based on primordial attachments'. His writings expose a strikingly paternalistic view of developing nations, calling them 'naïve' or (worse still) '[i]imitative, poorly organized, eclectic, opportunistic, subject to fads, ill-defined, uncertain' (Geertz, [1963b] 1973: 278). Nevertheless, he did not see the political turbulence of the ethnic conflict as a sign of dismal failure. While other Western observers had grown pessimistic about the possibility of creating inclusive, democratic cohesion in emerging, postcolonial nation-states, Geertz urged caution,

and argued that the future remained indeterminate. All social systems, he explained, were open and multi-faceted. It was precisely the negotiation of social diversity (and the conflicts that arise around it) that helped constitute an emerging democratic order (Geertz, [1963b] 1973: 278-9).

In *Old Societies and New States,* Geertz and his colleagues meticulously catalogue rising political tensions in the Third World. Demands for the creation of linguistic territories in India, attacks on racial minorities in Uganda, the exclusion of Tamil-speakers from public service in Sri Lanka, growing hostilities between the Igbo and Yoruba communities in Nigeria – each of these signaled the collapse of broader democratic harmony. In its place, observers witnessed sectarian clashes and new, more militant, ideological positions. In turning to these events, Geertz also addressed some of the common questions posed by American social scientists during that period. Was nationalism inevitably a failed project in postcolonial states? Was the zealotry of ideology to blame? For Parsons, ideological systems, as condensed expressions of cultural values and social self-understandings, were designed to act as cybernetic controls that regulated, stabilised and unified societies (Geertz, [1971] 1973: 251). The rising factional violence witnessed in Third World politics posed particularly acute challenges to Parsonian theories of social unity, stability and regulation.

It is in the context of his work on 'new nations' that Geertz actively begins to interrogate and modify Parsons's theory of culture. He credits Parsons for explaining how symbol systems provide important frameworks of understanding and navigating a complex social world. Here again, Geertz argues that culture helps guide human activity, much like software provides operational instructions for a computer or a

recipe instructs a cook:

> At once a product and a determinant of social interaction, [symbol systems] are to the process of social life as a computer's program is to its operations, the genic helix to the development of the organism, the blueprint to the construction of the bridge […] – so the symbol system is the information source that, to some extent, gives shape, direction, particularity, and point to an ongoing flow of activity (Geertz [1971] 1973: 250).

While this formulation appears in multiple essays of the time period, Geertz here adds an important warning, explaining that culture, as a concrete 'information source', does not stand apart from its entanglement in the wider social world. Instead, symbols systems are formulated, enacted and refashioned in real time, even as they guide and shape human activities. While analogies with computer programmes and genetic codes are useful, they had to be deployed cautiously, since they might incorrectly 'suggest a pre-existing template stamping form onto a process external to it'. This, he explains, is one of the central weaknesses of Parsons's theory of culture. For Parsons, social control mechanisms such as cultural systems necessarily take enduring forms that persist over long periods, distinct from the messy, inchoate facts of everyday life.

In contrast to Parsons's view of culture as a mechanism of social, cybernetic regulation, Geertz argues that ideological viewpoints and actual human activity are only loosely connected. Metaphors such as 'programs' and 'codes' serve as devices for reframing Geertz's central theoretical question: how should contemporary cultural theorists 'conceptualize the dialectic between the crystallization of such directive "patterns of meaning" and the concrete course of social life' ([1971] 1973: 250)? How

do our vast, socially dependent understandings translate into lived human experiences? This question, explains Geertz ([1971] 1973: 251), 'has haunted Parsons's writings on culture from the earliest days'. Despite Parsons's claim that culture served as a mechanism for social control and regulation, beliefs systems are not straightforward determinants of human action. Rather, they represent incomplete attempts to make sense of rapidly changing worlds, even as they give direction and form to human activities. In the 'new nations' of the postcolonial world, nationalist ideologies did not straightforwardly lead to political violence. They must be seen as incomplete, real-time efforts to grapple with the multi-faceted transformations and dislocations of modernisation. While nationalist fervor had been blamed for much of the violence in postcolonial state formation, it had also 'been a driving force in some of the more creative changes in history' (Geertz [1971] 1973: 254). For Geertz, a new, more flexible, theory of culture – an updated version of Parsons – offered social scientists the best theoretical tool for understanding rapidly changing developments in Third World politics.

Geertz's approach to culture was a thorough reconsideration of midcentury American social theory – one that, unlike its predecessors, prized models of flexibility, incompleteness and discontinuity. In his1966 essay, 'Person, Time, and Conduct in Bali', Geertz argues that anthropologists need to take 'cultural discontinuity' seriously, rather than assuming 'culture is a seamless web'. 'Systems,' he argues, 'need not be exhaustively interconnected to be systems' (Geertz, [1966a] 1973: 407). This statement signified a direct challenge to Parsonian theory, in which a social system is made up of interpenetrating, neatly layered sub-systems. For Geertz, discontinuity

might be a crucial element of social adaptation. Citing the British cybernetician Ross Ashby's work, *Design for a Brain*, Geertz explains that 'there are some rather compelling theoretical reasons for believing that a system which is both complex, as any culture is, and fully joined *cannot function*' (Geertz, [1966a] 1973: 407; emphasis added). Cultural discontinuity, 'even in highly stable societies', was an empirical fact that social scientists needed to better understand. What is more, it was likely to be a *necessary* feature of modern societies – a source of their adaptability and development. The appropriate metaphor for culture was not the spider web, but 'the octopus, whose tentacles are in large part separately integrated, neurally quite poorly connected with one another and with what in the octopus passes for a brain' (Geertz [1966a] 1973: 408).

The comparison between spider webs and octopuses vividly contrasts two distinct agendas within midcentury cybernetic thought. The first of these, evidenced in Parsonian system theory, is an emphasis on self-regulation and homeostasis. How should social scientists model societies as stable but evolving units? Parsonian theory frequently relied upon organismal and structural examples. As with a spider web, societies persist as integrated and identifiable units and gradually expand, while necessarily undergoing change, repair and renewal (Parsons, 1970: 850-1). This is Parsons's account of development — as a slow and ultimately linear process. For Geertz however, writing in the context of the political and social upheavals of the 1960s, societal transformations had to be theorised differently. An octopus could lose one of its legs, but such trauma is not fatal. Its cognition is not singularly located but distributed across its loosely connected, unwieldy body.[16] He argues that culture is

like an 'octopoid'. It does not change 'all at once in a smoothly coordinated synergy of parts, a massive coaction of the whole, but by disjointed movements of this part, then that, and now the other which cumulate in directional change'. Cultures, though patterned, are formed by a confluence of 'partial integration, partial incongruences, and partial independencies' (Geertz [1966a] 1973: 408).

Geertz borrows this language directly from Ashby's 1960 *Design for a Brain*. In chapter 13 of that book, Ashby (1960: 171) sets out to describe the behaviour of systems that contain 'partial, fluctuating independencies within the whole'. In an extended footnote, Geertz cites this section of the book to argue that partial social connections are crucially responsible for societal adaptation, flexibility and resilience. He also quotes the following passage from *Design for a Brain*:

> 'It has been shown so far that, for adaptations to accumulate, there must not be channels . . . from some variables . . . to others . . . The idea so often implicit in physiological writings that all will be well if only sufficient cross-connections are available is . . . quite wrong' (Qtd in Geertz, [1966a] 1973: 407 fn 47).

Ashby's (1960: v) book focuses on the brain's 'unique ability to produce adaptive behaviour'. Given that brains are mechanical devices, with defined physical and operational limits, how are they nevertheless capable of learning so many new things over the course of a lifetime? This question would certainly have interested Geertz, who had long been fascinated by the plasticity of human brains and who believed that this ability was intrinsically linked to the diversity of human symbolic systems. For Ashby, the answer lay in incompletely integrated networks – in partial connections rather than fully, 'richly' joined systems and subsystems (Ashby 1960: 205-9). Partial

joins are responsible for adaptation and learning, for emergent, expansive growth and self-development.

For Geertz, understanding the importance of partially connected, unwieldy social formations was centrally important to theorising the unsettling, but still indeterminate political development of postcolonial nations, as well as the increasingly turbulent political landscape of late Cold War America. Emphasizing the importance of disjuncture, Geertz's social theory remodeled cultures as discontinuous systems rather than seamless, as adaptively transforming rather than stable, and as emergent rather than homeostatic. As the optimism of postwar social science started to recede, Geertz set out to craft a new approach to culture, one that tried to find systematic relationships within social interaction, rather than prior to it. In an interview with Arun Micheelsen conducted in 2000, Geertz claimed that he no longer *did* systems theory, arguing that 'systematic relationships are to be found in that [thing] one is studying, not formulated before the analysis via a general philosophy or general theory' (Micheelsen and Geertz, 2002: 9). Rather than eschewing cybernetics and information theory, Geertz re-appropriates them, using them to reframe anthropology's culture concept with a new emphasis on contingency, complexity and the emergent nature of social development. Reading the 'Impact of the Concept of Culture on the Concept of Man' in this fashion, we start to see a new direction in cybernetic social science, one that emphasizes the indeterminate, processual nature of cultural activity, mediated by minute (sometimes discontinuous) acts of symbolic interpretation. Underlying Geertz's hermeneutics is an informatic ontology, in which human development and cultures as mutually constituting. When the 'Impact of the

Concept of Culture on the Concept of Man' is first published in BAS, it is accompanied by a drawing of a man staring up at an open-ended maze. The future, though path-dependent, was largely indeterminate, and humans had to write and rewrite the instructions for navigating this warren of possibilities, in the moment, through the ongoing activity of cultural interpretation.

Epilogue: 'Tortoises all the way down' or Geertz and Cybernetics Beyond the Cold War

In 1948, William Grey Walter, a neuroscientist based at the Burden Institute in Bristol, began constructing the first of his famous robot tortoises, Elsie and Elmer. Walter referred to them as members of a new inorganic species, which he titled *Machina speculatrix*. In his 1953 book, *The Living Brain*, Walter argued that imitations of the brain, as a highly complex adaptive machine, could give researchers insight into adaptation as a set of behaviors or activities. An influential member of the British cybernetics group, the Ratio Club, Walter was a pioneer in the development of electroencephalogram (EEG) devices for recording brain activity and the use of electroconvulsive therapy for the treatment of mental illness. His work on both neurons and electrical activity in the brain offered new understandings of the type of purposive, goal-seeking behaviour that formed a central concern for many cyberneticians of the time. In *The Living Brain*, he writes, 'Goal-seeking missiles were literally much in the air in those days; so, in our minds, were *scanning mechanisms*.' (Langton and Shimohara, 1997: 34-5; emphasis added). 'Scanning' became a term of art, indicating the process by which an entity encounters and processes its external

environment, without relying on sensory or cognitive metaphors that lean too heavily on notions of 'seeing' or 'understanding.'

Walter's tortoises were equipped with one front wheel and two back wheels. They were programmed to follow a few simple directives. Operated by a battery-powered motor, the tortoises were light seeking, but only up to a certain intensity of illumination. With the help of a photocell in front, they would locate and move towards light sources, but if the light were too bright, they would reverse direction. If they hit an obstacle, they would move back and forth until they managed to extricate themselves. This simple experiment yielded some surprising observations. While the robot tortoises were very primitive examples of 'artificial life', their behaviour proved to be unpredictable and 'lively' (Walter, 1953: 126).[17] Each was equipped with a small running light, so when a tortoise encountered a mirror or another tortoise, the observer might see a complex dance, watching the machines move towards, away from and around their own lights. The tortoises, prominently featured in a 1950 *Scientific American* article (Walter, 1950: 42-45), demonstrated the complex activity of 'scanning' through which such living or lively entities encountered and navigated the world around them.

According to Andrew Pickering, cybernetic models of servomechanical structures were less concerned with representation than with performance. Despite the simplicity of their construction, Elsie and Elmer were unpredictable. They activity could not be forecast ahead of time, since each iteration might produce sharply varying, unforeseen outcomes. Quoting from Walter's own writing on the subject, Pickering explains, '[I]t is often quite impossible to decide whether what the model is

doing is the result of its design or its experience' (2010: 50). The tortoises do not possess a high-level 'understanding' of the world around them, but nevertheless behaved in purposive and complex ways, 'scanning' their surroundings, seeking out certain conditions while shying away from others. Cybernetic researchers such as Walter were concerned with how things behaved in the world, not with how such entities understand or represent their surroundings. The tortoise robots and their wanderings modeled the brain (a much more complex entity) not because the machines 'knew' about lights or obstacles, but because their goal-seeking behaviour had emergent, non-deterministic properties. According to Pickering, Walter's tortoises stage a cybernetic ontology — one more interested in the contingent and emergent activity of living beings than the deterministic causal relations that are mapped by modern science.

Seen in this context, we can read Geertz's early account of culture against convention, not solely as a set of concerns about regimes of representation, but as a new way of framing the open-ended and mutually-constitutive fashioning of humans and their culture – the purposive, self-generative *activity* of meaning-making. In the 'Impact of the Concept of Culture', the focus remained squarely on the 'interpretation' of symbolic structures as an *action* in itself. Such interpretive acts could decipher so many winks and twitches and blinks, and turn the endless (and endlessly variable) artifacts of human culture into legible and operable programming, which in turn made human choices and life both meaningful and possible.[18] This is not to argue that Geertz was uninterested in human understanding or in problems of epistemology (since these were certainly at the center of his humanistic interests), but only to bring

attention to the fact that 'meaning-making', as an activity, sits at the centre of on-going cultural performances. If Walter's turtles behaved in surprisingly complex ways, despite the simplicity of their programming, by analogy, we begin to imagine how much more complex and diverse human activity must be, if humans also have the capacity to produce and alter their own instructions, rules and codes.

This insight — that Geertz's account of man's search for meaning also emphasizes the action and mechanics of interpretation — leads to some surprising conclusions. First, despite the emphasis on culture as an epistemological project, Geertz's notion of culture required a discrete, informatic ontology of what it means to be human. If the recent ontological turn in anthropology is an attempt to reconsider the relationship of the human and natural worlds, it is worth bearing in mind that ontology did not disappear from late twentieth century cultural theory. When Geertz writes, (based on an allegedly Hindu tale) that it's 'turtles all the way down', this was not (as frequently presented) a way of saying that there are no ontological foundations to knowledge. Instead, meaning and form are co-constituted in this model. Philip Descola, in his article 'Modes of being and forms of predication', defends a conceptual distinction between ethnography and anthropology. It is not the task of anthropology, he argues, to 'provide "thick descriptions" of specific institutions, cultural habits, or social practices – this is the job of ethnography'. Anthropology, in contrast, must shed light on 'how beings of a certain kind — humans — operate in their environment, how they detect in it such or such property that they make use of, and how they manage to transform this environment by weaving with it and between themselves permanent or occasional relations of a remarkable, but not infinite,

diversity' (Descola, 2014: 273). Hence, anthropology is concerned with ontological relationships, while ethnography only describes (albeit thickly) particular social phenomena. Yet, putting the claims of the ontological anthropology alongside Geertz's mid-century account of man and his culture, there are startling similarities between the two. Geertz's informatic account of humans fashioning their own cultural programs is also of a story of ontological becoming, in which the boundless uncertainties of life are encountered and navigated, and where deciphering the lively, confusing tensions of cockfights and political rallies has the power to produce diverse social and material outcomes.

Ultimately, the purpose of this essay is neither to resuscitate Geertzian anthropology, nor to defend Geertz himself from his critics. Rather, it is an attempt to revisit midcentury intellectual developments, in order to lend a new, critical framework for evaluating current trends and claims within anthropological theory, much of which are based on loose but important historical claims about rupture and discontinuity. In writing this, I echo recent work by John Johnston on cybernetics and machinic life. Johnston explains that 'contrary to widespread belief, cybernetics was not simply a short-lived, neomechanistic attempt to explain all purposeful behavior – whether that of humans, animals, or machines – as the sending and receiving of messages in a feedback loop'. Rather it represents 'the historical nexus out of which the information networks and computational assemblages that constitute the infrastructure of the postindustrial world first developed, spawning new technologies and intellectual disciplines we now take for granted' (Johnston, 2009: 26). As such, returning to Geertz's midcentury entanglements offers new, more precise genealogies

for better articulating our current questions about the nature of information economies and our debates over the posthuman. In the process, some of the questions raised by the cultural turn recede, while others deserve greater and perhaps renewed consideration. For instance, it becomes easier to see that culture is both something humans *do* and who they *are*. In retrospect, it is not very surprising that an open-ended, recursive and emergent model of self-fashioning would have been an object of vexation for anti-essentialist critics in the 1980s and 1990s. However, scholarly concerns about power, and the claim that Geertzian views of culture does not adequately take into account the significant and damaging distortions of power imbalances, might be restaged and rearticulated for a new moment, to sharply examine the ontological turn's ability to contend with human experiences of exploitation, precarity and injustice. Both Geertz and Descola are interested in explaining the constitutive diversity of human cultural practices, and not necessarily with asking the question, 'Whose 'being-in-the-world' comes to matter?' By tracing the informatic ontology underlying Geertz's interpretivism, we provide a new entry point for critically interrogating our own conceptual moment, and for thinking about the historical precursors, conceptual possibilities and political limits of anthropology's recent 'ontological turn'.

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[*] Note on style: I have included the original publication dates, in brackets, for all of the essays which appear in the *Interpretation of Cultures*, so that readers can easily follow the historical thread of ideas from this period in Geertz's writing. However, I have opted to cite from *Interpretation of Cultures*, rather than from earlier publications, since references in that text are much easier for contemporary readers to chase up.

[1] The different sciences listed above ('cybernetics, information theory, neurology, molecular genetics') are historically closely related. Cybernetics, the study of communication and self-regulation in systemic processes, used the emerging sciences of information analysis and engineering to study a host of complex biological processes including neural signaling and genetic coding. See Gleick, 2011; Kay, 2000; and Wiener, 1948.

[2] While Geertz implies that Levi-Strauss's grasp of cybernetics was shallow at best, new historical research by Bernard Geoghegan persuasively argues just the opposite. See Geoghegan, 2011.

[3] This period saw the demise of many experimental, multi-disciplinary institutes and faculties where cybernetics and systems theory had been incubated after the war, including Talcott Parsons's Department of Social Relations at Harvard and Heinz von Foerster's Biological Computer Lab at the University of Illinois Urbana-Champagne

[4] Geertz (1973: viii) explains in the volume's preface that the essays were republished for 'retrospective exhibition.' Since 'correcting one's misjudgments by writing changed views back into earlier works' would not be 'wholly cricket,' he decided to keep revisions to a minimum. 'The Impact of the Concept of Culture on the Concept of Man' was first published in 1965, and true to his word, Geertz made very few changes to the text between 1965 and 1973. Between the two publications (Platt, 1965; Geertz, 1973), he took out one comma and changed *Homo australopithecus* to read simply (and accurately) *Australopithecus.*

[5] The term culture became a very popular way of addressing race-based differences in the 1980s and 1990s, without explicitly engaging the politics of race. See for instance Huntington and Harrison (2001) claim that racialized urban violence and disparity in the US finds its roots in a 'culture of poverty'. In a similar vein, celebrations of multiculturalism from this period frequently elided issues of historical injustice and on-going racial inequality. Elizabeth Povinelli's (2002) work exposes many of these dynamics. See her analysis of Australian political discourse, which encourages citizens, after decades of racial injustice, to start enjoying their differences, which (after all) are merely cultural, and as such, define the boundaries of a tolerant, multicultural society.

[6] See the editors' note for the 40th anniversary issue (*Bulletin of the Atomic Scientists*, 1985, 4(7)).

[7] See for instance Alvin W Gouldner (1970), for an account of how this growing unrest challenged foundational theories and methods within the field of American sociology.

[8] Besides Geertz, other speakers included the Nobel Prize winners Willard Libby, Roger Sperry and George Wald, along with information scientist and historian of science, Derek John de Solla Price and James Redfield, from the Committee on Social Thought. The series organizer John Platt and the biologist Roger Sperry had both been active in the field of cybernetics prior to these lectures. In June 1960, Sperry and Platt presented papers at Heinz von Foerster's *Symposium on Self-Organization* hosted by his Biological Computer Laboratory on the campus of the University of Illinois Urban-Champagne. Funded by the Information Systems Branch of the U. S. Navy, the conference also included contributions from Gordon Bask, Stafford Beer, Ross Ashby, Warren McCulloch and Friedrich Hayek. See Heinz von Foerster and George W. Zopf (1962).

[9] This insight (along with many others), I owe to Anush Kapadia, who analyzed these citations in an earlier draft of this paper.

[10] There's some dispute over whether Wiener or Shannon first developed this mathematical approach to analysing information transmission in relation to entropy. For an overview, see Kline, 2015.

[11] In their joint 1941 memorandum, 'Towards a Common Language for the Areas of the Social Sciences,' Parsons, Clyde Kluckhohn and O. H. Taylor present their pedagogical approach as a grand synthesis of the theories of Pareto, Weber, Durkheim, Freud, Marshall and Malinowski. Parsons had attempted an earlier version of this theoretical convergence in his 1937 book *The Structure of Social Action*. In that work, he'd dealt primarily with the work of Marshall, Pareto, Weber and Durkheim. In the intervening period, as Parsons came to read and depend more on Freud and on psychoanalysis generally, the project grew in both scope and ambition (Parsons, 1937; Parsons 1970: 826-881).

[12] The emergence of the US as a global superpower after the war, the booming post-war economy, and increased faith in technology and technical expertise underwrote renewed interest in scientific experimentation across the social sciences (Heims, 1991: 1-6).

[13] For a more thorough account of the Department of Social Relations and its early history, see Isaac, 2012: 158-190.

[14] For references to the influence of the group around L. J. Henderson, see Parsons [1951] 1991: x; and Turner 1991: xvii.

[15] Geertz spent most of his career in interdisciplinary think tanks, projects and institutes (Harvard's Laboratory for Social Relations, Stanford's Center for Advanced Study in the Behavioral Sciences, the Chicago Committee for the Study of New Nations and the Institute for Advanced Study in Princeton), rather than traditional academic anthropology departments. Over the course of a career that spanned 50 years, Geertz spent just one year teaching in Berkeley's anthropology department (1958-1959) and 10 years in

anthropology at the University of Chicago. The first five years of his appointment at Chicago were funded by the University's Committee for the Comparative Study of New Nations and the later 5 years by a Senior Career Research Fellowship from the National Institutes of Mental Health (Geertz, 1995: 114).

[16] See for instance https://blogs.scientificamerican.com/octopus-chronicles/even-severed-octopus-arms-have-smart-moves/

[17] Walter explained that 'the variation of behaviour patterns exhibited even with such economy of structure are complex and unpredictable' (1953: 126). See Pickering, *The Cybernetic Brain* (2010: 50) for an extended analysis of this view of 'lively' behaviour.

[18] In an early, unpublished book chapterisation, Geertz originally titled the second chapter of his culture book, 'Culture as an Action System.' When an anonymous reader questioned this title, and argued that action system theory (as a Parsonian framing) included personality, society *and* culture, Geertz seems to have dropped that phrase entirely. 'The Impact of the Concept of Culture on the Concept of Man', which appears as the second essay in the final volume when published in 1973, does not use the term 'action system', but that initial framing importantly highlights the role that interpretation plays in human activity (not just in human understanding) by generating actionable instructions, codes and programs. See Geertz, n.d.a