

Too Far, Yet Not Far Enough: A Heideggerian Response
To Héctor José Huyke's *Technologies And The
Devaluation Of What Is Near.*

Syed Mustafa Ali
Computing Department
The Open University, Milton Keynes, UK.

INTRODUCTION

Professor Huyke (2003, this volume) presents both an interesting and convincing argument. Yet while I am somewhat sympathetic to his critical approach to an ethics of technologies as prostheses (Huyke 2001a, 2001b) and broadly endorse his "proposal for a politics of technologies of relevance to collectives" (p.1), I take issue with certain claims that he makes in formulating these positions. In what follows, I will confine myself in the main to analysing two specific claims that I take to be central to Huyke's proposals: (1) that technologies have intrinsic ends; and (2) that technologies as prostheses effect the devaluation of the near. My critique is grounded in a synthesis of systems theory and Heideggerian phenomenology and makes reference to the current paper, an earlier conference draft of the same (Huyke 2001b), and a previously published work of the author (Huyke 2001a), all of which explore closely related themes. With respect to the first claim, I maintain that Huyke *goes too far* in his proposal to extend agency to technologies. As I will attempt to show, the justification for such an anthropomorphizing move – an instance of what might be referred to as 'teleological projection' – is grounded in an analysis of artefact intentionality that fails to engage the ontological and epistemological issues associated with contemporary dynamical systems theories of emergent agency. With respect to the second claim, and principally by recourse to both the 'earlier' and the 'later' Heidegger's reflections on the phenomenon of 'existential distance', I argue that Huyke *does not go far enough* in conceiving nearness anthropocentrically in terms of a cultural notion of autochthony (that is, 'rootedness'). In examining each claim, I will briefly comment on the possible implications that such a systems-theoretical phenomenological analysis has for an ethics of technologies as prostheses.

"TECHNOLOGIES HAVE INTRINSIC ENDS"

According to Huyke, "technology is never simply a means but is always also simultaneously an end." In this connection, it is crucial to appreciate that he is "not affirming what is trivially true: that technologies embody ends which human beings consciously or unconsciously place in them"; rather, he means to assert that "technologies also have their own ends and that the effects of these ends are not secondary. They are primary. They do not originate in anybody's consciousness or in the unconscious, but in the technologies themselves as entities with cultural significance." (2001a, p. 54) On his view, "technologies have a certain type of intentionality, certain aims which are intrinsic, which make themselves felt" (p.55), such aims – at least in the case of "contemporary transportation and communication technologies" – being associated with "an inherent tendency to devalue what is near." (Huyke 2001b, p.7) It is crucial to appreciate that it is the fact that technologies "are not regularly *designed* for such purposes [emphasis added]" that leads Huyke to view such ends as inherent or intrinsic to technologies. This, in turn, allows him to reinterpret technologies as "*agents* in history, not mere means [emphasis added]" (Huyke 2003, p.2), and thereby argue that "an ethics of technologies is both possible and desirable." (Huyke 2001b, pp.1–2) According to Huyke, "if we see technologies not as mere instruments but as prostheses with their own ends then maybe we can give them the cultural and critical importance they merit." (2001a, p.56)

The above argument is problematic for (at least) three reasons.

First, the 'cogency' and 'usefulness' (Huyke 2003, p.2) of viewing technologies as historical agents is contestable both on psychological and technological grounds. According to Lanier, "[technological] agents make people redefine themselves as lesser beings" as a consequence of the "unavoidable psychological algebra" (1995, p.77) associated with the attribution of agency to artefacts. Crucially, such 'dumbing down' acts to block "the feedback that leads to good design." (p.78) Hence, while endorsing Huyke's claim that "technology is not beyond human control" and that "what is needed is reform" (2003, p.1), it might be argued that the extension of agency to technologies should not be included as part of this reform.

Second, and relatedly, while it might be conceded that technological ends do not necessarily originate in "the human subject" (p.1), it does not thereby follow that such ends must be intrinsic to technologies themselves. Huyke appears to hold

that ends that are not extrinsic, in the sense that they do not originate at individual sites of external agency, must be intrinsic;¹ however, this is to tacitly assume that the grounding of extrinsic agency in *individual* (and external) intentionality is both necessary and sufficient. According to Searle (1995), this is simply not the case: ‘institutional facts’ such as money – and, I would argue, technologies – are socially constructed; hence, their intentionality is necessarily and sufficiently grounded in a *collective*. It is crucial to appreciate that collective intentionality is not ontologically reducible to individual intentionality because it is essentially – that is, *intrinsically* – holistic; in terms of dynamical systems theory, collective intentionality is a non-linear systemic phenomenon emerging from and constraining the dynamical interactions between individual intentional agents (Juarrero 1999; Searle 2001). According to Langton:

Linear systems are those which obey the *superposition principle*. We can break up complicated linear systems into simpler constituent parts, and analyse these parts *independently*. Once we have reached an understanding of the parts in isolation, we can achieve a full understanding of the whole system by *composing* our understanding of the isolated parts. This is the key feature of linear systems: by studying the parts in isolation, we can learn everything we need to know about the complete system.

This is not possible for non-linear systems, which do not obey the superposition principle. Even if we could break such systems up into simpler constituent parts, and even if we could reach a complete understanding of the parts in isolation, we would not be able to combine our understandings of the individual parts into an understanding of the whole system. The key feature of non-linear systems is that their primary behaviours of interest are properties of the *interactions between parts*, rather than being properties of the parts themselves, and these interaction-based properties necessarily disappear when the parts are studied independently (1989, p.41).

It follows, then, that there is a need to consider a third source of intentionality beyond design (interpreted in terms of individual² extrinsic intentionality) and nature (or intrinsic intentionality), viz. *emergence* or non-linear systemic intentionality.³ In a dynamical systems context, the functionality of a non-linear system (or whole) is held to be ontologically reducible to the functionality of its components (or parts) *and* the interactions (or dynamic relations) between them.

On this basis, and by analogy, it might be argued that the emergent intentionality of technological complexes is ontologically reducible to the extrinsic intentionality of individual technologies within the complex *and* the interactions between them. This dynamical systems conception of technological agency, in which the emergent intentionality of technological complexes is grounded in a collective human intentionality that is itself grounded in individual human agents and their interactions, appears to have phenomenological support. According to Ihde, "there is a latent trajectory to technologies such that technological directions occur which incline, though not determine, human curiosity and desire." (1982, p.23). As he goes on to state, "in our engagements with technologies, trajectories emerge, *trajectories which refer back to our own imaginations and desires*, but which by extending the amplificatory (and reductive) structure of technology, can actually result in qualitative changes with respect to human destiny [emphasis added]" (p.26).⁴ Hence, rather than referring to intrinsic or inherent technological ends, we should refer to emergent-derivative ends that are grounded in inhering ends, that is, extrinsic ends that have been embedded within the component technologies (or 'parts') in a technological complex (or 'whole'). On this basis, it might be argued that in identifying the intentionality (or ends) of technologies as intrinsic, Huyke himself, somewhat ironically, appears to effect a 'devaluation of the near' – 'the near' in this case being the human source of extrinsic intentionality that grounds emergent technological intentionality.

Crucially, such a conception of technological ends is, I maintain, consistent with Heidegger's (1977) identification of the essence of modern technology with Enframing (*Ge-stell*), that is, cybernetic totalism⁵. Although Heidegger holds that technology is beyond human control, it does not thereby follow that technology is autonomous and in possession of intrinsic ends. According to Dreyfus, "the understanding of the being of the ready-to-hand in *Being and Time* leaves equipment available for the assault of technology, the way the Cartesian understanding of the being of the present-at-hand made nature available for the assault of scientific research." (1992, p.175) Furthermore, "seen in the light of the relation of nature and technology revealed by later Heidegger, *Being and Time* appears in the history of the being of equipment not just as a transition but as *the* decisive step towards technology." (p.182) On this basis, it might be argued that the existential structures of *Dasein* (or human being) presented in *Being and Time* are ontologically grounding relative to technological Enframing⁶. Given that Heidegger (1967) holds technological (that is, instrumental or 'equipmental') complexes to be socially-constituted, implying the grounding of emergent

technological intentionality in collective extrinsic intentionality, it appears that a dynamical systems interpretation of technological Enframing such as the one outlined above is valid, perhaps even decisive⁷.

Finally, ethical issues relating to tracking and apportioning responsibility for technological outcomes must be considered. On Huyke's view, once technologies become part of our culture, "they become part of us and so [do] their ends, as well as all the responsibilities this implies." (2001a, p.56) In this connection, it is interesting to note that according to Berdichevsky and Neunswander (1999), designers of technologies whose behavioural outcomes are unintended, not reasonably predictable and unethical, should not be held responsible for outcomes that they could not reasonably control. On their view, lack of prediction and control of outcomes constitute necessary and sufficient conditions for discharging responsibility *from* humans; such deficiencies do not, however, entail the necessity of granting intrinsic agency, and thereby responsibility, *to* technological artefacts. What all this amounts to is that a distinction must be made between 'simple' (or individually-extrinsic) and 'complex' (or collectively-extrinsic) technological intentionality and that this distinction has implications for determining whether or not responsibility can be reasonably apportioned to humans. Rather than embracing a new concept of agency on the basis of human failure to predict and control certain technologies, might it not be more prudent to heed Weizenbaum's (1984) prescient advice and reconsider whether we should be in the business of bringing forth technologies that we do not – *cannot* – understand or control?

Huyke maintains that "if technologies are taken as mere means, they end up becoming *the means* without ever going through the kind of analysis that would clarify the real choices and empower the collective." (2003, p.14) We concur with this view – not, however, because technologies have intrinsic ends, but rather because there is nothing trivial or 'mere' about technologies as means.

"TECHNOLOGIES AS PROSTHESES EFFECT THE DEVALUATION OF WHAT IS NEAR"

According to Huyke, "many recent technologies tend to bring closer that which is distant at the expense of what is near" (2001a, p.57). On his view, "as what is difficult to obtain becomes repeatedly and easily accessible, other possibilities are left out"; furthermore, "ends that are near tend to be devalued with increasing

facility" (2001*b*, p.2). Crucially, Huyke holds that "to bring something that is distant closer implies distancing what is close" (2001*a*, p.62); hence, "access is not cumulative...if you access this, you don't access that" (2001*b*, p.3).

From a phenomenological perspective, it must be appreciated that Huyke's conception of the bi-directional distancing effects associated with prosthetic technologies bears more than a passing resemblance to Heidegger's 'horizontal' conception of primordial truth as simultaneous unconcealment (*aletheia*) and concealment⁸. Nonetheless, in my opinion, it is problematic for (at least) two reasons, both of which have to do with the fact that Huyke's analysis of nearness is overly anthropocentric. Before these arguments are presented, it is necessary to briefly examine Heidegger's own thinking on the phenomenon of nearness in order to provide a background for my critique.

It is crucial to appreciate at the very outset that, for Heidegger, the phenomenon of nearness (and distance) must be understood in terms of the *ontological difference*, that is, the difference between beings and the Being ('how' or 'way-of-to-be') of beings⁹. On this basis, a distinction must be made between ontical and ontological nearness and distance¹⁰. According to Dreyfus, 'early' Heidegger interprets the difference between ontological and ontical distance as that between "the general opening up of space as the field of presence (dis-distance) that is the condition for things being near and far [and] Dasein's pragmatic bringing things near by taking them up and using them" (1991, p.132). Furthermore, it is necessary to "distinguish the role of concern in opening up the [general] *possibility* of nearness and remoteness, from the nearness and remoteness [that is, degree of availability] of a *specific* piece of equipment vis-à-vis a particular Dasein." (p.131) On this view, it might be argued that the essence of nearness lies in instrumentality, functionality and pragmatic intentionality.

In *Poetry, Language, Thought*, Heidegger continues his phenomenological inquiry into the essence of nearness. On his view:

Man puts the longest distances behind him in the shortest time. He puts the greatest distances behind himself and thus puts everything before himself at the shortest range. Yet the frantic abolition of all distances brings no nearness; for nearness does not consist in shortness of distance. What is least remote from us in point of distance, by virtue of its picture on film or its sound on the radio can remain far from us. What is

incalculably far from us in point of distance can be near to us. Short distance is not in itself nearness. Nor is great distance remoteness" (1975, p.165).

So "what about nearness? How can we come to know its nature?" Heidegger maintains that ontological (or the existential foundation of) nearness "cannot be encountered directly. We succeed in reaching it rather by attending to what is near. Near to us are what we usually call things. But what is a thing? Man has so far given no more thought to the thing as a thing than he has to nearness." (p.166) After a sustained phenomenological analysis of things – using a vessel, more specifically, a jug, as means by which to concretely focus the inquiry – Heidegger concludes that the thing-*ness* of a thing lies in its thing-*ing* (p.174). In a radical departure from his earlier 'instrumental' conception of things, Heidegger interprets the thing-*ing* of a thing in terms of the capacity of the latter to effect what he calls the "gathering-appropriating staying of the fourfold" (p.174). This refers to the holistic interplay ('ringing' or 'round-dance') of earth, sky, mortals and divinities – necessity, possibility, disclosedness and givenness respectively – that is 'world' (or the understanding of Being). Crucially, on this basis¹¹, Heidegger is led to conclude that in discovering the nature of things:

We also catch sight of the nature of nearness. The thing things. In thinging, it stays earth and sky, divinities and mortals. Staying, the thing brings the four, in their remoteness, near to one another. This bringing-near is nearing. Nearing is the presencing of nearness. Nearness brings near – draws nigh to one another – the far and, indeed, *as* the far. Nearness preserves farness. Preserving farness, nearness presences nearness in nearing that farness. Bringing near in this way, nearness conceals its own self and remains, in its own way, nearest of all. (pp.177–178)

Given Heidegger's interpretation of nearness as presented above, (at least) two criticisms of Huyke's assertion that 'technologies effect the devaluation of what is near' can be made.

First, Huyke does not appear to have considered the fact that technologies as prostheses also effect the devaluation of the *far*¹². According to Ihde, the essence of prosthesis lies in simultaneous amplification and reduction. While this thesis might appear to anticipate that advanced by Huyke, it in fact stands in inverse relation to the latter with respect to focus: For Huyke, amplification-reduction happens proximally, whereas for Ihde, it happens distally. For example, Ihde

maintains that "to see the moon through a telescope is, while it occurs, to lose it as a part of the heavens, to enclose it within a bounded frame. It is to reduce both its sense of distance and its relations to the surrounding stars and earth" (1982, pp.24–25). Although it might be argued that Ihde's example is interesting but irrelevant since the context of Huyke's argument is cultural (or social) rather than natural (or physical), I hold the general point to be both sound and important, especially if the excesses of anthropocentrism are to be kept in check.

Second, Huyke maintains that "the new nearness [prosthetic technologies] favour does not have the same structure [as] what was near originally and is now forgotten or turned away" (2001a, p.57), and that "ranges of nearness" are devalued through the prosthetic functioning of technology (Huyke 2001b, p.3). On his view, nearness is to be understood in terms of *autochthony*, that is, rootedness. From a phenomenological perspective, this point is significant since Heidegger (1966) identifies the 'danger' associated with modern technology (as Enframing) with the loss of autochthony in man and his works. However, in this connection, it is crucial to appreciate the radical difference between their respective conceptions of autochthony: For Huyke, autochthony is a *cultural* phenomenon; for Heidegger, by contrast, autochthony is an *existential* phenomenon, that is, a phenomenon concerning Being¹³. In Heidegger's (1975) later thinking, autochthony or rootedness refers to the fact that humans *are* human because they dwell on the earth. However, as stated previously, on this 'poetic' ontology, earth is but one among a fourfold that includes sky, mortals and divinities and, significantly, none of these has ontological priority over any of the others; they all come into play together in the unitary 'appropriating event' (*ereignis*) that is Being as world-ing (or the coming-into-presence of world). Clearly, such a conception of autochthony is at odds with more traditional anthropocentric (or 'humanistic') conceptions such as that due to Huyke, and has a number of implications for an ethics of technologies as prostheses. For example, Huyke proposes an ethics that aims to "reinsert nearness into our value judgements on technologies" (2001b, p.8) However, from a Heideggerian perspective, prioritising valuation at the expense of adequately engaging the question concerning nearness and its various meanings undermines, somewhat ironically, the value of this very project. On Heidegger's view, such an approach to technology remains caught up in what he refers to as the metaphysics of the will-to-power with its emphasis on human control. In order to escape the grip of this metaphysics, which assumes its ultimate form in technological Enframing, Heidegger proposes a twofold strategy: (1) the cultivation of 'releasement' (*gelassenheit*), which does not mean mere passivity or detachment but rather a

mood or attitude of non-attached engagement, that is, a 'free association' to technology; and (2) the bringing-forth of a plurality of worlds, technological and otherwise. On this basis, it becomes possible to understand what Heidegger meant in stating "but where danger is, grows the saving power also" (1977, p.28), since the devaluation of the near is simultaneously its valuation in the sense that in withdrawal, things attain value by becoming 'difficult to obtain'. Furthermore, it is crucial to appreciate that, for Heidegger, things do not appear as things "by means of human making. But neither do they appear without the vigilance of mortals. The first step toward such vigilance is the step back from the thinking that merely represents – that is, explains – to the thinking that responds and recalls" (1975, p.181). Here, Heidegger again points to the existential orientation that is a pre-condition for an affirmative relation with technology, viz. releasement (*gelassenheit*). Crucially, and somewhat against Huyke's proposal for an ethical relation to technologies as prostheses based on their critical evaluation relative to what is *already* given (near) and given *culturally*, Heidegger maintains that "things as things [never] come about if we merely avoid objects and recollect former objects which perhaps were once on the way to becoming things and even to actually presencing as things." (p.182) In short, without a change in existential orientation, the devaluation of near-ness – that is, the ontological near – cannot be countered.

End Notes

¹ Perhaps Huyke was led to such a view on the basis of a tacit adoption of the Aristotelian distinction between that which arises – more precisely, becomes – through *an individual* human 'other' (*techné*, art or design, extrinsic intentionality or agency) and that which arises through 'self' (*physis*, nature, intrinsic intentionality or agency).

² By 'individual' is here meant 'an entity with a unified perspective'; on this view, both persons and (some) organisations are examples of individuals.

³ It is important to appreciate that the phenomenon of emergence is not uniquely linked to non-linear dynamical systems: For example, Silberstein (2001) and Hagan and Hirafuji (2001) have shown that emergence can also occur in linear systems, albeit those of the quantum mechanical kind.

⁴ The conceptual and linguistic parallels between notions in Ihde's (1982) phenomenological analysis of technological ends and those employed in dynamical systems theory are striking. Consider, for example, the explicit reference in both schemes to the notion of a 'trajectory' (that is, a sequence of system states) and the implicit analogy between Ihde's notion of 'inclination' and that of 'attraction' (or state-convergence) in dynamical systems theory.

⁵ Dreyfus and Spinoza (1997) define cybernetic totalism as "flexible ordering for the sake of more ordering and reordering without limit" (p.163), that is, "endless transformation and enhancement." (p.172) On this basis, it might be argued that the devaluation of the near does not occur through technological prosthesis but rather through technological *hyperprosthesis*, that is, technological prosthesis *for the sake of* technological prosthesis.

⁶ Additional support for this argument may be derived from the claim – endorsed by the majority of Heidegger scholars – that the earlier and later ‘phases’ of Heidegger’s phenomenology constitute a unity.

⁷ “I do not see the situation of man in the world of global technology as a fate which cannot be escaped or *unravelling*. On the contrary, I see the task of thought to consist in helping man in general, within the limits allotted to thought, to achieve an adequate relationship to the essence of technology [emphasis added].” (Heidegger 1993, p.111)

⁸ According to Heidegger, the Being of a being refers to the ‘way’ or ‘how’ (that is, manner) of its presencing (or coming–into–presence before *Dasein*, that (human) being capable of appreciating the Being of beings). Crucially, Being is necessarily finite since it is always the Being of a being. One way to think about Being is in terms of a network of nodes of meaning, in which only a finite sub–network of nodes is accessible at a particular time.

⁹ Crucially, this is the case with respect to both his ‘earlier’ and ‘later’ thinking.

¹⁰ ‘Ontical’ is Heidegger’s term for that which pertains to beings *as beings* in contradistinction to ‘ontological’, which is that which pertains to the Being of beings.

¹¹ In fact, the displacement of the early ‘pragmatic’ interpretation of nearness by the later ‘poetic’ interpretation appears to have been signalled in *What is Called Thinking?* (1968): “What we encounter at first is never what is *near*, but always only what is *common*. It possesses the *unearthly* power to break us of the habit of abiding in what is *essential*, often so definitively that we never come to abide anywhere [emphases added].” (p.129)

¹² Heidegger asks: “What is nearness if it fails to come about despite the reduction of the longest distances to the shortest intervals? What is nearness if it is repelled by the restless abolition of distances? *What is nearness if, along with its failure to appear, remoteness also remains absent?* [emphasis added]” (1975, pp.165–166).

¹³ In a ‘supplement’ to *The Metaphysical Foundations of Logic*, Heidegger asserts, somewhat cryptically (sic), that “the freedom toward ground is the outstripping, in the upswing, of that which carries us away and gives us distance.” He then goes on to state that, “the human being is a creature of distance! And only by way of the real primordial distance that the human in his transcendence establishes toward all beings does the true nearness to things begin to grow in him. And only the capacity to hear into the distance summons forth the awakening of the answer of those humans who should be near” (1984, p.221). According to Heidegger, primordial distance is existential distance which is grounded in the ontological difference, that is, the difference between beings and the Being (or way–of–to–be) of beings. Concomitantly, existential autochthony must be understood as ontological, that is, as pertaining to Being, while cultural autochthony must be understood as ontical, that is, as pertaining to beings.

References

- Berdichevsky, D., Neunshwander, E. "Toward an Ethics of Persuasive Technology". *Communications of the ACM* 42 (5). 1999, pp. 50–58.
- Dreyfus, H.L. *Being–in–the–world: A Commentary on Heidegger’s Being and Time, Division I*. Cambridge, Mass., MIT Press, 1991.
- _____. "Heidegger’s History of the Being of Equipment." In *Heidegger: A Critical Reader*. Edited by H.L. Dreyfus and H. Hall. Oxford, Blackwell. 1992, pp. 173–185.
- _____. Spinosa, C. "Highway Bridges and Feasts: Heidegger and Borgmann on How to Affirm Technology". *Man and World* 30. 1997, pp.159–177.
- Hagan, S., Hirafuji, M. "Constraints on an Emergent Formulation of Conscious Mental States". In

- The Emergence of Consciousness*. Edited by A. Freeman. Thorverton, Imprint Academic, 2001.
- Heidegger, M. *Discourse on Thinking: A Translation of Gelassenheit* by J.M. Anderson and E.H.Freund. New York, Harper & Row, 1966.
- _____. *Being and Time*. Translated by J. Macquarrie and E. Robinson. Oxford, Blackwell, 1967.
- _____. *What is Called Thinking?* Translated by J.G. Gray. New York, Harper & Row, 1968.
- _____. *Poetry, Language, Thought*. Translations and Introduction by A. Hofstadter. New York, Harper & Row, 1975.
- _____. *The Question Concerning Technology and Other Essays*. Translated by W. Lovitt. New York, Harper & Row, 1977.
- _____. *The Metaphysical Foundations of Logic*. Translated by M. Heim. Bloomington and Indianapolis, Indiana University Press, 1984.
- _____. "Only a God Can Save Us". In *The Heidegger Controversy: A Critical Reader*. Edited by R. Wolin. Cambridge, Mass., MIT Press. 1993, pp.91–116.
- Huyke, H.J. "Toward an Ethics of Technologies as Prostheses". *International Journal of Technology and Design Education* 11, 2001a pp.53–65.
- _____. Technologies and The Devaluation of What is Near. Paper presented at *Nature and Technology: The 12th International Biennial Conference of The Society for Philosophy and Technology, University of Aberdeen, 9–11 July, 2001*. 2001b, pp. 1–9.
- _____. "Technologies and The Devaluation of What is Near". *Techné: The Journal of the Society for Philosophy and Technology*, 6:3 Spring 2003, 1–17.
- Ihde, D. 'Technology, Utopia and Dystopia'. In *Technology and Utopia: Proceedings of a Symposium held on 10–11 August, 1982 at the University of Zululand*. Edited by C.S. de Beer. University of Zululand. Pp. 1982, pp. 4–30.
- Juarrero, A. *Dynamics in Action: Intentional Behaviour as a Complex System*. Cambridge, MIT Press, 1999.
- Langton, C.G. "Artificial Life". in *Artificial Life: Proceedings of the First Workshop on the Synthesis and Simulation of Living Systems*. Edited by C.G. Langton. Reading, Mass., Addison–Wesley. 1989a, 1–47.
- Lanier, J. Agents of Alienation. *Journal of Consciousness Studies* 2 (1). 1995, pp.76–81.
- Searle, J.R. *The Construction of Social Reality*. London, Allen Lane, 1995.
- _____. *Rationality in Action*. Cambridge, Mass., MIT Press, 2001.
- Silberstein, M. "Converging on Emergence: Consciousness, Causation, and Explanation". in *The Emergence of Consciousness*. Edited by A. Freeman. Thorverton, Imprint Academic, 2001.
- Weizenbaum, J. *Computer Power and Human Reason: From Judgement to Calculation*. London, Penguin, 1984.