Book Review

Cognition In The Wild, Edwin Hutchins, MIT Press, Cambridge, MA and London.

Although the hard-back versions costs £38.50 in the UK it is still a bargain. Not only is it an enduring testimony to the craft of printing, being one of the most elegantly produced academic books seen for a long time, it harbours, in effect, two books, though they are uneasily moored alongside one another. The first is an engaging and very readable ethnography of navigation. The second is made up of a set of exhortations to cognitive science to expand its dominion into the realm of the social. I do not think that other readers will dissent from my view of Hutchins' ethnographic command of his subject matter but they may be surprised that I characterise him as a cognitive science imperialist, for his intentions might well be alternatively characterised as exactly the reverse: to colonise cognitive science with the social.

We embark upon our navigational odyssey aboard a U.S. Navy warship, the U.S.S. *Palau*. From the vantage point of the bridge Hutchins surveys the key personnel involved in the navigation large vessels, their duties, the rudimentary principles of navigation, the tools used to support navigation, Hutchins himself, in his identity as ethnographer, the ship, and most importantly, what he calls "the unit of cognitive analysis" for the book which is "nagivation as it is performed by a team in the bridge of a ship". From the bridge we travel to numerous ports of call: a consideration of navigation as computation, the implementation of navigational computations in the context of surface ship piloting, how navigation is done in teams, the communication that occurs between team members, how navigation is learnt on the job, and a case study of how the navigation team handled an emergency situation. Hutchins describes how an omni-relevant question for the navigator is "where am I?", and we could add that, correspondingly, an omni-relevant question for Hutchins which he attempts to answer through an examination of these topics is "how do they come to know that?"

Beginning with an examination of navigation as computation he, in effect, describes how the technical knowledge of position finding is tied to the techniques of the activity of navigation and its traditions. Thus Hutchins describes how western (a strange cultural designation to buy into, given Hutchins' keen sense of the compass rose and the position of the prime meridian) navigators have developed various

computational techniques of representation and algorithms for applying them. For example, the representation of a location through a system of co-ordinates on a chart, and dead-reckoning, estimated position, and course-to-steer algorithms. Hutchins draws out the way in navigational knowledge is tied to such a set of cultural traditions through a comparison with Micronesian navigation. Micronesian navigators have also developed computational techniques of representation and algorithms for applying them, ones, however, which significantly differ from their western counterparts. The result is that knowledge of one cultural tradition of navigation is not sufficient to understand the navigating practices of another tradition. Hutchins produces a remarkably deep description of both navigational traditions and their respective techniques.

This command of his subject matter is carried over into an equally detailed description of the way in which navigation is practised for the purposes of surface ship pilotage, a form of navigation which involves determining a vessel's position with respect to known geographical locations. Hutchins provides an insightful description of the way in which the work of navigation is accomplished in the skilful manipulation of instrumentation and the embodied practices of the navigators. In both his general description of navigation and the particular description of pilotage, Hutchins displays his own detailed knowledge of both western and Micronesian navigational traditions. This fact allows us to raise a question of practical methodology for ethnographers of work which concerns the degree to which they need to become experts in the work they study. The obvious expertise displayed by Hutchins parlays an argument for ethnographers to develop a high level of competence in the work they investigate as a methodological device for coming to grips with the details of its accomplishment. It is unlikely that the depth of description produced by Hutchins could have been achieved by someone who themselves could not navigate and pilot a vessel.

Having examined the work of the navigator, Hutchins steers his examination towards the work of the navigation team, addressing how the activities of those involved are co-ordinated with one another and how the members of the team use the tools of navigation together. For example, he describes how in 'sea and anchor detail' the team members work to reconcile the chart, which is being viewed by one team member, to the physical layout of land and built structures, viewed by another team member. Communication is an obvious issue here, one to which Hutchins also turns in a subsequent chapter. He builds an interesting *interactional* account of language, an emphasis carried over into his subsequent two chapter consideration of learning. His final chapter underscores the idea developed in the course of his ethnographic account of what he calls 'cultural cognition'.

This takes us to the other book that is submerged within the covers of *Cognition in the Wild*. Interlaced throughout his ethnography of navigation are appeals to the cognitive character of human action and interaction and each substantive topic he addresses is first situated in cognitive science. Thus, for example, he begins both of his excellent descriptions of the embodied work of navigation and pilotage

by anchoring them within established cognitive science literature. The examination of navigation is first located within David Marr's description of information-processing systems, and his consideration of contemporary pilotage is, similarly, first rooted in Herbert Simons' description of problem solving by re-representation. Hutchins' examination of the co-ordination of individuals in navigation teams also makes appeals to the so-called cognitive properties of groups which we are told differ from the cognitive properties of individuals, and his chapters on communication and learning are equally grounded in traditional cognitive conceptions: Hutchins, approvingly quotes Bateson "the elementary cybernetic system with messages in circuit is, in fact, the simplest unit of mind; and the transform of a difference travelling in a circuit is the elementary idea" (p. 291).

Such approval of a computational model of mind may, however, seem strange to many readers because it is, seemingly, Hutchins' intention to radicalise cognitive science by viewing cognition as a culturally situated phenomena, to place cognition in the wild seas of the social. In this latter respect it might be reasonably assumed that the general tenor of Hutchins' work will appeal to those within the CSCW community who have moved away from the more cognitive science dominated domain of HCI in their recognition of the importance of cultural phenomena such as collaboration at work. Many will, no doubt, desire to read Hutchins as a powerful and alluring critique of traditional cognitive science which charts the epistemological shoals generated in divorcing what Hutchins' refers to as the internal mental environment from what he characterises as the external world: "Interaction with the world was reduced [by cognitive science] to read write operations conducted at either end of extensive processing activity. This fits the computer metaphor very well, but it made the organisation of the environment in which thinking took place seem largely irrelevant. Both behaviourism and cognitivism must be wrong" (pp. 371–372).

There is, however, another reading of Hutchins' ambition for cognitive science which is not one that merely seeks to reformulate the discipline in the light of culture, but is one that seeks to reformulate culture in the light of cognitive science: "Culture is . . . a process. It is a human cognitive process that takes place both inside and outside the minds of people" (p. 354). In this respect Hutchins' provides an account of phenomena encountered in a culture such as co-ordination at work, utilising a vocabulary that is drawn straight from cognitive science, not from the cultural context of the work he describes. Consequently, for example, the concertion of the actions and interactions of the navigation team is described thus: "The system formed by the navigation team can be thought of as a computational machine in which social organisation is computational architecture". In this respect the computational model that has been hawked around by cognitive science and which has been the spring from which so much confusion in the philosophy of mind has welled is, it would seem, actually being promulgated as a sound conceptual edifice from which to address social/cultural questions. On this reading, Hutchins is, then, not so much making an argument that cognitive science should be reformulated in

addressing social/cultural phenomena but that social/cultural phenomena are to be investigated through the concepts of cognitive science.

I find it difficult to sustain a reading of *Cognition in the Wild* as a corrective to cognitive science because its references to culture are not used to constitute a reformulation of the epistemological foundations of cognitive science, questioning its very understanding of mind, rather they are an admonishment of cognitive science for not having also sunk its epistemological hooks into the social as well as into mind. When placed in the context of the inexorable thrust of the book it is, therefore, apparent that when Hutchins says of cognitive science that it is "wrong" with respect to its utilisation of a computational model he is not so much saying this because cognitive science problematically articulates a computational model of mind, but because it has missed an opportunity to also articulate a computational model of the social. On this reading Hutchins may not so much be building a bridgehead between cognitive science and the social for the purposes of correcting the problematic understandings of mind that abound within cognitive science, but for trundling the cognitive science conceptual armoury across for the purposes of addressing cultural phenomena such as action, interaction and collaboration.

For example, when Hutchins describes the division of labour on the bridge of the ship in which there are a number of people each with assignable roles, duties associated with those roles, and who are working together to accomplish some task, he is describing settings well known to those who study the social. The question that has constantly exercised sociologists is how order manifest as a division of labour is possible, or to put it another way how can we account for the concertion of action. There are, of course, numerous ways in which sociologists have attempted to answer this question. One of the most prominent being Talcott Parsons who described how, by performing their activities in accordance with reciprocally defined and reciprocally shared rules and norms, actors co-ordinate them with one another. Harold Garfinkel, the founder of ethnomethodology, in a radicalisation of Parsonian sociology describes how the concertion of social action resides in the design of action as accountable, that is, observable/reportable action.

Hutchins is consequently marching cognitive science onto terrain that is already occupied. The question that those who study social action and interaction, and who study the organisation of work must ask of Hutchins is what is gained in our understanding of social order, and of our understanding of the practices of work, by rendering them through the conceptual apparatus of cognitive science. Hutchins own excellent ethnographic descriptions do not provide a basis for answering this question because it is perfectly possible to strip out the cognitive account of navigation and the division of labour from his descriptions of the navigation and pilotage without impacting upon the cogency of his description of what the navigators and navigating team are doing as the work of navigation and pilotage. I am certainly not arguing that the social is the sacred preserve of other disciplines to cognitive science. I am saying, however, that unless it is shown how the conceptual apparatus of cognitive science engages the social world in the latter's own terms

then like many existing social theories, its commentaries will run over and above the social world. As such there is little hope that cognitive science can provide convincing accounts of how that world is organised in the actions and interactions of those that make it up, the very actions and interactions Hutchins so ably depicts in his ethnographic descriptions.

Many readers of this journal will find *Cognition In The Wild* important. It addresses matters of great moments for CSCW, such as collaboration, work, cognition, and ethnography. It also provides an excellent insight into its principle subject matter: how navigators come to know where they are. It will, however, be also read by many as an important corrective to cognitive science, simply because it articulates the idea of culture for cognitive science. It is this reading that vexes me. Cognitive science is not "wrong", to use Hutchins' evaluation, because it has not addressed culture, cognitive science is wrong for conceiving mind in terms of a computational model. If it is being exhorted to turn to culture, it will be just as wrong about these matters as it is about mind if it holds to its foundational concepts, and there is little in Hutchins to suppose that he is also proposing a foundational purging of the conceptual underpinnings of cognitive science. Cognitive science may well need the cultural world in order to ply its trade in new intellectual areas, the question that many will have, however, is how well that serves our understanding of the workings of culture.

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