Prehistoric Stone Tool Technology and the Evolution of Cognitive Behavior

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Today, more than a century and a half after Darwin, it is almost a commonplace that human species is the outcome of a process of evolution going back to the origin of life. Just as the human brain-body, as per the dominant views of the biological sciences, has been moulded and shaped by evolutionary pressures operating in our ancestral past, the biological structures and mechanisms relating to human mental or cognitive aspects might also have been selected for. In this sense, at the very least, the human mind. (The terms "consciousness," "human mind" and "cognitive system" are used interchangeably throughout the paper. For, the term "mind" here does not refer to any immaterial, essentially conscious substance in the Cartesian manner; rather it refers to a distinct realm or evolutionary level consisting of all kinds of cognitive operations and subjective experiences, in short, to what Popper (Popper & Eccles 1977) calls World 2) or cognitive system has an evolutionary past and it probably took millions of years for the distinctive cognitive or mental faculties to evolve. Features like advanced intelligence, language, consciousness of self and others are commonly seen as some of the unique aspects of what we call the human mind. What is rather more contentious is whether these mental or cognitive abilities were themselves selected for in evolution. One way to find possible evolutionary explanations of these unique mental or cognitive aspects is to explore the domain of lower Palaeolithic stone tool technology. For, the archaeological data of stone tools shaped and used by the Homo Habilis or the Homo Erectus are considered today as a crucial source of evidence for the initial emergence of some form of hominin cognitive behaviour.

The problem about which disagreements are rife among scholars is - how in the evolutionary process did minds (or consciousness or cognitive abilities) emerge in a world hitherto purely physical in its attributes? This indeed is too big an issue to address and promising solutions are not easy to come by. In spite of centuries of critical study by a wide range of researchers the evolution of the mind or cognitive capacities still eludes an adequate explanation. What is interesting to note, the decades-old philosophical speculations of Karl Popper (1902-1994) about the evolution of mind or consciousness in the biological world (intertwined with his three-world hypothesis) seem strongly convergent with current archaeological studies on early stone tool making and cognitive evolution (see e.g., Hutchins 2008; Jeffares 2010; Malafouris 2013; Mithen & Parsons 2008).

The present paper attempts to critically review Popper's (Popper and Eccles 1977; Popper 1977; Popper 1978; Niemann 2014) philosophical reflections on the emergence of mind in the promising light of latest archaeological investigations on the cognitive dimensions of prehistoric, that is, pre-Homo sapiens stone tool making (e.g., Stout and Chaminade 2009; Stout and Chaminade 2011; Wynn & Coolidge 2016; Wynn & Coolidge [eds.] 2017). The main objective of this study is to discover how the philosophical and archaeological inquiries can mutually benefit each other. To be exact, the paper intends to show what the contemporary archaeologists can learn from the critical insights of Popper on the problem of the emergence of mind and how Popper's views could be further illuminated with current archaeological findings.

There are three sections in this paper. The first section takes a close look at the lower Palaeolithic stone tool technology and aims to explain why it is necessary to look intoprehistoric stone tool making for detecting the initial emergence of hominin cognitive capacities. The second section discusses how, reinterpreting Darwin's views on the biological function of mental phenomena and the process of

adaptation, Popper argues against the epiphenomenal explanation of one-sided action of brain-body on mind and opens the possibility of causal interaction between three evolutionary levels namely, World 1, World 2 and World 3. The concluding section seeks to integrate Popper's philosophical insights with contemporary archaeological research in order to see if some fresh light could be thrown on the problem of hominin cognitive evolution.

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