Shea, J. J. 2017. *Stone Tools in Human Evolution: behavioural differences among technological primates*. New York: Cambridge University Press, Paperback: 978-1-107-55493-1, 236 pages, 51 figs b/w, 26 tables.

Fiona Coward (fcoward@bournemouth.ac.uk)

This book represents an ambitious attempt to re-frame the interpretation of stone tools as evidence for hominin evolution. I have every sympathy for Shea's reasons for writing the book, as outlined in the Introduction: as he notes, many palaeoanthropologists demonstrate a curious lack of interest in the evidence for human origins available from the study of stone tools – or indeed, in my own experience, almost any archaeological evidence, despite the fact that such evidence is far more prevalent than hominin fossils, and the *only* direct evidence for the behaviour of early hominins. For this reason, Shea has explicitly aimed this volume not so much at archaeologists – who despite Shea's efforts at a radical shake-up of stone tool analysis will probably find much of the content here very familiar – but primarily at physical anthropologists, in an attempt to convince them of the worth of evidence from stone tools for studying human origins.

However, with that in mind it seems odd that the opening sections of the book are in fact more of an outlining of the negatives of the terminology and current chronological framework within which stone tools are studied by archaeologists, which while probably providing a reasonable explanation for why non-archaeologists find this material so easy to ignore, strikes me as unlikely to do much to convince them. Chapter 1, 'how technological differences between humans and other primates explain changes in the archaeological stone tool evidence' sets out Shea's central method, alluded to in the subtitle of the book ('*Behavioral differences among technological primates')*. Shea's main issue – and the one he feels is doing the most to prevent stone tools contributing to the wider, multidisciplinary debate about human evolution – is with the all-too-common elision of stone tool variability with the distinct cultural 'identities' of discrete populations or 'cultures' in the past. Such a culture-historical view of prehistoric technology, with its misleading terminology of often enormous, monolithic and often ill-defined 'cultures' and 'technocomplexes' is of course only superficially repurposed from even older and less dynamic chronostratigraphical frameworks dating back to the very dawn of archaeology as a discipline. A product of the assumptions of the early industrial age in which they were developed, these frameworks collapse multiple axes of variability into overly-simplistic schemes of unilineal 'progress' in technological (by extension biological) evolution. They are also of course based primarily in most cases on European evidence – not always, or even often, a good fit for the evidence from elsewhere. The extent to which this culture-historical perspective is allowed to dominate the study of stone tools, Shea argues, is one explanation for the limited appeal of stone tools (and archaeology more broadly) among other disciplines: 'Archaeologists are the only people who ask such questions, and few people other than archaeologists care about the answers'. Instead, he argues, reformulating the framework within which stone tools are studied to reflect their significant not as signatures of temporo-spatial identity but as residues of behaviour, offers the opportunity to reinstate stone tool evidence as a major potential line of evidence for studying human evolution more generally.

Following this call to arms, Chapter 2, '*How we know what we think we know about stone tools*', sets up the basics in the form of a thorough yet admirably succinct overview of some of the major lines of evidence and analytical techniques involved in the study of stone tools, and one which has already been added to reading lists across my courses. Chapter 3,

'*Describing stone tools*', is rather more radical in its attempt to reformulate the terminology associated with the study of stone tools as a step towards reframing the debate. Shea boldly calls the two main sections in this chapter 'essential terms and concepts' and (the obvious corollary) '*in*essential terms and concepts' (emphasis mine). Retained as *essential* are geological terms relating to raw materials and the basic terminology of lithic technology (including assemblage; flake; core; retouch; hammerstone, as well as slightly more 'abstract' terms such as 'operational chain'; façonnage; débitage, curation; expedience; discard; function and style). Decidedly '*out*' are all chronostratigraphic/culture-historical terms relating to age-stages, industries or technocomplexes (Palaeolithic; Mesolithic; Neolithic; Oldowan; Acheulean; Aurignacian etc.), and indeed Shea does indeed avoid the use of such terms, and only a handful of named stone tool 'types', in what follows – and I for one did not feel a lack.

Shea's criticisms, while well-honed and succinctly presented here, are of course not as radically new as he seems to suggest. To me the reformulated framework advocated here seems to represent simply the re-focus from typology to technology long promulgated in much of the more recent lithic literature. However, Shea goes further, attempting in this chapter to establish an alternative descriptive framework for stone tool technology. I certainly applaud his ambition: however, I have to admit I am not entirely convinced by the new framework. In fact, Shea himself does not necessarily seem that convinced, because while he spends a significant part of chapter 3 setting it out, actually much of the evidence as discussed in the following chapters largely eschews these painstakingly described Modes A-I in favour of what is in fact fairly standard technological (rather than typological) terminology. Furthermore, the wider appeal of such frameworks – for example to the physical anthropologists Shea claims to be attempting to convince of the manifold attractions of stone tools – is somewhat in doubt given the abstruse language sometimes employed here. A sample quotation: 'Because these costs increase with greater fracture propagation surface elongation, this work distinguishes the reduction of relatively short platform cores from relatively elongated blade cores of differing sizes' (p. 37). Those of us more familiar with this kind of language may find this section interesting, but I have my doubts about how convinced the average biological anthropologist will be that this kind of work is relevant and useful.

However, where this book *does* make a quite radical step forward is in building on the criticisms of 'traditional' culture-historical/chronostratigraphic frameworks in a novel and potentially very valuable way. Shea argues persuasively that all 'traditional' approaches to investigating the role of stone tools in human evolution suffer from the same fundamental flaw: they are descriptive, rather than explanatory, generated by induction and indeed intuition after surveying the evidence itself in order to create plausible narratives about technological evolution. Such narratives are then, to all intents and purposes, untestable because, having been generated from the evidence, there is nothing independent left against which to test them. For me, this is a rather more novel criticism, and I would argue that the more significant achievement of this book is to plausibly establish an alternative means of generating hypotheses about the role played by stone tools in human evolution, using independent evidence – to whit, the study of contemporary tool use by 'technological primates', i.e. non-human primates on one hand, and modern humans on the other.

To achieve this, Shea structures the five chapters that make up the meat of the data in this book thematically. At first blush this seems to be a promising departure from the norm of chronological structure – however, closer study reveals the case studies/bodies of evidence each set of hypotheses is tested against are in fact organised chronologically: chapter 4 tests

its predictions against the Plio-Pleistocene evidence from Africa, Chapter 5 (‘*logistic mobility’*) takes something of a leap forwards to address the Early-Middle Pleistocene evidence from a number of regions across the world; Chapter 6 (‘*Language and Symbolic artifacts’)* tackles – surprise! – the Middle and Late Pleistocene of Africa and Europe; Chapter 7 (‘*Dispersal and diaspora*’) the Late Pleistocene and early Holocene, including Eurasia, Sahul and the Americas; and Chapter 8 (*‘Residential sedentism*’) the Late Pleistocene and early Holocene of the Levant. To be fair, the inclusion of this last, and arguably even the time period covered by chapter 7, is to the book’s credit, as most stone tool primers would stop at the Mesolithic at the latest, and more usually at the Upper Palaeolithic, despite the fact there is clearly much to be learned from later human groups’ use of stone tools. However, overall the fact that it is not very clear why these particular case studies were selected for each topic is something of a weakness here; the sense of familiarity as one progresses chronologically through the case studies is rather at odds with the radicalism Shea appears to be aiming for.

Nevertheless, the structure of the chapters is interesting. Each of chapters 4 through 8 deals with a different contrast observed between non-human primates and contemporary humans with regard to stone tool manufacture and usage. Each of these chapters itself follows a similar structure. First, the observed contrast is discussed in detail – so, for example, in chapter 4 ‘*Stone cutting tools*’, Shea begins by expanding on his suggestion that while non-human primates use stone tools as percussors, only modern humans also use them for cutting, piercing, etc. Next, these observations are used to generate a number of ‘predictions for the archaeological record’, which are then tested against the evidence. This pattern is very satisfying in terms of its rigorous insistence on hypothesis-testing using independent evidence – however, readers already familiar with the archaeological record will find that this re-framing of the debate, while interesting, ultimately seems to produce some rather familiar results to those of more traditional chronologically-structured discussions. Each chapter also includes a section on ‘contrasts with traditional approaches’, but these ‘differences’ often come across as rather abstruse: as noted, most of Shea’s criticisms of ‘traditional’ approaches are valid but have been voiced extensively elsewhere, though perhaps not so extensively operationalized.

It is refreshing, however, that the book deliberately and explicitly makes no speculations about cognitive change over the course of technological evolution. It also boasts a number of very clear, informative diagrams and illustrations, many of which I suspect will find themselves on teaching slides before too long. A useful glossary and helpful appendix briefly describing the ‘traditional’ framework of ages, technocomplexes and industries (presumably included through gritted teeth!) are included, and the book is well-written, including some nice and thought-provoking comparisons (e.g. describing logistic mobility by reference to plane travellers’ excessive use of overhead lockers) and epigrams at the start of chapters. Some potentially thought-provoking ideas are flung out almost unexplored, for example speculating that some of the damage found on very early stone tools reflected hominins’ using them to create noise for social display or signalling, or some oblique speculation about early carrying technologies made from perishable materials.

There are also, inevitably, some irritating niggles, most notably Shea’s insistence on referring to ‘ethnographic humans’ throughout. Given that most if not all human societies – including modern, western ones – have been made the subject of anthropological enquiry, surely all contemporary humans are ‘ethnographic’? I was also left rather unconvinced by some of the ‘homologies’ Shea identifies between stone tools and language in Chapter 6

(especially table 6.1): ‘Just as there is more than one way to say “I love you” there is also more than one way to detach a flake from a core’, seems rather a facile comparison that I’m not convinced gets us very far. Likewise, references to ‘quasi-linguistic variation’ among artefacts would seem to be pre-judging any evidence. Admittedly Shea does at least reference alternative potential explanations for variability relating to demography, but not others, for example those referencing population differences in social structure and density which might be equally appropriate (and rather more appropriate than linguistic analogies).

Overall, this book represents an ambitious attempt to re-frame the discussion around technological evolution. However, this is not so much because of its reformulation of the traditional overall descriptive framework for the evolution of stone tools, which in fact seems to be mainly the plausible consequence of the shift from typological to technological terminology already relatively widespread in archaeological study if human origins. While I am sympathetic to Shea’s motives and find his new descriptive framework intriguing, I am not convinced it represents a radical step forward, nor that it will attract more physical anthropologists to the archaeological evidence. As Shea himself recognises, the traditional framework has significant first-mover advantage, having embedded itself deep in the bedrock of early archaeology, and although I agree with Shea’s suggestion that only radical overhauled, rather than lily-livered tweaking around the edges, is likely to ‘work’ in terms of re-framing the debate, I suspect that sheer familiarity and academic inertia (never to be underestimated) make it unlikely this new framework will catch on. For me, the significant advance made here is Shea’s success in generating testable hypotheses relating to these various elements of early stone tool use, based on his thorough and painstaking comparison of contemporary human and non-human primate stone tool use. Although it is sometimes hard to escape the feeling that some of these hypotheses are really quite familiar re-statements of some fairly old stalwarts of the traditional ‘narrative’ picture of human technological evolution, the way they are framed here mark a step forward in allowing robust testing of those hypotheses using the independent evidence from the archaeological record, whether or not it actually manages to convince the hypothetical sceptical biological anthropologist Shea aims to seduce. While I have some caveats about the particular evidence against which each set of hypotheses is tested – which in fact, I think, stray very close to simply reproducing traditional narratives of technological evolution – the approach is very promising and Shea’s final call to arms, arguing for further testing of his hypotheses against evidence from beyond his chosen case studies in order to refine, and indeed potentially to reject and replace them, represent an exciting prospect for future archaeological study of stone tools.

Fiona Coward
Department of Archaeology, Anthropology, and Forensic Sciences
Bournemouth University