

The worthy explanations tested to understand this repartition mobilize archaeological or linguistic data to hypothesise a three waves model of innovations in link with agricultural practices. A discussion on the correlation between material culture and language highlights in the background the need for interdisciplinary to deal finely with these interactions and linkages as has been effectively demonstrated elsewhere (Hermann and Walworth 2020).

To conclude, the convergence between European Neolithic and New Guinea polished stone tools is demonstrated here through 'morphospace' comparisons. Thanks to this study, the polished stone tools come alive more than any European archaeological context would allow. The population dynamics investigated through these tools are directly relevant to current scientific issues concerning material culture. This example of convergent evolution is therefore an important key to considering this article as a source of inspiration for the archaeological community.

References:

Buckley C. (2023). Hafted Stone and Shell Tools in the Asia Pacific Region, PsyArXiv, v.3 peer-reviewed and recommended by Peer Community in Archaeology. <https://doi.org/10.31234/osf.io/8cwa2>

De Labriffe A., Thirault E. dir. (2012). Produire des haches au Néolithique, de la matière première à l'abandon, Paris, Société préhistorique française (Séances de la Société préhistorique française, 1).

Hermann A., Walworth M. (2020). Approche interdisciplinaire des échanges interculturels et de l'intégration des communautés polynésiennes dans le centre du Vanuatu, Journal de la Société des Océanistes, 151, 239-262. <https://doi-org.docelec.u-bordeaux.fr/10.4000/jso.11963>

Maslans Latorre A. (2020). Use-wear Analyses of Polished and Bevelled Stone Artefacts during the Sepulcres de Fossa/Pit Burials Horizon (NE Iberia, c. 4000–3400 cal B.C.), Oxford, BAR Publishing (BAR International Series 2972).

Pétrequin P., Pétrequin A.-M. (1993). Écologie d'un outil : la hache de pierre en Irian Jaya (Indonésie), Paris, CNRS Editions.

Pétrequin P., Pétrequin A.-M. (2020). Ecology of a Tool: The ground stone axes of Irian Jaya (Indonesia). Oxbow Books.

Reviews

Evaluation round #1

DOI or URL of the preprint: <https://doi.org/10.31234/osf.io/kt8br>

Version of the preprint: 1

Authors' reply, 13 March 2023

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Decision by Solène Denis, posted 27 February 2023, validated 27 February 2023

Statement on your manuscript: Revision needed

Dear Christopher,

First, I apologised for the delay regarding your manuscript submission. I finally received the two reviews of your manuscript.

Both reviewers agree that your preprint is a useful contribution to the field and that it should be published. However, some revisions are needed before.

I agree with the reviewers' comments. I am strongly recommending you to precisely go through all the remarks made by them. Please, prepare an answer to each of the comments as everything will be published and of course, can be discussed and justified.

I would like to underline a few important comments highlighted by the reviewers:

- please, make a statement or a choice regarding the integration or not of shell tools in your paper;
- please, use the suggested references to complete your preprint and add some references when required by the reviewers;
- please, follow the reviewer's request of addressing the "ethnic" group by bringing more details regarding this concept in anthropology;
- please, provide an important methodological and theoretical development regarding the articulation of ethnographic data to the past;
- please, enlarge the discussion/bring caution regarding your hypothesis of 3 waves of stone tool innovations in the Papua/New Guinea region.

I guess you will receive in the same time the reviews and the file uploaded by one of the reviewer.

If you have any question regarding the process, don't hesitate to contact me.

Looking forward to your revised manuscript,

All the best,

Solène Denis.

Reviewed by anonymous reviewer 1, 06 December 2022

The literature review in this paper mixes observations on stone, shell and metal tools, and discusses (deep) archaeological data/phenomena. The author might want to modify their abstract accordingly and maybe their title as well.

The paper presents a global typology for hafted tools in the Asia-Pacific region, which is interesting and useful. One comment that relates to other aspects mentioned in this review: the author generalises based on ethnographic data but then applies their haft typology to the past, which is problematic on a methodological and theoretical level. For example, how can one assume that mortise and tenon hafting (M types in the author's typology) were not used for adzes in the past?

On a similar note, the author uses ethnographic data and very limited archaeological examples to demonstrate 3 waves of stone tool innovations in the Papua/New-Guinea region, which is not convincing in my opinion.

The hypothesis is interesting, but without a thorough and wide-scale archaeological investigation, claiming this as a model to explain the distribution of ethnographic stone tools is just not robust enough.

The final and concluding discussion about potential correlations between material culture and language is not announced in the abstract or in the "Objectives" section of the paper.

General lack of bibliographical references in multiple instances (noted in the pdf).

My overall recommendation for this paper is that the paper should be published after major revisions addressing the comment made in my review and in the ms document.

More detailed comment are embedded directly in the pdf.

[Download the review](#)

Reviewed by **Adrian L. Burke**, 26 February 2023

Review of the chapter by Chris Buckley, Hafted stone tools in the Asia Pacific region

Adrian L. Burke, Département d'anthropologie, Université de Montréal

I very much enjoyed reading this chapter. I have to say at the outset that I am not an expert on the archaeology of the Asia-Pacific region. I work primarily on the Indigenous pre-contact archaeology of North America. I have however, like many anthropologically trained archaeologists, read the classic ethnographies of the region. I am also quite familiar with Pétrequin and Pétrequin's work in Irian-Jaya and their work on the axe-adze manufacturing communities, an "incontournable" for anyone interested in the manufacture of axes-adzes in the past. I can therefore not really speak to whether the survey aspect of this chapter is exhaustive since I am not familiar with the data available.

The text is well-written and easy to read. The objectives are laid out clearly and the organization of the paper is logical. This is not a journal article but rather a book chapter and as such it is longer than most articles which also allows the author to conduct a thorough survey and provide more descriptive data than usual. I found very few grammatical errors. I have communicated my minor stylistic suggestions directly to the author and they are not pertinent here. The figures in the chapter are excellent. The maps are very useful and help to summarize the large corpus of data. There is also an online Google Maps version of the maps and the distribution of the axe-adze data that is really very helpful and user-friendly. The photographs of ethnographic axes-adzes are a plus and provide the necessary visuals to show how varied and sophisticated this technology is in the Asia-Pacific region.

This chapter is primarily a survey of the ethnographic data available for the Asia-Pacific region concerning axes and adzes, and more specifically the various ways that these tools were hafted in the recent, ethnographic past. This survey of the data is then compiled and used by the author to address questions that are more archaeological in nature. The distribution of different axe/adze forms and their specific hafting methods are compared to ethnic or linguistic groups in the region to look at interactions and relationships between these groups, as well as the population history of different groups that occupy the region today ("waves" of migration). Buckley also addresses the issue of convergent evolution with regards to axe/adze forms in the Asia-Pacific region and then compares this to the European Neolithic. I will return to these two major questions below after a few comments on the text.

The author says that he will not formulate any ethnoarchaeological models (p. 5). This is too bad but I think that it is understandable and one sees the purpose of his text towards the end and it is clearly more archaeological than ethnoarchaeological.

Buckley mentions in two places the fact that polished axes/adzes appear before agriculture in other parts of the world (p. 6 & 27). It is interesting to note that in many parts of North America, flaked-pecked-ground-polished stone tools of a large calibre such as axes, adzes and gouges predate horticulture by thousands of years. Moreover, they are present in areas where horticulture was never possible and was never adopted such as the Boreal Forest. Even more intriguing is the fact that they are also present in areas and at times when trees were absent or very small suggesting that they should not always be automatically associated with felling of trees and woodworking.

The last paragraph of section 1 (p. 6) is not really clear and I am not sure it is necessary. In addition, on the same page in the second paragraph of section 2, the author states “These sophisticated ground tools were mainly, but not exclusively, associated with migrations of Austronesian-language speaking peoples.” which seems to contradict what he just wrote in the last paragraph of section 1.

If there is one weak link in this chapter it is the apparent conflation of ethnicity and language. I repeat, I am not an expert in the Asia-Pacific region but it is always best not to presume that an “ethnic” group as defined by outsiders is the equivalent of a linguistic group. I think that it would be useful if the author added one or two paragraphs to address this rather thorny issue in anthropology if only to make his assumptions clear to the reader from the outset. Defining “ethnic” groups is hard in anthropology and ethnoarchaeology. Trying to match these amorphous and dynamic ethnic groups on the ground with linguistic groupings is tricky at the best of times. This in turn has a direct impact on how we read the author’s interpretations of the axe/adze distribution data in the last part of the chapter that are more archaeological. In section 5 Correlations between material culture and language, Buckley returns to this issue and takes a critical look at it, which I appreciated. The author discusses the example of some coastal ethnographic materials compared to language groups showing how it is in fact very hard to correlate the two. He asks: “why are correspondences between material culture and ethnicity so difficult to discern (requiring cutting-edge statistical analysis) in the Lewis dataset?” I suspect that the answer is because there is often no direct or obvious correlation (see for example Hodder 1982, *Symbols in action: ethnoarchaeological studies of material culture*)! I am not sure that I am convinced, or that my misgivings are assuaged, by Buckley’s arguments in this section, and I leave it up to each reader to decide for him or herself.

Regarding the question of how an ethnographic distribution of axe/adze hafting styles can be used to address issue of migrations and peopling of a region, I find that the author’s interpretations and hypotheses are reasonable and based on the data at hand. I assume that it will be up to the specialists in the region to fight it out over whether they accept these interpretations or not. At the very least, they provide hypotheses and models that can be tested against other archaeological data or DNA data. The proposed model for the adoption of agriculture in interior highland New Guinea, and the proposal of three waves of development of the tools associated to agriculture is fascinating. It is not entirely clear however if the author implies that these waves were accompanied by people or not. For the larger Asia-Pacific region the author proposes models that are more clearly migration models for the islands and these are based again on the hafting styles of the axes and adzes. As Buckley states, this kind of research trying to match material culture to specific groups is not very popular any more (old-fashioned culture-history?), but this chapter shows that a careful survey of the ethnographic data can at least generate some very compelling models for the peopling of a region and also for the adoption and intensification of agriculture – two things that interest most archaeologists.

Finally, concerning the issue of convergent evolution in technology and forms of tools for example, the use of morphospace to compare hafting methods between the Asia-Pacific region and the European Neolithic is a good way to present the data visually and show the high number of parallel forms. I am not sure if I agree with the author that this is a “remarkable” example of convergent evolution (p. 49), but it is certainly interesting and compelling. It is worth more investigation and more cross-cultural comparison, another approach that seems to have fallen out of favour with archaeologists. I think that the author may want to eventually try statistical methods to test some of these ideas as is done in the book by O’Brien, Buchanan, and Eren that he cites. At the end of section 4 Buckley discusses alpine jade axes and their association with high status, comparing them to axes in New Guinea that were seen as prestige items. It would be good to provide some references here, possibly to Pétrequin and Pétrequin’s recent JADE project, or for example to the Irish Axe Project (see references below).

To conclude, I think that this chapter should be published and it will be a useful contribution to the field. The specific study of hafting remains understudied in archaeology and merits much more serious attention and research. Buckley points to the European studies of well-preserved hafts and stone tools, and I would add that there is also significant research being done on use-wear of hafted segments of stone tools. I think that

this study will help to promote such studies and to continue the dialogue between the recent ethnographic past and the more ancient archaeological past.

The book by Hampton on the Dani manufacture and use of stone axes/adzes is not cited which surprised me. It is a very interesting book, full of ethnographic information on this technology. Perhaps the author should cite/consult it.

Hampton, O.W. "Bud"

1999 Culture of Stone: Sacred and Profane Uses of Stone among the Dani. College Station: Texas A&M University Press.

Other references that may be useful.

Pétrequin, Pierre, Gauthier, Estelle et Pétrequin, Anne-Marie

2017 Jade : objets-signes et interprétations sociales des jades alpins dans l'Europe néolithique. Besançon: Presses universitaires de Franche-Comté, Centre de recherche archéologique de la vallée de l'Ain.

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1998 The Irish Stone Axe Project. Dublin.

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2014 Stone Axe Studies in Ireland. Proceedings of the Prehistoric Society 58(1):389-416.