

425 E. 79 Street
New York, N.Y. 10021
August 30, 1973

Mr. Don E. Crabtree
Route 1, Box 110
Kimberly, Idaho 83341

Dear Don:

Thank you for your kind letter of August 17. If there are ever any other "difficult to locate" articles that you might like to obtain, please let me know and I would be happy to be of assistance. The library facilities are really wonderful here in New York.

Thank you for your too kind a comment on my remarks on the relevance of knapping. I would be happy to expand on my remarks for Ed Wilmsen. I think my remarks could be improved considerably - I wrote them rather quickly. Because of my unusual background (for archeology), perhaps I could include some comments on the role of analytical mechanics theories and concepts as they might relate to studies in knapping and anthropology. (Of course, I would not expect any payment. It would be a pleasure to write such an article.

Talking about aboriginal lapidary arts, have you seen the article by Erich G. and Harriette H. Thomsen, "Litho-Mechanics and Archaeology", in Contributions of the University of California Archaeological Research Facility, No. 12, May, 1971? They briefly discuss perforation, and the manufacture of ear spools. If you have not seen it, let me know and I will send you a copy of it.

Today I mailed to you a Xerox copy of the Ludwig Pfeiffer Book. I must apologize for some of the poorly copied pages (only had a Xerox myself), the unequal page sizes, and my scribbling on the pages. Although the book is in German, there are some interesting diagrams, etc. Am enclosing here some comments John Witthoft made on (an earlier version? of) the book (from p.4 of Witthoft's article "Lithic Materials and Technology", Proceedings of the Twenty-Fifth Southeastern Archaeological Conference, Bulletin 9, ed. by Bettye J. Broyles, Morgantown, West Virginia, 1969).

My wife was happy and proud of getting recognition from an eminent scholar of being a tolerant wife of a knapper.

With best wishes,

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Remarks on the Relevance of Knapping

Even as a beginner in flintworking, or knapping, the writer has found that information and insights can be gained in knapping experiments that are extremely useful for archeological and anthropological research. Knapping, it is believed here, can lead to more meaningful analysis of lithic industries and of assemblages as a whole, thereby indirectly enabling the construction and testing of hypotheses that are more relevant to the cultural components in question. Not only is knapping experience useful for analyzing lithic artifacts (debitage, as well as tools, are considered to constitute artifacts here), but it also aids the study of tools used for the manufacture of stone implements.

It is generally accepted that the attributes of stone artifacts related to their manufacture constitute one class of primary attributes of such objects, and that such attributes may, in general, be related to all the other primary and secondary attributes of the artifacts. However, it is generally not known a priori which of the artifact attributes relate to the fabrication techniques of the artifact. For example, platform preparation and edge grinding might incorrectly be taken to relate to use characteristics. Familiarity with the possible flaking techniques can give insights and can be of heuristic value in constructing hypotheses as to the correct meaning of such attributes. Thus, knapping experience can be helpful in the choice of attributes that are related to the methods of manufacture, and it can be of aid in the attempts to interpret the meaning of such attributes in terms of the possible methods of manufacture.

Similarly, experience in flintworking can be useful for the study of fabricating tools - e.g. hammerstones, antler batons, punches, pressure flakers, anvil stones, and abraders. For example, experiments can be conducted to assess the possible

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meaning of the form, size and material of the fabricators, together with the wear patterns on the fabricators, in relation to the stone tools for which they might have been used. In literature, one often sees references to "soft" and "hard" hammers. Experienced knappers recognize that really there is a whole range of hammers and batons ranging from so-called "soft" to "hard".

Experience in flintworking can also aid in the identification and interpretation of the attributes of artifact material that are relevant to their manufacture and utilization. For example, it is understood by archeologists that obsidian can provide a sharper cutting edge than flint and that the latter can usually provide a stronger scraping edge than the former. However, the more subtle differences in this respect can only be evaluated by actual tests. The question of the "workability" of materials can be posed along similar lines.

In knapping, the experimenter basically breaks stone. Some of the breaks are intentional, and some are not. But even the unintentional fractures are enlightening and useful. In the study of lithic industries, artifacts are often encountered that seem to have been unintentionally broken during their manufacture or use. If the former is the case, then the location and characteristics of the break can be expected to throw light on the methods of manufacture - possibly on the types of percussors used and the holding techniques and devices. Similarly, the attributes of the unintentional breaks on tools broken during their use may imply something about the manner in which the class of stone artifacts was used. The frequencies of unintentionally broken artifacts may be expected to relate to the preferences for the kinds of materials chosen.

In flintworking, the experimenter can become familiar with the amounts and the characteristics of debitage produced in various flaking processes. The study of lithic debitage

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from archeological sites has received inadequate attention to date. The primary reasons for this, the writer believes, are probably twofold: The analysis of the great amounts of debitage encountered at many sites can be tedious and very time-consuming; even if one is willing and able to overcome the first obstacle, there remains the question of how to relate the debitage to the probable methods of manufacture. Especially in terms of the latter, experience in knapping is helpful. Obviously, study of debitage may reflect the fabrication activities conducted at the site, the activity areas, the location and the nature of the material sources, the form in which the material was brought to the site, and so on. Moreover, the amount of debitage may be meaningful as to the extent of the activities carried out at the site. For example, what do ,say, 50000 flakes in the debitage imply ? Quantitative experiments in flaking can be a starting point in such studies. Finally, the analysis of debitage, it has been recognized, can shed light on the processes of tool manufacture that may not be reflected in the finished tools themselves.

Because of a background in engineering and applied solid mechanics, the writer started to pose questions on the mechanical processes involved in stone tool manufacture, in terms of analytical mechanics, before he tried knapping. Experience in flintworking is providing empirical data to guide the possible mechanical explanations involved in the physical processes of flaking; also, the mechanical processes associated with flaking stone suggest particular experiments in flintworking for understanding the flaking processes further.

Only some of the ways in which experiments in knapping may provide information and insights for archeological research, in the opinion of the writer, have been pointed out briefly. It should be evident that experiments in replication of aboriginal tools as end products constitute but one line of research - experiments in knapping may contribute to the recognition and understanding of all the steps that may have been involved in the manufacture of tools.

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