

**PRICKLY BUSH, A SITE WITH BACKED BLADES ON THE BRISBANE RIVER:
A PILOT STUDY TOWARDS THE MEASUREMENT OF SITE "DISTURBANCE".**

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INTRODUCTION

In August, 1976, while conducting a search along the Brisbane River Banks for scarred trees, one of the writers (WL) discovered stone artefacts scattered on a pathway at the edge of the river about 2km from the Queensland University campus (Figure 1). Further examination of the area revealed the presence of a number of backed stone artefacts among an assemblage of flakes and cores. After enlisting the aid of the Pre-history section of The University of Queensland application was made to the Aboriginal Relics Advisory Committee for permission to make a collection of this assemblage. This paper reports the basic findings of that work and initiates an inquiry into the problem of how to estimate the degree of disturbance, especially trampling, a site has received by examining stone artefacts.

THE SITE

The Prickly Bush site (LB:A53), named for a large and obstructive *Bouganvillia*, is located on the North bank of the Brisbane River adjacent to the Indooroopilly Golf Club (Figure 1). Stone artefacts were sparsely scattered on the surface of a small ridge composed largely of weathered phyllite with a significant milky quartz content. The ridge slopes north where it meets Sandy Creek. Here the phyllite is overlain by river silts derived from Brisbane River floodwaters. Parallel to the northern end of the ridge is a small lagoon (Figure 1). Today the ridge supports a remnant sclerophyll open forest which includes narrow leaved ironbark, spotted and blue gums and other eucalypts and acacias (eg. *A. fimbriata* and *A. cunninghamiae*). The site is wooded from the top of the ridge down the steep river embankment, at the edge of which it gives way to mangroves.

It is important to note that the site has been severely disturbed by both natural and cultural agencies. The phyllite bedrock is being constantly degenerated by weathering processes, the finer grades being washed downslope by rain and floodwater leaving a coarser gravel on the surface. This too has undoubtedly been moved about by flood action. Human agencies include the grading of a pathway running parallel to the river bank, the bulldozing of land for the construction of the adjacent

D.P.I building and surrounding fence, the digging of a pipeline and other earthworks, the removal of silts for garden soil, the felling of trees and the trampling by untold numbers of golfers and hikers' (on foot as well as wheeled vehicles). State Government Flood Maps indicate that the 1974 Brisbane flood as well as previous major floods would have inundated this site.

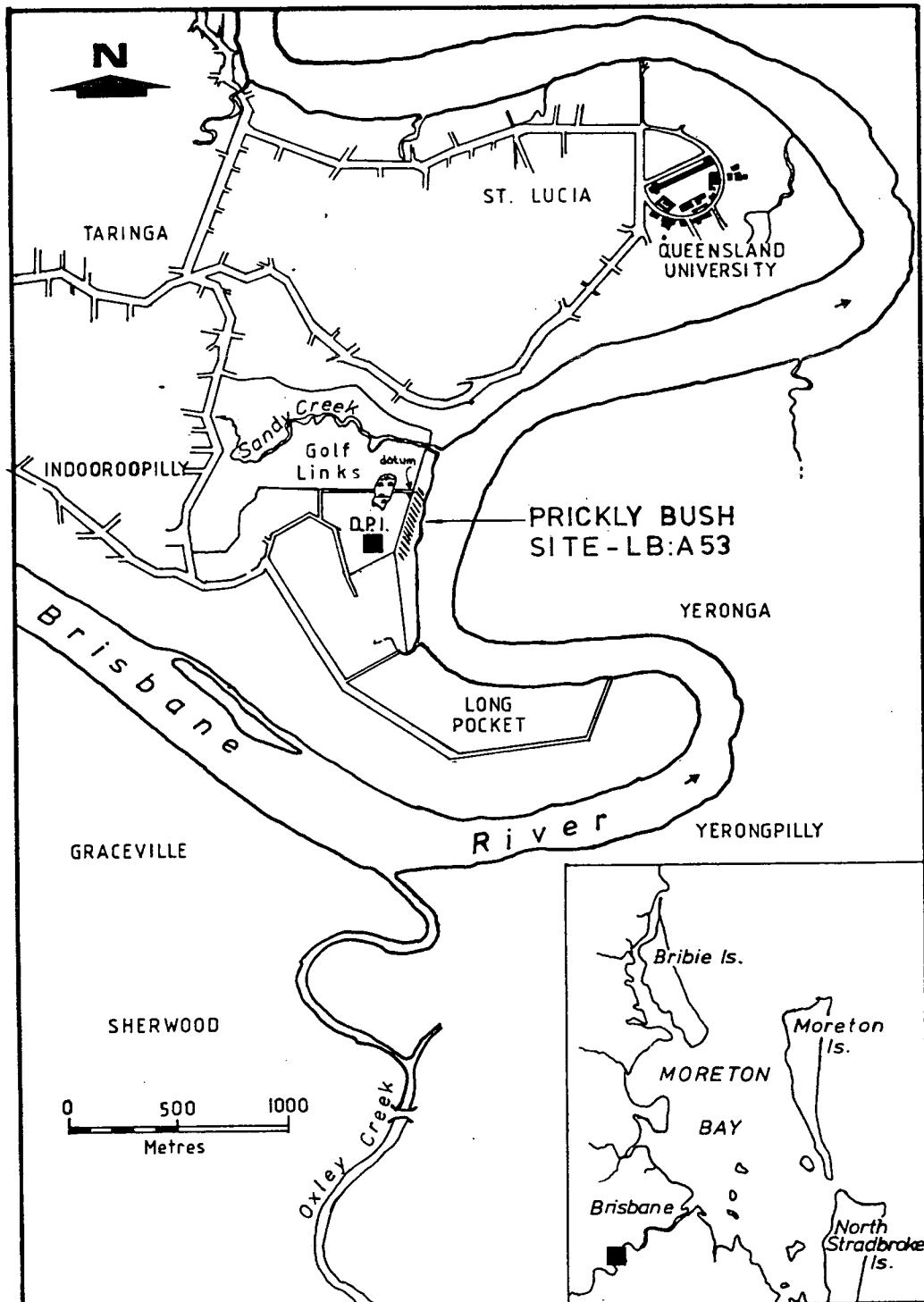


Figure 1. Location map of the Prickly Bush Site.

COLLECTION PROCEDURE

Despite clear evidence for significant post-depositional disturbance to the integrity of the site, it was still considered prudent to recover the artefacts in a systematic manner. Accordingly, a grid composed of 10m x 10m squares was laid over the site, using the existing D.P.I. boundary fence as a baseline and its NE corner post as a datum (Figure 1). Artefacts were then located and collected according to their grid coordinates. One of us (WL) has continued to monitor the site regularly since the initial collection took place and has added to the original collection.

Although it was considered that the stone artefacts were wholly surficial, three 1m x 1m "sondages" were dug into silty areas at intervals in the grid as a test of this assumption. The excavation revealed a series of waterlain silt bands and no cultural material.

Identifying stone artefacts similar in size to the phyllite gravel proved difficult and time consuming. Due to inexperience, the students had difficulty distinguishing artefacts from non-artefacts. Thus, they were instructed to collect all stone pieces which appeared alien to the geology at the site as well as any local material exhibiting conchoidal fracturing. All such material was collected, bagged and labelled according to its grid coordinates.

THE STONE COLLECTION AND ARTEFACT ANALYSIS

A total of 472 items were collected including 35 fragments of glass. These were sorted in the laboratory and classified essentially in the manner described by Hiscock (1984:129) except that retouched flakes were a subunit of the flake category. Of the stone material, 118 pieces could be identified as artefacts, the remainder simply being put into a category called non-artefactual stone. A careful examination of the glass indicated that all pieces were broken fragments of modern beer bottles and none were considered to have been Aboriginal artefacts. Although some exhibited small conchoidal fractures, these could not be distinguished from normal edge damage fractures caused by trampling and other post-depositional processes. All material classified as stone artefacts had been produced during the course of knapping; that is, all was included in the general category, "chipped stone".

Chipped stone was further subdivided into the categories "flake", "core" or "flaked piece" (possesses no P.F.A. or positive or negative bulb but does exhibit other features derived from the application of external force to the rock) (see Hiscock 1984:129). Preliminary analysis recorded attributes including weight, raw material, retouch, and some details about use-wear and edge damage.

The chipped stone artefacts from Prickly Bush included 7 cores, 71 flakes and 40 flaked pieces (total 118). Nineteen among these exhibited retouch and/or use-wear, seven of which were identified as backed blades. Edge damage was a prominent feature of flakes (36 of 71) and flaked pieces (19 of 40) - ca. 50% of each category. This fact made identification of retouch difficult. More importantly, as will be made clear later in this paper, it served to redirect the nature and scope of the analysis.

Raw Material

Two main questions were asked of the stone assemblage pertaining to raw materials used in artefact manufacture. First, in order to conduct a subsequent search for sources, it was necessary to identify the range of raw materials represented. Second, in order to make inferences about on-site or off-site manufacture of particular artefact classes, it was considered useful to look for possible differences in proportions of raw materials versus artefact categories.

Six types of stone are represented in the artefact collection. These include chert, chalcedony, silcrete, quartzite, quartz and basalt. As Figure 2 illustrates, more than 55% (by number) of the artefacts were made from chert. Chalcedony and silcrete comprise 17.8% and 16.1% respectively, quartzite 6.8% and quartz and basalt combined make up less than 3.5% of the collection.

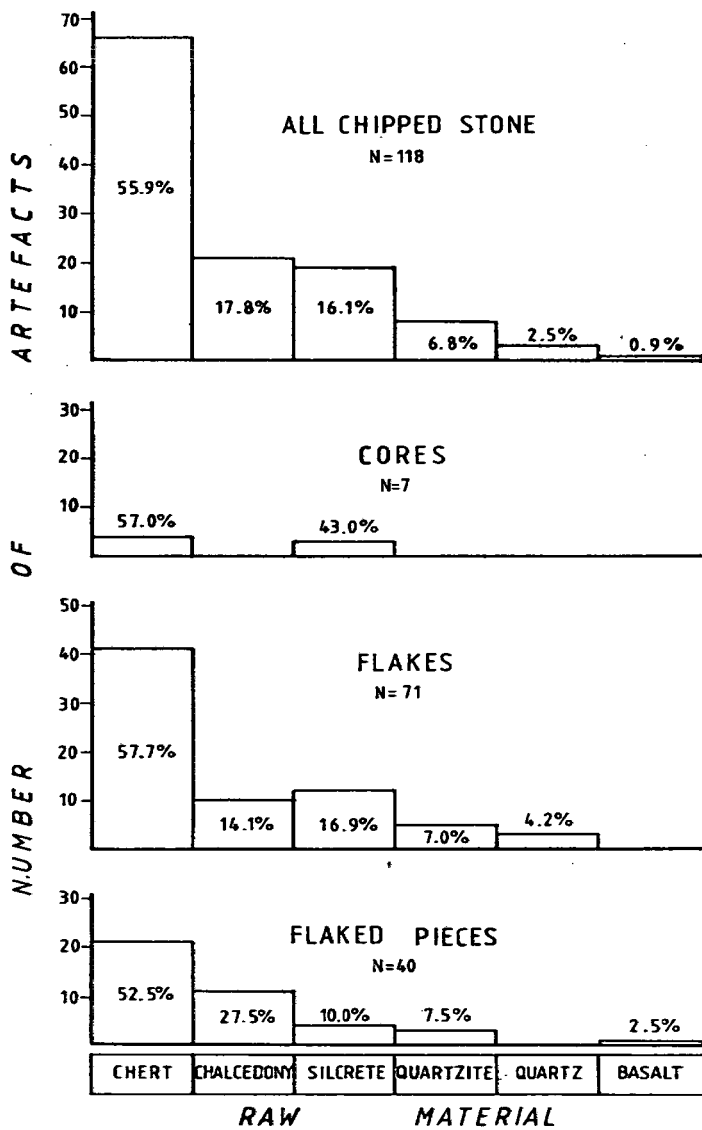


Figure 2. Stone artefacts from Prickly Bush by proportion and raw material.

Sources of stone artefacts found in the western Brisbane area have yet to be unequivocally located. However, all types of stone represented, except for quartz, may be found in the form of rolled river pebbles in the adjacent Brisbane River. Previous searches of localities upstream from the site by one of us (JH) have yielded abundant silcrete pebbles and fewer numbers of the other types represented. The relative absence of quartz artefacts is noteworthy given a readily available source of this material in the phyllite substrate of the site and its environs. From the above it is inferred that people at Prickly Bush preferred working with chert over the other materials. A comparison of proportions of raw material types represented within stone artefact categories (Figure 2) reveals a remarkable consistency for chert. Across all four categories the range of chert predomination falls between 52.55% and 57.8%. Whether or not the Brisbane River was the source of chert or the other rock types has yet to be demonstrated; however, it is presently considered the most likely origin.

Backed Blades

A total of seven backed artefacts were recovered, examples of which are given in Figure 3. Five were made of chert, one of chalcedony, the other of a fine-grained silcrete. The chert and chalcedony specimens were roughly crescentic in form, one being somewhat triangular. The silcrete blade was most interesting in that it exhibited a brownish stain at one end. This surrounded one end and terminated approximately one-quarter of the way along it (see shading in Figure 3a). It is considered that the stain may represent the residue of a resin or other material used in hafting such a point into a wooden shaft. It may have thus been used as a spear barb. This notion has yet to be tested. None of the other backed pieces exhibited staining of this sort. Although transverse snapping and edge damage was noted for five of these artefacts, no usewear was demonstrable.

If the chronological placement of these kinds of backed artefacts in other parts of Australia is correct, the Prickly Bush site could date human occupation on the Brisbane River at some time after the mid-Holocene, but possibly prior to the past 2,000 years (Johnson 1979, Morwood 1981, White and O'Connell 1982:106-125). This time bracket certainly holds for Platypus Rockshelter (KB:A70) further upstream on the Brisbane River (Hall 1981, see also Caddie et al. 1984) as well as for Rocky Scrub Creek near Gatton (M. Morwood, Pers. Comm. 1985) and Bushranger Cave (LA:All) in the Numinbah Valley (Hall, in prep.).

A CHANGE OF STUDY AIMS: WHAT MEANS DISTURBANCE?

Originally the objective of the stone artefact analysis was to characterize the backed blade component within the context of the entire stone industry at the site. It was soon realized that trampling and other processes had caused such damage as to render such an exercise impractical. For example, numerous flakes had been snapped either transversely or longitudinally or had received heavy edge-damage, presumably by trampling or treadage. Thus, any calculations, whether based upon weight or linear morphological attributes, would undoubtedly contain gross inaccuracies.

On the other hand, it was considered by one of us (JH) that the shortcomings of the sample for previous objectives might be turned to some advantage by using it to generate data for purposes relating to

the identification and possible measurement of "disturbed" sites. This was prompted by the frustrations experienced in both consulting and research work of being unable to usefully conceptualize the words "this is a disturbed site" which all too often are written on site record forms in state government and research files. It would be very useful if we could measure the nature and degree of such disturbance in some way, even if only in a general way. It would certainly enhance the assessment of site significance, especially if such measurement could be made during site survey.

The monitoring of the Prickly Bush site over the past decade has produced unambiguous evidence that the ground surface is regularly trampled and otherwise scuffed and disturbed. Thus, the predominance of edge damage to the stone artefacts were considered to have largely derived from post-depositional agencies, especially trampling. So an attempt was made to portray the main aspects of damage to the assemblage with a view to eventually building a scale by which such site disturbance may be at least roughly measured.

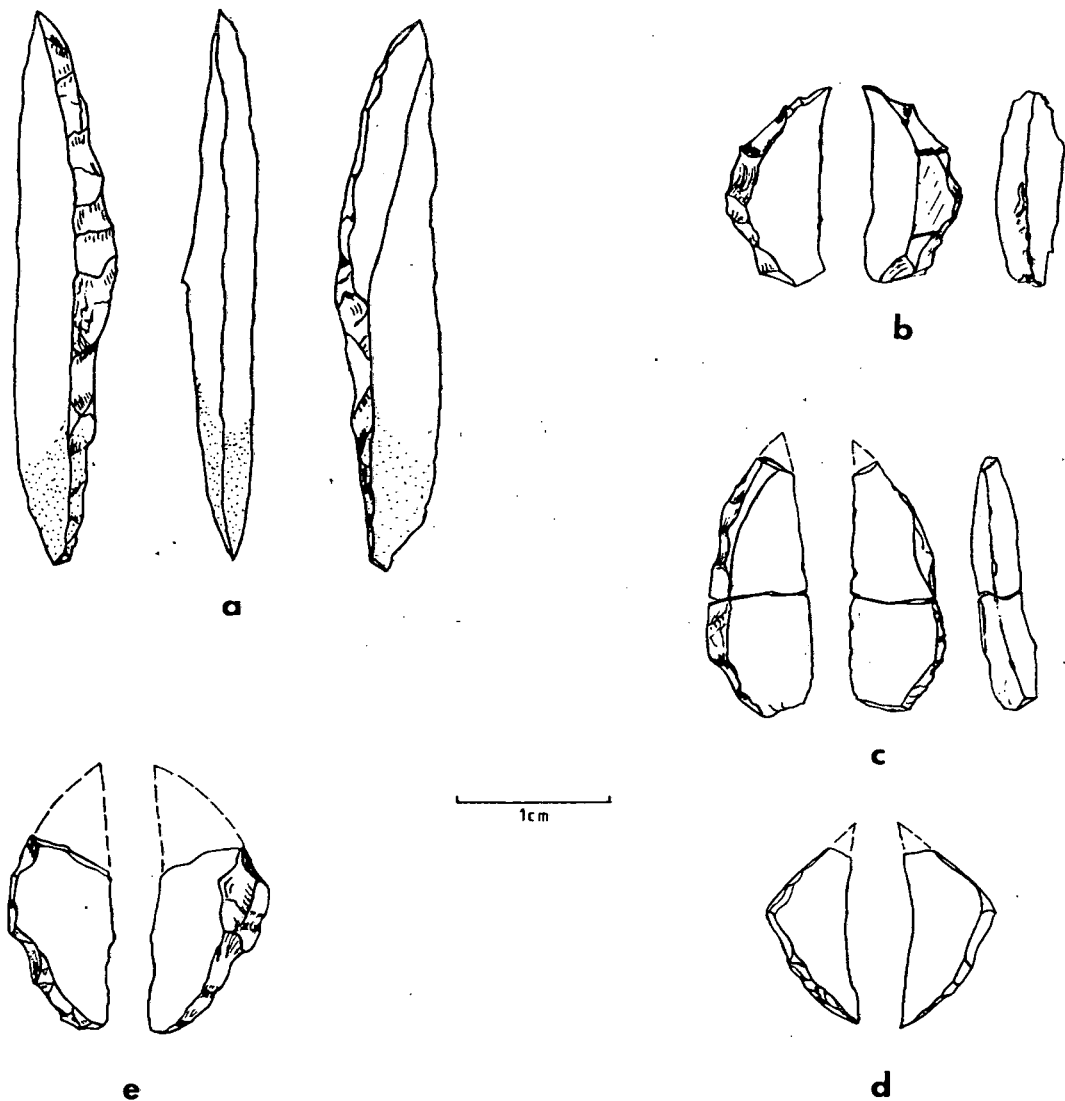


Figure 3. Examples of backed blade forms found at Prickly Bush

Any archaeologist who has knapped stone will know what generally happens when one tramples on a pile of stone flakes; they become further flaked. Sometimes flakes will snap into two or more pieces (usually transverse to the long axis - Peter Hiscock pers com; see also this Volume) and often numerous flakes are removed from flake margins (cf. Kamminga 1982:9, Tringham et al. 1974). Thus, the first hypothesis generated was one which holds that the degree to which a site has been disturbed by trampling is proportionate to the number of transversely snapped flakes.

A second hypothesis relates to an original observation made on flake margins from Prickly Bush, ie. they exhibited much edge fracturing or damage. According to Flenniken and Haggarty (1979:208), stone artefact edge modification/damage may result from four sources including manufacture and/or maintenance, use of the artefacts, geological and other non-cultural flaking processes and post-discard cultural agencies such as trampling (see also Keller 1979). Unfortunately, there has been insufficient research undertaken to permit easy identification and thus separation of these sources. For example, Kamminga in his pioneering work in usewear studies in Australia (1982) notes inter alia that it is not only difficult to discern between retouch and use-fracturing, but it is also very difficult to unequivocally differentiate either of these from post-depositional edge damage. In this connection Flenniken and Haggarty (1979: 213) would agree and even explicitly argue from experimental data that, "polish is the only definite indicator of aboriginal flake use".

Such caveats notwithstanding and generalizing about the nature of human action and stone artefact use in Australia, it was considered that the amount of edge damage could provide a gross indication of post-depositional fracturing. Interestingly, single event trampling experiments have indicated that edge fractures tend to be distributed uniaxially (Kamminga 1982:10, Tringham et al. 1974:191). Thus bifacial edge damage should tend to occur with repeated trampling over time as artefacts get turned over and over on the surface of a site.

It was considered that there were at least two possible attributes of edge fracturing to measure. One is simply the presence of edge-damaged artefacts in one's assemblage. When translated into a proportion the figure may be used to compare with those from other sites. A second is to actually count the number of flake scars per unit length of artefact margin. This study used the latter measure largely because the number of margins would always be greater than the number of artefacts and thus would of benefit in the measurement of small samples.

It was therefore hypothesized that the number of flake scars per unit length of stone artefact margin would be proportional to the degree of post-deposition or post-discard trampling. Consequently the following pilot study to investigate the viability of these notions was initiated by one of us (JH) which, a) measured the proportion of snapped flakes and, b) measured the mean number of flake scars per centimetre of stone artefact margin in the Prickly Bush assemblage.

PROCEDURES

Measurement of breakage consisted of the following simple steps.

- 1) The number of broken flakes in the Prickly Bush assemblage were counted (retouched flakes were included in the sample).

- 2) A check was made for conjoins among broken pieces to ensure that none of them were counted as more than one event (eg. the 4 broken backed pieces in Figure 3 count as 3 events).
- 3) The number was converted to a percentage proportion of the total number of items in the sample.

Measurement of edge damage was not so straightforward as it dealt with a more qualified sample. Firstly, as tiny edge fractures were found to be more difficult to discern in coarser-grained raw material (eg. quartzite), only cherts, chalcedony, basalt and finer-grained silcrete was selected for the sample. Secondly, as it was considered that edge angle would be an important variable in this exercise (the more acute the angle, the more likely to sustain edge damage fractures), the sample was confined (arbitrarily) to stone artefact margins with an angle of less than 40°. The following procedure was followed.

- 1) Fine-grained stone artefacts were selected from the Prickly Bush assemblage.
- 2) Artefact margins with obvious or suspected retouch and/or use damage were omitted from the sample.
- 3) Artefact margins with an edge angle of more than 40° were omitted from the sample.
- 4) A count was made of macro and microscopic flake scars along selected artefact margins using a Wild variable power (6x - 100x) stereomicroscope. Counting was done for 1cm units of margin length.
- 5) A mean figure of flake scar per centimetre was derived for the sample as a whole.

RESULTS AND COMPARISONS

Flake Breakage

A total of 14 Prickly Bush flakes exhibited snap breakage. This means that some 20% of the 71-piece sample had been broken. Three conjoins were identified, including one backed blade (Figure 3c). It is worth noting that this figure was not significantly altered (ie. 20 of 111 = 18%) when flaked pieces were added to the sample.

If the original assessment of the Prickly Bush site as a heavily trampled and otherwise "disturbed" site is correct then the figure of 20% breakage should be quite a high one. It should be expected to be considerably above, for example, the figure for a living floor deposit from a relatively protected subsurface context. In order to appraise the strength of this notion, two other sites were sampled for flake breakage. One is Platypus Rockshelter, a protected and stratified site also on the Brisbane River which dates to over 5000 BP and exhibits at least two 'living floors' sandwiched between layers with slightly less stratigraphic integrity (Hall 1981, see also Caddie et al. 1984).

Flakes were sampled from one of these 'living floors' (field number Fl4). The other site is a very large surface stone artefact scatter at Gregory, central Queensland (GF:A25), which was subjected to a controlled surface collection (Hall 1979). The site, named Diamond-3 after the sampling strategy employed, is known to have been subjected to trampling by cattle for decades and was thus expected to exhibit greater stone artefact edge fracturing than the Platypus Rockshelter flakes.

Results of the three samples are compared in Table 1 below and they appear not to be at odds with the first hypothesis. The "breakage index" for Platypus Rockshelter is only about one half of that for the open sites of known disturbance. The Diamond-3 figure is only slightly lower than that for Prickly Bush, suggesting that both have received more post-discard trampling/disturbance than Platypus Rockshelter.

Table 1. Stone artefact 'breakage index' comparisons for 3 sites.

SITE NAME	NO. IN SAMPLE	NO. OF BROKEN FLAKES	PERCENTAGE
Prickly Bush	71	14	18.0
Platypus Rockshelter	106	8	8.0
Diamond-3	100	15	15.0

Edge Damage

As Table 2 shows, Prickly Bush artefacts exhibited a mean number of 4.8 scars per centimetre of margin (range = 0-20). This contrasts markedly with the figure from Platypus Rockshelter of only 1.5/cm (range = 0-7) but is more in line with the measure of 4.1/cm (range = 1-15) for the Diamond-3 site. Interestingly, the differences are also reflected in the high end of the range for each sample. Again, the result is supportive of the hypothesis originally put forward. Certainly, it argues for more work to be undertaken along this line of enquiry.

Table 2. Measurement of flake scars per centimetre of stone artefact margin for three sites.

SITE NAME	MEAN NO. FLAKE SCARS PER CM OF MARGIN	RANGE
Prickly Bush	4.8	0-20
Platypus Rockshelter	1.5	0-7
Diamond-3	4.1	1-15

Of 48 margins measured, 8 exhibited no edge damage at all (and a further 8 had only 1 fracture/cm). Thus, if only those with edge damage had been chosen for the sample the derived average would have been increased significantly (to ca. 6/cm).

CONCLUSION

When the results of the breakage measurement and those of the edge damage are plotted against one another (Figure 4), the outcome is quite a linear one, suggesting a good correlation between the two variables. That is, it is considered that the agencies which caused flake snapping also caused the edge fracturing (or at least a goodly amount of it).

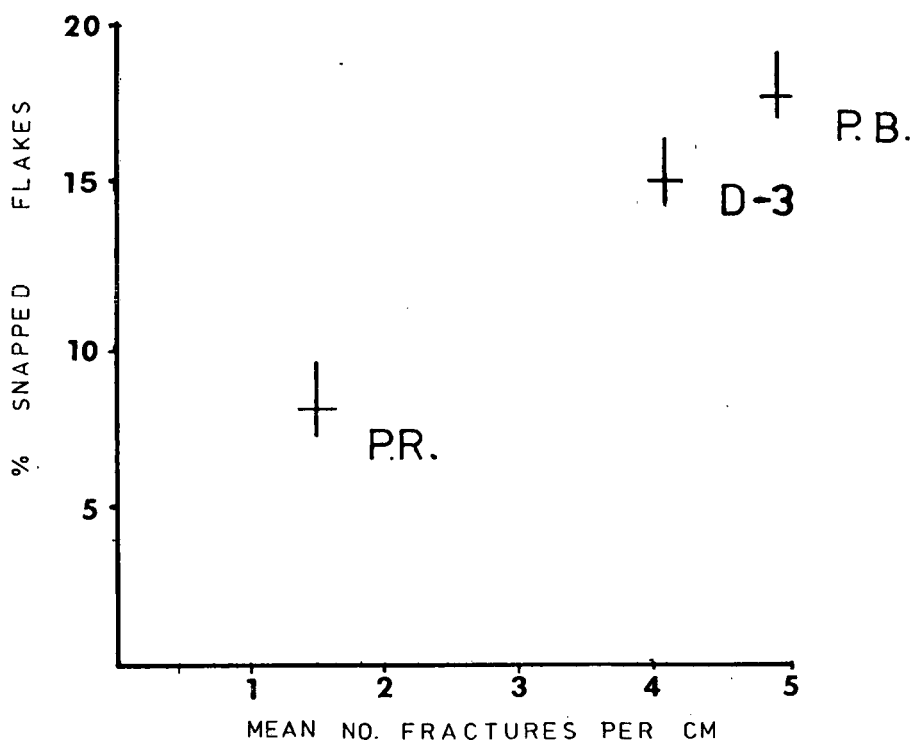


Figure 4. Plot of flake breakage against edge damage for the three sites mentioned in the text.

Of course, only empirical evidence from trampling and other replicative experiments can test this notion fully. One such study is underway at present by Peter Hiscock and Ian Walters (see Hiscock - this volume) the results of which may greatly aid in the unravelling of problems or inadequacies inherent in this simple pilot study. Those problems relate mainly to the control of important variables such as edge-angle, use-fracturing, raw material and cartage-storage damage. Also to this end, a more comprehensive and rigorous study of the three assemblages mentioned above is already underway.

In conclusion, while the Prickly Bush site did not offer a pristine stone artefact assemblage, by its trampled nature it offered quite a useful set of data by which to compare assumed attributes of treadage between open and stratified sites within the context of attempting to find a way to assess the degree to which sites have been so disturbed. We find the results rather tantalizing and certainly argue for further and more comprehensive research designed along these and other lines.

ACKNOWLEDGEMENTS

An earlier version of this paper was given by one of us (JH) as a "Working Seminar in Archaeology" at Queensland University and this version owes much to critical comments from audience members but especially Peter Hiscock. Many thanks also to Jean Thomas (University of Massachusetts) who recorded some of the data. Finally we thank the University of Queensland students who worked at Prickly Bush.

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