NOTES ON FLAKES, prompted by Norman Tindale

The writer has formed certain conclusions and theories and related them to actual functions as a result of seeing 16mm movies of the Australian aborigines securing animal food and the lithic tools used in obtaining the food source. The majority of their lithic industries is related to food gathering, and plays little or no part in the preparation of clothing and protective garments as the people are unclad. The only body protection they seek is from the intense rays of the sun, which they partly overcome by covering the skin with red ochre and animal fats. As stated by Tindale, the red ochre is also used ceremonially as is common in other parts of the Old and New World. The milling stone served a dual function, being used for grinding hemitite and the reduction of wild seeds. This poses the question which appeared first; the milling stone was used to grind hemitite to protect the tender skins of the nude aboriginals or was it primarily used to grind seed. Often red ochre occurs imbeded in the vesicules and cavities of a milling stone and a lack of husks and seed residue. This may be due to the perishable nature of the organic material. These comments are made only to point out that because of the lack of natural covering of the human animal and being partly

covered by hair, an artificial protective means would have to be devised in the form of unguents and pigments. Therefore, the study of milling stone should include an analysis of the functional purpose which may indicate that the user was grinding his ochre as a cosmetic for protective covering of the skin.

The film revealed actual techniques of lithic technology which are invaluable to the experimentor who covers a variety of techniques, for it demonstrated that there were varying qualities of work depending on its proposed use of the tool. Tools were made that were devised to perform multiple functions not a singular one as is commonly thought to perform some specific task. The need for bifunctional implements is clearly understood when one can observe the native with no pockets of carrying medium and at the same time needing the use of both hands to throw spears and perform the hunting arts. Both hands must be unincumbered and the hunter prepared to dash after game that has been wounded or frightened to deliver a second blow to his adversary.

The remarkable film recordings of Tindale will cause modern theorists to recapitulate and often change their way of thinking. There were similarities

in the forming of stone implements and the contrasts of techniques used to accomplish the same function. It was mentioned by Tindale that the Australian aboriginal placed the flakes in the ashes of the fire for apparently purification, and left for approximately twelve hours. The flakes were heated slowly and cooled slowly by keeping them carefully covered with fine wood ashes. The only observation made was of flakes and not large massive material that could subsequently be used as cores for the removal of additional flakes. The slow heating and cooling of lithic material by the use of indirect heat is a basis for preliminary treatment of chalcedonic rocks to make them more vitrious prior to pressure flaking. There are numerous examples of this method of altering the material prior to fracturing in both the Old and New Worlds, yet at this time usually not recorded archaeologically. It is of great interest to me as an experimentor to find this being done today by the stone age people of Australia. My experiments show that in order to heat lithic material larger than flakes for projectile points considerable control of the heat is necessary to avoid fracturing the material. The larger the objective piece the more slowly

it must be heated and cooled without being in contact with the air, unprotected. A devise of some degree of refinement would be necessary to alter lithic material that constitutes any mass larger than detached flakes for projectile points or lumps suitable for cores from which blades or flakes may be removed.

The manner in which the aboriginal held the projectile point while pressure flaking the piece was deed strange to me. It was unlike any technique attempted in any of the experiments conducted over the past many years.

The Australian aboriginal made use of a support composed of a rounded stone appearing like a cobble or small waterworn boulder and this was placed in the sand or slightly buried in the soil to further immobilize the rest medium. The surgace was covered with bark from the paper tree to act as a pad. The preformed artifact was then placed on the several layers of paperbark and ehld at an angle to expose the leading edge which is away from the worker rather than next to him. The right hand held a wooden shaft made from hard wood which was gripped by the fist of the right hand with the thumb held vertical and parallel to the wooden pressure tool. The thumb didn't seem to play an important part in actually applying pressure as it sometimes rested on the shaft and at other

times was free from the shaft. The shaft is between three-quarters to one inch thick and about eighteen to twenty inches long. The end used against the objective piece is not sharp but of a blunt and rounded nature. The wrist and forearm appear to be held quite rigid by the worker while the upper body and the shoulder supply the force that removes the flake from the artifact. The fingers of the left hand and the thumb must have endured long training to furnish an opposing force exerted by the right shoulder and arm. The objective piece must be caused to be inert by the fingers of the left hand before a flake may be removed from the artifact being worked. The fingers of the left hand do have some assistance when the base and the point are being formed. My feelings were that it was imperative that I attempt to replicate the Australian technique of removing flakes by their pressure technique. So far the results are negative as I find the method very awkward and extreme weakness in the fingers of the left hand when holding the objective piece. In order to make a copy of the aboriginal work and at the same time use their method of removing flakes, it will take several months of intensive work and even then there will be no assurance that one will master the problems of holding and applying pressure by the use of a wooden pressure implement. The film fails to show exactly what

kind of a support is devised under the bark of the paper tree. The film, or for that matter any pictures, can not show the direction of the forces. One can, however, observe the result of the application of both downward and outward force. The aboriginal worker when thrusting downward does so with such exertion that the knees of the worker are lifted from the ground. Yet the observer of the film will get the impression that the force is directed away from the worker and the rest causes the objective piece to remain static or stationary with little effort in holding with the left hand. The strength of my hands should compare to that of the aboriginals as they have had long practice in replicating techniques common to North America. The viewing of the film of the Australian aboriginal does, however, point out that muscular control, habit feel, traditional instruction, and individual aptitude are characterized in various groups of peoples that are identifiable and may be associated with people using sets of traits performed in the lithic industries. Traits of the aboriginals, and those that have been done in the experiments have certain parallels, first the preparation of the blank and then the preparation of the preform by percussion. Unfortunately, I was unable to observe these stages of development but only saw the preformed

artifact prior to being pressure flaked. The platform was prepared by grinding the edges and the lateral margins to give more strength to that part. The resultant flakes would upon examination show this particular trait. Another trait that we have in common is the preparation of individual platforms prior to applying pressure. The individual platforms in the experiments select areas directly over and above a ridge left by the previous flake (this is determined by the first finger of the left hand), and then using the ridge to guide the flake and prevent its expanding. The force is applied in such a way that the flake is terminated at the center of the face of the bladepart or the longitudinal median axis causing the finished folliate point to be diamond shaped in transverse section. The flake termination is caused by the rapid thrust after the pressure tool is set. The flake scars are usually at right angles to the lateral margins yet may be directed away from the worker and the flake scars at the tip of the projectile point are directed towards the base to prevent the tip from being snipped off.

The next stage is to serrate the edges, and this is done by changing the pressure tool to a sharpened piece of bone rather than one of wood. The

pressure is applied differently by pressing more downward rather than inward as in the other pressure technique using the hard wood pressure tool and the flakes are short and expanding. The application of the bone pressure tool is from one side only to the lateral margins causing the serrating flake scars to be unifacial. Careful study of the film with several replays would be necessary to determine the order of the flakes removed both the first retouch and the serrating. Several years ago a similar projectile point was examined prior to viewing the film, and the point was provided through the courtesy of Alan Bryan who obtained the point while in London. The history of the point is not known other than it was made of bottle glass by the Australian aboriginals. The techniques employed in its making certainly permits it to be placed into the category of those made by the native Australians. Bryan and I discussed the techniques used in making the point of bottle glass. The conclusions reached were in accordance with those used in the film furnished by Tindale. This film demonstrated that a study of the flake scars will show that the last stage or final flaking does show several distinct technological traits that can be related to techniques.

Tindale's film of the Australian aboriginals' methods of survival and their actual use of tools appeared to range from the early Paleolithic to the Neolithic. The Paleoliths were of great interest for they not only showed actual function but were most serviceable to perform many functions. These functions provide one with factual knowledge rather than theory. First one must consider the people of the Paleolithic period who, without clothes, were able to survive in a most hostile environment. They are people that cannot be encumbered with any surplus of possessions and can only take with them the necessities for survival, (and what they can carry in their two hands) and still be able to pursue any game or food animals at a moment's notice. One cannot help but think that if he were in the same habitat , would he be able to survive such an environment. Undoubtedly, people of our modern civilization would no doubt perish. An interesting quote by Claude Levi-Strauss, "A primitive people is not a backward or retarded people; indeed it may possess a genius for invention, or action that leaves the achievements of civilized peoples far behind". The Australian aboriginal with the use of a single flake of silicious material was able to devise an implement to perform many functional needs. The throwing stick (åtlatl)

was used as a handle to secure the flake on the end opposite to that of the hook to cast the spear. The flake was affixed by using an adhesive called spinifex, a type of natural resin blended with sand and hair to secure the flake to the throwing stick. The platform part or the proximal end of the flake is placed on and in line with the shaft part of the stick by first heating the adhesive on a stone that will not crack when heated, such as sandstone. Then a small fire is kindled to cause the spinifex to soften. While it is softening the stick and the flake are heated at the same time. The spinifex is heated slowly so that it will not smoke or burn and lose its adhesive qualities. As soon as it is soft a portion is placed on the stick that is sufficiently hot and a good bond is made between the stick and the adhesive. The adhesive is then added until it is of size great enough to secure the flake to the stick. The hot flake is then thrust into the spinifex and the whole mass heated so th at the flake may be positioned and the adhesive formed around the flake and the stick. When the spinifex has cooled the flake is formed by unifacial percussion flaking on the end protruding from the adhesive. The percussor is a pebble or a piece of wood. The ventral side of the flake is left unflaked because it is smooth and slightly convex. This surface acts as a

gouge if the tool is used for forming wood. The flakes are specially selected for this quality. Such a tool is then readily available to perform a variety of cutting needs and is comparable to our pocket knives. For more rigorous use a shaft of hard wood is used having a slight curve and of a size that will suit its intended function. When the flake has been exhausted by resharpening, it is then discarded and replaced with a fresh flake. Such a flake, if found in North America, would be lost in a collection of what we call scrapers or objects that denote a specific function. The object was used as a knife, a gouge, digging implement, and miscellaneous functional purposes. The use of adhesives may have been also important in the New World and conceivably change one's outlook of possible uses of stone implements.