Simple Field Techniques for Recording Engravings by Casting and Stereophotography

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Introduction

Engravings are three-dimensional objects, and can sometimes only be recorded adequately in three dimensions. This paper is about two recording techniques which have the advantages of being easy and cheap to use in the field, while apparently posing no threat at all to even the most fragile of surfaces. There are more cumbersome techniques which surely produce results which are much better for some specialised purposes — for example, casting with plastic or latex, and photogrammetry. The techniques described in this paper are not considered rivals of those specialist techniques; they are intended for an ordinary fieldworker who is carrying a camera anyway, and willing to abstract from his kitchen equipment a roll of aluminium foil, and burden himself with an aerosol can of spray-glue, some masking tape and perhaps a newspaper.

Aluminium Foil Casting

This technique is based on the malleable nature of aluminium kitchen foil. School children's cultures have long included the knowledge that silver paper (as aluminium foil used to be called) can be made to conform so closely to the surface of a coin that the design is visible. The design shows through in so much detail that a foil-covered copper coin may be mistaken for a silver one of approximately the same size. The underneath surface of the foil — which is actually in contact with the coin — provides a very close reproduction in negative of the surface detail. The detail is certainly well within the order represented by the ear or mouth of royalty on a small coin; there should be no doubt that millimetre-sized detail will be reproduced — which is an accuracy of one part in a thousand of a metre-sized engraving.

Materials

These materials are available under a variety of trade-names; I have no preferences of one over the others.

Aluminium kitchen foil	1 roll
Masking tape	1 roll
Spray adhesive	1 aerosol can
News or other paper or cloth	to cover the cast area 3 times over.

Equipment

Foam plastic sheeting	To cover cast area twice; suggest 1 cm thickness of the spongy plastic they make into mattresses.
Light-weight board	Size of cast area: for carrying the cast.
Brushes, stiff	Various sizes and textures; for tamping the foil to the rock.
Scissors	

Techniques

1. Brush the area to be cast lightly to remove leaves, dust or other detritus.
2. Cut a conveniently sized sheet of foil and place it on a portion of the area. It may be loosely attached to the rock — especially under windy conditions — using weights or masking tape (Fig. 1).
3. Repeat (2) until the whole area is covered. At this stage the sheets of foil should not overlap; any tiny gaps between sheets will be filled later.
4. Tamp the foil to the rock till it conforms to the surface (Fig. 2). Feet, fingers, brushes of various sorts work; the choice of tamper should depend on local conditions. The action of tamping is perpendicular to the surface; oblique tamping is likely to tear the foil. This process stretches the foil and moves it about a little until it settles

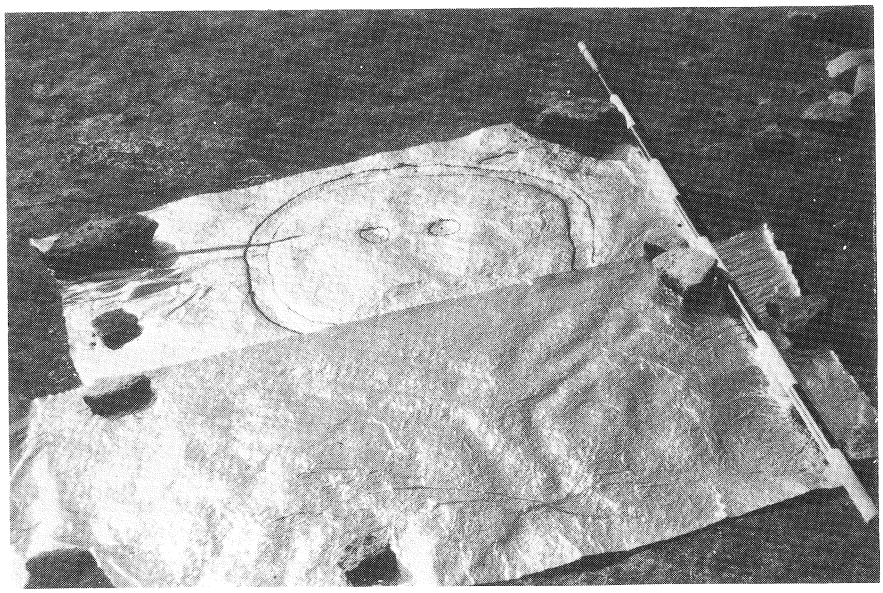

Figure 1: Foil placed over engraving, has been walked in. Scale in decimetres. Sydney.

Figure 2: Tamping with brush. Same site as Fig. 1.

down; some adjustment of the tape or weights may be needed.

5. It is now necessary to build up the foil to a thickness of three or more sheets. Small sheets of foil are sprayed with the spray adhesive (read instructions on the can). Tamp these smaller sheets one at a time onto the first layer until the whole area is covered to a thickness of at least three layers.
6. Reinforce the *deepest* grooves with strips of masking tape. Use tape to strengthen the edges of the foil.
7. By this stage there should be no possibility of holes or cracks remaining through the foil, so tougher glue may be used if desired. The further stages are intended only to make the aluminium surface tough enough for transportation. Three layers of paper or cloth, each glued on separately, seem the minimum (Fig. 3).
8. Once the cast is considered thick enough, it may be removed from the rock. The cast is protected with foam plastic on both surfaces, and the whole sandwich strapped or taped onto a carrying board, for transportation back to a laboratory, where

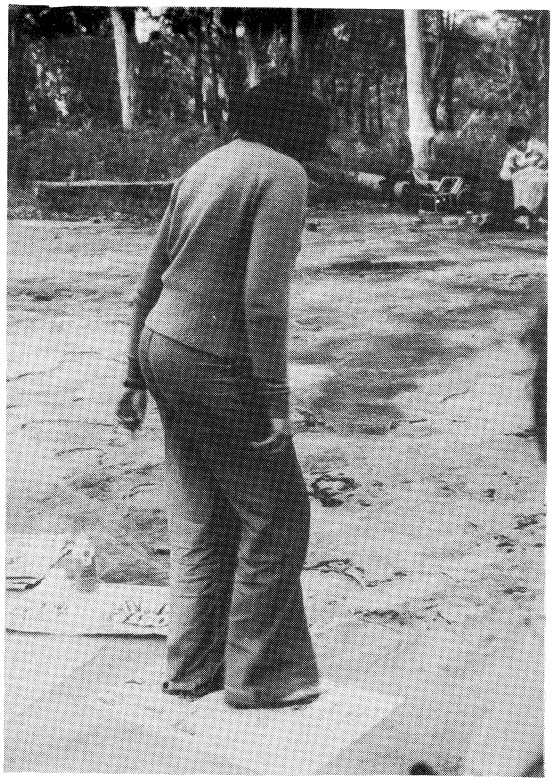

Figure 3: Walking paper layers into the thickening cast. Sydney area, engraving.

Figure 5: Same point as 4: original in white, the mask still carries its foil.

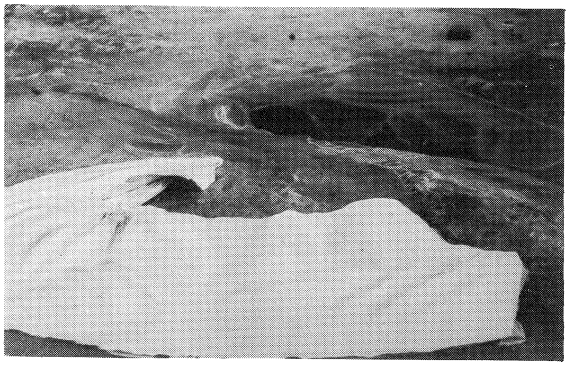

Figure 4: Grinding grooves, and the cast made of them. Demonstration that deep relief can be cast by this method. The cast itself did not survive transportation home, as the dog sat on it.

Figure 6: Tripod for low-level aerial photography. Same site as Figs. 3 and 4.

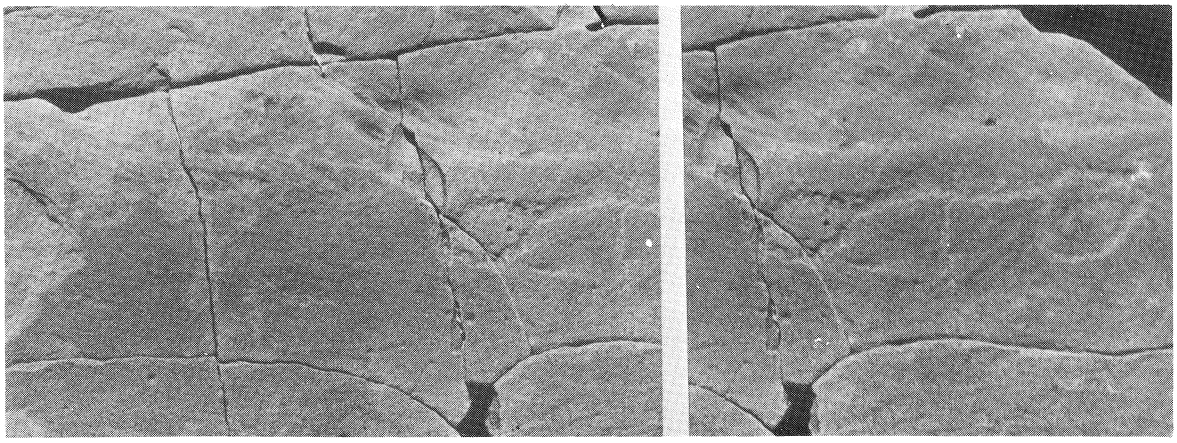

Figure 7: Stereo-pair of engraving in north west New South Wales.

Figure 8: Stereo-triplet of painting at Walga Rock, W.A. Note the relevance of the relief to the design.

9. as soon as possible the cast — now a mould — should be used to produce a fibreglass or other permanent and robust positive reproduction of the engraving.

Comments

a) So far this technique has been used successfully on areas up to 1 metre square: in larger sizes the problem is transportation.

b) It seems best for grooves up to 1 cm or so deep; for greater relief the problem again is transportation (Fig. 4). In the laboratory the method has been used to cast a mask from a full bust (Fig. 5).

c) The *detail* obtained depends largely on the methods of tamping; it is suggested that a battery of tampers be taken into the field till experience will demonstrate the most suitable one. Detail down to a texture level — where sandstone smoothed by grinding is distinguishable from un-ground areas — is readily obtained.

d) The use of aluminium foil has one advantage unconnected to the casting process. In the Sydney area at least, many engravings are almost invisible until they are wet, when light reflected by the now shiny surface reveals the engraving. The first four stages of casting as outlined above effectively make the surface shiny and thus sometimes reveal previously unnoticed detail (Fig. 1).

Stereophotography in the Field

Stereophotos are just as useful as you thought, but much easier to take.

The principles of stereo-vision and stereo-photography are well enough known to need no recapitulation here. If an object is observed from two distinct places, two slightly different pictures are formed, which can be combined by a human observer into one three-dimensional perception, or by mechanical means into a 3-D diagram, for instance a contour map.

There is a great deal of information which is only available from three-dimensional pictures, as Bela Julesz has recently demonstrated[1]. People who have attempted to look at rock art will be aware at once of how useful a 3-D photo would be — for conveying the shape of the whole surface, for indication of how the art fits into the surface etc. For rock engravings, which are themselves three-dimensional, an exaggerated 3-D can help interpretation and recognition a great deal.

Julesz[1, 2] has shown that stereopsis can be obtained perfectly well even if one picture is larger by 15%, out of focus, or tilted compared with its pair. I took this to mean that the precise placing of the two viewpoints is by no means critical, and carried out some very successful experiments by simply photographing an object from different places. I have now standardized the practice for myself; I stand with the feet comfortably apart, and take one shot while standing with the weight on the left foot, the pair with the weight on the right. This means that within limits of say 10% error, my photographic base-line is fairly constant.

Refinements using tripods can produce low-level (1½ metres) aerial photographs directly analagous to those taken by surveying aircraft (Figs 6, 7 and 8).

I pass the information on for the benefit of those workers who may feel that stereo-pairs would be valuable, but are beyond them technically or expense-wise.

References

1 Julesz, B. (1971), *Foundation of Cyclopean Perception.* University of Chicago Press, Chicago.

2 Julesz, B. (1965), Texture and Visual Perception. *Scientific American, 212*, No. 2, 38-48.