LERNIE - PHASE IV

A.R. Diment
Leo Biek

Video-Animation
Ancient Monuments
Laboratory

At the last Conference in 1976 (pp.65-72) the 3-D capability of the computer aided animation system developed at Imperial College was described and a videotape demonstrated the range and versatility in full colour.

Since then two short lengths of film have been produced in this way to show the direct applicability of the system to archaeological work. Both start from conventional drawings of small finds. One deals with the rotation, about its long axis, of a void in the shape of a bridle bit link such as was found among the mould debris of a bronze foundry at the Iron Age site of Gussage-all Saints in Dorset (Spratling 1977). The film shows how it is possible from drawings of assembled mould fragments to project a 3-D image of the object that would have been cast in a given mould. Provided the shape is symmetrical it is easy to produce an image even of a complex object which containes two loops set at right angles.

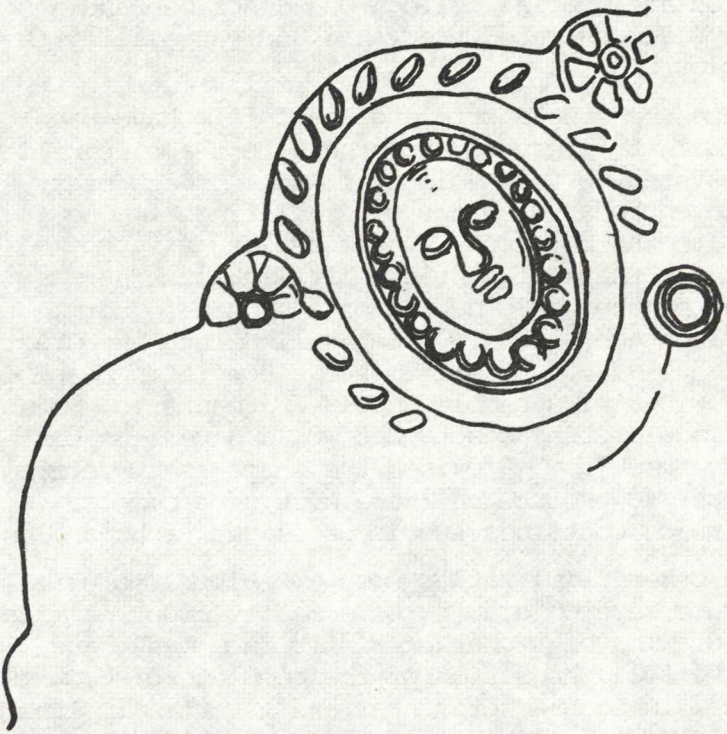
The other film, rather more ambitious, takes a monochrome section drawing of a medieval pot profile, with a drawing of a characteristic face mask, and shows the full generation of the complete dish, with one face, in both a horizontal and a vertical plane of rotation, in colour.

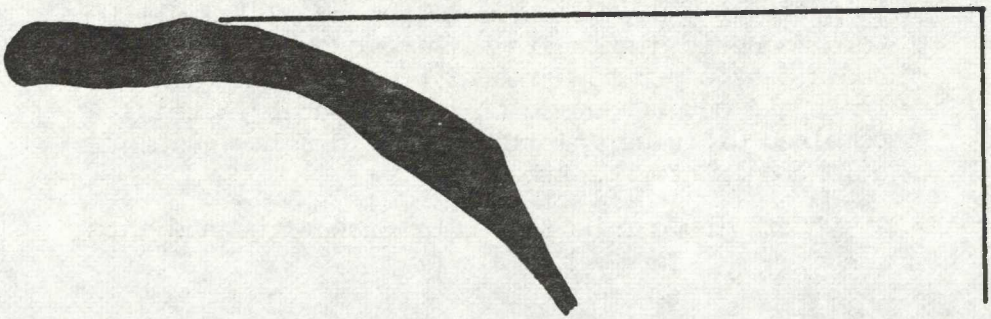
The Video Animation system is based on a CADMAC C.A.D. system and consists of a DEC PDP 11/40 computer with 32,000 words of memory, 2 1.2 million word magnetic disk units with removable cartridges and a fast paper tape reader/punch. The main input and output device on the computer is the combined digitiser/plotter. The display system is a Tektronix storage tube.

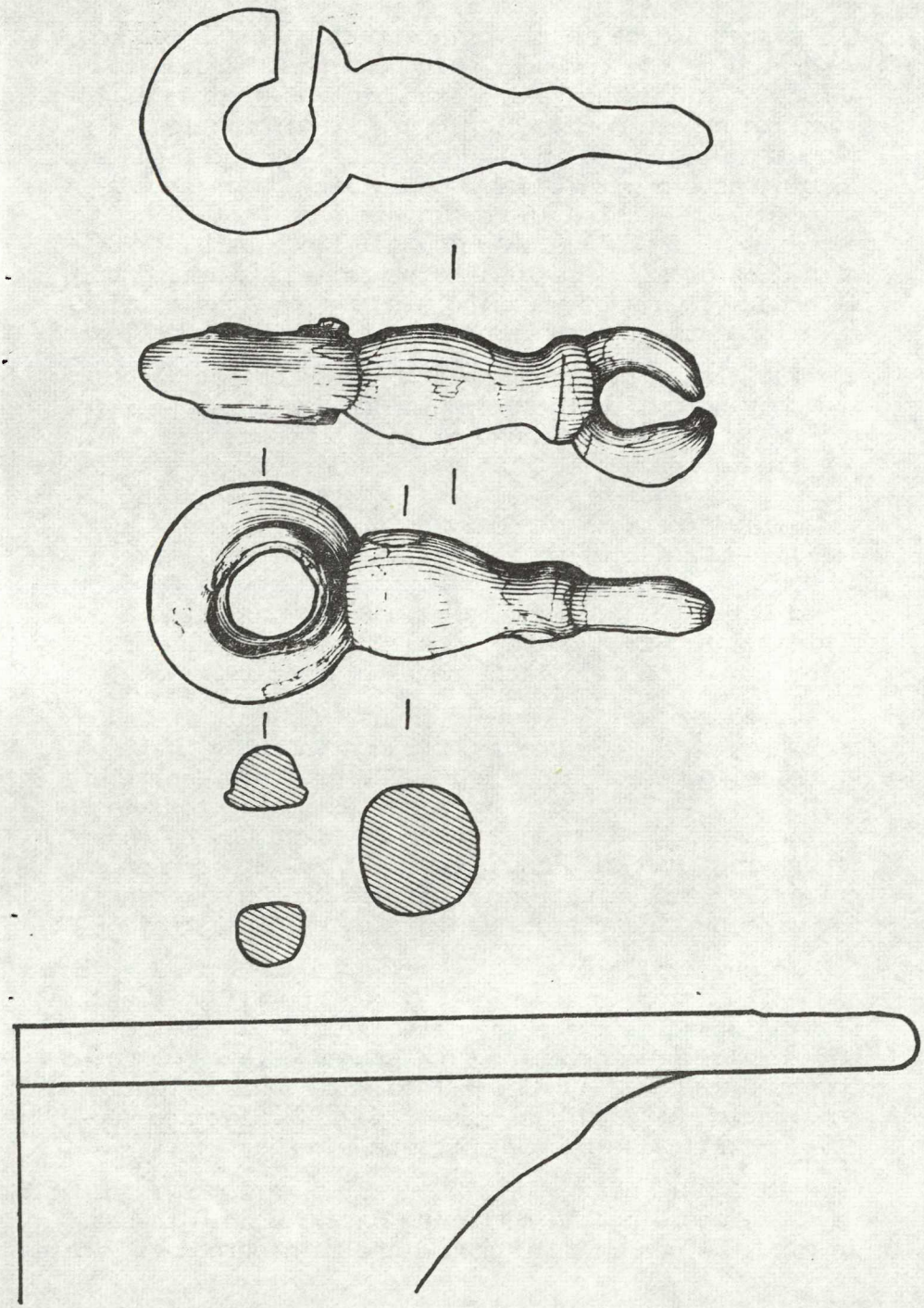
A drawing can be traced or drawn freehand into

Conventional drawings of objects

used for computer aided animation







the system and geometric or abstract patterns can be generated by the computer which can then be used to animate the drawings using standard VAL programmes to simulate camera movement, picture transformations (Inbetweening), scaling and perspective, rotations etc. in conjunction with the 3-D capability which is the principle attraction in considering the storage and comparison of small archaeological finds data. The method is equally useful in studying structural data; alternative ways of treating missing portions of finds or alignments of structural remains can be investigated.

The final product was plotted onto animation cel and conventional painting techniques were used for colouring. The advantage of this approach over electronic methods is that a full spectrum is available without numerous greyscales. However, the whole job can already be done directly using a TV camera: a set of slides was shown of a 'rotating' stylised flask. It had been produced be Gordon Freeman at the Computer Aided Design Centre, Cambridge, and demonstrated a system linked to a conventional TV screen with a full, interactive colour palette and 3-D capacity.

Of course all 3 demonstrations were only intended to convey to larger groups more conveniently what could actually be seen moving on the VDU or TV screen; there is no need to make a film. Also, existing programs and systems were used which had been evolved on the basis of drawings and cartoons, because they were concerned primarily with animation of designs and environmental development, and there just were no original 'objects'.

In our application we do not have the actual objects and as the process comes to be used it will by-pass the drawing stage. The object itself will be rotated before a digital camera. The stored data can then be compared without any need to see them, and conventional publication of drawings - as of text (Conference Report, 1974) - will also become obsolete.

General LERNIE note - by LB. - While we improve specific ways of recording and comparing data, we need to bear in mind the general background and main purpose. There

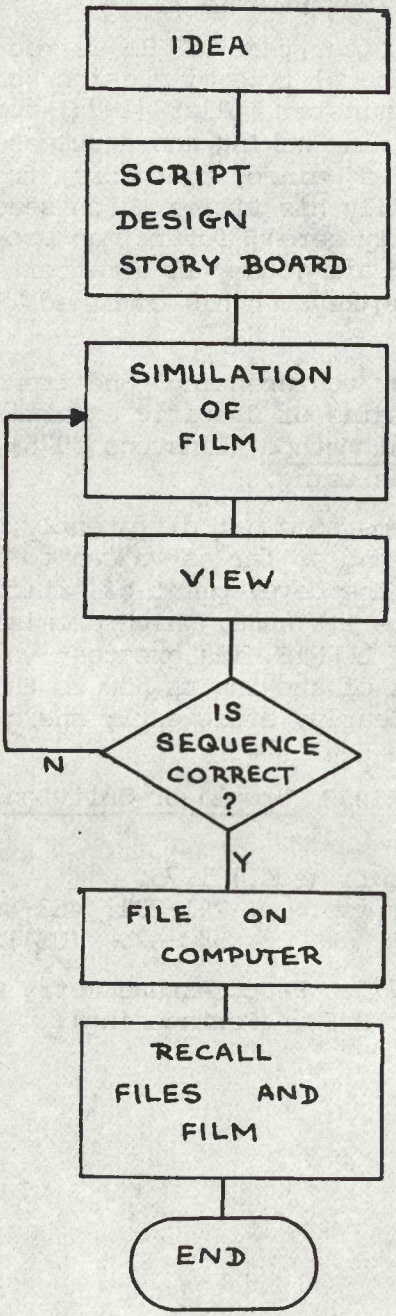


FIG 3. ANIMATION WITH COMPUTER.

are 3 principal avenues of development along which our thoughts and efforts might profitably run.

First, it will be clear that LERNIE is really a special tool of the general type of "Design Science" kit postulated by Buckminster Fuller (1973) for ever "doing-more-with-less" in "making man a success in universe." Much can be gained, therefore, from his experience and especially his vision which sees, for example (very relevantly here), future man booking his infinitely complex air journey in a matter of seconds simply pressing keys on his combined TV and VDU at home.

Secondly, "computer conferencing" and trend forcasting" within domains of specific expertise, as described in The Delphi Method (Linstone 1975), is obviously there for the using.

Finally, and perhaps somewhat differently, we all need our various ways and as far as we can to share in accelerating the development of Artificial Intelligence. Despite its name, which promises the ultimate perfection of LERNIE, its greatest value lies in the reverse benefit of showing us how to think - and to learn - more clearly, efficiently and quickly!

R. Buckminster Fuller 1973 Utopia or Oblivion. Pelican.

H.A. Linstone & M. Turoff (eds.) 1975. The Delphi Method: esp. pp. 291-321; 463-86; 550-62. (USA).

M. Spratling et al 1977. Proc. Archaeometry Conf. Edinburgh, 1976. HMSO. (Forthcoming).