

RECENT DEVELOPMENTS IN THE PRODUCTION AND DESIGN OF  
TACTUAL MAPS AND DIAGRAMS IN THE UNITED KINGDOM.

A joint paper by G.A. James (1) and J.M. Gill (2)

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1. Blind Mobility Research Unit, University of Nottingham.
2. Inter-University Institute of Engineering Control,  
University of Warwick.

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1. Introduction.

This paper describes the initial stages of a project on tactual maps and diagrams being undertaken by research centres at Warwick, Nottingham and Birmingham Universities in the United Kingdom. We are fortunate in achieving a good degree of co-operation between engineers at Warwick University, psychologists specialising in mobility of the blind at Nottingham University, and educationalists at Birmingham University.

Recent developments in this field will be considered in the context of the need for tactual maps and diagrams, the need for research in production and design and, finally, the question of training. We are omitting a good deal of detail in this paper in the belief that this may be dealt with more fruitfully in discussion.

2. The need for tactual maps and diagrams.

(a) Geographical maps and diagrams for the blind are viable propositions and are used in schools to supplement verbal information. Blind children are encouraged to study subjects such as science and geography. In general, it has been demonstrated that carefully selected geographical maps and diagrams can be produced in a tactual form and that these are useful in speeding up information input and comprehension. This is educationally desirable.

(b) Mobility maps, or functional maps, have been used

by blind youngsters and adults as navigational aids. The pioneer work of Leonard (1967 and 1970) demonstrated that some congenitally blind children could use a tactual map and complete an unknown route without a single error. Tape-recorded descriptions of routes and memory discs (demonstration) are uni-directional and usually for a single route, whereas a tactual map can provide spatial information about complex routes. As well as having some functional value, the mobility map is also valuable as a means of correcting or enriching blind childrens' knowledge about the composition of the physical environment.

### 3. The need for research.

#### (a) Production.

In the United Kingdom there is an unsatisfied demand from schools for the blind for inexpensive high quality tactual maps and diagrams. It is apparent that supply does not meet demand because production methods are time consuming or expensive.

Maps for the blind have been produced in the United Kingdom by the Royal National Institute for the Blind for nearly the last 100 years. The present production method consists of hand-engraving a high quality master in sintered bronze which requires several months work. Maps produced by the R.N.I.B. are mainly atlas-type ones, although they have produced a plastic general mobility map of Central London and topological maps of the London Underground Railway on manilla paper.

The most commonly used production method in schools for the blind in the United Kingdom is that devised by Mr. J. Pickles (Pickles 1970) of Worcester College for the Blind. This method consists of building up a master on transparent cellulose. Various thicknesses of string and wire are used for line symbols; sandpapers, linoleum and fabrics are used for areal symbols and lead shot, pins, etc. for point symbols.

The main advantage of this method is that maps and diagrams can be produced in the school and their usefulness can be assessed immediately. The main disadvantage is that the process is time consuming and has to rely to a great extent on volunteer labour.

Recent developments at Warwick University have demonstrated that high quality tactual maps and diagrams can be produced rapidly with digital computer assistance. The basic system consists of:-

- (a) Input of graphical information from a co-ordinate table.
- (b) Editing and insertion of text on a visual display unit.
- (c) Negative master produced on an engraving machine.
- (d) Positive copy made using silicone rubber.
- (e) Brailon copies are produced on a Thermo-form machine.

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Slide 1: the co-ordinate table and the V.D.U.

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The map or diagram is considered as a line drawing. This information can be input from the co-ordinate table. The resulting picture is simultaneously displayed on a visual display unit.

Editing on the visual display unit permits the insertion or deletion of individual lines, movement of end points of lines and change of scale. A wide variety of line types (continuous, dotted, dashed etc.) can be specified from the keyboard. The operator also has control of the height of lines.

