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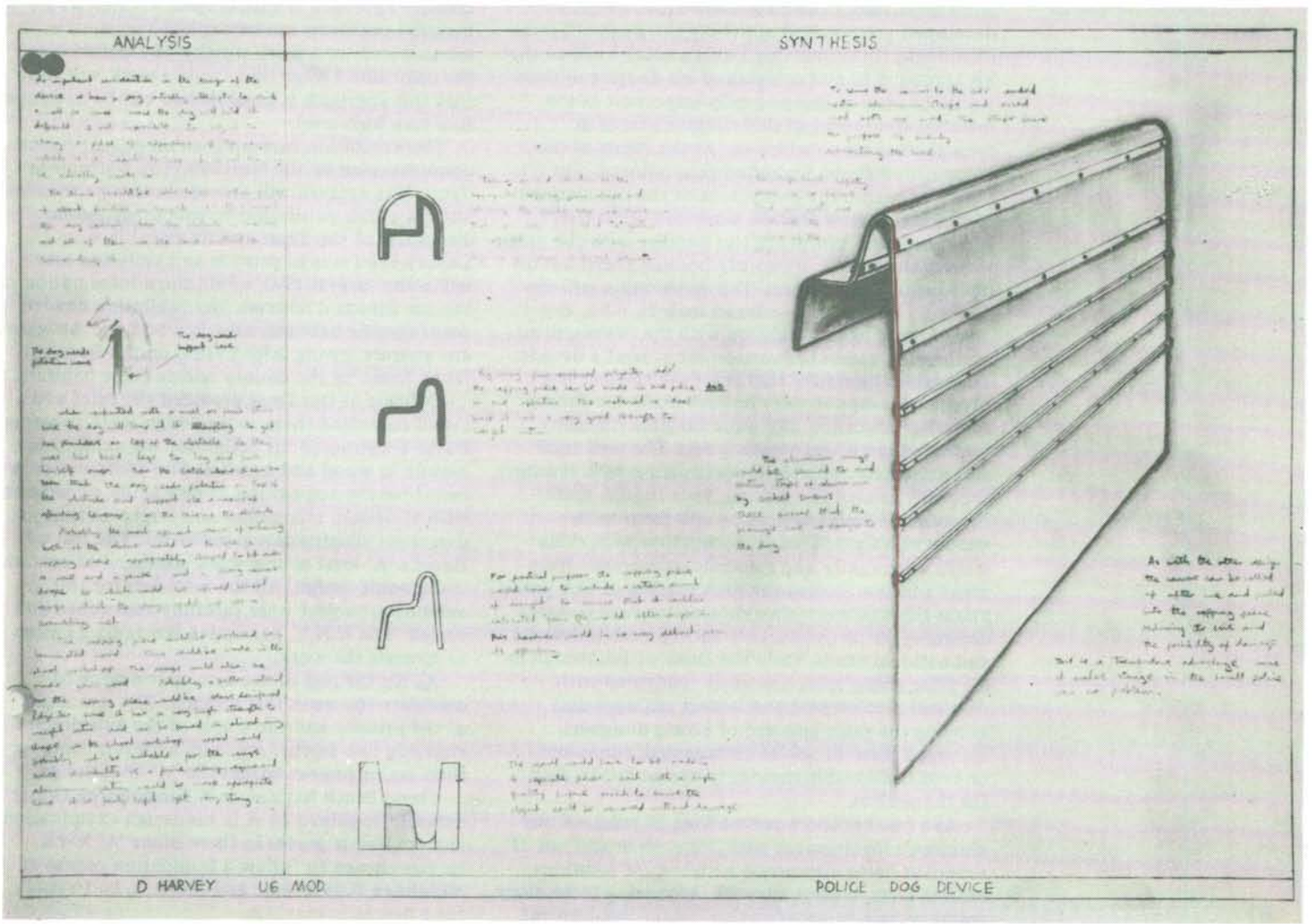
Solving a Dog Handling Problem

My main aim as a teacher involved in Design Education, has been to encourage students, through design-based practical work, to become adults able to adapt to an environment founded on materials and a fast developing technology. This adaptability is of paramount importance as the pace of life quickens and the changes become more frequent and profound. The ability to 'produce' is now less important with the advancement of the *micro-processor.* Practical skills once essential for learning a trade or embarking on an apprenticeship or design draughting career are now almost unnecessary as many jobs are totally automated or highly specialised.

Uncertain Future

At a recent conference of the 'Council for Educational Advance' many important questions were posed regarding the future of the working population. I do not intend to dwell on figures and statistics but what was clearly stressed at the conference was the awesome prospect that less than half of the workforce in this country will be involved in manufacturing industries during the 80's. As few as 20% will be involved by the year 2000. It seems reasonable to suppose therefore, that the present small amounts of retraining will increase dramatically over the next 20 years.

In order for teachers to cope with the changing local and world situations, Education Authorities should be encouraged to provide the necessary refresher courses which can assist in the development of teaching skills. In this way, teachers would have a greater awareness of the developments taking place and become more likely to include them in their teaching. This broadening of one's outlook can only be of benefit to the students. Headmasters and advisers should actively encourage teachers to attend courses and not merely to those directly linked to their normal subject material but also those where a future link seems likely. Headmasters



should strive to break down the barriers which exist in many schools between 'rival' departments in order that specialist knowledge on the fringes of other subject areas can be tapped. There have been several occasions when I would have welcomed the experience and knowledge found within the physics and mathematics departments. Their assistance could have quickly solved some of the more complex scientific problems which have occurred within work carried out in the design department.

Personal Approach

The approach adopted is one of putting students into 'problem solving' situations which require a practical solution. Initially of course, a simple solution is required and can be solved with a limited knowledge of materials and technology.

In order to make this practicable to even the least intelligent of students, it is essential to give a very carefully worded *'Design Brief'*. This statement will give instructions and information about what is to be designed and/or made. At first, the scope for individual design variations should be small, but some opportunity for further development is obviously given. This factor will be of value in mixed ability groups. At the same time, design procedures will be taught to the group as a whole. However, great care should be taken at this stage because it is very easy to influence and impose one's own ideas.

A balance must be struck between leading the students to a solution and giving them freedom to follow their own lines of thought where it is obvious that the student is on the wrong track. You will find that, at first, some students are incapable of any creative thought, whilst some others will surprise you with their response. Both types of student will need guidance but each will have something to contribute to the lesson as a whole, demanding the best from you, the teacher. Following the design brief it becomes necessary to isolate and *analyse* the problems involved. There is no doubt that this is the most difficult part to teach and the most demanding on the students to comprehend. It can be very frustrating to be met with a sea of blank faces, having just set up an interesting (you think) problem solving situation. This is inevitable, particularly at first, but I have devised a series of questions that should be considered with each fresh problem. It should not be thought of as a complete list, other relevant questions will be necessary from time to time.

Analysis

A What is the *function* or *purpose*?
B What is the type of *environment*?
C What is the *shape* or *form* desired?
D What *materials* are suitable?
E What is the desired *colour* or *finish*?
F Is there a restriction of *size*?
G Imposed *Limitations:* Time
Cost
Availability of materials
Tools
Machines, etc.

If these questions are answered in order, they should help in making this vital section more meaningful and promote better sketch designs.

The student should now be in a position to tackle the *synthesis* stage where 3 dimensional sketching is an appropriate method. 2D diagrams and supporting notes are also very valuable, particularly if they relate by letter to the problems posed in the *analysis*: A, B, C etc.

Prior to this stage, *communication* has been carried out by the written and spoken word. This form is now of very limited value to the designer. It is for this reason that I have developed a *basic sketch design course* for all students of whatever background. This ensures that they are able to grasp (and hopefully develop) the necessary *design* vocabulary. The ability to communicate ideas using graphics provides a vital link between student and teacher.

The course is based on the following techniques.

A	*Freehand Line Drawing*	: Straight lines : Curves
B	*Freehand Shapes*	: Squares, circles, rectangles, triangles, etc.
C	*Freehand Forms*	: cubes, cuboids, cylinders, etc.
D	*Shading*)	: Using examples in C
E	*Shadow*)	:
F	*Techniques of Highlighting Sketches*	: colour wash (water-colour) shading shadow
G	*Perspective Sketching*	: based on 2 point
H	*Working Drawing (Measured)*	: orthographic projection

Sketching has become an integral part of the design and technology course. Students work in their own sketch books which makes possible an assessment of their development as well as permitting the build-up of a source of reference for future work. Practice using sketching techniques outside lessons is encouraged.

Realisation

Having progressed through the design stages of the project, the student develops an understanding of materials and techniques (strengths and limitations) through practical work, teaching and reading. This is principally because of the need to cover as much ground as possible to enable the student

Sketches of the 'Portascale', a device designed by David Harvey of Royal Liberty School, Romford, Essex to enable police dogs to scale fences.

to commence practical work while the subject is fresh and 'alive'.

Evaluation

As each project draws to a close, time is spent discussing the success and failures of the individual's artifact in terms of *'fitness for purpose'*. Care should be taken in the approach used here as a resentment may be felt by the student through lack of tact. Reference should be made back to the statements made in 'Design Brief'. Only by asking objective questions at this stage can a proper assessment be made, the hope being that errors made in the prototype can be avoided in development work and future projects of a similar nature.

A Working Example

As was stated at the outset, my main aim through design education, has been to develop the student's thinking capacity through the media of graphics and materials so that any new experience, at any intellectual level can be attempted with some degree of success.

The example I shall use to illustrate this point occured recently as part of the Advanced Level, Design and Technology coursework. The design and subsequent prototype, was a winning entry in the GEC/Design Council, 'Britain's Designers for Tomorrow' competition.

I shall now outline the way the project was set up. The design department of the school was approached by a local police dog handler in the hope that a solution could be found to a recurring problem experienced by many handlers. The problem is that of lifting a police Alsation dog (often weighing in excess of 55kg) over high spiked and chain link fences while on patrol duty.

The handler visited the school in order to brief the students himself about the problems involved and the dangers to the welfare of the dog experienced in day-to-day work. At present, the handler has to perform this difficult task (often at night) totally unaided. In order to highlight some of the problems, a practical demonstration was staged which brought the whole project to life. This was invaluable in providing the students with essential information, notably the method used by the dog to scale obstacles and taking measurements for the device. The prototype is, I'm sure you will agree, both functional and, of equal importance, simple to carry, set up and use.

The device illustrates clearly how the student was able to combine his natural flair, his designing ability, with a sound understanding of the technology involved. Above all, however, the ability to adapt these skills to a unique problem, one that was not contrived within the framework of normal teaching but to fulfil an *actual need*.

The 'Portiscale' device is at present undergoing trials with the Metropolitan Police and further models have been made to enable a widespread evaluation. This is not the first time that outside bodies have approached schools for help in solving design and practical problems and I trust it will not be the last. The uncluttered minds of many students have a lot to offer to what will become 'their' world in the near future. They should be encouraged by all to help formulate its 'design'.