

Christopher M. Thomas
Sevenoaks School

Teaching the Blind: An Electronic Project at Sevenoaks

Roddy Fairweather from Sevenoaks School in Kent designed an electronic device which teaches young blind children to recognise and learn braille letter forms.

'I did it, Miss Fulton, I did it!' exclaimed Neil Thomas. It was a moment of joy for all those present because Neil has always been blind and at seven was learning to read braille letters by touch. It was this exclamation that meant success for both himself and for Roddy who had only just finished making the machine Neil was using. It had made a funny noise as reward for Neil's correct recognition of the letter 'P'. The other children in the class were cheering but Roddy and Neil's teacher, Miss Fulton, were watching with a critical eye for ways of improving the device. This was, in fact, Roddy's 'A' level Design project being evaluated under the stiffest conditions. Apart from all the observations one could make about the design itself, it was a moving experience and a very valuable one for Roddy. Neil was learning, being rewarded immediately for recognising the letters, and enjoying himself! Roddy was putting his work to the acid test and was being made aware of the value of what he had done. Miss Fulton, perhaps was dreaming of all her children acquiring these devices!

Roddy's project shows, we believe, the range of educational potential of Design work in school. Not only in terms of intellectual and creative skills but also in fostering and encouraging young people's emotional and moral well-being. Design is so much about decision making and value judgements that it can play an important part in the process of growing up.

Prior to taking up Design as an 'A' level Roddy had pursued two unrelated interests which came together to form the basis of his work. He had received a grounding in electronics at the school's Technical Activities Centre with Gerd Sommerhoff and had spent Thursday afternoons working with Sevenoaks Voluntary Service Unit under the guidance of Mike Bolton. Both of these activities are optional parts of the curriculum.

The project began first of all with our suggestion that all the students should keep an eye open for

Roddy Fairweather of Sevenoaks School, Kent designed his Braille teaching aid to help children at a local school for the blind. Unfortunately, Roddy's project and design plans were stolen shortly after this photograph was taken. The competition is sponsored by Rolls-Royce Limited and organised by The Design Council.



interesting and potentially problematic situations in their normal daily lives. Roddy spotted one particular area very quickly and much of the following article is from Roddy's own note books. Perhaps it should be borne in mind that these are his thoughts and observations made at the time.

Choosing a Project

'The first event of this project was a visit to Dorton House Blind School. This is a local school and caters for about 100 children. All the teachers read braille. The visit showed three main areas which a project could be based on.

1. Sport. Games are relatively simple and do not involve physical contact. They are normally slow. The children find it difficult to run in a straight line. When they are running in races, people have to stand in front of them and clap. What about some sort of homing device that the children can aim for?

2. Cooking and Domestic Science. This is done by mentally sub-normal children. There aren't any major problems, but there are a large number of small ones, e.g., they find it very difficult to hold a spoon level. Would a series of cooking aids suffice as a project?

3. Infants. These are mainly children who are learning braille. All the apparatus is home made, and

not very efficient and there is an obvious need for an improvement here. The teachers are unable to do much because of their limited technical knowledge, and the lack of facilities to make things with'.

Visit to Mr. Clarke

'Mr. Clarke is blind, and has been for some time. He used to teach at Dorton House. He now works for himself at home. He likes to be independent.

He recommended that I visit or write to the Royal National Institute for the Blind. This is a charity, and depends on voluntary subscription. It copes with everything to do with the blind. It has a large staff, including an education officer (who might well be useful). The organisation also copes with the blind handicapped. There is a public relations department which has pamphlets and leaflets available.

Mr. Clarke spoke of the lack of apparatus that is available commercially, and recommended that I get hold of a booklet, 'Illustrated Catalogue of Apparatus and Games'. This shows all the equipment that is available as aids for blind people'.

Roddy gathered much information at this point which put his project firmly in a context.

'There are some 120,000 blind people in Britain - 80,000 of them are over 60. There are a lot of aids available for the elderly and there is also a radio programme for the blind. Radio 4, Sunday, 5.00 p.m. 'In Touch', but he didn't think that this would help me very much.

He also told me that the local schools for the blind are Dorton House, Linden Lodge (at Wimbledon), and Valence School (which has only a few blind pupils)'.

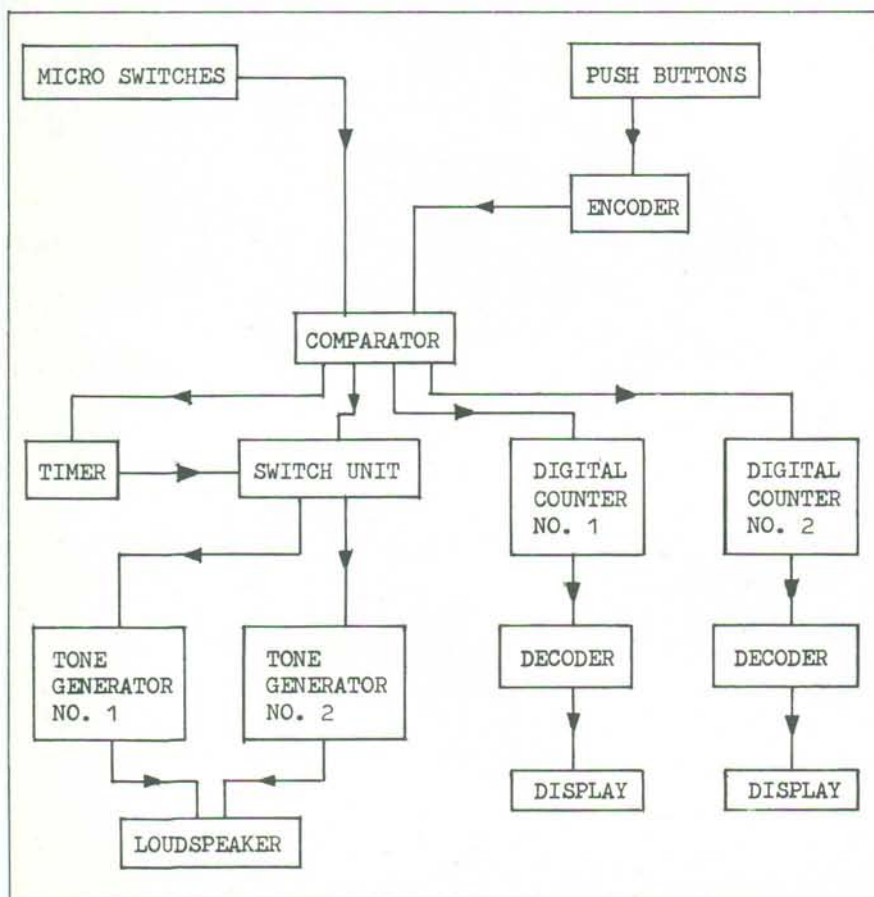
Visit to the RNIB

'This visit proved not to be as profitable as I had hoped. The RNIB in London is divided into two sections, the shop and the administration. The shop is obviously not as well kept as they might hope, and gives the air of a charity shop which is short of funds. However, I went to the administration section, where I was bundled about until I was introduced to the Education Officer. He was not at all enthusiastic about me, and gave me the impression that a large number of people did not get very far with projects to help the blind. He gave me a pile of bumph, most of which is pretty irrelevant, but I did get the 'Illustrated Catalogue of Apparatus and Games' as Mr. Clarke recommended. This shows an astonishing lack of teaching aids. There are no exercise aids, only things like books and brailers. Any equipment that is being bought for the blind, or that the blind will use can be bought cheap. That might well be useful later on in the project'.

Visit to Dorton House

'I met Miss Fulton, who takes care of the 6 and 7 year olds. This is where they start to learn braille. They use very simple home-made apparatus, which

System Flowchart



is very cheap. The children spend a large part of a year doing an important exercise which develops their sense of recognition of letters. They are given a board (350 x 250) on which there are six tins. Each of the tins are labelled with a braille letter. The child is then given a pile of cards. These cards have one of the braille letters on it. The child has to find the tin with the same letter on it, and put the card into it. This exercise is not as effective as it could be, since the child doesn't know if he has got it right until he calls the teacher over, who opens the tins and tells him. The child may become depressed if he has made a lot of mistakes and has to do them again. It also wastes a lot of the teacher's time having to go round all the children

in the set just to tell them how well they are doing. What is needed is a device which gives an immediate indication as to whether the child is right or not, so that they could get on on their own. This system of tins has some advantages over an automatic device. These are:

1. It is very cheap. It is made out of old tin cans, covered with some fablon, and some card.
2. It can, and is, made by the teachers in the schools. The only 'tools' needed are a pair of scissors.
3. They are very light. The children have no problems at all carrying them about.
4. They are easy to use — the children understand how to use it immediately.

The current method of teaching braille letter recognition. Cards and tins.



A self-correcting device would suffer from the first two points, since neither of these would apply. However, it need not weigh too much, and it could be fairly simple.

The advantages with the present system are:

1. It is not self correcting. (This is the most important problem).
2. They are awkward to pack away, mainly because there are a large number of boards to cope with all the letters.
3. Each board can only handle six letters.
4. The apparatus breaks after a relatively short time — mainly because it uses quite a bit of sticky-tape. The cards break and bend quite quickly, but

this is not much of a problem, because the teacher can make these very easily and quickly.

Several questions remain:

1. Why use six tins?
2. Would five or seven be better?
3. Have other pieces of apparatus been built?
4. Have other exercises been tried.

I put these to Miss Fulton.

She had tried with fewer than six tins, but she found that the children learnt which each of the tins were, and so didn't have to bother reading the tins each time, which reduced the effect of the exercise. The 'Illustrated Catalogue of Apparatus and Games' would show anything available. The only other forms of exercise are ones which develop the sense of touch. These are used from the moment that the children start school'.

Having looked at the whole scene as it were Roddy was then able to decide exactly what his proposals should do to be a success.

Specifications

'The eventual solution must therefore:

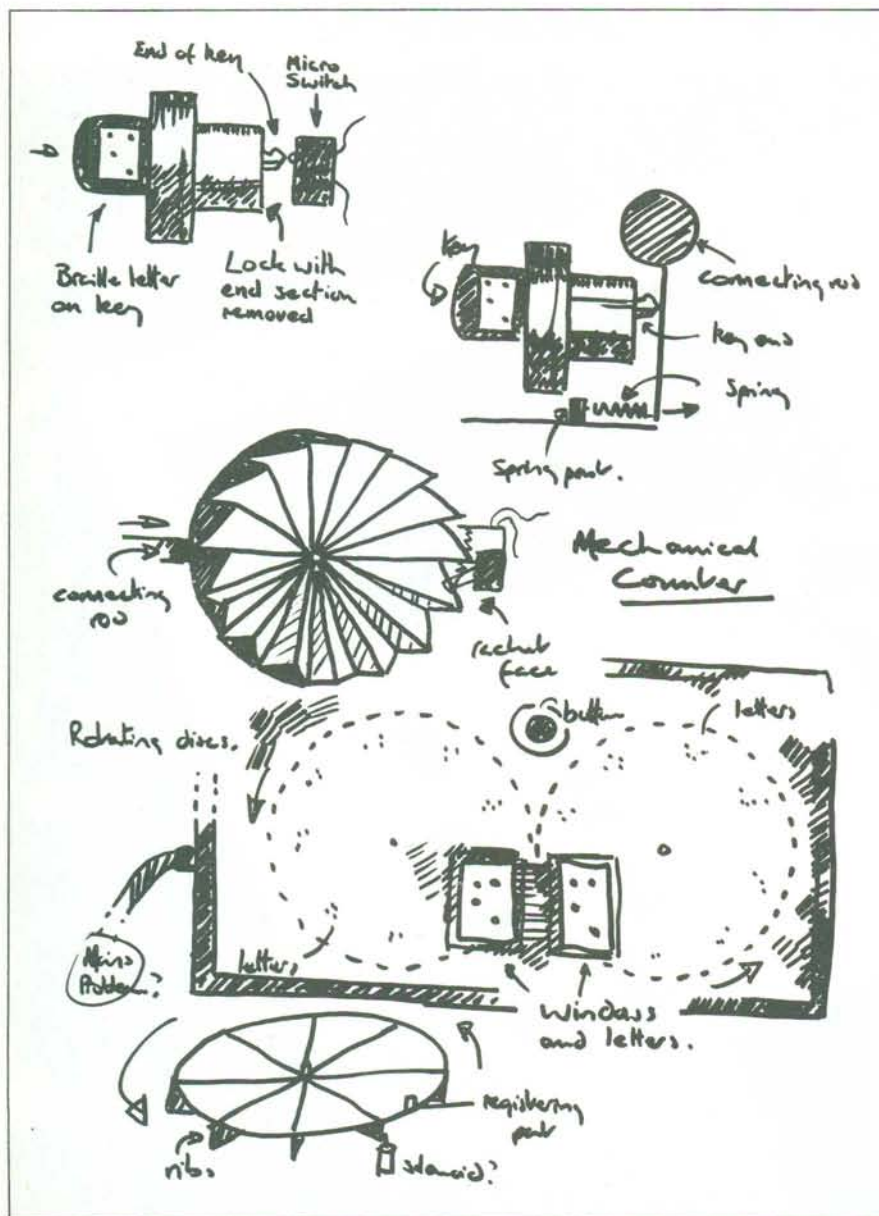
1. Teach the children to recognise at least six letters at a time.
2. Be useable by one child at a time.
3. Be table top size and within the reach of a five year old.
4. Be light and tough enough for children to handle.
5. Have smooth surfaces.
6. Be cheap. All the children have Perkins Brailers which cost in the region of £140, so the device should be cheaper than that.
7. Be reliable and safe.
8. Give children immediate feedback whether they are right or wrong.
9. If possible, keep a score for the teacher to check on progress'.

Ideas

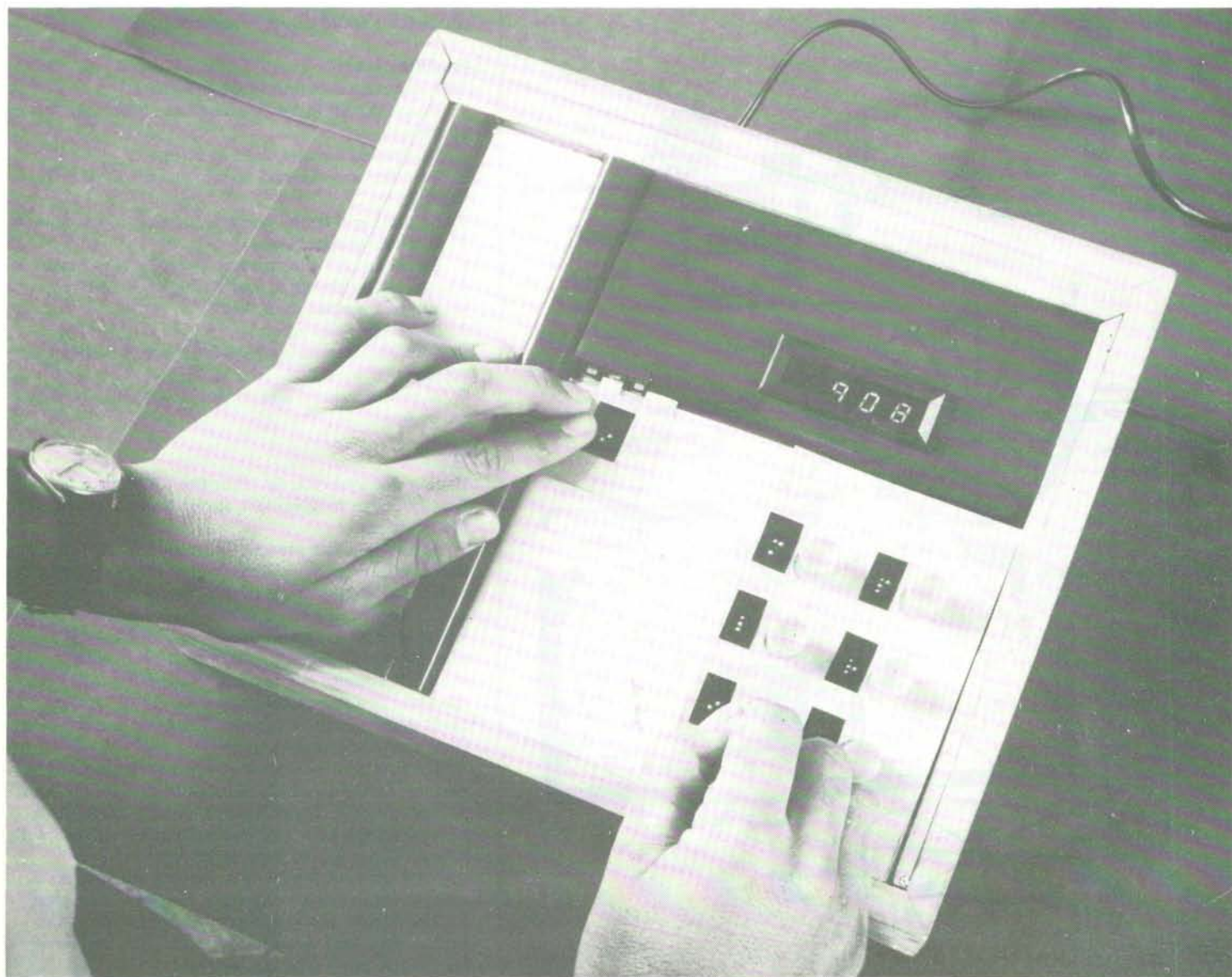
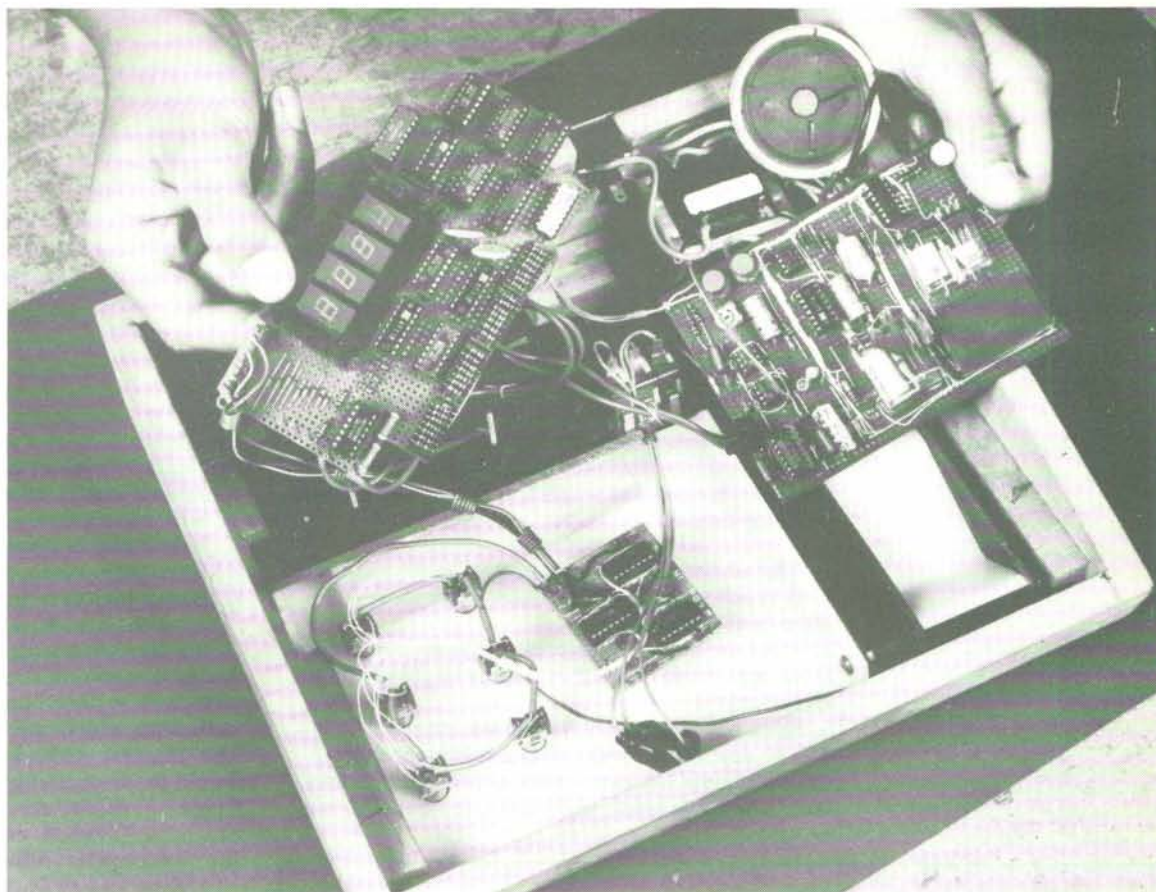
Having decided exactly what the problem was Roddy began to speculate about how to approach the problem.

'What does the present exercise do? Its primary function is to provide an exercise which can improve a child's ability to read braille letters. How does it do it? By forcing the child to read a series of letters and making him match two of them. What else does this? Nothing at present. What else does it do? It enables the teacher to monitor how well the child is doing. How does it do it? By having cards placed in the tins, which the teacher looks at. How else could this exercise be done?'

His first thoughts were about purely mechanical devices. Locks and keys seemed to him an obvious pairing method. Only the correct key would turn a lock and the keys and locks could be marked with letters. There would have to be a mechanical method of counting correct answers but the main reasons for moving away from this idea were that 'the device would be very large because of the surface area that would be needed. The one device could only cope with six letters'.



Insides of the Device.



Also the device would have been very heavy. His note book here is full of Leonardo-like drawings of mechanical counting devices. The whole thing seemed to be getting too complex at this point and tobacco tins acquired a new appeal!

The next idea was to have two rotating discs which had the letters arranged around their circumference, and which could be paired by feeling the letters as they appeared at windows in the casing. A button could be pressed when letters were paired. The need for mains electricity was the main problem with this proposal, and so once more Roddy moved on.

Finally, he was attracted back to the simplicity of using cards. It was not long before he had made the cards into simple keys by means of cutting notches along one edge of each card. These

correspond to a set of micro-switches on the machine and there are also a set of buttons with braille letters adjacent to them.

'The machine would then electronically 'look at' the card, and 'look at' the button pressed to see if they correspond. The machine could have two digital counters, one for 'rights' and one for 'wrongs'. There could also be corresponding noises'.

The use of electronics avoided mains electricity since it uses only tiny amounts of current. It would be extremely light and he estimated the cost at about £50.

The parts were ordered and the consul was designed and made in the meantime. When the parts arrived the device was assembled and tested relatively quickly.

Operating the device

The child is given six cards with one braille letter on each card. A larger card with six holes and corresponding letters is placed over the buttons on the machine (see photo). The child then takes one card at a time, slides it into the machine and pairs the letters up. Upon pressing a button a child will hear one noise for 'correct' and a buzzer for 'incorrect'. The digital counter monitors a child's success rate. Also, the cards may be changed, giving the facility, not only of offering the whole alphabet, but numerals too.

Mutual Gains

This project was of Roddy's choosing and he must accept credit for identifying a real need and seeing it through to a competent conclusion. The commercial potential of this sort of product is impossible for us to ascertain, but that is not our main concern. The opening paragraph of this article describes something of the way the device was evaluated and draws attention to the human aspects of the project, and tries to show how meaningful these can be. Failure, however, can mean disappointment for all concerned and if Roddy's assessment of the RNIB's Education Officer's attitudes were correct they are understandable. Fortunately Roddy's hard work and the good will shown by Dorton House School for the Blind made this a success.

One would like to think that winning a prize and gaining an 'A' level did not compete in terms of reward with hearing the words that Neil shouted, 'I did it, Miss Fulton, I did it!'

