British School Technology

Her Majesty's Inspectorate*

Editor's Note: Many readers of Studies in Design Education Craft & Technology *have participated in courses conducted by British School Technology. We believe that they and many others will be interested in this new, highly detailed and illuminating excerpt from the report on the Centres at Trent Polytechnic and Carlton and in the conclusions reached.*

1. BRITISH SCHOOL TECHNOLOGY

1.1 Introduction and History

British School Technology (BST) was formally launched on 1 April 1984 with a Central Government grant provided by the Department of Trade and Industry (DTI) and the Manpower Services Commission (MSC). The Government grant was to act as a pump priming over the first three years of operation and BST was charged with moving towards a self-financing operation from 1 April 1987. The creation of BST brought together two separate centres which had been providing a driving force for the development of technology in schools:

The National Centre for School Technology (NCST) located at Trent Polytechnic had been developing resource and examination material for technology courses throughout the 1970s. In 1982, supported by a grant from DTI, a pilot project of in-service training was launched by NCST called the British School Technology Programme. The aim was to promote the dissemination of teaching materials and ideas, to raise awareness through regional conferences and exhibitions and to provide a programme of in-service training (INSET) all of which would further the growth of a range of technological activities in schools. The announcement of the pilot Technical and Vocational Education Initiative (TVEI) in December 1982 created further pressure for INSET in technology teaching.

The Ampthill Centre was created by Bedfordshire Local Education Authority (LEA) in 1975 to help support the expansion of technology courses in the Authority's schools being at that time promoted by its adviser for craft, design and technology (CDT). The centre was particularly active in co-operating with the Cambridge Examination Syndicate to develop Certificate of Secondary Education (CSE) and General Certificate of Secondary Education (GCE) Ordinary (O) and Advanced (A) level courses and examinations. Bedfordshire also pioneered a Mobile Resource Development Unit (MRDU) to design and fit our buses as mobile teaching support units. Following the creation of British School Technology in April 1984, new premises were required for the former Bedfordshire Centre and a site was found at the village of Carlton in North Bedfordshire, where BST Carlton was established.

In most respects the two centres had developed and continue to develop independently. The major activity at BST Trent has been in-service training, with the development of curriculum resources and equipment as an important but subsidiary concern: that at BST Carlton has been the design and building of mobile units and the development of curriculum resources and equipment, although since Summer 1985 BST Carlton has also offered in-service training courses. Two distinct teams of tutors and support staff have been gathered together to match the different levels of activity and emphasis at the two centres.

1.2 Terms of reference

BST is required to take all practical steps to promote and develop technological education in schools and colleges throughout the United Kingdom. Within this very wide brief, the following functions have been developed:

- acting as a national focus for advice and consultancy to LEAs which are planning to introduce technology courses in their schools
- promoting an interest in technology in schools, colleges and training organisations
- providing a programme of in-service teacher training
- acting as a focus for curriculum development in technology
- acting as a focal point for other curriculum development groups with an interest in developing technology courses
- co-operating with Examining Groups to develop assessment for technology courses
- providing training for technicians to support the work in schools
- developing resource materials for school courses
- developing and undertaking small scale manufacture of specialist equipment for use in technology courses
- co-operating with manufacturers of equipment which could be used in schools.

2. THE INSPECTION

The inspection of BST began during the spring term 1986. It sought to evaluate the work of BST by examining the in-service teacher training model which had been established. This was achieved by making visits to a number of courses provided through the Trent and Carlton centres and by looking at the context (both school and LEA) from which the course members were drawn. Meetings were held with the representatives of 10 LEAs to discover their expectations of the courses to which they were about to send teachers and also to establish the LEA's own baselines of support for technology in schools, including curriculum planning, INSET activity and resourcing. Visits were also made to the schools of course members in six LEAs before the teachers began the BST course.

The major part of the inspection involved the following:

BST Trent

- visits to 14 of the four-week LEA based courses, covering all four stages, totalled 31 HMI days.
- visits during four of the six weeks of a 'training the trainers' course totalled 12 HMI days.

BST Carlton

- visits to three courses mounted specifically for one LEA, namely:— a four day electronics course, a one week technology course and a six week CDT course, totalled eight HMI days.
- visits during four of the six weeks of a 'training the trainers' course totalled 12 HMI days.

The team of HMI included specialties in science, technology, and teacher training together with some secondary curriculum specialists. Most visits were undertaken by pairs of HMI and the pairing changed so that perceptions of the quality of provision could be shared.

Inspection concentrated on an assessment of in-service training provision. Discussions with BST staff, LEA officers and school teachers yielded information about a wider range of BST's activities. Both centres are engaged in equipment and curriculum development. That which is being developed at BST Carlton will be marketed through independent manufacturers and is therefore confidential. In this report we do not comment on BST's commercial activities, except where those activities have an effect on the quality of the in-service training provision, as described in this report.

BST AT TRENT POLYTECHNIC

3. DESCRIPTION

3.1 Activities

In-service training of teachers is the major activity at BST Trent. The centre is also engaged in a number of other activities; curriculum development relating to examinations at A Level, curriculum devlopment in technology for primary schools, strong links with the work of the MEP Programme, association with NCST in the development of electronics equipment and with a major manufacturer of constructional equipment in the development of kits for school use.

3.2 Accommodation

BST Trent uses accommodation adjacent to that used for initial teacher training in technology at Trent Polytechnic. When the inspection took place the centre had use of two small rooms and one larger workshop/laboratory suitably fitted for a range of work involving construction, mechanical, electrical and pneumatic control. There are also suitably equipped storage and work spaces for technicians, together with some staff offices and small seminal rooms. One of the smaller rooms has been specially adapted for the 'training the trainers' course and there are work stations for 12 course members, working in pairs. There is access to further specialist workshops on the floor below. From the Autumn Term 1986 additional accommodation has been attractively adapted for INSET, including additional laboratory and seminar space and a common room. Teachers on residential courses use the student accommodation at Trent Polytechnic.

Resources

The centre is well resourced with a wide range of high quality sets of equipment, especially kits: for example, Meccano, Fischer Technic and Technical Lego. The overall provision reflects BST Trent's current concern for the areas of structures, mechanisms and electronic and pneumatic control. The centre has no equipment for the teaching of a wider range of technologies, such as optical or opto-electronic technology, food technology or bio-technology.

3.4 Mobile facilities

A fleet of 9 forty-foot mobile resource/workshop/laboratories are used to service LEA-based Programmes.

The WISE buses

The Equal Opportunities Commission and the Engineering Council are joint sponsors of the Women into Science and Engineering (WISE) project. BST was commissioned to convert and operate a double decker bus as a mobile teaching/exhibition vehicle to support a programme of activities which would bring to the attention of girls, parents and the general public, the roles and opportunities for Women in Science and Engineering. The vehicle is used on a regional basis for teaching and dissemination activities in selected LEAs. It is also used at conferences and exhibitions and as a public relations exercise. The purchase and fitting of the bus was sponsored by industry. Recently a second, single decker bus sponsored by British Gas has been commissioned to further support this work.

3.5 Staffing

The centre has a Director and a team of tutors and support staff. Considerable expansion of the staffing establishment took place in January 1986 in order that BST could respond to demand for additional INSET programmes, including an increase in the number of LEA-based four week courses. Seven full-time tutors and two support staff were appointed, bringing the total establishment to 24 teaching staff and 11 non-teaching staff. The size of the team is a strength because it contains a wide range of expertise and relevant previous experience. Five tutors have extensive experience in industry and five have experience as examiners. A number of tutors have played a major part in various curriculum development initiatives, including work for the Schools Council, and have published teaching materials. One tutor has worked on a research project for the Assessment of Performance Unit, two have specialist expertise in computing and a further two in electronics. Occasionally part-time tutors drawn from related fields in teacher education are used.

The rapid expansion in January 1986 led BST Trent to consider induction arrangements for the teaching staff. Following an initial residential conference, the plan was to use a mentor system, where a more experienced colleague worked alongside the new recruit. In the event, the pressure of course provision meant that this could not be effected.

4. TRAINING THE TRAINERS COURSE AT BST TRENT

4.1 The course

The 'training the trainers' course is designed to prepare experienced and able teachers to take an in-service training role in their authority and to train and support other teachers in their development and teaching of technology courses. It is a six weeks, full time, residential course held at Trent Polytechnic. BST Trent intends that this course should complement the four-week LEA-based courses. Many LEAs have planned a co-ordinated participation in both types of course so that teachers receiving training locally will benefit from follow-up courses tutored by course members from the 'training the trainers' course.

The Trent centre organises a one day follow-up meeting for course members in the term after the end of the course. This is a valuable feature, providing opportunity to examine and discuss the professional implications of course

design, structure and personnel management in the light of experience; the above issues are vital ingredients of in-service training.

4.2 Course members
Several visits were made to one 'training the trainers' course during the spring term 1986. On this particular course there were six course members from five different LEAs. The usual number of participants is greater than this (up to 12 course members can be accommodated) but teacher action had forced some withdrawals. Five of the teachers on the course had CDT backgrounds, one was a scientist. Most of the course members had not receivd any significant INSET in technology previously and, unusually for this type of course, the teachers demonstrated a considerable lack of previous experience in electronics. Some were uncertain why the LEA had nominated them and half had no clear idea of their LEA's intentions for their future role.

Teachers from three authorities had received an indication of their future training role within the LEA. An example of an effective partnership with BST Trent was demonstrated by one LEA which has trained six teachers on the 'training the trainers' course and plans to train a further four. BST has worked closely with the LEA systematically to build up this team of ten teachers who will support both curriculum development and INSET in the authority. As part of the course assignment each pair of teachers will develop a module of curriculum material complementary to that prepared by other pairs. Thus, by stages, the LEA is developing a programme of work leading to certification at 16+.

4.3 Staffing
The course structure is designed to enable course members to come into contact with a number of BST's staff and therefore, a wide range of expertise. Continuity is provided by one or more tutor(s), including a member of staff who is resident along with the course members. The resident tutor is able to detect problems and to be responsive to the needs of course members by making adaptations to the programme.

4.4 The course content
During the early part of the course the emphasis was on problem solving. Most of the time was used to gain practical experience of designing based on materials and their macroscopic properties. Understanding technological processes, and to some extent of concepts related to control systems was introduced. Teaching methods used included formal and informal tuition and practical problem solving.

During the second and third weeks a major electronics project was set. Working in pairs or small groups, members were asked to design and make an aid for blind people. A totally blind social worker, with an enthusiasm for electronics, talked to the group about his disability and the aids that he has devised to improve his lifestyle and independence. The presentation provided excellent general education and a superb stimulus to the assignment. Course members then had two days to complete the task, which was finally evaluated by the blind person.

Towards the end of the six weeks members had to produce a curriculum pack consisting of a scheme of work for a six week module lasting one hour per week for pupils of all abilities in the secondary school. One session of the module had to be developed into a detailed lesson plan. Groups have a major presentation of their ideas at the end of the course, thus giving them the opportunity to prepare and mount a presentation for other teachers, a skill they will need when teacher training. This task was undertaken with enthusiasm and proved to be a valuable experience.

It was to the credit of the BST tutors that they renegotiated the course programme in an attempt to make it more appropriate to the needs of course members. The pattern described above, therefore, may not be typical of that which might be provided for a group of more experienced teachers.

4.5 Quality of provision
In early sessions practical problem solving was the main method by which course members were guided through new areas of experience and understanding. The assignments were carefully planned to enable the teachers to increase their own knowledge and understanding, as well as to provide a model which could be translated into classroom use with pupils. Most teachers were successful in devising solutions. Their approach was mainly empirical and work proceeded on 'a try it and see' basis. In some instances the processes of solving problems would have been aided if drawing and modelling techniques had been specifically encouraged and members had been helped to see the value of such techniques as an aid to thinking and decision making. For most projects the solution was finally achieved by connecting standard kit items in the correct sequence to achieve the desired function. The general use of kits precluded craft and aesthetic consideration. On future occasions it might be beneficial to take the solution further into the prototype stage, so that the additional constraints and problems posed at this stage might be appreciated by the course members. The electronics project was successful in giving experience of handling various components but many course members were constrained by lack of confidence and knowledge when it came to using their understanding of electronics to solve problems.

The course included some successful discussion sessions. One of note did not dwell on narrow technical arguments but explored wide ranging issues of a technological and pedagogical nature arising from participants efforts to build a mast from a limited range of materials. Technological issues included: referring back to earlier designs, using available knowledge, balancing issues of strength against ease of construction, problem solving as a cyclic activity, trying again, using scientific concepts. Pedagogical issues included: encouraging talk, using the overhead projector, getting pupils to look at real examples as a starting point, resource management, the importance of enabling all to succeed sometimes, considering the suitability for teaching in school.

The educational value of the final project was to be found in the range and depth of thinking, the wide variety of skills and techniques used and the quality of the presentation. The exercise was of value in developing a whole range of practices, particularly working and

group discussion and evaluation during and after project construction were extremely successful. For example, in one course tutors were able to get the group to devise and think about ways of presenting problems so that they fitted into coherent courses. Discussion was lively and profitable, and was well handled by the tutors who demonstrated the skill of valuing contributions from all members of the group. Tutors showed some excellent examples of teaching style and skill. In a second, the tutor systematically went from group to group helping with solutions and suggesting amendments and extensions to the activity. The help was sensitive and constructive with sound advice and tips on how to get the best learning opportunities out of the activity. Two groups of teachers were encouraged to use constructional kits with which they were unfamiliar in order to increase their experience of equipment which was new to them. Course members were also helped to appreciate the strengths and weaknesses of the particular equipment that they had chosen to use.

Evaluation was successful because issues were drawn out during dicsussion of each group's work. These included the concepts covered by the brief, the age group for which the activity was appropriate, managing group work in mixed-ability classes and resource management. Differentiation and progression within the task were also given particular consideration. Again, the teaching style adopted was a good model of that which teachers might use in class. A few courses did not capitalise on the opportunity that such well handled discussion offers and some tutors could improve this aspect of their work by following the good practice exemplified above.

In most courses, few direct references were made to cross-curricular links, even though some course members were engaged in developing courses which included aspects from areas traditionally associated with CDT, such as science and mathematics. The implications of pupils' previous experience of constructional activity were underplayed. Technology was not placed in an historical perspective and the courses did not particularly address the issues of motivating and encouraging a successful experience for girls. On two courses there were teachers from girls' schools which had successfully introduced a range of courses in technology. It would have been interesting for these teachers to have shared their observations with others on the course, but opportunities were not made because the course tutors were not aware that this particular expertise existed.

Before commencing a project, course members were given a brief, which outlined design requirements and constraints. Many of these briefs presented stimulating and relevant problems but some were poorly written and led to misunderstandngs among the group. On two of the week one courses visited, teachers expressed discontent and irritation at the end of the first day because the briefing for projects was perceived to be weak and the assessment criteria were vague. But tutors effectively channelled the discontent into negotiation, and a restatement of problem solving as a learning activity led to some valuable discussion and a free exchange of ideas.

During week four of the course the teaching pattern changed and course members worked on one major project in two groups of seven or eight teachers. The aim was to produce a greater degree of collaboration between course members and to encourage mutual self reliance rather than reliance on tutors when problems were encountered — in other words — to wean the teachers from the security of the course. This worthy aim proved difficult to achieve in practice, because there was a lack of project management support in targetting tasks and sharing expertise and dividing labour. The project briefs were complex and challenging and required consideration of an extended range of desirable attributes such as simplicity, production economy and peripheral development potential. However, the course members and tutors were vague about the judgements to be made ultimately regarding durability, elegance of solution and aesthetic considerations.

5.8 The mobile trailers

A trailer is not an ideal environment for in-service training. There is no learning stimulus other than the novelty of surroundings and activities are given a kind of spurious glamour and mystique when taking place in the trailer. No attempt was made to make the environment visually stimulating or to associate the technologies being used with real life situations, thereby helping to show the contribution that technology education can make to the personal and social development of pupils. In this respect, course members could assist by contributing some of their own pupils' work for display. It is extremely difficult to see an OHP screen from the back of the trailer, numbers have to be restricted, teachers cannot talk face to face, or wander easily to see the work of other groups. In contrast, when tuition occurred in classrooms all the advantages of paired and group work were immediately apparent.

Problems occurred because the trailer had not been satisfactorily maintained prior to some courses taking place and vital items of equipment were missing. Also insufficient arrangements were made to park the trailer on two occasins; on one of these it became stuck on a traffic island while being parked in a car park. In both cases time from the course was lost while alternative arrangements were made. On one course the pneumatic jacks leaked and the trailer gradually became less and less horizontal and shook when anyone moved around. A succession of technically minor irritating problems served to underscore the need for adequate and swift communication between units and the centre.

The imaginative use and novelty of the trailers is not in doubt, what is in question is the suitability and adequacy of the trailer for all the training purposes which reflect BST's aims.

5.9 Resources

When properly maintained there is generous resource provision on the trailers and this highlights the poor level of resourcing at many of the course members' schools. At least one teacher commented 'Technology may be possible on the trailer but it certainly isn't at my school'. Those teachers from schools participating in a TVEI project indicated that TVEI funding had been a helpful facilitator in the introduction of technologically-based courses in their schools. Many of the teachers had been promised enhanced resourcing as a

consequence of attending the course and this presented a powerful motivator for attendance.

The predominant use of kits on the trailer is helpful because units can be quickly combined so that effective progress can be achieved in the minimum amount of time. There is a danger, however, that teachers may become lulled into thinking that all technological work can and should be pursued using constructional kits. Such kits are an expensive investment and more advice on the relative merits of each would have been appreicated by the teachers. There would be merit in having some junk materials and off-cuts of consumable materials available locally for some problem solving activities.

5.10 Reaction of teachers

The immediate reaction of teachers was very positive. They considered the course to be relevant and to meet their needs. All were grateful for the opportunity to share the course with a colleague from the same school and said that the relationship created through the pairing would help in developing technology courses in their school in the future.

Teachers were pleased with their newly acquired expertise and many of the CDT teachers could see ways of directly relating this to their own teaching. On the whole, scientists tended to be less sure whether the knowledge and experience gained would be of direct help in their teaching because of the constraints of examination syllabuses and the lack of time to divert into technological activities.

On two courses, teachers were openly critical and the first half of the first week generated a good deal of tension. This was partly due to poor preparation by inexperienced tutors and partly through poor anticipation of needs by the LEA. Teachers also associated successful, and therefore enjoyable, learning experiences with certain tutors and were not happy when tutors changed from week to week. To ease this problem BST Trent have recently strengthened their communication between tutors responsible for the different weeks of the course.

5.11 Summary

The four week courses were well conceived and effectively planned to meet a real need — that of taking teachers from a relatively low base of experience in technology and, over a period of 16 days tuition during four terms, giving them the necessary knowledge, experience, and most importantly, the confidence to engage in curriculum development in their own schools. By training both science and CDT specialists, the foundation is being laid for a broadly based curriculum in technology. By working directly with the client LEAs, BST is well placed to advise and help in the continuing support of teachers who have received training.

On the four week course most of the teaching was successful, combining a relaxed style with the correct degree of stimulus and security, whilst at the same time being challenging. On only one occasion was it disappointing and that was when presentations had been poorly prepared and were intellectually superficial and confused. Some areas require attention in order to improve the already sound provision. These include a better use of the overhead projector in presentations and discussion, the increased use of IT and the use of displays of materials to aid an appreciation of aesthetic considerations and to create an environment which reflects technological activity.

The trailers form a good resource base and provide more sophisticated equipment for use with specialist courses. They do, however, have limitations in general use. The benefits of the trailer are best demonstrated when the course requires bulky, delicate and/or expensive fixtures, for example, pneumatics equipment for the week three course. In the future, trailers might be designated specifically for certain courses, such as bio-technology or food technology.

BST AT CARLTON, BEDFORDSHIRE

6. DESCRIPTION

6.1 Activities

While BST Carlton makes a contribution to in-service teacher training, the range and scale of other activities have a major impact on the organisation and day-to-day running of the centre. These activities include product development, the design and fitting of mobile resource units, a design consultancy service and a curriculum development consultancy service for LEAs and the independent education sector. A considerable export market potential is being explored.

6.2 Accommodation

The centre has a range of diverse accommodation built within a former residential school and is able to designate studios or workshops for each of its functions. There are two lecture/seminar rooms, one to support dsign the other electronics and pneumatics. There is also an area for mixed material working with an adjacent seminar room and display space, and an exhibition hall.The design of teaching materials and equipment and the manufacture of vehicle mobile resource units, are carried out in specialist workshops. Residential accommodation in some houses adjacent to the centre provides excellent facilities for teachers attending long courses. The use of available space is biased towards the non-teaching aspects, but BST Carlton hopes to remedy this situation in the near future with the addition of a mobile building to increase teaching space.

6.3 Resources

As at Trent, Carlton has an excellent range of equipment and resources, some of which have been designated by BST staff. High quality reprographics facilities are available which enable teachers on courses to exchange ideas with each other. The latest equipment for use in schools is displayed in the exhibition hall and can be viewed by teachers visiting the centre. The only weakness detected in the resource provision concerned the level of maintenance; electronic kits, in particular, were not adequately serviced and proved to be unreliable in use.

6.4 Mobile facilities

BST Carlton has a separate Mobile Resources Development Unit, which converts vehicles for use as conference and exhibition rooms, mobile resource carriers and mobile laboratories and workshops. It is a commercial service and a number of LEAs have bought vehicles to support technology in schools or in-services training for

teachers. For example, a London double decker bus has recently been converted for one LEA, the funding coming from local industry. The upper deck provides a quiet teaching area, while downstairs provision allows for design and making activities. The LEA intends using the bus to tour schools, making half-day visits to each, over a period of 10 weeks. The bus is also intended for staff development in the initial stages. Such arrangements allow equipment and facilities to be shared among a large number of schools.

6.5 Staffing

BST Carlton has a small team of seven full-time members of staff, including a Director and a Curriculum Leader and specialists in electronics, pneumatics, design and graphics, and structures and materials. One member of staff has responsibility for work in primary phase technology. All full-time tutors are well qualified and have had a wide experience of teaching in a variety of schools. Two have extensive industrial experience and one was an LEA advisory teacher before joining BST. Together the team possesses a high level of expertise in a relatively narrow range of activity, with design predominating. There is a lack of expertise in electronics, and lecturers from a local college of further education are used part-time to fill the gap. At times the team is seriously stretched, especially when more than one course is taking place at a time, or when a tutor is called away to service another of Carlton's activities. Frequently, profitability is the driving force and commercial activities are given first priority; teacher training comes second. This also applies to the deployment of technician time.

7. COURSES AT BST CARLTON

7.1 Range of courses visited

During the spring and summer terms of 1986 visits were made to courses mounted for two LEAs. Included were visits to four of the six weeks of a 'training the trainers' course mounted for one LEA and to three courses which were funded through the TVEI-Related In-service Training Initiative (TRIST) for a second LEA. The three courses visited were:

a six week course of further training for CDT teachers;
a four day course in basic electronics; and
a one week course in technology.

7.2 The 'training the trainers' course at BST Carlton

The six week residential course is divided into three blocks of two weeks, each separated by work in school. At the end of the six weeks there is a six month development in their own school. The course visited was the first to be validated externally by the Cambridge Examinations Syndicate and the teachers will be awarded certificates.

The course was planned for 10 teachers but only eight arrived due to problems of finding suitable supply teachers. Seven were CDT specialists, including one woman. One school had both a science and a CDT specialist on the course. They represented a wide range of experience and interest, from a teacher just completing her probationary year to a head of department in his mid-50s. Schools participating in the LEA's TVEI project were well represented. Close contact is said to exist with the advisory service of the LEA. However, the course was a standard package and there was no evidence of any adaptation to meet the needs of the LEA nor of individual teachers. The needs and expectations of course members were not as clearly identified as they should have been, despite the collection of course members profiles in advance. The profiles were very brief documents and, in practice, offered little that could not have been ascertained in a 30-second introduction.

The course is designed to enable participants to come into contact with all staff at Carlton. Teachers therefore met with expertise of considerable depth but not of equivalent breadth. One of the tutors provided continuity throughout the teaching programme.

7.3 The course curriculum

Technology at Carlton is firmly placed within a design context. It is aligned to CDT rather than science or any other curriculum areas and a considerable emphasis is placed on designing and aesthetic considerations, particularly presentation. Formal sessions of instruction are provided in topics such as electronics and pneumatics. Teachers are expected to deploy their skills of design and communication in thinking through solutions during problem solving exercises.

The early part of the 'training the trainers' course consisted of design projects including product analysis tasks and the production of design briefs which could be used in school. Interspersed with these sessions in the design studio were major injections of teaching in electronics, pneumatics and mechanisms. The direct teaching of scientific content was undertaken to reinforce or widen the base from which technological activity could develop.

By the fifth week the thrust changed to one of translation of knowledge and expertise into ideas for teaching. Course members were asked to develop a set of curriculum teaching materials which were to form the major part of the final exhibition of course members' work. Forty four hours over the fifth and final weeks of the course were devoted to working on this task.

As a finale, course members mounted a major exhibition of their curriculum project and other work completed during the course. LEA officers and head teachers of participating schools were invited to the exhibition and the individual contributions were assessed by the external moderator appointed by Cambridge Examinations Syndicate.

7.4 Quality of provision

The course was intensive, evening sessions were arranged and course members participated willingly.

In early sessions design tasks were matched to the course members' experience and expertise. For example, those more experienced in drawing were given a product analysis task. They recorded the design intricacies, identified inadequacies and made proposals for improvement. However, the result while satisfactory, did not offer challenge and the teachers continued to demonstrate the skills that they already possessed. The less experienced group were asked to design a casing for a clock, having been given two and three-dimensional drawings of the clock mechanisms. The latter was a more demanding brief because there was greater scope for inventiveness and work of quality emerged.

A more formal, and less effective, method of presentation was used when teaching electronics. The session which introduced electronics was so laden with theory that most teachers became demoralised. The aim was purely to instruct: developing teaching methodology was excluded. By contrast, in a pneumatics session there were good, sensitive interventions by the tutor and a high degree of success was achieved by course members. Demonstrations were clear and carefully prepared and the standard of instruction was high. Some issues were expertly handled, such as how to encourage pupils to record their circuits without the actual complexities of recording getting in the way of the flow of pupil thought and ideas. Later in the course electronic kits were used to introduce the idea of electronic systems. It was an excellent piece of in-service training since the tutor referred constantly to pupils' needs and helped the group to anticipate problems when teaching this aspect and how to seek or suggest ways of resolving them.

The session devoted to considering technology for pupils with special educational needs was inserted into the programme at the last minute because an electronics session had to be postponed. The session was not planned with sufficient thought. Teachers were divided into groups and asked 'to devise a strategy within the technology curriculum for coping with six statemented children in their school'. There was no focus to the discussion and no illustrations of possible adaptations of equipment were provided. The session contained many opportunities for teachers to consider how they might adapt their curriculum to meet special needs and to consider how practical activity might enrich these children's experience, but most of these opportunities were missed.

Within the 44 hours available for the final curriculum project at BST Carlton some valuable experiences were gained and shared in an atmosphere where there was a good group spirit. However, the activity took a large amount of time and graphical presentation was given pre-eminence over designing. There was an inadequate balance between design communication and modelling, and drawing was rarely placed in the context of modelling. Also, a number of opportunities to consider teaching styles and other professional matters were missed. For example, the display of work in the final exhibition could have prompted a discussion about the role of display in school.

Accreditation of the course is an interesting development which brings some disadvantages along with the obvious advantages in terms of professional qualification. External certification is a valuable asset but can place undue pressure on course members and influence the choice of project to one that 'looks good' for the final exhibition when viewed by LEA officers and head teachers, rather than to a project which challenges the teacher's own weaknesses. This is a problem which needs careful managing by BST Carlton's staff. It is also an issue

worthy of debate with course members because it is one which teachers face in school, where projects designed with external examinations in mind may tend to constrain rather than encourage pupil creativity.

7.5 The TRIST courses

In these courses membership was drawn from CDT and science specialists but teachers from the same school were not paired. In the case of the electronics and technology courses, most teachers had very little previous experience in the subject of the course and regarded them as a kind of professional lifeboat. For example, the electronics course was planned as an introduction to electronics for teachers without any previous experience. Information from BST Carlton to the LEA stressed the 'basic' level of the course. Despite this two teachers present needed a more advanced course and were unlikely to have benefited from what was offered. Course members appeared to have been selected by the seconding LEA with no obvious plan in mind. However, for the CDT course, continuing support is being planned by the LEA through advisory contact and facilities at the LEA's central resource unit.

The basic electronics course included functional theory, fault finding practice and circuit design. The programmes for both the electronics and the technology courses dealt almost exclusively with content. In both, the emphasis was on instruction. The six-week CDT course commenced with a graphic communication package, based around designing a logo. This was followed by an introduction to simple mechanics, in readiness for project work. The teachers were required to make a working device to illustrate movement using constructional kits and pneumatics. The instruction/practical stage was then followed by a consideration of the application to teaching.

The technology course was well managed and by the third day the strengths and weaknesses of course members were known and alterations in the programme readily made. A lecture on project management was well presented, illustrated and received but it defined management somewhat narrowly. The CDT course was successful in encouraging a more positive approach to broadly-based foundation work in CDT. The possibilities for greater integration of technological activity in CDT projects was stressed and graphics work was employed positively in the introduction of a design brief for pupil use. The electronics course contained a very heavy diet of information, given through exposition. In view of the wide range of experiences of course members, the content was pitched at the right level but no attempt was made to use the knowledge being acquired to solve problems. During a second session devoted to designing, teachers constructed a teaching aid within the constraints of a fixed specification. This session was planned to occur earlier in the course but was postponed as the tutor was away contributing to a course in another part of the country. In the event, the tutor clearly misunderstood or confused the purpose of the session and course management and planning was found to be wanting.

7.6 Teacher reaction

Most teachers were enthusiastic and considered the courses to be helpful either in confirming and developing their ideas and giving added confidence or through motivating their interest in new aspects of technology. Some, however, were doubtful whether resources would allow them to put their newly acquired knowledge into practice. Despite HMI reservations described above, teachers were generally pleased with the graphics part of the course but dissatisfied with the electronics. Some were critical of the balance in terms of time devoted to particular activities, and in particular, the final curriculum project.

7.7 The teaching accommodation

The three teaching areas are rather small but can support groups of 12 to 15 in reasonable comfort, although if a quantity of equipment is used the size of rooms is limiting and their shape does nort facilitate group discussion. The design studio has no two dimensional display space and is aesthetically barren. It is also difficult to project slides and transparencies with the result that some excellent and sophisticated visual aids could not be displayed in such a way that they could be fully appreciated. The laboratory could present a somewhat forbidding image of technology, with its arrays of electronics and pneumatics systems boards.

Seating arrangements in the design studio are such that designing takes place by facing outwards and benches in the centre are used for some practical work. The model is flexible, and informal yet allows a degree of privacy. It is a model which might have advantgages in schools.

7.8 Summary

In many of the sessions seen teachers were not required to work in areas in which they felt insecure. Their natural reluctance to put themselves 'at risk' came from pressures arising from the intensive nature of courses, the 'public' exhibition of their achievements at the end of the course, and the external accreditation.

In those areas where BST Carlton possesses staff expertise the quality of sessions was good, but the most successful could have been better given the talent of the tutors and the excellent facilities. There are weaknesses, notably in electronics, but following the inspection an additional tutor was appointed to help remedy this weakness. The teaching team at Carlton is small and greater collaboration between Carlton and Trent in the joint use of the considerable expertise at Trent, would have ameliorated the short term problems faced at Carlton. Future development there will depend on a willingness to analyse the problems and to create a structure in which constructive comment from its staff, client LEAs and course members can be heard and acted upon.

The present approach of BST Carlton to technology is different from the approach of Trent. There is no attempt at Carlton to pair science and CDT teachers on courses and the design and communication emphasis is geared mainly towards improving the quality of work in CDT rather than in developing a wider view of technology. These differences must be recognised by the potential clientelle. (The issue is discussed further in Section 10).

8. THE PARTNERSHIP BETWEEN BST AND THE LEA

8.1 LEA policy and plans

Meetings were held with the Officers (frequently the Adviser for CDT) of ten LEAs who had teachers attending either the four week course or the 'training the trainers' course. None of the LEAs had a clear working definition of 'technology' and, at best, most had no clear policy for the introduction of technology in schools. Similarly, there had been no systematic evaluation of current provision for technology in most LEAs. The strengths and weaknesses of the LEA or of the teachers concerned had rarely been identified in advance of the teachers receiving INSET. Two of the LEAs were an exception to this criticism, as each had developed a coherent plan of action.

Action plans developed by two authorities

In one LEA the CDT adviser, on taking up his post, undertook a comprehensive survey of CDT in the authority. He presented his findings to the CEO and the Education Committee in the form of an action plan. This highlighted strengths — traditional craft work — reflected weaknesses — design activity — and exposed gaps — technology. It included a strategy for short, mid and long term toals and stated the need for capital expenditure. The initiative was well received and, recently, additional funding has been available to schools involved in curriculum development in technology. Building alterations have been undertaken to improve workshop accommodation and a mobile technology work bus has been bought using MSC funds. A peripatetic technology advisory teacher has been appointed, funded through TRIST. The decision was made to participate in the 'training the trainers' course first and then to use these teachers as course members or assistant tutors on a series of four-week courses, so that continuity was achieved and experience of teacher training gained.

In another authority, some seven terms ago, it was found that there was little or no work going on in secondary schools that could be termed technological. Since then a series of initiatives have come together to form well co-ordinated provision. These include TVEI, a scheme of TVEI replication and the setting up of a teachers' centre for technology with a second, funded through TRIST, in the planning stage. Four BST courses were arranged; staff from the most experienced schools being the first to benefit and those from the least experienced the last, so as to build up early success from strength. A technology trailer has been purchased through industrial sponsorship; primary technology is being supported by funding from the School Curriculum Development Council (SCDC); appointments have been made for three advisory support teachers, two for middle schools and one for the primary phase. These developments received the full support of the Education Committee and the CEO, who were involved in the early decision to employ BST. At present, technology is perceived solely within the areas of science and CDT, although the LEA has been asked by a university research team to work with them to develop schemes for technology across the curriculum. The cascade model for INSET is envisaged, growth being developed from focal points spread across the LEA. Schools are provided with additional funding to support technology courses.

8.2 BST's course provision for the LEA

In most of the authorities visited there was little participation in INSET for technology prior to BST involvement. Where previous INSET had been provided it was on a modest scale and was dependent on the national and regional programme provided by the DES and, more recently, by the MEP. BST now represents the major contributor to this field. Four authorities plan to have teachers in all their secondary schools on the four week trailer courses. In some of the larger authorities which have already participated this means that the LEA is currently engaged in its third or fourth round of courses. In one LEA two-thirds of the schools now have BST trained teachers (32 schools).

A number of the remaining LEAs intend employing the cascade process to disseminate teaching skills in technology across their schools. The likely effectiveness of this approach is questionable since the majority have not decided how they are going to use their trained teachers.

8.3 Liaison between science and CDT advisers

In most authorities the initiative to develop courses and teaching expertise in technology is firmly in the hands of the CDT adviser. This is the case even though an equal number of science and CDT teachers have received training and BST Trent views technology as an activity which crosses the boundaries of the two disciplines. During each of the four week courses visited, a CDT adviser was present for at least part of one of the days but a science adviser was very rarely seen to visit any course. Many course members who were science specialists expressed disappointment and concern at the lack of interest shown by their adviser. During conversations with advisers it became clear that there is some tension over who should have the ultimate responsibility for technology within an authority and more than one CDT adviser conveyed feelings of exasperation with his science colleagues over their apparent lack of interest in the BST initiative.

8.4 Selection of participating schools and teachers

In those authorities where a cascade model is intended, schools were invited to express their interest in developing courses in technology and sending their teachers on the four week programme. In one LEA, approximately half the schools showed interest at first but the numbers swelled appreciably when schools discovered that those participating would receive a grant to fund the introduction of technology courses. Since not all teachers will directly experience BST training in such a model, the selection of teachers is important. The authority which placed its schools in order of greatest need (see para 8.1, above) would have reaped greater benefit from its first course had it communicated this plan to BST and had the course tailored accordingly to meet the starting points of the participating schools.

Where the LEA selected individual teachers for the course it was rare to find a formal procedure of application and interview with the LEA adviser. Where this did occur the criteria for selection

varied from 'vision and energy' to a consideration of the personal qualities that would make the trainee suitable as a potential trainer. In many cases teachers were selected by their LEA without knowing why they had been selected for the criteria that the LEA applied. In one authority the teachers from a school which was designated to have a TVEI-funded technology centre were not selected by the authority for the first round of four week courses which the authority had commissioned.

8.5 Resourcing technology courses in schools

Most LEAs plan to support the introduction of technology courses in those schools where teachers have participated in BST INSET by providing additional funding. Usually the funding is in the form of a single grant; sums of the order of £1,000 or £2,000 were mentioned. In some cases the funding is provided on a 50/50 basis, schools agreeing to match the LEA support with money from their own capitation allowance. Schools are experiencing problems in using such funding effectively. The amount is insufficient to equip for the range of technology courses that the school might envisage for the future, so immediate deficiencies compete for the limited funds. A realistic arrangement had been made in one LEA where an initial grant had been provided to each school for equipment and an additional sum is to be provided annually to extend and up-date the equipment in the authority's schools.

8.6 LEA influence on course design

LEAs have negotiated with BST to modify the standard course package that it reflects their needs more accurately. However, as this inspection has shown, the LEAs themselves have not always identified their needs with sufficient precision. Some LEAs have not been in a position to communicate these needs to BST through their advisers. For example, a few LEAs using BST training had no CDT adviser in post at the time of the inspection. Some LEAs had little knowledge of what BST had to offer and, in a sense, were negotiating from ignorance or having a 'blind date' with both BST and technology. Where an LEA commissioned several BST courses, possible modifications were more often discussed for the second and subsequent weeks.

8.7 Course evaluation

There is no joint evaluation of courses by BST and the LEA. After each week-long course BST Trent tutors write an evaluation, but are under no obligation to share this with the LEA. Most LEAs undertook some form of post-course evaluation, either at the end of each week or at the end of the whole course. One LEA gave an evaluation of each week's course to BST staff. Some LEAs had some criticisms and a joint evaluation may have brought issues into the open and resulted in a better joint understanding of the problems and in agreed modifications to meet the LEA and course members' requirements. Some criticisms mentioned by LEAs were clearly valid but others were born of the LEA's lack of clarity concerning their own policy for technology in schools and their lack of planning for the future. This left BST having to guess at the LEA's intentions. Part of the problem might be resolved if lines of communication between each LEA and BST were improved; in particular, BST might commit more of its thinking to paper for the benefit of course members and LEA advisers.

9. ORGANISATION AND MANAGEMENT

9.1 Management Structure

Given that the two constituent parts of BST were well established and well known in their respective fields before April 1984, it was always likely that there would be some difficulty in bringing the two centres together in partnership. At the outset, the DTI commissioned a consultant to make recommendations about the future role of the two centres. The consultant envisaged that the Directors of both centres would remain in post and take day-to-day responsibility for the management of affairs, subject to a Board of Management for BST which would make policy and ensure a unity of purpose. It was suggested that an executive secretary should be appointed to control overall finance and administration. The consultants also made recommendations as to how the relationship between the two centres might develop in order to prevent unnecessary overlap and competition.

In the event, the three advisory panels which had been suggested were never formed and the Board — finally called the Council — of Management and the executive secretary were not in place at the time of the launch. On 1 April 1984 BST's affairs were guided by an ad hoc management committee aided by the services of an acting executive secretary seconded from Bedfordshire LEA. The appointment of this same officer was fully confirmed in February 1985. The executive secretary had been closely associated with the Bedfordshire centre prior to the establishment of BST. A Chairman of the Council of Management was appointed and the Council met for the first time in its properly constituted form in September 1984. By this time the two centres were already in being and had embarked on their own agendas.

The consultants brought in to advise at the inception of BST highlighted the following activities:—

- the design's manufacture and licensing of equipment
- consultancy with other national bodies and LEAs
- curriculum development in technology
- in-service training of teachers
- publications

9.2 Design, manufacture and licensing of equipment

BST Carlton has continued to develop and market converted buses with considerable success and BST Trent has developed mobile trailer workshops and converted buses to meet their own needs. BST Trent does not buy their buses and trailers from Carlton because they are able to purchase them elsewhere at less cost. Each centre has worked effectively with different manufacturers to secure improvements in the range of equipment to teach technology in schools. There does not appear to have been much sharing of ideas between centres and there is some evidence of wasteful duplication, for example, in the design and modification of tools for use in primary schools. However, it is likely that the educational world has benefited from the promotion and development of a wide range of equipment and resources.

9.3 Consultancy with other national bodies and LEAs
BST Carlton has developed its role in overseas promotion of British technology education and has offered a consultancy service to LEAs. To date one LEA has benefited from a full survey. BST Trent has worked closely with MEP.

9.4 Curriculum development
Both centres have sought to take a lead in curriculum development, with alternative courses and examinations having been developed and supported. However, the lack of close agreement between the centres regarding philosophy, course aims and mode of operation has led to duplication of effort within BST and confusion amongst the users of the materials and courses — the teachers and schools. Likewise, there has been a competitive view of the development of technology in primary schools.

9.5 In-service training
The major INSET role was based at the Trent centre. BST Trent has the advantage of being situated within an institution of higher education, Trent Polytechnic, which has a long tradition of teacher training. However, a great deal of time, money and energy have gone into developing INSET provision at Carlton. Whilst it is understandable that co-operation between Trent and Carlton is inhibited by the geographical distance which separates them it is reasonable to expect that a co-operative mode of working should have been established. This would have avoided risks of duplication and encouraged a similar philosophy and the sharing of ideas which were not evident during the inspection.

9.6 Publications
A range of useful publications, including teaching materials, publicity leaflets and curriculum descriptions have been published. It is unfortunate that this valuable contribution to the debate on technological education should have been compromised at the onset, by a difference of view and practice regarding the use of an agreed logo. There continues to be no single image, reflecting perhaps to the outside world, a lack of overall policy and direction. BST needs to first establish and then project its image as a single entity, with a common purpose — the national focus for the development of technology in schools.

9.7 Finance
With BST Trent's major activity located in INSET, which cannot easily generate revenue, it is always going to be difficult for the centre to cover all its costs and make a profit. The courses provided by both centres have been poolable, which means that the LEAs could reclaim 75% of teacher replacement costs and 100% of course fees. Trent has found it is not possible to cover more than about one third of its expenditure from fee income. To add to the problem, the demand for INSET courses rose rapidly following the expansion of TVEI and the introduction of TRIST. The Council of Management instructed BST Trent to expand the trailer programme and the money for this was provided by a further injection of funds from DTI and MSC, and a small grant from DES. Although there are some ways in which BST Trent may look forward to an improvement in its cash flow, its ability to cover costs in the future is unknown. The introduction of the new in-service training grant arrangements by DES (a successor to TRIST) with effect from April 1987, will create a more competitive situation. It will be for BST Trent to seek to persuade LEAs that their high quality provision and associated fees should be given priority within the allocations available.

9.8 Summary
Separately, both centres are effectively managed. The evidence of this inspection suggests, however, that the benefits anticipated from the creation of a single enterprise have not so far been realised. The Council of Management has not given a sufficiently clear indication of policy to the Director of either centre. Firm decisions have often not been made and, in particular, the corporate plan presented to the Council in November 1985 was never finally agreed. Future planning and the co-ordination will require regular meetings between the executive secretary and the Directors of the two centres.

10. COMMENTARY

10.1 The place of technology in the curriculum
In schools, technology is generally thought to be one of a range of courses within the curriculum area of Craft, Design and Technology. That curriculum area, in turn, forms parts of design experience which extends into other subject areas such as Creative Arts and Home Economics. However, in searching for a definition of 'technology' educational opinion has broadened. Technological capability and experience may well be acquired through attendance at classes containing the words 'Design' or 'Technology' as part of their titles. But, equally important, are the technological ideas, values, knowledge and skills acquired through the whole curriculum, through geography, history, mathematics, social studies, to name but a few of the subjects which can contribute.

In 1985 HMI described the educational experience of technology. Paragraph 84 of 'The Curriculum from 5-16' (DES 1985) says: 'The essence of technology lies in the process of bringing about change or exercising control over the environment. This process is a particular form of problem solving; of designing in order to effect control. It is common to all technologies including those concerned with the provision of shelter, food, clothing, methods of maintaining health or communicating with others, and also with the so-called "high technologies" of electronics, bio-technology, fuel extraction, and the alternative technologies of the Third World. As in all learning, the involvement must be characterised by progression, internal coherence and continuity. But technology also has its content which, while not exclusive to it, is essential to the technological process. That content broadly concerns the nature and characteristics of natural and manufactured materials, and the nature, control and transformation of energy'.

10.2 BST's Philosophy and working definition of technology
In their courses, BST are not anxious to impose a view of technology, but wish to lead course members to conclusions by example. At both centres the underlying philosophy is of designing and making

achieved through finding solutions to problems set within design briefs. Throughout, the emphasis is on gaining first hand experience, although the actual experience offered is different at the two centres. The work at Carlton expresses the philosophy in a high quality presentation of artwork, with emphasis on graphical communication and product analysis leading to construction. BST Trent interprets the design process as a cross-curricular activity having foundations in science and CDT. The emphasis is on problem solving, including the stages of analysis, consideration of alternatives, negotiation with others in the working group, division of labour, some modelling and making, followed by evaluation.

BST's approach in building content and process round an implied need — that of solving a problem — is a laudable one. The use of carefully constrained assignments designed to force the potentially hesitant course member to gain some practical experience and subsequent understanding are a strength. However, all exercises in problem solving raise some questions. Firstly, the thinking around a problem is inevitably constrained by knowledge and experience, which raises the obvious, but important question of just how much preparation (knowledge, concept building, practise with equipment) should precede such an exercise? Secondly, should course members — and by implication, should pupils in school — address all aspects of problem solving every time? On occasions it might be perfectly valid to short cut the problem solving cycle and yet still provide effective teaching and learning. Thirdly, is it sufficient for the exercise to end at the prototype stage or should it be taken on to a production stage, where other problems may well occur? For example, should the design for a device to be used for measuring liquid levels in a jug be of actual dimensions that would allow it to be built into the jug? If a problem is 'real', it requires a 'real' solution. If, as is more often the case, the problem is contrived to provide a vehicle for a particular learning experience, then a model which shows the principles of the solution is sufficient. HMI are aware that these problems have no easy or universally constant answers. We have indicated in the earlier text where we felt that some of the above issues could have been raised explicitly with course members.

BST's interpretation of technology through its courses could be considered narrow giving as it does scant attention to a whole range of other technologies, such as chemical technology and bio-technology, as well as providing limited opportunity to consider the aesthetic elements of design in final manufacture and the social implications of technological advancement. However, in limiting its scope BST has taken a sensible course. It has had to use the expertise that was available, meet the specific needs determined by current syllabuses and it has had to bear in mind the low base level of expertise which the majority of teachers possess when commencing their training. In taking schools on from where they are it has to work within the present structures and all the signs are that the approach has been successful. However, as the impact of BST training grows and as the pool of experienced teachers increases the time will come when BST should be able to reflect a wider vision of technology and one which has breadth across the whole curriculum.

10.3 The in-service training model

BST has developed an in-service training model which is worthy of analysis in its own right. It has demonstrated the power of teacher in-service training provided by a specialised organisation, rather than each LEA providing its own, individual local training. At the same time BST has been conscious of the need to provide a reservoir of locally based 'experts' who could provide further training at LEA level, and hence the inception of the 'training the trainers' course.

BST's major impact on INSET has been through the LEA-based, four week courses. Here, the strength is derived from the training of two teachers of different specialisms, from the same school. The two teachers are able to work together, providing support for each other, and collaborating in curriculum development which crosses subject boundaries. The course is of a substantial length and the pattern of one week per term allows time for reflection, assimilation and gradual development; benefits which outweigh the disadvantages of the course spanning two academic years, with the consequent possibilities of staffing changes in the participating schools.

The success of this kind of specialist course provision depends on the establishment of an effective partnership between the provider and the client LEA. As has already been indicated, in Section 8, this partnership is not easy to achieve, and more consideration needs to be given to this problem. The key lies in a clear identification of the target group for training and good communications between the provider and the LEA. There is also a clear responsibility on LEAs to define their curricular objectives and identify the course clientele.

In-service training of the type provided by BST has to achieve a balance between teacher instruction and education for teaching. Teachers need to update or enhance their own knowledge and expertise in unfamiliar fields, as well as to consider school course construction and teaching method. In all in-service training the quality of the tutoring is crucial, and the style of delivery provides a powerful model for teachers to take away with them and to incorporate in their own practice. Although staff teams at both centres had strengths of experience and expertise in technologically related fields, experience in teacher training does not feature among the previous experience of most tutors. The transfer from teacher to teacher trainer is not an automatic process and BST should consider ways in which it could additionally support its tutors through in-service training in the development of the delivery of courses. A programme of tutor conferences has recently been instituted to support the professional development of the tutors at Trent.

10.4 Conclusion

Over the last three and a half years BST has achieved its target and 6,500 teachers have received some additional training through its influence. BST has provided in-service training of a very high quality and has raised the awareness of the educational world and the public to the importance of a

technological education for young people. Together with TVEI, BST is beginning to have a real influence on curricular change in schools.

BST is already looking to broaden its own definition of technology. Future developments will depend on BST's flexibility in responding to the new system of funding INSET. It will also depend on BST's flexibility in responding to the new system of funding INSET. It will also depend on good management at Council level and upon more effective collaboration between the two centres, so that planned activities are complimentary and the developments at one centre mutually support those at the other.

BST is now at the crossroads because it is required to become financially independent. Its considerable success in commercial activities gives ground for optimism that this branch of activity will be secure. It is the in-service training which is vulnerable. To provide training for teachers of the quality evident from this report is expensive, and training in modern technology is particularly expensive. Both centres wish to continue their in-service training, regarding it as an essential element in their activity. However, BST might wish to consider in the light of this report whether the present organisation of INSET is an effective and economical as it could be. It is also important that the provision of INSET should not be compromised in the creation of an independent commercially oriented organisation.