

The
B.B.C. Quarterly



WINTER 1953-4

Volume Eight, Number Four

Price Two Shillings and Sixpence

TECHNICAL TRAINING FOR BROADCASTING

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IS technical training really necessary for broadcasting engineers and operators? Would it not be easier and cheaper to let the new recruit learn on the job? Would not this also be true of the 'old hand' changing from, for example, sound to television? Questions of this kind have had to be answered, for the B.B.C. devotes some of its resources to a comprehensive training programme, which embraces all the technical staff in its Engineering Division. The B.B.C., in common with many other organisations, under private as well as public ownership, considers technical training essential. The reasons for this are to be found in complicated apparatus the use of which calls for specialised skill, the rapid changes in technique as the results of research into programme facilities and more economic operation are applied, the need to reduce the time between an individual starting a new job and his becoming fully operative, and the necessity for avoiding the waste inherent in trial-and-error methods. For the average individual, trial and error generally lead to the formation of bad habits and a sense of frustration, and if this learning has to be carried out during a broadcast the result can be irritating to the listener or viewer and exasperating to the producer, who sees his artistic effects ruined. The B.B.C. would therefore give an unhesitating 'yes' to the first question, and as a result of ten years' experience in technical training would certainly say 'no' to the second and third questions.

During the first twenty years of broadcasting, when no organised training was available, a valuable fund of practical experience and 'know-how' was built up;

it was often in the nature of private experience and, understandably, was jealously guarded by the individual, who had gained his knowledge by the slow and tedious process of trial and error. Since the advent of training it has been possible to co-ordinate and analyse this valuable practical experience and to present it to new recruits as a foundation for what to do, what not to do, and why. It is estimated that in this way an operator of broadcasting equipment can reach in nine months (three months' training and six months' experience on the job) a greater and more soundly based proficiency than could be obtained by two years' learning on the job. A further advantage of training is that it can present general principles, which can then be applied to any problem, and it encourages staff to analyse a particular problem rather than search their memory for a near experience, possibly with no success.

B.B.C. training policy can be stated quite briefly: its aims are to develop the skill and capabilities of staff so that they maintain their satisfaction in work, to encourage them to adopt a constructive attitude to new ideas, and to increase the efficiency of the individual and of the organisation as a corporate body.

In order to discuss B.B.C. training practice it is convenient to consider the three categories into which the engineering industry generally groups production staff, *viz.*, craftsman, technician, and engineer.* All three types are employed by the B.B.C., all possess different qualities, and all require different treatment in training. The craftsman needs particular manual skills and these can be acquired

* The Education and Training of Technicians'. *Proc. I.E.E.*, 1951, 98, Part 1, p. 28

only through a planned apprenticeship, which includes workshop training and practice in interpreting drawings and instructions. The B.B.C. is an operating and not a manufacturing organisation so that the number of craftsmen it requires will not be large, and they will be used for highly skilled work on the construction of prototype or specialised apparatus. As a consequence, the B.B.C. cannot give wide practical experience and it provides no craft training but recruits skilled men from industry. In the Operations and Maintenance Department, however, a certain amount of repair and constructional work is required from time to time, and there is a special workshop course of six weeks' duration for staff from this department who show a particular aptitude for work of this nature. The technician requires skill in specialised techniques and in handling the simpler equipment, but above all he must be able to grasp quickly a problem once outlined. Routine operations are often a part of his duties, and for this a quick reaction to an emergency fault is a *sine qua non*. The majority of B.B.C. Engineering Staff are technicians concerned with the operation and maintenance of broadcasting equipment and it is not surprising that the main effort of training is directed to this class. Training cannot afford to neglect the cultivation of

artistic appreciation, and the proportion required is higher the nearer the technician is to the producer. The graduate engineer will need to take a broad view in which thought precedes action, because there will be occasions calling for the handling of men as well as materials without a comparable previous situation to guide him. In the B.B.C. he will be mainly destined for Research or Designs Departments but some experience will have to be gained in the Operations and Maintenance Departments, which he will later be serving. In what follows we shall consider only the technician and the graduate engineer or physicist.

If we analyse B.B.C. technical training we find that there are present in some degree or other four aspects, *viz.*, manual, operational, theoretical, and artistic. The chart in Fig. 1 is arranged to show the proportion of time allotted to the four aspects in the various training courses. Under theoretical are grouped lectures on organisation, promotion prospects and facilities for achieving them; this section also includes laboratory work on the theory. The courses, listed in Fig. 1, are divided into basic, conversion, and refresher. The basic courses deal with new recruits (probationary) for the sound and television services, with those who are to exercise technical supervision, and with

TYPE OF COURSE	MANUAL	OPERATIONAL	THEORETICAL	ARTISTIC
PROBATIONARY	100%	55%	35%	
PROMOTION			90%	10%
GRADUATES		45%	45%	10%
PROGRAMME OPERATION		100%	55%	35%
CONVERSION		40%	50%	10%
REFRESHER		10%	90%	
WORKSHOP	85%		15%	

Fig. 1. Types of course and their time analysis

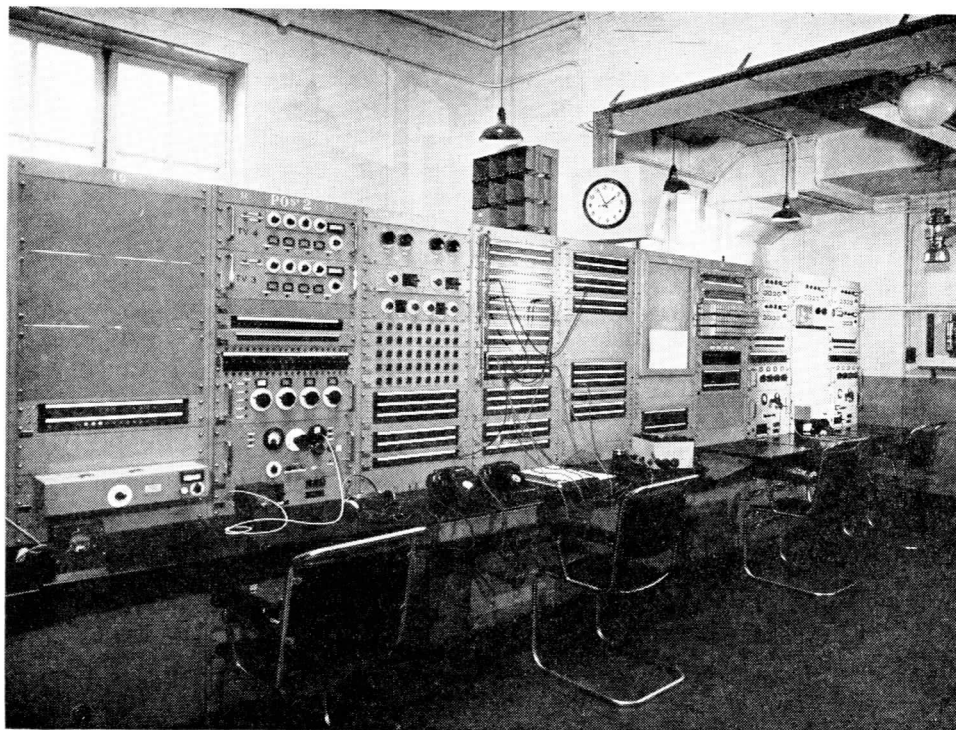


Fig. 2. The B.B.C. Engineering Training Department: the main control room

graduates. In the probationary courses emphasis is placed on the acquisition of operational skill and a knowledge of procedure but sufficient theoretical instruction is given to allow an understanding of the apparatus which is to be handled, and of the complete broadcast chain. A short period of workshop training with simple tools is included so that repairs and replacements can be satisfactorily executed. The facilities available in the B.B.C. Training Department for operational training may be gauged from Figs. 2 and 3. Fig. 2 shows the control room, in which five operators can work simultaneously; Fig. 3 shows operational and lighting experience being gained with a television camera channel. The promotion course aims at producing supervisory technical staff either for maintenance of apparatus or for technical operations. The maintenance staff require theory with special reference to circuit functions, and Fig. 4

shows a corner of the Aerials Laboratory, where Transmitter staff are carrying out an experiment on the directional characteristics of a model short-wave array. Analysis of operational procedure is the keynote of the training of supervisory staff for technical operations. The probationary and promotion courses are of twelve weeks' duration, the first five weeks being concerned with fundamentals common to all aspects of B.B.C. work and the remaining seven with specialisation on transmitting, control rooms, recording, etc. A part of the Fundamentals Laboratory is seen in Fig. 5.

The period spent in the Training Department by the graduate is six weeks, during which he is given a working knowledge of the sound and television broadcast chains as well as an introduction to the work and functions of the departments through which he will pass during his first two years with the B.B.C. Sufficient

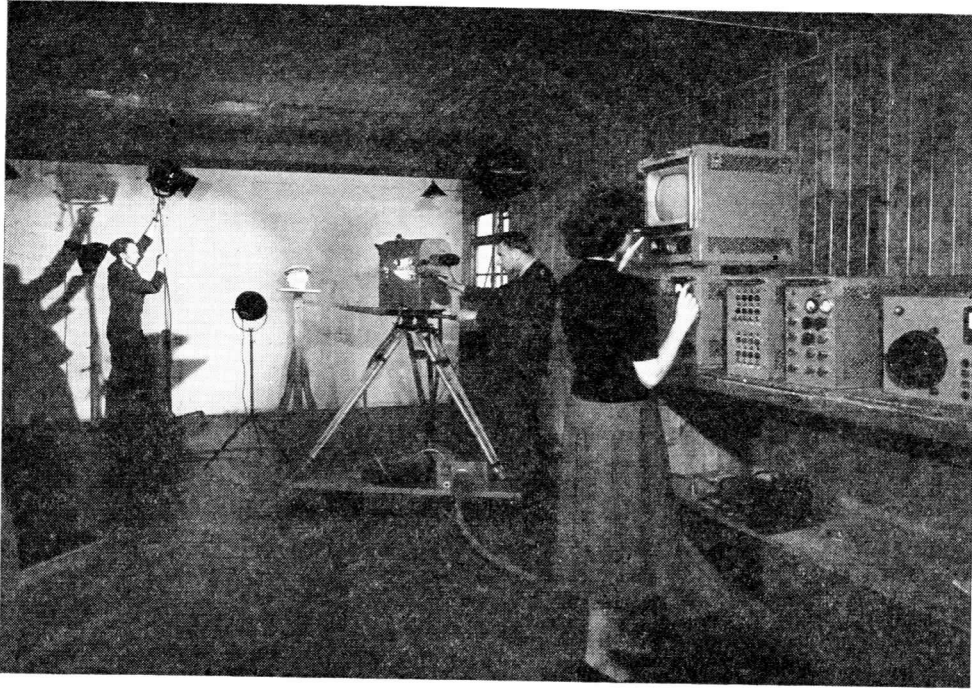


Fig. 3. The B.B.C. Engineering Training Department: practical work in television lighting using a camera channel and monitor

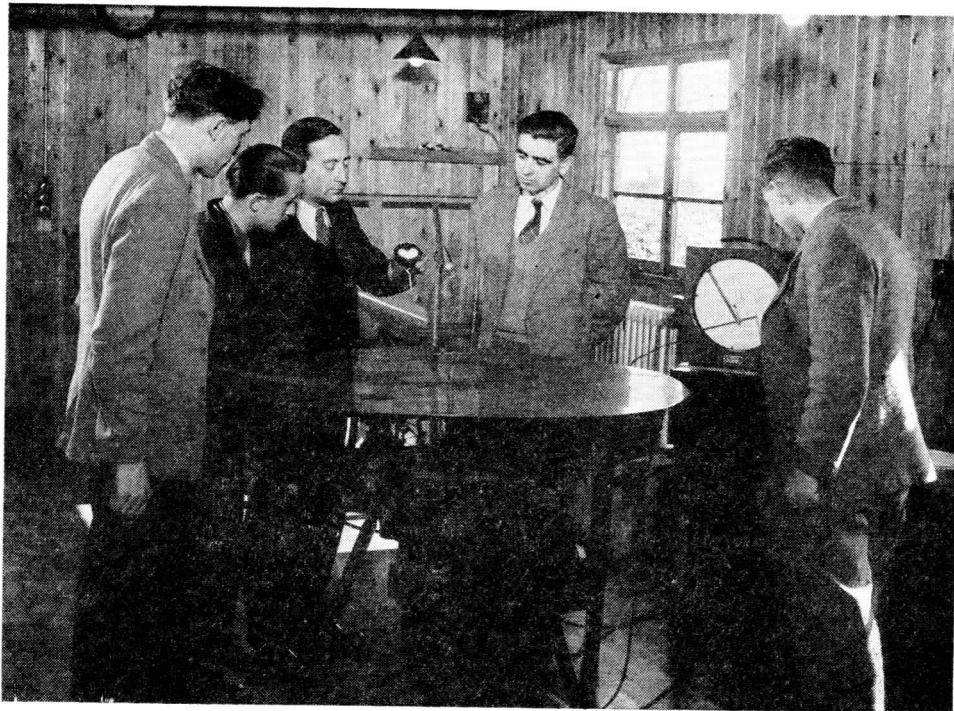


Fig. 4. The B.B.C. Engineering Training Department: the acrials laboratory

operational practice is also given during this six weeks to allow the graduate to play a useful part in and gain full advantage from his period with the Operations and Maintenance Departments. This two years' practical experience prepares the graduate for full professional responsibility.

Courses are also organised for Programme Presentation staff in the sound service, who work in close collaboration with the producer and are therefore selected for artistic rather than technical characteristics. For certain work ability to read a musical score is essential; in another sphere a knowledge of drama production may be required. The technical standard of the course must be lower and considerable emphasis must be placed on the artistic limitations of the broadcasting medium and on methods of overcoming or mitigating these limitations. Basic physics, acoustics, and elementary

electricity and magnetism are the important subjects.

Conversion courses are needed to assist those changing from, for example, sound to television, or to give instruction in new techniques caused by research developments or changes in programme presentation methods. They generally last for about six weeks and after a preliminary brush-up of fundamentals turn to a detailed examination of the subject from an operational and theoretical angle.

Older members of the staff will require refresher courses to renew their skill and technical understanding, to offset staleness, stimulate interest and morale, and to reduce resistance to new ideas. Two types of staff are involved, those whose duties are mainly administrative and those whose work is chiefly technical. The administrators will need help so that they can appreciate and discuss with understanding the technical problems of their



Fig. 5. The B.B.C. Engineering Training Department: the fundamentals laboratory

juniors. A revision of fundamentals using familiar illustrations from current practice is undertaken, and every possible link with past experience is seized, techniques are of secondary importance. The course for more technical staff presents fewer difficulties, and the instruction given is of immediate value in their work. Techniques play an important part. Refresher courses have not so far exceeded a fortnight's duration since temporary replacements for senior people cannot easily be found.

A much debated question is whether a written examination should be employed as a measure of progress. The late Lord Lindsay* has asserted that 'the right course is to restore the solid evidence of achievement in the written examination', and for probationary and promotion courses some form of test is essential in order to give a standard of achievement which has some meaning for those outside the Training Department. Taken in conjunction with a report it provides a good guide to student potentialities, and it is easy to frame the questions so that they cannot be answered satisfactorily by the 'crammer'.

Examinations will not normally be required at the end of conversion courses and they are quite unsuitable for

older men being given refresher courses.

Since B.B.C. staff have to operate equipment at regional centres and transmitting stations suitably disposed throughout the United Kingdom, technical training must be full-time and residential. This has considerable advantages since skill and specialised knowledge is acquired more quickly, and progress is rapid because there is no division of interest between training and one's everyday job. It also promotes the unity of the organisation and tends to break down artificial barriers between groups. Naturally, residential life brings its own responsibilities and satisfactory amenities must be provided.

A business organisation can find in its sales a proof of success or failure. It is not, however, easy to discover a satisfactory yardstick for training; numbers are certainly no guide. The only criterion is whether a particular student is a success or failure at his job, and this takes time to assess. The B.B.C. Engineering Training Department cannot claim 100 per cent. success, but it is gratified by seeing many of its past students now filling posts of responsibility, some in overseas broadcasting organisations, and by finding that its promotion examination has attained some standing outside the B.B.C.

* 'Examinations and Selection Boards'. *Nature* editorial, July 24, 1948. p. 124