

EDUCATION GROUP DISCUSSION

The Work of The Engineering Industry Training Board

F. METCALFE, B.Sc.(Eng.), M.I.Mech.E.*

Since the Industrial Training Act was passed almost two years ago, a number of Boards for various sectors of industry has been established. In this paper, the author reviews the work of the Engineering Industry Training Board, covering the Board's approach to its financial responsibilities, its duties in securing an improvement in the quality and efficiency of training, and the provisions for the establishment of a corps of training officers. The paper concludes with an examination of some of the problems facing the Board.

INTRODUCTION

It is hardly necessary to make much reference to the situation which brought about the establishment of the training boards through the medium of the Industrial Training Act. Most people, particularly in the engineering industry, are familiar with the persistent shortage of skilled and knowledgeable people, of the lack of controls over standards of training and of the unfairness of a system in which a firm may pay considerable sums to train a person for skill, only to lose him to someone else soon after he is trained, without recompense. All attempts to right this situation by exhortation failed, the last notable attempt being the Carr report in 1957. The Training Act having been brought about to right this situation, it is perhaps worth reminding ourselves what the training boards are charged to do:

- a) to ensure an adequate supply of properly trained men and women at all levels in industry;
- b) to secure an improvement in the quality and efficiency of industrial training;
- c) to share the cost of training more evenly between firms.

All this is a very tall order, for the responsibility is for training over the whole perspective of the work force from junior operative to senior management, for forecasting industry's needs for manpower and exercising suitable controls, for taking action in the training field itself to raise the standards, and finally, to be involved in a complicated exercise in high finance. The boards are given, for the first time, a powerful weapon to bring about their wishes, that of financial sanction, and although the carrying out of training itself is permissive, there seems little doubt that the subject of training has become front-page news.

FINANCIAL RESPONSIBILITIES

It might be useful to begin the explanation of the work of the Engineering Industry Training Board by examining how it has interpreted its financial responsibilities through the system of levy and grant. In any case, the first payments of levy and grant are to be made in about a month's time, so the subject is a topical one. Furthermore, the levy/grant system should no doubt indicate the philosophy of a training board in interpreting the Act and it may be possible to identify elements which give a pointer to the future.

Three elements of training have ideally to be reflected in

the financial arrangements; quality, quantity and cost, and the overall result should be to give a stimulus to training activity where it is required. No doubt it would be ideal to begin by asking "how many people ought we to be training in each category?" and then raise the necessary monies to meet the cost and distribute them accordingly. Unfortunately such a question is extremely difficult to answer and, although the Board will take account of evidence provided by such bodies as manpower research units, and will no doubt also mount its own research effort, it is going to be a long time before a clear picture emerges. What, in fact, the Board decided to do, was to find out the cost of training going on now, and start from there. A survey on training costs was mounted with over a hundred firms known to have good standards of training, from which it emerged that the net cost of training being conducted in the engineering industry at present is of the order of £75 million.

The Board has the power to raise money by levying industry and decided in the first year to impose a levy of 2½ per cent of the total annual wages and salaries bill of each firm, excluding those at this stage with a total bill of less than £5,000 per annum. Such a levy is expected to raise £75 million, so that the Board is in a position to deal with the third of its duties, that of sharing the cost of training more evenly between firms. It proposes to do so by a system of grants, based partially on an assessment of the quantity and quality of training being conducted by a firm related to its own needs for training, together with a series of specific grants to the areas of training to which the Board attaches special importance and wishes to encourage. Early consideration was given to a system of grants based on the direct costs of training to each firm, but the analysis of such costs, revealed by the survey, showed considerable variations which would make such a system unreliable without the introduction of extremely expensive accounting techniques. A direct-cost system of grants was therefore abandoned in favour of a general grant system based on identifying the needs of a firm for training in various categories, and taking account of the national effort in training in each category, together with an assessment of the quality of the firm's training as revealed by the facilities it provides. Added to the general grant system is a series of specific grants to be paid for particular areas of training to which the Board wishes to draw special attention. It is perhaps worth noting that the administrative costs of the Board, which are extracted from the levy recoupment, are more than covered at this stage by grants which the Board itself receives from the Ministry of Labour.

* Chief Education and Training Officer, Engineering Industry Training Board.

The Work of The Engineering Industry Training Board

TABLE I

Categories of employee	(a) Total employed in engineering, millions	(b) Numbers in training in the industry	(c) Percentage in training
A.T.C.	1	37,000	3.7
Craft	1	147,000	14.7
Op.	1	18,000	1.8
U.	$\frac{1}{2}$	—	—
Total	$3\frac{1}{2}$	—	20.2

To deal first with the general grant system (Part A) it is helpful to refer to Table I. This summarizes in round figures the national position in training in the engineering industry as revealed by returns made to the Ministry of Labour in 1964. Four categories of employee are referred to:

- i) A.T.C.—administrative, technical and commercial, which includes all managers and superintendents, scientists and technologists, draughtsmen and other technicians, foremen, assistant foremen and all other administrative, commercial, clerical and office staff.
- ii) Craft—craftsmen in skilled occupations for which the normal method of entry is by apprenticeship.
- iii) Op.—operatives who have acquired a degree of skill by experience and/or training.
- iv) U.—other employees.

The table reveals that there were about 1 million employed in each of the first three categories and $\frac{1}{2}$ million in the fourth, making a total of $3\frac{1}{2}$ million employed in the industry. Columns (b) and (c) show the proportion of people in each category returned as being under training. The figures of people under training need to be treated with some reserve, since the returns were made under circumstances rather less pressing than those which will apply when claims are made for grant. The Board will receive fresh returns as a result of its enquiries, but the figures under column (c) will be used for the purpose of this paper.

Firms wishing to claim grants are required to make similar returns, together with a return of training facilities in the form of a completed questionnaire. Reference is now made to Tables II and III which are hypothetical returns which might be made by two firms, the first employing a large number of skilled people and the second with a much smaller need for skill, but employing a large number of semi-skilled operatives.

An additional feature of these tables is column (d)—quality assessment. The return of training facilities will be marked by the Board taking account of the cost of providing such facilities and the degree of importance attached to them, each category being considered separately and allocated a percentage

TABLE II

Categories of employee	(a) Total employees	(b) Numbers in training	(c) Percentage in training	(d) Quality assessment	(e) =(c) × (d)
A.T.C.	300	10	3.3	75%	2.5
Craft	500	100	20.0	60%	12.0
Op.	200	10	5.0	50%	2.5
U.	100	—	—	—	—
Total	—	—	—	—	17.0

Table II represents a firm with a high demand for skill—
 Performance rating = $\frac{17.0}{20.2} = 84\%$

TABLE III

Categories of employee	(a) Total employed	(b) Numbers in training	(c) Percentage in training	(d) Quality assessment	(e) =(c) × (d)
A.T.C.	300	10	3.3	75%	2.5
Craft	200	40	20.0	60%	12.0
Op.	500	25	5.0	50%	2.5
U.	100	—	—	—	—
Total	—	—	—	—	17.0

Table III represents a firm with a smaller demand for skill and employing large numbers of operatives—

$$\text{Performance rating} = \frac{17.0}{20.2} = 84\%$$

rating. The firm's training effort is measured by column (e), being the product of column (c), the quantity rating and column (d), the quality rating. Each firm is then allocated an overall *performance rating* in training, being the ratio of its own total training effort to the total national training effort.

Tables II and III are shown to illustrate how firms, with very different training needs, because of their different demands for skill, may achieve the same performance rating, provided their overall training effort is proportionate to their skill requirements and makes a fair contribution to the national effort. Thus the firm represented in Table II and employing large numbers of craftsmen would be expected to have a proportionately large number of craft apprentices, whereas the firm represented in Table III and employing a large number of operatives would be expected to mount a proportionately large operative training effort.

At the time of writing, the interpretation of the summary of all the performance ratings allocated to firms has not been finally resolved. Clearly the Board cannot pay out in grants more than it receives in levy, and the first step must be to allocate funds for the specific grants (Part B) together with monies it requires for its own purposes. Part B grants are not expected to exceed £3 million in the first year however, so that the great proportion of levy will be redistributed in the form of the general grants described. If, as seems likely, there is a considerable spread of performance rating throughout industry, the Board will need to strike a point at which a particular performance rating results in grant equivalent to levy (see Fig. 1). Having done so, firms with a performance rating higher than this are liable to receive back in grant more than they pay in levy, in recognition of the fact that their training effort is in excess of the national norm in relation to their needs, and firms with a lower performance rating will receive less back in grant than they pay in levy.

If it decides to continue this system of general grant, no

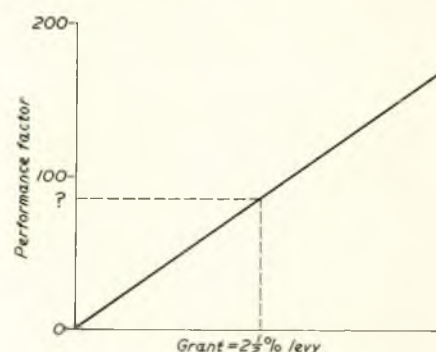


FIG. 1—Hypothetical plot of performance factors of all firms

The Work of The Engineering Industry Training Board

doubt, in the long term, the Board will need to fix its own standards of required percentage in training in each category and perhaps also to specify categories in greater detail, in order to carry out its first task "to ensure an adequate supply of trained men and women at all levels in industry". To do so, it must identify industry's needs more accurately than is possible at present and specify how they can be met effectively and efficiently, and this will take time.

THE QUALITY AND EFFICIENCY OF TRAINING

It is proposed now to turn to the second of the Board's duties under the Act, with which, together with ensuring an adequate quantity of skilled people, the Board's training staff will be most concerned, i.e., to secure an improvement in the quality and efficiency of training. In order to assist those firms, which form the large majority, who wish to take part in training, a substantial number of training officers have been appointed to the Board to work in the field, with the prime duty of helping firms in training matters. They will operate regionally, offering an advice service to industry, and at the same time carrying out a check on training standards claimed in grant returns. They are not meant to replace the training officers in the firms, large numbers of whom will be needed and on whom, no doubt, the brunt of the training effort will fall and on whose success all depends. The Board's training officers will be expected to work closely with the training officers in industry, and in addition to help those firms too small to employ their own training officer to play their part effectively. They will be expected to interpret, for the firms, the Board's recommendations in respect of training at all levels, as they are formulated.

In thinking about the kind of training needed for the future, it would be as well to keep a number of principles in mind. Firstly, that training should be a good investment—it must carry a "pay-off" with it. Training for its own sake is not likely to commend itself to industry, nor should it, and it would be wise to examine proposals wherever possible in the light of the expected return in productivity. Secondly, it is necessary to recall the astonishing rate of technological change in industry, so that within a lifetime new worlds have been opened up in communications, in travel, in production, and in the inter-dependence of nations. Hence training as a once-and-for-all activity is likely to be unacceptable, since people will be being prepared for a working life of perhaps forty years during which they may change their jobs several times. Thirdly, the character of work itself is changing, so that skills become more inter-dependent and, hence, the unilateral type of skill definition and preparation, which was acceptable in the past, will do no longer. The training plans must recognize the need for flexibility and make it possible for people to be broadly skilled and unconfined in what they are able to do. Fourthly, it should be recognized that the technological revolution which has been brought about has almost dispensed with the need for men of muscle, whilst at the same time it has created an unsatisfied demand for men and women who can design, direct, write and, above all, do the thinking for the machines that have replaced them. Hence the pattern of training for some, the apprentices, has to be changed into a system whereby all have the opportunity to develop as far as their capabilities will allow. Finally, it has to be remembered that training concerns people and influences the kind of lives they lead. It is commonplace to say that a man (or woman) who is contributing to the full is happy in his work, but happiness in work is not to be undervalued. There is also a responsibility to demonstrate the worthwhileness of high standards and the satisfaction to be derived from them, and there is perhaps also a responsibility to prepare people to cope with the prosperity that is striven for, once it is achieved.

It is not difficult to define the problem nor to state the aims of its solution. It is perhaps worth examining the weapons available to deal with it. Firstly, there is the Industrial Training Act, setting up for the engineering industry its Training Board with authority and power. The Board is a tripartite organization of employers, trade unionists and educationalists,

bringing to its work the experience and wisdom of people hardened in the fire of practice, yet willing to examine the problem in absolute terms. It works through a series of training policy committees, dealing horizontally across the various levels of required training for management, technicians, craftsmen, operators and so on, whilst reserving to itself the final resolution of training problems. Quite properly, no one imagines that all the information and advice about training rests with any particular group of people, and so the policy committees attract to themselves experts over a wide field to make their contribution through working parties. In due course the Board will publish recommendations for training over a very wide field, to be available both to industry and to the Board's own training officers.

The second weapon, of immense possibilities, results from the development of facilities for further education since the war. The technical colleges have a tradition of drive and flexibility and are sure to make a tremendous contribution despite the many new demands which will undoubtedly be made on them. A similar development is taking place in the universities, although there are few signs yet that this is resulting in a greater proportion of our ablest young people entering technology; perhaps the reason for this is one of the problems the Board has to tackle.

Thirdly, and no less important than the others, there is the nucleus of a corps of training officers in industry who have seen in the Industrial Training Act the chance they have been waiting for to raise their work to new levels. There are, however, not enough of them and, without a training college for training officers, there seems to be no immediate prospect of getting the substantial numbers of professional people needed to do this important work. A committee has been set up by the Central Training Council charged with making recommendations for both short-term and long-term provisions for the training of training officers. Perhaps there may result both a strengthening of the present short courses in technical colleges for existing staff and the establishment of a faculty at one of the technological universities concerned with formal training of training officers and research into training methods. There is also considerable strength to be gathered from the fact that much of the training carried out at present in some of our best firms equals any in the world. This "know-how" can be made available for others to copy; it is too easy in enthusiasm for the "new-look" to forget that many existing excellent training practices should form the sound base from which developments can grow.

PROBLEMS FACING THE BOARD

It is proposed now to examine some of the problems facing the Engineering Training Board and to offer some suggestions for their solution. The Board is charged with, among other things, ensuring an adequate quantity of craftsmen for the future. Before making any estimates as to the number required, the question must be asked and answered, what *kind* of craftsmen are needed for the future. Any refinements to existing training programmes will be pointless if the kind of skills that industry will need are not identified. The question "what kind of skills?" is difficult to answer, for industry is in a state of change, although it is true that fundamental skills change slowly. New skills tend to be identified after they have created themselves as a result of new processes or products, so that they are difficult to forecast, although trends can be noted from more sophisticated industry. In addition to this, account needs to be taken of the fact that many of the established craft skills will increasingly be taken over in the future by single-purpose operatives and in turn by automated devices.

Proposal for the Training of Craftsmen

It seems, therefore, that what is needed is a new structure of skill identification, matched with training programmes which will be flexible enough to cope with change and which at the same time, will reinforce the dignity and respect that ought to be accorded to skilled men and women. The author proposes to examine an idea which has such possibilities with the pur-

The Work of The Engineering Industry Training Board

pose of having it discussed and criticized. In the proposals for first year training of craftsmen and technicians, which the Board will be publishing very shortly, a number of important decisions has been made which break with the past. The first year of training is to be largely common for all potential craftsmen and technicians; it is to take place "off-the-job", in an area set aside for the purpose, is to be conducted by people trained to instruct and it is to be integrated as closely as possible with the related studies taught in the technical colleges. Its purpose is to give a controlled introduction to the engineering industry, to give sound instruction in basic mechanical and electrical skills, from which more advanced skills can be developed, and is to act as a continuous selection process by means of progressive assessment. The course is to consist of three parts:

Part A

Induction, which lasts for three months, is to act as the bridge between school and industry, providing an introduction to the ways of work and instruction in hand skills.

Part B

Acquisition of basic skills, lasting for six months, is to provide the main groundwork in the skills of manipulating and forming metal and other engineering materials using hand and machine tools.

Part C

Commencement of development of special skills, is to be a first introduction to specialization in one of the fields of mechanical, electrical and electronic, forming and fabrication, or instrument engineering.

TABLE IV

Part A	Part B	Part C
Selection and induction into industry	Acquisition of basic skills with progressive assessment	Initial development of special skills with certification
3 months	6 months	3 months

The proposals are made in the belief that such a course taught away from the production environment, ensures more rapid progress and that the broad foundation given lends itself to flexibility thereafter.

Hitherto, the pattern has been to follow a vertical path of skill development, reaching to quite high levels, but often resulting in a lock-up of skills which are rarely used and at the same time failing to provide the breadth of ability which industry needs. Perhaps the foundation provided by a first year course, such as that described, can be used to erect a new structure of skills which reach across traditional boundaries. A beginning might be made by identifying all the skills needed in the engineering industry (perhaps as many as 500) by a process of skills analysis on the basis of a module of time of training needed to learn them and a module of time of experience needed to develop them. Suppose for example a "training module" of six months is used and an "experience module" also of six months. It might then be arranged that the first year training was certificated, on to which individual skill achievements could be endorsed as they were learned and proved under test. The procedure might then be, that at the end of the first year training a selection could be made in each individual case, of the skill modules to be learned and endorsed. In this way it would be possible for firms, identifying their own needs and the capabilities of their trainees at the end of the first year, to provide for new kinds of craftsmen possessing combinations of skills with a relevance to current and future activities.

The skills could, of course, be broken down as much as was convenient and efficient, so that there might be many different electronic skills, a number of welding skills, different machining skills and so on. For any particular skill module there might be more than one kind of related experience which would be appropriate. The main purpose of the time spent on the experience module would be to gain maturity and dexterity under the pressures of cost and time, and hence it would be important that the experience in exercising a particular skill was planned as carefully as the training itself. Because of the broad basic training in the first year, it ought to be possible to engage in carefully selected production work during the training modules and this should certainly be so during the experience modules. The activities during the training modules should be carefully supervised by instructors, and training staff should also play an important part in the control of the experience modules, both as to the variety of experience and the maintenance of standards.

A craftsman might now be defined in a new way as a person who had received groundwork training and a specified number of training and associated experience modules. It might lead on to "grades" of craftsmen, the higher grades being those who possessed greater breadth of skill. At least industry would know a man's capabilities when he moved from one firm to another, which is not so at present when skill is so ill-defined.

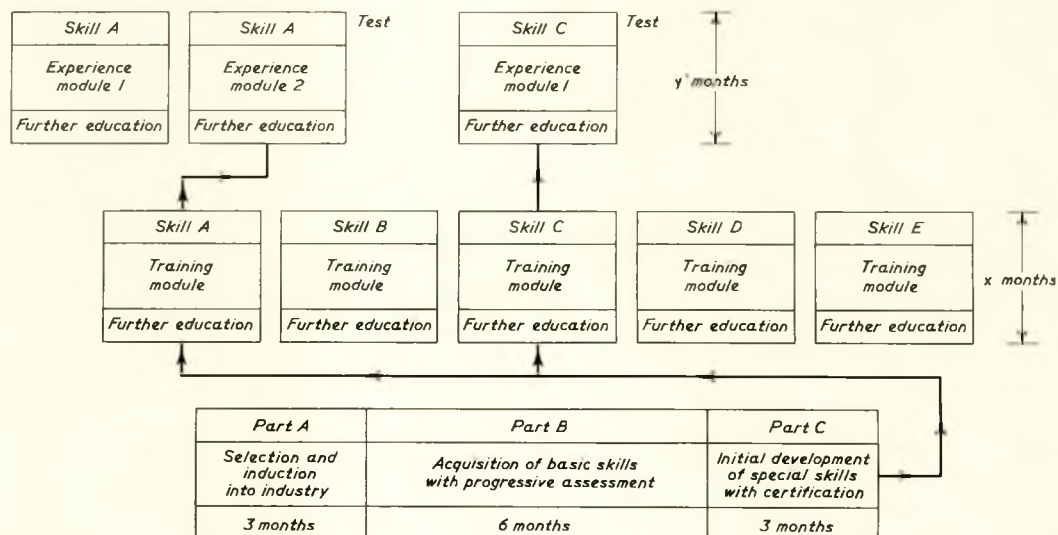


FIG. 2—Training modules for craftsmen

The Work of The Engineering Industry Training Board

Re-training would also become a much simpler problem, since the trainees would be starting from a known position and modules of new skill could be added at any time. This is perhaps the most exciting outcome of such a scheme, giving the opportunity to break the stranglehold of shortages of skilled people by being able to look for the potential exponents of new skill amongst the existing work force. The system lends itself to dealing with the problems of technological advance, for, as soon as a new skill need was identified, the training and experience modules could be set up and endorsed at will. The new pattern might also help to solve the educational problems of young trainee craftsmen, when they set out on what seems at present the insurmountable hurdle of a five-year City and Guilds course at a college. The technical education required for the understanding of each skill could be worked out alongside the training module, so that integration between theory and practice might be achieved and training and education joined into learning-in digestible pieces.

Management Training

To turn to the other end of the scale, the training of managers, there appear to be two obstacles to be overcome. First, the attitude that training is for somebody else; the higher up the scale the more likely is that view to be taken. It seems at any rate reasonable to assume that a similar rate of change operates at the level of management techniques and practices as at more humble levels, so that managers are just as likely to get out of date unless they do something about it. It seems unlikely that a man selected for a post in which he guides and directs the activities of others will not benefit from familiarizing himself with the composite of knowledge accumulated by his predecessors the hard way. The other difficulty seems to be that a particularly good start has not been made in management training in this country, largely because it has been based on the understanding that there is some sort of course for managers based on a common task called "management". Management is not like that: there are as many different kinds of managers as there are men, for it would be next to impossible to find two managers' jobs that are the same. No doubt there are some basic principles and practices like economics, law, costing, marketing and so on that might form a common course, but it will always be at a fairly elementary level and the conclusion is that management training should be one of personal development. The implication is that training for management begins with a careful analysis of what the managers' job is to be, an appraisal of that analysis in terms of the qualities and knowledge that are needed to do the job effectively, a selection based firmly on the appraisal and, finally, an assessment of the individual's need for training directed to the demands of the job. If this is so, there are likely to be individual subjects to be studied rather than courses, a meaningful pupilage to be served under careful tutorship and a controlled programme of directed experience to be undergone. It means above all, perhaps more than for any other group, that once-and-for-all training for managers is a false conception and that recurring periods of re-appraisal and refreshment are necessary.

Post-graduate Training of Professional Engineers

The post-graduate training of professional engineers has taken on a refreshingly new look during the last year or so. The success of sandwich forms of undergraduate study has attracted the Board's attention so that special grants have been made for Council for National Academic Awards degrees and Higher National Diplomas under Part B of the Grant Scheme. The changing philosophy by which much of the craft form of training of graduates has given way to directed project work, and whereby the periods of standing and watching have been considerably reduced, is much to be welcomed. The recognition that professional levels of education are unlikely to be reached through part-time day or evening study is also very desirable and the professional institutions who have been revising their standards are to be congratulated. Even so, there are many experienced people in industry who take the view that graduate students in technology are ready to take responsibility after a

shorter period than two years after graduation. No doubt this differs from one technology to another, and will be a matter to which the responsible training policy committee of the Board will wish to give attention.

Group Training Schemes

There is a danger in making plans for training to overlook the problems of small firms and the contribution they can make. In fact the engineering industry of this country consists predominantly of small and medium-sized firms and a substantial contribution to the total training effort must occur in small firms if the targets are to be reached. The Board has given much attention to this problem and has been examining ways in which they can help small firms to play their part. The solution seems to lie in group training schemes in which a group of small firms are organized together to make a joint contribution to training. Despite some individual cases of outstanding success, the development of group schemes has not so far matched the enthusiasm and efforts of those who have been working in this difficult field and it might be worth while examining the reasons. The first and obvious one is that small firms are incapable of mounting the capital either to provide, for example, off-the-job training facilities where they are needed, or to meet the costs of obtaining the necessary training advice. The Board has recently offered development grants to help meet the initial expenses in getting group schemes off the ground and has also announced its proposal to set up training workshops for the use of groups where they can be used effectively. Another factor, limiting development in the past, has been the fear of small firms that they would lose their trainees to other firms as a result of the interchange which takes place between firms during the periods of planned experience. There is enough experience now to show these fears to be largely groundless, for there are few examples of such unsettlement taking place. The Board proposes to appoint officers with specific responsibilities for the development of group schemes, and all the Board's training officers in the field have been briefed to encourage development in this important sector.

Programmed Instruction

Another subject which might have been mentioned when referring to the weapons available to solve some of the training problems is that of programmed instruction. The subject of programmed instruction has been confused by two diversions, namely, whether the introduction of programmed instruction methods will lead to the replacement of teachers, and the inaccurate use of the phrase "teaching machine". There is little doubt that there is no higher quality of instruction available than that given by a trained and imaginative teacher, but the difficulty is that the numbers of such people will always be strictly limited. The size of the task is such that all the teachers available will be fully employed and there will still be a considerable short-fall. The principles of programmed instruction are not all that new, but it has taken an unconscionable time to realize their potential. Fortunately the picture is now changing and a dynamic industry is being built up to provide these new tools for learning. Many of the programmes now available are excellent, some produced as small books, some on cards, some film loops, some continuous film, and some on tape which industry can use with confidence. What really matters is the programme itself, its relevance to the job in hand and the efficiency of its presentation. The actual method of presentation has importance, since some programmes are more effective in one medium than another, but it would be more profitable to spend less time looking at the ironmongery of the so-called teaching machine and more at the programme itself. So far attention has been mainly drawn to the use of programmed instruction in the training of operators, and certainly this is an important field which requires widespread attention. The title "operator" needs more careful definition however. There are those operators who demonstrate a considerable amount of skill, usually by carrying out a single-purpose craft operation. At the other end of the scale there are those operations involving the minimum of skill, but requiring a procedure that has to be

The Work of The Engineering Industry Training Board

learned and adhered to. It is necessary to examine how far and what kind of programmed instruction can help across this range of activity, for the present common method of learning by watching somebody else is of doubtful efficiency to say the least. Programmes also have their part to play in the training of craftsmen and technicians and there is a number of proposals on the market that need to be evaluated as soon as possible.

The Training of Technicians and Commercial Staff

It is perhaps in the training of technicians and of commercial staff that industry has made least progress. In recent years industry has started to identify technician grades and a start has been made in the provision of suitable courses of further education in technical colleges. This is likely to be a growing need and careful attention will have to be given to the development of suitable training schedules. Even the training of draughtsmen, perhaps the biggest single group of technicians, is not particularly well done except in a few places and there are shortages reported everywhere of these important people. The planning of suitable training, for the varieties of draughtsmen which form part of the design team, is a sector on which the technician training policy committee of the Board is already working and the committee hopes to issue its recommendations soon. It is perhaps worth commenting on the provision of further education for technicians. The Board has already concluded that a minimum of one-day release is essential to the proper development of potential craftsmen, and has also associated itself fully with forms of lengthy sandwich training for

professional levels. It seems unlikely therefore that the middle group of people, the technicians, will be adequately served by the traditional form of day release and that consideration will need to be given instead to forms of block release which allow more time for the technical study appropriate to their work.

The whole field of clerical and commercial training is the "forgotten man", as far as industry is concerned. Because these kinds of occupation spread across the work of all the training boards, the Central Training Council has itself set up studies with a view to advising everybody what ought to be done. A start can be made pending such information by releasing junior staff for courses in technical colleges directed to such awards as the Certificate in Office Studies and the Ordinary and Higher National Certificates in Business Studies, which have a flexibility of subject construction to give industry what it needs.

CONCLUSION

In presenting this paper the author is conscious of two limitations. Firstly, in order to give the necessary time for printing, the paper had to be written three months before its presentation: such is the pace at which developments are taking place in the work of the Engineering Industry Training Board there is a danger that sections of it will be out of date before it appears. Secondly, because the subject is such a large one, it has been necessary to leave out discussion on certain areas of training and give inadequate treatment to others in order to limit the paper to a reasonable length. Despite this it is hoped that it will stimulate discussion into many aspects of the important subject of training for the engineering industry.

Discussion

MR. S. HOGG, O.B.E. (Honorary Vice-President), opening the discussion, thanked the author for his comprehensive review which, he said, must have been a Herculean task.

The problems being resolved by the Training Board were many and varied. With over 50 years behind him in association with engineering, in one way or another, he had seen many changes. He did not recall any one of these changes really being in the interests of the apprentices, apart from the reduction in working hours from 54 to 40 per week and the introduction of day release to study—and that had not been universally accepted. The changes in the industry since the beginning of this century had been mostly brought about by two world wars, growth of the trade unions, and adverse international trade conditions which brought about slumps in the shipbuilding industry, of which many members of the Institute were well aware.

In those days before the First World War, apprentices in many firms were nothing more than a form of cheap labour. It was true that a few enlightened employers had training schemes and regarded their apprentices as an investment for the future, but they were very few. We had now entered a life and death struggle, in this technological age, with foreign competitors, at a time of a shortage of school-leavers opting for a career in engineering. Hence, the changes being introduced by the Training Board assumed more and more importance. It was, therefore, surprising to read on page 351 of the paper, "that training should be a good investment—it must carry a 'pay-off' with it". Training for its own sake was quite unacceptable to the employer who was interested in the short-term return only—that was understandable—but surely any training was a sound long-term investment, not only for employers, but for the apprentices concerned and their subsequent contribution to the national effort.

He called the attention of his friends in the marine world to the paragraph on page 351, "Problems Facing the Board". There the author clearly stated the problem that haunted many of those interested in training marine engineers during this rapidly changing era. What kind of skills would be essential for seagoing engineers tomorrow, and which of the older skills could with propriety be played down? The author had clearly posed the question; possibly someone present would have the answer.

The proposals for the training of craftsmen appeared to be very satisfactory, but one point was not clear. Were craftsmen to be graded by a practical test on completion of their training, and if so, what became of those who failed to make the grade? Would there be different types of certificates? In the past one simply served one's time. In Mr. Hogg's day, if the employer was dissatisfied with an apprentice at the end of his apprenticeship, he simply told him that he had not reached the necessary standard and offered him improver's money, 25s 0d a week. He kept the man on for another six months and then told him that he should seek further experience in another shop.

Was he (Mr. Hogg) correct in assuming that craftsmen apprentices who showed academic potential, would be hived off into some alternative stream that would ensure for them the opportunity of full-time education leading to an H.N.D. or C.N.A.A. award only? He asked this question because, in the present state of his knowledge, he understood that the training schemes dealt only with the first year of an apprenticeship. He felt that there was a danger that potential technologists might be lost in the machine.

On the subject of post-graduate training of professional

engineers, dealt with on page 353, he would be interested to learn more about "project work" in the C.N.A.A. sandwich courses. He found it hard to believe that a student could tackle a project himself before he had undergone a short intensive course in the use of hand tools and small machine tools. Was it possible that the old saying, "An ounce of practice is worth a ton of theory" was wrong? He still thought it was true.

Believing others currently active in training would have more pressing inquiries to put to Mr. Metcalfe, he concluded after again thanking the author for his most interesting discourse.

MR. METCALFE, referring to testing, said that the certificate would have room for endorsements of tests of practical ability at the various stages of training, and also certification obtained by attendance at colleges in such examinations as the City and Guilds and so on. An ounce of practice equalling a ton of theory was a difficult balance to accept. His view was that both were necessary and he would be prepared to argue on the proportions.

Thoughts about post-graduate training were not yet finalized. It would seem that there was a number of ingredients to the training of a post-graduate, whom one assumed had been educated to a pass degree level. Those ingredients were what he would describe as induction—knowledge about his company, his industry and his own place in it—what he would call basic engineering practice, with a warning that this must not be conceived as the high development of craft skills as in the past, but a thorough understanding of how materials are formed and some practice in doing so, and most of all, all the activities which occurred in industry to bring a piece of metal or other material into a saleable article. This was not merely a case of the student himself learning to manipulate the material, although that of course was necessary, but of an understanding of all the components of engineering practice. In respect of most engineers, it meant an understanding and appreciation of the language of the engineer. The drawing and design activity was vital, not that he himself was vitally concerned in producing beautiful drawings, but as an understanding of drawings as a communication device. Most of all, there was the preparation for his later development by studying, in this drawing-design period, this language, with a view later to having a true appreciation of manufacturing and production processes.

There was an element of "objective training". It was right to identify with the graduate at not too late a stage what he was to become and to start training him for it. This of course meant giving him a degree of responsibility under careful tutorship. It certainly involved learning to work in a team—engineering was a team activity—but specifically fitting him for the job he had to do. Finally, he needed some instruction in "organization and administration".

The speaker challenged the suggestion that this should necessarily add up to two years. He wondered why it became two years. It might be that a student spent three years at university and five years was the traditional period for learning.

If that were the basis for the calculation it seemed singularly ill-founded. What had to be done was to find what the student needed to know and, having identified that, to find how long it took him to learn it. He did not agree that they should ignore the premise that training ought to carry a pay-off with it or that training for its own sake was not good.

The Work of The Engineering Industry Training Board

There might be a confusion about the definitions of training and education. Training was preparation for the known situation and education was preparation for dealing with the unknown situation. He agreed that a person's education should be extended for as long as he could possibly cope with it, but training was a more specific exercise. There also seemed to be some confusion about the C.N.A.A. and H.N.D. awards. The C.N.A.A., which was a B.Sc. or B.A. degree, was an award for technologists. Education of technologists could not be carried out adequately on the basis of day release because of the level and breadth of learning required. The kind of training of which he had spoken, for the professional engineer, was to supplement and make use of his academic knowledge.

It should always be possible for people to climb from one particular level to another. There must never be insistence on rigidity, but as the first-year training for a craftsman was also common to a technician, an identified technician would move to a different form of training afterwards and, having qualified perhaps with an ordinary national certificate, he was then acceptable to the new colleges of advanced technology for a sandwich course for technological training if he was good enough. Mr. Metcalfe did not believe that the very valuable qualification of H.N.D. should be allowed, by institutions such as this Institute, to die. It had a very important purpose to serve. It was a qualification of very high technical level, and there was a need for such people.

It was also another avenue to professional status. There was no reason why a person should not obtain a high national diploma with a sandwich course, grow and develop with success, and go on to become a chartered engineer.

Mr. Metcalfe said that he knew only too well that people developed late, but he had been in education for a long time and he had never yet met a late developer who grew extra brains or changed physically—but he had met many people who learned to work at a late stage.

MR. P. J. HOWARD, B.Sc. (Member), said that he had listened with great interest because, as a principal, he was very much concerned with the way in which this matter would affect his college and others. He asked if, during the basic year of craft training, there would be associated academic study linked to the training, not necessarily the present City and Guilds courses, so that when the lad came off the one-year, full-time, off-the-job training and proceeded with the City and Guilds studies, he would have to follow a different syllabus from that which now existed.

They were talking in terms of common training during the one year and, as things were at present, a boy who worked in a machine shop or in general engineering practice would follow a course in his first, second, third and fourth year. If he was to do a common course with electricians, he would presumably require slightly different first-year academic training and could not move in his second year to City and Guilds Mechanical Engineering Craft Practice. One was likely to see a set of syllabuses for Industrial Training Board people and a different set for part-time day release people.

MR. METCALFE replied that during the first year, as a result of the education processes which existed—and it was expected, in the first year, to reach skills which at present were achieved in two years—a young man would find a number of alternatives available. Depending on his abilities, there were available a G course, or a technician's course, and a quite new kind of craft course, which did not at present exist, but which would come into being in September 1966. The City and Guilds were producing a new kind of craft course, matched to the new first-year training course.

In making recommendations, they had said that responsibility for training lay on the shoulders of industry. Therefore, the form of craft course in which 60 per cent of the time was spent on practical work would not meet the situation. The colleges ought to be engaged on that which they could do better than anyone else—related studies. Hence, a new form

of course, absolutely matched to the requirements of first-year training, would be common to all craftsmen, leading to a basic City and Guilds certificate.

At the moment they were discussing, with the Department of Education and Science, the kind of further education provision which linked with each of these modules, and it needed to be clearly thought out. The first year of training was also common to the technician. At this point of time, the trainees were either potential craftsmen or technicians, although some might be potential technologists. What was apparent, from examination of the syllabuses which existed, was that the G course and the T course included appropriate workshop theory and seemed to match the first-year proposals satisfactorily. It was equally true that the ordinary national certificate did not, and one had to consider whether day release would do for the ordinary national certificate kind of student. His personal view was that it would not. He did not believe that this was best met—again it was a personal opinion—by 1½ days release; but block release might be appropriate.

No one should ever be held back. The intention was to create the greatest number of opportunities.

MR. J. MCAFEE (Member) was puzzled by the remarks about potential technologists. He could not imagine that any craftsman in training could possibly be a potential technologist, because he would have left school at far too early an age.

MR. METCALFE contested this and pointed out that many boys were leaving school at sixteen with four, five and six "O" level results. They went on to ordinary national certificate courses, after two years got the O.N.C. and proceeded to sandwich courses. This was happening, not in tens, but in hundreds of cases.

MR. MCAFEE said that he was grateful to be told that that was so. A Committee of the Institute had made recommendations about practical training of technologists. He would be glad to have Mr. Metcalfe's views on one point which was emphasized—that the practical training of future marine technologists should be under the control of the people from whom they received their technical or academic education. Experience had shown quite clearly that if graduates, or even boys under the alternative training scheme, were drawn into industry, very little interest was taken by the management. He had a dossier which showed that hardly a firm in the country took a serious interest in the practical education of the boys. On paper they might appear to do so, but the experiences related by the boys showed plainly that it was not so. He would like Mr. Metcalfe to state his view about the practical training of such boys being in the hands of educationists and not those of industry.

He realized that Mr. Metcalfe had spoken mainly about craftsmen, when dealing with proposed changes in the apprenticeship system, but was this not politically explosive? He was very curious to know how Mr. Metcalfe would deal with trade unions which insisted on periods of training of five to seven years. Probably this country was alone in Western Europe in having an apprenticeship system completely out-of-date and unsuited to modern industry. How would the Training Board cope with this?

MR. METCALFE said that he would not be very happy if responsibility for training of technicians lay with academic institutions. He was quite sure that there were good and bad firms, and equally sure that there were good and bad institutions. He would not personally be happy to leave the industrial training of a graduate to a university. The barricades of British universities were very high indeed and he would not be satisfied that they knew or cared enough about industrial training to do this job effectively. But there were many firms which did it splendidly, although many did not do it at all well.

There were other forms of industrial training, particularly for technologists, where one did four years, comprising six months of academic work and six months of practical training each year. There they were on better ground for suggesting

Discussion

that responsibility should lie in an academic institution, but even then he did not agree. The real problem was to resolve the dichotomy which existed between education and training. These were two parts of the same process of learning. They had to get the co-operation of the parties in these activities. This had happened very successfully in some areas. The Council for Academic Awards had published a first-class report, giving guidance to industry on how this training should be carried out. Training itself must be carried out in industry. They were talking about training people who were to become leaders of industry and their training could not be done anywhere but in industry. He was sure that his academic friends would join him in suggesting that they would have an almost impossible task if they were expected to control this.

A very interesting question had been raised about trade unions. His Board consisted of nine very important trade unionists and nine equally important employers and five educationists. The proposal on the training of craftsmen was passed unanimously by the Board, and he would have considered that the Industrial Training Board had failed if it did not do what it knew to be right because it saw difficulties in implementation. Of course, there were problems which lay ahead, but if they looked at the pattern of training proposed and studied it very carefully they might agree that it represented an important step forward.

MR. P. J. FOSTER (Associate Member) in a contribution read by the Assistant Secretary (Technical), said that the paper indicated that the Board had studied each category of employee as a separate entity and did not appear to be concerned with those who, on their own initiative, wished to study for advancement. With the clamour for day release, block release, and sandwich courses, many colleges had already suspended evening classes and consequently it was now virtually impossible for, say, a craftsman to become a technician, unless seconded for day release by his firm. Thus, by encouraging day-time-only courses, the engineering institutions and the Board were in danger of establishing an "11-plus" at school-leaving age, whereby a person would be stereotyped for life by his "O" or "A" level attainments.

Obviously firms could not be expected to release mature employees, other than the chosen few, but this should not mean that those not chosen must remain in their Industrial Training Board category. Bearing in mind that one volunteer was worth ten pressed men, would it be within the Board's terms of reference to encourage the re-establishment of facilities in technical colleges for the volunteers? These volunteers would implement item (a) of the opening paragraph of the paper and would alleviate, to some extent, item (c).

MR. METCALFE regretted that Mr. Foster was not present because he failed to understand what was asked. If it was suggested that the right way for young people between 15 and 21 was to study at evening classes rather than part-time day courses, day-release or block release, he dissociated himself from that view. One had merely to look at the history, which he thought they had outgrown, of wastage of effort and utterly undistinguished performances by young people who had had to continue their education in the evening after a hard day's work. He thought it very much in the interests of boys themselves, and clearly in the interests of employers, that day release should be part of a young man's learning activity.

Mr. Foster might have been referring to people who wanted to acquire further qualifications later—about adults. When the author was in a technical college he had many more evening students than day students and he found the same pattern in the country. The number of people studying in the evenings was tremendous. This was perhaps likely to be supported by a University of the Air. Good luck to them.

MR. HOWARD said that he was in sympathy with the questioner, although he thought there was a misunderstanding of the situation. He believed the question referred to national certificate qualifications. At one time this could be taken at

evening classes at a college, but the restrictions which were now imposed made it very difficult to do so. If the student had not a qualification which entered him to O.N.C., he must interest himself in "O" level or the general courses of the City and Guilds and, if he did not want to work four nights a week in evening classes, this would take him three years. Then he could enter the national certificate course, which also required three years work.

MR. D. A. EATON, B.Sc. (Member of Council), recalled that some years ago headmasters of grammar schools were invited to a meeting at this Institute and the opinion was formed that they all tried to persuade students to carry on their studies to advanced level. He did not think there were enough places in universities for all those with advanced qualifications. Was there a niche in this Industrial Training Scheme for such people who got so far and then for some reason found there was no opportunity to go farther?

MR. METCALFE called attention to the 3,000 unfilled places in the technological faculties at universities in 1965. The position was entirely different in regard to the arts.

He was more concerned about the rationale of what people studied after the age of 16. On this subject they could spend a great deal of time. As a country which relied on technology for its bread and butter, we did not have an adequate share of the ablest brains of young people taking up technology. There must be many reasons for this. We blamed headmasters, career masters and parents. Let us be sure that we were not ourselves to blame and that the opportunities for training we offered young people were such as to give us a clean sheet before we criticized others.

MR. D. J. LOCHHEAD (Member) said that in the past the shipping industry had depended for its seagoing marine engineers on the surplus of trained engineering craftsmen from the heavy engineering industry. Since it was to award grants for training, he assumed that the Board would look carefully into the balance of requirement and control training so that there should be no future surplus.

MR. METCALFE was intrigued by the naïve assumption that the reason why young men had gone into the marine industry was that there was a surplus of well qualified engineers. He assured the questioner that there was no surplus. These lads might be attracted by the spirit of adventure or because of the pay, although he had no idea what the latter was.

He supposed that, ultimately, the shipping industry would have its own training board.

MR. L. T. DIXON (Associate Member) asked about the 60 per cent of practical training to be done in training centres. Who would provide the centres? There were very few Government training centres, very few industrial training schemes were of an adequate standard, and technical colleges generally were not in a position to offer the intensive training necessary under the proposed scheme.

MR. METCALFE replied that the first-year training that he had described could be provided in one of four kinds of establishment. One was the firm's own training school. In order to encourage the development of such activities, the Board had already announced grants for 50 per cent of the running costs for the first five years, as an incentive to industry to provide the schools. A great deal of interest was being taken in this.

Secondly, it could be provided in technical colleges. He hoped that college friends would consider whether their plant was being adequately used when it was allowed to stand idle for 13 or 14 weeks of the year. The colleges could provide 36 or 48 week courses. The costs had at present to be borne by ratepayers, so when colleges provided industrial training as distinct from education, as from September 1966 they could

The Work of The Engineering Industry Training Board

make an economic charge for it. If they were doing a 48-week year the charge was likely to be of the order of £300.

In respect of this kind of training, as from next year every boy trained in accordance with the Board's requirements would be eligible for a grant of £500. This was specific incentive to industry to train in accordance with the recommendations.

Thirdly, there were Government training centres. The Minister of Labour had announced a programme of development of the centres all over the country. Fourthly, training could be provided in the Board's premises. It would provide workshops for group training schemes. This was a very important way in which small firms could give training by joining together and sharing the cost of providing a training officer. Once they had provided and developed this training, the Board had a million pounds for assistance of such groups. That sounded a lot of money and he had longed to do this all his life. It was astonishing how difficult it was to spend £1,000,000 (*laughter*).

MR. R. HUNT, B.Eng. (Associate Member) said that he thought it true that all colleges represented there worked for 46 weeks a year, rather than 36. He was rather puzzled about the certificate to be given at the end of the first year. Was it to be purely a trade certificate? If so, would it be a certificate which no one would fail?

MR. METCALFE was not quite sure of what was meant by the last remark. The certificate would be on the basis of a test, which was to meet the normal standard to be expected at the end of the year's training. If he was asked to justify the sort of examination success at 60 per cent or 50 per cent which had been current practice in education activity, he would have nothing to do with it. He thought it an absolute disgrace. We had set up a series of "Keep out" signs and managed to keep out 40 per cent a year. We had no right to do that.

He wanted to erect the sort of test that acted as the right stimulus. Who was stimulated by a test? What was the test for? He saw no intrinsic merit in a test or a certificate. If a test meant anything it was a test of a teacher rather than of a pupil, a time when he should stand back and ask, why have these students failed? Not enough of them had considered why 40 per cent had failed for so long. If the test was so high that in the normal process only 60 per cent got through, the test was wrong and the teachers ought to have the courage to say so. He had been one and accepted as much blame as anyone.

His test was intended to ensure that a normal lad could get through if he worked in the normal way. If he got 90 per cent through he would be cheering on the sidelines.

MR. HUNT agreed with what Mr. Metcalfe said about testing. He was against artificial barriers erected in courses. The purpose of the test should be to see whether a lad had sufficient intelligence or knowledge to go on to a further course of study. But what would happen to the remaining five per cent?

MR. METCALFE confessed that he did not know, but they were bound to make some mistakes. He recognized that a common test by itself was not the right way to carry out this exercise. There must be a continuous assessment. He did not believe in the sort of test which was like a game of snakes and ladders and said "Go back to square one", but a test which said "Back a bit" if the boy failed.

The CHAIRMAN (Mr. A. W. Bell, B.Sc., Member) considered it a tragedy that it was difficult to persuade craft apprentices to attend classes. Whilst all were offered day release the number still interested in classes at the end of their apprenticeship was about 50 per cent or 60 per cent. He believed that 20 per cent or 30 per cent of those took the day classes because they found it easier to get up for a class at 9 o'clock in the morning, than for work at 7.30. There had been more enthusiasm by apprentices who worked 47 hours a week

and attended night classes than by many of the present day youths in industry.

The firm with which he was associated normally trained more apprentices of the fitting and turning category than could eventually be accommodated as, although there was an acute shortage of turners and they received practical training in both trades during their apprenticeship, the greater proportion preferred to become fitters, many of whom left to take up a sea career, which was both welcomed and encouraged.

MR. METCALFE commented that he spent some time in his last job measuring all he could about young people—how fast they could run, how high they could jump, how much they weighed, how much they ate, how many G.C.E. "A" levels they passed, how many got degrees, how many continued education after 16. He found that his generation were "not a patch" on the present. If any one tried to convince him that in those things that he could not measure—honesty, truthfulness, kindness, tolerance—they were worse, he reserved his opinion. He wished to believe that they were better than the past generation in those matters also.

He wondered if much of non-attendance for day release courses was due to a lack of a positive attitude by employers. Employers were acting unwisely if they did not take a quite positive line on this. They were talking about training young people who would have a working career in engineering of 40 years. They could remember what it was like technologically 40 years ago. Life was "impossibly" different. Radio had only just been invented; electronics was not even a word in their vocabulary. When talking about preparing young people for the next 40 years, employers should regard it as their duty to see that they had the technical education associated with their craft skills. If the employers did not do so, they would pay a very heavy price in future.

MR. G. F. GATWARD (Associate Member of Council) said that the success of the scheme would largely depend on the recruitment of the right people. How did Mr. Metcalfe, therefore, intend approaching the problem of selection?

MR. METCALFE thought this rather difficult to describe briefly and, in any case it was all laid out in detail in the first-year handbook, in the section on the first three-months period. Selection was a progressive activity and took account of all the scientific measures at their disposal, and a lot of common-sense measures also. He believed that hidden behind the question, and in much of the discussion, was the fact that we must continue to seek for the very able people to be craftsmen, but this was to fly in the face of facts. A friend of his had made a little graph with society on one side and people on the other. Up above were the judges and down below were the dustmen. As time progressed—we had seen it in our lifetime—there were more and more judges, teachers, doctors and social workers, all who were part of the new era, and less and less of those useful ones down below, but generally we had the same kind of people to fit those jobs. Thus people had to be lifted up to fit a new kind of activity.

If we thought that, as in the days of 25 or 30 years ago, boys with four "O" levels would come knocking at the door and saying, "Please may I be a craftsman?", we were asking for the moon. If we took a lower stratum of society, next year lower and the next lower still, we would have to so arrange training methods that they lifted them to the standards required.

MR. GATWARD contended that liberal studies would have to be introduced in order to educate people.

MR. METCALFE was sure that they were talking about the same thing. Liberal studies were part of the business of growing up and finding what life was all about. This was built into everything we did and the Board had the clearest possible statements to make. Liberal studies were part of education, and it was education that they wanted to see.

SUMMER MEETING IN GERMANY

12th—16th June 1966

The Schiffbautechnische Gesellschaft e.V.

The Institute of Marine Engineers

The Institution of Engineers and Shipbuilders in Scotland

The North East Coast Institution of Engineers and Shipbuilders

The Royal Institution of Naval Architects

The success last year of the Joint Meeting in Glasgow between the Institute of Marine Engineers, the Schiffbautechnische Gesellschaft e.V., and the Institution of Engineers and Shipbuilders in Scotland, was such that, at the invitation of the S.T.G., members of the above-mentioned Institutions, together with members of the North East Coast Institution of Engineers and Shipbuilders and of the Royal Institution of Naval Architects, attended the Summer Meeting held in Hamburg and Munich from 12th June to 16th June 1966.

On Sunday, 12th June, prior to the meeting proper, the British delegates, as the guests of A.E.G.-Schiffbau, were entertained to a dinner and dance held at the Atlantic Hotel, Holzdamm, Hamburg. During the dinner, speeches were given by Herr Semler, Senator Meister, Professor Dr.-Ing. H. W. Lerbs (President of the S.T.G.), Dr. F. Moldenhauer, and Mr.

At the invitation of Howaldtswerke A.G., on Monday, June 13th, a number of the delegates made a tour of the Port of Hamburg by launch. A visit to the shipyard of Howaldtswerke A.G., where members saw something of the company's ship-building activities, followed the tour of the port. The visitors were guests of the company at lunch, and were welcomed by Herr H. Röhrs.

Meanwhile, another group of delegates visited A.E.G.-Schiffbau, Schenefeld and Schulau, while the ladies were taken on a tour of Hamburg and of the Alster.

Later, all those who had visited Hamburg flew to Munich, where they joined other delegates at an informal opening reception at the Hotel Bayerischer Hof.

The Congress Hall of the Deutsches Museum, Munich, was the venue for the opening ceremony of the Summer Meeting

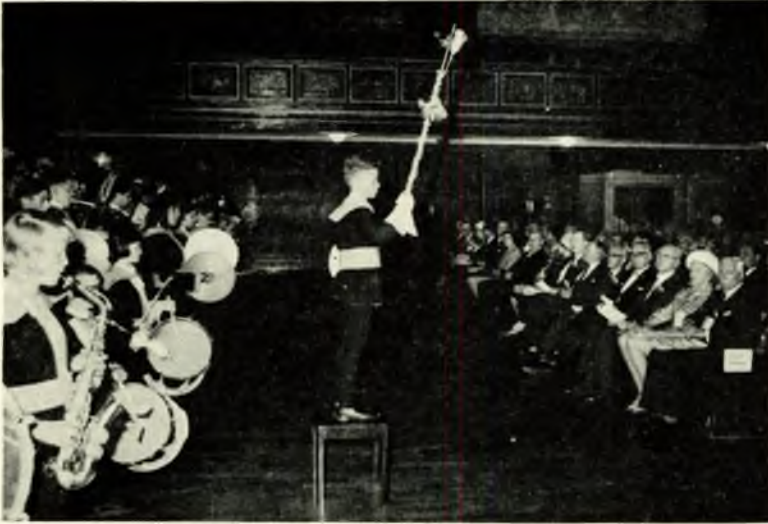


At the informal opening reception held at the Hotel Bayerischer Hof, Munich, on Monday, 13th June 1966. From left to right: Vice-Admiral Sir Frank Mason, K.C.B. (Vice-President, I.Mar.E.), Professor Dr.-Ing. H. W. Lerbs (President, S.T.G.), The Right Honourable the Viscount Simon, C.M.G. (President, R.I.N.A.), with Lady Mason

J. Lenaghan, C.B.E. (President, I.E.S.), all of whom emphasized the pressing need for co-operation between European shipbuilders and marine engineers and the value of an exchange of ideas in order to meet the competition from the East. Reference was also made to the Geddes Report.

which took place on the morning of Tuesday, 14th June. Attended by members of the four British technical institutions with their ladies in all about 200, and 500 members of the S.T.G., the meeting opened with the music of the Munich Bugle Boys.

Summer Meeting in Germany



At the opening ceremony of the Summer Meeting held in the Congress Hall of the Deutsches Museum, 1, Museumsinsel, Munich, on Tuesday, 14th June. The proceedings opened with a programme of music played by the Munich Bugle Boys

Vice-Admiral Sir Frank Mason, K.C.B. (Vice-President, I.Mar.E.) (left), congratulating Professor Dr.-Ing. E. Sørensen on presenting him with the Herbert Akroyd Stuart Award 1964-65. The award was made jointly to Professor Sørensen and Dr.-Ing. F. Schmidt for their paper "Recent Development of the M.A.N. Marine Diesel Engine" read before the Institute of Marine Engineers in London on 28th January, 1964



President of the Schiffbautechnische Gesellschaft e.V. Professor Dr.-Ing. H. W. Lerbs, and Frau Lerbs (seen on right), with some of their guests at the conference dinner and dance held on Thursday, 16th June, at the Regina-Palast-Hotel, Munich. From left to right: Mr. G. Yellowley (Member of Council, N.E.C.I.E.S.), Frau U. Neumann, Mr. J. Lenaghan, C.B.E. (President, I.E.S.), and Lady Mason

Summer Meeting in Germany

Professor Lerbs, supported by Staatsminister Dr. Otto Schedl, and the mayor of Munich, Herr Georg Brauchle, welcomed the visitors and expressed his appreciation of the hospitality offered by the firms concerned with the various events.

Speaking on behalf of the visitors, Vice-Admiral Sir Frank Mason, K.C.B. (Vice-President, I.Mar.E.) said that the countries of Europe should get together and that Great Britain was an integral part of Europe. Co-operation, he said, was essential to meet the formidable forces represented by foreign competition.

Then followed the presentation by Admiral Mason of the Herbert Akroyd Stuart Award for 1964-65 to Professor Dr.-Ing. E. Sörensen and Dr.-Ing. F. Schmidt. At the conclusion of

were arranged for the members of the technical institutions: one group went to the Zahnradfabrik Renk A.G., where members saw gear cutting and assembly.

Another group, meanwhile, went on a tour of the M.A.N. works, beginning with a lecture by Dr.-Ing. J. S. Meurer. Prior to the start of the works tour, the party was shown the museum, in which the exhibits were proof of the contribution of this company to the building of prime movers during the past century. In various shops members saw engine parts in the course of manufacture, and vast assembly lines for the whole range of Diesel engines, as well as many machines under test. As the works began in 1845, with building printing presses, it was fitting that several shops should have been devoted to the construction of rotary and other types of printing press.



Vice-Admiral Sir Frank Mason, K.C.B., with Frau Dipl.-Ing. Moldenhauer (left), and Mrs. J. Lenaghan at the conference dinner and dance

the ceremony, the ladies left for a coach tour of the city and a visit to Schloss Nymphenburg, arranged by courtesy of the City of Munich. By invitation of Siemens-Schuckertwerke A.G., Erlangen, everyone present at the meeting was entertained to lunch at the Bürgerbräukeller.

During the day, the following five technical papers were presented by the authors and discussed: "Some Aspects in the Design of Propellers for High-powered Ships" by Professor Dr.-Ing. H. W. Lerbs (Schiffbautechnische Gesellschaft e.V.); "Hydrodynamic Design of Merchant Ships for High Speed Operation" by A. Silverleaf, B.Sc., and J. Dawson, B.Sc. (Royal Institution of Naval Architects); "Turbine Propelling Machinery" by Sir Eric Yarrow, Bt., M.B.E., B.Sc., and E. Norton, C.B.E. (Institution of Engineers and Shipbuilders in Scotland); "The British High-powered Marine Diesel Engine" by P. Jackson, M.Sc. (North East Coast Institution of Engineers and Shipbuilders); and "Automation of High-powered Diesel Machinery" by R. Munton, B.Sc., and J. McNaught (Institute of Marine Engineers).

On Wednesday, 15th June, the ladies were taken on a sight-seeing tour of Augsburg as guests of Maschinenfabrik-Augsburg-Nürnberg A.G., and also paid a visit to the Riedinger Textil-A.G., which included a fashion show. Two works visits

The highlight of the social programme was in the evening of the Wednesday, when, as the guests of M.A.N., all the delegates went to the opera at the Nationaltheater, Munich, where they saw a performance of Verdi's "La Traviata". Later there was a civic reception at the invitation of the Bavarian Ministerpräsident, Dr. H. C. Goppel, at the Residenz (Antiquarium).

The events arranged for Thursday, 16th June, were full of interest and variety; they included a visit to the Deutsches Museum; a tour of Munich; and a day tour to the Bodensee as the guests of J. M. Voith G.m.b.H., with a trip on the lake; a tour round the Tegernsee and a visit to Siemens and Halske A.G. Wernerwerk (Computer Department) by invitation of the company, followed by a visit to the Ground Radio Station at Raisting, Bavaria, where the party saw the communication satellite antenna.

A conference Dinner and Dance at the Regina-Palast-Hotel, Munich, concluded the proceedings of the Summer Meeting. Replying to Professor Lerbs, The Right Honourable the Viscount Simon, C.M.G., on behalf of the visitors, thanked the German hosts for their generous hospitality and expressed appreciation of the excellent programme, which had been full of variety.

INSTITUTE ACTIVITIES

Minutes of Proceedings of the Ordinary Meeting Held at the Memorial Building on Tuesday, 25th January 1966

An Ordinary Meeting was held by the Institute on Tuesday, 25th January 1966, at 5.30 p.m., when a paper entitled "The Development of a Highly-rated Medium-speed Diesel Engine of 7,000-9,000 Horsepower for Marine Propulsion" by J. A. Pope, D.Sc., Ph.D., Wh.Sc., M.I.Mech.E., and W. Lowe, B.Sc., M.I.Mech.E., was presented by the authors and discussed.

The Honorary Treasurer, Mr. J. Calderwood, M.Sc. (Honorary Vice-President) was in the Chair and one hundred and forty-six members and guests were present.

Nine speakers took part in the discussion which followed.

A vote of thanks to the authors was proposed by the Chairman and received prolonged and enthusiastic acclaim.

The meeting ended at 7.40 p.m.

Branch Meeting

South Wales

The Annual Golf Meeting of the South Wales Branch was held on Friday, 10th June 1966, at the Glamorganshire Golf Club, Penarth.

Despite torrential rain the night before, conditions on the day of the meeting were near perfect.

Forty-one members and guests took part in the tournament, while sixty-one attended the supper which followed.

After supper, the Chairman of the Branch, Mr. T. W. Major, cordially welcomed those present and expressed his appreciation to the organizers, for what he understood was a record meeting. The Chairman then called upon Mr. David Skae (Vice-President), to present the prizes.

The David Skae Cup and replica were presented to Mr. N. J. Morgan (Member of Committee), and the Visitors' Tankard to Mr. G. Palmer. Golf balls were presented to Messrs A. E. Savage and A. N. Ianson for the best net score for members and visitors respectively, and the prize of golf balls for the best net middle six holes was presented to Mr. J. Wootten.

A vote of thanks to the Club for the use of its facilities was proposed by Mr. R. S. Andrews (Member of Committee). In reply Mr. S. W. Harrison, Past Captain of the Club, expressed the pleasure of the Club at the visit of the Branch and hoped that the Branch would continue to hold its meetings at the Glamorganshire Golf Club.

A vote of thanks to Mr. Major for presiding at the meeting was proposed by Mr. F. R. Hartley (Member of Committee).

Election of Members

Elected on 19th July 1966

MEMBERS

Jehangir Jamshedji Dastur
Edward Victor Dear, Lt.Cdr., C.D., R.C.N.
Eric Evans
Edwin Albert Howey
Reginald John Jukes
Christiaan Robert Kirschbaum
Michael Langballe
William Andrew Lindsay
Harpal Singh Madan
Antoine Abdallah Neemeh, Cdr. (E.), U.A.R.N.
Thomas Pritchard
Achanta Rama Rao
Albert Dale Redford
Jacobus Gerardus Franciscus Warris

ASSOCIATE MEMBERS

Ivor Wilbert Amesbury, Eng.Lieut., R.N.
Mitchell Andrew Anderson
David Andrews
George William Armstrong
William Thomas Osborne Ballantine
Mirza Khaliq Beg
Henry John Burrows
John George Green
Stefan Karnowski
John Laird
Peter Lister
William Lomas
Ronald Selwyn Francis Lovett
Maung Kyaw Maung
Alan Harward McConkey
Campbell Monteath
Isaac Noel Moody
Provat Kumar Mukherjee
Andrew Robertson Nichol
Thomas Keith Norledge
Edward William Pashley
Roland Cameron Sandalls, Eng.Lieut., R.N.
George Simpson
Brian John Stack
Kenneth John Stanton
Donald Ian Stuart, Lt.Cdr., R.N.
William Richard Taylor, Eng.Lieut., R.N.
Malcolm Charles Timberlake, Lt.Cdr., R.N.
Brian William Turner
William Derrick Vyse
Anil Gajanan Walavalkar, Lieut., I.N.
John McNair Wilson

ASSOCIATES

Leslie Percy Barber
Hugh Crawford Ferguson

Institute Activities

Albert James Hector
Frank Edward John Jeffrey
Anthony Waters Joyce, Lieut. (S.C.C.), R.N.R.
Zafar Wahid Khan
Bernard Philip Lisgarten
Harold Brook McDonald

GRADUATES

Stanley Roy Foster
Campbell Hemsworth Gardner
James Geoffrey Heaney
Ronald Hooper
William Leggat Johnston
Badar Munir
Gustav Piene
Thomas Alwyn Rees
George Stephenson
King Hui Tham

STUDENTS

Robert Edwards Arnott
Kevin Leslie Bartimote
Philip George Easton
Richard Cyril Egere
Peter Raymond Gough
Ong Ah Heng
John Campbell McDougall
Alan Edward Mather
Iain Thomas Arnot Niblock
Peter John Ratcliffe

PROBATIONER STUDENTS

Graham Arthur Birch
Philip Brabazon-Drenning
David Arthur Stevenson
John Henry Thomlinson

TRANSFERRED FROM ASSOCIATE MEMBER TO MEMBER

Richard Henry Butt
John Dent
Eric Lindsay Edens
Derrick Simpson Elliott
James Alfred Greenwood
Ernst Hansen
William Keith Highfield
Edward James McCord
Peter Stuart Mann
Constantine Philippou, B.Sc.

Ivor Lee Polden
John Robertson
Anthony Bennett Smith
Andrew Peter Cairns Thomson
Desmond Thomas George Woon

TRANSFERRED FROM ASSOCIATE TO MEMBER

John Marcus Ord Forbes
John George Heads

TRANSFERRED FROM ASSOCIATE TO ASSOCIATE MEMBER

James Evan Lees

TRANSFERRED FROM GRADUATE TO ASSOCIATE MEMBER

James Rutherford Anderson
David Roy Austin
James Langlands Balmer, B.Sc.
Victor Buchanan
John Anthony Carter
Geoffrey Francis Dart
Ronald Paul Holbrook
Christopher Jebaratnam Lawton, Lieut. (E), R.Cy.N.
John Frank Shaw
William Wilson

TRANSFERRED FROM STUDENT TO ASSOCIATE MEMBER

Joseph Barry Cull
James Stanley Foxcroft
Kenneth Lowe

TRANSFERRED FROM PROBATIONER STUDENT TO ASSOCIATE MEMBER

David Robert Mullin

TRANSFERRED FROM STUDENT TO GRADUATE

Edward Green
James Adams Keltie
Walter John Lightfoot

TRANSFERRED FROM PROBATIONER STUDENT TO GRADUATE

John Heron Lightfoot
Malcolm Robert Charles Robertson
Robert Waters
William Edward John Wood

TRANSFERRED FROM PROBATIONER STUDENT TO STUDENT

Kenneth Charnock
John Kenneth Tomlins

OBITUARY

HENRY JOHN WHEADON (Honorary Treasurer, Vice-President and Member)

An appreciation by G. M. Kennedy (Member)

The many friends at home and abroad of Mr. H. J. Wheadon, will have learned with sorrow of the death of this fine man who died on 16th July 1966, after a short illness.

Henry John Wheadon was born at Southampton on 8th October 1903. He served his apprenticeship with Messrs. Day and Somers, of Northam, before commencing a career of outstanding merit with Royal Mail Lines Ltd. After serving at sea in various engineering capacities, he obtained his First Class Board of Trade Certificate, was appointed assistant superintendent engineer, Royal Mail Lines, and shortly afterwards obtained his Extra First Class Certificate.

In 1945 he became deputy superintendent engineer for his company and in 1958 was appointed chief superintendent engineer in charge of the technical departments of both Royal Mail Lines and its sister company the Pacific Steam Navigation Company. In 1962/63 he became a director of both companies and also a director of Air Conditioning and Refrigeration Ltd., and H. A. Harben and Co. Ltd. He relinquished his appointments as chief superintendent engineer and naval architect, on his retirement on 31st December 1965.

Mr. Wheadon was elected a member of the Institute of Marine Engineers on 6th July 1931 and, despite the many calls made upon him professionally, always found time actively to support and advance its aims. He was also a

Member of the Institution of Mechanical Engineers and a Member of the Royal Institution of Naval Architects.

John Wheadon was elected a Member of Council in 1940—serving as Chairman in 1942—and a Vice-President in 1951, in which capacity he remained on the Council until his death.

He served continuously on numerous committees, the Joint Committee, R.I.N.A. and I.Mar.E., the National War Memorial Appeal, Finance, Papers and Transactions Committees, and the Building Committee of which he was Vice-Chairman. At the last Annual General Meeting he was elected Honorary Treasurer.

There were in fact, few of the Institute activities that were carried out without benefit of his mature counsel and most of its functions were graced by his presence and

that of his lady wife.

It is with deep regret that we record the passing of this always cheerful and respected friend.

