

## CORRESPONDENCE

SIR,

### The Use of 'O'-rings in Hydraulics

Commander (E) L. D. Dymoke's article on 'O'-ring joints and seals was one of the most comprehensive articles I have seen on this subject. There is, however, one point which he did not mention, which I feel is important ; that is, in any static joint, the two functions of sealing and joining should be separated.

Examination of the joints in Commander Dymoke's article will reveal that in each application the 'O'-ring is under a pre-selected load ; the value of this load is dependent upon the amount by which the ring is compressed when the mating parts are brought together.

Examination of, say, a joint employing copper diamond rings will indicate that the ring is expected to withstand the full (and generally unprescribed) joining load, together with all effects of vibration and shock. Clearly a copper joint ring could be employed under preselected load conditions, but it would not lend itself readily to this method, since it is not self-sealing, and would require frequent replacement due to hardening.

It is not possible to employ synthetic rubber 'O'-rings in copper diamond joint designs, since they extrude ; in this instance, the synthetic rubber application would have to be of the very successful A.E.L. constrained disc type.

It would appear, therefore, that to prevent extrusion, designers of 'O'-ring joints have been compelled to separate sealing and joining, and the realization of this fundamental principle in practice explains a large part of the success achieved.

(Sgd.) W. J. ALCOCK,  
*Lieutenant (E), R.N.*

SIR,

I entirely agree with Lieutenant (E) Alcock's remarks, and I am grateful to him for stressing a point on which I did not lay adequate emphasis in the article. It is indeed fundamental in joints of this nature that the 'joining load' should not be transmitted through the seal. A great advantage of this, as in all self-sealing joints, is that the joining arrangements need only withstand the fluid pressure and external loads. With seals like copper diamond rings, where mating on the sealing surfaces is first achieved by plastic deformation and thereafter maintained only by residual elasticity, the joining load must be considerably greater than that applied later by the fluid pressure and external forces, in order to maintain adequate sealing contact.

I think it is a little unfair to the early protagonists of 'O'-rings to say that the necessity to prevent extrusion compelled the separation of the sealing and joining functions, since this implies that they were unaware of the intrinsic virtues of self-sealing seals. Doubtless some designers were persuaded by bitter experience, presumably because there always seem to be people who can only learn the hard way.

(Sgd.) L. D. DYMOKE,  
*Commander (E), R.N.*

SIR,

**Water Washing of Boilers at Sea**

In 'Notes from Sea', Vol. 7, No. 2, in the paragraph headed 'Boilers, H.M.S. *Swiftsure*', it was stated that water washing of boilers must be done in harbour, otherwise the water was too cold.

While serving in H.M.S. *Superb* during the last two years, boilers were successfully water washed at sea, using the harbour service de-aerator with the feed transfer pump and de-aerator extraction pump. The temperature of the water used was regulated by the amount of exhaust steam admitted to the de-aerator. No trouble was experienced in transferring the water required for steaming in the steaming unit, a careful watch being kept on the main feed tank level in the controlling engine room.

(Sgd.) W. TOWLER,  
*Chief Engine Room Artificer.*

SIR,

**Notes from Sea—Feed Regulators—H.M.S. 'Newcastle'**

Commander (E) Sutton, in his letter in Vol. 7, No. 3, implies that a level-controlled feed regulator cannot adequately meet the requirements of a boiler when its output is changed suddenly, because it will not 'dwell a pause' before responding to a change in level, and therefore advocates a dual control on level and steam flow.

While this is perhaps in accord with the theory of servo-motors, which a feed regulator essentially is, it occurs to me that a simple level-controlled regulator could be made to fulfil this function if a restriction were placed in the water connection to the float box, thus causing the level therein to lag behind that in the boiler.

The action on a sudden increase in output would be that the level in the float box would not rise almost instantaneously, as will the level in the drum, but would rise only very slightly, reducing the feed a little while the surplus water boiled off, and would then drop in response to the subsequent drop in the boiler drum and pick up the new rate of feed.

The converse would occur on a sudden reduction of output, and in both cases the violent changes in rate of feeding, with their reactions on the closed exhaust system, would be avoided.

A very simple trial, by a brave engineer officer, screwing down on the water valve to the float box, would confirm or refute this theory.

(Sgd.) J. SIDGWICK,  
*Commander (E), R.N.*

SIR,

Commander (E) Sidgwick's suggestion is very interesting but I regret that I cannot support it.

Assume that a 'Daring' boiler is steaming at about half power. An increase in output is demanded, which causes a rise in level of four inches. If feed is cut off by this action, it will take rather over one minute, by my rough calculation, assuming dimensions, for the level to return to its starting place. If the feed is

not to be cut off, but is to be maintained roughly at the same rate until the new increased rate is required, the delay will be considerably longer, possibly five minutes.

Thus, to obtain the lag required, the restriction would need to be so great that the controller would be unsafe, particularly with a valve which at such an opening can act in a non-return capacity.

It might be argued that the suggestion has merit as a means of stopping hunting during steady steaming. In this case, however, the period of oscillation, as measured in 'Battle' Class, is of the order of one minute, and the objections are still great. In my opinion, damping at a higher power level, for example, by restriction of the main feed flow for a period by operating the check valve, is preferable. Obviously, there are other ways, unknown to me, since not all ships experience hunting. Others, for instance, *Newcastle*, apparently do not experience hunting so long as there is no aggravating circumstance, such as a sticky feed pump governor.

Commander Sidgwick suggests that I have advocated a two-term control as a result of a theoretical analysis. This is not strictly so. The two-term controller is standard equipment in new ships and, I believe, in some 'Battle' Class destroyers. I have merely attempted to explain its advantage in steadiness of system operation. A strict theoretical analysis would suggest that two distinct controls are required, one to control the feed rate *pro rata* steam flow, the other to maintain a satisfactory water level by adjustment to the water content of the boiler by addition or subtraction, as required. Evidently the two-term controller is a compromise between the old simple standard and the theoretical ideal, the engineering of which does not appear attractive.

(Sgd.) E. G. SUTTON,  
Commander (E), R.N.

SIR,

### The Regulation of Auto Pumps

Mr. Clausen's article on 'The Regulation of Auto Pumps' in Volume 7, No. 2, calls for some comment.

It is legitimate and wise to specify a long 'time constant' by means of adequate accumulator effect. This can be provided, of course, by a separate accumulator. It is not legitimate to allow the control gear to be sluggish on any other account. Such sluggishness will cause very bad regulation.

The large auto pumps to which Mr. Clausen evidently refers were fitted in *King George V* Class for supplying the 14-in gun mountings. The pressure regulation of the pumps as fitted was hopelessly bad, the pressure varying from 300 to 1,750 lb/sq in as compared to the designed pressure of about 1,050 to 1,150 lb/sq in.

In my opinion, line accumulators should have been incorporated in the design, since it was judged to be impracticable to fit larger control cylinders. That was not done, and none were readily available.

It was realized, however, that if the actual response time of the regulator could be reduced, improved regulation would result. It will be appreciated that in this type of pump the valve gear blanks off the valve ports of the top and bottom dead centre cylinders, while the act of regulation alters the position of the piston in these very cylinders. As designed, the valve had an overlap of

·005 in, thus causing a definite check to regulating movement every time each cylinder came on top or bottom dead centre. The valves of all pumps were removed and given a negative lap of ·003 in. This simple change so greatly improved the regulation that no further modification on this account was required.

What this boils down to, I think, is that the value of the 'time constant' must be substantially greater than the value of the 'response time.'

(Sgd.) F. E. LEFROY,  
*Captain (E), R.N.*

SIR,

### **The Purpose in Training**

The article by Captain (E) C. W. Jones on 'The Purpose in Training' is very close to the truth of an important subject. Indeed I feel he might well have gone further by adding to the title 'for a career at sea.'

In my experience of training apprentices the greatest need is for training in the use of leisure in a manner appropriate to a sea career : this is particularly important for ratings in view of the greater proportion of time spent in the ships. The emphasis commonly put on team games, athletics, etc., is misplaced, for at sea the opportunities for such activities are few.

The youth of to-day differs from the youth of 1920–1930s by virtue of the greater influence of the cinema, and now of television. The family evening round a piano is extinct and there is already a significant decrease in the number of books borrowed from libraries, so that it now seems possible that reading will gradually cease to be a pastime. It is perhaps significant that the T.V. programme appealing to most ages is the Newsreel!

I agree whole-heartedly with his views on the need to place authority where it belongs—viz., on the individual. Every opportunity should be taken of doing this, not merely by the artificial method of duty days, cadet captains, etc., but by the more positive method of requiring the activities to be run by the trainees with the absolute minimum of supervision.

The complaint regarding excessive leisure is general and widespread, and there is a parallel complaint that insufficient time exists for covering the training programme adequately : one might think that action and reaction were equal and opposite, but for a suspicion that the real reason why inroads into the leisure time are not made is that it would mean longer hours of duty for the training officers (or the school master and university professors ashore !).

In the case of this company's engineer cadets, they are made to understand clearly that the responsibility for their careers rests with themselves, and it is perhaps a measure of the success of the policy that about 1 in 10 wins a scholarship to the University of Liverpool and only 1 in 50 fails to achieve a sufficient standard to complete the course.

(Sgd.) L. BAKER,  
*Commander (E), R.N. (Retd.),*  
*Marine Superintendent,*  
*Blue Funnel Line.*

SIR,

Captain (E) C. W. Jones, in his interesting appreciation on 'The Purpose in Training,' in Volume 7, No. 3, suggested that writers on the subject should disclose their background of experience. As a novice with less than four years in the training service, I might have been too overwhelmed by Captain Jones' imposing qualifications to make any comment had I not noted a curious deficiency in his otherwise comprehensive list. He has not stated what he has read and so learnt from others in the present and the past. A bibliography usually accompanies a statement of personal qualifications in the other fields he has referred to.

In attempting the most difficult of all tasks for a man, the training of another man, personal experience of training is most necessary, but fortunately this is something which no naval officer who has done his job properly in H.M. ships and establishments is likely to be without. What is just as important as personal experience but regrettably is often absent even in 'experienced trainers' in the Navy, is the desire and ability to harvest the 3,000-odd years' experience of bringing up young men outside the Navy which is recorded for our benefit and use as changing circumstances demand. There is much difference between the experienced trainer who has studied other experience and selected his method, and the experienced trainer who sticks to the training lines he was brought up on because he knows no other and is suspicious or fearful of the unfamiliar.

For many of us the information provided by Captain Jones on the shifting sources of recruitment of artificer apprentices is of great interest since the earlier history is not widely known. All details of methods by which the apprentice was trained in the past are also of interest and value since it is wise to build on the experience of others. But in the latter part of his article Captain Jones seems to infer that, whereas past methods of training have validity, new methods have not. This seems to me to be in the nature of myopic conservatism and I think Captain Jones is a little unfair to the training world when he states that it is 'one that almost believes in change for change's sake.' Perhaps, contrary to his belief, the changes originated in recent years are aimed at meeting changed needs rather than suiting the idiosyncrasies of the originators.

The apprentice himself, as he is at birth, does not change much from decade to decade. Here Captain Jones is on the solid ground of the now widely accepted theory of evolution. Many of the factors determining his development up to, and his state of mind at, entry to the Service are, however, changing fast as also are the duties for which he is to be trained. These matters should surely influence the nature of training? For example, the post-war educational system gives far more help to the child than was the case pre-war. He is cosseted almost, and the Welfare State influences his development and influences the influence of his parents. Self-reliance is sapped, but the Navy still needs self-reliance and must therefore increase the effort to get it. Naval training cannot give initially less attention to the individual than was provided in his pre-Service environment or it will fail in any of several ways. To reduce the number of Divisional Officers as Captain Jones has suggested, would not serve the end he purports to serve. Their task is greater, not less, than that of the Training Officers of earlier days. The post-war Engine Room apprentices are destined in much larger proportion for charge of the machinery of small ships and they must be enabled to develop their latent talents for getting the best out of their subordinates to a correspondingly greater degree. Changes in the nature of our machinery require a shift of emphasis from craftsmanship to diagnosis, and knowledge to-day must be spread over a far wider field. The

strength of economic and other compulsions to make an apprentice work have declined and change in training method is needed to meet this too.

Captain Jones has also perhaps been a little unfair over the matter of parade ground training in that he quotes an outmoded statement from an outmoded book and then tears it to ribbons. I think it is worthwhile including in this letter the following quotation from B.R. 1834, the handbook of parade training as it is to-day, since it is to-day that we are concerned with :—

‘ Discipline may be defined as that high sense of duty, mental alertness and self control which alone enables men to work or fight together in cheerful comradeship, confident in their leaders, self-reliant, and obeying orders instantly and accurately, and unquestioningly. The attainment of good discipline calls for a high development of personal qualities, particularly of self-control and co-operation. Basic training and the day to day routine of service life are designed to develop these qualities so that their practice becomes habitual and will persist under the strain of war routine, in the excitement of battle, and in the boredom of periods of inaction.

Good discipline, however, must on no account be rigid to the exclusion of initiative or common sense ; it should rather be the flexible but certain means by which the products of these essential qualities are directed into channels where they are most required.

Parade drills have been found by experience to form a sound basis for development of those characteristics required in a well disciplined man. Insistence on immediate obedience, and on smart personal appearance, physical fitness, and mental alertness, develops self-confidence, and serves to instil a sense of pride in man and unit. No substitute has been found by any service in any country that will swiftly instil discipline in large numbers of men as parade drills do, though many have been thought out and tried.’

Parade training provides essentially a conditioned discipline. Conditioned discipline has its limitations, but so long as instant obedience to orders is necessary to compete with an emergency, whether in a boiler-room or a boat, we cannot, as a fighting service, dispense with it. There are other and higher forms of discipline to be learnt in training, and their acquisition is in general helped by a habit of obedience. Captain Jones suggests that there is but one discipline—the triumph over self—but I would refer anyone interested in this much more complex subject to the training given at H.M.S. *Royal Arthur*, which was itself derived in part from papers written by Lord Montgomery.

The middle aged, to which category, although a novice in training, I also belong, will sympathize with Captain Jones’ nostalgic hankering after the past, but if the young listen to the over-simplifications of those brought up when life was more simple and who do not wish now to adjust themselves, they will fail to bring up adequately those who in the present must face more difficult circumstances. Officers recently engaged in training will note that most of the solutions offered by Captain Jones in his last six paragraphs add or alter little to what is already being done in *Fisgard*, *Caledonia* and *Condor*. Of his other recommendations, causing the apprentice to pay more for his sport is a worthy target, but one already closely engaged, while to reduce games inside the establishment and send the apprentice outside to local clubs as he has suggested, would be to discard the advantages of having a boarding establishment for training. Considering this proposal, even if it were desirable, from the practical point of view, the impact of 850 apprentices on the Boys’ Club in Torpoint would be interesting to watch, similarly at Rosyth, and in the case of *Condor* and the local town of Arbroath, it would be necessary to set up suitable facilities.

I would agree with Captain Jones that stable traditions in training are highly desirable and that change for change's sake would be evil, but I feel also that stagnation or going back to the 1910's or 1930's would be no solution to current problems. The defect, if there is a defect, in what has been going on in training over the last few years, is perhaps that the Admiralty has failed to give the necessary leadership and so effect change to meet change in an orderly manner. Others will always seize the reins if they seem to be lying inert in the hands of one who should properly be taking charge, and if too many seize them, confusion ensues. This danger however now looks like being averted.

(Sgd.) D. J. HOARE,  
*Captain (E), R.N.*

SIR,

I was delighted with Captain Hoare's letter to you. It was a new and exciting experience to read that I am somewhat tinged with conservatism, and I would like to reject, although perhaps I cannot, the suggestion that I am a fellow-traveller in middle age with Captain Hoare.

It is always difficult to assess what one has learnt from the past by experience or reading. I am still uncertain how I reach conclusions, but it is probably by a mixture of experience, learning, logic, and intuition, seasoned by environment and inborn influences. I have not been a methodical reader nor have I kept records or a scrap book.

My youth was spent in the shade of Calvinism with its emphasis on repressions and penalties. That might explain how I later took an interest in the methods of upbringing employed by the Society of Jesus and also, I think, by the Later Carmelites. The methods of Montessori, Froebel and the P.N.E.U. were introduced to me by my wife, as well as the methods at St. Christopher's, Letchworth, and at a Catholic Girls' Boarding School in the same area. I have read various bits and pieces on the youth movements in the U.S.S.R., Hitler's Germany and Mussolini's Italy, and on the trade training system in pre-1939 Czechoslovakia. I know a little about the Scottish Education System, and I have it from no less an authority than the Secretary of State for Scotland himself that I was responsible for at least four words in the Scottish version of the 1944 Education Act ! I have also read 'Tom Brown's Schooldays,' 'The Loom of Youth,' 'Cheaper by the Dozen,' and am a keen follower of St. Trinian's.

On the technical side I have attended and very occasionally dared to speak at symposia and lectures held by the learned and professional bodies in London. I have had the fortune to make an extensive tour of apprentice training establishments since the war, embracing both sides of the aviation industry as well as the Royal Dockyards, Naval Aircraft Yards and the R.N. Aircraft Training Establishment for aircraft artificer apprentices. In higher education, in accordance with my functional responsibilities, I have paid visits to the College of Aeronautical Engineering and to the Royal Naval Engineering College. I may even have had just the slightest effect on some of the things they do. For four and a half years, I was directly responsible for the early stages of the training of civilian aircraft apprentices—a period I am rather proud of—and have now some influence in the Admiralty on the policy governing their present training.

This is all a rather vainglorious addition to my previous immodest puff, but I would add that I run, or rather mismanage, a Boys' Club in what is erroneously known as the lower income group. But there I am a most unhappy novice, and not at all confident that I am achieving anything at all.

What reading I have done and what external experiences I have had, have not indicated to me that the apprentice training was so far off the proper road. I hope I am still receptive, but it may well be that I am not as receptive as I should be. On the whole, I think both industry and schools could learn more from us than we from them. As in the field of industrial management, with which I also have some concern, quite a lot of the writing seems to be done by people who have little or no direct experience. This may of course be a very great advantage.

A comparative analysis of the methods of training for normal youths in the U.S.S.R., the United States, the United Kingdom, Hitler's Germany and the French Republic would be of inestimable value. It is beyond my capacity, but I wish that you, Sir, could persuade Captain Hoare to undertake this task, for which, I venture to suggest, he is eminently well suited.

I agree with Captain Hoare that bringing up the young is no easy task, but it has been done more or less successfully for ages, and we should not be borne down by the awful complexities that the psychologists and professional trainers have brought into it. It is also well to remember that those under training are not inanimate plasticene or empty hulls but have powers of discernment and rejection. It has been said that one can only modify but not fundamentally change the character developed before puberty and that intellectual ability at fifteen is a measure for life.

I am not sure that I agree with Captain Hoare on the alleged evils of the so-called Welfare State. It is only in its infancy and I am sure there will be adjustments. I do not believe that the modern youth is as bad as he is painted, nor should he suffer odious comparison with the youth of yesterday.

Although many of the apprentices in the past joined for economic reasons—as no doubt many do to-day—I do not believe that economics had any effect on their work after they were in. Their incentive was mainly pride in their direct responsibility. If, however, there are evils in the Welfare State, I simply cannot understand how they will be cured by more intensive welfare. The ability to take responsibility can only be developed by having responsibility, with the sanctions invoked by failure.

One of the difficult problems in training apprentices is to inculcate responsibility. This was at least partly achieved in the 'old nostalgic days' by seeing that the apprentice had a considerable proportion of real work in his training. I understand that the complexity of modern machinery and possibly the remoteness of the training establishments from real work has made the provision of real jobs more difficult. Any internal or external artificialities intended to fill the gap will be detected as such by the young man, who will treat them accordingly. Perhaps we teach the right things at the wrong time. We could leave the acceptance of real responsibility to follow when contact with the real thing is made. That might be too late, but it would be useful to read younger officers' remarks on this question and on possible solutions.

I am surprised that Captain Hoare in his very clear paragraph on changing needs did not include the care of aircraft, especially as I hear that our old-established old-fashioned cousins in marine engineering are considering applying aircraft methods of servicing, maintenance, and inspection to their material, and also the examination methods to the end product of training.

I wish to reiterate my belief that if the purpose of training is to produce a sound naval craftsman rating, we should concentrate on the craftsman part as the main purpose openly and undisguisedly. Good craftsmen are seldom bad



characters, the very learning of a trade imposes discipline and forms character. I do not suggest that the other things—moral and physical training, academic and parade training, etc.—are unnecessary. On the contrary, but they are ancillaries to the main object and should be kept in their proper place. It is not insignificant that in your last issue Captain Sandars' excellent article was preceded by the Guard and Band !

The proportion of craftsmen to watchkeeper maintainers, or even whether we need craftsmen at all, is another problem now being examined, but whatever we do train for, there should be no doubt in the boy's mind what his most useful future function is to be.

I had not seen the present handbook of parade training but it seems to say, perhaps in more words, what I recollect of the old one which I saw some 25 years ago. Let us look at one of the important sentences.

'Insistence on immediate obedience and on smart personal appearance, physical fitness, and mental alertness, develops self confidence and serves to instil a sense of pride in man and unit.'

In my opinion, of the six qualities mentioned, at least four do not necessarily require a parade ground, and in one case I doubt if the parade ground is of much help.

The key to the use of the parade ground lies in the words 'swiftly instil' and I agree with their use, especially when dealing with war time recruiting for the fighting man. We have five and a half years with the apprentice and we can take more time. It is essential that the apprentice should do parade ground work but it should be kept, and perhaps it is, in its relative importance. I think that it is of little help in those remarkable drills used in submarines or by the manoeuvring team in an engine room. Their efficiency comes from reasoned discipline—they know what they do—rather than from conditioned discipline. If I might digress—although I think it is relevant—the drills I like best of all are the docking down of a big ship by the Royal Dockyard workmen, parade ground flag drill by naval signalmen, and stokers under a Chief Stoker in an eight-boiler boiler room while manoeuvring.

As regards boarding house versus local integration, I may be on a shaky wicket. Boarding schools spend about a third of the year shut, so the boys do get some outside life, whereas the training establishments close for a little more than a seventh. The proposal is not new. When naval facilities were not so adequate as they are now, many boys belonged to local clubs both in active sports and cultural pursuits, although they did not have a great deal of free time. I would not expect them all to join the same club and the thought of apprentices joining a Boys' Club never entered my head. Local integration would be a good thing, but there are practical difficulties, although I suspect that apprentices do join local dance clubs. Gordonstoun has a method of local integration.

Changes are essential in the training world, and in my experience the trainers have never been stagnant, but I prefer the process of gradual change based on demonstration of the bad and the good, and in the full knowledge that it takes so long really to see the results of a change.

Captain Hoare mentions 'stable traditions.' I expect it is a misprint for 'conditions' and I do hope he is referring to the principles and not the accommodation.

(Sgd.) C. W. JONES,  
Captain (E), R.N.

SIR,

There will be few ex-apprentices still serving who remember Captain Jones' halcyon days of 'tuff cakes, saffron cakes, Cornish cream and jam,' but I can recall one glorious year as a brass-bound apprentice—a glory brought to an abrupt end in 1925 when we were 'reduced in status and put in what was thought to be our proper place.' And so, coming betwixt the old and the new, and having been one of Captain Jones' former apprentices, I read with interest his provocative article. Equally interesting was Captain Sandars' article on *Fisgard* training.

Even if we allow for the fact—well known among older generations—that the sea is not as rough as it used to be, the probability is that the Boy Artificer was a better type than the Artificer Apprentice of to-day. But we are told by Captain Sandars that even to-day half the boys are Grammar School boys, so perhaps there is not much difference after all.

Captain Sandars suggests that serving officers and men might discuss the advantages of apprentice entry with suitable boys and their parents. Since discussion of this kind might have a profound effect on a boy's future it is only right that the disadvantages should also be discussed. Anyone who has read the several training articles which have appeared in the *Journal*, or has visited training establishments, can have no doubt about the attention paid to the boys' welfare. Much sincere thought is devoted to the development of character and the strengthening of moral fibre, and in these days of comic strips and potted pleasure responsible parents will find the service training of their boys most refreshing. It is not the purpose of my letter to extol the advantages, but to draw attention to some of the disadvantages.

It is reasonable to suggest that up to a tenth of the boys might become officers ; what of the remainder ? Should they serve so long, they will leave the service at the age of forty with no recognized qualifications other than that of a trade, and this after some 25 years service involving considerable sacrifice, domestic disturbance and separation. Parents will do well, therefore, to consider whether a half-life career of this kind is suitable for boys of Grammar School calibre. It is not surprising to learn from Captain Jones and Captain Sandars that the brighter boys at the Grammar Schools seek other careers, sometimes going on to the Universities with State Scholarships.

Another feature which might exercise the minds of responsible parents is that service training does not link up with civil standards, and that *vis-à-vis* his contemporary in civil life the naval apprentice will have little opportunity to acquire those qualifications which are the recognized measure of attainment. In this connection it is encouraging to learn that *Fisgard* apprentices are now being allowed to sit for the General Certificate of Education. But these innovations, welcome as they are, are not enough to bring apprentices into line with their opposite numbers ashore. In the early days recalled by Captain Jones there was comparatively little educational opportunity and against this background the naval system of apprenticeship was most commendable. Those advantages have long since been overtaken by the facilities now provided by Education Authorities, and by many reputable firms employing apprentices.

Whilst appreciating that Service training must primarily meet the particular needs of the Service, I firmly believe that more could be done to bring it into conformity with civil standards. Some might argue that such steps would aggravate the already difficult problem of retaining men in the Service. No doubt there is some truth in this, but to withhold opportunity on this account would, I think, be morally wrong.

There can be no valid reason why Service apprenticeship—including the Royal Dockyards—should not follow more closely the nationally recognized standards. These standards are set with the full concurrence of the Minister of Education and it would be logical for the services to abide by them. For example, naval and dockyard apprentices training should lead to National Certificate or City and Guild Certificate as appropriate ; the Higher Education Test could well be replaced by the General Certificate of Education. And at the higher level of training the Keyham and Greenwich engineer officers should have degrees. There is nothing revolutionary in these suggestions. The Army and R.A.F. are moving in that direction and the Navy's own electrical officers obtain their degrees through service training.

Hitherto Service training has been directed almost solely to its own paramount needs. I submit that the time has come to consider also the needs of the individual—not only whilst he is serving—but against the day of his return to civil life to begin a new career in early middle age. It is not enough that preparation for this climacteric be made by a few weeks vocational training ; preparation is needed throughout the whole service career and especially in the early stages, i.e., during apprenticeship.

In offering these views on training I would submit that there is nothing in them which is inconsistent with loyalty to the Service. Progress can never be made by dismissing criticism as disloyalty, nor by resting on laurels of tradition. The Royal Navy does not of its own volition remain the finest service in the world ; it has been kept so by each succeeding generation.

We need seriously to consider the purpose of training.

(Sgd.) H. HOUNSELL,  
*Commander (E), R.N.*

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