CORRESPONDENCE

SIR,

Policy-Wise (?)

Once a matter of policy has been decided, especially where among the laymen it was thought and has sometimes proved to be highly suspect, how long elapses before the authority is prepared to reconsider the decision?

The policy in question is the elimination of that very useful trade—the coppersmith, and the insertion of a very watered down substitute—the sheet metal worker, now replaced by the shipmetalwright!

There is at present too much tendency to discard the skilled trade, the higher training, etc., purely on the supposed grounds of there not being the requirement for the finesse, or the higher training, etc. What is overlooked is the fact that the average student or apprentice absorbs only about 80 per cent of a training schedule, be it of a high or low standard, so that starting him off on a lower standard is a retrograde step and produces a lower grade product. (Shades of the purple stripe forbids us to say tradesman!)

In submarines we are as hard hit as anywhere. Who is to remetal the stern tube bushes, to sweat the periscopes' and masts' wires, to renew the pipe—you know, the one that runs from the centres to the 'snake pit'? And don't forget we want a proper job made of it!

Let the policy makers have their Jacks-of-all-trades for all the good they think it might do them, but let us keep our coppersmiths and fully trained tradesmen. There will then be no need for the dilutees and no worries for the engineer. It is as simple as that.

(*Sgd.*) E. ENDACOTT,
Engineer Lieutenant-Commander R.N.

Departmental Comment

The syllabus for the Shipwright Artificer Apprentice has been revised to cover all facets of metal work, including coppersmithing, previously covered by the Metal Worker Apprentice, with the exception of boiler mounting work. The Shipwright Artificer already had the same welding training as the E.R.A. Metal Worker.

SIR,

Cleanliness

While many of the problems that arise in ships may be avoided in design or operation, that of keeping machinery spaces clean is always present. Part of this problem is up to the ship's organization to overcome, by proper employment of hands, provision of paint and cleaning gear, and planning and supervision of work. But this is only part of the story. The other part is indoctrination of personnel.

I write as one who has never served in a training establishment, but ten years at sea out of the last fourteen have proved some experience of their products and, in this experience, almost to a man, the products of training establishments (be they officers or J.M(E)s) come to sea unaware that they are required to play any part in keeping machinery spaces clean.

The problem is nearly always at its worst at the beginning of a commission, and the combination of circumstances may mean that it takes months to overcome. For at this time not only are E.O.s faced with organizing their own departments and removing round pegs from square holes, but also with learning to run the machinery, shaking down and working up in general, and often completing a refit as well. Under these conditions a large proportion of the ships company are straight from training and the majority of them :

(*a*) Are aware that they must make things work, and will do their best to do so,

(*b*) Are aware that they must keep themselves, their kit and their messdecks clean, and are more or less reluctantly prepared to do so, but

(*c*) Seem completely unaware that they have any responsibility for the cleanliness of the rest of the ship, including their own departmental spaces, and their attitude to the question may vary from passive resistance to active opposition.

This state of affairs can be overcome, and is, in any well regulated ship. But it involves a complete indoctrination of the hands which must be done from start to finish by the ship's officers. This is common to all departments.

Why should it be that, over the years, the products of training establishments show this same failing? The approach to the question has been well worked out by any number of ships' executive officers, engineer officers and senior engineers and, basically, the message is readily put across. If *you* make dirt, *you* make extra work for yourself (rags in bilges block suction strainers and *you* have to clean them) ; dirty equipment will not function properly and makes extra work for *you* (dirt in the lub. oil and *you* are up all night changing the bearings) ; a dirty ship will eventually make *you* dirty—and your expensive shore-going suit. There is enough to make life at sea unpleasant that cannot be overcome, so the surroundings may as well be as clean and as pleasant as you can make them. Finally, watchkeeping is often boring, but you can make it less so by a bit of cleaning and painting.

In recent years the whole problem has been becoming more and more acute, as ships are worked harder and fewer hands are available to spend less and less time on housemaid duties. Under these circumstances should it really be necessary for such a vital part of a man's training to be through the medium of Daily Orders or Night Order Books? Work-study and proper organization on the part of ships' officers can help, but why do training establishments leave men untrained in this respect? Or have I just been unlucky?

(*Sgd.*) C. M. ROBINSON,
Lieutenant-Commander, R.N.

SIR,

Evaporators

On behalf of one of the Admiralty's oldest suppliers of warship evaporators, may I take leave to comment on Commander Lockyer's account of the work carried out in the Ships Service Machinery Section published in Vol. 14, No. 1 of the *Journal of Naval Engineering*?

One appreciates Commander Lockyer's difficulty in finding manufacturers capable of designing new evaporating plants for Admiralty requirements, but I cannot help comparing the efforts of the United States Navy and the Office of Saline Water Research and the results obtained in commercial markets throughout the world by U.S. manufacturers and by those in this country. A very large incentive has been provided in the United States both by money spent on research and commercial contracts placed for land installations. The order of cost involved in the U.S. programme is reason enough for their position vis-a-vis evaporator development in the United Kingdom. However, as one who has recently retired from the Royal Navy, I cannot but be impressed by the change in performance of current R.N. designs (albeit for the R.N. some six years out of date because of lack of continuity of orders) compared with the standard coil design fitted with slat baffles and feed regulators. Stability, output per unit volume and purity are now possible which were undreamed of by the seagoing engineer five years ago ; and this largely without Admiralty expenditure.

Reference is made to the vapour compression plants and their compressors. No commercial incentive exists for this type of plant except on a broad basis. The Admiralty could well spend money on developing a steam compressor for their use if they foresee gas turbine or Diesel propulsion predominating.

The development of the existing vapour compression designs has been made by Caird and Rayner with very limited financial assistance in a spirit of co-operation to meet the R.N.'s requirements, but the market is now so limited that an optimum result has not yet been achieved.

Whether the effort by the Admiralty in development of the Wellworthy compressor is justified, remains to be seen. Whatever its performance at present, it is twice the specific weight, and thrice the specific volume of the existing compressor. In the latter's case, no definite noise level has been established which is unsatisfactory.

I appreciate the Admiralty's desire for the adoption of flash plants, but cannot help pointing out that it has certain fallacies and difficulties associated with it. It is now agreed by the major manufacturers that scaling of the heat exchangers is still a problem, albeit not on the same order as that in, say, coil evaporators. Pumps capable of operating continuously and reliably at a suction pressure of 28 inches Hg vacuum and above are extremely difficult to come by in this country. Performance is extremely variable with loss in vacuum or change in sea temperature. There must be a plant to succeed the flash plant which eliminates these disadvantages.

Commander Lockyer makes a statement in connection with flash plant performance which cannot pass without comment. The one big advantage of this design of plant is that its ' efficiency ' can be improved by the use of multi-staging. The greater the number of stages, the closer the machine approaches regenerative perfection and the better the performance. Unless this were so, there would be no incentive to produce plants with a very large number of stages where pressure drops and temperature differentials are reduced to an extent that mechanical design becomes extremely complex. The aim is always to achieve the highest possible feed (condenser cooling water) temperature at entry to the feed heater, thus reducing the quantity of heat to be added to the cycle from external sources.

If space will allow, I must correlate the correspondence started by Lieutenant-Commander Wildy with the above remarks. Here due consideration is given to multi-staging flash plant but the emphasis placed on waste heat is unjustified generally. The use of waste heat is governed by its temperature level and this temperature difference between source and sink. If the source is low—as in commercial marine Diesels—the price to be paid is inevitably large in plant size.

The sink temperature can only be reduced by high vacuum—unnatural but inevitable—and as dictated by sea water temperature. It is on this score that the vapour compression plant shows to advantage for, whereas the sink temperature may be the same for all plants, it incorporates a heat pump allowing lower grade heat to be improved. Its ' efficiency ' is then a function of heat exchange. A reliable compressor must, however, be found.

(*Sgd.*) V. M. LAKE,
Commander, R.N.(Rtd.)

Comment by D.M.E.

The United States' effort on the development and production of plants for purification of salt and brackish water has been forced on them by the necessity to provide potable water for the civil population in certain areas. This is a situation which has not yet arisen in this country where the major users of pure water are generating stations, the Mercantile Marine and the Royal Navy. The generating stations do not normally have to deal with either salt or brackish water and in many cases simple demineralization of town mains is sufficient and more economical.

The effort by the Admiralty has been dictated by the building programme but in recent years some twelve plants of new design have been or are being tested at the Admiralty Distilling Experimental Station, with another three in the pipeline for test. Of the twelve, only three have been supplied by the manufacturer on loan. The total expenditure on test plants, compared with the equipment actually installed, is therefore considerable.

With reference to vapour compression plants, the Admiralty has spent considerable sums in their development. The original prototype 25-ton plant was developed on an Admiralty contract and the prototype ' D ' type submarine plant was also at Admiralty expense. It is also appreciated that Caird and Rayner have done much to develop both these designs without Admiralty assistance.

However, the cost of developing a new design compressor for either of the plants has been carefully considered, and is always under review.

Pumps capable of operating continuously under 28 inches of vacuum have been in use at sea for many years, viz, main extraction pumps, but it is agreed that to get a good pump is costly, and far more attention must be given by all concerned to ensuring that the design chosen is the right one for the service.

Regarding the statement on the flash plant performance and the number of stages, the point which was being made was that flash plants are not compounded in the same way as conventional designs, and the performance ratio for any particular plant can vary considerably depending on the conditions at that time. This emphasizes the need to maintain the optimum condition by partial recirculation.

SIR,

Boiler Cleaning in the Royal Navy

In Commander Inches' absorbing article on Boiler Cleaning in the Royal Navy, in Vol. 14, No. 1, he states that U.S.N. boiler compound was adopted by all major Fleet units progressively between 1942 and 1946. Captain Farquar Atkins, in the subsequent discussion, stated that to his knowledge no naval ship was authorized to use it before 1944. Both are right !

Between May, 1940, and September, 1943, I was marine engineering specialist No. 3 of the British Admiralty Delegation in Washington, DC, which was charged, *inter alia*, with making effective advance arrangements with the Navy Department to repair expeditiously battle damaged R.N. warships in their Navy Yards. Before Pearl Harbour, in 1940, the Navy Department sent their boiler compound expert, Captain Solberg, U.S.N., to our Grafton Hotel, Washington offices, as they were amazed that we were restricting our boiler internal cleaning interval because of reliance on lime. Admiralty approval to change was strenuously sought, but in vain. At that time the U.S.N. boilers had no automatic feed regulators, and the first objection was that ours would foul up with compound !

However, eventually *Royal Sovereign* limped into Norfolk, Va., (from memory) in a sorry state, with her feed and oil fuel tanks cross-connected, and, for her subsequent large repair trials, B.A.D. insisted that U.S. boiler compound was used and reports on performance submitted ; these latter were glowingly successful. Other R.N. ships were overtly provided with U.S. boiler compound and test sets by their U.S. Navy Yards when they left the U.S.A. to continue winning the war. Whether Captain Atkins' gallant *Orion*, after his departure, was one of these I cannot remember !

The U.S. boiler compound was used in selected R.N. ships from at least 1942, but not officially until 1944 ! The story of welding the pressure parts of boilers is rather similar.

At this time, U.S.N. naval marine engineering technology was riding high. A variety of their ships had controllable superheat boilers, double reduction gearing steam installations capable of burning treacly Bunker C fuel, vapour compression evaporators, reversible variable-pitch propellers for geared I.C.E. combinations, etc., allied with new concepts of habitability both in the machinery spaces and living quarters, all of which were to leave their mark indelibly on the Royal Navy, either from their subsequent lease-lend ship experience, or after the war. For marine engineering technical exchange at this time we had damage-control know-how, boiler feed regulators, and, on the marine engineering side, precious little else ; but fortunately on the electronic side we had the vital R.D.F., promptly renamed Radar ! (The steam catapult and angled deck were to appear much later to redress the balance.)

The U.S.N. dopes, too, were generally advanced for those days, V12 plastic brickwork, anti-corrosion additive steam turbine, and detergent I.C.E. lubricating oils (which ousted our perennial S.M.L.O.), evaporator feed compounds, almost all of which gained R.N. official recognition by *force majeure*, due to the enormous Admiralty war-time technical overload.

(*Sgd.*) A. E. TURNER,
Captain, R.N. (*Rtd.*)

Author's Comment

Since official records for the early part of World War II are rather scant (as is, in fact, mentioned in the article), information from people who 'were there' is always of great interest. Captain Turners' letter, in addition, highlights the important contribution to be made to technical progress within the Admiralty by those serving in sea—and liason—appointments. Although he does not actually make this point, it can only have been this contribution which ultimately brought about the acceptance of U.S.N. boiler compound, and of many of the other U.S.N. ideas he mentions.