RECENT DEVELOPMENTS IN ARTIFICERS TRAINING

PART II ESTABLISHMENTS

H.M.S. CALEDONIA

by

COMMANDER (E) J. A. N. MALIM, R.N.

Although a description of the Old and New Schemes of Training of Artificer Apprentices has appeared in a previous issue, it will be as well to include a summary of that description here.

Briefly then, the old scheme consisted of a 4-year course of training either in H.M.S. *Fisgard* at Torpoint or in H.M.S. *Caledonia* at Rosyth, for which apprentices were entered twice a year. Under the new or Series Training Scheme, the course has been split into two parts, the first, of 1 year 4 months or 4 terms duration being held in *Fisgard* for all apprentices and the second, of 2 years 8 months or 8 terms in one or other of the three Part II Establishments, *i.e.*, *Caledonia* for Engine Room Artificer, Ordnance Artificer and Shipwright Artificer Apprentices, *Collingwood* for Electrical Artificer Apprentices, and *Condor* for Air Artificer Apprentices. At the same time a change was made in the entry of apprentices from twice to three times a year.

Effect of Series Training Schemes in "Caledonia"

The introduction of the Series Training Scheme naturally gave rise to numerous problems but the transition stage has been further complicated by the change from a bi-annual to a tri-annual entry and therefore from two terms a year of about 5½ months duration to three of 15 weeks each.

This new system of entry was introduced in August 1947, and the change-over was achieved as follows :—

(i) The two senior classes remained as before.

(ii) The remaining six classes were put together in pairs in sequence of seniority.

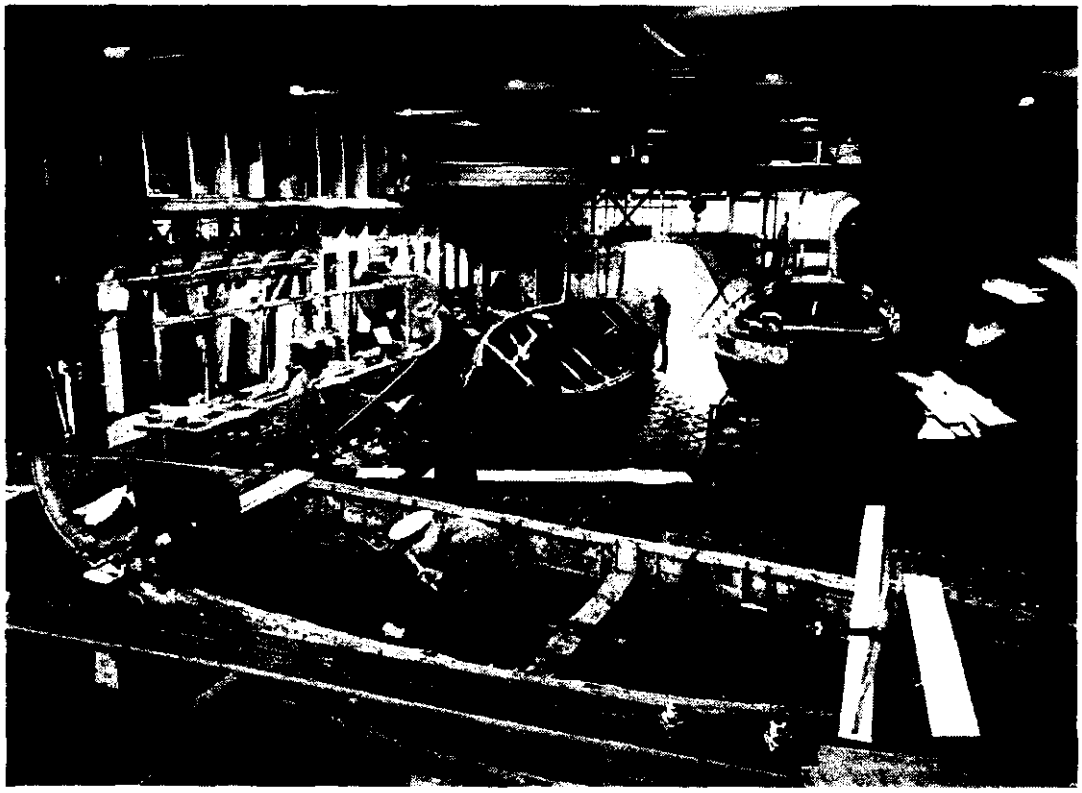
(iii) The bottom third of the senior class of each pair was then joined with the top third of the junior class of the pair to make the extra classes required to conform with the three entries per year.

(iv) These extra classes were inserted for purposes of training and seniority between the remainder of each pair of classes.

Thus the bottom third of a class joining up with the top third of the class junior to them found themselves doing an extra four months training. As this was unavoidable it was approved for these apprentices to make up for the loss by back-dating their seniority as 5th Class Artificers by four months. The last of such classes will be passing out from *Caledonia* in December 1950, and all classes will be series trained ones by May 1951.

Shipwright Artificer Apprentices

With the Series Training Scheme came also the introduction of the training of Shipwright Artificer Apprentices by the Navy, instead of by the Royal



SHIPWRIGHT ARTIFICER APPRENTICES LEARNING THE ART OF REPAIRING WHALERS

Dockyards as hitherto. As this was an entirely new departure, a great deal of preliminary work in making out the syllabus of practical and technical training was necessary before the first entry of Shipwright Artificer Apprentices could be accepted, and it was therefore not until May 1949 that the first class arrived. As there was no room in the existing factory for the new workshops required, H.M.S. *Artifex*, heavy repair ship, was allocated to *Caledonia* for this purpose, and here again much preparatory work was necessary to clear and fit up the working spaces required for all the different phases of training.

There are now four classes of Shipwrights under training, and although the arrangements in *Artifex* are very satisfactory, there are some disadvantages. Firstly, the working spaces are widely dispersed and of varying size and shape, making it necessary in some cases to split classes and therefore employ two instructors where one would normally be sufficient. Secondly, *Artifex* is berthed at the south-west corner of the basin, two miles from *Caledonia*, and as transport cannot be made available in these hard times, the Shipwright Apprentices have to march to and from *Artifex* every day, a matter of 50 minutes, part of which comes out of their factory time and part out of their free time. In order to prevent any further loss of time, arrangements were made for these apprentices to have their midday meal in *Artifex*.

H.M.S. " Easton "

In addition to *Artifex*, H.M.S. *Easton* (an ex-Hunt class destroyer) has been allocated to *Caledonia* for use in the training of Shipwright Artificer Apprentices. She is secured alongside *Artifex* and the Shipwright Apprentices carry out on board much of their practical training such as general plate work, drilling, riveting and caulking, shipfitting and welding.

PART VIEW OF THE MAIN FACTORY SHOWING IN THE FOREGROUND E.R.A. APPRENTICES DOING A COURSE ON GRINDING MACHINES

It is also intended to use such machinery as remains in *Easton* for the instruction of Engine Room Artificer Apprentices in its operation : a useful example of this is the steering gear and telemotor system which remains intact.

TRAINING

As has been seen from the article on Artificers Training in a previous issue, it is not until apprentices reach their Part II Establishment that they start their trade and technical instruction in detail. A syllabus of factory and technical instruction was therefore laid down for each branch, but it will be seen that certain parts of this syllabus are common to all. The training is based on a 42-hour week, of which approximately 75% is devoted to work at the respective trades in the factory, the remainder of the time being devoted to school and technical subjects, physical training and parade ground work, and religious instruction.

Trade Instruction in the Factory

The most marked effect of the Series Training Scheme has been a reduction of some 11% in the total factory hours over the whole course ; if to this is added the 22% reduction in factory time already caused by the shortening of the course from $4\frac{1}{2}$ to 4 years at the beginning of the war, it will be seen that a post-war E.R.A. does 33% less time learning pure craftsmanship than his pre-war counterpart. As the Series Training Scheme progressed a point was eventually reached where the syllabus of school and technical instruction could not be fitted in without a further reduction in factory time. This caused considerable concern as it was felt that an unacceptable lowering of the skill of the artificers of the Navy might very soon result and an Admiralty ruling on this point was sought. In consequence it was decided that for the present no further reduction in factory time could be accepted and any cuts necessary were to be made at the expense of the school and technical syllabus.

As it is impossible to give a detailed description of the work carried out in the factory in this article, the following summary is included to give some idea of the time spent on the various phases of instruction :—

SUMMARY OF WORKSHOP INSTRUCTION

Department	O.A.	F. & T.	B.M.	C.S.	E.S.	Shpt.
	Wks.	Wks.	Wks.	Wks.	Wks.	Wks.
Fitting Bench	46	41				
Tool Room	2	2				
Lathes	34	36				
Milling	2	2				
Boring	2	2				
Grinding	1	1				
I.C.E. Course		7	7	7	7	
Practical Electrical Course	2	3	3	3	3	2
" Afloat " Refit of Aux. Machinery and Boiler Mountings in Ships in commission or undergoing refit in H.M. Dockyard		7	7	7	7	10½
Erecting Shop—Stripping, Adjusting and Reassembling Aux. Machinery, Boiler Mountings, etc....		3	3	3	3	
Gunnery Engineering	15					
Boilermakers Shop			70			
Enginesmiths Shop					70	
Foundry				13		
Welding			14	14	14	10½
Coppersmiths Shop				56		
Patternmaking				1		
Joinery						7
Boat Work (Repairs)						15
Mast Work (making Boats, Spars, etc.)...						10½
Drilling (Hand and Pneumatic) ...						2
Riveting (Hand and Pneumatic) ...						2
Iron Caulking (Hand and Pneumatic) ...						2
Wood Caulking						1
Ship Fitting						4
Plumbing						7
Blacksmithing						6
Cable Work						1
Painting						3½
General Plate Work						7
Sheet Metal Work						7
Boat Building						7
Revision	2	2	2	2	2	2
Admiralty Finals	4	4	4	4	4	3
Disciplinary Course	2	2	2	2	2	2
Total	112	112	112	112	112	112

Notes

1. The number of weeks work shown above is the total performed on the particular item of instruction during the 2 years 8 months spent in *Caledonia*.

2. Until recently E.R.A. Apprentices, Fitter and Turner, and Ordnance Artificer Apprentices have done the same course ; the training in turning of the latter has now been directed to smaller and lighter work in the latter part of their time. O.A. Apprentices also do some additional electrical school periods in order to give them a grounding in alternating current work.

3. The Internal Combustion Engines Course has been made as comprehensive as possible for the time available and in it the theoretical and practical instruction

E.R.A. Coppersmith Apprentices under Instruction in the Foundry

run parallel. The emphasis is on the maintenance and operation of the types of motor-boat engines, both gasoline and diesel, in use in the Service and each E.R.A. Apprentice strips, adjusts, reassembles and finally runs an engine of each type.

4. The Practical Electrical Course is designed to give the apprentices an understanding of the principles of the electrical installation of a ship and to demonstrate some of the theory learnt in school.

5. The Gunnery Engineering course includes both theoretical and practical work in the following : Breech mechanisms, transferable gun mountings, hydraulics and heavy gun mountings, optical theory—sights and gyro, basic mechanisms, T.A.S., transmission and auto, director and surface fire control and anti-aircraft fire control.

Production Work

The first two terms in the factory are devoted entirely to practice work and a test job ; in succeeding terms, however, as the apprentice's skill improves, production work is introduced when completion of the practice work and progressive test jobs allows. As much production work as possible is fitted into the course in order to relieve the monotony, of which many readers of this article will have painful memories, of learning the art of fitting ; in this way it is also possible to give the maximum assistance to ships during their self refit periods besides providing experience for the apprentices in some of the work that they will be called upon to perform when they go to sea.

Technical and School Instruction

All apprentices go to evening school for two hours three evenings a week during which time all technical and school instruction is carried out. There is, however, one exception to the above ; five to eight classes inclusive do their mechanical drawing instruction during the day, which is necessary in order to avoid a further evening's instruction and also to avoid congestion of the available drawing classrooms.

The following summary shows the subjects taught and the hours spent at each subject :—

SUMMARY OF TECHNICAL AND SCHOOL INSTRUCTION

(*a*) Five to eight classes inclusive, according to their branch, receive two hours per week instruction in the following subjects :—

(i) E.R.A's—mechanical drawing, mechanics and electricity, marine engineering.

(ii) O.A's—mechanical drawing, mechanics and electricity, gunnery engineering.

(iii) Shipwright A/A's—mechanical drawing, mechanics, ship construction.

(iv) All apprentices—history and current affairs.

(*b*) 9 to 12 classes inclusive receive instruction in the subjects shown below :—

Branch	Subject	Hours per week			
		9 Class	10 Class	11 Class	12 Class
E.R.A.'s ...	Mechanical Drawing	1	1	2	2
	Workshop Practice	1	1	1	1
	Marine Engineering	2	2	2	2
	History and Current Affairs ...	2	2	1	1
O.A.'s	Mechanical Drawing	1	1	2	2
	Workshop Practice	1	1	1	1
	Gunnery Engineering	2	2	2	2
	History and Current Affairs ...	2	2	1	1
Shipwrights ...	Ship Drawing (Naval Arch.) ...	1	1	2	2
	Shipyard Practice	1	1	1	1
	Ship Construction	2	2	2	2
	History and Current Affairs ...	2	2	1	1

Note.—E.R.A's and O.A's work to a common syllabus in Mechanical drawing, Mechanics and electricity and workshop practice, while the history and current affairs syllabus is the same for all apprentices. Shipwrights in 5 to 8 classes inclusive follow the same syllabus in mechanical drawing as the E.R.A's and O.A's, branching off on to ship drawing in 9 class. In their 8th term the O.A's are given a week's basic instruction in alternating current and elementary thermionics in addition in order to prepare the ground for instruction in transmissions and auto.

It will be seen from the above table that the amount of time spent at technical instruction is very small and therefore it will be readily understood that it is only possible to teach basic principles.

O.A. Apprentices at Instruction on Fire Control Instruments

For this reason the importance of Part III of an artificer's training, that is, the year at sea as an Artificer, 5th Class, cannot be over-emphasized, since that is when he receives his detailed professional training.

Examinations

The Series Training Scheme originally provided for an Admiralty Part II Final Examination at the latter end of the 12th term, together with an Admiralty Examination in Mechanics and Electricity in the 8th term, but it was later realized that the apprentices were being examined in their 12th term on 32 months work, which, it was considered, was expecting too much of them, observing that the normal practice in the teaching world is to examine on 12 months' work. The Admiralty Examination has accordingly now been divided into two parts as follows :—

(*a*) Admiralty Part II Examination held in the 8th term, papers being set on the work in the 5th to 8th terms inclusive in mechanical drawing, mechanics and electricity and the engineering subject appropriate to branch.

(*b*) Admiralty Final Examination held in the 12th term, papers being set on the work done in the 9th to 12th terms inclusive in mechanical and ship drawing, workshop and shipyard practice and the engineering subject appropriate to branch.

Papers are also set on internal combustion engines for E.R.A's, fire control for O.A's and a second paper on ship construction for Shipwrights.

In addition, local examinations on all subjects taken are held in the 6th and 10th terms, and test papers in 5th, 7th and 11th terms.

Accelerated Advancement

The results of the Admiralty Examinations and Test Job and Local Test Job in 7 and 9 classes count towards final seniority, accelerated advancement being awarded as follows :—

(*a*) *Admiralty Part II Examination*

75% and over	... ...	1st Class ...	... 4 weeks.
65% and over	... ...	2nd Class ...	... 2 weeks.
55% and over	... ...	3rd Class ...	... 1 week.
40% and over	... ...	Pass ...	... None.

(*b*) *Admiralty Final Examination*

As for Admiralty Part II Examination.

(*c*) *Admiralty Test Job and Local Test Job in 7 and 9 Classes*

75% and over	... ...	1st Class ...	... 10 weeks.
65% and over	... ...	2nd Class ...	... 5 weeks.
55% and over	... ...	3rd Class ...	... $2\frac{1}{2}$ weeks.
40% and over	... ...	Pass. ...	... None.

(*d*) *Service Mark.*—Awarded for general bearing, powers of leadership and conduct throughout apprenticeship.
Up to a maximum of 4 weeks.

An apprentice can therefore obtain a maximum of 18 weeks accelerated advancement as a result of his work in the Part II Establishment.

Failures

Apprentices, however, who fail to achieve the Pass Mark, 40%, in the Admiralty Examinations or Test Job may be put back one term and are given an Admiralty Warning. An apprentice who is put back and then achieves more than 55% marks in the examination in which he failed is not, however, eligible for any accelerated advancement as a result of these marks.

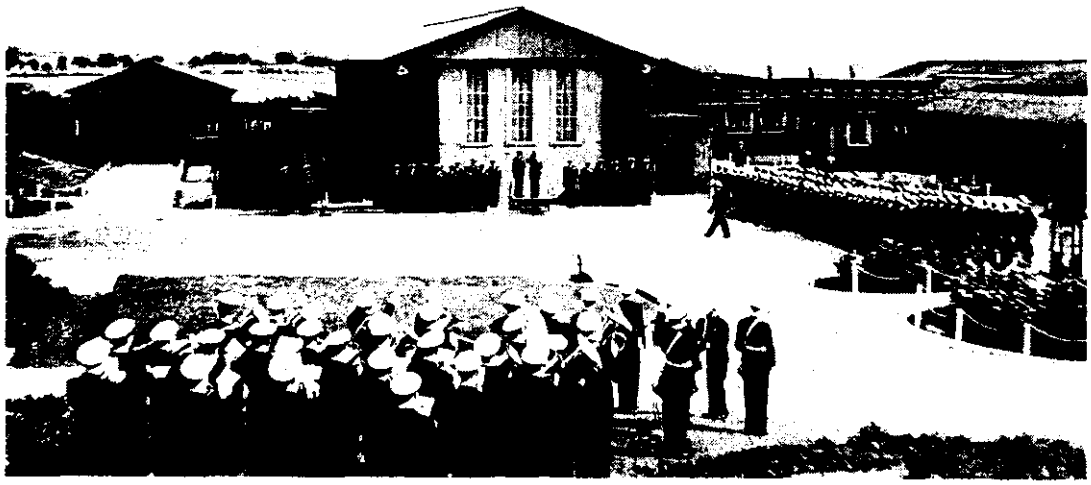
Parade Ground Work, P.T. and Religious Instruction

In addition to the foregoing, each apprentice goes to religious instruction once a week for half an hour, and is given 50 minutes instruction on the parade ground and 50 minutes physical training once a week. These periods are fitted into the time-table at the beginning or end of a forenoon or afternoon in order to avoid splitting up the day's work in the factory.

Disciplinary Courses

The last fortnight of the 12th term is devoted to a course which aims at the development of powers of command, leadership and sense of responsibility in the apprentice. This course is at present under review, since it is felt that its position in the syllabus is wrong and it is in any case inadequate. The possibility, therefore, of putting all apprentices through a disciplinary course in H.M.S. *Royal Arthur* after leaving *Caledonia* is under discussion.

In the meantime a broader interpretation is being applied to the periods provided for parade ground work ; various lectures and tasks designed to help in developing Petty Officer-like qualities are being included and in general these periods will follow the lines of instruction given at the Petty Officers' School, H.M.S. *Royal Arthur*.



INTER-DIVISIONAL COMPETITIVE PARADE

DIVISIONAL ORGANIZATION

For the purposes of administration, games, welfare, living quarters, etc., the apprentices are divided into six divisions, named after famous Admirals, each division containing a proportion of each Branch.

For the purposes of instruction, however, the apprentices have to be divided into classes, a class on arrival in the Establishment being designated " 5 " Class, progressing to " 12 " Class in the final term.

There are six Divisional Officers consisting of five Lieutenants (E), one of whom is qualified in gunnery engineering, and a Senior Commissioned Shipwright Officer ; an Instructor Lieutenant is also attached to each division as Divisional Tutor.

Each division also has attached to it a Chief or Petty Officer who may belong to either the Seaman or Stoker Mechanic Branch, the numbers at present being equally divided.

Finally, there are the Chief and Petty Officer Apprentices, six of whom are appointed in each division on merit in the ratio of one Chief to five Petty Officers, and who play their part in the organization, administration and discipline of their respective divisions. In addition, one extra Chief Petty Officer Apprentice is appointed as " Head Boy ".

Ceremonial

At Sunday divisions and on ceremonial occasions a guard is mounted by the apprentices and there is a volunteer apprentice band, under the direction of a Band Corporal, R.M. A guard is also provided for local courts martial and on certain civic occasions.

Games Facilities

Caledonia is fortunate in possessing very reasonable playing fields where rugger, soccer, hockey, cricket and baseball are played in due season and an annual athletic contest is held in the summer.

THE SWIMMING BATH

Sailing in our six whalers and two cutters is popular, though this part of the Forth is not perhaps the best of waters for the inexperienced.

There is also an excellent gymnasium which is used for basket ball, a very popular game, as well as for the usual gymnastics, boxing, fencing, etc.

Finally, there is the swimming bath, which is considered to be the finest in Scotland. It is in continual use throughout the year and is a very valuable part of the amenities here. It is also lent for use by local clubs and assocations.

Living Quarters

The number of apprentices at present borne (summer 1950) is 682, and for these the living quarters are quite adequate, having been designed for 750 apprentices. Single beds are provided in 24 dormitory blocks, with one spare block.

If the number of apprentices should increase considerably, it will be necessary to revert to some double tier bunking in dormitories and corresponding increases in the ship's company accommodation will be necessary.

Staff

The staff borne in *Caledonia* is somewhat complicated by having three different categories, *i.e.*, naval, pensioner and civilian, but the following description should give some idea of its composition.

There is a Captain (E) in command, having as his Heads of Departments two Commanders (E), one as Executive Officer and the other as Training Commander, a Commander (S), as Supply Officer, Surgeon Commander,

Surgeon Lieutenant-Commander (D), and Chaplain, the Departments directly concerned in the training being made up as follows :—

(*a*) *Executive Officer*

All Divisional Officers, including one for the ship's company. P. & R.T. Officer, a Lieutenant (E) who has completed the short P.T. course.

Master-at-Arms and Regulating Staff.

Ship's company other than Naval Instructors.

(*b*) *Training Commander*

(i) For instruction in mechanics and electricity, mechanical drawing in 5 to 8 Class inclusive and history and current affairs :—

Instructor Commander and eight Instructor Lieutenants, from these Instructor Lieutenants are drawn the Divisional Tutors mentioned in the paragraph on Divisional Organization.

(ii) For general charge of factory and the instruction, production work and machinery therein :—

Lieutenant-Commander (E), Senior Engineer.
Senior Commissioned Engineer Officer, Factory Officer I.
Senior Commissioned Electrical Engineer Officer, Factory Officer II. and for charge of Practical Electrical Course.
Lieutenant (E) for charge of afloat training and I.C.E. Course.
Inspector, for charge of all civilian employees and all matters affecting them.

Active Service Instructors	17
Pensioner Instructors	30
Dockyard Instructors	21
Total	68

(iii) For technical instruction in engineering subjects, mechanical drawing in 9 to 12 Class inclusive, and workshop practice :—

Lieutenant-Commander (E), Technical Officer.
Divisional Officers for Lectures in Engineering.
Active Service Instructors for lectures in Workshop Practice.
Civilian Evening Teachers (Dockyard Inspectors) for Instruction in Mechanical Drawing.

(iv) For Shipwright Artificer instruction :—

Shipwright Lieutenant-Commander.
Shipwright Lieutenant, Workshop Officer in *Artifex* and for lecturing.

Active Service Instructors in *Artifex* and for lecturing...	6
Pensioner Instructors in *Artifex*	5
Dockyard Instructors in *Artifex*	4
Total	15

Conclusion

It is obviously impossible to go into any great detail in such an article as this, but it is hoped that the foregoing may give some idea of the organization and scope of training carried out in *Caledonia*.

Apart from a very small proportion of misfits and " bad hats ", the apprentices coming here now are, on the whole, fundamentally sound ; they receive a thorough training in craftsmanship, some instruction in the basic principles of the construction and operation of machinery, gunnery equipment or ships, and some instruction in mechanics and electricity. The syllabus for the latter subjects is now under discussion, with a view to bringing it more clearly into line with the practical requirements of the average artificer.

Much more emphasis is being and will be placed upon their disciplinary training and " Petty Officer-like " qualities, as it is felt that the future trend of the Royal Navy makes it more important than ever before that all artificers shall be able to exert to the full the qualities of leadership and command required of a Petty Officer.

We receive the material from *Fisgard* and we endeavour by constant improvement in method to supply the Fleet with better and better artificers who will be a credit to their branches and to the Service.