

BASER NEWS

(IT COULD HAPPEN TO YOU)

BY

CAPTAIN A. E. TURNER, A.D.C., R.N., M.I.MECH.E., A.F.R.AE.S.
(Chief Staff Officer (Engineering), Flag Officer Sea Training)

Portland 1960-61

This article is mainly the story of marine engineering experiences at H.M. Naval Base, Portland for the thirteen months July, 1960 to July, 1961. During this time the following thirty-seven destroyers and frigates of various classes finished (or nearly finished) their Work Up :— *Battleaxe, Beas, Betwa, Broadsword, Caesar, Cassandra, Chichester, Crossbow, Diana, Diamond, Duchess, Dunkirk, Eastbourne, Finisterre, Jaguar, Jutland, Leopard, Llandaff, Londonderry, Lochs Alvie, Fyne, Insh, Lomond and Ruthven, Otago, Plymouth, Rhyl, Rothesay, Saintes, Scarborough, Scorpion, Solebay, Talwar, Taranaki, Trafalgar, Troubridge and Yarmouth* :—and the Resident Second Frigate Squadron of *Teazer, Keppel, Murray, Grafton, Pellew, Verulam and Brocklesby*, and the Minesweepers *Highburton, Bronington, Glasserton, Yaxham, Squirrel, Watchful, Gossamer* and the S.D.B. *Tilford* continued to do their local tasks.

Of these thirty-seven work-up ships eleven came to Portland new (two were dockyard built), six after straight recommissioning, fourteen after commissioning after normal refit and six after recommissioning after conversion/extended refit. With the wide diversity of machinery installations and age of ships, inevitably the variety of technical surprises, pleasant and startling, never ran out. It is part of the law of probability that improbable things will happen!

Once the Portland background has been set, the climax of this article inescapably must be the detailed marine engineering deficiencies which occurred. The facts are baldly stated, and conjecture on responsibility avoided, because always three, and sometimes five of the following partners are involved in some degree :—Dockyard or Building Yard, Work Acceptance Authority, Past Commission, Present Commission, Fleet Maintenance Unit (F.M.U.). The latter is not F.O.S.T.'s job, since all ships should arrive at Portland ready to start Work Up, and, in any case, cannot usually be done without a Board of Inquiry.

The successful ships, engineering wise, receive less emphasis because a record is not something to stand on, or gloat about, but to build on!

Nevertheless this article has been firmly planted in Part II of this *Journal*, despite its constructive intentions, because in naval circles the broad backed species seems to be getting ousted by the prolific porcupine population, doubtless due to lack of personal experience of the modern complicated small ship of which we talk so much and understand so little.

Thus history repeats itself, and a small ship Work Up Base has again been created to provide a short cut to experience. During the Fleet expansion stage in World War II an individual ship Work Up Base was established at Tobermory and a group ship one at Larne. Now because of the insufficiency of large ships, in which an effective practical apprenticeship can be served, Tobermory II flourishes at Portland.

Aim of Work Up (W.U.)

The aim of W.U. is to bring each ship to a sufficient state of efficiency to allow her to take her place as a single ship unit of the Fleet, able to face with confidence any operational task, and obtain full benefit from more advanced exercises and practices with its Fleet.

Square One

The naval/civilian organization of Portland Naval Base, while effective and bulging with goodwill, is quite the most complex in the Author's experience.

The Way Ahead Committee decreed that H.M. Dockyard Portland should close (A.F.O. 869/58), and a Work-Up Base for cruisers, destroyers and frigates (re)commissioning in the United Kingdom should take its place (A.F.O. 724/61). Accordingly the first Flag Officer Sea Training arrived on September 26th, 1958. By the end of his commission, nearly two years later, 52 R.N. ships had completed work up, also six R.I.N. frigates, one Royal Nigerian Navy C.M.S., three Commonwealth frigates, and five N.A.T.O. ally vessels. With the W.U. tempo steadily rising with the increased proportion of small ships in the Royal Navy this basic organization of the first F.O.S.T. commission has been proved admirable. So far in its existence the Portland Work-Up Base has been too busy with destroyers and frigates to cope with cruisers, which have been diverted to the Mediterranean where the facilities for this purpose are less good.

Potted History of Portland

To complete the flash back, almost every visitor to Portland thinks he is visiting a bird sanctuary, devoid of human life apart from its marooned naval inhabitants.

In fact Portland has always been a hive of activity. The famous Portland stone is sub-marine in character. Later, after the convulsion which raised the present plateau, dinosaurs enjoyed the view, and over the centuries gave way to wild boar (these may return if visitors continue to arrive above distraction level). The Ancient Britons started the quarries for weapon components, and the Romans gave its name *Portus Landus* in memory of their Consul Landus' defeat of the British tribe of Veronians. The Saxon Warrior Wyke, whose tribal emblem was a red pole, later returned to the area; hence the neighbouring villages of Wyke Regis and Radipole. The Danes burnt Weymouth looking for Alfred the Great concealed in adjacent Melcombe, and the devastated area continued apparently until after the Norman Conquest, as the Domesday Book acknowledges only a poor hamlet having eighteen churlish fishermen, three villeins, and two score leane coves! Nevertheless Portland, because of its great strategic importance, jutting out into the Channel, and joined only by the unique Chesil Beach to the mainland, was holden of the Norman Kings to become a Royal Manor, and Rufus Castle was built. Later Henry VIII constructed Portland Castle as part of his coast defence system against a French invasion. One hundred years later it was defended valiantly, but unavailingly, against Cromwell. In the interim, Sir John Dolphin's Portland Squadron distinguished itself against the Armada, H.M.S. *Squirrel* sacking the Spanish Treasure Ship *Bermuda*, and later H.M.S. *Victory* often watered here. Much of London was rebuilt with Portland Stone, after the Great Fire of 1666, including Sir Christopher Wren's St. Paul's, convict labour being imported to the quarries to speed production. The surplus stone was used to build a lighthouse named Bill after a popular Governor (the last Governor was John Penn circa 1800), and rebuilding Malta's Valletta. When the latter task waned the unwanted stone was dumped into the harbour to inspire the construction of the present breakwater; this was founded by the Prince Consort in July, 1849 and declared complete by King Edward VII (then Prince of Wales) twenty years later, to enclose a roadstead of 2,200 acres.

Portland was an important coaling base for the Channel Fleet in the First World War, and repaired many torpedoed ships. In 1932 the submarine M2 sank at Portland, and H.M.S. *Osprey* was established. In the Second World War, Portland was both the Coastal Forces Base 'Attack' and a Combined Operations Base. Between June 6th, 1945 and May 7th, 1946, 420,000 American

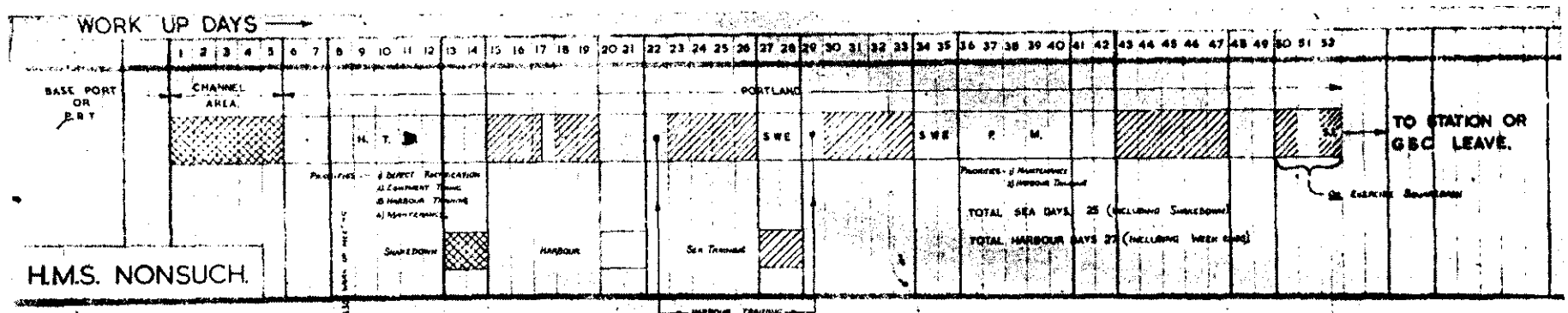


FIG. 1—TYPICAL WORK-UP STRIP PLAN

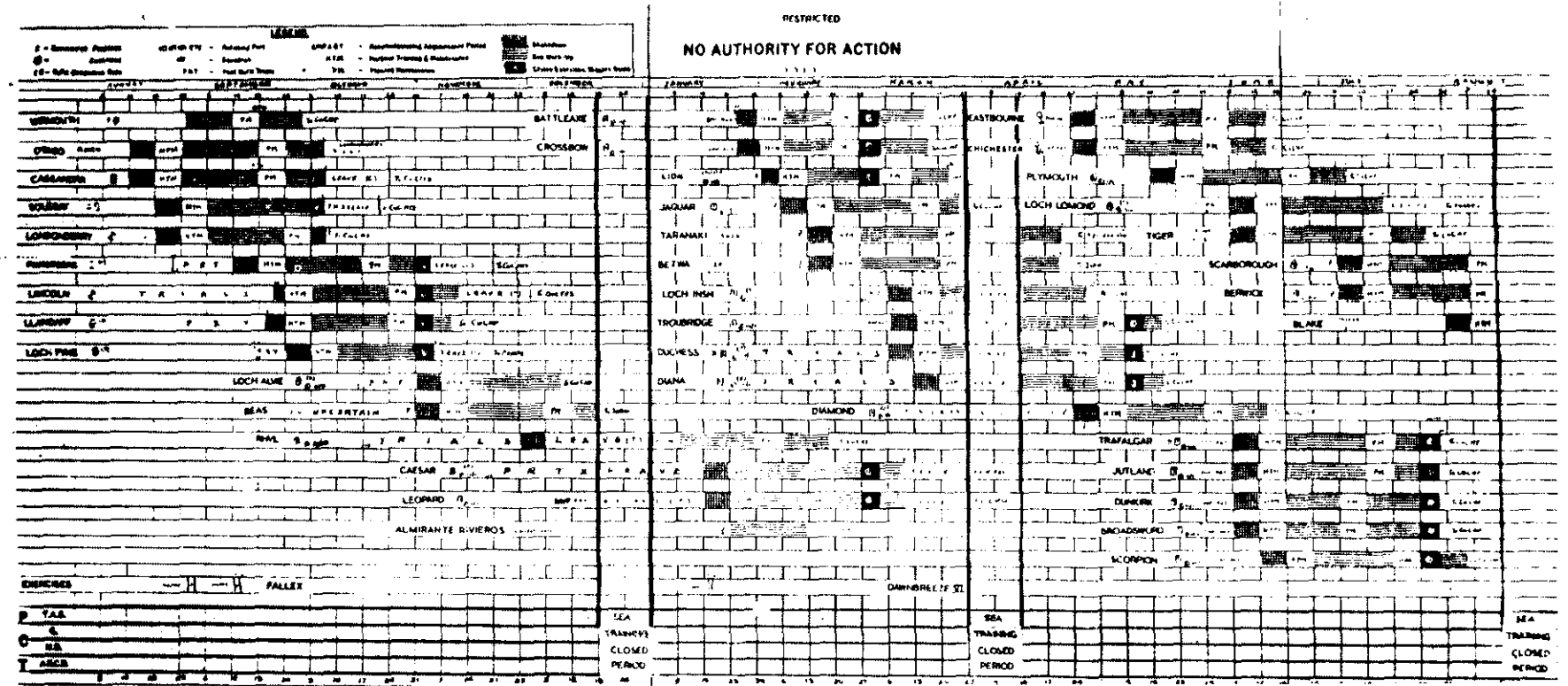


FIG. 3—FOST WORK-UP PROGRAMME

troops and 150,000 vehicles embarked for Normandy. The local Borstal boys manufactured degaussing coils for merchant ships.

Now to return to the present.

The Work-up (W.U.) Organization

The standard time for working up ships, though varied when necessary, is $7\frac{1}{2}$ weeks or 7 per cent of a G.S. manned orbit! It is spent broadly as shown on the strip plan (FIG. 1). On the ship being chopped to F.O.S.T. Command, after at least one week alongside since (re) commissioning, one week is spent alone at sea on shakedown getting to Portland. Various checks and preliminary or emergency drills are done by all departments as guided by F.O.S.T., and a scorecard, rendered on arrival, clarifying deficiencies. During this phase recommissioned engineering departments are encouraged to get in steady runs of two hours, duration at $1/5$ th, $2/5$ ths, $3/5$ ths and $4/5$ ths full power to compare the control pressure and temperatures of their machinery installation with ships' records, and establish the degree of erratic running of any of its components. Immediately after arrival at Portland each ship goes alongside for its Harbour Training/Defects (H.T.D.) week to make sure that it can start Work Up effectively, and not waste the expensive training aids available, e.g. helicopters, submarines, ranges. The Ship Maintainer Departments in agreement with the Base Technical Departments make good all seagoing defects likely to jeopardize the W.U. and tune their equipment. Only when those tasks are done are ships' technical staffs allowed to do harbour training and maintenance. Meanwhile the ships' user departments concentrate on harbour training (damage control, landing parties, shallow water diving, etc.) Subsequently W.U. proceeds with a series of graded navigational, gunnery, T.A.S., seamanship, A.B.C.D. and replenishment exercises. On the fifth or sixth week, as convenient to base resources, the ship returns alongside for a Planned Maintenance (P.M.) week, the priority aim then being reduction of the departmental P.M. backlogs, including the proportion of long dated schedules, to negligible proportions. Ideally the Base Maintenance Party (B.M.P.) send 50 ratings per type 12 frigate or destroyer, 40 ratings per Type 14 frigate and 30 ratings per Loch Class frigate to assist ships' staff for this purpose, divided appropriately between departments and skills. The ship then returns to complete her advanced W.U. exercises, ending with a $3\frac{1}{2}$ day and night Hallmark Inspection, under war conditions, in company at sea, where, for example, a convoy with occasional helicopter support has to be defended against resolute submarine, aircraft, cruiser and F.D.B. attack. In the process the R.F.A. tankers are also well worked up. During this period of high incident rate, the Technical Departments' leadership, organization and stamina is well tested, including damage control and day/night replenishment. (FIG. 2). This ordeal is sometimes viewed with mixed feelings (like Mother-in-law driving over a cliff in your new car), but, once accomplished, the self confidence of the entire ship is exhilarating.

Subsequently Flag Officer Sea Training raises three reports. The first is to the Admiralty certifying that the ship is fit to join its Fleet as an individual unit, with provisos where necessary, and feeding back operational achievements, training states and important materiel deficiencies requiring the Admiralty's policy attention. The second is to the next Commander-in-Chief, feeding forward operational and materiel details deserving his attention, and the third goes confidentially to the Commanding Officer (to be destroyed within one month) noting individual weaknesses in personnel, and minor organizational and materiel deficiencies of all sorts. Copies of the first and second reports are sent to all interested operational, refitting, building, work acceptance, class and instructional authorities.



FIG. 2—HALLMARK DAMAGE CONTROL INCIDENT

The Technical Aspect of Work Up (W.U.)

Materially there are four categories of ship for W.U. viz. new ships, ships after normal refit, ships after conversion/extended refit, and ships after recommissioning. It is important to note that the recommissioning date determines whether a small ship shall come to Portland, not whether it has been refitted. Unhappily refit completion dates tend to get delayed, to oblige the drafting authorities to recommission at the end of normal refit, which, of course, is the worst time for the Engineering user-maintainer Department.

Thus ships come to Portland any time from two weeks after recommissioning to 18 weeks after commissioning, and, because not only their machinery installations vary so widely, but also their history, crew experience and training state, it is vital to treat and assess each ship's materiel efficiency individually.

H.M. Naval Base proper has three sectors, Work Up, Resident Squadron, and Civilian. Of these the former is the most important, and the favourite (FIG. 3); but the Base maintenance organization has to support both the first and second sectors receiving assistance from the third sector only in emergency, as the civilians are fully occupied with their Port Auxiliary Service task.

The Base Maintenance Party (B.M.P.)

Organization (Capacity)

The complement of Portland's B.M.P. is 125, being thus a double F.M.U., but, because of its usual overload and the need to send a stream of rating replacements to ships, by the benevolence of C.N.D. Haslemere, its bearing is often nearer 150. (See FIG. 4). It is organized into four 'ship' departments of Hull, Engineering, Electrical and Weapons, each comprising skilled, semi-skilled, and unskilled elements. These ratings work a 35-hour weekly routine, of

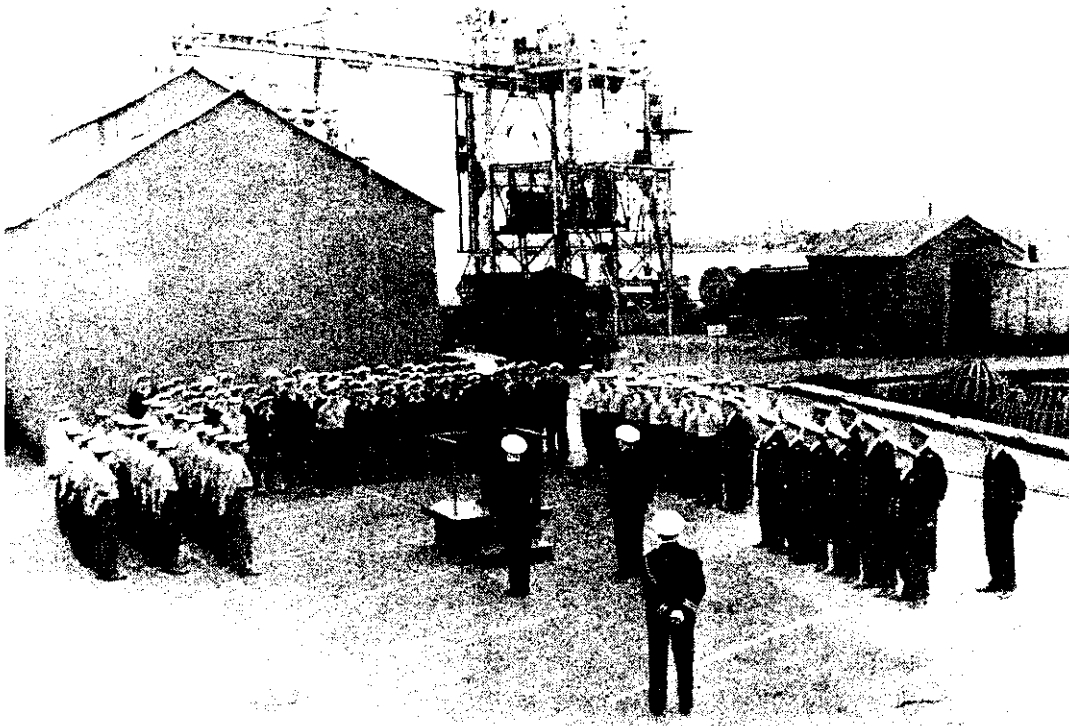


FIG. 4—FLAG OFFICER SEA TRAINING ADDRESSING THE BASE MAINTENANCE PARTY

which 30 are effective, thanks to close co-operation with *Osprey*, their barracks, and the vicinity of their workshops. It is impracticable to work them as they are complemented, and, in practice, they are deployed flexibly from a pool with work-up ships absorbing normally nearly 70 per cent of the effort, or twice the theoretical allocation.

Task

Their tasks in order of priority are :—

- (1) Rectifying sea going defects in either the W.U. ships or Resident Squadrons
- (2) Keeping planned maintenance state of the Resident Squadron ships up to date
- (3) Ditto W.U. ships
- (4) Reclaiming defective spares (mainly for 50th M.S. Squadron), since calamities must always be made good before the insurance against them.

On rare occasions there are insufficient ships to keep the B.M.P. occupied. Working parties are then formed to supplement assistance to any resident squadron ship in a Home Port, and in November, 1960, a B.M.P. 'Commando' flew to Gibraltar to assist *Londonderry* and *Verulam* on a special mission with gratifying results. The weapon ratings also do suitable specialist courses at their schools during this period, but, until *Sultan* gets modern instructional machinery, the B.M.P. engineering ratings learn on the job.

Plan

The Resident Squadron ships at present have a maintenance week every one in seven, though this is varied slightly to try to give the B.M.P. ideally one Work-Up ship, one 2nd Frigate Squadron ship, and one 50th M.S. or Channel Division F.P.S. ship per week. (Certain resident ships are experimenting giving seasonal leave in one watch, with a maintenance week every one in five.)

Before the week starts, ships and base officers agree departmentally the details of what the base and ships staff teams shall do ; normally the base accepts the

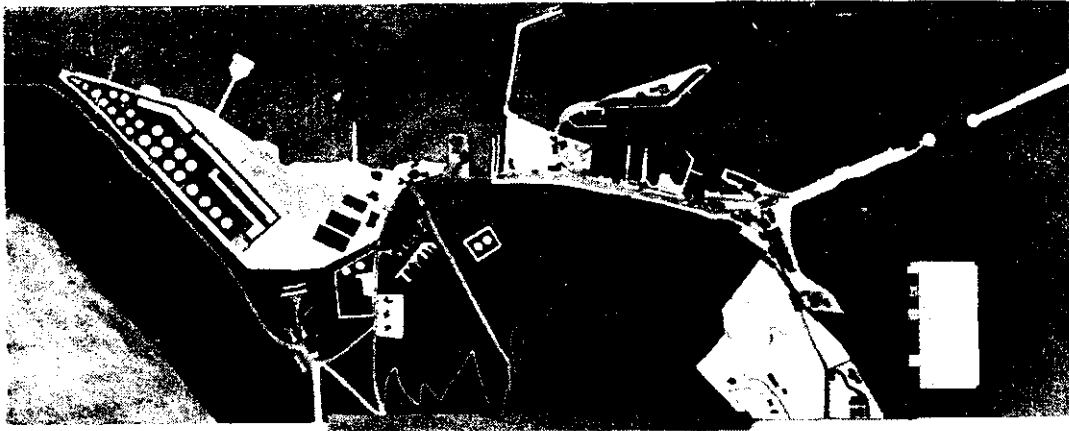


FIG. 5--LAYOUT OF H.M. NAVAL BASE, PORTLAND

machining and maintenance work, leaving ships staff to rectify defects, a proportion of which are normally of their own making at this stage of the commission! Ships staff are then urged to have available for Base Staff all foreseeable spares, stores and special tools for a mass start on the Monday.

As the Senior Base Officers are also staff officers assessing the ships technical efficiency, and usually have the balance of superior experience, the B.M.P. assumes responsibility and guarantees its own work in ships. Ships' technical officers remain officially responsible overall for the technical work done in their ships, and have full discretion to inspect the work of the B.M.P. at any stage. In practice, after their H.T.D. and P.M. periods, ships' officers are encouraged to test all systems early (normally on Friday) functionally, and then under power, so that any defects or loss of performance is revealed in good time before the work-up programme resumes in earnest on the succeeding Monday.

Facilities

The B.M.P. workshops, crew rooms and invaluable tank/bilge cleaning plant (*Journal of Naval Engineering* Vol. 12, No. 1, Art. 14) are situated ideally on the Coaling Pier, the thick limb of the lobster's claw (FIG. 5) next to the planned maintenance berths. The buildings are old fashioned, but reasonably well equipped for their maintenance role, except for electronic test facilities. They include combined machine, combined plate, I.C.E., electrical, electronic and shipwright shops. Dome exchange equipment for use by Base divers is available. Extra bench fitting, testing and spare gear areas will be added in 1962.

Plentiful shore steam, and distilled water (the Admiralty Experimental Distilling Station is situated at Portland, vide the *Journal* Vol. 10, No. 3) is available to all berths, but alternating and direct current supplies are limited, and fresh water also, in Weymouth drought periods. Sullage discharge facilities are poor. Condensate brine scale removal equipment can be requisitioned.

The Admiralty is supplying extra suitable A.C. power, but is unlikely to be installed before 1962, nor keep pace with the expanding requirements of the Base.

Supporting Civilian Base Organization

Although Portland Dockyard has closed, its total of some 2,700 civilians and workshops remain, though in a completely reorganized form. Thus the Admiralty Underwater Weapons Establishment has absorbed the eastern group of workshops, including the foundry, the Navy Works (who is now responsible for all Base Services which in a dockyard would be run by M.E.D. and E.E.M.) is using the main machine shops in the western group.

Before the Dockyard closure the ship refitting/repair element numbered



FIG. 6 LITTLE MONSTERS—F.O.S.T. TECHNICAL STAFF AND B.M.P. CONTROL

over 800 industrials. Nowadays this Vote 8 complement has been reduced to 100 men, and is responsible mainly for the defect rectification and maintenance of the 70 strong Port Auxiliary Service Craft, and slipping of the 40-odd harbour (as distinct from ocean-going) craft. This Port Auxiliary Repair Unit (P.A.R.U.) is well housed in part of the former Coastal Forces Base, behind the 42-ton boat lift gantry, comprising integrated mechanical, plate, and pipe workshops, a feature which, for economy, will doubtless evolve in time in the dockyards themselves. Although P.A.R.U. should not carry out White Ensign ship work, other than to instal A.U.W.E.'s experimental fittings, it does so in emergency, or for small repairs where the loss of time to ships' programmes is uneconomic and unacceptable.

The Naval Stores organization naturally has been hard put to keep pace with the increasing R.N. tempo, and has been obliged to fit out the ex N.A.A.F.I. bakery as an additional store to its former seaplane hangar.

Although all Base departments work a 42-hour week (0700-1600/1615) skeleton staffs match the overlapping naval activity to the best of their ability, and spares, stores, etc. are sent to ships, when they return late at night by the naval manned staff boat.

When is a Dockyard not a Dockyard?

With the transfer of the only (floating) dock to Portsmouth, and the loss of its main workshops to Vote 6 and 10, realistically Portland Dockyard has closed, having negligible ship (as opposed to boat) repair capacity, as announced by the First Lord (Hansard 232/104 dated 5/7/61).

The legal control of local waters, however, depends upon the Dockyard Port Regulation Act of 1865! Meanwhile, Ensign continue to issue Portland

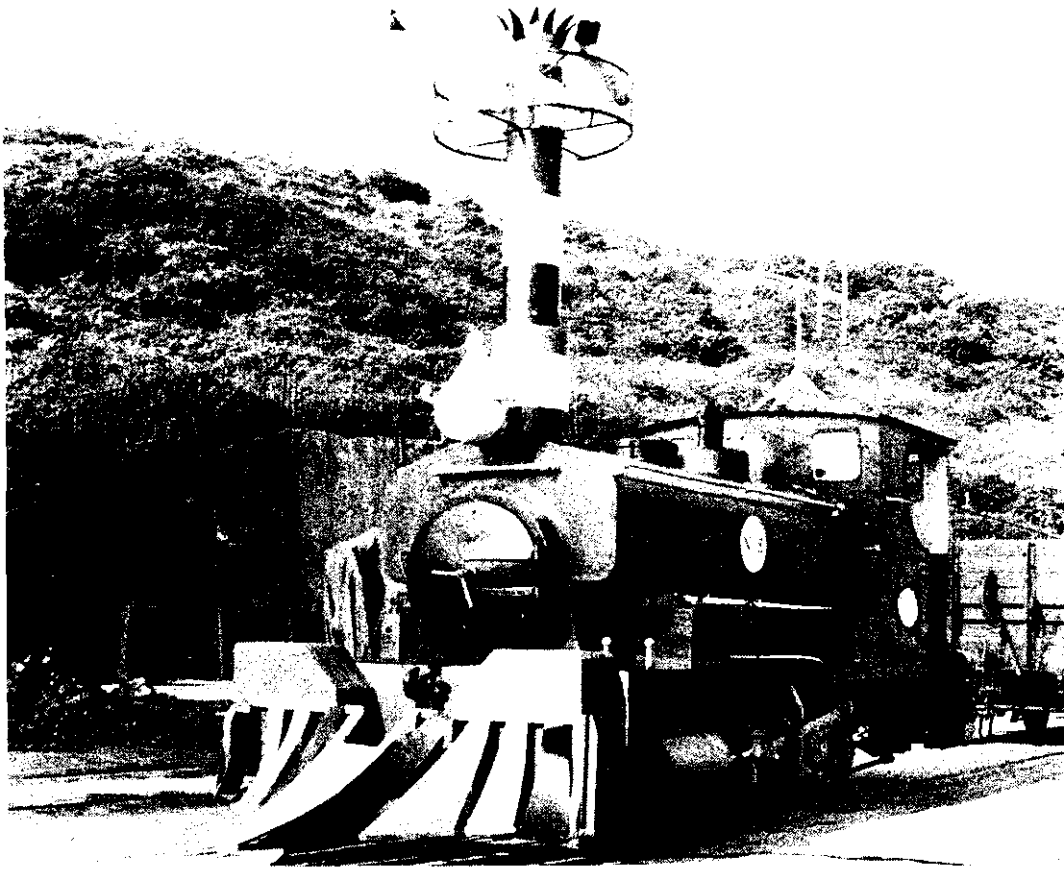


FIG. 7.—SPY CATCHER—1961 MODEL.

Dockyard financial programmes, while denying that the Establishment is any longer a Vote 8 establishment. Does it matter? Well it is confusing to visitors, naval or civilian, and the Admiralty certainly does not understand it (A.F.O. 1596/61), so the paint brushes have been out eliminating dockyard signs, wherever possible, in favour of the new complicated little monster, the Naval Base, H.M.S. *Basilisk*. A basilisk incidentally is a fabulous reptile hatched from a cock's egg, whose look and breath is fatal. (The matelots, being topical, however, prefer to call *Basilisk*, Ethel ! (FIG. 6). Profile of the 1961 Base Spy Catcher is shown in FIG. 7.

MATERIEL EXPERIENCE

General

The technical object of work-up ships is to remove any (re)commissioning material teething troubles. Some trouble is to be expected. Even so major, or avoidable materiel trouble, now that the ship is in its active phase, is unwelcome. Conclusive statistics are not available, but as a minimum, maloperation accounts for 10 per cent of the defects experienced at Portland.

Broadly over this wide range of small ships of differing age, ordnance engineering has given the least trouble, electrical engineering not very much, hull and electronic a lot, and marine engineering usually the most, though naturally there have been exceptions.

Nor must it be thought that the executive user is trouble free. On the last Hallmark, ships being inspected sometimes needed prompting by their attacking submarines, got caught napping by high-speed aircraft, fired at their own low-speed aircraft, changed identities inadvertently during the night, illuminated the wrong target, gassed their own landing parties, and often got outmanœuvred by their more experienced adversaries!

Ordnance Engineering

With a present 75 per cent overbearing of O.A.s, the B.M.P. O.A. section has been divided into Control and Weapons teams. The Control team has successfully diagnosed *Jaguar's* faulty C.R.B.F.D/X. mounting, *Broadsword's* incorrect S.T.A.A.G. wiring, checked bench marks with positional errors in *Troubridge* and *Loch Class*, supervised *Troubridge* mortar/control system trials, and instructed ships' maintainers in armament alignment, and equipment tuning (the latter to report a weakness reported by Med. Fleet).

There have been some dirt-in-system troubles, viz. *Plymouth's* 4.5-inch elevation ram, also gunhouse beam grit discharging over right gun mechanism, *Taranaki's* 4.5-inch pressure ram, *Scarborough's* scale in mortar range valves from ineffective jacket pickling etc., but few of neglect, viz. *Battleaxe* S.T.A.A.G. gearbox sludge, *Eastbourne's* 4.5-inch overriding the hoist stops. The Weapons team has dealt with numerous 4.5-inch rammer and hoist troubles from dimensional inaccuracies, and rectified defects as required, e.g. replaced *Dunkirk's* S.T.A.A.G. gyro unit, *Eastbourne's* gyro air supply unit, renewed A.S. Mortar Mk. 10 hoist channel beams in *Londonderry*, *Otago*, *Talwar*, etc.

Attitude is no longer the art of gunnery!

Power Electrics

New Type 12 frigates have suffered extensively from low hygroscopic insulation of fans (A.F.O. 1317/61). *Lynx* and *Jaguar* single-phased their steering motors, and *Taranaki* and *Berwick* a generator by faulty D.C. drill. One of *Otago's* main stators failed from dripping salt water cooling connections. C.R.T.s of the J.Y.A. plotting tables have had a high failure rate. In the older ships badly worn equipment and perished wiring have proved troublesome, e.g. *Dunkirk*.

ELECTRONICS

Tuning

Radio, weapon and A/S equipments frequently have not been at optimum tune due to lack of experience of the maintenance complement in diagnosing faults. The stocks of Group F spares, aggravated by lack of standardization, often have proved insufficient. Ships cannot be kept running on 'Inability' signals.

Aerials

Low insulation of aerials has been contributed by faulty trunk manufacture and unsatisfactory dealing of cable joints. *Rhyl* was a bad example.

General

Radars in a low modification state have proved temperamental.

The normal refitted ships have suffered from lack of full sea trials by an outside authority.

HULL

General

Except for new ships, the hull materiel state has left much to be desired. Recurring troubles have been untested, poorly fitting watertight doors, hatches, scuttles, deadlights, ventilation flaps after rerubbing; badly worn mechanisms usually to boiler-room top air lock doors; seized boiler-room intake flaps, e.g. *Battleaxe* had no clips; strained davit turning out gear; absence of A.B.C.D., and replenishment gear storage brackets. *Crossbow* was a bad general example.

Many ships not only have been sadly adrift with their W.T.C. air pressure tests, but have been without the gear to do so (A.F.O. 669/60). All ships are obliged to demonstrate their ability to carry out one such test satisfactorily during the P.M. week.

Loch Insh arrived with No. 5 F.F.O. tank leaking badly from the sea from three dozen rivets, to demonstrate the unsuitability of Rosyth's pressure test while in dock!

MAIN MACHINERY COMPARTMENT (M.M.C.) BILGES

Many older ships arrive with boiler room bilges seriously contaminated with F.F.O., and sometimes dangerously so, e.g. *Battleaxe*, *Crossbow*, *Eastbourne*. Where the ship has just refitted, either insufficient time has been allowed in the completion programme to huck out the dockyard dross, or no T.C.V. has been provided (A.F.O. 459/61). Rosyth is particularly vulnerable, having no T.C.V. of its own, power cleaning facilities being essential for the modern inaccessible bilge. The Oil in Navigable Waters Act 1955 (A.F.O. 1502/61) requires far sterner measures to prevent small ships leaving their Home Ports in this disgusting condition.

To keep the boiler room bilges clean for long also defies most ships staffs. O.F. pump glands are rarely tight unless packed with Walker 'Lion Chevron' or Allenite rubberised rings, but numerous F.F.O. system valve glands fail to remain tight whether packed with *Rate Book* hemp, S/H steam packing, or dry asbestos ZX 13 lubricated. Apart from correct fitting the proper packing material needs to be reassessed. Meanwhile the mockery of a spillage tray under the O.F. pumps cries to be sensibly redesigned.

Collisions

At peak periods Portland's berths are congested and the capricious weather conditions are notorious. During this period there have been ten collisions in which *Broadsword*, *Caesar*, *Grafton*, *Leopard*, *Murray*, *Plymouth*, *Taranaki* and *Trafalgar* have suffered hull damage, which has been either permanently, or temporarily patched by the B.M.P. with its electric welder. *Trafalgar* wins this league with a hat trick, being more sinned against than sinning. *Broadsword* caused three of these damages by breaking loose while warming through turbines, an unorthodox method wrongly applied being to blame. Unscheduled check lists for warming through steam machinery should not be tolerated, and engineer officers are strongly advised to write out their own detailed warming-through orders on each occasion in the early days of a commission. Trim your lamps to give more light and less smoke!

Hull Outfits

The fairing plate screws were of the wrong material or too permanently secured in *Broadsword* or *Jaguar* to impede a Dome exchange by B.M.P. divers.

MARINE ENGINEERING

New Ships (New Tyres)

New ships have been most encouraging in the propulsion aspect. Dirt in the sophisticated systems on assembly remains the implacable major enemy, holding nowhere sacred. Thus *Rothesay* and *Talwar* had serious main gearing bearing trouble, and *Rothesay*, *Rhyl* and *Taranaki* turbo auxiliary defects from this cause. *Taranaki* had closed feed and deaerator defects, and *Rhyl* auxiliary boiler controller faults from foreign bodies. Few have emulated *Plymouth's* example of insisting on adequate dirt strainers until the feed system had been well flushed through. More imagination is required, the quality a wife takes to bed with her when her husband is out late! Both *Taranaki's* intermediate shafts had to be skimmed after shot and turnings from the shipbuilders tubes had entered the shaft bushes.

The Shipbuilding Industry's standard of cleanliness compared with the Aircraft Industry's is lamentable, due to inadequate inspection. With even more

sophisticated machinery soon coming into service, reform is urgent. (A.F.O. 1531/61).

The Type 41/61 frigate Diesel machinery has performed admirably as long as it has been correctly and cleanly assembled. A gudgeon washer in *Beas* P3 engine disintegrated. *Betwa* was even more unfortunate, having to clean shot blast grit from the main lubricating oil rail of seven main engines with assistance from a Portsmouth Dockyard outport party.

By way of variety *Londonderry* had an auxiliary boiler uptake fire from faulty insulation, and *Betwa* fuel starvation of main engines, despite the incredulous Admiralty, because the aerated discharge from the separator had been led to a few inches from the ready use tank suction.

Commonwealth ships naturally regard the brief W.U. period as their effective guarantee period also, and Contractors' services are much sought. Where F.O.S.T. Staff is used as an intermediary this development is a nuisance, justifying a resident liaison officer, but latterly the R.N.Z.N. ships have proved stoutly self-reliant, and Admiralty design departments are tending to use F.O.S.T. only as an information address.

In general all these eleven new frigates were fine, with *Yarmouth*, *Otago* and *Plymouth* outstanding, except for *Rothesay* who experienced far too much joint dirt, and casting trouble from careless construction.

Conversion/Extended Refit Ships (Retreaded Tyres)

This category of six ships, although less good materially than the new frigates, have not overloaded Portland's resilience. *Diamond*, ex Chatham, was exceptionally fine, and *Caesar* ex Rosyth at least as good, except, regrettably a series of lime trays had been left in each saturated Melesco superheater header, the connecting bolts and calcined stones from which blew over to play Old Harry with the ahead throttles! *Loch Alvie* ex Devonport performed excellently, though the M.M.C. were grubby, and *Diana* ex Devonport was also satisfactory. *Duchess* ex Portsmouth was disappointing generally, the inaccessible nozzle control valves seizing, and the port main condenser and several auxiliaries failing. The only really bad ship in the engineering line was *Cassandra*, ex Chatham, with multiple steam, water and fuel system defects (including a useless No. 1 O.F. heater). Finally both main feed pumps failed, one from previous faulty assembly at a Contractor's yard, and the other from excessive vibration, necessitating her return to Chatham for extensive general rectification.

Straight Recommissioners (Changed Tyres)

The first straight recommissioner to arrive, *Troubridge*, was heartening in that its engineering defects were so trifling, that the B.M.P. remained undiverted from its proper task, maintenance, to reduce its backlog to zero.

The only other straight recommissioners, the 7th D.F. were not typical in that their hulls were elderly, and the *Battles*, not having been adopted for P.M., their servicing routines were poor. Both *Dunkirk* and *Jutland* had feed water trouble: the former from erratic regulators and the latter from 'B' boiler-room leaks, also generator defects and corroded pipes and emergency rod gearing. *Jutland* and *Broadsword* also had pronounced evaporator output trouble from watchkeepers and inoperative compound injection equipment. *Broadsword*, exceptionally, not only was adopted for planned maintenance, but was using the 'Kite' visible work load display board, with miniature schedule and job cards. Her compartment servicing boards in perspex were a derived bonus.

Recommissioning Immediately After Normal Refit (Thin Tyres)

The worst engineering group of work-up ships coming to Portland is that which recommissions immediately after normal refit. Recommissioning at

this time should only happen exceptionally (A.F.O. 952/60), but, at the moment, the exception is the rule 70 per cent of the time. This unfortunate practice asks for trouble in the engineering user/maintainer department, since the old commission is tempted to render unrepresentative main defect lists, fails to supervise the refit, or do its share of the refit efficiently. Meanwhile the new commission, if the Engineer Officer and his key ratings are unfamiliar with the machinery installation, or lacking in drive, get off to an indifferent start by maloperating the machinery and systems to hazard the mobility of their ships. Too often dockyards do not complete their work to time at the terminal and completion date stages, so that the new commission arrives before the main machinery compartments have been properly cleaned out, or the partial repair trials completed.

Of the various types of ships in this category the robust *Lochs* have behaved well, with *Loch Fyne* ex Rosyth very good indeed. The Type 41/61 Diesel frigates, too, have been reasonable, apart from badly leaking A.S.R.1 crankcase doors and oil joints generally. *Llandaff* damaged a crankshaft balance weight, *Leopard* had some clutch sticking and *Chichester* sluggish pneudyne engine controls from overgreasing, two hot shaft glands and left limited to 22 knots by super-charger cooler corrosion trouble from leaking exhaust flaps.

The major trouble can thus be narrowed to steam turbine propelled destroyers and frigates in this category, which depend so much on the efficient operations of their systems, and, in particular, to *Battleaxe* and *Eastbourne* (Ch).

Crossbow (Ch), *Finisterre* (Ch) were not much better, the former having an excessive water rate, and the latter greased up main condensers, while *Scarborough* (P) would have been as bad if her refit had not been extended by three weeks by C-in-C. Home Fleet. *Battleaxe* and *Eastbourne* each arrived in tow, plagued by an excessive number of minor engineering defects, with boiler room bilges dangerously dirty and contaminated with F.F.O. Neither had completed the prescribed two-hour partial repair trial. Soon after going to sea from Portland *Battleaxe* tipped her port L.P. turbine and *Eastbourne* burst tubes in both main boilers! *Eastbourne* later discovered hot stern tubes.

PLANNED MAINTENANCE (P.M.)

Ships at Portland divide themselves into two classes, those which run and those which do not carry out their P.M. routines.

Although the standard method of installation of P.M. is plain (A.F.O. 240/57) almost every ship prefers its minor variant, usually for good reasons. The cards, however they are arranged, represent a quarter's work and the vital aspect is to get this work done, while immobilizing machines and equipment as seldom as practicable in the process.

Even more important than negligible P.M. backlogs is regular comprehensive servicing (buff card routine), and daily user tests of equipment in all departments. F.O.S.T.'s staff check all these aspects in each ship, also that semi-skilled maintenance work is being properly apportioned, and that a simple statement showing the current maintenance achieved against target number of schedules, with its significance, goes to the Command monthly. Costing schedules in man/hours is regarded as a nugatory pastime, because the rectification element is so erratic.

Ships' records of all sorts are also sighted for completeness, the ordnance master record being a persistent offender, both for new and refitted ships. Every variety of ship planned maintenance state is seen at Portland viz. adopted, self adopted, heavy backlogs, up to date, or forged!

New ships have the incalculable advantage of having their P.M. systems installed with their material unblemished, so it is rare for them to leave Portland with other than a negligible backlog in any department. Modernized ships are

often as good, e.g. *Caesar*. The few straight recommissioned ships received so far have been reasonable, but the recommissioned ships ex normal refit are usually bad, being swamped with minor defects. Indeed F.O.S.T.'s rule of thumb is that if a ship arrives with an engineering P.M. backlog of over 200 schedules its materiel level is so low it will never catch up at Portland.

Work-up ships being passing wonders, the Resident Squadron ships are studied for reliable P.M. trends, and, in particular, the six Type 14 frigates. P.M. has now been installed in the latter for over three years, and *Hardy*, *Grafton* and *Pellew* have shown negligible sea going engineering defects during this time. *Keppel* and *Dundas* have been creditable too, only *Murray* defaulting. This Second Frigate Squadron, incidentally, are day runners, the continual shutting down of steam tending to raise the general wear and tear. Only *Keppel* avoids these thermal reversals by always remaining flashed up during the working week!

Over Insurance Evaluation

Encouraged by these results F.O.S.T. is now conducting an experiment to shake out any over insurance in these Type 14 frigate P.M. schedules, by extending all three-monthly schedules to four-monthly and the longer dated schedules pro rata. So far the results are favourable in all departments. Preliminary, rather sketchy, statistics indicate that the Second Frigate Squadron is dependent on Portland for one third of its maintenance work at present.

Also being investigated is what schedules must be done by ships staff during normal and extended refits on items untouched by the dockyards. By making use of Reserve Fleet's preservation routines and experience, considerable saving in labour and rationalization of approach is anticipated. The results should assist making steam P.M. machinery items mandatory, rather than discretionary, like running-hour items, which keep I.C.E. driven ships so reliable.

Bull Points

Taranaki began doing the proper proportion of 18-monthly P.M. schedule items soon after first commissioning to get right the stagger. As a result dirt was removed from the wearing surfaces of important auxiliaries before it had done any harm. *Taranaki's* spare gear concertina racks, and metalcraft cabinets mark an important advance in being able to get hold of spares quickly.

Diamond was the ship best organized for servicing. Each M.M.C. had its servicing equipment stowed on a 'shadow' board, with the detailed routines, under perspex, adjacent. Wide use had been made of stove enamelled gauge panels, attractive plastic engraved tallies, and chromium plate to crop the unskilled 'spit and polish' task still so prevalent in engineering departments today. Built-in boiler water washing distribution system, and tightly organized workshops were other good features to expedite maintenance.

Broadsword has an effective visible display of the planned maintenance task and achievement, to which the defect position has been neatly grafted, as developed by Fleet Work Study. The diminutive schedule and job cards are difficult to read, however, in the M.M.C. *Grafton* also has long been using an excellent alternative for its simple layout.

Further Defects for the Collector

On occasion the Second Frigate Squadron (FIG. 8) falls from grace. *Keppel* vibrated her cruising turbine to delay important fluidrive clutch trials and burnt out a Portsmouth Dockyard donkey boiler, *Pellew* burnt out her galley, *Verulam* corroded through her main inlet shipbuilders tubes, *Dundas* sprinkled her boilers liberally with O.E.P.90 lubricating oil, indirectly through mal-operation of the separator heater, *Brocklesby* achieved the heaviest salt water contamination of main boilers at 100 grains per gallon (previously disputed

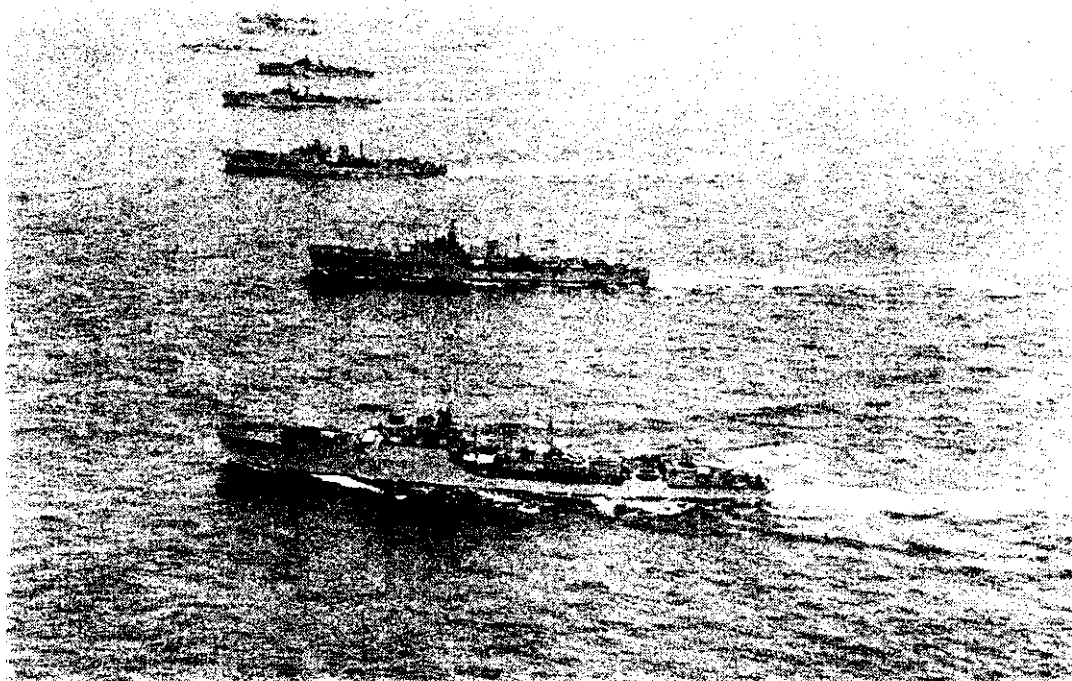


FIG. 8—SECOND FRIGATE SQUADRON

by *Diana*, *Battleaxe* and *Finisterre*), and *Murray* twice flooded remote compartments from abandoned hull and fire pumps.

The 50th Minesweeper Squadron has been docile, apart from its supernumerary, S.D.B. *Tilford*, which overheated its Paxman YHA blown main engines from exhaust leaking at high power into the cooling water, and *Yaxham* who lowered its lattice mast to comply with a three monthly P.M. routine, but unfortunately about the wrong (unspecified) fulcrum to strain both it and its radar cables! The resident tanker *Black Ranger* upheld commercial honour valiantly, apart from tearing out most of her forward cast iron winch during a towing exercise.

Loch Ruthven jammed one wire-operated telegraph, when approaching *Black Ranger*, because of absence of its transmitter stop.

Loch Class frigates' boilers on conversion to pattern 6300 sprayers have pulsated until the distance of the combustion tube from the brickwall has been increased beyond specified limits.

Virtually none of the Type 41/61 frigates, whether old or new, have had a serviceable Elliott main engine cooling water temperature board, either the thermocouple joints or their long leads becoming defective. Foster main steam temperature gauges in Type 12 frigates have also been unreliable.

PERSONNEL

It is difficult to generalize about personnel, yet the compression of this article permits no other treatment. As Napoleon said, 'Morale is three times as important as material in war', and for modern complicated small ships that holds for peace-time too.

Generally the A/E, O/E specialist officer, and the C.E.R.A. specialist BM/CS,

or 5th fives understandably do less well during work up, particularly where the aftermath of a normal refit is involved, than their, 'dyed in the wool' brethren. Chief mechanics, too, tend to do better commissioning a new ship or recommissioning a modernized one, where the bringing forward tempo to work-up is slower, but, of course, there are glorious exceptions.

To improve matters Manadon now runs a Ship Husbandry Course for rusty engineer officers, and means of giving *Sultan's* P.C.T. a more practical flair are being discussed. For ships crash recommissioning after normal refit, F.O.S.T. is preparing standard organization guidance notes, and vital checks and emergency drills per class of ship to be done during the shakedown period. An experienced C.E.R.A. 'ship rider' is also loaned to this category of ship to reduce any maloperation of machinery systems, en route to Portland.

Squadron officers cannot be relied upon to help their ships during this vital pre-work-up period, because either they are engaged in their own ship, or are on another Station. Whether the Squadron system should be retained for the small ship navy needs review. While it is retained, annual Squadron reports require to be organized on an objective material assessment basis.

M.M.C. should be organized under an E.R.A. (C.P.O.) to cover the maintenance task, and also accord with the new engineering merger (A.F.O. 650/61); likewise shelter stations. Keeping the E.R.A., P.O.M.E. skilled/semi-skilled organizations separate under the Engineer Officer, as was common in the last war, is now obsolete.

The more advanced engineering departments have their training schemes (A.F.O. 272/61) started even at the work-up stage. The 7th D.F. straight recommissioners had not even received their ratings' service certificates!

Engineer officers who run their departments on a tight rein prior to and during work-up get rewarding results, to which bad luck is the only exception.

CANDID FOCUS

The small ship has always been self-supporting, and given a good account of itself, so why this furore? The trouble is that the vast naval technical experience dispersed ashore is failing to back up with effective close support. The assumptions of an unforgettable past are not the surest guide to an unpredictable future!

Normal Refit Organization

The major weak spot is the organization for the normal refit of small ships, whether or not such ships come to F.O.S.T. Normal refits are dual control between the dockyard and ships staff and, with the present degree of inexperience afloat, it is essential for Home Port senior technical officers to integrate themselves effectively with ship's staffs for pre-refit trials, dockyard conferences, and post refit trials. Plymouth is consolidating such changes and already Devonport small ships, on the whole, have given the least trouble, with *Rosyth's* as good, but grubbier.

Normal refits are accepted by the Commanding Officer, and his chief technical officers on Form S.237 (though sometimes in retrospect, due to its tardy arrival). In future, where an unreasonable number of minor defects are outstanding, or the ship is dangerously dirty, the Commanding Officer should conform to the undertaking given in his Commissioning Warrant to support his Technical Officer in refusing to sign this indemnity, until a satisfactory and clean finish to the refit has been obtained. This action needs guts, and will be as popular as a pork chop in a synagogue with the operational and refitting authorities, but should command the full hearted support of the work acceptance ones, as, until this is done, the meagre F.M.U.s and B.M.P.s will remain

substantially misemployed post refitting, and will be unable to provide the Fleet with a proper reserve of serviceability by means of up to date maintenance.

Dockyard Readjustments

To cope with this overdue tightening of small ships' material standards and the virtual elimination of Reserve Fleet 'hospital' ships, the dockyards surely ought to discard their traditional master policy of deliberately overloading their ship task to ensure each of their forty or so trades being always kept busy, in favour of flexible higher labour loadings per ship, with a single superintendent in charge of each ship. The time also is surely ripe, in these days of threatened national pay roll tax, for the dockyards to face up to pruning firmly its marked unbalance of trades to match the new pattern of refitting task set by the modern Navy. Further it is suggested that the dockyards should emulate the Aircraft Yards by organizing the equivalent of separate Flight Test Section finishing off parties. When properly organized these changes could result in ship dates often being brought forward, instead of drearily drifting to the right, as is normal custom.

A new attitude is also necessary against fouling up inaccessible small ships' bilges during normal refits on the present scale. Current dockyard afloat incentive schemes penalize workmen for slowly draining pipe systems etc., hence the mess, which traditionally is ships staff responsibility to clear. Either the incentive schemes need renegotiating or out-of-work-hour contract cleaning parties organized on the U.S. Navy Yard pattern. Some dirt inevitably will remain, requiring more T.C.V.s to be available (there are none in the Building Programme) than at present.

Dockyard job cards, when based on ships staff survey must reflect that information, and not get it distorted in remote planning offices. Only planning with a light hand is economic for the Navy's overhaul businesses! Too many dockyard packed glands and remade joints leak after refit. A regular change of personnel between ships and shops is advised to harmonize workmanship standards!

Admiralty Maintenance Organization

The effectiveness of the present D.F.M. organization (A.F.O. 997/60) vis-a-vis D.M.E. and D.A.P. could well be examined against the U.S.N. BuShip organization, where ships under design, building and up to one year's running experience are divorced from those beyond their acceptance teething troubles, until they get scrapped.

At outport naval level, effective pre-refit sponsor and work acceptance organizations, to restore the necessary balance of material experience to small ships, is receiving a Committee's attention. The ideal committee, of course, consists of two members one of whom is unavoidably absent, and the other knows what he is talking about!

Appropriate cyclic P.M. support must be insisted upon to prevent these relatively fragile small ships from being over-run, and to enable these troublesome normal refits to be extended to one per ship per modernization. Technical executive power in the Commands seems dangerously weak.

Recommissioning Procedure

Many a true word is spoken in jest. During the last war the most successful small ship runners appeared to be those in which the top three in the Engineering Department were all on the ball. One had to sleep. So ill assorted for experience are some of the engineer officer/key rating teams recommissioning modern small ships that integrated appointing by D.O.A.(E). with C.N.D., Haslemere, seems overdue.

To breed the team spirit early the Engineer Officer and his key ratings ideally

should do their precommissioning training courses together, and the machinery operation instruction, particularly for Y.100 and later designs, should have a more practical flair (A.F.O. 2038/60).

More formal turnovers between engineer officers should be insisted upon, as some are nebulous at present. 'It is not alone what we do, but also what we do not do for which we are accountable (Moliere)!' or in 1961 lingo, 'Fings ain't what they used to be.'

Finally recommissioning at the end of normal refits must stop despite the expense of the straight alternative, while the present abuses remain.

Conclusion

'The wheels always go round' was the proud motto of the Engineering Branch through two successful World Wars. Now, for small ships, as has been shown, it depends more on their tyres!

A few further organizational adjustments, however, can soon put matters completely right, on top of the gradual general material improvement already evident at Portland since 1959.

VALETE

This is the Author's fourth and last *Journal* article, and it is time to say goodbye. He has enjoyed every minute of his 35 years in the Service, and wishes he was young enough to enjoy the challenge of the modern small ship, which it has been his privilege to study at first hand.

With the simultaneous arrival of the General List, and a further rapid naval engineering technological advance, he advises all engineer officers to perfect their professional standard. Remember Esau.
