

WAR EMERGENCY DESTROYERS

The 'O' to 'Z' classes described and modelled

By PETER HODGES

PREVIOUS articles in AIRFIX magazine have dealt with a number of British destroyer classes and have given details for the conversion of the existing Airfix *Hotspur* and *Cossack* kits.

Chris Ellis has covered the 'A' to 'I' class ships, Ian Whitehead the 'J' to 'N', while Allan Gwinnell has shown us the detail differences in the 'H' boats as a whole.

My own earlier destroyer article jumped to the 'Battle' class (July 1969) thus creating a gap of ten classes to say nothing of the extensive group of 'Cs' which followed.

The aim of this article is to deal with the majority of these classes. It will be divided between this, the first part, in which the background of the ships will be traced; and a second part, next month, which will detail the conversion of the *Cossack* kit.

As has been said elsewhere, the emergence of the 'Tribal' class ships before the war, heralded a new concept in destroyer design. But although the 'Tribals' were very fine vessels in many ways—and sixteen were built for the Royal Navy—they were expensive and could not be produced quickly.

They were followed by a reduced design in the 'J', 'K', and 'N' classes, which suppressed one 4.7 inch mounting and re-introduced two sets of torpedo tubes; and this in turn was revised to produce the big 'L' and 'M' class ships. Like the 'Tribals', the five classes were similarly expensive, so that at the outbreak of the second world war it quickly became clear that a simpler vessel was required. It was to embrace the constructional features of the post 'Tribal' ships—that is, to be longitudinally framed, and to have a single funnel—but to revert to single hand-worked 4.7 inch guns instead of the power operated twins previously fitted. As might be imagined both types of twin 4.7 inch mounting were complex and took many months to complete. The standard arrangement of Fire Control equipment introduced in the 'Tribals' was to be retained and full torpedo armament carried.

The outcome was the War Emergency classes, so very nearly identical that one basic hull served for most ships.

THE 'O' AND 'P' CLASS

The first sixteen ships were somewhat makeshift, no doubt caused by the transition from their big predecessors. Insufficient guns of 4.7 inch calibre were available for first fitting, and most 'O' and 'P' class had an extemporaneous armament of four elderly 4 inch HA guns of 1918 vintage. Some, indeed, were completed without the after bank of torpedo tubes, the site being taken up by a fifth single, open 4 inch HA. The other 4 inch guns in the conventional positions usually had substantial gun shields, and all sixteen ships were designed for rapid conversion to mine-layers.

In keeping with their armament, they had a small open topped dual-purpose director on the bridge, of much the same style as the HA director in the 'Tribals', but not mounted on a 'stalk'.

Compared with their successors, the 'O' and 'P' classes had a noticeably different bow. The rake was more upright and the fo'c'sle deck rose sharply in the eyes of the ship, giving it a 'trawler bow' appearance. Altogether, this bow arrangement reduced the overall length from the standard ship which was to follow and because this makes conversion difficult I have not attempted to detail the work involved.



Above, top to bottom: HMS Opportune shows the shorter 'trawler' stem which characterised the 'O' and 'P' classes, and the old 4 inch guns with which these earliest classes were armed. Note the mine laying chutes at the stern and the lattice mast which was a post-war fitting. HMS Quail shows the early small shields fitted to the 4.7 inch guns of the 'Q' and 'R' classes, also the 'Quad' pom-pom abaft the funnel (P. A. Vicary). HMS Rotherham in 1945 with red/white candy stripe funnel bands as a flotilla leader and red/yellow Carley rafts. Note the prominent warning surface radar aerial on its pylon amidships and the catwalks between the after deckhouses (A. & J. Pavia).

THE 'Q' AND 'R' CLASSES

The final hull design came closer in these two classes, although there were again slight differences. The bow became more raked, and the 'trawler' appearance was less evident, but it had not yet taken on the final form. Nevertheless, these minor differences were hardly noticeable, so one basic hull will now apply.

This group of sixteen had their proper main armament of single 4.7 inch guns, similar in appearance to those fitted in the 'H' and 'I' class destroyers. They were protected by a small rather box-shaped gunshield, and were controlled by the standard arrangement of DCT for surface fire and HA range-finder director for AA.

The close-range armament comprised various combinations of pom-poms and 20 mm Oerlikons, both calibres being largely supplanted by 40 mm Bofors towards the end of the war.

THE 'S' CLASS ONWARDS

The hull had by now been finally standardised and the ships followed in alphabetical class order through to 'Z', but excluding 'X' and 'Y'. No doubt the task of finding eight understandable names beginning with 'X' was too much for a hard-worked Admiralty Ship Name Committee, but the exclusion of eight 'Y' class is not understood.

The 'S' class introduced a new 4.7 inch gun mounting in a much more substantial shield, affording a higher order of protection for the gun crew, at the same time making the mounting more weatherly. One ship of the group—*Savage*—was selected as a trials ship for the new twin 4.5 inch mounting destined for the forthcoming 'Battle' class ships. Her own 'A' and 'B' guns were replaced by the prototype twin fitted in 'A' gun position; and to preserve uniformity of calibre, the single 4.7 inch guns in 'X' and 'Y' positions were exchanged with identical mountings, re-barrelled with 4.5 inch calibre guns. *Savage* can therefore be said to have introduced both the 4.5 inch single and

the 4.5 inch twin into British destroyers, although many more ships were to be launched before this calibre became standard.

The same 4.7 inch gun was fitted in all the classes that followed up to the 'Z's, which, with the 'Ca' group, were equipped with the re-barrelled 4.5 inch version. All these mountings were hand-operated, or 'handraulic' to use Naval jargon.

Finally, the remaining three classes of the 'C' group were given a power-worked model, identified by a small look-out hood on the right hand side of the gunshield roof. This mounting was remotely controlled by the Fire Control System. It also appeared in 'Q' position on the '1943 Battle' class, and, much modernised, is fitted in the present 'Tribal' class frigates.

The DCT/HA Director arrangements on the bridge remained constant through to the 'V' class, but by this time a new Fire Control system was under development which would require one dual-purpose director. The 'W' class, therefore, reverted to the original 'O' and 'P' class equipment of a small HA range-finder director, while the 'Z's and 'Ca's had quite a large power operated tower, employing the final design of gyro-gunsight.

Thenceforth, all destroyers were given the twin-nacelled director which made its last appearance in the 'Darings' in their original form.

THE 4.7 INCH CALIBRE GUNS

The earliest 4.7 inch guns in destroyers had been of the screw-breech type, but these were quickly superseded by the Quick-Fire mechanism employing a horizontal sliding breech block. As the maximum elevation increased, loading trays were provided to ease loading at the higher angles and at the same time to reduce the effort involved. Semi-automatic operation of the breech was evolved which caused it to close by the action of a spring when the cartridge was rammed. Conversely, it opened automatically when the gun ran out after recoil, ejecting the empty cartridge case to the rear, and resetting the breech mechanism for the next cycle of operations.

One of the advantages of the twin 4.7 inch mountings was their power-operated loading trays and rammers. This facility was not available in the single hand-worked guns, but later in the war spring-operated rammers were developed. They were cocked by recoil, their introduction further increasing the rate of fire.

THE CLOSE RANGE ARMAMENT

The classes of between-wars destroyers from 'E' up to 'I' relied almost entirely on two sets of quad .5 inch Vickers machine guns for their AA defence, because their main armament with its limited elevation was not really suitable for use in this rôle.

The 'Tribals' introduced the four-barrelled 2 pdr pom-pom to destroyers and this was a much better proposition. Like its eight-barrelled big brother—fondly known as the 'Chicago Piano'—it was able to put up a veritable hail of 2 pdr shells in the general direction of the target. Diving towards the muzzles of a well aimed pom-pom must have been a daunting business.

Below: HMS Savage with twin 4.5 inch turret forward and single 4.5s aft. Note searchlight abaft funnel and warning surface radar aerial on a 'solid' tower. Oerlikons flank each. **Bottom:** HMS Vigilant with warning surface aerial on foremast, lattice masts, searchlight abaft funnel and Bofors amidships (Imperial War Museum).



Above: HMS Zodiac with typical late fittings—lattice masts, twin Bofors amidships, a single director, and 4.5 inch guns (Imperial War Museum).

After a preliminary appearance on the after superstructure of the 'Tribal' class, the familiar 'Quad' settled itself just abaft the funnel on a number of successive classes, handsomely supplementing the somewhat obsolescent multiple .5 inch machine gun mountings. The 'Quad' in destroyers, from being a hand-worked mounting in its early days, was quickly adapted for power control, although space limitations prevented it from being controlled by its own pom-pom Director. In larger vessels, each multiple 2 pdr had its own Director, and indeed, latterly in the war, its own prediction system and radar, too.

By the time of the advent of the 'O' and 'P' classes, the production of the 20 mm Oerlikon gun had got under way, although only single hand-worked mountings were available in the first instance. As the classes evolved, the Oerlikon armament (which had superseded the .5 inch machine guns) was gradually doubled up by the installation of twin power operated mountings.

The Oerlikon, a Swiss design, had a high rate of fire, better hitting power, and greater range than the earlier machine guns. But it, too, was found to be incapable of destroying a plane in the sky, so that when the Japanese 'Kami-Kaze' attacks developed in the closing stages of the Pacific war, the Oerlikon was supplanted by the 40 mm Bofors.

In the same way, the 2 pdrs were ousted by the twin 40 mm Bofors in destroyers, although with director control, the pom-pom did continue to serve in larger ships.

Strangely enough, the single Oerlikon mounting reappeared in the post-war frigates and destroyers quite recently. However, in this application it was installed to give them a weapon which could be used to cover small ships under interrogation, when the use of the main armament of guns or missiles was not justified.

TORPEDO TUBES

The quadruple torpedo tube mounting had been introduced very early in the between-wars building programme, and, by the time the 'G' and 'H' classes were launched, a five-fold or 'Pentad' mounting had been developed. *Glowworm* was the trials ship for this weapon which was then fitted in the successive classes up to and including the 'N's, but excluding the 'Tribals'.

The Pentad mounting did not meet with whole-hearted approval and in some instances the centre tube was removed thus effectively turning it back into a quad. With the emergence of the 'O' class, a quad mounting proper was fitted, but it now had an armoured cupola over the control position.

Torpedo tubes on destroyers were always trained on to the beam—ie, at 90° to the ship's centre-line—for a torpedo attack, and the 'tin-fish' were fired from a torpedo sight on the bridge, the ship's course being directed as necessary. It was also possible to pre-set the torpedoes to turn through a set angle on entry into the water, enabling them to be launched while the attacking destroyer was still closing with the target. Usually, however, the torpedo course was at right angles to that of the firing ship.

SEARCHLIGHTS

A large searchlight on the centre-line aft was standard equipment for most destroyers and continued to be fitted, even after radar was well developed. Towards the end of the war, however, this searchlight was removed, and in some ships, where it had been mounted

Continued on next page

Destroyers—continued

immediately abaft the funnel, it was replaced by a single 40 mm Bofors.

HMS *Tumult* is an example, and I have included her next month to show an 'up-gunned' variant. Post-war, the armament of individual ships of all classes was frequently upgraded or downgraded to suit existing requirements.

MINE LAYING

Because of their inherent high speed, the use of destroyers as mine layers has always attracted. The pre-war 'G', 'H', and 'I' classes were designed for rapid conversion to this rôle, and this adaptability persisted until well after the war, when some of the 'Ch' group were so modified. The conversion usually meant a reduction in torpedo and/or gun armament because not only was there a need to preserve stability, but also, the presence of the mine rails on each side of the main deck fouled the torpedo discharge. The rails ran almost the full length of the main deck, from just abaft the boats to the quarters. Here, a projecting platform carried the mine clear of the ship's stern, where a short power-operated endless chain conveyor completed the final dropping action. However, none of the ships of the group I will be featuring were modified for mine laying.

MINE SWEEPING

Pre-war, many classes of destroyers were given special mine sweeping equipment, designed to be towed at high speed. It took the form of two paravanes stowed on the quarterdeck, two heavy duty winches sited just abaft the after superstructure, and two davits on the extremity of each quarter. These davits were not unlike the more familiar torpedo davits fitted close to the 'tubes', and their presence on the quarters is a sure sign that the sweep gear is fitted. They are, in fact, provided in the *Airfix Hotspur* kit.

The need for this equipment became a contentious matter during the war, because on the one hand destroyers were seldom used for mine sweeping in practice, and on the other, the clutter on the quarter deck prevented more substantial depth charge arrangements from being fitted. In consequence most of the War Emergency classes were 'fitted for but not with' sweep gear.

ANTI-SUBMARINE WEAPONS

From the first world war, and right through the second world war, all destroyers (other than the old ships converted to Escorts) were fitted solely with depth charges for anti-submarine attack.

Ships involved in the Battle of the Atlantic, on the other hand, had

Ahead Throwing Weapons in the form of 'Hedgehog' and 'Squid' mortars.

The original depth charge equipment consisted of a 'trap' over the stern, and a depth charge thrower to port and starboard, fitted close to the after superstructure. In a standard attack 5 depth charges were delivered in a 'cross' pattern, three being dropped in sequence from the 'trap' and one each side from the throwers. After the attack, the throwers had to be re-loaded, but normally sufficient charges for at least two attacks were contained in rails leading to the stern 'trap'.

In the War Emergency destroyers (and in most others) the force of the attack was doubled to the '10 pattern' arrangement. This involved duplicating the stern rails and traps and doubling the number of throwers, the second stern rail being offset from the centre-line.

The number of charges available was increased by extending the twin rails and by fitting a ready use rack alongside each thrower. This stowage, which incorporated a simple winch, working on the parbuckle principle, allowed for rapid re-loading of the throwers. The '10 pattern' depth charge attack was something worth watching from the surface, particularly if the fuses had been set to explode 'shallow'. This caused the most spectacular upheavals of water and to have been on the receiving end of successive attacks must have been a fearful experience.

RADARS

One of the early radars fitted to the groups was a set whose aerial was installed in a cylindrical cover (sometimes called a 'lantern'), mounted either on a special lattice structure amidships, or alternatively, on a small platform projecting forward from the foremast at yard height. This was a 'Surface Warning Radar' as distinct from the Gunnery Radar mounted above the range finder in the HA director. Here, a linkage from the director sight drive, coupled to the aerial array, caused the latter to elevate in conjunction with the director sights and the rangefinder. As the reliability of radar increased, the optical rangefinders came to be less and less used, although they were not finally abandoned as gunnery instruments until well after the war.

The warning radars were designed either for Air Warning or Surface Warning and towards the end of the war, most ships had both. The earliest surface sets were contained in the cylindrical tub or 'lantern' already described, but later came to be mounted on the foremast and took the form of the segment of a circle. Part 33 of the *Airfix Daring* kit, is the right shape, but is over scale and need only be 4 mm wide.

The Air Warning sets tended to be more complex in design and in 1:600 scale are best represented by a cross of plastic sprue.

Other electronic equipment included two types of direction

CLASS LIST: War Emergency Destroyers

Name	Pendant No	Disposal	Name	Pendant No	Disposal	Name	Pendant No	Disposal	Name	Pendant No	Disposal	
Quilliam	G09	N	Saumarez	G12	S	Grenville	R97	C	Kempenfelt	R03	Y	Notes: (i) Pendant numbers changed to 'D' flag superior in 1949. (ii) Pendant numbers of conversions changed to 'F' flag superior as Frigates.
Quadrant	G11	A	Savage	G20	S	Ulster	R83	C	Wager	R98	Y	
Quail	G45	L	Scorpion	G72	N	Ulysses	R69	C	Wakeful	R59	SA	
Quality	G62	A	Scourge	G01	N	Undaunted	R53	C	Wessex	R78	SA	
Queenborough	G70	A	Seraphs	G94	N	Undine	R42	C	Whelp	R37	SA	
Quentin	G78	L	Shark	G03	N	Urania	R05	C	Whirlwind	R87	C	
Quiberon	G81	A	Success	G26	N	Urchin	R99	C	Wizard	R72	C	
Quickmatch	G92	A	Swift	G46	L	Ursa	R22	C	Wrangler	R48	SA	
Rotherham	H09	I	Troubridge	R00	C	Hardy	R08	L	Myngs	R06	E	
Racehorse	H11	S	Teazer	R23	C	Valentine	R17	CN	Zambesi	R66	S	
Raider	H15	I	Tenacious	R45	C	Venus	R50	C	Zealous	R39	IS	
Rapid	H32	C	Termagant	R89	C	Verulam	R28	C	Zebra	R81	S	
Redoubt	H41	I	Terpsichore	R33	C	Vigilant	R93	C	Zenith	R95	E	
Relentless	H85	C	Tumult	R11	C	Virago	R75	C	Zephyr	R19	S	
Rocket	H92	C	Tuscan	R56	C	Vixen	R64	CN	Zest	R02	C	
Roebuck	H95	C	Tyrian	R67	C	Volage	R41	C	Zodiac	R54	IS	

Key: N: Netherlands; A: Australia; S: Scrapped; I: India; C: Converted to A/S Frigate; CN: Canada; Y: Yugoslavia; SA: South Africa; E: Egypt; IS: Israel; L: Lost.

finders—a High Frequency and a Medium Frequency—and a special set (IFF) which automatically identified friendly aircraft. The MFDF projected forwards from the bridge superstructure, while the HFDF was mounted either at the top of foremast or alternatively on its own lattice mast on the after superstructure. The IFF set was usually on the foremast, and all are best modelled by simple plastic sprue struts.

BOATS AND CARLEY FLOATS

The arrangements of the boats was variable. Most ships had two 27 ft whalers, a 25 ft motor boat, and a 16 ft motor dinghy. They were stowed with a whaler to port and starboard at the break of the fo'c'sle, the motor cutter further aft on the starboard side, and the motor dinghy inboard to port. However, some later allocations only allowed for one whaler, in which case it was normally at the break of the fo'c'sle on the starboard side, balanced by the motor cutter to port.

In addition, many ships had a sailing dinghy stowed on the deck beneath the motor cutter, and using that boat's davits. Hence it could not normally be lowered unless the cutter was already in the water. Sometimes there was also a diminutive 10 ft dinghy, for the Side Party in harbour for general hull-painting and inspection purposes. Its small size allowed it to be stowed in an odd corner of the main deck, and launching was carried out by the torpedo davit.

The siting of Carley floats was even more variable; typical arrangements will be shown in the drawing appearing next month.

DAVITS

There were two types of davit in use in the Service during the war, if the heavy landing craft type are discounted, the modern Gravity Davits (which feature in the Devonshire kit) not being introduced until comparatively recently. Both the earlier patterns are available from existing Airfix destroyer kits.

The most common type takes the form of a swan neck in model form (because the falls are integral with the davit) and these always face outboard.

The davits are screwed outwards by jacks to launch the boat, and form a support for it in the inboard position, when the boat is constrained by diagonal gripes. This type of davit was used in the Emergency classes for both the whaler and the 25 ft motor boat.

In later classes, the motor boat was carried in conventional Radial Davits, rotated by hand gearing. In the stowed position they were turned to face inboard, the boat being constrained by gripes against a gripping spar set between the two. The spar had to be removed to allow the attitude of the davits to be reversed when the boat was prepared for lowering, complicating the procedure. For this reason Radial Davits were not used for the whaler, because it might be necessary to lower it in an emergency.

In both types the boat dropped under its own weight, once the davit heads were over the water, but no power hoisting arrangements were fitted, the recovery being effected by the ship's company manning the falls and running the boat up literally by 'manpower'. (In contrast, the modern Gravity Davits are power operated, with winch drums driven by either electric or hydraulic motors.)

In my model of HMS *Rocket*, I have arranged the 25 ft motor boat to be 'turned out' ready for lowering, while the ship flies her Pennant Number flags from the starboard yardarm. This is a typical state of affairs for a ship entering harbour to secure to a buoy. The motor boat carries the 'Buoy Jumpers'—ratings (usually of the fo'c'sle party) whose duty it is to take the cable from the ship and shackle it to the ring-bolt or similar device on the buoy.

MASTS

Before the war, most destroyers had quite tall pole masts in the fore and main positions between which the main roof radio aerials were suspended from yards crossing the topmasts.

On the foremast, in a lower position, a wide yard carried three or four signal halyards on each side. As the weight of gear aloft increased, tripod masts became fashionable; and at the same time, the main mast was much reduced in height, to give clearer arcs of fire to the close range AA weapons mounted abaft the funnel.

When more and more Radar and radio equipment came to be mounted on the foremast, even the tripod structures were insufficiently strong, and lattice masts took their place. Occasionally, the



Above: HMS *Wizard* post-war with the single small HA director, two single Bofors abaft the funnel with a twin Bofors mount amidships.

main mast was constructed from lattice girdering, too, particularly when it was required to support a direction finding aerial.

The ultimate lattice structures in destroyers featured in the 'Battle class Radar Picket conversions, their enormous foremast spanning the complete width of the maindeck. Nowadays masts tend to be completely plated in, which combines strength and appearance with ease of construction.

INTERNAL ARRANGEMENTS

Internally, the complete group was very similar. Up to the 'R' class, the Wardroom was in the traditional position aft, but from then on it was built into the forward superstructure beneath the bridge where it remained up to and including the 'Darlings'. This was to facilitate access to the bridge for the officers; in very rough weather the bridge was sometimes cut-off for days when the Wardroom was sited aft.

We need not concern ourselves with the detail of the ships below decks, but the main machinery compartments might be mentioned. All ships had two boiler rooms, one beneath the break of the fo'c'sle, and the second further aft, roughly beneath the forward torpedo tubes. The waste gases were trunked into the single funnel, which accounts for the 'belling' fore and aft at its foot. Abaft the boiler rooms came the engine room and gearing compartments.

It is often not realised that the gundeck immediately abaft the funnel, and the midship structure between the tubes, were positioned not so much to support guns as to contain the large ventilation trunkings supplying the machinery compartments below. The extent of the engine room/boiler room area can be seen by the absence of portholes in the ship's side.

UPPER DECK FITTINGS

Each gundeck had several ready-use ammunition lockers from which shell and cartridge were drawn at the commencement of an action. From then on, they were kept filled by a supply from the magazines and shell rooms below.

At one time ready use shells were stowed vertically around the 4.7 inch mountings, and they are included in the moulding of 'B' and 'X' gundeck in the Airfix *Cossack* kit. Here, to be strictly accurate, each shell should be given a touch of buff coloured paint, that being the distinguishing colour for HE projectiles.

Apart from the ready-use lockers there were numerous other lockers around the upper decks, positioned against the bulkheads of the superstructure units. There were also a large number of ventilators, supplying fresh air to, and taking exhaust air from, the various compartments within the ship. These units took the form of cylindrical or square-section projections from the decks and bulkheads and each had a water-tight flap which could be closed in case of damage. Electric fan motors delivered the air to trunkings throughout the ship.

Four sets of bollards were located along the deck edge of the upper decks, to port and starboard, generally associated with fairleads through which the berthing wires were led when the ship was alongside.

Each of the close range gundecks had a small portable davit, to supply boxed ammunition for the AA guns, and sometimes these was a small gun-crew's shelter where personnel could keep out of the weather when they were on watch, but not closed-up, at Action or Defence Stations.

The gunshields on the main armament gave protection to the key ratings in the gun's crew—Layer, Trainer, Breech-Worker and Sight-Setter—all of whom had positions on the revolving structure. The loading numbers on the other hand, continually moved between the ammunition supply position and the mounting, and were vulnerable

Continued on page 145

War Emergency Destroyers—from page 117

to injury. To give them a measure of protection a splinter shield in the form of a solid bulwark was positioned on the deck edge around each 4.7 inch gun.

The bridge superstructure supported the DCT and HA Director, while sponsons extending outboard from it held look-out positions, torpedo sights and signal-searchlights.

On the centre line was a compass and the Captain's Sight. The latter instrument could be trained and elevated, and by transmissions to electrical repeaters, indicated targets to the main directors.

There were two galleys, the main unit forward at the break of the fo'c'sle and a secondary one aft in the superstructure beneath 'X' gun-deck. Each had an H-shaped 'Charlie Noble' funnel, and the forward galley funnel trunking was cranked in several directions. In ships with tripod masts it was led within the mast 'legs' and in those with lattice structures it was directed between the mast and the main

November, 1969

funnel.

The funnel itself had twin waste steam pipes leading up its forward surface and smaller steam pipes in the rear leading to the sirens. A grating was provided for the inspection and adjustment of the siren valves, which were operated remotely by cables attached to hand-levers on the bridge.

On the quarter-deck, two dan buoys were stowed to port and starboard. These were used as floating markers for various purposes, and each took the form of a timber spar about 18 ft long which passed through a cylindrical drum. In the water, they rode upright, something like a spar buoy. Attached to each was a necklace of six small floats. On later ships, it was common practice to stow the two dan buoys on the cat-walks above the torpedo tubes.

The port hand dan buoy drum was painted in red and white chequers, with red and white stripes on the spar, while the starboard hand buoy was similarly marked in green and white.

The foregoing, then, has been an outline description of the ships. Next month I shall deal in detail with modelling these vessels.