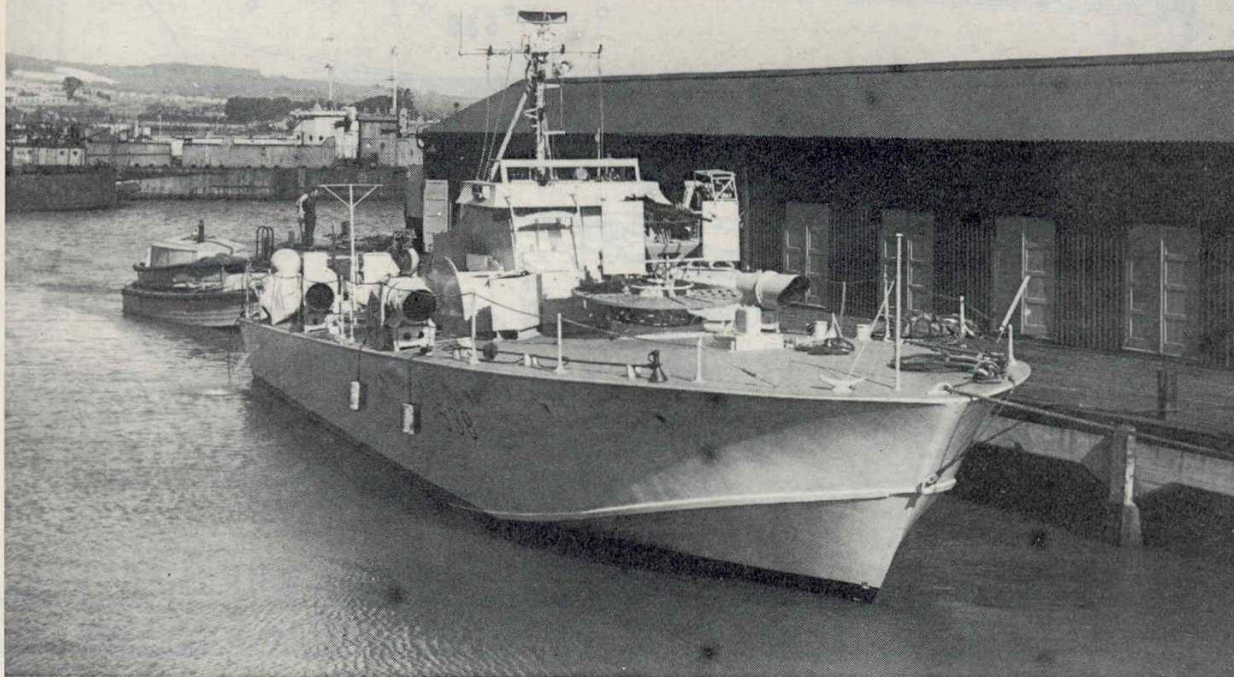


ROYAL NAVY COASTAL FORCES



Post-war developments by Vosper and others continue the MTB/MGB story by John Lambert

A fine builder's view of the brand new MTB/MGB 538 in 1948. The higher chine line is clearly evident (Vosper Thornycroft Ltd).

Vosper's 1943 designs (see last month's issue) were still utilising the basic hull form of the motor torpedo boats designed pre-war. A number of improvements had been made in construction, using weight-saving methods. Also the offensive armament was improved, and maximum use was made of the availability of standard power plants. The hull design dated from 1937, and Commander du Cane asked to re-design and improve the hull shape by raising the chine line forward in order to reduce the amount of spray which came aboard at the slower sub-planing speeds. However the idea was vetoed by the Admiralty, as it would require a large number of specially constructed cradles, for use at the numerous depots when the boats were undergoing maintenance.

However, the development of improved and more seaworthy high speed hulls continued. Plans were put aside, and with the end of the war in 1945, many new developments were in the pipeline, both at Vospers and with other companies concerned in the construction of coastal craft.

Vosper had continued to build boats to very high standards. By the end of hostilities, du Crane's designs were carrying 70% more military load, than in 1938, on what was basically the same 70 ft hull. They had built an experimental boat with a length of 100 ft 6 in in 1943, to join the service as MGB 510.

Now Commander du Cane was authorised to design and build a short boat, embodying all the wartime lessons learned. In 1948 he produced MGB 538, a dual purpose hull that could rapidly be converted for duties as an MGB or MTB.

This design is our detailed drawing for this month. As can be seen, the chine line is much higher than in the previous boats, and there is a more pronounced flare to the bows, which are deeper, for improved sea-keeping and lift. She was of all-glued laminated wood construction, making use of the much improved bonding techniques previously mentioned.

She displaced between 36-45 tons depending on her armament. Her dimensions were 68 ft between perpendiculars, 74 ft 6 in length overall, with a beam of 20 ft 3 in. She was powered by three Packard petrol engines of 4050 bhp, which produced a maximum speed of 40 knots, and a sea speed of 31 knots which was capable of being maintained into a head sea.

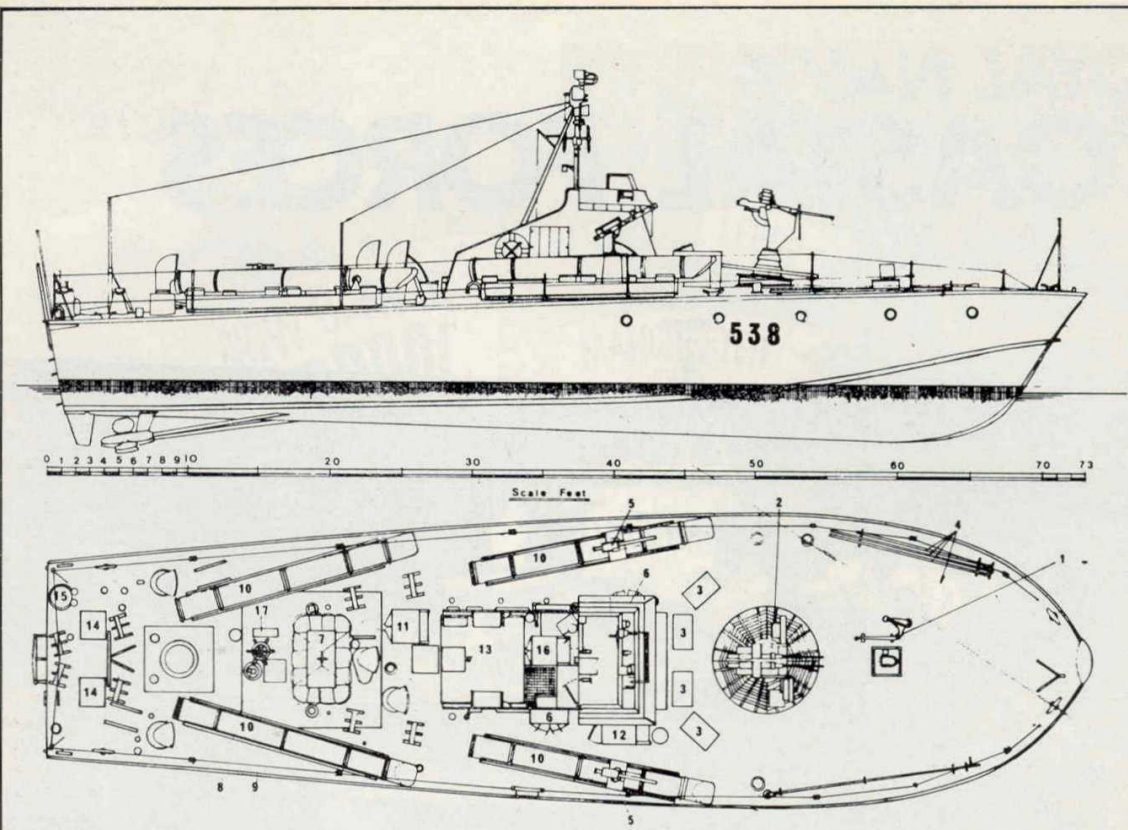
The exhaust was originally silenced by being led through a hollow rudder stock and blade, thus preventing additional cavitation problems to the propellers, but this system was not successful, and the more usual Dumbflow silencers were found to be the answer. The steering was again duplicated, with an emergency hand steering aft and hydraulic steering from the bridge. The increasing

amount of electronic equipment required alternating current, so that normally the installation of DC/AC converters and the resultant weight penalty had to be accepted. However in MGB 538, this problem was solved by incorporating AC and DC converters on the same shaft. (All RN warships then used direct current, and it was not until the construction of the new 'Daring' class destroyers in the early 1950s, that the RN changed to AC current.)

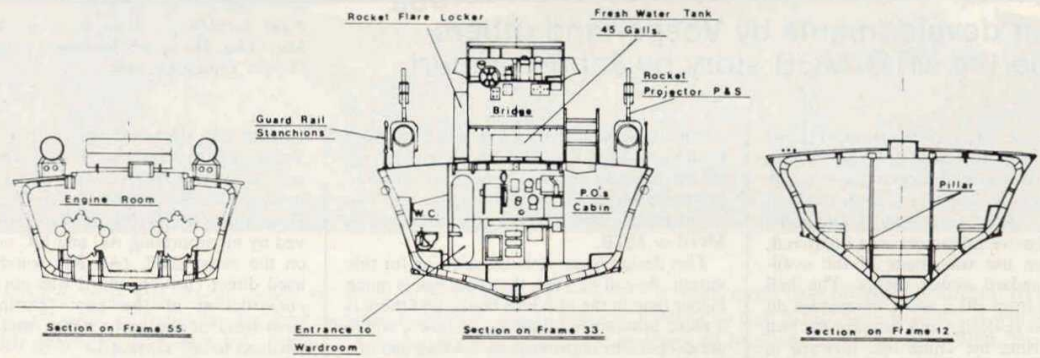
I mentioned last time the requirement for a harder hitting gun foe coastal forces. In May 1944, a conference presided over by the Deputy First Sea Lord was convened to consider the application of a light 4.5 inch QF gun, and the 95 mm tank howitzer, for mounting in light coastal craft. It was decided to place a pre-production order for eighteen of each type, with the necessary ammunition, and to carry out comparative trials against various representative targets.

These trials were carried out at the Shoeburyness range, against box targets representing (A) a trawler, (B) a merchant ship, and (C) an 'R' boat (a German Raumboat was a 121 ft long 20 knot minelayer, which operated with the 'S' boats off the East Coast). The results were discussed at a meeting at the Admiralty, on June 26, 1944, and the DNO (Director of

*Scale drawings next page
Text continued page 142*

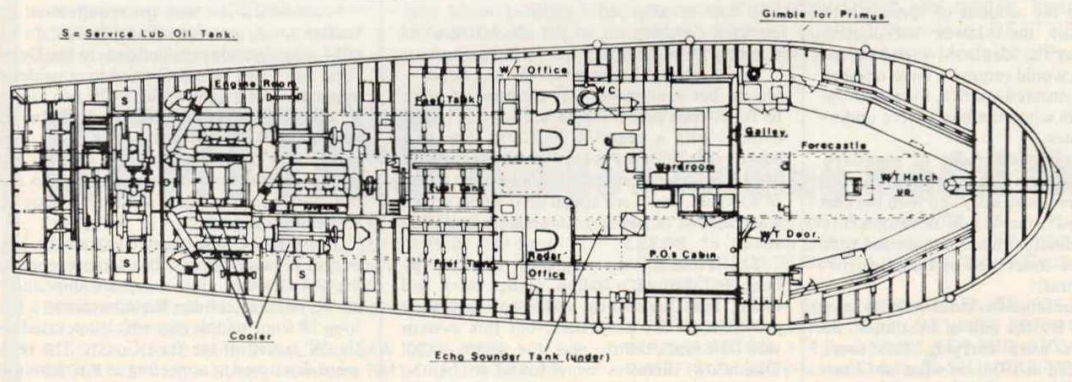


**GENERAL ARRANGEMENT & DETAIL M.T.B./M.G.B. 538
BUILT BY VOSPER LTD. PORTSMOUTH - CONTRACT 1**



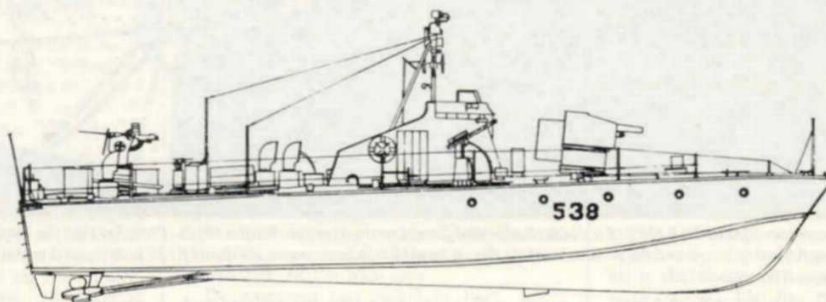
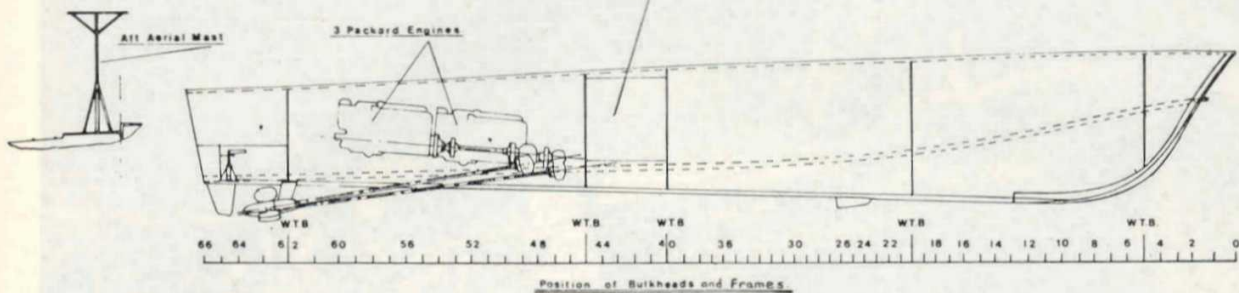
EXPERIMENTAL
DIMENSIONS-68
74
25

MACHINERY-3:
DISPLACEMENT-
ARMAMENT-1AS
FOU
IAS
TWC
COMPLEMENT-1:
BUILT 1948
COMPLETED AS
M



- KEY T
- 1 C.Q.R. ANCHOR
 - 2 TWIN MANUAL
 - 3 OERLI
 - 4 READY USE
 - 5 BOATHOOKS
 - 6 ROCKET FLARE
 - 7 ROCKET FLARE
 - 8 LIFERAFT
 - 9 EMERGENCY S
 - 10 18 INCH TOR P
 - 11 ENGINE ROOM
 - 12 PETTY OFFIC
 - 13 PETROL FILL
 - 14 W/T SCUTTLE
 - 15 CHEMICAL S
 - 16 FOLDING SEA

Wing Fuel Tanks capacity, 835 Gallis.
 Centre Tank capacity 570 Gallis.
 Total 1840 Gallis, at 100%



8.
No. C.P.8E/112282/43V.1080.

L. PROTOTYPE

68 FT BETWEEN PERPENDICULARS.
 74 FT 6 INS OVERALL.
 20 FT 3 INS BEAM.
 6 FT DRAUGHT
 3 SHAFT PACKARD PETROL ENGINES.
 4050 BHP = 40 KNOTS-31 SEA SPEED

[- 36 TONS.

AS M.T.B.] TWO 20 MM OERLIKONS.
 FOUR 18 INCH TORPEDO TUBES.
 AS M.G.B.] ONE 4.5 INCH GUN
 TWO 20 MM OERLIKONS.
 -15.

AS AN M.G.B. THEN RENUMBERED
 MTB 1601.

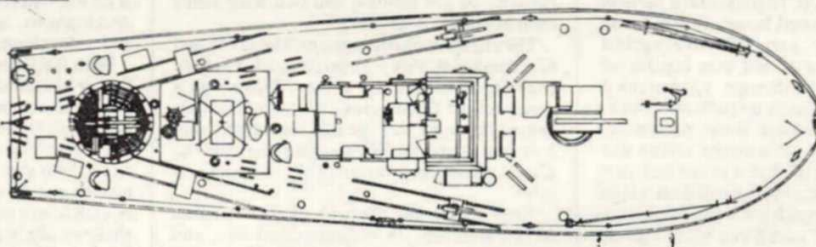
TO G/A DRAWING

DR.
 FULLY OPERATED 20 MM.
 OERLIKON MOUNTING.
 AMMUNITION LOCKERS.
 FIRE PROJECTOR.
 FIRE LOCKER.

Y STEERING COMPASS.
 Y WHEEL.
 TORPEDO TUBES.
 TOW COMPANION.
 TOWER'S COMPANION.
 TAILING CAP.
 T.E.
 SMOKE MAKING APPARATUS.
 SEAT.

ARRANGEMENT AS MOTOR GUN BOAT

ARMAMENT QF 4.5 INCH 8 CWT MARK I GUN ON MARK I P MOUNTING.
 TWIN 20 MM OERLIKON MANUAL MOUNTING.
 NOTE ALTERNATIVE AERIAL LAYOUT.

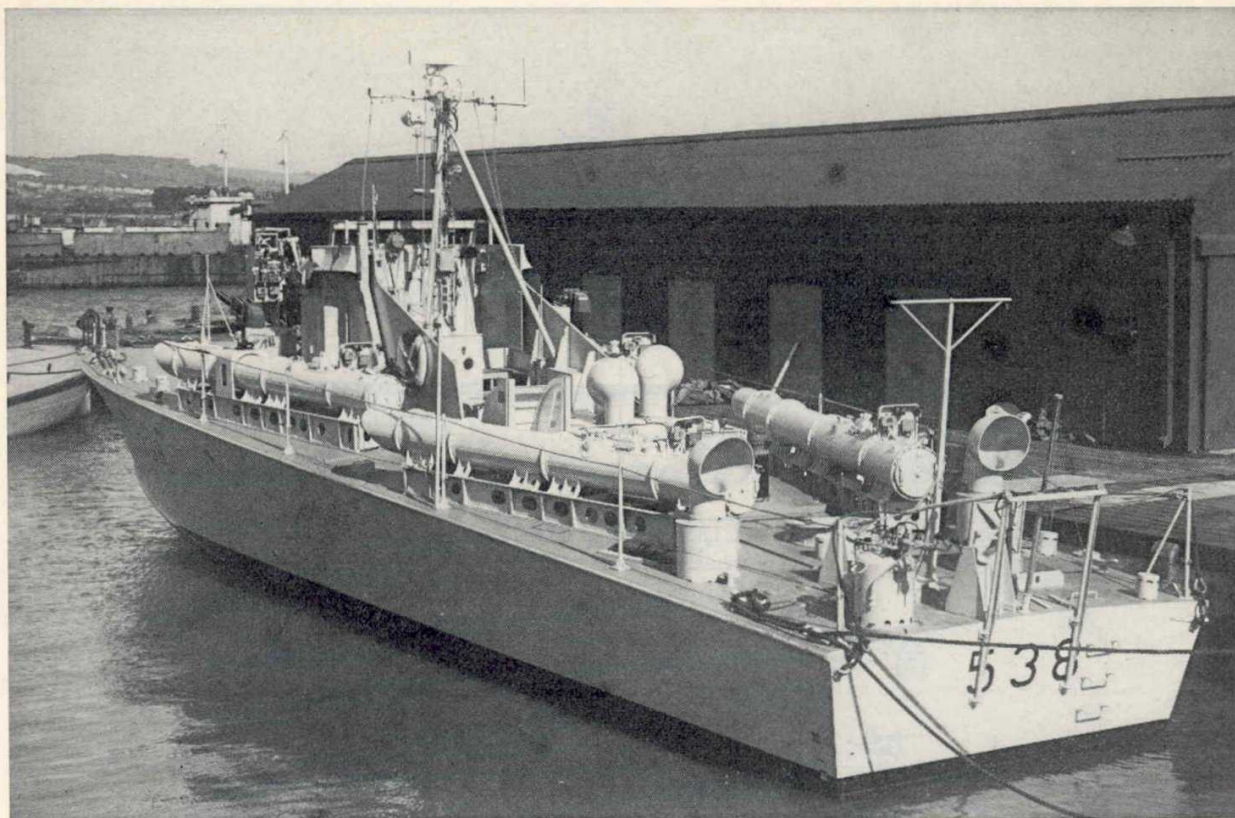


REDRAWN FROM DRG No 13469 (GENERAL ARRANGEMENT)
 & 13470 (ACCOMMODATION & SECTIONS)
 BY VOSPER LTD. PORTSMOUTH.
 ORIGINAL DRAWING DATED DECEMBER 1948.

L/S/18.

© JOHN LAMBERT

19/4/78



As can be seen in this stern view, MTB/MGB 538 had a similar bridge and fittings to the previous Vosper boats. Provided that the modeller was prepared to carry out some work to alter the hull depth forward and the prominent chine line, it would be feasible to convert the Airfix kit to depict this vessel, by reference to the drawings on the previous page (Vosper Thornycroft Ltd).

Naval Ordnance) considered that the 4.5 inch 'Jefferis' gun was undoubtedly superior to the 95 mm gun, against targets A and B, but there was less to choose between the two guns against target C. It was decided to adopt the QF 4.5 inch 8 cwt gun, with shells filled with RDX TNT.

Further trials were carried out in September 1945 against a larger range of possible targets. These represented (A) the 'R' boat, (B) a merchant ship, (C) a junk, (D) a sampan and (E) a fast armoured barge. It was found that the shell was very effective against wooden hulled vessels, and was capable of causing considerable damage to merchant ships with mild steel hulls up to ¾ inch thick.

Gunnery trials ashore were reasonably good, but gun jump (downward force) was large and it was feared that it might be larger when the gun mounting was carried on a light coastal craft. The problems were overcome, and the short QF 4.5 inch 8 cwt Mark I gun in the Mark V power operated mounting was as a result fitted to many of the coastal forces still in commission in the early 1950s.

MGB 538 was completed as a gun boat, and underwent trials with the 4.5 inch mounting forward, and a twin manually operated 20 mm Oerlikon aft. A rocket flare projector was fitted to the forward gun mounting.

Now an examination of the internal hull layout, which was a completely new design. As previously it was divided by five watertight bulkheads, situated on frames 5, 20, 40, 45 and 62. The forepeak was a closed compartment right forward, and extending to frame 5. Next came the small messdeck with its all electric galley. A watertight door, through the bulkhead (frame 20), was now situated on the starboard side, passing into the petty officer's twin cabin. This also contained the 20 mm ammunition lockers. There

was a small wardroom to port, and the central area was a navigational office, with the radio office aft, to port, and the radar office against the after bulkhead to starboard. The companion ladder from the bridge was placed amidships, with the petty officers' companion way, directly into their cabin on the starboard of the bridge.

The three fuel tanks are carried between bulkheads 40 and 45. The centre tank had a capacity of 570 gallons, and two wing tanks each holding 635 gallons.

The engine room between bulkheads 45 and 62, contained three supercharged Packard engines, all having 'V' drives. There was a generator aft fitted across the ship. Back aft behind frame 62 was the last watertight compartment containing the steering gear, and the standard tanks of lubricating oil, and pool petrol.

After trials, No 538 was fitted out as an MTB, with four 18-inch torpedo tubes, and the twin 20 mm gun forward. Her aerial arrangement was also altered. Two excellent photographs of MTB 538 have kindly been supplied by Vosper Thornycroft. From forward the new hull shape with its broad bow is shown very clearly. The upper deck forward is less cluttered, with less ventilators in the bows. The only hatch forward is to the mess-deck, and the hydrophone gear is stowed to starboard. The petty officers' companion way can be seen on the starboard side, as well as the new type of 20 mm mounting and its ready use lockers.

Turning to the other view, taken from aft, we have a clear picture of the torpedo tubes. S1 and S2 to starboard, and P1 and P2 to port. The bridge appears slightly smaller than the war-built boats. The torpedo loading chocks and CS Apparatus are clearly visible aft.

The vessel was a 'one-off' design, having

completed in 1948, and was still in service almost ten years later. In service she was re-numbered MTB 1601, and had a complement of fifteen.

The days of the petrol engine, and the fire risks attached, were rapidly being overtaken by a number of new technical developments. By 1946 it was recognised that lightweight steam power plants was not the answer for high-speed craft, that the petrol engine was good but had reached possibly the peak of its development, and that new diesel engines under development might prove better still.

With the jet engine now in pride of place for fighter aircraft of the RAF, a new lightweight power source was available for trial installation in light warships. One of Camper and Nicholson's boats (MGB 2009) was modified, and a 2500 shp Metropolitan Vickers G2 gas turbine engine was fitted on her centre shaft. A clutch and gearbox was fitted to allow this shaft to idle when manoeuvring on the two wing shafts which were driven by the normal Packard engines. It was only a trial installation for feasibility tests, but was full of promise.

Vosper then undertook the conversion of HMS *Grey Goose* (ex-SGB9), one of the seven steam gun boats completed during the war (see the February 1978 issue of *Airfix Magazine*). All her steam power plant and boilers were stripped from the hull, and a specially designed marine gas turbine, the Rolls-Royce RM 60, was fitted to each shaft. 'Rotol' controllable pitch propellers provided manoeuvrability and astern power.

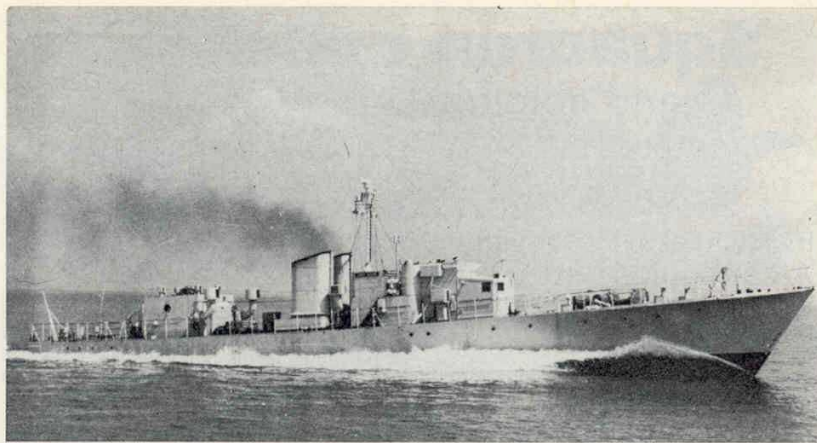
Her new gas turbine power plant gave an increase of 35% in power, combined with a reduction of 50% in the weight of machinery and a saving of 25% in space for machinery. The two new turbines produced 10,800 hp. She was simply a test bed for the new

machinery, and carried no armament. Her fine hull lines are shown in the MoD (Navy) photograph. *Grey Goose* completed her conversion in 1955, and was commissioned as a trials vessel on June 22, 1955. (For readers who construct detailed warships, a kit of *HMS Grey Shark* is now in preparation, and should be available by Christmas 1978.)

The trials of small ships powered by gas turbines was so successful that two new craft were specifically designed for operational use. Each ship was to be powered by two Metrovick G2 gas turbines 4275 shp with Mercedes-Benz diesel engines coupled to each shaft for cruising and manoeuvring. This system became known as CODOG (Combined Diesel or Gas), and no warming up period was required for the gas turbine. The exhaust gases from the turbines was taken up by the distinctive twin funnel arrangement. Two differing hull types were used. A hard-chine, built by J. S. White, to join the service as *HMS Bold Pioneer* (P5701), and a Vosper round bilge design, *HMS Bold Pathfinder*. Built in 1951, both units were 123 ft long overall, with a beam of 20 ft, and a displacement of between 130-150 tons depending upon their operational roll. They proved capable of 43 knots, and carried a complement of twenty.

There were a number of problems encountered with the new engineering. Salt spray could enter the turbine air intakes and cause blade corrosion, in spite of a system of baffles and settling chambers. They had a number of faults particularly when travelling at high speed, but they did prove the soundness of this new form of propulsion.

These two prototypes proved that they could operate as a new type of all round offensive sea-going high-speed craft, and as a result, they were classified as Fast Patrol Boats, capable of a number of differing functions. Their roll depended upon their armament. As MGBs they mounted two short 4.5 inch guns, one forward and one aft, and a single 40 mm Bofors mounting behind the bridge. As torpedo boats they carried four



HMS Grey Goose as she appeared when converted from steam to an unarmed gas turbine powered 'test bed'. Note the distinctive twin funnels for the twin turbine layout (MoD).

21-inch torpedo tubes, and a single 40 mm gun forward. They could also carry landing parties of Royal Marine Commandoes, with two inflatable boats and an armament of two 40 mm guns, or they could be used as high-speed minelayers.

Bold Pathfinder was launched by Vosper's on September 17, 1951, and was pipped at the post by White's *Bold Pioneer* on August 18 the same year. The German diesel engines were soon to be replaced by a new development, the Napier Deltic diesel engine. It was a completely new idea, eighteen cylinders arranged in a triangle, with the cylinders opposed, and driving three crankshafts. New light alloys kept the engine weight down to about 4½ tons, and the power available produced 2500 bhp at 2000 rpm.

Development had begun in 1947, and a completed engine was under trial in 1950. The power/weight ratio gave one horse power for every 4.2 lb of its weight, the best power-weight ratio ever achieved in a marine diesel engine. This engine was to power all the new

short boats of the 'Dark' class completed between 1954-58. This new lightweight power plant was later used to power coastal minesweepers of the 'Ton' class, and a number of classes of British Rail locomotives.

The two early 'Bold' class units were disposed of in 1958 and 1962 respectively, but were the starting point for many new Vosper designs.

The drawing of 538 showing both configurations is available on a single sheet, No L/S/18, and a large drawing of the .303 inch Vickers gas operated LM Gun, just completed, is on sheet L/O/12. David MacGregor Plans Service, 99 Lonsdale Road, London SW13, can supply full-size prints from the originals.

The story of the RN coastal forces was not all in the hands of Vosper's, although they were responsible for most of the MTB designs. A number of shipyards were building other warship types, and next time we shall look at the 72 ft Harbour Defence Motor Launch, produced in large numbers and destined to serve all over the world.

HMS Bold Pathfinder at speed on builder's trials in 1951. The twin funnels follow the Grey Goose layout. Boat is in MGB configuration (Vosper Thornycroft Ltd).

