Minewarfare and Clearance Diving 1989

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Commander A ROSE Royal Navy

FOREWORD

The antecedents of this magazine, 'MINE' and 'BUDDYLINE" were well produced and whilst each were appreciated in their own field they did little to encourage the cohesion of the 2 different professions which form the Minewarfare and Clearance Diving Community Diving Community.

Whilst not wishing to interfere with the jovial rivalry between the 2 branches it is of upmost importance that we all have a clear understanding of our counterpart's role. Articles forwarded for open discussion, submitted by any rank or rate could play a vital part in our constant drive for increased efficiency in our task.

Do ensure it is freely available for all your people to read and encourage them to submit any comments for improvement. Indeed, contributions for inclusion in future editions are welcomed. The magazine will not survive without your involvement.

Commander A ROSE Royal Navy
for
Director of Naval Warfare

EDITORIAL

As we welcome the introduction of this new look magazine dedicated to all Minewarfare and Clearance Divers, past and present, we take this opportunity to thank the editors of our predecessors, the "MINE" and "Buddyline" magazines for their dedication and hard work.

Although this first edition was printed behind schedule it is hoped that with the knowledge gained in collating and cataloguing numerous articles, things will improve. Therefore please forward articles throughout the year, and include clear photographs or diagrams/cartoons, (no matter how badly drawn) to enhance your text, they will be most welcome. Also, the author should write his name clearly and a phone number (if possible), to be contacted should the information not be fully understood at the time of print.

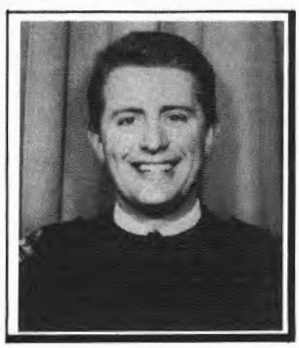
Remember that although your current employment may appear to be mundane and monotonous to you it will enlighten others, especially those who have left the Service. Also, it will enable everyone to have a better understanding of our role within the Royal Navy.

We therefore await articles from many of the out-stations around the world and the UK where RN MCD personnel are employed such as Hong Kong, Fishery Protection, RNR Divisions, EOD School, BRNC Dartmouth, Portland and Australia to name but a few. The Canadian Armed Forces is currently updating it's MCM capabilities and it is hoped that they will also contribute in future editions.

Finally our sincere appreciation goes to all the authors of this edition for their interesting and often humorous articles.

The closing date for next year's edition is:

13 February 1990 (Please be prompt).



Lieutenant Andy JOHNSTONE-BERT RN

Lieutenant Tony SILVA RN

DIVING PROGRESS REPORT

By Commander J RICHES Royal Navy

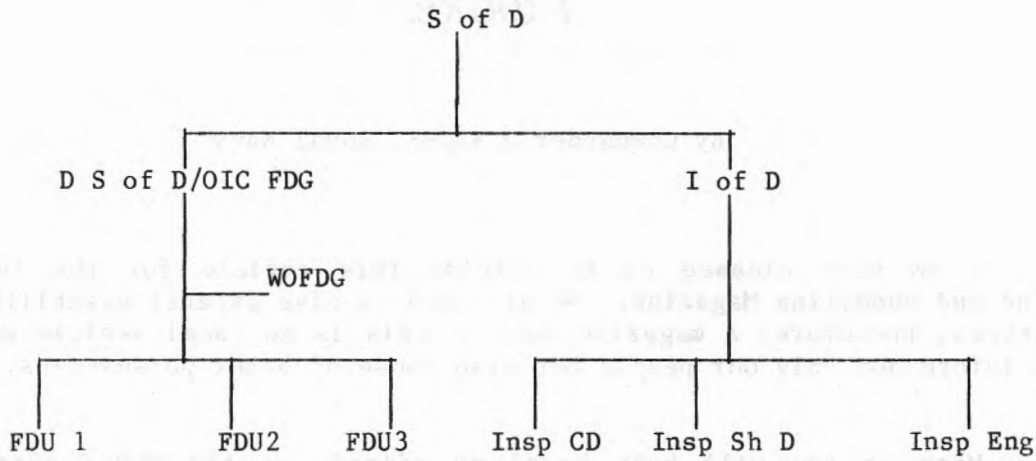
I am very pleased to be writing this article for the 'new look' Mine and Buddyline Magazine. We all need to give greater visibility to MCD matters, therefore, a magazine such as this is an ideal vehicle with which to inform not only our people but also those of other persuasions.

Many of you will have heard my address at the MCD Conference and others will have heard me whilst visiting your diving units. I intend though in this short article to reiterate my views of where we are with diving today and then turn my thoughts to the future. We must all now be looking towards the 21st Century and how, perhaps, the Diving Branch should fit into the future RN.

The greatest step forward in recent years has been the re-organisation of Superintendent of Diving's department. It says much for the foresight of Commander Alan PADWICK my predecessor but one, that the changeover was so smooth and the result has been so successful. S of D has been a CINCFLEET Operational Commander since November 1986 and the benefits have been considerable: flexible response, speedy unit deployments and the ability to redeploy personnel and equipment quickly. Above all we have a much tighter grip on safety. There is an article from the Inspector of Diving later in the magazine.

The Fleet Diving Group is now well established with Fleet Diving Unit One (Maritime Counter Terrorism) taking part in several exercises and there is always an element at 4 hours notice. Fleet Diving Unit Two (Worldwide Operations) have continued their world and in particular NATO deployments in a variety of environments. Fleet Diving Unit Three (Trials and CHALLENGER support) have provided personnel for CHALLENGER's SDS trials, DCIEM (Toronto) diving tables development and other trials. Officer in Charge Fleet Diving Group, also Deputy Superintendent of Diving, writes in more detail later.

The S of D organisation, therefore, looks like this:



I am also functionally responsible for Area CD Units who have all had a busy and varied year. There has been a much greater emphasis on Underwater Engineering, indeed the Units have all recorded considerable increases in activity from last year, between 15 and 50%

COMMW's divers, though perhaps not achieving as much diving as they would like (not a new problem!) nevertheless have proved their worth in a variety of operations and exercises.

Ships Diving in the Fleet has been beset by the manifold problems with DSSCCA and matters will not improve until the introduction of the new compressed airset (SABRE) mid next year.

RNR divers are spreading their wings and it is pleasing to see how quickly the Port Diving Units are being established.

Saturation Diving is in limbo at the moment. Trials are progressing with CHALLENGER's SDS but what we all want is a definite decision from MOD whether or not CHALLENGER is to survive. The current indecision is morale sapping to say the least.

On equipment, we have got over some potentially crippling crisis earlier this year. We still, however, have an outdated/unaccepted Clearance Diving Set which, though well proven and meeting the NATO specifications is badly in need of replacement. Why do we still insist on a compressed air set with upside down bottles, twin bottles and full facemask? If we are going to go commercial let us go fully commercial in our equipment buys. Other nations manage successfully. Frankly, our procurement system is too long winded and complicated, it needs to be streamlined. I am addressing these matters but there will not be early resolution.

The advent of the Diving Systems Effectiveness Group (SEG) with its Operations and Availability, Reliability and Maintainability (ARM) Sub Groups is a major step forward. At long last we are able to formally list, our operational and equipment deficiencies and work towards rectification.

All these disparate parts of the RN diving whole need to be consolidated, properly established and linked more closely together. To do this we need a MOD(N) endorsed diving policy. Amazingly for all these years naval diving has been conducted without a policy to support it! Almost by false preferences you might say. Happily this state of affairs is being rectified and the staffing of a policy is being addressed at high level in MOD(N).

The policy must state; why we need MOD(N) divers, their roles, their priorities, the manpower and equipment requirement. At the moment I am trying to maintain operational capability without a firm basis on which to operate!

I would now like to turn to the future. The Diving Branch is a small cog in a large wheel: 400 Divers in a 50,000 man Navy. In order to keep the savings measure sharks away we must, therefore, justify our existence and make ourselves cost effective. To achieve this I believe our priorities should be:

MCM Diving and MIE. I understand MCM diving will be required for the immediate future but there is uncertainty over the requirement for divers in the long term, particularly with the SRMH and its RCMDS 2. Mine Identification and Exploitation (MIE) is run on a shoestring at present. This essential area of Mine Warfare needs to be regularly exercises, with proper procedures and equipment to support.

Underwater Engineering. I believe it is in this area that RN Divers are most cost-effective and perhaps it should be our first priority. We are doing much of it now. We have most of the equipment but could do with more and we need to look to our training. We should consider giving Divers qualifying some sort of certificate of qualification in Underwater Engineering.

Submersibles. My third priority and another growth area. The use of RN submersibles lacks a co-ordinating body. What is needed is a uniformed authority to take charge of MOD(N) requirements in this field. The MCD Branch/S of D organisation should take the lead here.

EOD/IEDD and General Diving. My fourth and fifth priorities will be always with us so I see no change in our commitments in these areas.

There are many other matters which we need to consider for the future and in brief these are:

Rationalisation of MOD(N) Divers - Why do the RN, DMS(N) and Dockyard have separate diving organisations?

Standardisation of Training - All to train to MDDS standards.

Ships Divers - Limit to 15 metres. The priority should be Ships Husbandry then Op Awkward.

Procurement of Equipment - Can this be streamlined?

Saturation Diving - The future?

Possible privatisation of ARE(A) - Effect on us.

Health and Safety at Work Act - MOD(N) liability.

Proposed closure of GUNWHARF - Effect on the future.

NATO Interface - A frowth area.

Female Ships Divers - RNR Port Divers show the way.

As you can see this article has been wide ranging and necessarily so. If the Diver Branch is to survive in this era of right financial constraints then we must look to our organisation and show at all times that we are an indispensable and cost-effective part of the Royal Navy. Operations in the past and recently, have undoubtedly justified the requirement for uniformed divers. We must continue to demonstrate our effectiveness in all areas of diving and thus ensure the future of our branch.

FLEET DIVING GROUP

Lieutenant Commander J COGGINS Royal Navy

Due to Complementing Changes, I now have direct responsibility for the Fleet Diving Group. All 3 Units have had an extremely busy and highly successful year, as you will see from the ensuing articles. Hopefully for the good of the Branch, we will be able to maintain this momentum, while at the same time it is intended to concentrate on underwater maintenance techniques, which is proving to be an area of great potential.

FLEET DIVING UNIT ONE

Lieutenant M P J CROOME-CARROLL Royal Navy

Fleet Diving Unit One (FDU1) has had an interesting and varied programme in 1988 with personnel deployed to a variety of locations throughout the year from Rothesay, Isle of Bute to Jakata Indonesia.

The Unit participated in numerous regional Maritime Counter Terrorist Exercises against a variety of targets in very different locations with diverse weather and diving conditions and culminated the year with the National MCT Exercise which took place in the Solent last November.

During the Solent Exercise the Unit succeeded in deploying the diving Gemini and equipment as an underslung load at night by Mk IV Sea King to the target area. This newly approved operating procedure has simplified logistics and considerably reduced the Unit's reaction time.

During '88 the duty element participated in both Exercise STUDSPLASH and CHANSPLASH which are parachuting training exercises which consist of both day and night descents with equipment from a C130 aircraft. Now that the Unit personnel have been parachuting for a sufficient period of time and have consolidated their training it is proving possible to practise the necessary special techniques required for that role and continue to develop and enhance the flyaway capability with particular emphasis on the streamlining of the equipment used for the parachute insertion.

FDU1 has carried out LEBA O^2 LAR V attack swims against ships of the Fleet in various locations in the UK and in Gibraltar, for MISCEX 840, at the request of sea training staff. An element was also dispatched to Gibraltar on a few occasions to provide underwater security protection for submarines visiting the Rock and whilst out there conducted underwater maintenance and engineering tasks in support of FDU2 who were deployed elsewhere.

The Unit provided LEBA O^2 LAR V training for MDDS Staff in preparation for the School's training courses for 22 SAS SQ divers.

In addition to MCT training and exercises FSU1 personnel has been involved in numerous Fleet Diving Group Operations with both FDUs 2 and 3 as part of the manpower interchange within the Group.

Lieutenant Commander Bernie BRUEN bade farewell to FDU1 and the Royal Navy in March and returned to the Gulf to work for the Sultan of Oman. With the termination of the Warrant Officer's Billet in FDU1 in July, WO(D) George SISSONS moved to ARE(S) at Portland to work with Lieutenant Commander Brian BRAIDWOOD and in November one of the FDU1 PO(D)'s billets was exchanged for the SGT RM(SC1) billet in FDU2.

The Unit complement is now 11 which comprises the Duty Team of 7 (one x Lt(MCD), one x SR(PO(D)/SC1), 5 x LS(D)) and the 4 off duty back-up personnel (one x SR, 3 x LS(D)) who are employed on continuation training or Fleet Diving Group Operation during their stand-off period.

As 1989 gets underway we look forward to the future with anticipation and remain ready for the unexpected.

FDU 1 TEAM MEMBERS - APRIL 1989

Lieutenant M P J CROOME-CARROLL RN
PO(D) R K WEBB
PO(D) N P J KINCART (PO(D) Course 17/4)
LS(D) G BIRCH
LS(D) J GARLICK
LS(D) I M JACKMAN
LS(D) M N POLLAND (Release 1/8)
AB(D) A J PEARCH
LS(D) R J PEAKE
LS(D) G T WARD
LS(D) A J WHEELER
AB(D) K F JAMES

FLEET DIVING UNIT TWO

Lieutenant M LEANEY Royal Navy

Having joined the Unit 3 weeks ago, it is difficult to write an interesting article from personal experience (a night in Hamburg probably not being relevant here), but a review of FDU2's employment over the last year provides a good sample of the sort of tasks we can expect to undertake.

January 1988 kicked off with an engineering task for one element in Dubai examining HMS BRECON's shafts (the ship's company was on leave), while the remainder of the Unit undertook a 75 m HeO_2 and 54 m DSSCCD Work-Up and a ROV Trial in Cyprus. The latter successfully exercised the Unit's Flyaway capability using a dedicated RAF C130 and a RCT LSL as a diving platform. Further use of the recently acquired Super Phantom ROV was made in the last half of February in the Mine Investigation and Exploitation Role with very promising results.

March was taken up with Mine Identification and Gulf EOD training at DEODS, FDU2's Annual Diving Inspection which went well and a 75 m diving trial in support of FDU3. This took the Unit up to a much needed Easter Break.

BLUE HARRIER 88 took up all of April. The Unit deployed by ferry and road to Hirtshals, North Denmark for the first phase of the exercise and was later redeployed to Wilhelmshaven, Germany for Phase 2. Both diving areas were harbour basins of about 10 m depth with nil visibility and very soft mud, the mines being 90% buried. All mines were found in the first area and 90% in the second (it was later established that one mine was laid our of area). The exercise provided excellent training in EOR procedures and search tehcniques under operational conditions. During the exercise, the notice for CIMNEL tasking was reduced requiring the return of one Element to the UK prior to ENDEX.

The major undertaking during May was the trialling of new 75 m HeO_2 tables in the Oban areas. Over 50 Man Dives were carried out at various depths and durations. Despite an O_2 poisoning, a mild DCS case and an ear problem, the trials were considered successful and the new incremented tables are now in use.

June and July were relatively quiet months that allowed for continuation training, including an EOD refresher at DEODS, demolitions training, an ROV trial and tool training at Horsea and a mine investigation trial at Helston. The latter was a very interesting period, involving the use of the ROV, MRO and DSSCCD equipped divers against special sensor packages dreamed up by the Boffins at ARE. The result were very encouraging.

On return from summer leave at the end of August the pace began to hot up. September saw 2 weeks EOD range clearance of a disused RAF weapons range at Larnaca, Cyprus which was becoming a hazard to the increasing number of tourists now using the area. The Unit was deployed by C130 with its own vehicles and equipment and were very well looked after by 33 Signals Unit based at Ayios Nikolaos. The clearance was achieved using a Light Jackstay with a team of surface swimmers on a distance line to maintain station. During the 2 week task, 2200,000 sq yd were covered and 240 items or ordnance were recovered, including 4 3" rockets. During this deployment, the complex and demanding EOD task in HMS SOUTHAMPTON arose and is covered in a separate article. On completion of the Cyprus task, the Unit redeployed to Turkey for Exercise DAMSEL FAIR. After briefing in Izmir the Unit moved to an exercise area based at Mentes Military Camp and commenced work alongside Turkish and American diving teams. The large open water Exercise area was divided into 3 parts, our area being the largest at 800 x 800 sq yd. The water depth was 18-24 m deep with good visibility and little tidal stream allowing a light jackstay to be used with 3 divers at a time. Although the search was hampered by strong seasonal winds, the clearance progressed well providing excellent training in DSSCCD. All 3 Mk 36 Mines laid in our area were recovered.

Underwater engineering was the theme for October with jobs on HMS EDINBURGH in Australia, HMS SOUTHAMPTON in the Gulf and HMS DUMBARTON CASTLE in the Falklands. HMS EDINBURGH had problems with a propeller providing a difficult task lifting and re-inserting blades. The job was arduous and working 24 hours a day, the team, along with the OUTBACK CDT and the Australian CDT1, completed in time to allow EDINBURGH to sail on schedule. The less publicised but equally important task involved the preparations for docking HMS SOUTHAMPTON onto the Heavy Lift Vessel. CPO(D) LAWRENCE and one element completed the extensive preparations in 3 weeks, tasks involving a complete underwater video survey, removing approx 70 sq ft of buckled hull plating, a keel alignment, removal of some CPP blades and the EM log. PO(D) HAMMOND and one element were deployed to the Falklands to remove a berthing hawser firmly wrapped around one of DUMBARTON CASTLE's propellers. Using a hydraulic tool pack and cutting equipment work was completed in time to allow the ship to return to UK as planned.

PO(D) HARRISON was deployed for 6 months in Charge of the OUTBACK '88 clearance diving team. They provided IED and diving cover for the 6 ships and were kept busy with numerous tasks, including the EDINBURGH job.

In summary, the Unit has been kept very busy over the last year with demanding work which has covered all aspects of diving, EOD and underwater engineering. Motivation remains high and the Unit is looking forward to the challenges which no doubt 1989 will provide.

FDU2 TEAM MEMBERS - APRIL 1989

Lieutenant M LEANEY RN
CPO(D) LAWRENCE
PO(D) A R HARRISON (FOST 18/4)
PO(D) G J WILSON
LS(D) T J SIMMONDS
LS(D) P TUDOR
LS(D) G S R BEAN
LS(D) N R EASTHAM
AB(D) S A McKEEVER
AB(D) A J OWEN
LS(D) J A MEEKIN
LS(D) C A SMART (PO(D) Course 17/4)
AB(D) M J BENTON
AB(D) C BARNES (Release 9/5)
AB(D) HORBATOWSKI
AB(D) McHUGH
AB(D) JOHN
AB(D) A J LASCKEY
AB(D) S PENNINGTON
AB(D) A D FROWLEY
AB(D) M A KILBY
AB(D) D I McKENNA (CHALLENGER 21/3)

FLEET DIVING UNIT THREE

Lieutenant S McDOUGALL CAF

Fleet Diving Unit Three (which many will recognise as the old Saturation Diving and Trials Team) has had a busy and varied year. 1988 began with the Unit involved in a rather sticky business, as we spent several days in the GUNWHARF Trials Tank conducting a teach-in with the underwater neoprene tile-repair glueing kit. This was judged a great success, as all divers were unstuck from their projects and recovered on deck. The Plymouth CDU also participated in this training and have since gone on to use the technique with good results.

In February, FDU3 carried out a trial of new 75 m O^2He Diving Tables off the West Coast of Scotland. No Bends were encountered and following a subsequent trial by FDU2, the Tables have now been accepted as part of Change 2 to BR 2806 (Supp). A vote of thanks is owed to Captain Ed THALMANN, USN(MC) for may hours spent slaving over a computer at the Institute of Naval Medicine (INM) to produce these tables. The efforts of others from INM who supported the trial should not go unmentioned.

In March, INM conducted a trial of the Duocom two-man RCC in their hot room, at 40°C with FDU3, to evaluate a cooling jacket developed for Gulf Ops. The subjects carried out extended Table 62s in this extreme temperature without discomfort, while the outside operators suffered. This cooling jacket was considered a success.

FDU3 sent a team to Oceanology International in Brighton to demonstrate RN diving equipment in action to the marine scientific community. Also periodically during the year, divers travelled to Toronto, Canada, to participate in a joint CANUKUS Oxyhelium decompression project.

The success of the Fleet Diving Group concept was demonstrated by the participation of divers from FDU3 in other taskings. Unit members went to Gibraltar for Awkwards, the Persian Gulf for EOD work, the Falklands to help with Diving Inspections and so on. FDU3 also provided divers to support HMS CHALLENGER during her Part IV Saturation Diving System (SDS) Trials.

On several occasions, divers from the Unit were tasked to support DGUW(N) and ARE Underwater weapons trials. These happened at places such as Portland, West Bay and Falmouth. The divers were exposed to some exciting new technology at these trials, deploying and recovering mines, working with ROVs and generally gaining invaluable experience.

This has been a very brief and broad-brush look at what FDU3 has done in 1988. Trials are continuing with a non-compressible dry-suit (ie neoprene), SIVA closed/semi-closed-circuit breathing apparatus, SABRE replacement DSSCCA and new Formlin lubricant. New trials to improve thermal protection for the 75 m diver and to fine-tune and the new 75 m Tables are expected early in the New Year, as well as CHALLENGER's 300 m dive. In short, business is booming here in the South and shows no sign of letting up!

FDU3 TEAM MEMBERS - APRIL 1989

Lieutenant S McDOUGALL CAF
CPO(D) COLDWELL
PO(D) GIBSON
LS(D) R C HAYTER
LS(D) TAYLOR
LS(D) PENNY
LS(D) TEAL
AB(D) GRADIDGE
AB(D) SIBBALD (Release 23/5)
AB(D) MITCHELL
AB(D) PARTON (NURTON 7/9)
AB(D) DONNELLY
AB(D) STEWARD
AB(D) SEXTON
AB(D) WILSON
AB(D) MURRELL
AB(D) COUSINS (CHALLENGER 30/5)
AB(D) BELL
AB(D) SLADE

SAFETY CONSCIOUS

Lieutenant Peter PEHL USN

On 4 October 1988, I had the honour of reporting for duty as the American Exchange Officer on the Staff of the Superintendent of Diving, replacing Lieutenant Commander Bill ZBAEREN USN as the Inspector of Diving. There is quite a lot to learn and Warrant Officers Mick FELLOWS and Jim GREEN along with CPO(MEA) Angus NELSON are working diligently to bring me up to speed on the workings of the Royal Navy Diving Branch.

So far I have found many similarities between the RN Divers and their American counterparts. Self motivation, a strong sense of professionalism, and in general, the best people in the Service, are just a few to mention. So with this in mind I want to talk about a couple of areas that would apply to both the Royal and US Navies.

The first I want to mention is the Diving Safety Inspections that my staff holds annually on the various diving Ships and Units. Having been an operational Diving Officer at numerous USN Diving Commands and previous to that an enlisted Diving Supervisor and working diver, I know how frustrating it can be to try to run your diving operations as safely and efficiently as possible and then be subjected to an inspection where it seems that the "Nitpicky" Inspectors cannot be satisfied. I can also remember how at times it appeared that the Inspectors got some sort of perverted pleasure out of finding as much fault as possible. Now that I am an Inspector I can see things from the other direction. When we do an inspection our main concern is safety and trying to stop potential hazards before they happen. It is far better to have us find your problems than to be standing on the wrong side of a Board of Inquiry. Our aim is to help you.

The other area that I want to touch is documentation. This seems to be the Universal bane to the passing on of good ideas or legitimate concerns for problem areas. Divers being the intelligent free thinkers that they are, constantly devise better procedures or equipment, or recognise actual or potential hazards. The best way for these improvements to be passed on is through some sort of written history. Unfortunately sometimes this does not occur and what becomes written in blood could have been written in ink instead.

So what avenues does the working diver have to get his point across? One way is to submit ideas through chain of command. Many times a concise memo will aid the busy Diving Officer to bring pertinent facts to the attention of the Diving Inspectorate or other authority for appropriate

action. Identification of equipment deficiencies through submission of the Form S2022 could prevent accidents in the short run and effect design improvements in the future. Remember to be thorough and include symptoms, causes, effects and recommended cures. Do as much research as is reasonably possible.

My Staff and I are ready to render advice and assistance and we can be reached at Portsmouth Naval Base Ext 24866. Since our tasking requires a lot of travel, unfortunately mainly to Scotland rather than sunnier locations, we would prefer a loose minute rather than telephone call if time permits.

HMS SOUTHAMPTON - SALVAGE OPERATION

Warrant Officer (Diver) KIDMAN

On the evening of 3 September 1988 while on Armilla Patrol, HMS SOUTHAMPTON was in collision with the 34,000 ton P & O container ship TORBAY. The bulbous bow carved through the Seadart magazine, only stopping when it met the keel. Flooding was extensive, including messdecks and the computer room, but the most significant flooding was in the Seadart and 4.5 magazines.

At 1300, 4 September 1988 the Fleet Diving Group Headquarters received instructions to deploy a Unit to survey the damage in the magazines and estimate the Explosive Ordnance Disposal work required to make the ship safe for docking. At 0930, 5 September 1988 the Unit arrived at FUJAIRAH United Arab Emirates (UAE) where the SOUTHAMPTON was berthed and commenced a detailed survey.

The inspection of the Seadart magazine revealed extensive underwater damage, the inside of the magazine being reduced to an array of broken missiles and tangled metal. The magazine raft assembly had been severely damaged and the port Seadart spray tank had been pushed into the Seadart magazine causing extreme damage to 7 of the 20 missiles embarked. The rails of the port side of the raft assembly had been pushed forward penetrating the bulkhead and entering the 4.5 magazine.

This movement also caused the leading port missile to be driven into the forward bulkhead of the magazine. The twisted metal of the spray tank had cut the port after missile in half and emtombed the boost motor under debris.

The 4.5 magazine after bulkhead had been split by the penetration of the port raft assembly rails, the damage measured 2 metres across and was below the level of the deck plates. As the rails protruded from the split it was not possible to fix a temporary patch over the split.

All 4.5 cased rounds appeared undamaged, some were flooded when inspected later, 4 boxes of Phalanx ammunition had been crushed and were trapped under the protruding rail assembly, beneath the deck plates.

RFA DILIGENCE arrived at FUJAIRAH early on 5 September and with her assistance the 4.5 turret and Seadart launcher were removed to reduce top weight. This caused the water level in the Seadart magazine to fall uncovering most of the missile warheads, therefore, the forepeak was flooded to bring the water level back up to keep the damaged warheads wet.

HMS MIDDLETON's diving team assisted in the lashing of the missiles to a shoring of 4 x 4 timbers, positioned in the Seadart magazine to prevent the missiles moving during the tow by RFA DILIGENCE to DUBAI.

On arrival at DUBAI, DILIGENCE and SOUTHAMPTON anchored off to await diplomatic clearance. During this time the ammunition stowed in the 4.5 magazine was removed to a temporary magazine; the helicopter hangar, to reduce the amount of explosives materials foreward. This task took 48 hours as all ammunition had to be manually removed, SOUTHAMPTON's ships company assisted the team in this hot and strenuous task.

The damaged boxes of Phalanx ammunition could not be removed as they were trapped by the rails from the Seadart magazine. After 2 hours work using a crowbar and chain hoist, the boxes were removed.

Diplomatic clearance was given to proceed to the neighbouring Emirate, ABU DHABI where preparations for the EOD phase to remove the missiles could take place. SOUTHAMPTON was allowed to berth at PORT ZAYED for 7 days, thus, preparations to conduct the EOD task at sea commenced.

The Seadart missiles are normally embarked and disembarked through the launcher. As this was almost totally destroyed in the collision the only access was through the blow hole. Therefore, it was, decided that the safest way to remove the missiles was by cutting 2 further blow hole size holes in 01 deck and then remove 2 deck cross passage. Before this could commence the removal of deck and deckhead fittings had to take place. The SOUTHAMPTON's ships company worked for 7 days removing equipment and delagging deckheads, at the same time the team removed the Seadart magazine deckhead fittings and produced a scale plan of the magazine showing the positions of the top and base of each missile relative to the forward bulkhead. From this the team was able to mark the missile lift positions on 2 deck.

To enable the missiles to be lifted clear of the magazine a gantry was constructed over the area of the deck where the intended holes would be cut. It was constructed by the DUBAI Transport Company (DUTCO); stood 7 metres high and had a SWL of 2 ton. Two moving travellers with low powered electric hoists were attached to the gantry and could be plumbed wherever required over the site.

As final arrangements were being made to conduct the EOD phase at sea further negotiations with the Ruler of DUBAI took place and diplomatic clearance was given for SOUTHAMPTON to proceed to an isolated berth in the very large port of JEBEL ALI.

On 26 September, DILIGENCE arrived at 45 berth in JEBEL ALI with SOUTHAMPTON undertow . The area had been evacuated and cordoned off to 200 metres to landward and 400 metres was cleared to the seaward.

A large barge was purchased and modified to hold the missiles after removal. Twenty steel containers were welded to the upper deck and 10 scuttling valves were fitted. A salvage pump was also fitted to prevent the barge sinking before the appropriate time.

After berthing at JEBEL ALI the cutting of 01 deck commenced, this was completed in one day by DUTCO using oxy-acetylene. After 3 sections had been removed from 01 deck a support beam was welded fore and aft across the centre of the holes to prevent the already weakened decks from collapsing.

The ship's company were evacuated on the morning of 28 September and the team commenced cutting 2 deck. Due to the close proximity of the missile warheads to the underneath of 2 deck the deck cutting operation had to be conducted using hydraulic cutting discs. The In-service standard hydraulic power pack was found very suitable. Wet blankets were positioned over the warheads to protect them. As one member of the team cut the deck another member remained underneath the deck with a running fire hose, damping down to prevent any possible ignition of the many combustible fluids contaminating the sea water. The team was limited to 30 minute work cycles because of the high ambient temperatures, combined with the contamination of hydraulic fluid and fuel oil in the water and also cutting of the longitudinal beams which had to be cut from underneath.

The deck cutting was completed in 3 days, 2 days earlier than estimated, this was achieved due to the continuous efforts of the team and the professional expertise of the Warrant Officer Chippy JOHN DENZEY who remained with the team during the whole evolution.

On completion of the deck cutting, the barge was brought alongside Starboard side of the foscastle. An earthing cable joined the barge to the ship to prevent any RADHAZ problems. The decks around the magazine were covered with shock mats and fire fighting equipment was checked. The preparations were now complete.

After an individual survey of each missile the plan was to:

a. Remove the wings off each missile, to assist stropping.

b. Cut away each trolley cover to gain access for stropping.

c. Remove the easiest of the missiles first by stropping them with the specially designed strops.

On 2 October the first missile was stropped in the following manner:

a. Two 12 metre braided nylon strops were passed around the base of the boost motor and butt hitched twice up the length of the missile body. Five mechanical strops were then secured around the missile body spaced at one metre intervals. After the slack had been taken up on the low powered electric winch the 4 missile unlatching mechanisms were operated, releasing the 4 locking bolts. The missile was then hoisted clear of the trolley approximately 2 metres. At this point the hoist was stopped and the 4 flip out fins were removed, a further 2 mechanical strops were secured to the boost motor and the missile

was then hoisted clear of the water to drain. This stropping method was devised to prevent the boost motor from breaking away at the launch beam; the weakest point, as the representatives of SINO had advised that if the boost motor dropped onto the deck it would probably ignite. Apparently no drop test has ever been conducted on this ordnance.

b. The missile was lifted clear of the decks and then lowered horizontally into another specialy designed strop, a type of hammock strop. With the aid of a spreader bar the missile was then hoisted in the hammock strop and then lowered into one of the coffins on the barge. The coffin contained a layer of sandbags and the missile was fully immersed in water.

c. This method of removal was then used on a further 9 missiles, the stropping and removal to the barge taking approximately 2 hours per missile.

Having established a clear area within the magazine the task of removing the more difficult missiles could commence. Missile JZ 432 had been pushed into the forward bulkhead by the impact of the collision. The team commenced cutting away the bulkhead fittings with hydraulic discs, which were entangled around the missile body. When this was completed the 8 bolts holding the launch frame to the boost motor were removed, the boost percussion link pipe and the launch electrical leads were then cut. The body of the missile was then stropped in a similar method to previous missiles and lifted clear of the magazine.

The boost motor had been crimped into the trolley by the trolley support arms bending inwards. By pushing these aside with a hydraulic ram (ENAPAC) the boost motor was stropped and hoisted clear. This task took 6 hours to complete.

Missile JZ 1214 had been partially separated from the boost motor at the control rink. The team commenced the removal by firstly removing the launch beam securing bolts, then carefully stropping the upper section of the missile body. After cutting away the boost percussion link pipe and launch electrical leads the upper section was gently hoisted on chain hoists at the same angle. Because of the damaged separation bolts, which contained explosive detonators, the body was hoisted without putting any strain onto the separation bolts. The boost motor was stropped and lifted clear separately. This took 4 hours. A further 8 missiles were removed during the following 5 days using cutting gear and hoists.

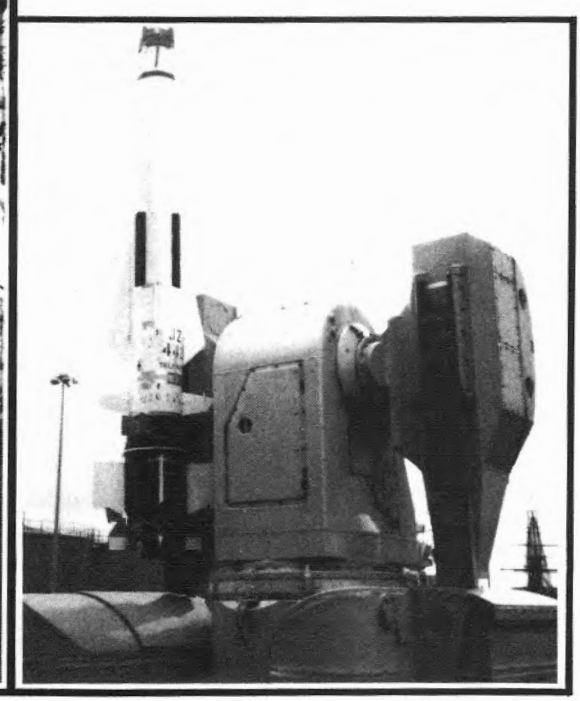
On 9 October the last task was to remove the last live boost motor remaining in the magazine. Work commenced to clear debris from around it. The main problem was that the spray tank was sitting on top of the boost motor and would have to be lifted to allow the motor to be pulled clear. Six 2 ton chain hoists were positioned in areas around the tank and wire strops were attached to the base, this only enabled the tank to be hoisted

some 20 cms above the boost motor. This allowed a more detailed inspection of the damaged boost motor, which exposed a large area of damage where the outer casing had been split exposing the explosive filling. After 4 hours work it was decided to continue the task next day as light was failing and everyone was ready for a rest.

The next day 2 members of the team entered the water, unfortunately after 3 hours one badly gashed his leg which required 5 stitches. At midday work continued using hydraulic rams and cutting gear, but again at the close of the day the motor remained entombed. On 11 October work continued on cutting away debris, though by this time the water within the magazine was getting heavily contaminated and hydraulic fluid from the raft assembly. At 1510 the boost motor was finally recovered and hoisted to the surface where SINO representatives inspected it before it was stowed in the barge. The removal of this boost motor had taken 22 hours diving time and almost had us believing it was welded to the deck of the magazine.

On 16 October the barge was towed into the Gulf of Oman and dumped in 1200 metres of water.

The whole operation took some 7 weeks and a lot of information was gained on how to tackle this sort of problem if it ever arises again. Hopefully this information will reflect in future training and procurement of equipment.



SCOTLAND AND NORTHERN IRELAND

CLEARANCE DIVING UNIT

Lieutenant C LADE Royal Navy

1988 saw a large increase in SNICDU's commitment to IEDD and the general security role. This coupled with an increase in CMD tasks and a greater emphasis on underwater engineering has led to a very busy and professionally satisfying 12 months.

Last year SNICDU covered over 96,000 miles, spent 30,000 minutes underwater and completed 250 EOD and IEDD tasks. Terrorist devices rendered safe included 2 fruit cakes and a microwave probe. Work continued on a number of ammunition wrecks in the FOSNI areas, 7 tons of 20 mm shells being recovered from the wreck of the SS OSTENDE in Mull and a variety of small arms including grenades and a Lee Enfield rifle were salvaged from the LOCH GARRY at Rathlin Island.

CPO(D) NEIL was offered the opportunity of a secondment to an RAOC IEDD team in Northern Ireland for a week. This proved highly successful and is hoped will become available again in 1989.

Probably the most demanding task of the year was in the form of a cross between Underwater Engineering and Damage Control The USS HAYLER arrived at Rosyth in October with a German Tanker's bulbous bow protruding from her starboard quarter. After extracting the foreign object the Unit was tasked with the problem of fitting a 25 x 15 feet steel patch to the ship's side. Twenty four hours later divers had cut away all the protruding metal and the patch was lowered into place by crane. Three bottom lines drew the patch up against the ship's side and once close up divers fitted soft wood wedges in the gaps between the plate and the ship's side. The repair enable the ship to pump out the after compartments and put the ship on an even keel for drydocking.

The Unit's Museum of Ordnance was officially opened by Captain Max LAWSON in November, amid much local publicity and has provided a focus of interest for the variety of clubs and organisations which visit the Diving Section.

This year a classroom/display room is planned alongside the museum where lectures will be held.

Despite the problems with equipment and stores SNICDU has had a successful 1988 and looks forward to what 1989 may hold.

TEAM MEMBERS APRIL 1989

Lieutenant Commander N DAVIES Royal Navy Lieutenant Commander CHAMBERS
Lieutenant C LADE Royal Navy (Joins 13/6)
PO(D) HAMMOND
PO(D) HUGHES
PO(D) NORRIS
LS(D) BALDOCK
LS(D) BRAITHWAITE
LS(D) BROWN (MIDDLETON 9/5)
LS(D) CARSS
LS(D) COWLING
LS(D) PLATT (BICESTER 9/5)
LS(D) WORT
LS(D) WALL
AB(D) DEARLOVE
AB(D) DONOGHUE
AB(D) FORREST
AB(D) HARRIS
AB(D) HARRISON
AB(D) JONES (Release 3/5)
AB(D) LUKE
AB(D) MADDOCK
AB(D) MARSTON
AB(D) MERRIDUE
AB(D) ORTON (Release 19/4)
AB(D) RINTOUL
AB(D) WILKINS
AB(D) BOYLE (Joins 7/4)
AB(D) BUGGIE (Joins 10/7)
AB(D) ENGLAND (Joins 12/4)
AB(D) MARSHALL (Joins 4/4)
AB(D) SOUTHWARD (Joins 11/7)
AB(D) WALTERS (Joins 24/4)

PLYMOUTH CLEARANCE DIVING UNIT

Warrant Officer (Diver) LIMBICK

It has been a busy year for PCDU and although we have had no major tasks to carry out we have had the normal assortment of underwater engineering tasks, ranging from hull inspections to tranducer/rope guard changes and submarine tiling, a job which anyone who has done it knows is very messy and time consuming. The team log shows that, even with gas and equipment problems, the team have managed to put in well in excess of 60,000 minutes underwater.

We have had a fairly quiet year on the EOD side but many miles were put in on the road and we managed to process 21 mines/bombs and 5,400 other items of ordnance. On top of this the team responded to 34 IED call outs, including one real IED and quite a few very elaborate hoaxes.

We have been kept busy with diving and demolition training, as well as our own continuation training, completing 18 4 day demolition courses despite the fact that the range closes for the lambing season in January to April each year. A total of 91 ships diver selection tests, over 200 monthly dippers, RNR training and support for Army and Royal Marines diving units, have kept us from getting bored.

The team has managed to keep up to standard on deep work ups despite the short time allowed due to budget constraints. Recently the team achieved 54 metres in DSSCCD and this was quickly followed by the normal S2022 action, but things are definitely looking up.

The team has had the normal turnover of personnel but still manages to retain that vital core of experienced personnel. the SMCDO (Lieutenant Commander Stuart HARPER) has recently left us, he's off to drive one of those sophisticated tupperwear boats that a small number of us have only heard about and usually only visit at lunchtimes. He has been relieved by Lieutenant Commander Dave SANDIFORD who, although pleased with his new appointment, is a keen volunteer to swop draft with anyone going out to the States. Kev SCARGILL and Steve STEVENS also leave us early in the New Year to go out to civvy street (no sign of reliefs yet Chris). I would imagine drafty will have a difficult task finding any one old enough to relieve Steve. We seem to have an increasing number of lads putting in their 18 months notice and I wonder if this is the norm throughout the branch. If it is in your teams, I am sure SoDs organisation will be interested in numbers.

TEAM MEMBERS APRIL 1989

Lieutenant Commander SANDIFORD Royal Navy
Lieutenant GREENWOOD Royal Navy (Exchange US Navy 30/6) Lieutenant ELVIN (Joins 16/5)
WO(D) LIMBRICK
CPO(D) ROWLANDS
CPO(D) SCARGILL (Release 20/6)
PO(D) DOWELL
PO(D) SEWELL
PO(D) STEVENS (Release 10/5)
PO(D) WALLER
LS(D) BATEMAN
LS(D) CARTWRIGHT
LS(D) CHAPMAN
LS(D) GERMAN (CHALLENGER 16/7)
LS(D) McGRATH
LS(D) MERRY
LS(D) O'BRIEN
LS(D) RENNIE
AB(D) BEAM
AB(D) BEECHING
AB(D) BRAILEY
AB(D) FULLEN
AB(D) FULLWOOD
AB(D) HOBLYN
AB(D) HOCKING
AB(D) LAMPORT
AB(D) LENNON
AB(D) LIMBRICK
AB(D) TEMPLETON
AB(D) WHALLEY
LS(D) COOKSON (Joins 5/4)
AB(D) MEERS (Joins 4/4)
AB(D) TROMAUS (Joins 2/5)

PORTSMOUTH CLEARANCE DIVING UNIT

Lieutenant R DAVIES Royal Navy

Gentlemen, having now been in the chair for 12 months (doesn't time fly when you're having fun) as the Officer in Charge of the Portsmouth Area Clearance Diving Unit and Staff Diving and EOD Officer to Flag Officer Portsmouth (quite a mouthful). I can honestly say that this is the most interesting, challenging and stimulating job I have yet undertaken. While I appreciate that we all initially joined the Royal Navy to be sailors and, therefore, go to sea (did someone say "not me Jack") it is pleasant to be able to take a break from the norm and do something basically different.

The past 12 months has seen PACDU undertake a great variety of jobs in Diving EOD and IEDD, all of which I feel are common to a certain extent with my brother Units. I will, therefore, not risk duplication and boredom by summarising my previous Reports of Proceedings and list the dome changes, screw changes and Type C German Mines we have dealt with to write this article.

Whilst we all like to get out on the road to deal with CMD jobs our bread and butter tasks are in the harbour carrying out underwater engineering in support of our Fleet. A lot of skill and ingenuity is required to complete these jobs efficiently and in a reasonable time scale, no doubt I will be corrected if I'm wrong, but at present there does not appear to be any official recognition given, ie a certificate, to the men who have qualified in this area. This includes the Tool Training module of the Leading Seaman (Diver) qualifying course (I appreciate the man's log is annotated) underwater welding and NDT courses. To be fair to our men and also to ensure we do not undersell ourselves, our hard earned skills should surely be given more credibility and recognised accordingly.

It is not until one joins a Team (Ooops, I mean Diving Unit) that we really get to learn, in depth, and put into practice our DEODS training. As we all know there is nothing more satisfying than a well organised, controlled Bang!

Working hand in hand with the Emergency Services was a new experience for me and I have been most impressed with their co-operation and professionalism, particularly the Coastguard Service. This dwindling group of men and women that look after our beaches and waterways really do do the job for the love of it and not the money. Without them our task would be extremely difficult and they deserve all the praise they can get.

I have only had the pleasure once (honest) of working with the Fire Brigade, which I hasten to add was in my earlier days with PACDU and that was to deal with a small fire, well actually 3 in some sand dunes at Hunstanton. They appeared really pleased to be called out even though it meant walking a mile over marshes to reach us. (Quote of the month was: "Don't worry Sir if anything goes wrong we have 2 fire extinguishers with us!")

As mentioned earlier we undertook a lot of major as well as minor diving tasks in 88 which on the whole were efficiently and professionally carried out. However, as we all know, occasionally something goes wrong and lessons are learnt and relearnt as appropriate. So if anyone finds a large fibreglass bucket floating around the Solent could they please return it to PSTO(N). (Last month's quote was: "Don't worry Chief there is a line on it!")

The calibre of the men coming through my Unit these days seem to be on the up and their enthusiasm for working long hard hours, limitless. Their generosity continues to amaze me and I just wonder how many civilian workers would contribute to the extent we do to help our unfortunate casualties. Well done men, let the tradition continue. (Yes I am doing the British Heart Foundation London to Brighton Bike Race again this year.)

Talking of charities, may I on behalf of my 8 year old daughter Charlotte, thank all those who contributed to the quartz clock (batteries not included) donated to the Commodore, HMS NELSON Charity appeal at the King's Theatre. This rendering of Cinderella really was a magnificant night out and well worth the money. At one stage I thought 3 of our more Senior MCDOs who were lurking in the front stalls with the odd G&T were going to give us a rendering of: 'We are the Sergeants Three'.

Being a typical Diver I've had 4 months to write this article but left it until 2 days before the deadline to submit. As it is also 1200 on Wednesday, I guess I had better get on with some work!

TEAM MEMBERS APRIL 1989

Lieutenant R DAVIES Royal Navy
CPO(D) LEADER
PO(D) ALLEN (FDU3 20/6)
PO(D) BRUNTON
LS(D) CROALL
LS(D) MELEADY
LS(D) PURCELL
LS(D) SEABROOK
LS(D) SILCOCK
LS(D) WOODWARD
LS(D) WORTH
LS(D) HARKER
LS(D) TURNER (Joins 30/5)

AB(D) BAMFORD
AB(D) BROWN
AB(D) CURNOW
AB(D) DEVANEY
AB(D) HARAN
AB(D) DENNAIR
AB(D) LOFTHOUSE
AB(D) MULLEN
AB(D) ORRIS
AB(D) PRESCOTT
AB(D) SMITH (Release 17/7)
AB(D) STURGESS
AB(D) WATSON

AB(D) THOMPSON
AB(D) WAKEFIELD

CLYDE CLEARANCE DIVING UNIT

Lieutenant J COX Royal Navy

In this the first of the MCD and MW Annual Newsletter I intend to give you an insight into what diving at Faslane is all about.

As usual the Clyde Submarine Base Diving Unit has been kept busy diving the past year not only with its less glamorous role of supporting the submarine fleet but taking on more varied and interesting jobs a little further afield.

Before all that a few words about team members. John STAVELEY (Boss I) is still hanging on waiting for a PWO to come hot foot from some big ship to relieve him in May. At the time of writing we await the Boss's fate. Andy DAVIES (old Boss II), having been relieved by Jon COX (Tadpole), is now well on the way to becoming a PWO - good luch to him.

Sadly, George WILLMER goes to Berkeley in May and as yet has no relief as Chief Diver. PO Diver SHEPHERD returns to the flock at the end of January. He relieves PO(D) GRIFFITHS. So far PO(D) FULLER remains with the team.

As I said, submarine support and underwater engineering keeps us busy. In the main, the bread and butter jobs for the team are: Towed array stub fits and removals, the docking of SSNs and SSBNs, hull and screw inspections, Transducer/Sonar/Pinger changes and numerous berth searches in support of Base Security. There are of course many "one off" jobs that come in which keep the team sharp and on its toes.

On the other side of the coin are the jobs we've done away from Base which have not only added interest and varied the diet somewhat but have allowed us to maintain our 54 metre and EOD capability. To give some idea, here is the potted history over the last year.

November 1987:	Helicopter launched bomb recover at Stranraer.
January/February 1988:	Anti-swimmer sonar trials for Plessey.
March 1988:	Trials on new SABRE set (only managed 2 days).
Summer 1988:	Mine Recovery/Continuation training to 54 m. Wreck survey MV LOUGH GARRY (the cargo's still there but contaminated).

September/October November 1988:	More Mine Recover, Dummy Missile Recovery practice, Mine lifting bag drills, Anti-swimmer net explosive trials.

So as you can see its not all "Black Pigs" and air-sets especially as the Chief Diver goes to Hong Kong for a month for a purported "spell of duty".

The team can now put 3 diving elements on the road at any one time which means to say that lately working closely with the SNICDU we have been able to take on more EOD jobs than before.

Now that the manpower continuity is looking good we are able to use the experience gained by our members for longer periods before they are drafted back to sea. It bodes well for the training staff at Gunwharf that the quality of diver we are getting straight from course is of a very high standard indeed.

TEAM MEMBERS APRIL 1989

Lieutenant Commander J STAVELEY Royal Navy
Lieutenant Commander WILSON (Joins 22/5)
Lieutenant J COS
CPO(D) WILLMER (BERKELEY 16/5)
CPO(D) QUINN (Joins 2/5)
PO(D) GRIFFITHS
PO(D) SHEPPARD
LS(D) ARCHER
LS(D) McFARLANE (DULVERTON 13/6)
LS(D) PATTERSON (COTTESMORE 1/8)
LS(D) RUSSELL
LS(D) WEAVER
LS(D) YATES
LS(D) MANGION
AB(D) DONOHUE
AB(D) GODFREY
AB(D) HOOSON
AB(D) LOVELL
AB(D) MAIN
AB(D) McSKIMMINGS
AB(D) REID
AB(D) SHAW

DIVING TRAINING SCHOOL

Lieutenant Commander S McALEAR Royal Navy

There have been a number of changes within the Diving School at GUNWHARF. The first worthy of note is the change of titles imposed by DRYAD to lessen confusion, the Diving Training Officer (DTO) is now Staff Officer Diving and Demolitions (SODD) and ADTO is now DSODD. This may lessen DRYAD's confusion but SofD is a little too similar to SODD!

The Section is now well off for diving equipment and career course cancellations because of that problem is over. The manifold shortages for DSSCCA still necessitate the reduction in the number of Ships Diver Courses.

Progress is slow in the enhancement of Underwater Engineering and Battle Damage Repair (the old Tool Training) but we now have a dedicated CPO(MEA)(P), who is a qualified Ships Diver Supervisor and things are improving. A hot water generator has been provided, and with the assistance of HMS CHALLENGER, hot water suits and some adaptation enabling 2 divers to work on training tasks are as warm as toast. Other more practical equipment has been asked for, video cameras and underwater welding/cutting equipment and the reply to these applications are awaited. In the longer term a building to house this facility is on the cards but with the limitations on funding this may take some time.

Those who visit Horsea Island in the future will see that a new jetty has been built alongside the old covered jetty giving a much needed 3 fold increase in walking area.

The Demolitions Training Section have been sentenced to hard labour since December 1988 to build a new Demolitions Range at Thorney Island. This project has not been without its pitfalls. It was built in an area selected in consultation with the Royal Artilary, the owners of the site, but when it was finished it was decided that it needed to be moved 50 yards. Once people had picked themselves and each other up from the deck the problem was tackled and resolved. By the time you read this the range should be in use.

Returning to career courses. You will all be aware that 2 LS(D) courses have been cancelled. This has occured for a number of reasons but mainly due to the length of wait on the roster by those who have passed their WPE's and the requirement that those who take the exam have their rate at the latest within 3 months of completing the course. The roster for LS(D) is expected to lengthen to over 2 years in the near future, this will mean that advancement will be on a points basis. The sooner you pass your WPE the earlier you will be advanced.

The roster for PO(D) is now intermediate and the wait will increase. Again the sooner the WPE is successfully completed the quicker careers will progress.

The first point preparation for courses is paramount. Fitness training conducted by a CPO PTI twice a week is an integral part of course, but the need to be fully conversent with BR 2806 and during theory cannot be over emphasised. If you have any problems, questions or need advice on Diving Training matters do not hesitate and contact the School.

INSTRUCTIONAL STAFF:

SOOD - Lieutenant Commander S D McALEAR Royal Navy (TBRB Lieutenant Commander M HOLLOWAY Royal Navy)
DSODD - Lieutenant A K JOHNSTONE-BURT Royal Navy (TBRB Lieutenant GERAGHTY Royal Navy)
DO1 - Lieutenant I M GERAGHTY Royal Navy (TBRB Lieutenant Harrison Royal Navy)
DO2 - WO(D) B OULDS
DO3 - (TBFB WO(D) CLANG)

CPO(D) MALHAM
CPO(D) QUINN
CPO(D) BALL
CPO(D) CRANG
CPO(D) TIMMS
CPO(D) SHARPE
CPO(D) CHRISTIE
CPO(MEA) GALLIMORE
PO(D) GUIVER
PO(D) CARDWELL
PO(D) TATT
PO(D) WHALLEY
PO(D) BLAMPIED
PO(D) CRIPPS
PO(D) MATTHEWS
LS(D) JACKSON
LS(D) HANWELL
LS(D) GRIGG
LS(D) JEACOCK
LS(D) JACOBSON
LS(D) GODDARD
LS(D) BOWLER
LS(D) BARRATT

AB/S(D) MURRAY
AB/S(D) O'GRADY
AB/S(D) WOOLSEY
AB/S(D) BLAIKIE
AB/S(D) SCANLON
AB/S(D) COLLINS
AB/S(D) DANIELS
AB/S(D) LOTHIAN
AB/S(D) AUBREY-DE-LAVENU
AB/S(D) DIXON
AB/S(D) VERNON
AB/S(D) MOFFATT
AB/S(D) BARROW
AB/S(D) MORRIS
AB/S(D) THOMPSON
AB/S(D) MADDISON
AB/S(D) MARSHALL
AB/S(D) DOUDS
AB/S(D) SMITH
AB/S(D) WAKEFIELD
AB/S(D) TROMANS
AB/S(D) DUNDERDACE
AB/S(D) WATKINS
AB/S(D) MOORE

MINEWARFARE PROGRESS REPORT

From COMMW Staff

During the last 6 months MCM effort has once again been largely focussed on Gulf operations and Group 3 leave the Gulf area shortly to commence passage home. The relaxation in the rules concerning notice of ships for Gulf ops now allow Group 4 to operate in the Mediterranean exercising with various navies and visiting a number of Ports. It should be an interesting deployment for all concerned.

However, we have not been loafing here at home. I'm sure that a lot of you wonder what we do in the Warfare Office; so here are a few of the projects which are up and running at the time of print, some of which will shortly evolve into flotilla doctrine.

FLOMS

As the majority of the MW publications are only changed once or twice a year and especially as some trials indicate a requirement to change regulations governing safety of men and equipment; it became necessary to invent a method of rapidly changing regulations and methods used throughout the Flotilla; hence the birth of the 'FLOM'.

FLOMS are assessed during their period of issue and amended as required prior to their inclusion in MOTIS, BRs and CBs. If you have any gems of wisdom or better ways of achieving something don't just drip about it, but, as many of you already do, forward your ideas to us through your squadron.

SQUADRON ORGANISATION

As from 13 February 1989 the squadron organisation will be as follows:

MCM1	HMS MIDDLETON	HMS BERKELEY
	HMS CHIDDINGFOLD	HMS QUORN
MCM2	HMS BRECON	HMS CATTISTOCK
	HMS HURWORTH	HMS COTTESMORE
	HMS ATHERSTON	

MCM3	HMS BRETETON	HMS HUBBERSTON
	HMS BRINTON	HMS IVESTON
	HMS SHERATON	HMS NURTON
	HMS KELLINGTON	HMS WILTON
	HMS KEDLESTON	
MCM4	HMS DULVERTON	HMS BROCKLESBY
	HMS BICESTER	HMS LEDBURY

DIVING

Recent relaxations in the regulations governing the operation of the DUOCOM 2 man RCC will ease the problem of having to remain within 4 hours of a TUP facility when conducting dives deeper than 42 metres. For certain operations COMMW will authorise ships fitted with DUOCOM to conduct diving operations below 42 metres when outside the existing time constraint (FLOM 1/89 refers.)

MECHANICAL SWEEPING

The current situation of sweeping from FLOM's is far from satisfactory. This was initially necessary after minesweeping trials following operations in the Gulf exposed some large problems. Thereafter, the FLOM aimed to draw together all the information in diverse publications, to allow one document - one evolution! A new 'stand alone' mechanical minesweeping FLOM (another one!) will shortly hit the streets; it is intended to trial this for 6 months prior to its insertion in MOTIS and thereafter into ATP 24A UK Supp.

MULTIPLANES (KOM's)

Paul Stockley 1 COMMW O

As S2022 rendered by that prolific author, (nearly) CPO(MW) STOCKLEY (ex HMS BRERETON) has passed scrutiny by COMMW and it is agreed that Kite slings need no longer be painted but can be protected by a rust preservation after each occasion of use. Whilst this is not a vast step forward for manking it is one less bit of kit to chip and paint.

MARKING OF SWEEP WIRES

In order to aid visibility of sweepwire markings fluorescent orange paint should be used. (No we should't paint PAPS pink with blue spots!)

SWEEPDECK ENHANCEMENTS!

Further to the improvements envisaged in September 1988 mine magazine (mechanical sweeping) we are looking at integral quarterlights underneath the stern rubbing strake to prevent short-legged sweep deck directors falling overboard whilst recovering sweeps at night.

To prevent the Sweepdeck Director's tonsils looking like the afterburner of a 'Phantom' and with arms waving like a demented octopus, integral communications headsets, similar to mag loop, are being investigated.

MSSA MK 1

The 35 year saga of OSBORN (MSSA 1) rattles onward. The system was submitted for Sea Acceptance Trial (Fleet) (SAT F) in late 1988; no expense was spared for the minefield lay (including VEMS) and BICESTER did much sterling work, but, despite all efforts the TAG reliability let the system down. At the time of print a trial is underway in the basin at ROSYTH; if this is successful LEDBURY will run from Scotland to Bristol return (cheaper than British Rail) towing and trialling the ultimate TAG!

MINEHUNTING

ROV'S

The Ton squadron will already be aware of the SEAPUP ROV. Reports have been mixed however the general opinion is that this system is too restrictive and unsuitable as an aid to Route Survey (not as a Diver replacement as some seem to think). We are currently looking at more capable ROV's, but don't hold your breath.

MDW TAILS

COMMW have taken delivery of the first 10 fibre glass MDW tails. These should produce an enhanced sonar target and ease the pains of MDW Conning Runs in poor sonar conditions. If trials are successful production will follow.

DRILLS

COMMW is concerned that the rapid introduction of high technology enhancements, (eg DBA Edition 6, QX4, QX3 etc) before handbooks are available, causes a very steep learning cure for operators and a variety of drills throughout the Flotilla. Perhaps the people who suffer most are

MDDS (the school) trying their best to teach equipments which, in some cases, they have never seen. We recognise that this is unsatisfactory and the problem is urgently being looked into. Ships already fitted with these and other new equipments have held their own admirably; those of you with ideas to improve system effectiveness or standardise operator drills please submit them through Squadron Commanders at any time.

MAGNETIC HYGIENE

It is recognised that the current allowances for ferrous stores (such as tools, oils and greases etc) during Magnetic State 1 are unrealistic and unworkable. A review is underway to redefine the Magnetic states and their associated allowances. Human nature being what it is magnetic hygiene standards have slipped over the years. This is about to receive considerably more attention - so look to your standard onboard.

Each out of area operation demands different enhancements which change the magnetic signature of the ships considerably. A portable, rapid deployment, degaussing range has just completed trials off KIRKCALDY. It is intended for use in support of out of area operations to range ships in their enhanced states prior to the task.

MINING

Exercise mining laid to support MCM exercises and SEG Field Analysis continues to place a heavy commitment on the staff. VEMS have been laid for the first time during JMC and 2 ships were 'sunk'. It is intended to hold a ready use stock of VEMS at ROSYTH and they will be deployed at every opportunity.

EOD

During the recent actuation of a VMFI the catastrophic failure of the VMFI case caused very serious injury to an EOD Operator. VMFI's have been withdrawn from service pending completion of an investigation and tests. However, all operators are warned that they must comply strictly with the correct RSP. The firing cable must be cut cleanly (ie with sharp snips) and not sawn with a knife; all precautions are to be taken to ensure that the VMFI does not surface under the Gemini.

CURRENT MCM OPS AND EXPERIENCE IN THE CLYDE

Lieutenant Commander J STAVELEY Royal Navy

INTRODUCTION

Despite the calls of operation in the Gulf the Clyde remains a high priority MCM operating area. Most of you spend a fair proportion of your sea time in the Clyde so this article is offered as an update for MW Officers and Ratings on current MCM business on the Clyde.

The security classification is a significant limiting factor in some respects so this should not be viewed as a full brief. These topics follow no particular order but are of course largely related to each other.

MINE RECOVERY

Between ourselves and the submarines we have left an indeterminate number of mines around the Clyde in recent years. I have been trying to catalogue their positions with little success, save in one respect.

DGST(N) has reported that the MMK 5s laid by submarines in their work-up periods, are to be recovered if minelaying in Submarine Sea Training is to be progressed. A large number have been laid in the last 2 years, in Brodick Bay, the approaches to Campbeltown and Ettrick Bay, and none recovered.

The policy for the foreseeable future is that all mines in good condition are to be recovered. Some ships have asked me to confirm that those mines found without exercise fittings in Ettrick Bay are not sodium phosphide filled. Bearing in mind the rationale behind the "SOD-PHOS" mine, ie that it was designed to be fired by a transmitting target, I consider it most unlikely that such mines would have been laid in Ettrick Bay, where the aim has always been to train the submarine in minelaying.

If anyone has any firm knowledge of the "Background" in Ettrick Bay I would be delighted to hear from him.

MCM NAVIGATION

Hyperfix coverage in the Clyde areas is now complete and extends from Tiree in the North to the Isle of Man in the South.

In addition, the construction of a network of beacons is almost complete.

Some of these beacons are suitable for Hunt Class ground stabilisation, while others are more appropriate for integrating the Ton Class system.

When all are built their positions will be published in FLOOS. In the meantime, the Glasgow Herald's perception of their role is included for your amusement.

SUBMARINE SEA TRAINING (SST)

After mine recovery, another MCM input into SST is MCM leadthrough. After strong recommendations from several recent exercises the leadthrough is now an accepted part of work-up. The "Show Stopper" is always the availability of a leadthrough vessel so, while pike ships are used when possible, any MCMV in the area should consider itself fair game. Ships on OPERATION GRENADA have also been used in the past.

AN ANALYSIS MINEFIELD

After prolonged negotiation with local fishermen the systems effectiveness group minefield was temporarily laid in the approaches to Campbeltown in January this year. A permanent minefield has proved, for the time being at least, to be too unpalatable for local fishing interests in an area which is heavily fished throughout the year.

Designed to permit an estimate of individual ships minehunting effectiveness the field will be used during OPERATION PIKE. On completion it will be recovered. It is intended to lay it again several times in the course of the year, possibly in an alternative area.

A BUOYANT MINEFIELD

For some years the submariners have practiced minefield penetration in Kilbrannan Sound, between Arran and the Mull of Kintyre. The truth is that there have been no mines there for as long as anyone can remember, rendering the submariners exercise largely theoretical and unrealistic.

However, submarines are still required to be able to penetrate buoyant defensive minefields and interest has recently been expressed in the renewal of the field. The likelihood of a new lay in the same area being acceptable to the fishermen is nil, so negotiations are underway to define alternative, mutually acceptable area.

STANAVFORCHAN

The presence in the Clyde of the standing Naval Force Channel has aroused much interest amongst the operators of the 'Black Tubes'. As well as enjoying good runs ashore in Glasgow, the allies were able to participate in what, I belive, were 2 fulfilling training periods with UK national squadrons.

These periods help to demonstrate our combined resolve in what is, after all, not only a national but also a NATO high priority MCMV Operating Area.

SURVEILLANCE

Surveillance is a somewhat unglamorous aspect of our business, conjuring up images of members of the Home Guard crouching with binoculars on wind-swept white cliffs in the 1940s. In fact, it will be vital in aiding us to define the limits of mined areas in the future, so that we can ensure that our time consuming MCM effort is devoted to areas where it will be most needed.

Plans to monitor shipping in the approaches to the Clyde through shore radar and television stations are at an advanced stage. The system will help us to monitor and identify the minelaying merchantman and to guard against attempts at covert transits.

HMS SENTINEL

In October 1987 SENTINEL relieved HMS WAKEFUL as the Clyde Support Vessel. Her primary roles are surveillance and the support of Submarine Sea Training. There are however, other plans.

Although she is currently fitted for, but not with, Hyperfix it is hoped that she will eventually be made capable of conducting MCM leadthrough.

THE FISHERMEN

Consideration of the analysis minefield prompts me to comment further on our relations with local fishermen. Fishing is a thriving industry on the Clyde and areas which may appear 'remote' to Trials Officers or Exercise Planners in 'the South' are actually amongst the most heavily

fished waters around the UK. The Navy's claims that 'we were here first' or that 'we own the water' carry little weight with fishermen from Campbeltown and Tarbert, amongst others!

Much effort has been expended to smooth the path for the analysis minefield, in particular. Quarter has been given in other areas for the sake of good relations. Reports in the popular press of the Navy 'trampling roughsod' are mainifestly untrue, by the fishermens own admission.

The Clyde is, of course, a favourite place for trials with both the submarine and MCM fraternities. Unfortunately there are still far too many instances of trials being planned for the Clyde areas without early consultation with either COMCLYDE or other water users. In every case the former is delighted to help by liaising with the latter. More often than not the fishermen will be completely co-operative as long as they are informed in good time. A telephone call at an early stage does much to alleviate last minute problems which threaten to jeopardise an entire project.

The message for those of you in ships is simply to check on these aspects as soon as you know your programme.

OPERATION PIKE

The number of ship/weeks allocated to PIKE has increased. While the main aims continue unchanged a sizeable part of the time is now devoted to Squadron/Flotilla work, such as trials and Weapon Training, as opposed to COMCLYDE tasking.

WEST COAST MCMV BASE

The provision of an MCM interim support facility/semi-permanent base in the West of Scotland is still stalled by lack of funds. Much staff work over several years has determined that the best of several options is part of the old breakers yard to the North of Faslane. The area is being developed to accommodate Trident Class submarines but funding for the proposed dedicated MCMV Jetty has been withdrawn. Watch this space!

FOURTH MCM SQUADRON

CPO(MW) Dixie DEAN

The Squadron is 2 years old in June. The ships and Squadron Staff have been involved in many aspects of MCM ranging from MCMG Courses in Rosyth to Operation CIMNEL in the Gulf.

The second stint of duty in the Gulf began in May 1988 with an evaluation into the feasibility of Route Surveys within the UK area of concern. SNOME required statistics on how long it would take when FF/DD escorts would be required because of the various positions of the "Frontline". After many discussions and meetings the Surveys started with and without escorts, above and below the "Frontline".

The amalgamation of the UK, Dutch and Belgian MCM forces fell to us and gave us claim to fame forming 2 Squadrons within a year. The amalgamation was called Operation CALENDAR II and gave everyone the chance to work with other nations learning about their systems and methods.

On August 20 1988 the ceasefire was announced and agreed between Iran and Iraq. This threw a new light on matters and gave the ships a bit more flexibility in their movement around the Gulf.

A couple of mine sightings turned out to be false alarms but they were a welcome break from Route Survey and Weapon Training.

Many visits to various ports gave the ships companies time to stock up on cheap tapes and loud shirts (which now seem to be compulsory for MW's and Divers) sampling the various customs of different Arab States.

On return to the UK, MCM4 Staff took leave and returned to Rosyth in October.

You will all be aware of the decision to form a third Hunt Class Squadron to share out the duties in the Gulf and transfer all the remaining Ton Class to one Squadron. MCM2 Staff came from Portsmouth and set up office in yet more Rosyth Portacabins in November.

December saw a change in personalities within the Staff. Commander C G MEATYARD relieved Commander T I HILDESLEY as MCM4, the remainder of the staff are as follows:

SOO	Lieutenant Commander Grenville JOHNSON
SEO	Lieutenant Jim BRUNINK
SMEO	WO(MEA) Don GILLIES
SCPO(MW)	CPO(MW) Dixie DEAN
SCY	CY Tom HOOPER
SLWTR	LWTR Dave PARKIN

In January this year the staff deployed to Campbeltown for Operation PIKE. The ships taking part were LEDBURY, MIDDLETON, ATHERSTONE, SHERATON and HUBBERSTON. Several tasks were completed including mine recover, seg minefield and various surveys. The weather, as always, was not as kind as it could have been so the ships had to endure some uncomfortable conditions to fulfil their tasks (so did the staff in RAF MACHRIHANISH).

Other events include BICESTER carrying out the Fleet Trial (SAT(F)) on MSSA MK1. A very successful trial which included several new modifications to the system. By all accounts FALMOUTH is still a good run.

HMS ATHERSTONE carried out a Search and Rescue operation for a ditched Phantom off the East Coast of Scotland. The wreckage was quickly found but unfortunately not recovered for some time due to heavy seas.

HMS LEDBURY completed her time in SNFC handing over to HMS DULVERTON in January. The UK are at present COMSTANAVFORCHAN so additional personnel are carried onboard the UK ship.

HMS BICESTER and HMS BROCKLESBY are in the Synchrolift undergoing DED and refit respectively. The BICESTER's recently broke out of the Synchrolift for an enjoyable weekend in the town of Bicester.

At present the SOO and I are preparing to embark in ARK ROYAL/INTREPID for Exercise COLD WINTER in Norwegian waters along with HMS ATHERSTONE and HMS MIDDLETON.

In May we deploy to France for NORMINEX (advert: 3 PO's/CPO's required for MCMTA further details contact SCPO) along with 2 x MHSC's, 2 x MHC and 4 x MSF's.

In August we become the Standby Squadron for the Gulf, so at present we are planning various aspects of Weapon training and visits (who said HONG KONG).

The programme has been, and is a very busy one but offers plenty of variety in various aspects of MCM as well as visits and diverse operating areas.

'EDSOS KEPT LEDBURY AHEAD OF THE HUNTS'

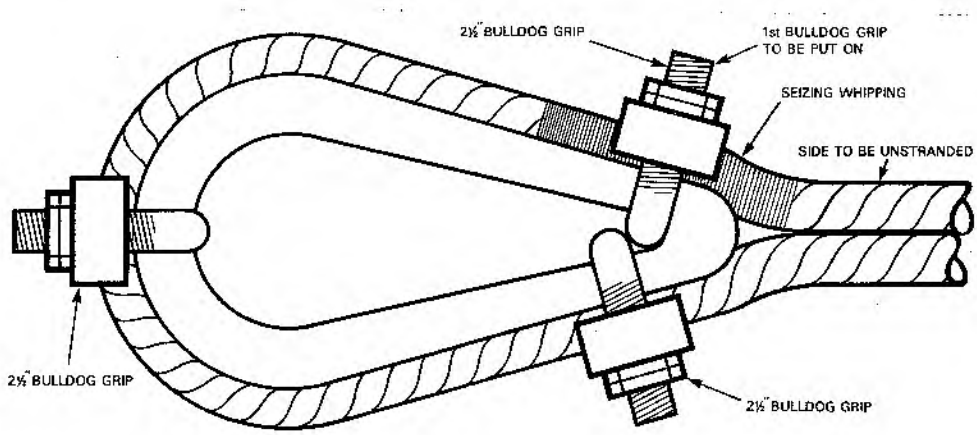
CPO(MW) HILTON
PO(MW) BREBNER

During out hectic programme while Flag Ship of STANS NAVY we were given a break to take part in Exercise 'TEAMWORK 88'. Our partner in STANS was HMS SHERATON, augmented by HMS BICESTER and HMS BRECON for the duration of TEAMWORK. We were operating North of the Arctic Circle in the VESTFJORDEN and smaller Fjords around the LOFOTEN Islands. The scenery was impressive, the weather was either good or gale force winds, and the beer expensive enough to make you tee total!

COMSTAN Commander P GALE RN, got fed up with cold plates and no ice cream so moved the Staff to the support ship FGS MOSEL (he came back 3 weeks later desperate for Pusser's chips). We started TEAMWORK as CTU of the UK ships, tasked for ATS of the USN Carrier Keep Area in VESTFJORDEN, the water depth was between 100 and 200 metres.

LEDBURY and BRECON teamed up for 6 days and swept the whole of the CVBG Keep Area in winds from light airs up to force 8 gales. For various reasons BICESTER and SHERATON didn't manage to join us sweeping but the rest of STANS was in the area hunting. Six days of sweeping from 0600-2000 and hunting overnight produced no mines except for FGS MARBURG's floater found on day one.

The only thing we did achieve was parting wires on uncharted rock mountains and bottoming sweeps while avoiding Kamakazie fishing boats and blind Noggie coasters. The starboard wire parted 15-20 metres from the end. Albert re-spliced the wire round a hard eye using bulldog grips to hold the wire in position. The port wire parted 80 metres from the end, when the wire was re-spliced we could not use it to the maximum depth for ATS rig 2. The wire, being of the new shortened type, and now missing a further 80 metres, would not have had a full layer of wire on the drum so it was ATS to starboard only.



Still 'mineless' we moved further in to the VESTFJORDEN towards NARVIK and used a bit of animal cunning in an attempt to find some mines. We started to hunt the 160 metre deep fjord with an artificial sonar depth set at 50 metres (good int and guess work as to the buoyant body depth!). After 5 hours trying our 'new tactic' (the old ones are the best) - Bingo at 0333 in the norming of Day 10 we hunted 2 buoyants which stood out like D--- B---S. Waiting until sunrise we streamed 'OO' and using sonar conned the ship through the mine positions, sweeping the first 2 mines of the exercise.

Having proved the tactic we were then re-tasked to a narrow fjord called TJELSUNDET between the mainland and the island of HINNOY. This busy route is the only route in the inner leads from North to South inside the LOFOTENS, an ideal place to mine. HNLMS SCHIEDAM hunted one and we hunted 2 buoyant mines in water depth from 100 to 180 metres, attempting to classify the sinker of the shallowest mine be RCDMS we found the water to be much deeper than charted as the PAP fell of the edge of a deep ledge. The only way to prove that our contacts were mines was to sweep them, but how? There was insufficient room to recover sweeps or turn in the fjord before the bridge, which was 200 metres wide between spans.

The plan was to stream single 0 at sea, rigged with 8 mm float wires, sweep the mines, increase to 14 knots speed to collapse the sweep and raise the otter (kite having been raised) to pass under the bridge and over the shallows. This gave us room to turn and come back for another go. This failed, due we assume, to the depth of the mine bodies. Next we used the same rig slowing the ship down to 6 knots through the water whilst holding the contacts on sonar, we again ran over them. This confirmed that the mines were laid too deep. Becoming frustrated we tried a third time using 'EDSOS' (Extra Deep Single Oropease Sweep!). We changed the depth of the sweep to 100 metres of kite wire awash and slowed the ship's spead through the water to 6 knots, all shackles and swivels remained the same size, but the float pendant was increased in length to 60 metres.

Streaming and sweeping procedure was as follows:

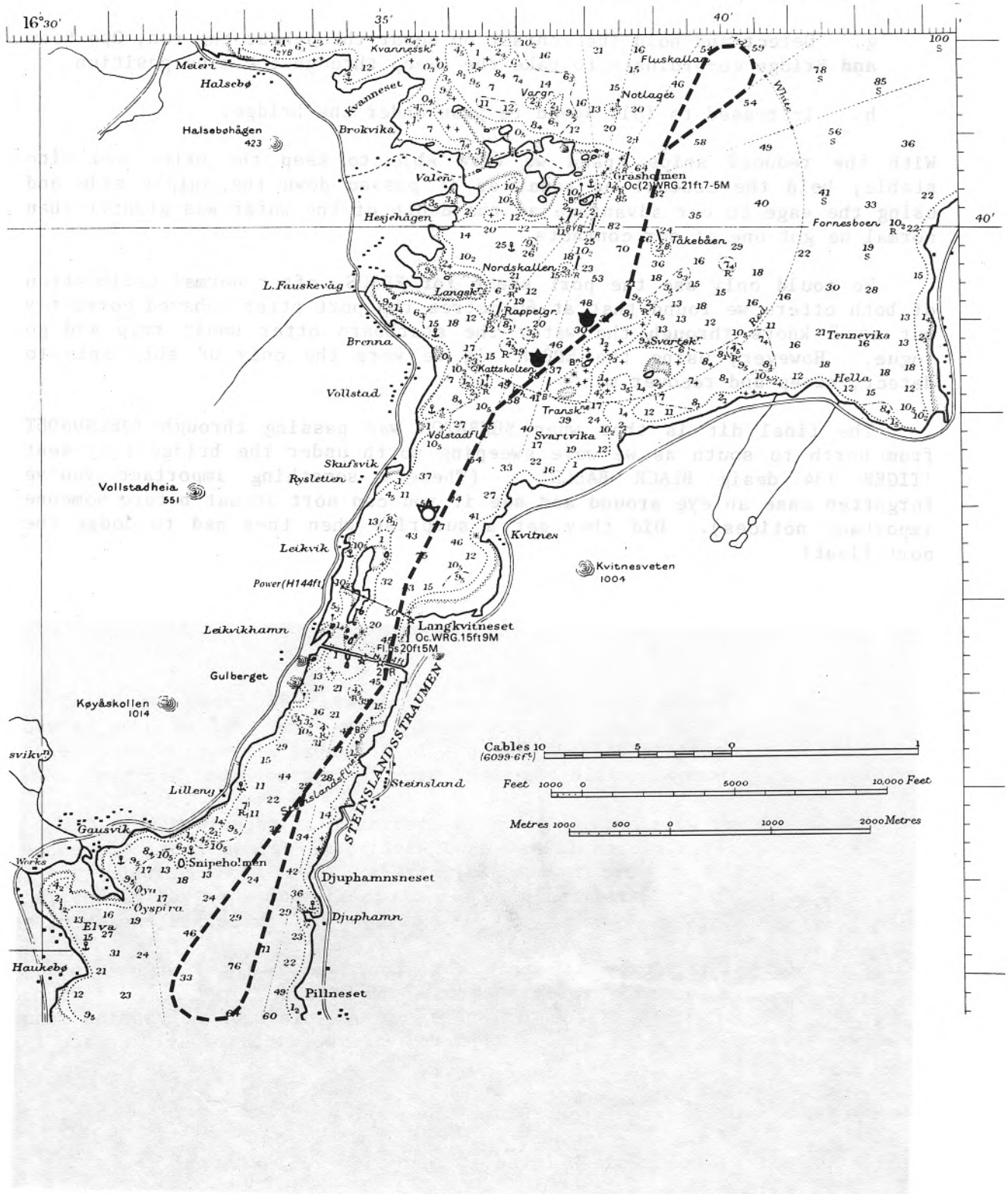
a. Ship speed 3-4 knots through the water.

b. Stream 60 metres of flat wire then slip the Oropease float.

c. Veer sweepwire to 90 metres fitting explosive cutters as required.

d. Allow the otter to stabilise and open out correctly (speed had to be adjusted).

e. Once the otter was stable continue to stream the sweep in the normal way downing kite to 100 metres.



f. Once fully streamed increase ships speed in one knot steps to 6 knots through the water.

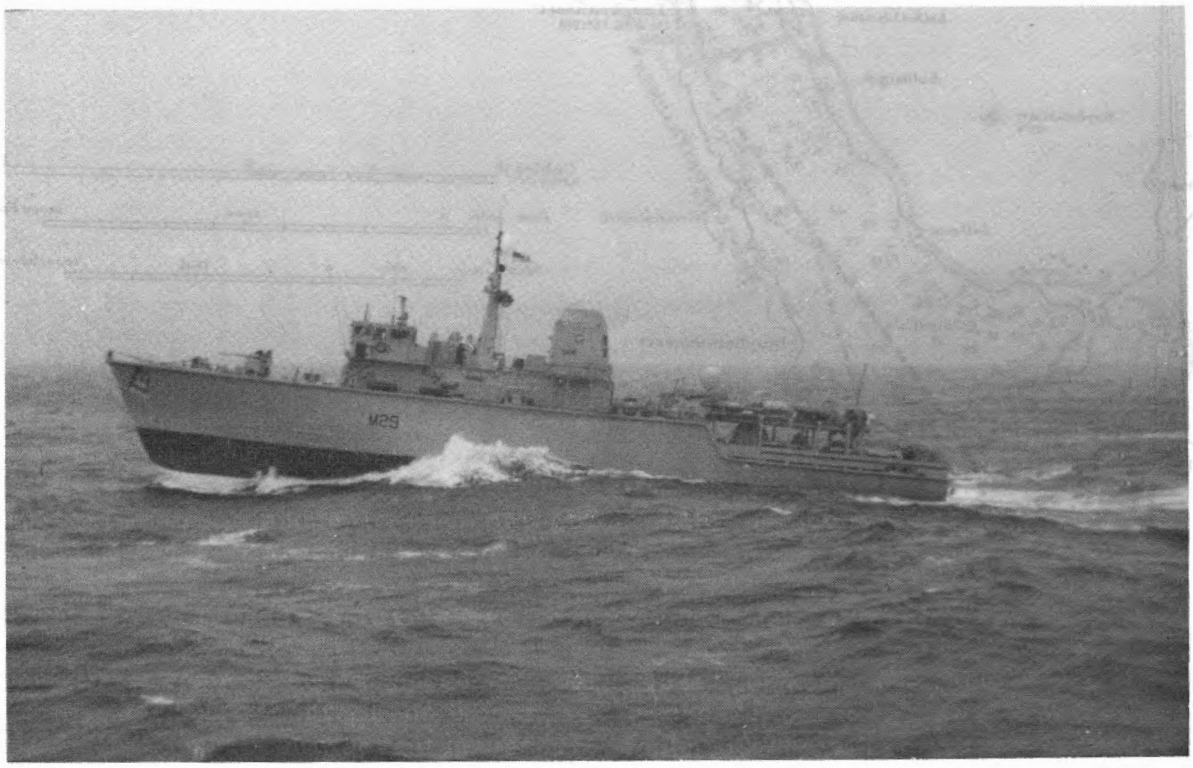
g. Detect and hold the contact on sonar throughout the run, Ops Room and Bridge co-ordinate to take the sweep through the mine position.

h. Increased to full speed to pass under the bridge.

With the reduced ships speed we were able to keep the otter and kite stable, hold the contact on sonar as it passed down the ship's side and using the sage to our advantage as the depth of the water was greater than normal we got one of our contacts.

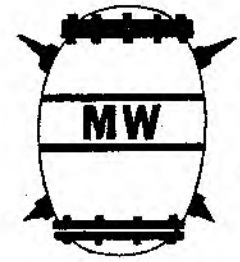
We could only use the port sweep for EDSOS, after normal calibration of both otters we found that at 60 metres the port otter behaved correctly but at 5 knots through the water the starboard otter would trip and go rogue. However, using the EDSOS rig we were the only UK ship able to detect, sweep and recover mines.

The final dit is that when SHERATON was passing through TJELSUNDET from north to south as we were sweeping north under the bridge they sent 'TIGER 134 desig BLACK BALLS'. (There's something important you've forgotten case an eye around and see if you can sort it out before someone important notices). Did they get a surprise when they had to dodge the port float!



TEAM SWEEPING WITH HMS BRECON

MINEWARFARE TRAINING SCHOOL



(OR SCHOOL OF KNOWLEDGE AND REVELATIONS)

Warrant Officer (MW) George TURNBULL

I thought that this incorporation of the Mine Magazine and Buddyline would be an ideal opportunity in which to reiterate the role and introduce you to the formidable and knowledgeable team who are currently charged with managing and running the school to the benefit of all interested parties.

So lets meet "The Team"

SOMW	Lieutenant Commander Mike CRITCHLEY (MCD)(AMW)(PWO) The Boss
DSOMW	Lieutenant Commander Mike ALLEN (MCD)(AMW)(PWO) D'Boss (TBR by Lieutenant Commander Dave CAREY in July 1989)
MW1	Lieutenant Steve WILD (MCD) LMCDO Course Officer
MW2	Lieutenant Paul RAISBECK (MCD) MWV PJT + POMW Course Officer
MW3	Lieutenant Tony SILVA SD(MW) LSMW Course Officer
MW4	WO(MW) George TURNBULL Sea(MW) Course Officer
CPCPO	CPO(MW) Taff EVANS Career Course Planning + Section Regulator
MPO	PO(SEA) Smudge SMITH MWV PJT Course Planning + Section Travel

Instructors:

LMCDO Course	CPO(MW) "Charlie" (speedy) HOWE
PO(MW) Course	CPO(MW) "Pinky" PRESTON
	PO(MW) "Jim" HAWKINS
LS(MW) Course	PO(MW) "Taff" READER
	PO(MW) "Nobby" CLARKE
SEA(MW) Course	PO(MW) "Nick" SMITH
	PO(MW) "Jumbo" HALLISSEY
	PO(MW) "Norman (the Stud)" THOROUGHGOOD

In addition and in support are the very important 1076 Trainer team ably 'headed' by:

CPO(MW) "Nobby" BEM CLARKE TBR by CPO(MW) "Mary" WHITEHEAD
PO(MW) "Tony" PRESTON

Course Design is fielded by the overworked but thoroughly dependable

CPO(MW) "Taff" JONES

The aim of the school is to train career officers and ratings in Minewarfare Tactics, drills and procedures as directed by CINCFLEET and COMMW. In addition we also run Minor War Vessel PJTs for those officers and ratings appointed/drafted to Minor War Vessels who require to be updated/refreshed in current MCM procedures. This may be a good point in which to show you the number that we are expected to train annually and to compare them with actual numbers for 1988.

Course	Frequency (per Annum)	Planned Numbers per Course	Planned for 88	Actual Numbers
SEA(MW)	6	12	72	64
LS(MW)	3	8	24	15
PO(MW)	3	6	18	8 (plus 7 RAN)
LMCDOs	2	10	20	13
MWV PJT(MCM)	6	12	72	68

As you can see the area which gives greatest concern is the PO(MWs) who are 53% below training requirements. This presents a bit of a problem to the Minewarfare Drafting Desk and in addition will probably cause an unblance in the Sea/shore ratio for M/W Senior Rates the message to the Senior Rates is therefore obviously clear, if you want to improve your shore time, encourage and help your leading hands to go for promotion. In fairness the figures would have been better if those personnel who attempted the WPE had been successful.

This leads me on to yet another function of the Minewarfare Section, "Task Book Training". A high proportion of our WPE failures were sadly lacking in their knowledge of mines and mining procedures. This is completely understandable when you take into account that few or even "none" of our MCM vessels carry mines. On the other hand, the Minewarfare School has lots of mines and is only to happy to make them available for task book training. In a lot of instances we will even "happily" provide an instructor, all that is required is an informal call or note with your proposed dates and numbers. I should also mention that the other facilities of the section are availabe on request.

We are of course continually updating the training requirement and preparations to introduce PJTs for the Single Role Minehunter (SRMH) are well under way. The SRMH team is headed by:

Lieutenant Commander Robin JACK (PWO)(MCD)(AMW) and he is, ably assisted by:

CPO(MW) Joe GEORGE
PO(MW) Tony MULRAIN
CPO(MW) Dave SMITH

The first SRMH PJT is programmed to commence in the Spring of 1989.

I would now like to plug a quick advert for Minewarfare and Clearance Diving Magazine. It is a worthwhile publication and a good medium for reaching all our people. To date we have very few Minewarfare DITS (thats DITS) and I am sure that there are some good sea stories out there that we would all love to share!

Finally for those of you who must be confused as I was over the myriad of name changes which have been attached to the once HMS VERNON here is the correct address and some useful telephone numbers:

The Commander
MDDS Faculty of SMOPS
HMS NELSON (Gunwharf)
Portsmouth
Hampshire PO1 3HH

Useful Telephone Numbers:

SOMW	Portsmouth Naval Base	24825
DSOMW		24004
MW1		24617
MW2		24617
MW3		24617
MW4		24826
Planning Office		24826
Instructors		24011
SRMH Training Design Officer		24811
SRMH Training Design Team		24813
Course Design/WPE/Task Books		24282

SRMH TRAINING AT MDDS

Lieutenant Commander R JACK Royal Navy

By the time this is read HMS SANDOWN will have been accepted from her builders Vosper-Thorneycroft and may even have been sighted at sea having started a 12 month period of Part IV Sea Trials. These, for the many projects involved, must seem like the beginning of the end but for the training world it is the beginning of the beginning.

The Training Design Team was formed nearly a year ago and are now just about ready to start running PJTs which will be the only form of training available until the AS 1107 trainer becomes available in early 1993. The battle for the trainer has been going on for the last year with the possibility of a combined operator and WE maintainer trainer being pushed into second place.

The bronze medal went to the option of all practical training being done as part of the handover on joining a new ship. The MER for the new trainer is in draft form and will be very similar to ARCTURUS but hopefully it will encompass the lessons learnt. Bear Island will not be figured but the Clyde and Forth areas will provide more realistic scenarios. Several other features are to be included to make life easier for the instructors as well as truer to life for the trainees. Ship motion however will not be simulated.

Until the trainer is accepted the PJTs will suffer from a lack of practical training facilities. Indeed there are some areas which will only be able to be exercised at sea but we are looking for ways to reduce this so as to keep bids for operational time to a minimum. This will be done by using COLLINGWOOD's facilities, the manufacturers and possible NORTHERN HORIZON.

There has been much speculation about the sale of 6 SRMH to Saudi Arabia. It now appears certain that the RN will be training them in Minewarfare (amongst other things) and a separate Saudi Training Team has already started to form with the first courses due to start in July of next year. There are vast numbers of unknowns about this training which hopefully will become clearer over the next 6 months. The main problem, of course, being the provision of practical training, especially since they have no experience of computerised Action Information Systems. The Saudi ships will be built at Vosper-Thorneycrofts yard at Woolston and Portchester so as not to interrupt the build programme for the other 4 RN SRMHs (INVERNESS, CROMER, WALNEY and BRIDPORT).

SANDOWN

Lieutenant B CLIFFE Royal Navy

Many of you will have read previous articles or seen presentations on the SRMH. Therefore, this is purely to update you on progress and remind you of the capabilities of this latest addition.

PROGRESS TOWARDS NAVAL ACCEPTANCE

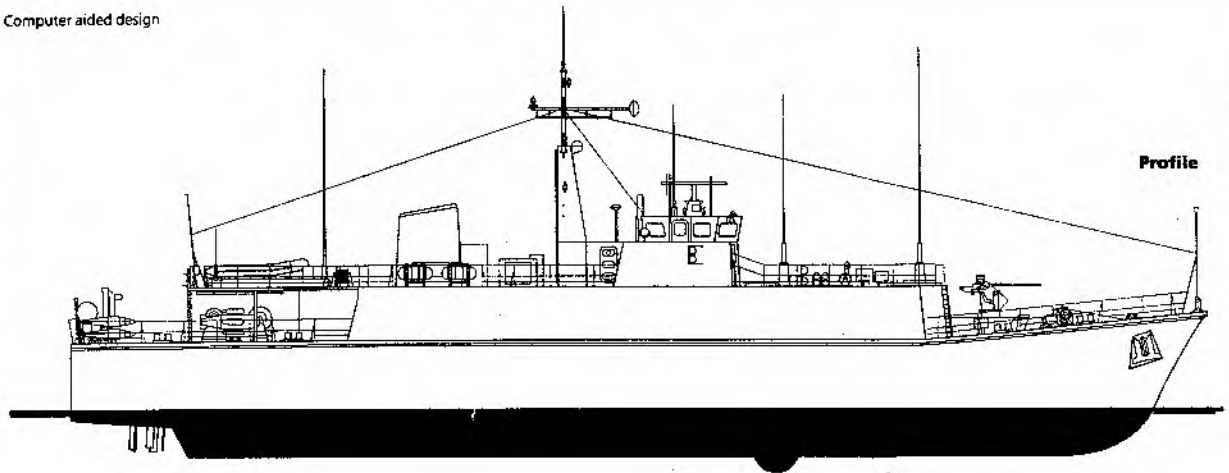
Since launch in April 88 ship build and fitting out has progressed well. Acceptance into the RN is now planned for March and at present there is no reason to believe that this date will not be met.

CSTs were carried out either side of Christmas and proved the basic ship design and propulsion system. With twin Voith-Schneider propulsion aft and powerful bow thrusters forward the ship proved to be very manoeuvrable - "look out CHALLANGER we can spin faster than you!" Acceleration and decelerating proved to be rapid and reaction to control order is quicker than with CPP. Different control orders have had to be devised to allow for the machinery specification which proved difficult for OOWs and QMs, however once learnt they worked well. Although the maximum sea-state yet experienced has been a 4, on passage to the Portland noise range, initial feelings on the seakeeping ability of the vessel is good and it appears to be more confortable than the HUNTS and TONS. The working and accommodation areas are concentrated in the centre of the ship which should combine to a more comfortable ship to live and work in.

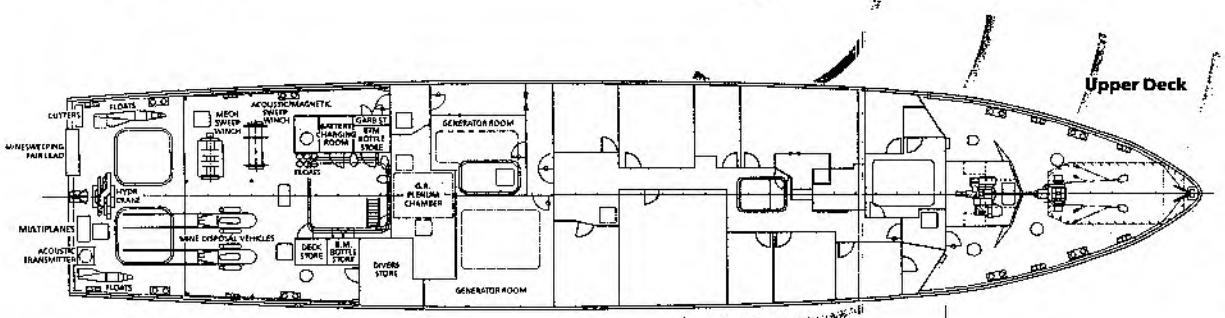
Sandown Class-Multi Role Version

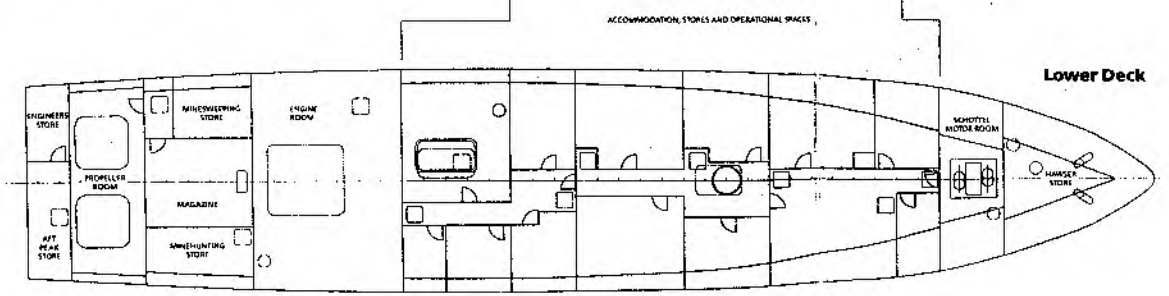
Principal Particulars

Computer aided design



Profile





Length overall		52·5m
Beam moulded		10·5m
Draft amidships		2·3m
Speeds	— max. cont. on main engines	15 knots*
	— minesweeping	7-10 knots
	— minehunting (electric drive)	0-6½ knots
Endurance at 12 knots		3000n.m.*
Main engines	— two Paxman 6RP200m Valentas	
Diesel generators	— three 250kW AC generators	
Manoeuvring	— two Voith-Schneider units	
	— twin bow thrusters	
MCM Outfit	— Plessey 193M high definition sonar	
	— Plessey NAUTIS action information system	
	— position fixing system	
	— double sided wire sweep armed with explosive cutters	
	— magnetic influence sweep	
	— towed acoustic generator	
	— two remote controlled mine disposal vehicles	
	— diving support equipment	
Radar	— Kelvin Hughes type 1007	
Communications	— 2 HF transmitters	
	— 3 LF/MF/HF receivers	
	— 2 V/UHF transceivers	
	— 1 V/UHF FM transceiver	
Weapons	— one 30mm gun	
Accommodation for crew and trainees	— commanding officer	
	— 6 officers	
	— 9 senior ratings	
	— 24 junior ratings	

* Dependent on machinery options.

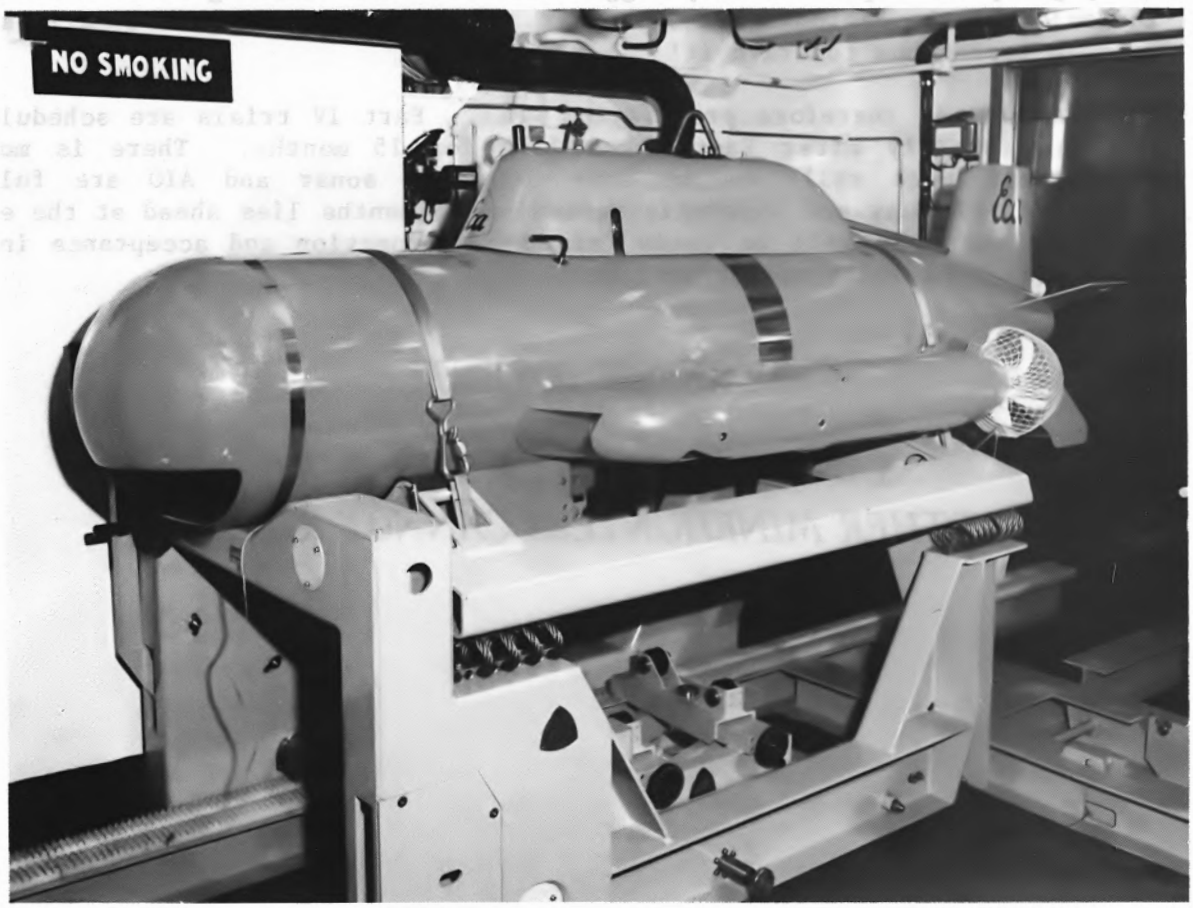
SHIPS SYSTEM

For those of you who have forgotten or not heard the main weapon systems are as follows:

a. Sonar 2093. A variable depth sonar being deployed by Plessey and GEC. The system can be used in either the hull mounted or deployed mode. It has 4 frequencies - 2 consoles, each with 2 displays, from which the search and class picture can be switched and the capability to hunt to the edge of the continental shelf. There is also a route survey capability used whilst hull mounted.

b. NAUTIS Command and Control System. An AIO system being developed by Plessey.

c. RCMDS II. The second generation of the familiar ECA developed PAP. This has a midwater capability in addition to bottom mode, a computer for maintainance checks and to aid the diver. Eventually it will be fitted with a manipulator arm for general use such as placement of transponders, and side mounted cutters for moored mines.



SHIPS COMPANY/PERSONNEL

The ships company at present consists of the following:

Officers:	CO + 4 (+ Part IV Trials Officer)
SRs:	MEO, WEO, 2 x PO(MEM), 1 x POD
JRs:	7 x MW, 5 x MEM, 4 x D, 2 x RO, 2 x CK, 1 x WEM, 1 x STWD

The more observant of you will have notices that there is no AB(R) or AB(M). This is due to both the Navs Yeo and Gunners Yeo tasks being done by either a MW or D Junior Rate. The advisability of this decision has yet to be proved. Suffic to say a diver, previously a radar rate, has volunteered as Navs Yeo and one of the MW's has recently returned full of enthusiasm for playing with the 30 mm.

Staying with training there have been a few teething problems with PJT courses for both engineers and Ops Branch personnel, with the RN courses ot yet available. This has led to courses being organised with the contractors and ships company disappearing off all over the country. One lucky group had a particularly rugged week with ECA learning about RCMDS II in Toulon at the beginning of September. A good suntan was had by all, and we even learnt how to drive it!

SANDOWN is therefore progressing well. Part IV trials are scheduled to start shortly after Easter and last for 15 months. There is much development work still to be done once the sonar and AIO are fully installed. A busy and hopefully rewarding 18 months lies ahead at the end of which the ship will be ready for COMMW inspection and acceptance into the Flotilla as fully operational Unit.

DON'T FORGET

SANDOWN REACHES THE PARTS
OTHER MINEHUNTERS CANNOT REACH

THE GREENJACKETS

Lieutenant T RUSSELL Royal Navy

This article is by way of a short introduction to the "Greenjackets" north of the Watford Gap. Before we go any further I would like to reiterate the Staff Motto:

"WE'RE HERE TO HELP"

and one for the ships:

"NO ONE TRAINS TO FINISH SECOND"

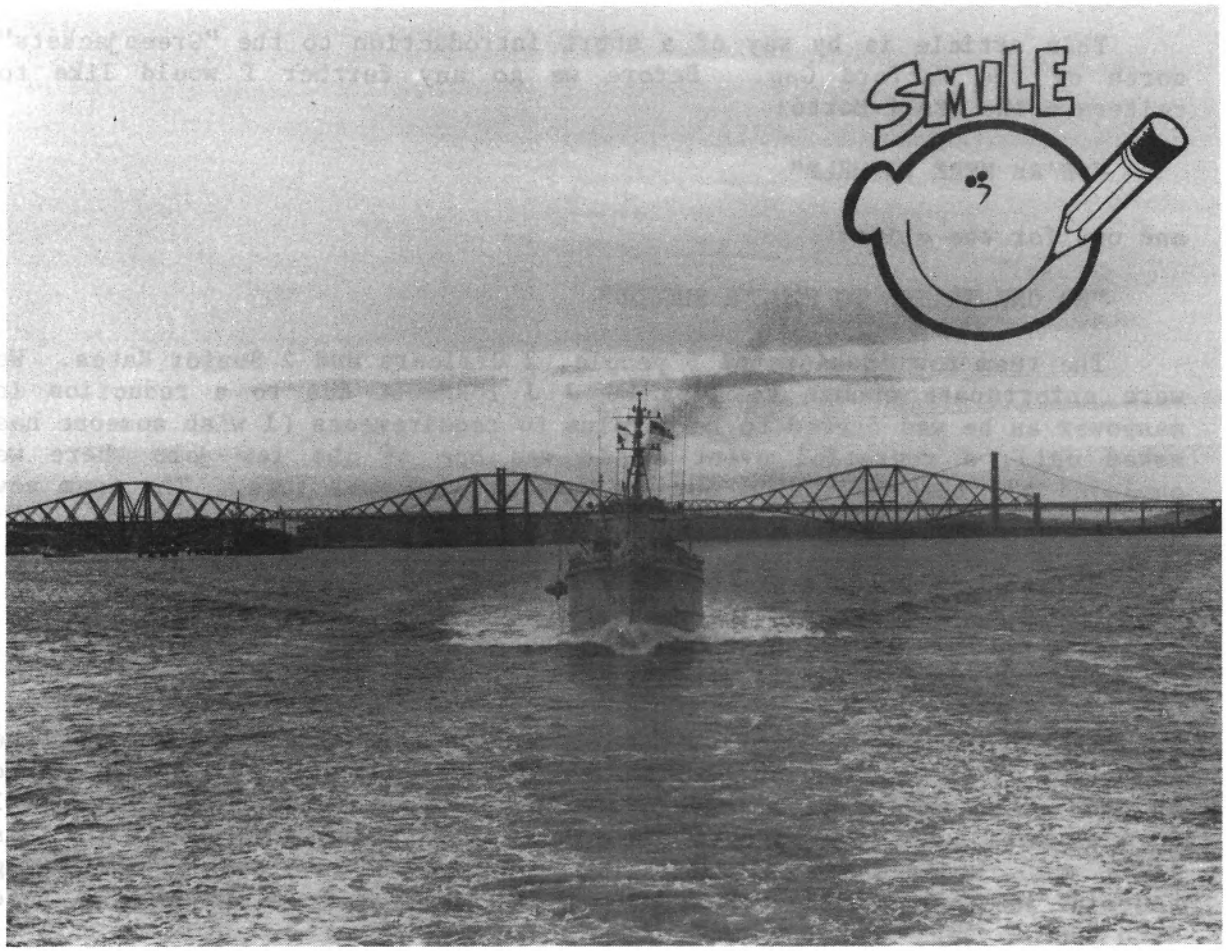
The team now consists of 4 people, 2 Officers and 2 Senior Rates. We were unfortunate enough to lose WO J J TURNBULL due to a reduction in manpower as he was deemed to be surplus to requirements (I wish someone has asked us!), a regretful event as it was one of the few jobs where we employed all the experience our WO have at the coal face. The team now consists of:

SMWO	- Lieutenant Commander A A BAYLISS (ALAN not ALEX)
DSMWO	- Lieutenant Commander RUSSELL
SMWI I	- CPO Ron BASHFORD TBRB CPO Pony MOORES (March 89)
SMWI II	- CPO Barnie BARNETT TBRB CPO Nobby CLARKE (June 89)

The programming of ships has recently been disrupted due to the inability of contractors to meet their completion dates. This has resulted in most ships moving right and before you know it, we find that we have 3 to 4 to work up at the same time and I am only talking about MCMV's! This is a most unfortunate situation and one which involves us employing "outside help" to enable us to get maximum value out of the time we have with you.

The OST Guide has been rewritten and distributed. We have tried to reduce its size by taking out all the old and irrelevant material. Thorough reading of the OST Guide is essential well before your planned OST. In the main OST ships arrive well prepared for their work-up but I cannot stress the point strongly enough that a visit to the staff before you arrive will pay dividends. The biggest hurdle the ships have had recently is their inability, due to Programme constraints, to conduct any weapon training. It is essential that you find some time to check the whole ship organisation and achieve some time in the lap prior to your OST. I am glad to say that the majority of ships leave us with a satisfactory assessment.

News hot off the Press is that Calendar Work ups are here to stay. We look forward to meeting you in the near future, Happy Hunting and Safe Sweeping.



LETTERS TO THE EDITOR

MAJOR RETHINK IN THE SEAMANSHIP EXAM!

LS(MW) W Vassie

Having just successfully sat the WPE for Petty Officer Minewarfare and with the published results being less than satisfactory overall, surely the time has come for a major rethink in the Seamanship examination subject matter for those persons serving in small ships.

With a 66% failure rate for the seamanship paper at the last board for Minewarfare Rates it must now be obvious that men who have served their whole Naval career in Minor War Vessels have a less than average chance of passing an examination that is most definitely aimed at the big ship rating.

It must be realised that small ships ratings are skilled in areas of seamanship that their large ship counterparts would not have a clue about and vice versa.

In the last WPE a major stumbling block was the Ships Husbandry Section. To ask a Minsor Warship rating, who has worked with nothing but wood and GRP decks about the care and maintenance of steel and sinc sprayed decks is rather unreasonable and puts the small ships rating at a disadvantage compared to hi big ship equivalent. Surely a seamanship paper based on subject matter relevant to the work carried out on board would give the small ship rating the chance to show just what he does know and so avoid the embarrassing situation we find outselves in for our branch at the moment. There are some fine Seamen in our branch who do their job on board every day with great skill and accomplishment, but, because the WPE does not cater for the knowledge which they have, are at a disadvantage when it comes to sitting the Seamanship paper for promotion.

The disadvantages are highlighted when a Leading Hand who has proven beyond all doubt that he is capable of carrying out the duties of Chief Bosun's Mate on a Minor Warship fails the WPE Seamanship paper for Petty Officer because the paper is orientated towards big ship ratings.

The different roles and equipment used differ significantly so why should the papers not reflect this difference. This would not necessarily make for easier examinations but would ensure that all subject matter would be relevant to the examinee's occupation on board.

In answer: - From the Seamanship Section

Many of the questions in the LS-PO WPE are based on the principle of Seamanship and are not aimed on any particular class of ship. The references for the PWE have not changed for 4 years. Whilst the Lead School has sympathy for certain candidates and lack of practical experiences in say Replenishment At Sea and indeed Ships Husbandry, to restrict theory to any class of ship would be rather foolish. On being advanced to Petty Officer it is quite likely a man could be quite easily drafted to a big ship where he would be expected to carry out Part of Ship duties immediately. The large failure rate on the last WPE coincided with the lack of candidates at the Seamanship School for continuation training. The Seamanship WPE has recently been changed at the behest of the MDDS Faculty to reduce the partial failures in any particular aspect of Seamanship. The questions are at present being amended to give the choice of the candidatee ship where possible, but the standards will not be lowered.

BOMB DISPOSAL REUNION 1989

The 20th Bomb Disposal Reunion will be held in HMS NELSON (Gunwharf) on Friday 29 September 1989. There will be a programme of events on Friday afternoon and Dinner will be held in the Wardroom HMS NELSON, commencing at 1930 for 2000. Dress: No 7 Mess Undress (soft shirt) with minature medals or equivalent (Retired Officer: Black Tie with minature medals). Fuller details will be forwarded to successful applicants at a later date.

The function is open to Officers of the 3 Services, Regular or Reserve, serving or retired, who are employed, or have been employed, on Bomb Disposal. All such Officers are cordially invited to attend. The cost of the dinner, with drinks at the table and pre-dinner sherry, will be £25.

The Wardroom Mess can cater for a maximum of 140 Officers. Unfortunately overnight accommodation in HMS NELSON is severely limited. However, it is anticipated that a reasonable amount of alternative accommodation will be available. For those making private arrangements a coach (departing from the Wardroom at 0200 Saturday 30 September) will be available to make transfers to local hotels in the Portsmouth and Southsea area.

It is expected that this event will be heavily over-subscribed, so early application is essential. A small reserve list will be kept and those on it informed. All unsuccessful applications will be returned with cheques.

Cheques are to be made payable to "The Wardroom Mess" HMS NELSON.

Lieutenant I M GERAGHTY Royal Navy is the organiser for this event and can be contacted on Portsmouth Naval Base Extension 24770.

THE UNOFFICIAL PORTSMOUTH TEAM REPORT

Once upon a time in a far flung corner of Gunwharf, under the constant scrutiny of SOD lived a small band of merry bomb dispoaleer's whose sole purpose in life, was to ensure the safety of Britains coastlines, beaches and pubs under the watchful eye of Lieutenant E R DAVIES, CPO(D) LEADER and Seamen Diver MURPHY. This small but intrepid band of rootin tooting gunshooting bomb dispoaleers have carried out many a heroic deed in 1988.

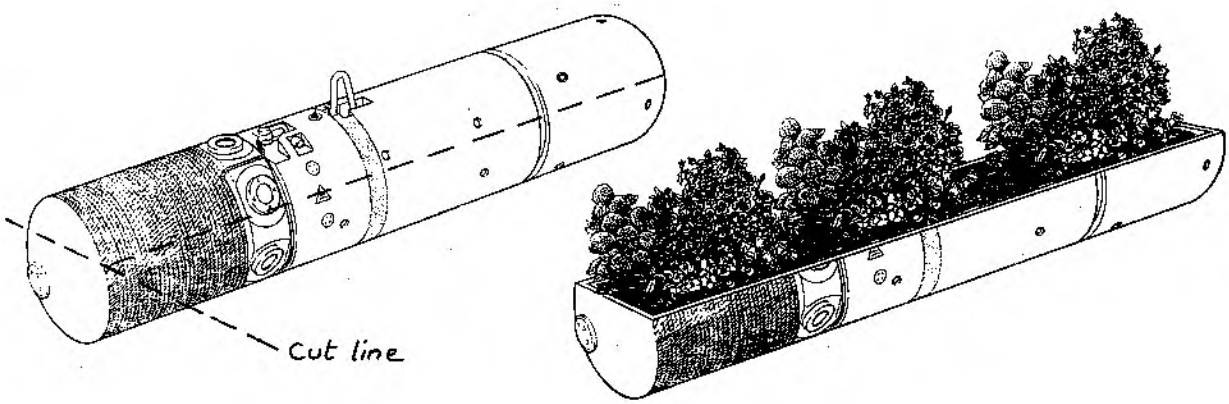
For example: AB(D) DEVANEY was tasked to carry out a very important job, involving Scotch-Brite and Brasso in the form of a prop scrub. Unfortunately after 1,300 minutes in the cold August weather the same said person surfaced. On inspection the shaft and boss nut were gleaming. Unfortunately he'd forgotten about the blades, however due to the intense cold and the arduous nature of the task this was understandable.

Other jobs in 88 were minor in comparison, a submarine screw change was successfully completed in a record time of 3 days, a large jetty was "carefully" dismantled, with the aid of 300 14oz blocks and 1000 feet of kerri cable. HMS SOUTHAMPTON was successfully transported from Dubai to Portsmouth. Unfortunately by a freak of nature the dome was washed off so if anyone finds a dome and 4 lifting bags please return to the team it was last sighted of Portland Bill.

On a more serious note we would like to congratulate WO(D) STILL on his promotion and thank him for all the hard work he put in 88 also we would like to wish all your readers a Happy and Prosperous year.

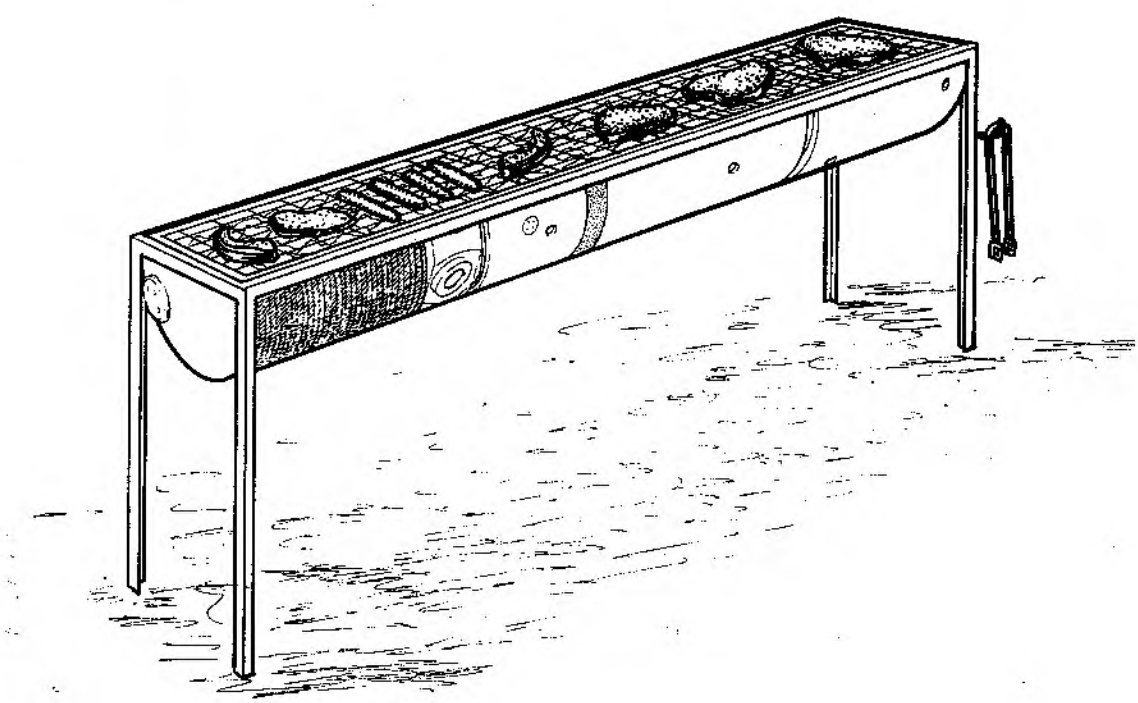
ALTERNATIVE USES FOR THE VERSATILE EXERCISE MINE

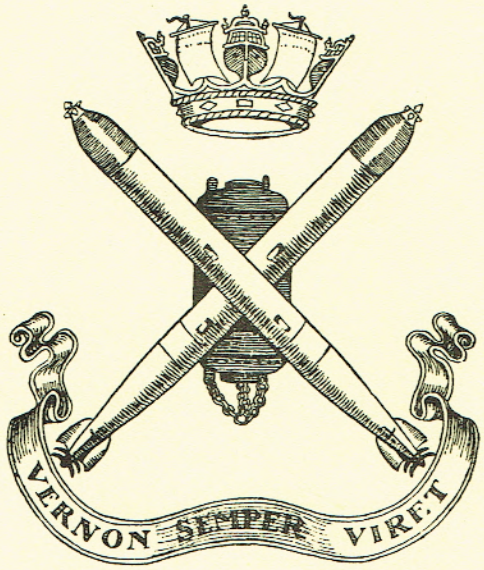
Lay the VEM on the deck. Cut through the casing as shown. Remove upper portion. Remove the junk inside. Fill with earth. Plant colourful flowers. NOTE Don't forget to water regularly .....not salt water. (It will look good on the forecastle)!



ALTERNATIVELY

Fill with coal. Rest on cradle. Set light to coal. Balance racks over the top and use as a BBQ. NOTE Don't forget to cook food thoroughly.





The Personal Side of some 'Vernon' Mine Recovery and Investigation Operations

September 1939 – December 1940

West Leigh Cottage

Havant

Early in 1941, when, for the first time I began to see the mining events of the first year of war in some perspective and realise how exciting and important those events had been I asked some of you who had been most intimately concerned to write me a personal narrative; you obliged me, and a year later I began the work of setting those narratives in order and adding a few photographs. Twenty copies of the resulting story - The Personal Side of some "Vernon" Mine Recovery and Investigation Operations, September 1939 - December 1940 - have now been produced by "Vernon's" Book Production Department. This number allows one for each of you and a few over for the officers closely associated with the work. A list of these officers is attached.

Owing to the very secret nature of this account, it is not possible to issue copies to the officers concerned until the conclusion of the war, or until the secrecy becomes less important. They will therefore be retained by the Mining Captain, HMS "VERNON", who will be responsible for their safety and issue at a later date.

I rely on all officers receiving a copy to appreciate its private nature and on no account to allow any part of it to be used in future publications of any sort without my permission and that of the contributors concerned.

(Signed) G THISTLETON-SMITH

10th May 1942 Commander

List of Officers to Receive a Copy of the Attached Story

Commander G Thistleton-Smith GM., RN.

Commander J G D Ouvry, DSC., RN.

Commander C E Hamond, DSO., DSC., RN.

Commander G B Sayer, RN.

Lieut. Commander R C Lewis, DSO., RN.

Lieutenant G A Hodges, GM., RNVR.

Lieut. Commander J E M Glenny, DSO., DSC., RN.

Lieut. Commander R S Armitage, GC., RNVR.

Commander C E Obbard, DSC., GM., RN.

Lieutenant H E Wadsley, GM., RNVR.

Rear Admiral B Egerton, RN.

Captain G B Middleton, RN.

Rear Admiral H C Phillips, RN.

Lieut. Commander C E Clowser, RNVR.

Captain A Maitland-Dougall, RN.

Lieut. Commander D Spiers, GM., RNR.

Lieutenant G H Goodman, MBE., RNVR.

Lieut. Commander M W Griffiths, GM., RNVR.

Lieut. Commander C W A Chapple, DSC., GM., RNVR.

Captain (Mining) for 'M' Department, HMS VERNON.

Note. The nine officers at the head of this list are contributors. Lieut. Commander R B Edwards, killed during an RMS operation in 1942, also contributed.

THE PERSONAL SIDE OF SOME VERNON

MINE RECOVERY AND INVESTIGATION OPERATIONS

SEPTEMBER - 1939 - DECEMBER - 1940

It is not easy to realise the conditions ruling at the beginning of the war. At that time "Vernon" had no information of modern German mines or their method of laying them. There was no proper organisation for the recovery and investigation of such mines and the staff of the mining department in "Vernon" was very small. Commander "M" was responsible to the Captain for minesweeping as well as mining work. On the mining side he had only one Lieut. Commander for depth charge and demolition work, and two Lieutenant Commanders and one Lieutenant for British mining. Furthermore, the vast scale on which the enemy would use aircraft for minelaying and the vital importance of finding, rendering safe and examining the mines they laid was not, and could not have been appreciated.

The following extracts from the Mining Department War Diary of this period are of interest:-

1939

18th September	ss "City of Paris" (mined off Aldeburgh Napes) examined at Tilbury by Lieut. Commander H Rogers, RN.
19th to 22nd September	Lieut. Commander J G D Ouvry, RN., at Harwich, engaged in attempts to recover specimen of German moored mine. Owing to failure of sweepers to sweep any mine, attempt not successful.
8th - 9th October	Lieutenant J Glenny, RN., at Swansea investigating report of alleged moored mine westward of Scarweather LV. Attempts to locate and recover unsuccessful.
12th October	Lieut. Commander Ouvry at Hull and Grimsby with mine recovery party (Ch PO Baldwin and two ABs) renders German horned mine safe on shore at Bridlington.
14th October	"Vernon's" Rendering Mines Safe Service begins on North East Coast. Ch PO Baldwin begins operations between Spurn Head and Scarborough.

Note. "Vernon's" parties were continuously engaged on this operation throughout October and November, a total of approximately 200 mines being successfully dealt with. Lieutenant R S Armitage, RNVR. was continuously, and Lieutenance Glenny intermittently, engaged in this operations.

20th October	Lieut. Commander F C Husband-Clutton, RN explodes first German magnetic ground mine by magnetic sweep in suspected minefield off Scarweather LV.
25th October	"Churchill" float recovered by Lieutenant Glenny near Mablethorpe, Lincs. Lieutenant Glenny suggests, in report on recovery of this float, the probability of enemy minelaying from aircraft.

The First German Z Type Mine

On 3rd November, 1939, Lieut. Commander R B Edwards, RN. (ret.), who had been appointed RMSO Nore Command, recovered the first German Z type moored mine. Here is his account of the operation:-

On 2nd November, after the original spate of "X" and "Y" mines had abated a little, the party, consisting of Ch. P O Spriggs, Able Seaman Keen, Able Seaman Wilson, and I, had returned to Great Yarmouth for a twenty-four-hour break. At 0830 on the morning of the 3rd, a signal was received from the coastguard at Corton stating boldly that a mine was ashore at Bakers Score. At the time of receiving the signal we were all set to flit North and clear up a bench of "X", "Y" and "Y^X" mines in North Norfolk. However, we went to Bakers Score and found a mine on the beach, very much smaller than usual, half buried.

We had recently become aware of the significance of the AE switch, so we carefully removed the sand from around the base, and to my surprise found first one and then another long steel spike projecting, three in all. This, coupled with five ordinary horns on top, was completely new, so from then on the most extravagent precautions were taken.

Gradually the mechanism plate was exposed, and a small mirror held underneath showed it to be similar to the "Y" type but much smaller, but the AE switch was set to E. To us this meant that the mine should have fired on breaking adrift, but in view of the steel spikes, now recognised as switch horns, I considered that it was probably designed to explode on hitting the beach, but had not done so owing to the fact that the soft sand had protected instead of breaking a switch horn.

Carefully, holes were dug to allow the horns to clear as the mine was tilted and then with great care it was gently rolled over to expose the mechanism plate. This done, and the AE switch verified, we withdrew and held a discussion.

Orders had been received from Admiralty and "Vernon" that mines set to E were to be countermined and not rendered safe. However, I decided that as it was a new type the risk must be taken, and accordingly the party were sent away and the Chief and I got down to it, not without some qualms. After a struggle the detonator was withdrawn, and we found it had fired. Out primer, only to find it had not dropped, but the end was badly pitted. Next the mechanism plate was removed, all wires cut and horns removed, then the charge of 108.8 kg of Hexanite was burnt and all the relics sweated up the cliff and sent to "Vernon".

Then on up to Sheringham to continue the fun and games.

Operation TM One

About this time, the enemy mining situation became very critical. Casualties, which were increasing at an alarming rate, indicated that the enemy were using ground mines on a large scale. Other evidence pointed to these mines being laid from submarines and possibly aircraft. Every effort was being made to try out various sorts of sweep, but until accurate information as to how the mines worked was received, the task of finding a satisfactory sweep was extremely difficult, particularly as the little evidence available was often conflicting. Unless a satisfactory sweep could be found quickly we were faced with defeat. Under these circumstances the recovery and investigation of German mines became a matter of vital importance to the nation. Efforts to recover such a mine by trawl from the Tongue area in the mouth of the Thames were pushed ahead. Initially they met with disaster. Commander C E Hamond RN (ret.) relates:-

My connection with MR work started with a discussion with Sayer, who was then Commander "M", about the possibility of trawling up a magnetic mine.

Apparently I was the only officer in "Vernon" who had practical knowledge of trawling or could understand the technical jargon of fishermen. Sayer asked me to get out a scheme of a trawl modified for this purpose. I discussed this with Skipper Reynolds of "Dorienta" and other practical fishermen and eventually the gear was ordered and, at long last, delivered. It was then decided to try it out on the Tongue Minefield where four ships had already been mined, their positions showing the mines to have been laid on a course parallel and about a mile East of the line joining NE Spit buoy and Tongue Light Ship.

It was decided to send the trawler "Cape Spartel" (Skipper Gue) round to Sheerness and to put Lieutenant Glenny in charge of the operation. I was very keen to have the job but Captain Boyd said "I don't want any of your damned propaganda, Hamond, because your job is here and you are not going to sea". However, he relented to the entent of letting me go for two days trawling to see that the gear worked properly. I have been there ever since.

Glenny and I went to Sheerness and got in touch with "Mastiff" (Lieut. Commander A A C Ouvry RN) who was detailed to dan and stand by for us.

"Cape Spartel" arrived 18th November and we were on the ground on the morning of 20th November. Glenny and I were on board "Cape Spartel".

We laid a dan 1' East of Tongue LV and "Mastiff" went 2' or so SE'ly and laid another. We then shot trawl and towed along this line, while "Mastiff" returned to our buoy to fix its position. He signalled that it was a bit out and he was going to shift it. While doing so the ship went up. We slipped everything and proceeded to rescue. This eork was slower than it might have been because we couldn't approach close to the supposed line of mines. Had "Cape Spartel" touched one off both crews would inevitably have been lost. "Cape Spartel's" boat made two trips getting all swimmers and those hanging to wreckage the first time and those on the Carley float the second. We picked up all except five men who went down with the ship, but one more died later.

Glenny and I were at Admiralty by 1900 or so and saw the First Lord and First Sea Lord. The latter discussed the future of the operation and I was told to go to Lowerstoft and take up and fit out a number of wooden drifters for trawling.

Recovery of First German Magnetic Mine

The sinking of "Mastiff" and the end, for the time being, of Operation TM One was disappointing. Fortunately, however, the pendulum of luck swung the other way, as these extracts from the narratives of Lieut. Commander R C Lewis, RN, and Lieut. Commander J G D Ouvry, RN., show.

Lieut. Commander Lewis writes:-

Up till Monday, 20th November, 1939, I was serving under Rear Admiral Lyster with five blockships and demolition parties assembled at Sheerness ready to block Zeebrugge and Ostend.

The previous few days had been spent by use at short notice, owing to considerable tension in Holland and Belgium. We were firmly convinced that the Tongue Minefield, which accounted for "Blanche" and "Adventure" that week, had been laid for our benefit.

On Monday we reverted to 4 hours' notice, and with the senior Commanding Officers of the Zeebrugge and Ostend forces, I went to London to see Rear Admiral Lyster. I did not go into the Admiralty in the forenoon, but on meeting by CO at lunch was told that my presence there was required that afternoon.

Apparently Captain Boyd had seen the Chief of Naval Staff during the forenoon about the mine menace, and that, as a result, Rear Admiral Lyster, with the staff then in "Vernon", were to carry out the search for this new weapon, chiefly because the information which could be collected at the Admiralty was fuller than could be obtained in "Vernon". Rear Admiral Lyster was selected, since while waiting for our show to materialise, we were not very busy.

So began a few days rather exciting and busy existence. During Monday afternoon and evening continual discussion went on as to how we were to approach the subject. At 2200 Lieutenant Cameron, RNVR and I produced a none-point programme to form the basis of our work, which, after further discussion, it was agreed that we should follow.

Work on this started the next day and continued to form the basis of the work now carried out by Captain Maitland Dougall. As far as I remember, the lines of information to be followed were:-

(1) A careful analysis of ships reported sunk or damaged by the weapon, interest being laid on speed, draught, beam, cargo, HP., type of engine, etc.

(2) Reports of movement of enemy aircraft, submarines and surface craft in the areas discovered to be dangerous from (1) above.

(3) Interview personally senior survivors from ships now being sunk.

(4) Personal visits by our staff to ships damaged.

(5) Personal visits by our staff to places where mines were reported dropped, in the hope of locating one sufficiently accurately to dive on it.

(6) To read again all information held by NID over the previous few years, on German mining development and trials, together with possible information collected by the Air Force.

(7) Issue of questionnaire to British Consuls and agents in neutral countries adjacent to Germany.

(8) A study of all German patents on magnetic and acoustic properties.

(9) Interrogate English firms, working in touch with Germany prior to the war, particularly armament firms, instrument makers and electrical engineers.

The work of collecting information was done by six RNVR Sub. Lieutenant barristers sent up from "Vernon", working under Captain Barratt. By the end of the day the numbers available began to dwindle, as work under headings (4) and (5) began.

On Tuesday "Belfast" was mined and one of our staff (Cameron) left for Rosyth to investigate. During the night of Tuesday/Wednesday, reports of minelaying by aircraft came in from the Humber, Harwich and Southend. I left for Southend by car at 3 a.m. on Wednesday morning (Armitage going to the Humber and Captain Barratt to Harwich) and spent the day interrogating the Masters of Merchant Ships at Southend who had seen mines being dropped by aircraft the previous night.

NOIC Southend, to combat these aircraft, posted Lewis guns on Southend Pier and in certain ships in the anchorage. At that time the Army were not allwed to open fire on aircraft without obtaining permission from Uxbridge. Naval machine gunners were not under this ban as they were not authorised defences.

I managed to fix the approximate position of about four mines, obtained some information about the enemy's laying methods, and returned to the Admiralty.

I left the Admiralty at 11 pm., only to be recalled at midnight. Southend had reported mines dropped near the pier above low water mark. Low water was at 4 a.m. Thursday. Ouvry was in the Admiralty at the time, so he was collected, and we both set off by car for Southend again.

These mines were dropped by an aircraft engaged by Naval Lewis gunners posted at the end of the pier.

The drive was grand. We crashed fifteen red lights before getting out of London. I sat in front with the driver, as it was foggy and I knew the way. Ouvry was supposed to sleep at the back. I remember being furious with him when he told me on arriving at Southend that he had not slept at all, the reason being that he was worrying about his "Rendering Mines Safe" notes which he had left on his dressing table in the room at his hotel.

Actually no mines were found off Southend Pier, and the party travelled on to Shoeburyness, as is shown in the following narrative from Lieut Commander Ouvry.

I was awakened at my home, hear Fareham, at 0300 on the morning of Wednesday, 22nd November, by a policeman hammering at the door. He gave me a message from the Duty Mining Officer in "Vernon", who had been unable to get through to me on the telephone, requesting that I should communicate at once with Commander "M" (G B Sayer). This I did and was told to catch the first train to London and report to Captain Morse (DMS).

At the Admiralty I found a state of considerable strain in the Minesweeping Department owing to the fact that the Thames and Humber estuaries had been mined and also the channel at Harwich.

The mines had been observed dropping from the air and were reported as appearing like "Sailors kit bags suspended from parachutes". HM Destroyer "GYPSY" had been sunk, and shipping in the three rivers held up.

Magnetic mines were suspected, but there was no proof and no immediate way of discovering the answer. Officers had been sent to Southend, Harwich and Grimsby to find out all details that were available. No useful information arrived during the day and the situation became acute.

Just after midnight that night I was runt up on the telephone at my hotel - 'Victoria' in Northumberland Avenue - and told to pack my bag and report to DMS's office at once. There I was joined by Lieut Commander R C Lewis, who informed me that the car had been ordered to be ready to take us both to Southend at 0100.

We were told that that evening a parachute mine had been dropped into the water off Shoeburyness and that it was expected that it would be uncovered at low water (at about 0400). Our orders were to examine and recover it at all costs.

Arrangements were made for our reception at the office of NOIC Southend, and at Shoeburyness, including the provision of lights, securing gear and a photographer. "Vernon" was communicated with and told to send the special mine recovery party with non-magnetic tools direct to Shoeburyness, and requested to inform Superintendent of Mine Design.

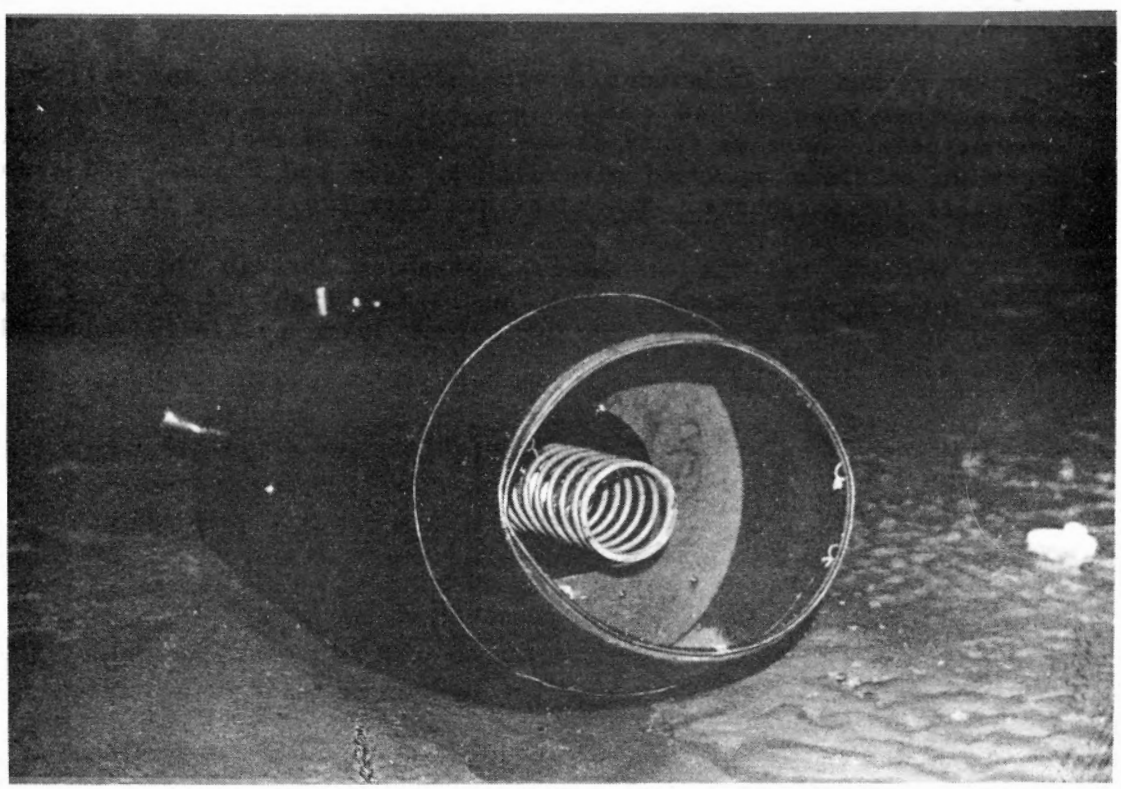
Lewis and I left by car at 0130 and arrive at the Palace Hotel, Southend, at 0330.

Off Southend a large number of ships were anchored unable to sail until the channel was cleared of the unknown. One frozen meat ship had caused a mine to fire as she swung to the turn of the tide.

We picked up Commander Bowles (NOIC's staff) and a local photographer whom he had rounded up, and continued our journey to Shoeburyness. Here we found Commander Maton, RN awaiting us with a party of soldiers equipped with lights, rope and stakes, and also his staff photographers. The night was dark and it was raining.

A private led the cavalcade, splashing through the pools of water left by the receding tide, until the light of our torches showed us a dark menacing looking object lying partially embedded in the sand.

"The light of our torches showed up a dark menacing looking object lying partially embedded in the sand".



"It had ..... a hollow tail containing a massive phosphor-bronze spring".

Lewis and I then advanced to the attack, the soldiers in the rear illuminating the mine by Aldis lamp.

It was cylindrical in shape, made of some aluminium alloy, had tubular horns on the nose and a hollow tail containing a massive phosphor-bronze spring. There were two unpleasant looking fittings near the fore end and these looked like being our Public Enemies Nos. 1 and 2.

One was evidently a hydrostatic valve, which was encouraging, but the other was something quite unrecognisible, made of polished aluminium and secured by a screwed ring sealed with tallow. Here again was some encouragement for there was what apeared to be a "tear-off" strip, somewhat twisted but still firmly secured to it and possibly a safety arrangement.

This latter fitting seemed the more likely to harbour a primer and detonator and so I decided that it should be the first to be tackled.

A four-pin spanner was required in order to unscrew the securing ring. Lewis took an impression of this ring on a bit of signal pad and I gave it to Commander Maton, who undertook to have a brass (non-magnetic) spanner made in his workshop by noon, also some brass rods of various diameters that might come in useful.

The photographers then took a series of flashlight photographs of the mine from all angles.

It was estimated that the mine would be uncovered again by about 1230, when we could tackle it in daylight, so we had the mine securely lashed down by the soldiers.

As we were moving off, a light, apparently from an electric torch, was observed further along the sands. This aroused our suspicions and instead of proceeding straight to the shore we made in that direction.

The light was extinguished before we had moved many yards; however we were lucky in our detour for we ran into a parachute that was lying spread out on the sand. This we took in tow and laid up on the foreshore above high-water mark.

Commander Maton then took us three Naval Officers along to his house for breakfast. This was at 0600.

Shortly afterwards a message arrived that another mine had been sighted about 300 yards distant from the first.

We immediately motored off to the nearest point to that stretch of beach and waded out in the deepening water to try and locate it. The occupant of a moored hulk in the vicinity informed us that it had been submerged for some minutes, so we decided to wait for the falling tide before dealing with both mines.

We returned by car to Southend, where we framed a preliminary report. This we sent to the Admiralty by car and with it copies of the flashlight photographs which had been developed and printed at Shoeburyness.

Lieut Commander Lewis and I returned to Shoeburyness at 1300, hen the tide had fallen sufficiently for use to sight both mines, and proceeded with Commander Maton and some of his soldiers to a sheltered position on the foreshore opposite to the mines. A tractor lorry with cranes was held in readiness.

While the Shoeburyness photographer took a series of daylight photographs of No 1 mine, Lewis and I examined No 2.

The mine had its nose inclined downwards and was on a different slew to No 1. This exposed a large plate, suspected to be covering a second hydrostatic valve.

Meanwhile the mine recovery party from "Vernon" had arrived with a set of non-magnetic tools to augment those made overnight at Shoeburyness.

I arranged with Lewis that he and AB Vearncombe should remain on the foreshore while Ch PO Baldwin and I tackled No 1 mine.

We fixed up a definite sequence of events, which he could clearly observe from the distance, in case of a mistake upon by part.

According to plan, Ch PO Baldwin and I started on the aluminium fitting on the upper part of the mine. The top of this showed a small plate jointed with tallow, an oval shaped groove filled with black wax, a screwed recess and a brass "tear-off" strip.

The keep ring unscrewed quite easily, using the brass four-pin spanner, and by jamming a brass rod into the recess it was quite easy to raise the fitting out of the mine.

This I did with the greatest care, as I thought I was handling either a detonator or some sort of magnetic needle device.

However, I soon discovered which, for directly underneath was a pocket containing a tubular disc of "CE" and obviously a primer. A cylindrical cup was screwed into the underside of the fitting I had removed and this was evidently a detonator.

Under the tubular disc of CE were two solid discs and these I could not extract even though I fished for them with a brass rod filed to a point at one end.

Believing that this first operation had removed the principle danger, I sent Baldwin to Lieut Commander Lewis to ask him to join up and help to manhandle the mine, which needed turning so as to get the remaining priming charge out of the pocket and to reach the fittings at present buried in the sand.

Meanwhile Dr. Wood, of Mine Design Department, had arrived, and he followed Lieut. Commander Lewis and AB Vearnbombe out in order to watch proceedings.

With the aid of a rope we hauled the mine over about 120° and extracted the loose primer discs.

We then unscrewed a plate flush with the shell of the mine, directly opposite to the small "hydrostatic valve". Beneath this was a circular screwed bung with four recesses. As there was no suitable spanner available, some force had to be used to move it.

Another screwed plate was exposed to view with two terminals mounted on it with a pair of leads leading from them and away out of sight through a hole in the side of the casting.

These we parted (by twisting) and then unscrewed the plate with the aid of a non-magnetic screwdriver, no spanner being available.

When removed, this plate proved to be a detonator carrier with an electric detonator of a type recognised as being the same as that of the German horned mines. We felt on the top of the world.

The primer was "home" and could only be removed from the opposite side of the mine, where was situated the smaller of the two hydrostatic valves.

Once again a certain amount of force had to be used to unscrew the fitting.

It came free from the mine with a rush and with a long phosphor-bronze spring after it, which was somewhat startling. This fitting proved to be a hydrostatically operated primer release gear. The second primer was then easily removed.

There remained only the large hydrostatic valve fitting to deal with, and as no time was to be lost we sent ashore for the tractor lorry to be sent out to us for transport of the mine to the shore.

The last extraction produced a heavy cylindrical object with an unmistakable hydrostatic valve at one end and with five leads connecting it through a hole in the mine casing to some invisible object inside the mine. We cut these leads after noting that they were conveniently tallied.

The mine was hoisted into the lorry without much difficulty and sent inshore to be stored under cover for the night.

The tide was rising and light was failing and so no attempt was made to recover the second mine. This appeared more battered than the mine that we had rendered safe.

Primers, detonators etc. were stowed ashore in the Police Lodge.

When the cylindrical fitting was laid down for the first time it started a ticking sound.

This caused a quick dispersal of the company, but shortly afterwards a good laugh when it was found that as the weight was thrown on to the protruding hydrostatic valve spindle so a clock movement automatically started inside the casing.

At 1700 a report was made to the Admiralty that the mine had been recovered and was intact.

Lieut. Commander Lewis went by car to Whitehall to attend a Board of Admiralty Conference at 2315 that evening; little did he realise that in a few hours he would be seated between Mr Winston Churchill and Admiral Sir Dudley Pound with these distinguished men dwelling upon his every word as he recounted our experiences.

Lieut. Commander Lewis continues:-

At 9 p.m. I caught a train to London. Rear Admiral Lyster was told that I would get to the Admiralty about 2230 and it was suggested that those interested should be collected at that time so as to avoid my having to tell the story too often.

Imagine my consternation when Rear Admiral Lyster told me that the meeting would be rather larger than he had intended, with Mr Winston Churchill in the chair and about sixty Admirals and Captains as well.

Ouvry and I decided that, from our inspection, I was to tell them:-

(1) That we did not think the mine was magnetic, but acoustic.

(2) That we did not understand the mechanism which afterwards was found to be a bomb fuse.

Our reasons for thinking it was acoustic were:-

(1) It was known that the Italians were developing acoustic mines.

(2) That we had found a large copper diaphragm (actually covering a filling hole) in the nose.

(3) The leads from the detonator disappeared into the nose in the direction of the copper diaphragm.

REPORT OF MEETING HELD BY FIRST LORD

IN ROOM 60, WEST BLOCK I,

AT 11 PM THURSDAY 23RD NOVEMBER

TO DISCUSS GERMAN MAGNETIC MINES

Lt. Cdr. LEWIS

Lieut. Commander Ouvry and myself were sent down to Southend. Shortly after 1.30 this morning it had been reported that one of these mines was on the beach close to Southend Pier.

On arrival we discovered that the mine at Southend Pier was non-existent but the Army at Shoeburyness had found one of these mines on the mud in front of their battery, and they had a party ready to go out with torches, lines and stuff for securing the mine - and their own photographer.

FIRST LORD

At what time?

Lt. Cdr. LEWIS

At 4 o'clock.

The Naval Control Service personnel at Southend had also been asked to get a local photographer, and the party with the torches etc. went out to the mine. A few approached it and looked at it, and then we got the photographer to take a series of photographs.

FIRST LORD

Did you lay hands on it?

Lt. Cdr. LEWIS

Yes.

On top of the mine as it was lying there were two pieces of mechanism - as shown in the photograph - and we were absolutely definite that the small one contained a detonator.

FIRST LORD

From your knowledge of mining generally?

Lt. Cdr. LEWIS

Yes. it was not like a detonator in any other mine, but Lieut. Commander Ouvry has played with other types of mines and from his knowledge and the way in which it was fitted we assumed there was a detonator in the smaller piece of mechanism.

We made a template with a thin piece of paper so as to get the Army people to make a tool to remove it. The tide was coming in and we secured the mine for the night and packed up operations. We were just about to retire when we saw a suspicious character walking between us and the sea and we set off after him. He got away, but in the meantime we found a parachute which we took up and brought on shore.

FIRST LORD

There was no parachute attached to the mine?

Lt. Cdr. LEWIS

The parachute is released at some time from the rest of the mine.

FIRST LORD

Who was the suspicious character?

Lt. Cdr LEWIS

He got away.

During the forenoon the Army under Commander Maton made some tools. The "Vernon's" party arrived with special tools. A Professor from "Vernon" was also in the party.

We organised another expedition to go out at 12.30. Getting ashore from the first expedition a man came and reported that another mine was to be seen on the beach. We went to look at it but by the time we got there the mine was covered. We had two mines within 400 yards of each other.

On the afternoon we again had the Army photographer, with a better camera, and we went out.

FIRST LORD

Had the tide receded?

Lt. Cdr LEWIS

The tide was going out.

We went out to the second mine first to see if it was lying another way up and to see if there were any other pieces of mechanism which we had not seen. The mine was lying on a different slew and there was another large plate to be seen, with a fitting for a soluble plug. There was another small plate of the same material as the mine screwed on flush with 4 screws. We then went to the original mine, took a better set of photographs, and Lieut. Commander Ouvry and Chief Petty Officer Baldwin decided to remove the small mechanism plate.

FIRST LORD

The one you thought was the detonator?

Lt. Cdr. LEWIS

Yes.

FIRST LORD

Is that the right thing to do?

Lt. Cdr. LEWIS

Yes, once the detonator is out, the mine should be safe.

The remainder of the party went ashore and the agreement was that if Lieut. Commander Ouvry was successful he would walk in to the shore and I would walk out from the shore to meet him, to collect the parts he had removed and to decide what was to be taken out next.

We had had tools made overnight and he removed the first piece of mechanism.

It consisted of a small steel cylindrical shaped object with a small primer in a copper cup underneath. In the top there is a small thing inserted which we have not taken out. There is also another small insertion of something, on the top with a piece of bent tin soldered on. This is quite common to explosives. The exact purpose of this we don't know. We assumed there was a detonator inside because the primer was attached underneath and further primers of substance similar to gun cotton were found.

There were no connections of any sort - electrical or mechanical - to this steel box. We took the object ashore and immediately photographed it. Lieut. Commander Ouvry removed the remainder of the primers and then announced that he considered the mine reasonably safe. I and the other rating joined him and we set to work to remove the next plate. This was a larger one which we thought to be a hydrostatic valve. This wouldn't come out.

FIRST LORD

Did you use force?

Lt. Cdr. LEWIS

We didn't get it out.

We took off the innocuous looking plate which was immediately opposite this hydrostatic valve, a small plate flush with the case of the mine held with 4 screws. On releasing the 4 screws we eventually got it off and saw electrical leads. One pair going into a ebonite thing which was screwed into the end and the other two leads going into the dome at the front of the mine.

FIRST LORD

Where the explosion would be made?

Lt. Cdr. LEWIS

We don't know what they were. We though it was a battery. We cut the leads and we inserted a screwdriver between the terminals and started unscrewing. It eventually came away after both terminals had been bent a little and we were rather surprised to find we had unscrewed another detonator.

FIRST LORD

A dangerous moment?

Lt. Cdr. LEWIS

One of the more dangerous ones.

FIRST LORD

You had to use quite a lot of force to get this thing out, and this was the detonator you had already removed?

Lt. Cdr. LEWIS

We had got one out and this was the second. We then tackled a larger mechanism which had been on the underneath. It had a soluble plug. We got that plate off and inside, to one side we found the normal piece of mechanism found in German mines - the "A" and "E" switch and on it as well there was a large drum-shaped thing with four leads and a hydrostatic valve. We took that out and put it with the other stuff. We then had a further attack on the valve which was the opposite side to the detonator and eventually got that out and following it came a long spring.

Eventually the second primer came out. There were still two leads going from this detonator into the rounded end of the mine, on which there are these six "horns". At the end of the rounded end there is another innocuous looking plate with 4 securing screws. We didn't remove them. We then announced the mine safe and the Army produced their lorry - a special machine which runs on the sand and is used to recover their projectiles. We hoisted the mine into the lorry and ran it ashore.

We took off the last plate and under this plate we found a copper diaphragm, and the scientist immediately said "some form of acoustic firing", so we have in this mine in the dome portion some form of acoustic firing connected with a battery which must be there, and we also have this other steel cylinder which we don't know anything about.

In carrying the clock ashore we put it down on a piece of rock and someone immediately said it was ticking, and when it was taken up it stopped ticking. The clock was also fitted with a change-over AE switch.

When the clock was put down it started ticking; when lifted up it stopped ticking. We assumed that it was some clockwork mechanism for firing the mine if it had not fired after a certain time set on the clock.

Connected with the mine in some way is the arrangement for first of all releasing the parachute itself and secondly for releasing the whole parachute from the rest of the mine. This mechanism goes through the centre of the mine and we have not looked at it.

FIRST LORD

Where is the explosive?

Lt. Cdr. LEWIS

The explosive starts from the position of the electric detonator and is round the other gadget and then goes towards the end of the mine on to a conical shaped bulkhead inside the mine.

FIRST LORD

What is the charge?

Lt. Cdr. LEWIS

About 300 lbs.

FIRST LORD

All the mechanism has been removed and the mine has been left where?

Lt. Cdr. LEWIS

It has been taken out of the lorry and put on a wooden duckboard.

FIRST LORD

To sum up you have dissected this monster, divided it into pieces and you can now examine it at leisure!

Lt. Cdr. LEWIS

The mine is going down to Vernon by lorry and the scientist is taking this particular piece to Woolwich where apparently they have some X-ray apparatus.

FIRST LORD

Taking the copper diaphragm?

Lt. Cdr. LEWIS

Taking the steel cylinder thing which we took out first.

FIRST LORD

What is he doing with it?

L. Cdr. LEWIS

We don't know what is inside it unless we take it to bits. There are lots of bits screwed into it with the screw threads sealed.

FIRST LORD

Could you make them by mass production.

Lt. Cdr. LEWIS

No, this is a very nice piece of work.

FIRST LORD

Tell me, what is your view, after this thrilling account you have given? Was the mine actuated by acoustics and not by electricity?

Lt. Cdr. LEWIS

I am of definite opinion that it is actuated by acoustics, and by some other means.

The Vernon scientist says if this other means is magnetic it is very small.

FIRST LORD

What do you mean?

Lt. Cdr. LEWIS

That they couldn't make it in that size.

FIRST LORD

The answer is slightly against it being magnetic?

Lt. Cdr. LEWIS

I personally think it is magnetic.

FIRST LORD

There are horns.

Lt. Cdr. LEWIS

These are nothing except to prevent the mines rolling on the bottom.

FIRST LORD

The enemy makes a mine and he wants to make sure it goes off. Therefore, he has two things - one acoustic, the other magnetic. But from our point of view, we who have localised the mine, it is to our advantage that there are two ways of setting it.

DSR

The two systems may be in series, one to cock the mine and one to fire it.

Lt. Cdr. LEWIS

This box is entirely separate to the rest of the gear and comes out complete, and is not connected with anything else in the mine.

FIRST LORD

What did you do with the other mine?

Lt. Cdr. LEWIS

The other mine has been left on the beach, and in the case of the other mine this gadget is underneath and to get at it the mine has got to be rolled over; we decided to leave it as it was.

FIRST LORD

You had to roll the first mine?

Lt. Cdr. LEWIS

Yes.

FIRST LORD

Why did the clock tick when it was put on the rock?

Lt. Cdr. LEWIS

Because we put it down with its small plunger underneath, and this got pushed in.

FIRST LORD

With this in your possession you will be able to find out all the life history of the animal?

Lt. Cdr. LEWIS

We hope so.

DSR

I think so, sir.

+ + + + + + + + + + + + + + +

FIRST LORD

We cannot carry on any further at the moment. We have got our prize, as good a ship as ever sailed the seas, and we owe a great deal to the public spirit of Lieut. Commander Lewis and his colleague Lieut. Commander Ouvey who have been up against it today. They have given us a lot of most valuable particulars which the science of the "Vernon" and the Admiralty will employ to the full.

+ + + + + + + + + + + + + + +

Lieut. Commander Ouvry continues:-

Arrangements were made for the mine and parachute to be sent by lorry to "Vernon" at 0900 on the following morning.

At that time Mr H J Taylor of Mine Design Department and I left for Woolwich Arsenal taking with us the mysterious aluminium fitting first removed from the mine.

At Woolwich we were met by Captain Barratt, who had arranged for a series of X-ray photographs to be taken. These did not reveal the secrets within the container but it was suspected to be some sort of time fuse. The detonator envelope was unscrewed and left at Woolwich for analysis of its contents.

Later, we returned to "Vernon" with the fuse which was subsequently stripped and examined and found to be a device for enabling the mine to be used as a delay action bomb.

The mine arrived in "Vernon" at 1600 the same evening, 24th November.

Commander Sayer had the mine parted and was able to hand over to Dr. Wood and his staff a most elaborate looking aluminium casing mounted in rubber. Inside this was a "Scientist's Paradise".

Word had been received from the First Lord of the Admiralty, Mr Winston Churchill, that the answer to the problem was to be given without delay and that work was to proceed night and day to this end.

Within twelve hours the solution was passed to the Admiralty - "a Magnetic Mine".

The Story of the recovery and investigation of the first magnetic mine is best rounded off by the narrative of Commander G B Sayer, RN., who was Commander "M" at the time.

If my memory serves me right, the start of this historic episode, as far as I was concerned, was at about 0215 on 22nd November, when I was rung up at my flat in Alverstoke by the Captain of "Vernon" (Captain D W Boyd). He told me that he had received news from the Admiralty that some soldiers at Shoeburyness had seen parachute mines being dropped in the vicinity earlier that night, and it was thought that two had fallen in shallow water where they might be recoverable at low tide.

This seemed to be the opportunity we had been waiting for - to catch a mine alive, and probe its secret. It is no exaggeration to say that at that date, when the losses of our merchant ships from this most efficient weapon had assumed alarming figures, it was vital to discover its method of operation in order that a suitable antidote might be produced.

Here then was our chance, and I decided on immediate action. Ouvry - the most experienced officer on our own non-contact mines in "M" Department, had early on been earmarked for this job, and fortunately he was available. I tried to ring him up at his house in Fareham, but he was sleeping particularly soundly that night and failed to hear the 'phone bell'. A call to the local police station produced a Bobby, who proceeded to Ouvry's house with instructions to wake him and tell him to ring me back.

This he did about 0300, and I told him briefly of the dangerous job of work in store for him. I don't think either of us had any illusions as to the possible consequences, and it was not a pleasant order to have to give. In the meantime I had organised a Service car, and as dawn was breaking Ouvry set off for London to report at the Admiralty on his way to Shoeburyness.

The next and really important part of the story I hope Ouvry has been induced to tell in detail himself. He tackled the job in his own inimitable way, and it is hard to express adequately one's admiration for the outstanding courage, coolness and clear-thinking efficiency which he displayed. Never was a DSO more thoroughly deserved.

The job of rendering safe was completed, as far a I can remember, in the early hours of 24th November. The news was 'phoned through to me by Ouvry a.m. that day, and arrangements were made for the immediate transport of the mine by lorry to "Vernon". It arrived about 1600, guarded by Ch. PO Baldwin and AB Vearncombe of "M" Department, who had been sent to Shoeburyness with tools, etc to help Ouvry and who had taken an important part in the rendering safe operation.

I had made various preparations for the reception and examination of our prize. It was decided to carry out the post mortem in the non-magnetic laboratory building, where operations could proceed behind locked doors and, we hoped, with a minimum of disturbance. Sentries were detailed to guard the door and a small team of experts chosen to do the job.

These consisted of Dr. A B Wood, Messrs. Kelly and Shaw (all of the Mine Design Department) and Ch. PO Baldwin and myself of "M" Department. A recorder was also detailed to keep a tally of what was done, and others were co-opted from time to time as required, such as the "Vernon" photographer and various skilled workmen from the MD Department. On arrival the mine was shifted out of the lorry and placed on the operating table, the doors were locked and the team started in.

The stripping and examination went on continuously throughout the night and I shall never forget some of the incidents - the first conviction on the part of the scientists that it was an acoustic mine - the excitement of stripping the bomb fuse which was still in a partially "alive" state - the supper party of the "team" in the wardroom guest room - the ingenious and plausible excuses of some who wanted "just to have a look" - the arguments and discussions - and finally the gradual piecing together of the why and wherefore of the whole infernal bag of tricks.

By 0200/24 the main secret had been laid bare, and I was able to 'phone direct to the Admiralty the brief but certain news that it was a magnetic mine and operated by vertical magnetism.

In the light of later events, it is interesting to speculate what would have happened if the Germans had not laid their mines until they were fitted with Prevent Stripping Equipment.

Rendering Safe the Second Magnetic Mine

Meanwhile the second mine had been left until the method of dealing with the first had proved satisfactory. As soon as this point was clear, Lieutenant Glenny was sent to render it safe. His story reads as follows:-

Friday the 24th of November, 1939, will always be rather a red letter day for me; it was the day that I saw for the first time a German magnetic mine. Lieut. Commander Ouvry with Ch PO Baldwin and AB Vearncombe had returned from Shoeburyness during that afternoon with a magnetic mine, afterwards to be called the Type "A" mine. Most of Friday night and early Saturday morning was spent in examining the mechanism of this mine.

At 1000 on Saturday, 25th, it was decided that I should go of with Baldwin and Vearncombe to tackle a second mine reported close to the position of the first one at Shoeburyness. Baldwin and Vearncombe were as keen as mustard to be off on the job again so after a few preparations we set out from "Vernon" at 1130.

On arrival at Shoeburyness we went to call on Commander Maton (Officer commanding Shoeburyness experimental station). He had done such splendid work in assisting with the first mine that I though we could not do better than enlist his support for the second. I might say now that I was right. Commander Maton gave us every assistance and made our work very easy.

The mine was lying some 400 yards below the HW mark and I must confess that as we approached it on that bleak foreshore in the dull grey light of a winter evening, I thought it looked infernally sinister. The position of the mine in the sand was a good one, the pocket for the detonator being on top. After a good deal of fumbling we succeeded in removing the cover plate and cover bung. Our hastily-made non-magnetic tools seemed to delight in slipping and turning at the edges. Eventually, however, the job was accomplished and the detonator removed. We carefully replaced the bung and cover plate, as the mine was now just awash by the incoming tide.

The next step was to roll the mine in order to remove the bomb fuse. In this we came up against difficulty. The nose of the mine was embedded in the wet sand, and the hollow horn protrusions around the nose seemed to have a terrific grip by suction: nine men working with handspikes as levers were quite powerless to move it. Eventually Commander Maton came to our aid and a long rope was hitched to a large army lorry. This did the trick and our friend rolled over obediently enough.

Inspection showed that the tear-off tab on the bomb fuse had been removed. With the knowledge we had of the type of fuse, it seemed strange that the mine had not detonated on impact. It was now just getting dark and the tide was coming in fast. Already the mine was surrounded by water about six inches deep. We started on the bomb fuse keep ring. Our spanner did not fit any too well but at last we got it to grip. The keep ring moved half a turn and stopped. As we moved the spanner for another turn there was a sharp 'click'. I glanced at Baldwin. He glanced at me. I don't know to this day quite how it happened, but before one could utter a word we were getting away from that mine like scaled cats. I had a bad start but by the time the field passed the 100 yards mark I had a commanding lead. Our helpers, the soldiers, who had been standing some 400 yards away, vanished into the gathering darkness and we saw nothing more of them that night.

After what seemed an age, in point of fact about 30 seconds, we stopped. There was our friend, the mine, still sitting in the water just visible. I decided what we needed most was a hot bath and a good dinner so, collecting our things, we retraced our steps, deciding to complete the job at dawn.

At 0700 the following day, Sunday, 26th November, we completed the job, the bomb fuse surrendering without resistance. The mine was then sent off the to "Vernon" by lorry, arriving there p.m. that day.

Lieut. Commander Lewis writes of this operation and subsequent events:-

Ouvry and I left the second mine alone because we though it better to make certain that our methods for dealing with the first had been correct before playing with another which could easily be left for a day or two.

Glenny was sent to deal with it, and had an abortive attempt one evening. This he abandoned rather hurriedly when "something went click inside". I arrived at Southend just after this and we dealt with it next morning. The noise, we decided, had been caused by the corner of his oilskin flapping against the mine.

After dealing with the second mine, and an abortive expedition to Gravesend for a cold morning outing on Mucking Flats, which lived up to their name with a vengeance, I returned to the Admiralty. By then schemes for blowing them up were on foot and several craft were already being equipped. Suggestions from every crazy inventor in England were pouring in.

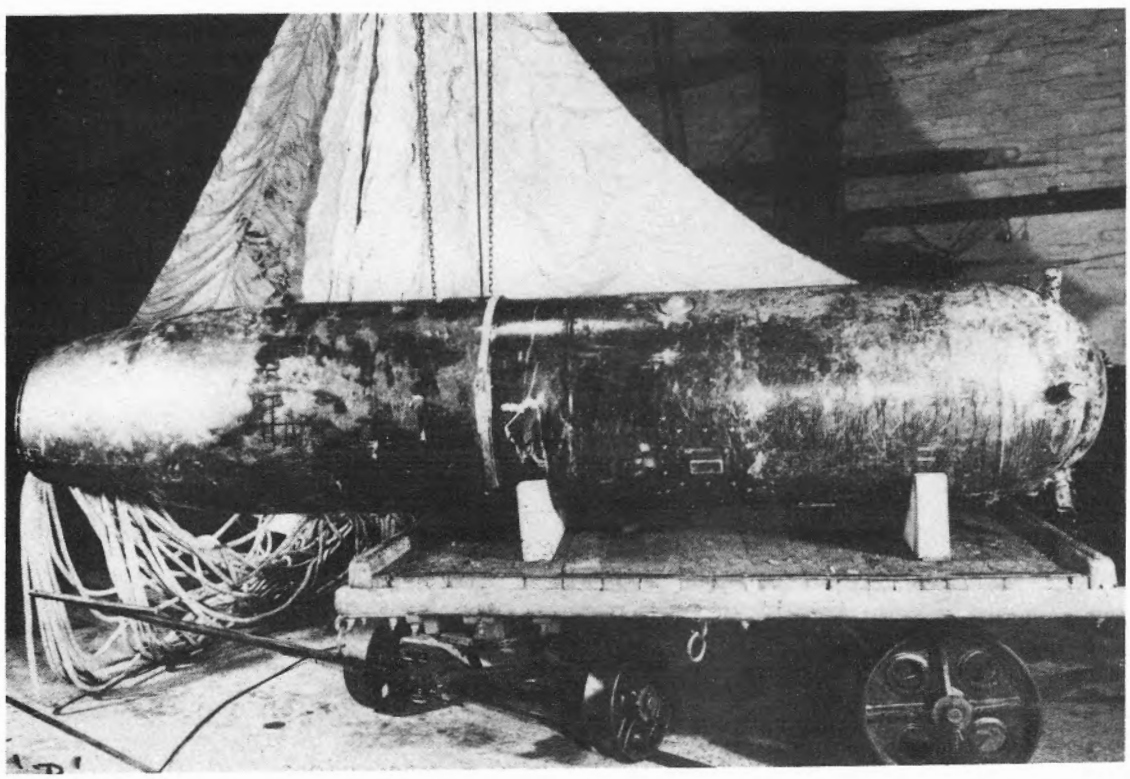
Admiral Wake-Walker, then RAML, who was preparing the Northern Barrage operations, and had ample time owing to lack of mines and minelayers, took over the antidote measures from Rear Admiral Lyster, and I managed to get away to Sheerness to help with sweeping operations and to keep an eye on the squadron of blockships with their demolition parties.

The organisation started by Rear Admiral Lyster for investigation purposes continued and shortly afterwards also went over to RAML.

Recovery of a Type "B" Mine

On 7th December, 1939, a very much large magnetic mine - later called Type "B" to distinguish it from the small Type "A" mine - was rendered safe and brought to "Vernon" for investigation by Lieutenant Glenny, assisted by Lieutenant Armitage. Lieut. Commander Lewis writes:-

> This is the story of how I was done out of this mine. It was reported to C in C Nore, who did not know what to do about it. I was then at Sheerness helping to run the various experimental sweeps which were being fitted out and starting what shortly afterwards became the Experimental M/S Flotilla.
>
> The report was, as usual, extremely vague, and I agreed to send someome to report what it was. I sent Sub. Lieutenant Dean and Ch PO Mann, TGM., from by blockship "Florentino". They reported eventually that it was a magnetic mine, but even though I had given them the rough dimensions, they never told me that this one was twice the size of the first two. Thinking it was a straightforward "A" type mine, and having no tools, "Vernon" were informed and Glenny got it.



German Parachute Mine Type "B".

Wild Goose Chase to Sheringham, December, 1939

Just prior to this event, a German aircraft came down in the sea off Sheringham and the wreckage was washed ashore. As it was suspected of being a minelayer, Lieut. Commander Ouvry and Lieutenant Hodges, RNVR., who had recently joined the department, went to Sheringham to investigate as fast as conditions allowed them. Here is Hodges' story:-

At 1719 one night, Admiralty reported a German mine-carrying aircraft crashed on the foreshore at Sheringham. A party was to proceed with all despatch, investigate and render safe a mine said to be in the fuselage. Commander Sayer arranged to send Lieut. Commander Ouvry and an Able Seaman, named Comfort, as soon as possible. I collected the necessary gear and rode out with Comfort to direct the car in the blackout to Ouvry's house. Arrived there I expressed great keenness to join the expedition. Lieut. Commander Ouvry arranged this by telephone with Commander Sayer on the ground that I know much of the road. Mrs Ouvry fitted me out with warm clothes and a scratch meal and we set out at 1900.

We were to drive under black-out conditions with an inexperienced driver who had never left the Portsmouth area before and had 250 miles before him. Our orders were to reach Sheringham to catch low water at 0530 next morning.

From Wickham onwards the driver know none of the road and I guided him to Slough, at which point we ran into thick fog which continued with us till beyond Cambridge. Two incidents worth noting occurred.

The first was perhaps more deeply impressed on me, physically and mentally, than on anyone else as it consisted of a headlong fall over an eighteen inch ornamental fence while I was groping in the pea-soup fog in an effort to read a signpost in Rickmansworth.

The other consisted of the discovery, due to running off the road to avoid a head-on collision, that our driver had been following the line marking the "off side" lane on the Great North Road. Whether he had any justification by virtue of overtaking other traffic on his near side neither he nor the rest of us could tell.

At 0400 we were 75 miles short of Sheringham and put in at a police station for a rest and to ring up Sheringham. Shortly after moving off again the driver dozed at the wheel and we steered straight for a telegraph pole, but happily I was able to seize the wheel and the collision only bashed in the wing, carrying away the side lamp, and removed the nut cap of a wheel, leaving the car still serviceable. The driver, however, was not, so I took the wheel and we reached Sheringham at 0800 to find that, after all, low water was at 0930.

Lieut. Commander Ouvry immediately made contact with Pilot Officer Hawkins, CMG. (an Air Ministry official who had been a full Colonel in the last war) and arranged to visit the beach after breakfast.

The investigation yielded nothing, as there was no mine, and the plane, which had not been secured clear of the tide, was completely broken up. Lieut. Commander Ouvry found the pilot's end of the fusing link in the wrecked fuselage and later we helped to buoy the lost engines of the machine. There was, however, no useful purpose to serve by staying and we left the next morning for Portsmouth.

Operation TM Two

All this time frantic efforts were being made to continue the operation in the Tongue Area. Commander Hamond describes this new operation, known as "TM Two".

I had six wooden drifters ready by the beginning of December and sailed them for Ramsgate. Glenny and Armitage were sent to Margate to find and prepare a suitable place for landing trawls, which they did at Palm Bay, by Foreness. It was the best place on a bad coast, but very flat, and meant a 700-yard haul from our hawser dan to the top of the beach.

We started off full of buck on the first fine day with "Ray of Hope" and "Silver Dawn". We trawled up and down the line and landed the trawl according to plan, to be hauled up beach by the tractor. It was empty. I then said I would go on board "Ray of Hope" for the night, anchor close off, and start work at dawn. Glenny was to arrange for "Fisher Boy" and "Formidable" to sail as soon as the tide would let them and join me on the ground. Glenny suggested that I would do better to go ashore for the night and sail with the other two from Ramsgate in the morning. I agreed to do this to my subsequent regret as I think I might have stopped "Ray of Hope" being blown up if I had been on board. "Ray of Hope" came fast on an obstruction on her second haul, which brought the ship up all standing. Hayes, the skipper, thinking he must have got a wreck, started hauling and got his ship up tide of the gear. When his 10-fathom mark was just awash she blew up. I was just arriving on the scene in "Fisher Boy" and was about ¾ mile off. I saw the ship's bows standing above the water at 45° and then she slid down stern first within 10 seconds of the explosion. "Silver Dawn" was close handy and got three survivors and between us we picked up four dead. The after part of the ship went to pieces like a box of matches and her planking and frames were floating all around in small pieces. It was pretty grim. Fortunately weather was calm. Hayes went down in the wheelhouse but scrambled out through the door under water. He hurt his shoulder but no serious damage. Bird, the mate, was blown over the winch into the fore deck and was dragged under water with ropes round his neck. He fought clear but was again trapped under the fore gallows and had had about enough by the time he got to the surface. The third survivor, a seaman, was badly shocked and was not a fit man before. He was invalided. As soon as Hayes and Bird came out of hospital they both came and asked to come back with me and have another go at it. They have been been with me ever since. Good chaps.

I then came into "Vernon" to discuss the future and got approval to ask for volunteers from existing crews and to make up with volunteers from Lowestoft. I saw the crews and told them that they could volunteer or not for the job entirely at their individual judgement. I would only say that the work was bound to be dangerous but was of vital importance and that I was going on in charge of it. I did not wish to influence any man and there would be no aspersions on any man who did not volunteer. The majority of the "Fisher Boy's" crew asked to go. They weren't a happy lot anyway. The other four ships' companies volunteered with very few exceptions. I then went to Lowestoft to arrange about balance of crews. I had the great good fortune, while in "Vernon", to run across my old friend and shipmate, Charles Chapple - a skipper in the last war and now a Lieut., RNVR. I managed to get him appointed to my flotilla and have had the benefit of his unbounded energy, loyalty and seamanship ever since. I also still had Glenny and Armitage doing the beach stuff and helping me generally, so we were off again.

We then started a period of great difficulty. The ships were vile, half fitted out, ridden with bugs and filthy. The weather was beastly and the men unhappy and at time troublesome. It was rarely possible to do more than snatch one or two days work in a week.

I frequently took the ships to sea when I knew it was no good, simply to give the men a blow through. We had days on end (and once, a week) of fog, when winds were westerly, and too much sea for beach work when they came easterly. I fitted up the big trawls ex "Cape Spartel" as "Spanish Gear" and worked them between two ships. After trawling as long as possible we used to tow the gear to Palm Bay and Glenny and Armitage with their braves would haul it up by tractor. It was then loaded on a lorry by the crew of the ship in harbour and taken back to Ramsgate ready for the next trip. Only once did I get a good pull, which I still believe was a mine, and what followed was such a nightmare that it is worth recording.

Time was getting on when we felt a good tweak, and warps started jumping. I hauled in to 50 fathoms and made for Palm Bay, "Formidable" and "Fisher Boy" both towing full speed. It was thickish but calm and getting jolly near dusk, and I decided to transfer both warps to "Formidable" before dark. I told "Fisher Boy" to close in and take our messenger. He did - at full speed - nearly hit us and then steered out with a rush, parting his slip rope and tearing our messenger away before we could get it to the winch. As a piece of mishandling it ranked high even in Skipper Yate's murky record. We were then left with the following procession following us: (1) our 50-fathom warp, (2) our wing of the trawl, (3) all the bunt of trawl, (4) "Fisher Boy's wing, (5) "Fisher Boy's 50-fathom warp, and (6) our 30-fathom messenger.

We could only just move with this lot and, of course, couldn't haul because of the mine. It was then dark. I didn't and don't know where we got to. All I do know is that we passed somehow through a forest of wrecks without spiking ourselves on a mast. I brought my fore warp into the gear and let the ship hang to it by the head. I could feel it dragging along the ground, so I let go my anchor and paid out a good scope to help to hold her. It was thick and black and damned cold and as soon as tide turned, anchor and trawl started pulling against each other and both dragging. Somehow the trawl got under the bottom and warp was tight along bottom of ship, I couldn't see where, and daren't move the engines. Ramsgate was screaming at us on the RT and we couldn't answer. So we spent 15 hours of darkness. She held at times and dragged at others, but at daylight, 0800, it was as thick as a hedge and I decided to give it an hour and get my head down, which I wanted. At 0900 it was a bit clearer and we started crawling in for the land. I sent the dunder-headed "Fisher Boy", who had turned up, to look for a buoy or land. Finally we got to Palm Bay at 1330, to find that the belly of trawl had turned over when wing was slipped and some large object had chafted out through the back of net. I still don't know where the mine is. We never got another bite that I know of. "Jacketa" had a fire on Christmas night which burnt all her after part out. When I last saw her under repair she had the deck off and four feet of snow in the cabin.

"Silver Dawn" leaked worse and worse. I sent Chapple out one day without me to try to change the luck. He came back with "Silver Dawn" a bit low in the water. Bilge pump and ejector were both choked and they had baled 600 buckets out of the cabin. I had her slipped and didn't go down to look at her till the morning. She was a sight. There was a shimmering curtain of ice hanging from her garboard seam and icicles 4 to 5 feet long from every butt. Pretty it was.

We kept the job up till the end of January, when it was decided to abandon it. I believe there might have been two mines left there, but they must have been silted in beyond hope of trawling long enough ago.

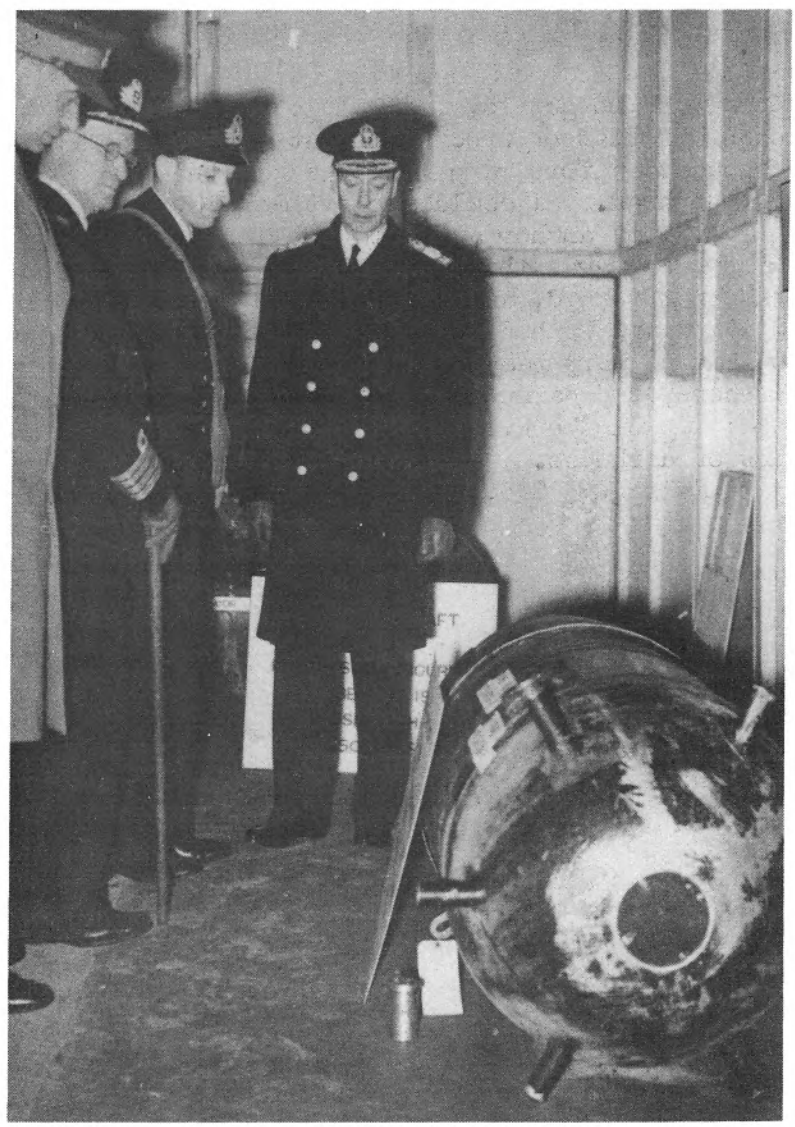
Thus ended an operation which cost two ships and 15 lives without achieving any result except a hell of a lot of experience.

Vernon Honoured

On 19th December, 1939, HM the King honoured "Vernon" with a visit. He inspected enemy mine exhibits and bestowed the first Naval decorations of this war on "Vernon" officers. They were as follows:-

Lieut. Commander J G D Ouvry RN	DSO
Lieut. Commander R C Lewis RN	DSO
Lieutenant J Glenny RN	DSC
Chief Petty Officer Baldwin	DSM
AB Vearncombe	DSM

On the following 1st of January, Commander C E Hamond, RN (ret.) was awarded the DSO and Lieutenant C W A Chapple, RNVR., the DSC.



"He inspected exhibits"

Recovery of Second Type "B" Mine at Whitstable

Early in the New Year, a second Type "B" magnetic mine was rendered safe and recovered by Lieutenant C A Hodges, RNVR. He tells the following story:-

As often as not the Germans, when they worry "Vernon", do so at the weekends, and at lunch-time on Sunday 28th January, a call came through from Admiralty to say that a parachute mine was lying in the Whitstable oyster beds just visible at low water springs, and that a party should be sent at once to deal with it.

Lieut. Commander Ouvry had 'flu and Lieutenant Glenny was at Falmouth, so my qualifications as caretaker of the Mining Museum fitted me as next best for the job, and by 3 p.m. I was on the road in a Dockyard car with Ch PO Ellingworth and AB Hurlstone and a driver whom I knew from previous experience to be bad and who also appeared to have 'flu.

The weather was desperately cold and snow and ice had dislocated traffic in the south generally. The car was off the road two or three times but we managed to reach Uckfield, where a meal revived us all except the driver, so I took the wheel at 9 o'clock. We were refused lodging at two village inns, and after a final 20 miles' driving with my head out of the window as the snow froze on the windscreen, we reached my mother's house at Sandhurst, Kent. Here a hot meal was made for us despite the late hour and my mother, always a disciplinarian, had me make the ratings' beds with her.

Next morning we found the car deep in snow, another 6 inches having fallen in the night. My mother dosed the driver with brandy and, having dug out the car, we got on the road again but were held up by snowdrifts on two routes. Finally getting behind a snow plough from Rye we appeared to be set fair to get across Romney Marsh and so reach a road said by the AA to be clear, but at the Sussex border the plough stopped and could be pursuaded to go no further, although another mile and a half would have got us through. Appeals to the foreman and to the authorities at Battle and at Lewes were unavailing, and as ringing up the Home Office seemed a tall order, we returned and caught a train at Rye, reaching the "Blue Anchor" at Sea Salter just after dark. We had missed two tides and this seemed to hamper future operations.

The "Blue Anchor" was run by a jovial ex-Petty Officer who would accept no payment and found rooms for us all. At six o'clock next morning, under the leadership of Lieutenant Trip, RN., from Sheerness, our party set out to wade 1½ miles out to the mine. We were supported by a large working party from Chatham whose gear included six iron floats which the "Vernon" party viewed with some misgivings.

The scene was memorable, as the coast was deep in snow, and we waded through great drifts of frozen foam to reach the waters on which was a top covering of slushy ice. The mine was found down by the nose 15° with the parachute container just awash, and after examining it Ellingworth and I agreed that the bomb fuse should be tackled as soon as it became clear of the water. The tear off strip was off and although the keep ring turned fairly easily, the bomb fuse would not come out. This, for a beginner, was a little upsetting. It was said that a bomb fuse took 20 secs. to fire after operation and with this for comfort I put my foot on the mine, and by a hard and steady pull got the bomb fuse out, called up Ellingworth and handed him the trophy. Next came the primer release. This would not shift with the pin-spanner, so I used the screwdriver as a punch and the spanner as a hammer but could not drive the screw round. I called up Ellingworth, but our combined efforts failed to loosen the thread. By this time we had both lost the feeling in our hands and the tide was rising. Our thigh boots were shipping icy water which warned us of the advancing tide and we had to retreat defeated. The tide was not again to be favourable.

A car sent for us by Lieut. Commander Obbard of the Chatham Torpedo School stuck twice before eventually getting to Chatham, where I made my report, and we left for Portsmouth, catching the fast train from Waterloo, and had the gloomy experience of taking 6½ hours over the journey down owing to snow and ice on the line.

This was the first time I had taken a party away or had charge of any work and I felt very disappointed to return to "Vernon" and to have to let down Ellingworth and Hurlstone, who had supported me splendidly through many discomforts.

On February 10th the "Vernon" party returned to Whitstable and met Lieut. Commander Obbard and Lieutenant West with a large working party from Chatham equipped with casks and plenty of 2½ in. hemp, but at the first attempt the wind and tide made it impossible to reach the mine, although my thigh boots were again filled with icy water. At the second attempt the "Vernon" party, wet and very cold, managed to make fast a line in the parachute housing which was just awash. It was not considered safe to tackle the primer release under water, so the only thing was to tow the mine into shallower water. The launch available for this was not up to the job and we had again to return to "Vernon" to await more favourable tides and weather.

On 26th February I returned alone to Whitstable equipped with a special lifting clamp, a screwed brass spindle to fit into the parachute release boss for towing and also a new heavy four-pin spanner for loosening the primer release gear. Lieut. Commander Obbard and Lieutenant West had brought brass bound casks and a large working party. We left Whitstable in the dark and made ready on the shore at 0600. The moon was high and there was a glorious sunrise and the wind set off-shore. The mine was reached without difficulty, the primer withdrawn and the casks lashed on to the mine, a line made ready for towing the mine at high water and the whole made fast to a mark stake on the oyster bed. We retreated

before the incoming tide and went to breakfast, returning in a boat on the rising tide to take the whole in tow, only to find all the casks had broken adrift and had to be rounded up from the bay. Next morning, having repeated the securing operation, we took no chances and stood by a boat. All went well this time and we took the mine in tow as soon as it was buoyant. We towed it three miles and beached it in Whitstable harbour, where the detonator was removed in preparation for transport to Chatham, where it later became an object of interest to C in C Nore.

On arrival in "Vernon" the mine was opened and examined, and rather to my disgust it was found that the unit had never become dangerous as the clock hydrostat was jammed with sand. This was something of an anti-climax to the thrills experiences while actually on the job, but when I recall the lusty efforts of Lieutenant West with his seven pound copper hammer named the "Chatham Persuader" shaking loose the primer release gear, I think it was probably just as well.

All the same I did feel that, for a beginner on his first important job, I had not done too badly. This may have been so, but I apparently failed in one important detail. Any commendation I might have received was heavily outweighed by the unanimous vote of censure passed on me by the rest of the Mining Department for having returned from Whitstable without a few barrels of the Natives!

The Recovery of German Type "S" Mines

The early months of 1940 were active and anxious. The production of magnetic sweeps and the work of degaussing ships proceeded at a great pace. I doubt whether "Vernon" will ever be a busier place.

Meanwhile the efforts to recover a mine from the sea bottom proceeded, and soon "Vernon" had two mine recovery flotillas of five drifters and one echo-sounding yacht each. The main effort was to recover a submarine laid mine, suspected fields of which had been laid in the Thames and off Falmouth. There were times when hope of success ran high. Objects were caught and landed only to be found to be old ships' anchors, rocks and the like. Other objects, that may well have been mines, were caught and burst the trawl. The work was exhausting and dangerous and the results were unfortunately disappointing. Finally the object of the search fell into our hands in a way least expected, as this account by Lieutenant Glenny of the recovery of German submarine-laid mines goes to show.

It was on Monday 29th April, 1940, that I was ordered to go to Scapa Flow. There had been talk of a German trawler captured off the Norwegian Coast and apparently there were mines on board of a type unknown to us. We had been trying for six months to obtain a German submarine magnetic mine and here, if rumour was true, was the very article, delivered on a plate, only instead of a plate was the German prize trawler "Polares".

After an uneventful journey punctuated by delays I reached Lyness at 3 o'clock on Wednesday 1st May. I reported to ACOS and was given a brief picture of the situation; then I was taken out to the German trawler. The first impression on approaching the ship was that she appeared a large fishing trawler. One could see her gallows and trawls and she had a definite 'fishy' air. A walk round the ship, however, revealed her to be a miniature arsenal. Her armament, included two 21-in. torpedoes fitted in concealed bow tubes, fives mine, twelve depth charges, two field guns, one 4-in. ship's gun (camouflaged as a boat), several light and heavy machine guns, large quantities of ammunition and many cases of stores continuing binoculars, compasses, bombardment boards etc. The ship was fitted with one D/F set, hydrophones and echo sounding.

She was in all respects an excellently fitted ship. At the time of her capture "Polares" was flying the Dutch flag and had a crew of some forty ratings on board. Among the large quantities of food found in the ship were many Danish hams and much butter. The Nazis had apparently wasted little time in using Denmark.

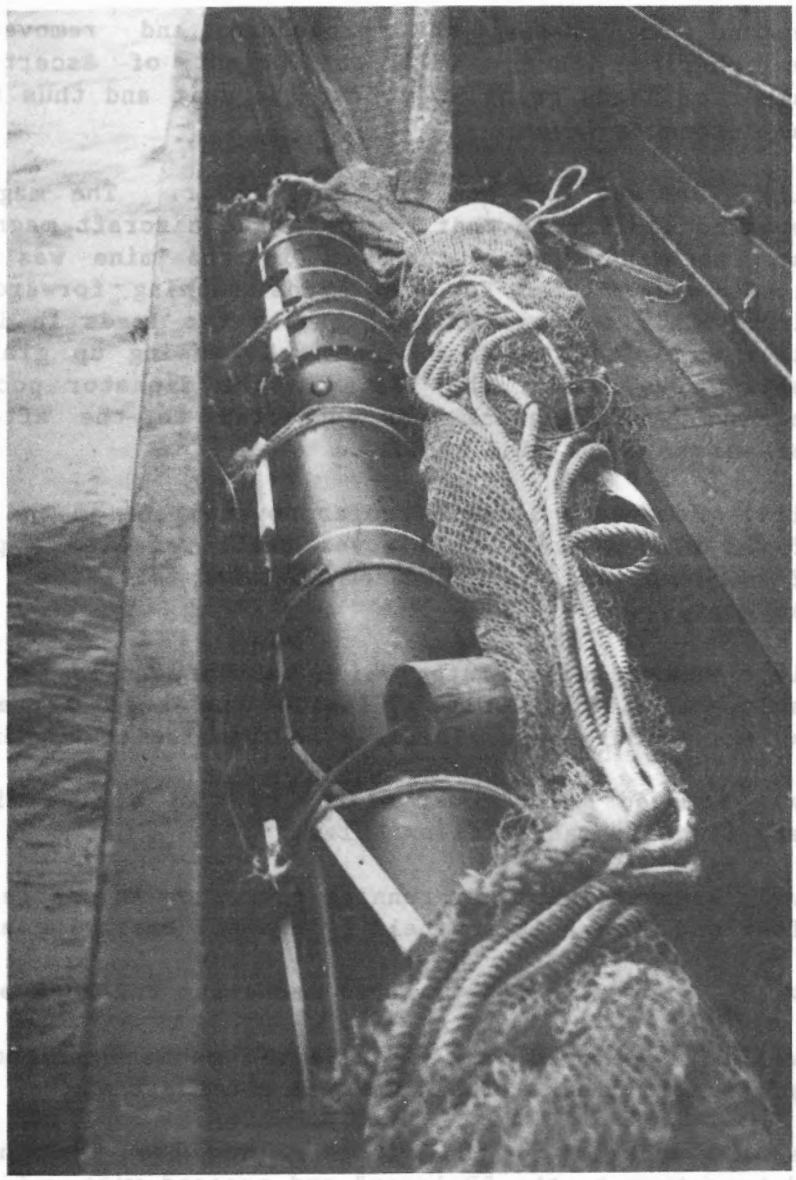
A scuttling charge had been found fitted in one of the magazines; only the sad end of her sister ship who had received short shrift from one of our destroyers deterred the Nazi seamen from scuttling.

Examination of the mines, which were lashed on deck and covered by a fish trawl, indicated by the shape and fittings that they were a type for use from submarine tubes. As the actual use of their fittings was not clear and the correct method of rendering them safe was unknown it was decided to remove one from the ship for stripping and examination.

The depth charges, six of which were the same type as dropped by German aircraft, appeared straight-forward. It was decided to defer the unfitting of these depth charges until the mines had been completed.

Arrangements were made with the PMSO Commander Piper, RN., for a trawler and an attendant drifter to be at my disposal the next day, Thursday 2nd May. Services of the Fleet Photographer were requested from HMS "Rodney". A signal was then made to Admiralty and "Vernon" reporting the situation, and work was then suspended for the day.

At 0800 on Thursday I proceeded in HM Trawler "Cape Nyemetzki" to "Polares". A mine was hoisted on board and "Cape Nyemetzki" moved to a position some four cables clear of other ships and anchored in shallow water. At 0900 the crew of the "Cape Nyemetzki" were removed with the exception of the Captain, Lieut. Commander R M Cobb, RN. For unfitting the mine it was decided to adopt the following procedure. A sequence of operations was outlined and on the completion of each part the attendant drifter was to be recalled with the photographer. Lieutenant R G L Pennell,, RN., on the staff of DNI., and engaged in examining "Polares", also remained in the ship to sight the result of each individual step.



"The mines were lashed on deck and covered by a fish trawl".

The mine, which was cylindrical, was 7 feet 7 inches long, 21 inches in diameter and hemispherical at the ends. The after end was detachable, bolting on to the main body; it had a small tail plane welded on at about 45° to the horizontal.

The following are the steps taken in the examination:-

(i) Removed a cover plate, cover bung and electrical detonator similar to the aircraft mine. With the aid of a torch it was possible to see the primer at the other end of the detonator tube. The position of the primer accounted for the foremost release mechanism in the mine shell. It was slightly disconcerting to find that the leads from the detonator ran away from the pocket in the opposite direction to the supposed magnetic unit. In view of this fact it was

decided to change the procedure and remove the end hemispherical cover, with the object of ascertaining the number of leads going away from the unit and thus to identify the detonator leads.

(ii) Removed end hemispherical cover. The magnetic unit appeared similar to that found in the aircraft magnetic mines but the method of suspension in the mine was different. Glands were fitted for two leads running forward into the mine. Only one was in use, having two leads in it, and the other was fitted with a blank. On easing up gland nut and pulling the leads, the leads in the deonator pocket moved. The hydrostatic clock was connected to the after release mechanism in the mine shell.

(iii) Removed a large circular cover plate in the top centre of the mine shell. This cover plate revealed a pocket some 12 in. deep, and at the bottom an inlet for leads. The pocket was empty.

(iv) Removed nose plate, which was very solid and fitted for taking a lifting bolt. Inside the nose plate the main explosive charge was visible. It appeared to be Hexanite.

(v) Removed small cover plates on side of the mine. These were found to mask filling holes.

(vi) Removed brass bar running from stop in centre of mine to after end, where it was held by a small brass lug and pin.

(vii) Removed formost release mechanism and took out primer.

(viii) Removed after release mechanism and examined hydrostatic clock. The clock was not started.

As all pockets in the mine had now been examined, it was decided to return to the "Polares" and proceed with unfitting. All mines and depth charges were unfitted by 1800.

At 2000 I was ordered by DTM Admiralty to arrange for the despatch of all the mines, four depth charges and all the DC pistols to "Vernon" as soon as possible. Arrangements to this effect were made in conjuction with the PMSO.

At 0900 on Friday 3rd May, all material required was embarked by the "Cape Nyemetzki" and at 1200 the ship sailed for Thurso in company with another trawler. Two mines were danned, the mooring buoy being secured out-board for slipping in an emergency.

On arrival at Thurso, material was loaded into a special van for the journey by rail to "Vernon", the van being locked and sealed. After an uneventful journey south the van was finally shunted into the "Vernon" at 0500 on Sunday May 5th.

In connection with the "Polares" it is of interest to note that there was no type of D/G equipment fitted nor any other method of controlling the ship's magnetic field. The ship's field was measured by the D/G Officer Scapa and it appeared normal for a ship of that tonnage. This is all the more remarkable as it was obvious that the ship had been fitted out with much care and forethought. This fact appears to lend weight to the statement attributed to the Captain of the "Graf Spee" to the effect that the Germans had no antidote to the magnetic mine.

It is considered that there was a strong probability that the empty pocket in the mine is for some form of scuttling or self detonating device. This devide would supply the answer to many of the hitherto unexplained explosions which have occurred at intervals in many known mine localities. A critical examination of the magnetic unit may throw more light on this problem.

I feel it should be stressed that the reports issued by DNI on German submarine mines have proved remarkably accurate.

Unfitting the First German Explosive Sweep Cutter

Just prior to this piece of good fortune, Lieutenant Glenny had rendered safe a conical float with an explosive mechanism in the base. This was done at Dover on 6th April. This conical float proved to be part of German anti-sweep gear, and very efficient gear it was. Lieutenant Hodges, who accompanied Glenny on this expedition, tells the tale.

Many empty conical floats thought to be of German origin had come ashore in the early months of the war, but their use remained unsolved until a float with its mechanism fitted inside was swept and brought ashore by HMS "Sandown". V A Dover advised "Vernon" on Saturday morning and Lieutenant Glenny was sent off to investigate. It was my weekend off and permission was given for me to go with him for experience.

We left "Vernon" in a Dockyard car at noon and had a tremendous lunch in Chichester, and reaching Dover at 1730 reported to VA Dover, who sent us down to the Mine Depot to sight the trophy.

Arrived, we found a conical float complete with mechanism and piece of mooring wire, but we also found that a member of the Depot staff had begun to unfit it, had disliked the look of it, had re-assembled it, and, most serious of all, could not be sure in what position a square-headed spindle had been found originally. Glenny reminded me of the single magpie he had seen on the way over and gave me a chance to remain more than unofficial. We then set to work.

The mechanism, when withdrawn and partly taken down, appeared to have a charge attached that we estimated at two or three pounds of hexanite, and had a hydrostatic valve that seemed to be the key to the situation. During our work we partly uncovered this diaphragm which was seen to be rising slowly up, but Glenny, who knew the danger, gave me hardly any indication of what he feared beyond suggesting that I might absent myself. The Depot official took the hint. This phase over, we decided to pull out the whole hydrostatic valve by a cord from a safe distance. The first attempt failed and so did the second, and we were fixing the mechanism more firmly for another pull when our friend, who was already walking back, caught his foot in the cord, stumbled and jerked out the valve completely under our noses.

At this point V A Dover arrived to see how we had got on and the Depot man served up cups of tea. On his departure and after discussion Glenny decided to unfit the charge so that we might lower the tension a bit. The Depot official, who was clearly anxious of us, murmoured something about getting a tool for us and went out. We took the plunge and unfitted the head. This revealed the striker forward though when it moved we could not say. The workshop staff at "Vernon" said later that it failed to fire because the striker was bent and could only slide forward slowly to bury itself in the percussion cap. Perhaps this happened when the hydrostatic valve was jerked out. If so, Glenny's single magpie theory does not hold water.

The remainder of the unfitting was soon complete and we went to supper at 2100, slept the night in Dover and after reporting to V A Dover left for "Vernon" on Sunday with the float complete.

This was a fair 'blooding', but I never got my travelling expenses as I was on holiday.

The Clacton Mine

We had another bit of very good luck in the early days of May which led to the recovery of a new German aircraft mine, which was named the Type "C". This mine contained a new, very ingenious and highly dangerous fuse. Lieut. Commander Lewis was concerned in the operations leading to the recovery of the first two mines of this type; he relates the following story:-

An aircraft crashed in Clacton and its "bomb load" exploded on the night of 31st April, 1940. This happened at about 9 p.m. I was still with the Experimental Flotilla, which was now working from Brightlingsea. Se felt the explosion quite planely and were asked by FOIC Harwich if we could give any idea of where this had occurred. We got in touch with the Observer Corps and eventually reported that we though it had occurred in Clacton or thereabouts. Other reports eceived by FOIC Harwich indicated that the explosion was at sea.

However, in the morning Lieutenant Forman, RNVR., of the Mine Recovery Flotilla, was sent from Harwich to inspect the damage, and he found an "object " close to the crashed aeroplane, which the local ARP parties had though was the cistern from one of the demolished houses, but of which he, Forman, was suspicious.

We at Brightlingsea were naturally keen to have a look, but as we had not been asked by FOIC Harwich to do so we did not wish to butt in.

However, Lieut. Commander Ryan rang up from Admiralty and said he was going to look, so I met him at Wivenhoe and drove him over in my car.

Forman was away 'phoning when we arrived. We immediately recognised the object as a magnetic mine, borrowed some tools from a garage, had the area cleared, and rendered it safe.

"We immediately recognised the job as a magnetic mine....."

Forman returned to find the job done, and was very upset because he had asked for a party from "Vernon", which he said, had already started.

The mine was towed away by a breakdown van, the local press took photos of us in our shirt sleeves drinking beer out of bottles (these were fortunately suppressed), and the mine was transferred to a lorry, owned by a Canadian (who gave me a very nice glass of rye whiskey), which then left for "Vernon".

We had handled the bomb fuse as before, which was, we discovered afterwards, dangerous, as it was one of the new pattern. The "Vernon" party arrived after we had returned to Brightlingsea, but they came over to see us, and ate a very large proportion of the plovers' eggs which we had collected one afternoon in the previous week.

" ... and rendered it safe".

It was certainly fortunate that one of the mines carried by the aircraft did not explode. Presumably it was thrown clear and its impact with the ground was insufficient to actuate the bomb fuse. The world in general was told that the bomb load had exploded. In reality we obtained our first Type "C" mine intact. This gave us good time to study the new bomb fuse and perfect our RMS technique before the Germans laid these mines in large quantities both at sea and on land. The mine unit at Clacton proved to be "Blue", the first unit of this polarity to be recovered. This discovery had far-reaching effects in the DG and minesweeping worlds.

The Maplin Mine

A few days later came the second Type "C", found by fishermen on the Maplin Sands. Lieut. Commander Lewis continues:-

On 8th May, 1940, a mine was reported on the Maplin Sands by local fishermen. It was only visible at low water during spring tides and was actually in about one foot of water on the day that we dealt with it.

Sub. Lieut Goodman, RNVR., and a TGM came from "Vernon" to Southend, identified the mine and made the necessary arrangements for boats and lorries. I was sent over from Brightlingsea to do the job, and took with me Sub. Lieutenant King, RNVR. (who had by now learnt quite a lot about Rendering Mines Safe and had done several H.II's and a Mk. XIV on his own), and the RMS TGM based on Brightlingsea.

We caught our boat at 0330, on board which was a very good crown of fishermen, and proceeded out with the tide to our mine. Low water always seems to be at ridiculous hours whenever there is something to be done at that time.

We anchored the boat in deep water, went over close in our skiff, eventually disembarking near the mine in about 2 foot of water. The skiff made off to a discreet distance.

We must have looked ridiculous, the five of us standing in the sea over a mile and a half from shore for half an hour as dawn broke on a cold April morning.

We got the bomb fuse out when it was still under water. This time it was removed with considerable care and the gaine immediately unscrewed. We put it into a box, and passed the box to the "Vernon" TGM., who walked off with it. About half a minute later we heard a small bang, and the PO turned round to tell us, "Its gone off".

As it was only the powder fuse, all was well. We finished the job, the hydrostatic valve taking some shifting, and stropped and buoyed the mine. We rejoined the skiff, rowed back to our Bawley boat and had breakfast while waiting for the tide to rise.

Later we weighed, recovered the buoy, and hoisted the mine inboard with the throat halyards, and proceeded back to Southend, where the mine was hoisted into a lorry, and despatched to "Vernon".

Luck was with that party, for there is no doubt that the bomb fuse was in a most dangerous condition and ready to complete its cycle of operation on the application of a slight shock. It must have got that shock as it was put in the box. Fortunately, by that time, it was out of the mine and had had its gaine removed. The Maplin mine unit was "Red".

It was not till 21st July that we recovered the little brother of the Type "C". The success came as a result of thoroughly good work by Lieutenant Glenny on the mud flats in Liverpool Bay, for which he was awarded the DSO. The new mine was called the Type "D". By now it was clear that types "A" and "B" had been superseded by types "D" and "C" respectively.

Strange Type of Mine at Deganwy

Those early summer months proved to be an anxious time. France was being overrun, all sorts of demolition requirements had to be met, the enemy mining campaign was in full swing. People were on edge and this was the probable cause of the many wild goose chases on which "M" Department officers were led. Here are two such chases related by Lieutenant Hodges:-

> In respose to an urgent and repeated call to "Vernon" from FOIC Liverpool, I left Portsmouth on Saturday evening, 13th April, for North Wales to investigate a report of a new type of cylindrical mine ashore in the Conway estuary.
>
> Changing at Crewe in the depth of the night I reached Conway at 0630 on Sunday and found my way to the Police Station where the constable on duty was most courteous but quite ignorant of any mine ashore.
>
> I went to get washed and have breakfast and returned at 9 o'clock by which time another constable was ready to take me to the object which turned out to be an acetylene gas container. A table on it carried in English the information that it was patented and it also bore the registered number.
>
> Now this worried the constable a good deal and the happy suggestion of a drive round the North Wales coast in the Police car silenced any protest I might have made. The morning was thus pleasantly spent.
>
> After lunch I was just leaving for the station when the Police car ran up and with the Superintendent's compliments I was run 20 miles along the coast to catch the train further down the line and so so more of the country.
>
> I reached "Vernon" at midnight and so far as we know FOIC Liverpool never even got chaffed about his mine.

Journey to Grimsby

On Friday evening, 6th June, Admiralty reported a German aircraft mine dry at low water in the Humber Estuary. This news came just after we had finished successful trials with the new safety horn for Type "C" bomb fuses, and I was despatched to use it on a live bomb fuse for the first time.

Faced with the task of using it in practice I checked up on the new toy with great care and had some indication marks cut on the lock handle so that the air pressure could be applied very gently at first.

CPO Dodsworth and I left Portsmouth in the evening and took a train from Kings Cross at 2300. An hour out of London an air raid warning came through. They were unusual in Cambridgeshire at this time, and the guard came into the carriage to tell passengers. The effect on the stout gentleman opposite me was electrical. He sprang up and made as though to get under the seat, but being stout thought better of it, so he turned on me and shook me out of my doze and perhaps expected me to leap in panic out of the train and kill myself as a sacrifice. I cursed him quietly and he, too, lay down while the train rolled on slowly, reaching Retford two hours late, and we lost our connection.

The railway company put a passenger coach on to a goods train leaving for Grimsby, and we reached our destination for an early breakfast on board the PMSO's ship, an ex-yacht, where Captain Kirby gave us our orders and Sub. Lieutenant Bates, RNVR., had made admirable arrangements for the party, which left on the ebb tide for the mud bank where the mine lay. We had with us the Port Surveying Officer and the object had been accurately fixed, but at low water only a black and ancient log of wood about twelve feet long appeared. This and many other possible objects were examined and on the flood we returned to the ship to find that the police had reported us, while we clambered stripped to the waist over the mud flats, as German parachutists.

Investigation of the evidence of mining activity in the estuary which we sifted carefully on our return revealed that of the five witnesses four had their evidence second hand and the fifth was at sea and not available. Captain Kirby, however, was still convinced that a mine had been laid and gave orders for sweepers to cover the submerged mud bank at the top of the flood. In doing this the ships would have had their keels about two feet from any mine that might have been there, and I was relieved when I was able to persuade him to countermand his orders. He was most courteous and, feeling that perhaps we were up on a wild goose chase, insisted that I should stay as his guest, thereby for once leaving me in pocket on expenses.

We returned to "Vernon" on the Sunday and the dangerous honour of using the safety horn for the first time fell later to Diver Tawn.

Recovery Operation Off Poole

Meanwhile, the lack of trawling success had led to great thought being given to other methods of locating and recovering mines under water. Echo-sounding yachts and boats were produced for location. Once located it was clearly desirable to remove the bomb fuse prior to attempting salvage. After many attempts to locate reported mines, we found one off Poole. Here is Lieut. Commander Armitage's story:-

On Thursday, 6th June, 1940, a report was received from HMS "Saltburn" that an enemy aircraft had dropped a mine off Poole Bar Buoy. There was considerable minelaying activity at this time in the approaches to Poole Harbour, as an attempt was being made to evacuate part of the DBEF from St. Valery, and no doubt the enemy considered that much of the shipping would attempt to make Poole.

The mine reported by "Saltburn" was slightly out of the main channel, and it was considered that an operation should be carried out to attempt to recover this mine, as the area could be reserved without disturbance to shipping using the harbour. Accordingly a signal was sent on the 6th June to FOIC Portland requesting approval for the operation and asking that an area of two cables round the mine should be reserved.

The method decided on for recovery was that the area should be searched by echo-sounding ships with divers standing by to examine any contacts. If the mine was found a specially-trained diver would be available to attempt to render it safe under water. It could then be dragged ashore and taken to "Vernon" for examination.

On 8th June the echo-sounding yachts "Esmeralda" and "Sir Sydney" started operations under Lieut. Commander Macmillan, RNR., with a mobile diving unit from HMS "Excellent" standing by. On this day six contacts were investigated by the divers, but nothing other than rock ledges was found. The divers worked under considerable difficulties owing to the strong tides and the fact that the only Launch available had no power. The search was continued on 9th June, three contacts were examined, and a diving search carried out with no results. At this point a message was received from RNO Poole to suspend operations and sail the yachts back to Portsmouth. Shortly before leaving, "Esmeralda" had located three objects which it had been intended to investigate.

On 12th June it was decided that the operation should be resumed. "Esmeralda" and "Sir Sydney" sailed for Poole and a diving unit was again supplied by HMS "Excellent". I was in command. On the 13th June diving was started on the positions marked by "Esmeralda" on her previous search. At 1517, Diver A R Knight, examining one of the contacts, reported a mine. It was clear from the diver's report that the mine was a German magnetic mine Type "C". It was lying in 7 fathoms at an angle of about 30° to the bottom and swinging gently in the ebb stream. The mine was actually found some 400 yds. from the position in which it was reported dropped, which led to the unpleasant conclusion that under certain conditions these ground mines would perambulate about the ocean bed. The mine was secured and buoyed and a report made to

"Vernon". On the report of these events being received in "Vernon", Lieutenant Glenny, RN was sent to take charge of the salvage operation.

On the morning of the 14th June a diving party, including "Vernon's" divers trained in rendering mines safe, started operations. Diver R G Tawn, AB., was sent down and found the mine laying flat on the bottom with the lifting lug on top. Tawn was using a motor horn specially adapted to screw on to the bomb fuse. This horn was blown up to a pressure of 10 lb. and fitted with a tap; its object was to keep pressure on the hydrostat in the bomb fuse to prevent any possibility of the fuse firing as it was brought to the surface. This part of the operation was carried out without difficulty. Tawn removed the fuse after attaching the horn, and the whole contrivance was brought on a line to the surface, where the fuse was unfitted.

The next stage in the operation was to find a convenient place where the mine could be beached for the removal of the main detonator and primer. Studland Bay was chosen. The long shelving foreshore and small rise and fall of tide would have made recovery by tidal lift a lengthy procedure. It was therefore decided to tow the mine until warps could be passed ashore. From previous research work it had been concluded that this type of mine would be prevented from firing by the anti-countermining pendulum while being towed. The run into the beach was searched by "Sir Sydney" for obstructions, and a 120-fm. tow line was fixed to the mine. A small open Poole fishing boat was used for the towing. The mine travelled quite easily for about 200 yards and then exploded. No damage was caused to the towing craft.

This was the first occasion on which a German mine had been located at sea and worked on by divers. Diver Tawn was subsequently awarded the DSM for this work, and it was certainly earned; it is not pleasant to work in a diving suit with 1500 lb. of high explosive under your elbow.

The loss of the mine was a most disappointing ending to the operation. It would have been very satisfactory to have captured it alive; no probable explanation was ever arrived at as to why it should have fired and it must just be accepted as a forcible reminder of the truth of the ancient adage, "quieta non movere". In spite of the loss of this mine the operation was not entirely barren, for it gave birth to a number of interesting ideas for the improvement of mine recovery such as Water Gazing, Resonant Mine Detectors and Mine Flotation Gear, and many of these have since struggled through adolescence to maturity.

Tragedy in "Vernon"

Early in August a tragedy occurred which fundamentally altered our conception of the best way to strip a German mine. The events leading up to this tragedy are best told by Lieutenant Hodges:-

On Saturday, 3rd August, Admiralty reported an aircraft mine, complete with parachute, buried in a field by Minnis Bay near Birchington, Kent. The parachute had been seen and reported by the driver of a passing train, and a platelayer had investigated it.

The Mining Commander arranged for Ch PO Wheeler and myself to leave by car at 0700 on Sunday. The Dockyard car was late, as usual, and this involved us in an air raid warning which we ought to have missed by half an hour. Eventually we left "Vernon" at 0830 and the driver, in spite of repeated requests, would rarely exceed 40 m.p.h. on the empty roads, so that we reached our objective 2½ hours late.

Lieutenant West and a working party from Chatham Torpedo School were already there and I fear that they felt that "Vernon" was trespassing in their country.

The mine was perpendicular and completely buried in a field about quarter of a mile from the sea and lay close to the Chatham-Margate railway line. The parachute had already been removed and there was no indication at all as to whether it was Type "C" or Type "D". There was no indication of any trap, as the local military reported minelaying activity in the inshore channel on the same night as it was dropped and that there was ground mist at the time.

It had therefore first of all to be dug out. Lieutenant West, always an optimist, proposed to haul it out by tractor, and the first afternoon and evening were wasted on three such attempts. The first with one tractor and without digging, the second with one tractor and a little digging and the third with two tractors and a little more digging. These operations were complicated and prolonged by the proximity of the railway across which the long tow rope had to be run.

Next day the mine was dug round under our own directions, a ramp cut and rollers put in position for the tow rope, and the mine came out easily. It proved to be a Type "C", and Lieutenant West helped me to remove the detonator and then, using the safety horn, I took out the bomb fuse and removed the gaine. The primer was also withdrawn.

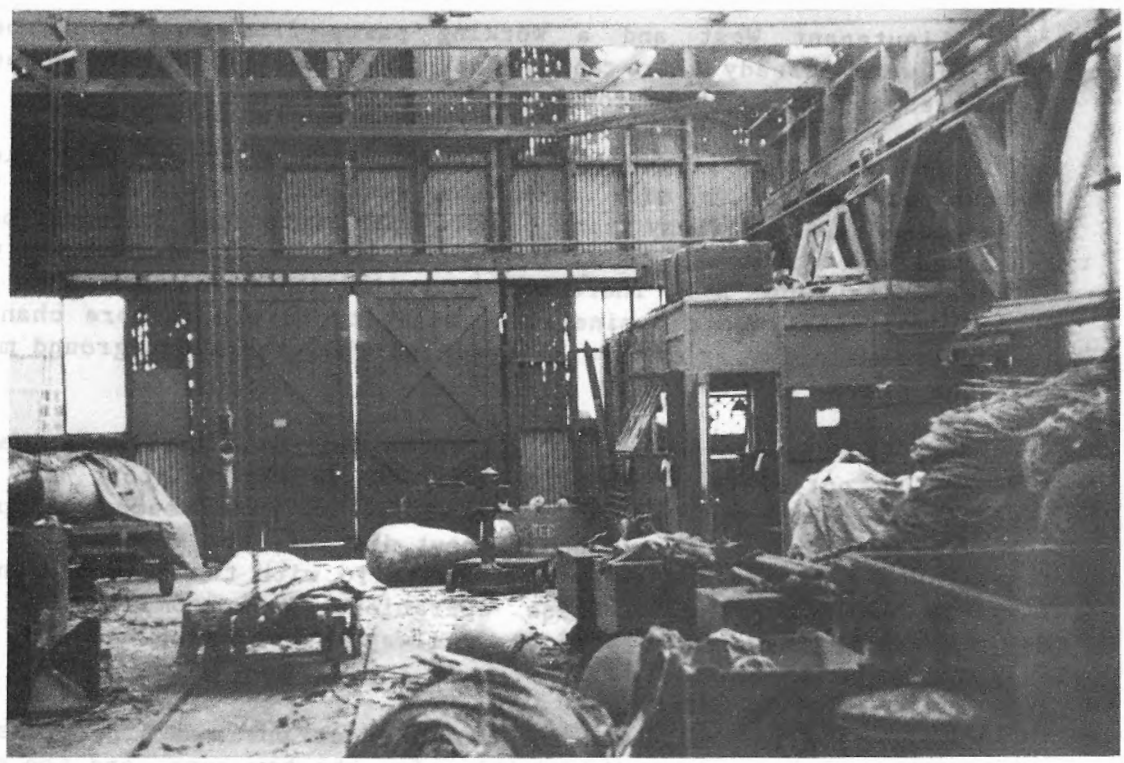
It was now almost 1400 and we were keen to leave for Portsmouth so the clock was left in position. We had no box to pack it in either. By 1500 the mine was loaded into our lorry, though not before Wheeler and I had suffered much anxiety over injury to the limbs of the working party.

Our three-ton lorry - speed 20 m.p.h.!! - was well handled and made the journey back rather quicker than the Dockyard car had done, and the mine was unloaded in "Vernon" by 2200.

Next morning after breakfast, hearing a "yellow" warning, I went to the shed, intending to make sure that the clock was taken out before the mine was ditched on a "red warning". In the Mining Shed the dismantling of the rear door was well in hand and Lieutenant Glenny sent me with Lieut. Commander Forest, USN., to Priddy's Hard. We reached Marlborough Pier and had cast off in the "Skimming Dish" when an explosion occurred and we saw the roof blown out of the Mining Shed.

The story is continued by Commander C Thistleton-Smith, RN who had taken over the Mining Department from Commander Sayer in January.

It was a Black Day - Tuesday, 6th August. I was sitting at my desk working at a multitude of papers. Glenny had been in to tell me that the work of stripping the mine from Birchington was about to commence. I said I should not come down. Hodges and



"There was a nasty shambles"

Lieut. Commander Forrest of the US Navy had been to see me too to arrange a visit to Priddy's Hard. There was a fairly loud explosion and my windows shook. I thought a bomb must have gone off in Portsmouth. Lieutenant Hight and I looked out of the window and saw and ambulance. After a few minutes Wood came in and said there had been an explosion in the Mining Shed. There had been. A nasty explosion. As I approached, some blackened men, incredibly burned, were being taken away from the south door. I hurried round to the north end. There was a nasty shambles. A damaged Type "C" mine thrown against the office, the roof gaping, glass everywhere,

blood, a shrunk, contorted, blackened man flung into a corner, a sailor collecting the blood-soaked and charred remains of another man and putting them on a trolley, a human leg; all these things I saw and felt sick with the tragedy of it all. Mr Cook was dying, nothing could save him. PO Fletcher was blown to bits, others had been taken off to sick bay. No one seemed to know what had happended to Glenny. I eventually found him in sick bay in bed badly burned and shocked. He had been standing only a few feet behind Fletcher as he was lifting off the rear door of the mine. There had been a whirring followed by a blinding flash and deafening roar. He knew little more. Three of the injured died in hospital. It was as well, for they were so terribly mutilated. The others recovered - one miraculously.

The days that followed were very busy. We searched for all the bits and pieces, and Dr Wood's section worked day and night to reconstruct the mechanism. It was obvious that a special charge had been inserted to go off and destroy the unit should the rear door be removed. What did the Germans wish to destroy?

"We searched for all the bits and pieces"

It amazed me to find out how hard it is to destroy things. Search and reconstruction unmasked the secret - an electrically fired 4 oz. charge, the circuit of which was completed by the withdrawal of a stud attached to the rear door; and the object guarded by this charge was a Period Delay Mechanism, suspected for some time.

Obviously we must be able in future to render this mechanism safe before removing the rear door. And how were we going to guard against other booby traps?

As I stood outside the Mining Shed a short while after the explosion, the Captain (Rear Admiral B. Egerton, RN) said, "We must see what we can do with X-Ray". We started investigations that day.

I look back now on that tragedy with deep sorrow at the loss of such valuable lives, but with profound relief that the auxiliary charge was not arranged to fire the mine charge. From the tragedy of this explosion was born a deep determination in us all to defeat every obstruction the enemy might put in our way.

The North Boarhunt Mine

It was not long before this determination was put to the test, for events soon showed that the Germans were prepared to go a long way to prevent us discovering the secrets of their mines. While the remains of the Birchington mine were being used to try out a portable X-ray equipment from Woolwich, and machinery to cut an inspection role in a mine shell from a distance was being designed and constructed, the Germans were preparing to lay two special mines with the sole apparent object of killing some of our experts and frightening the remainder from every trying to strip a mine again. Soon after midnight of 16th August enemy aircraft laid one such mine a few miles behind Portsmouth and another a few miles behind Portland.

The following extracts are from "Vernon's" official report, written on 17th August, and Commander Thistleton-Smith's narrative. The "Vernon" report states:-

Soon after midnight last night an aircraft flew round and round over North Boarhunt, near Southwick, Hampshire. There was a thick ground mist in the valleys. After a while a green flash was observed, followed about a minute later by an explosion. The explosion was noisy and accompanied by a bright flash, but there was little or no shock.

The Home Guard found bits of a mine and parachute in a nearby low meadow , and "Vernon" was eventually informed.

Commander "M" visited the scene in the early morning.

Commander Thistleton-Smith relates:-

I well remember that morning; a morning in late summer, dew on the ground, a nip in the air and blue overhead. I was living at the "Red Lion", Petersfield, at the time, and was awakened about 0230 to answer the telephone. It was C in C's staff passing on information from the police that a parachute mine had been dropped near Bere Farm at North Boarhunt, and would "Vernon" do something about it. Apparently it had not gone off.

As soon as it was light I was in my car trying to find Bere Farm. Eventually a village grocer's boy said "Oh it's the paractute mine you are looking for is it, Sir; why that be just down the next lane". There I found a constable on guard who led me to the spot. My visions of rendering safe the mine with my own fair hands faded when I found the mine in bits. At first I thought it had only partially exploded, but that did not account for the detonator and primer end of the mine being still intact. There was no crater and only a small area of burnt grass, and around that the ground was covered with pieces of explosive. Clearly there had been a small explosion. The people at the farm half a mile away had heard that. But what had exploded and why?

Some little way from the mine lay a heavy cylinder. The deposit of yellow explosive on its outside showed it to have been fitted into the main charge. It looked like a primer. If so, why hadn't it exploded? Parts of mangled metal had been thrown some way away, and I found the usual tail cap in the next field.

I returned to "Vernon" and soon after breakfast, Ouvry went out with Walden to extract the main detonator and primer (there was no bomb fuse) and to search for scattered bits. By noon he was back and a hurried reconstruction was carried out. There had obviously been an electrical booby trap to operate when the rear door came off; but it seemed clear that the cylindrical charge which I had found beside the mine, and which seemed to have fitted in a central hole in the rear end of the main charge was the charge for this booby trap. If so, a second auxiliary charge had actually fired, and cannot have been in contact with the main charge. To our surprise there was no sign of any sort of mine actuating gear at all - no magnetic unit or anything in its place.

The official report written that day concludes:-

Examination to date shows the following:-

(i) There was no clock or magnetic unit in the mine.

(ii) No bomb fuse was fitted; the hole in which it normally is sited was filled up with the main charge.

(iii) The mine primer and detonator was normal.

(iv) A second primer and detonator of similar type had been fitted in a cylindrical container and inserted from the rear into a hole running axially through the main charge. The entrance hole was in the centre of the fore bulkhead of the unit compartment.

(v) A third charge must have been fitted in a sector of the unit compartment; this charge exploding on the mine hitting the ground.

It seems possible that, on hitting the ground, the blow was sufficient to shear off the rear door; this movement completing a circuit to fire the charge. The second primer in the central tube is unexplained.

Evidence in fact goes to show that this mine may have been "planted" with the object of destroying the people who tried to investigate it.

The Piddlehinton Mine

Concluding his narrative of the North Boarhunt Mine, Commander Thistleton-Smith says:-

Later on that day we received a signal from FOIC Portland informing us of a parachute mine at Piddlehinton, and it soon became apparent that we had a similar mine there in an undamaged condition. As Glenny was in hospital, I arranged to motor Armitage and Mr Walden to Piddlehinton on the morrow, got CSRD Woolwich to send the X-ray lorry down post-haste and encouraged the NPL to complete the new cutting machine in two days instead of a week. In the meantime, the mine was safe in the hands of Constable Fish, the local policeman, who had apparently taken complete charge of proceedings in the district.

The following is an extract from "Vernon's" report dated Monday 19th August:-

The mine was found lying undamaged on the slope of a grass field about 1½ miles from Piddlehinton. The nearest house was over a mile away and the nearest military objective over two miles away. It had been droped on the night of 16th/17th August. The night was fine with a full moon. There was little or no mist. The aircraft that dropped the mine seems to have approached fairly high from the south, almost immediately dropped the mine and then returned. Piddlehinton lies ten miles north of Weymouth.

The mine had landed near the top of a slope and rolled down some way before being arrested by the aircraft securing lug. The parachute was still attached.

In shape and size the mine was found to be identical with a Type "D" mine. The normal primer release and plate over the detonator were visible, but there was no place for fitting either a clock or bomb fuse. In fact the shell of the mine had been specially made for the job.

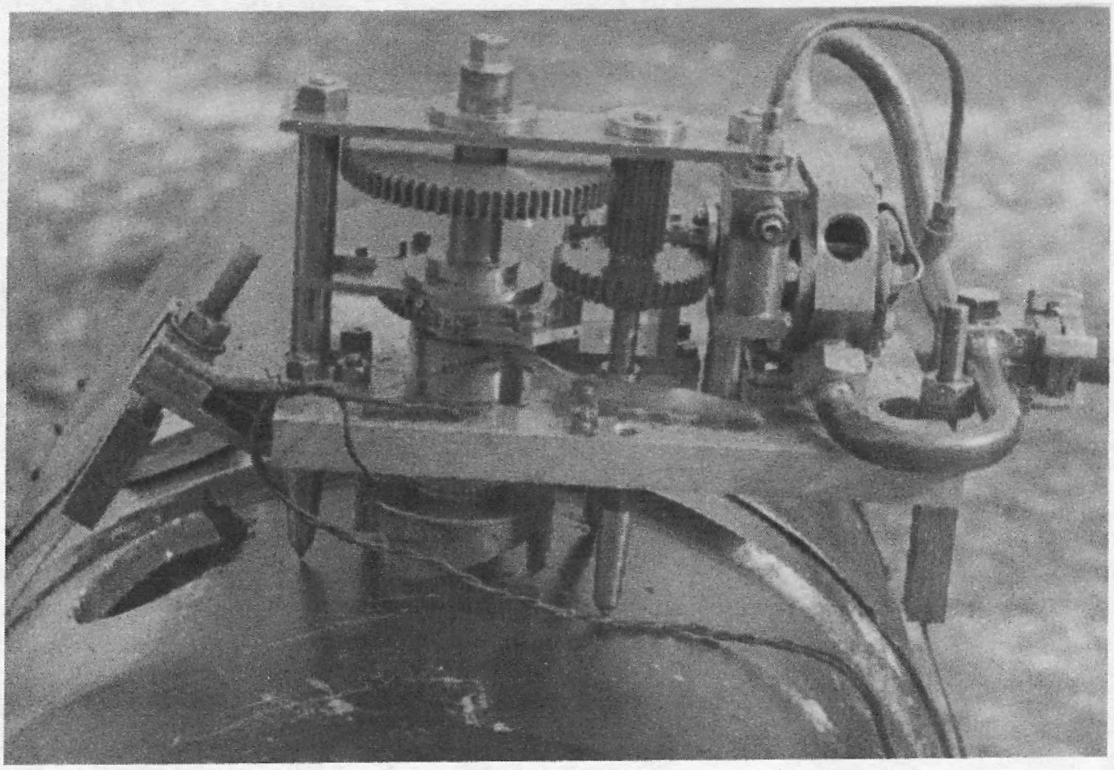
Commander Thistleton-Smith relates:-

It was a pleasant drive somewhat delayed by air raids. We lunched well at a pleasant hotel at Lyndhurst, and eventually drove up to Constable Fish's front door step about 3 o'clock. It was the land of the Piddles and the Wallops and very lovely. The mine lay in one of those rather steep, narrow valleys, typical of Wiltshire and Dorset, that divide up the high plains. It seemed miles from anywhere. As I stumbled down the steep hillside, I was struck by the strangeness of finding a mine in such a place. It was guarded by a section of local soldiery in addition to the capable Fish, but they all kept at a very respectable distance.

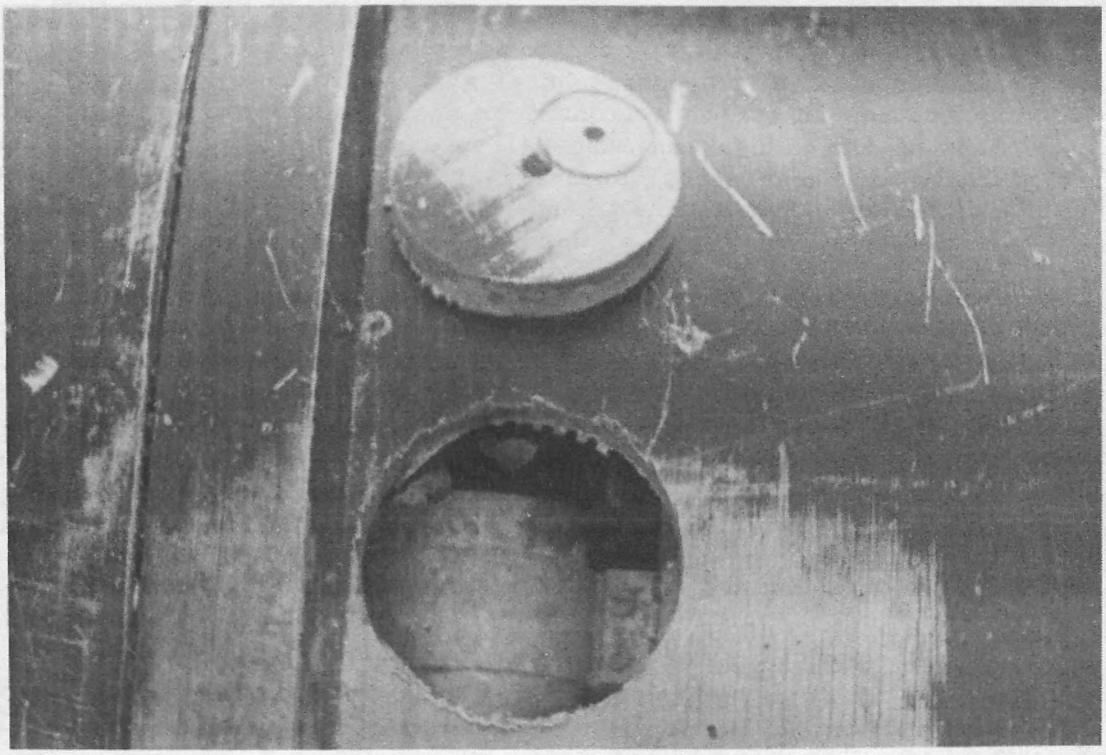
After confirming that there was no sound of ticking, photographs were taken and the mine rolled over to see the other side (it had rolled so far already, it couldn't harm it). As there seemed a possibility that the main detonator might be fitted to some clock device inside the mine, and the X-ray machine would not be available till the morrow, I told Armitage to whip out the main detonator and primer. They proved to be normal.

I eventually left there about six, leaving Armitage and Walden behind to get busy with the work of X-raying and then cutting the shell.

The design and production of an instrument to cut a hole in the mine shell, being controlled from a distance, was a story in itself. The need for such an instrument became obvious soon after



"Our final cutting machine, remotely controlled ...."



"...." and the hole it cuts"

the discovery of the booby trap on 6th August. We examined the trepanning and boiling-out plant that had been produced for work on bombs. This plant consisted mainly of a prehistoric-looking engine for supplying the steam. We got the NPL interested and at the time of the mines at North Boarhunt and Piddlehinton, a suitable machine running on compressed air had been designed by Mr Bradley of NPL. As soon as I heard of the mine at Piddlehinton, I did everything possible to speed up the production. Mr Butcher, of T2 Section, did invaluable work in this respect, and the people concerned at NPL did so well that they produced the machine inside three days - and nights. Mr Bradley arrived with it on Wednesday, 21st, and the necessary air bottles had arrived the previous evening.

Meanwhile X-ray photographs had brought to light an astounding box of tricks. Armitage brought them back to "Vernon" on Wednesday and we studied them with great interest before he returned to commence the cutting operation. We decided to cut a 4-in. hole at the end of the battery so that the leads going away to the electrically-fired auxiliary charge could be cut. The attempt failed owing to the cutter not working satisfactorily and the supply of compressed air becoming exhausted. This, and the fact that additional photographs showed new complications, induced me to go down to the scene of action on Friday. Walden had been working on the cutter must of the night, Armitage had been scouring the country for more air and, by the time I arrived, they were just about to make another attempt.

The next few hours were most exciting. The high wail of the cutter, our retirement to the little trench shelter dug by the soldiers in the neighbouring field, the eager approach after each cut to see what mysteries were revealed, and the usual disappointment when we found there was still a long way to go. These are vivid memories. At last the cutter got through on one side, and Walden enthusiastically set to work with a bit of hacksaw. It was at this stage, when we were all keyed up, that first I, then Walden, then all of us smelt burning. "Pitch" said Walden. "It's getting worse" said I. We prepared to run and leave it for awhile. As I turned I found a cloud of smoke coming from my jacket pocket - I had done the usually silly thing with a pipe.

The hole proved to be well positioned, half over the end of the battery and half over the little compartment at the end, but the disc would not come away from the battery; finally we had cut across it as best we could by boring small holes and then cutting through the bits between with the trusty hacksaw blade. At last it was out and there were the leads coming away from the battery, all ready to be cut and insulated.

I was pretty certain now that we had isolated the primer in the rear end of the charge, and that we were left with a separate charge in the rear compartment - a mechanically fired charge. Photographs showed this to be very complicated and gave little guidance as how best to tackle it, the air was exhausted and the cutter badly in need of modification; it was getting late and we had already been five days on the job. All these things decided me to use plastic explosive to make a hole in the rear door through which we should be able to see the mechanical gear. Ch PO Thorns was itching to use it, and very shortly after I had given the word, he was ready with his two-inch circle of the stuff on the rear door, a detonator inserted and Bickford's fuse ready to light. We all took cover in a nearby fold in the down. Thorns came hurrying in and we all counted the seconds. Bang! - just about the right time, and the mine had not exploded. I leapt up and led the party, straggling behind me, to see the result. We had been sheltering about 250 yds. away I suppose (except Armitage, who wisely had gone considerably further). As I was walking towards the mine and still about 50 yds. away, there was a loud explosion and I was lying flat on my face in the grass. I looked round anxiously. Nobody was hurt, thank the Lord! Everyone was getting up and none the worse. The mine was in bits and blazing explosive all around. It was clear that the mechanically operated charge had gone off after a delay but goodness only knows why. The heavy battery lay a few yards in front of me and masty bits of metal were scattered amongst and beyond us. The X-ray lorry 100 yds. away had been hit by the parachute shackle. We were extremely lucky and soon very busy putting out the flames. The remains of the mine were similar to those at Boarhunt, but the mechanism was a little less damaged. Armitage and Walden were very disappointed at losing the mine, but I said then, and say now, that it was just as well. That device would have been the hell of a thing to render safe, and even had we done it, the knowledge gained was unlikely to lead to much. It was designed for a specific purpose, I think, and is most unlikely to turn up again.

"The remains of the mine were very similar
to those at Boarhunt"

I clambered into my car and drove back to Portsmouth, with a headache and a feeling of great excitement.

We had little time in "Vernon" to worry much about the booby trap mines. The Battle of Britain" was in full swing. So was the enemy mining campaign. One emergency after another was met with enthusiasm and skill. We never had a dull moment.

The available officers for operations at this time were Armitage, Wadsley, Hodges and Spiers, the latter being CO of the mine recovery division based at Portsmouth. In addition, Griffiths and Chapple were in charge of the divisions at Brightlingsea and Rosyth respectively.

On 17th August reports of a parachute mine laid in the mining trial ground were received. This and the frequent air raids practically stopped trial work for a time. Naturally we were keen to find and recover this mine, but all efforts failed until a search at low water springs early in September resulted in the mine being found with about two feet of water still over it. Armitage took charge of subsequent operations which were fraught with difficulties and dangers. We used our new flotation gear for the first time on service. This gear consisted of a strong light bag which could be attached to the mine by a diver and inflated from a distance sufficiently to float the mine off the bottom. The mine floated off all right, but as we towed it to a distant beach for landing and investigation, the bag got lower and lower in the water and eventually, to our disgust, disappeared from view! In the end, however, Armitage achieved success.

Visit to Eire

On 19th August we received news of a parachute mine visible at low water in Dungarven Bay. The Irish wanted assistance, so off went Hodges, who relates as follows:-

After discussion Admiralty decided to send a "Vernon" representative to Eire to investigate and report on a mine laid on 19th August in Dungarven Bay.

John Glenny was still convalescing. The mining Department was at the time wrestling with two other booby trap Type "E" mines. "M" did not wish to miss any chance of solving the problem, so I was sent off to get any information available, together with Mr Thompson of MDD and Ch PO Salter.

We left "Vernon" during an air raid warning and Ch PO Salter missed the train but caught us up at Admiralty, where Captain Phillips gave me instructions, permits and advice. He pointed out that we were belligerents visiting a neutral country to get information and might expect to be watched by German Agents. We were to travel in plain clothes, styled as engineers.

Very bad weather off Holyhead made Thompson and myself sick on the way to Kingstown, where we were met by plain clothes police whose secretive behaviour worried me. In Dublin we were visited by Major Lawler of the Eire Army and it was at once evident that we were were at cross purposes. Admiralty wanted all possible information without revealing to anybody the method of tackling German mines, and the Eire Authorities wanted the beast removed and to learn how to deal with any further mines that might be laid. Thus they had the goods and we had the knowledge. Further, their description of the mine added something unusual to the ordinary run of parachute mines (this turned out to be a double fusing link, safety pin and washer for the primer release and bomb fuse respectively). They also made it out to be bigger than it proved to be.

A frank talk lead to an appreciation of one another's positions and me to feel that it was worth going ahead and that Major Lawler was an honest man. I therefore checked up by visiting the British Embassy for advice, and Sir Grant Murphy was of the clear opinion that the Eire Authorities could certainly be trusted. Thompson also felt the same about Lawler.

Next day we left for Dungarven in 30 h.p. Fords with Army drivers in plain clothes and went via Carlow, Kildare, Kilkenny and Clonmel, on the way having a lunch of fresh killed trout and salmon, which I shall long remember. We reached Dungaren Bay at 1330, low water being at 1515, and found much gear assembled by the Eire Army Engineers; though the flotation barrels I had asked for were without bungs!

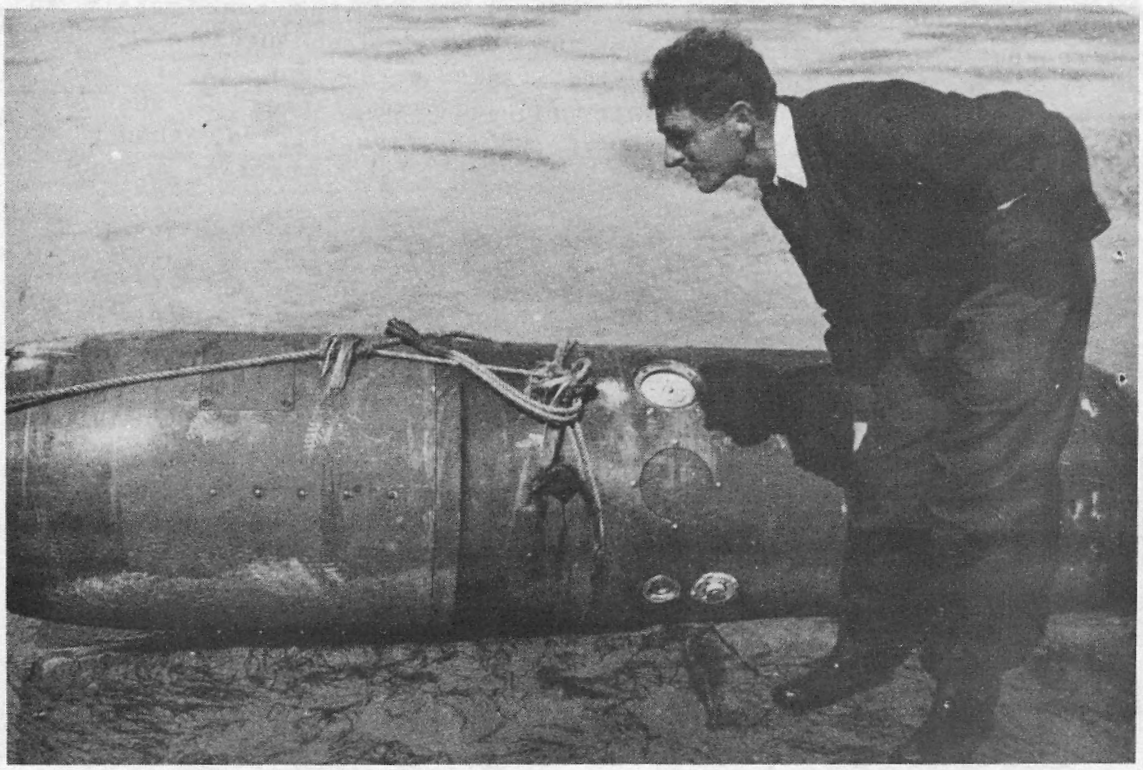
The mine lay a mile and a half out in the bay, covered in a channel 3 ft. 6 in. deep at low water. It had been staked, but the marking post was only 4 ft. out of the sand and the mine was therefore located very tardily. Meanwhile the Eire Army and Police fell over one another to help, but as there was nothing to do but wait the fall of the tide they failed to notice that one car had sunk deep in the sand. The retrieving of this disaster then took all their energy and attention until at last it was got out shortly after 1500, and at the same time we found the mine.

The situation was tricky. None of their gear was very handy for us and we had about 20 mins. to get the mine. Enlisting the help of four members of the Eire Navy (led by Mr Power, an ex RN. Ch PO., who had been just previously to "Vernon" and knew a little about German magnetic mines"), we got out four kapok floats and had them lashed together while the "Vernon" party waded into the sea up to the waist to get a line attached to the mine. The trophy lay at an angle of about 15°, down by the nose with the carrying lug buried in the sand and the tide running fast in the channel. Vainly I attempted to secure the lifting clamp to the lug and finally being held against the mine by Thompson and Salter, for the stream was strong, managed to pass a light line round the mine and take one turn round the carrying lug. Salter then made a most excellent job of securing the kapok floats to the mine in record time while I got a superficial feel over the mine which appeared to be Type "C" with the fusing link to both the primer release and the bomb fuse in position. A small brown disc (new to us then) was fitted into the top of the bomb fuse.

The incoming tide now drove us back and we paid out 400 yds. of tow line to a lorry and waited for the tide to lift both kapoks and mine. The crux of the matter being that we had only one turn of light line around the lifting lug and this might part easily, but it stood the strain and by 2000 we had the lorry ashore and the mine grounded 400 yds. out. The cheerful Irish driver then tried by main force to tow it further in. The two, of course, parted and I had to wade in and refasten the line.

We went to dinner and returned at midnight when it was low water and were greeted by the military with an urgent message from "Vernon" forbidding action if Type "E", and in other cases warning me to delay between any two operations in RMS for at least five minutes. We concluded that the Mining Department had met a 'teaser' at Piddletrenthide, but got confidence from the information.

Examination by torchlight revealed a Type "C" mine undamaged with the fusing link and safety clips pulled off and lying jammed under the mine, having apparently been rubbed off when the kapok floats ceased to lift it clear of the sand. During this inspection the driver of one car let the rear axle sink in the sand, and after a lusty little Eire soldier had put us to shame by lifting it out for us when six of us had failed, we eventually got free and to bed by 0300.



"The mine grounded 400 yards out"

After lunch next day I set about the eight-stage RMS procedure, taking most careful precautions, beginning with the bomb fuse and finishing with the rear door. The removal of the parachute spindle and the inspection plug were both more worrying than usual and the whole job took 4½ hrs.

We found all the leads cut when the magnetic unit was removed. Thompson then spent an hour on the unit which had been damaged by the drop, but it revealed nothing new and I kept my part of the bargin and explained RMS procedure to Major Lawler and an Eire Armement Officer.

It was now the turn of the Eire Army Engineers who had waited for action for two days. Up swung the crane and lorry, and the mine was immediately grappled and there was then an hour's interval while the crane was put into working order before the trophy was hoisted and removed. We returned to Dublin that night.

Next day, Sunday, we intended to sail for Holyhead, and indeed were taken to Kingstown quay just in time to see the boat slip! The Eire Authorities had thought the boat sailed an hour later than it did.

On the Monday I took the chance to report at the British Embassy and renew permits before we caught our boat safely and reached "Vernon" at about noon on Tuesday, 27th August. The bomb fuse, safety clips and fusing links were sent later to the Admiralty by the Eire Government and examination of the first revealed this to be seized up and so inoperative, though the positive of its setting proved one of Mr Hill's theories correct.

The whole expedition was most enjoyable and the Eire Authorities were most courteous.

Recovery of German Antenna Mine off Portsmouth

Early September brought us our first German antenna mine. Commander Hamond provided it after somewhat prolonged and exciting operation. This is his story:-

The recovery of the first of these mines was due to Lieut. Commander Lawson of "Cypress" who found it and, spotting that it was something different, refrained from sinking it.

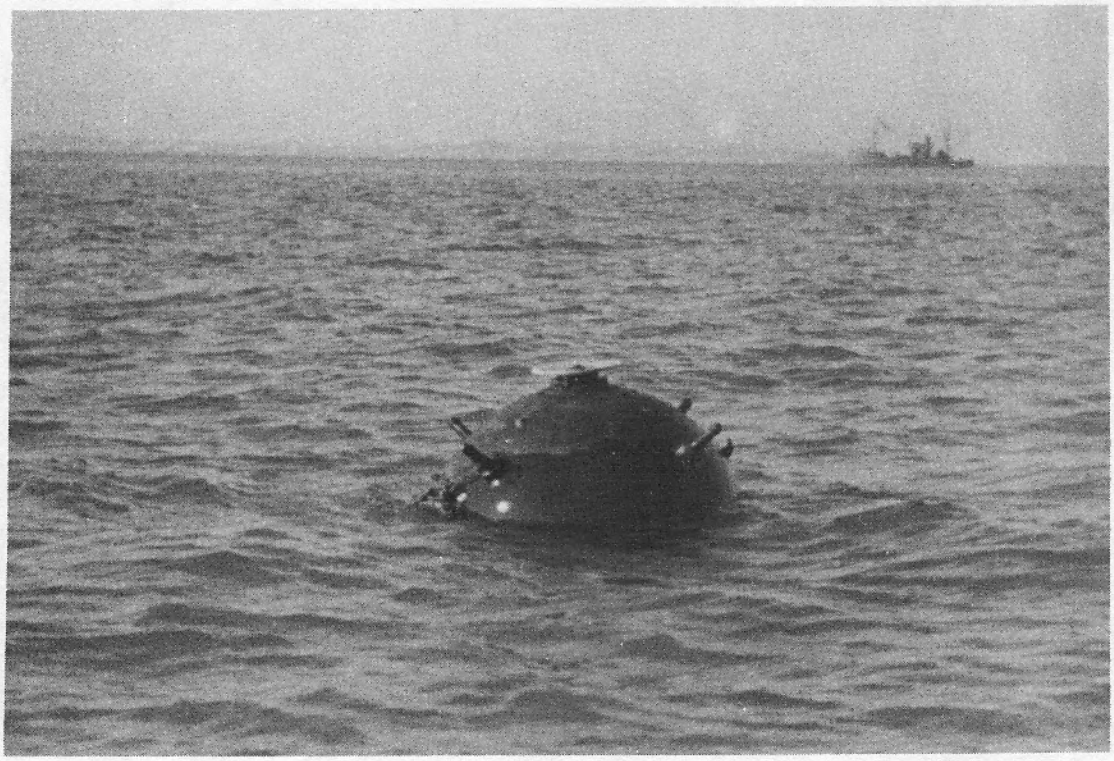
I was glad to get the job and, on arrival on the ground, to find it really was something new to me.

The grapnel sweep worked the first time and got a good hold of something in the sinker. I wish now that I had hove the thing straight up on board. I think it could have been done with engines just turning ahead to keep the mine clear of the stern. What put me off was the fact that, if the grapnel hold slipped, the mine would probable have been thrown right on board. I was anxious to avoid this, especially when considering the sinister appearance of the mine with its green hat.

I thought I would get it into 6 or 7 fms., when I could handle it easily. In the end it hit the rocks at 10 or 11 fms. and straightened a grapnel arm. Another arm must have caught the mooring wire and parted it. It took some time shackling the wire into the mine and getting it in tow and it was then dark. I didn't know how long we had been drifting East and anyhow my standard compass was at least 3 points out; so we just kept towards the land till we saw a ship. We made our recognition signals to her but received no reply, which was not surprising, as she turned out to be the wreck on the Pullar Bank. I was glad enough to anchor the mine and then ourselves to the Looe. Next day we picked it up and took it to Ryde Sand and put it where it dried out. The following day, 5th Sept., Captain Harbord placed "Cedar" and "Cypress" under my orders. I went to sea in "Cypress" with starboard gear rigged.

On arrival we found another mine of the same type watching on the surface. Swept it against the tide catching mine near middle of sweep. Mine travelled down sweep nicely till it reached the Cutter Grabber when it dragged along without cutting. There was nothing to do except to try to drag it to shoal water so we got in kite and shortened in sweep and tried to do so. It parted in

position 109° Nab Tower 2½ miles. I called "Frons Olivae" alongside and went in her dinghy to get the mine, shackling a dan wire on to its lifting bolt as before. Eventually we got it moored somewhere to NW of Pullar Buoy and I went on board "Cypress" for the night. Next morning I thought we might as well have a look to see if another mine had surfaced but found nothing so we went back after yearerday's mine.

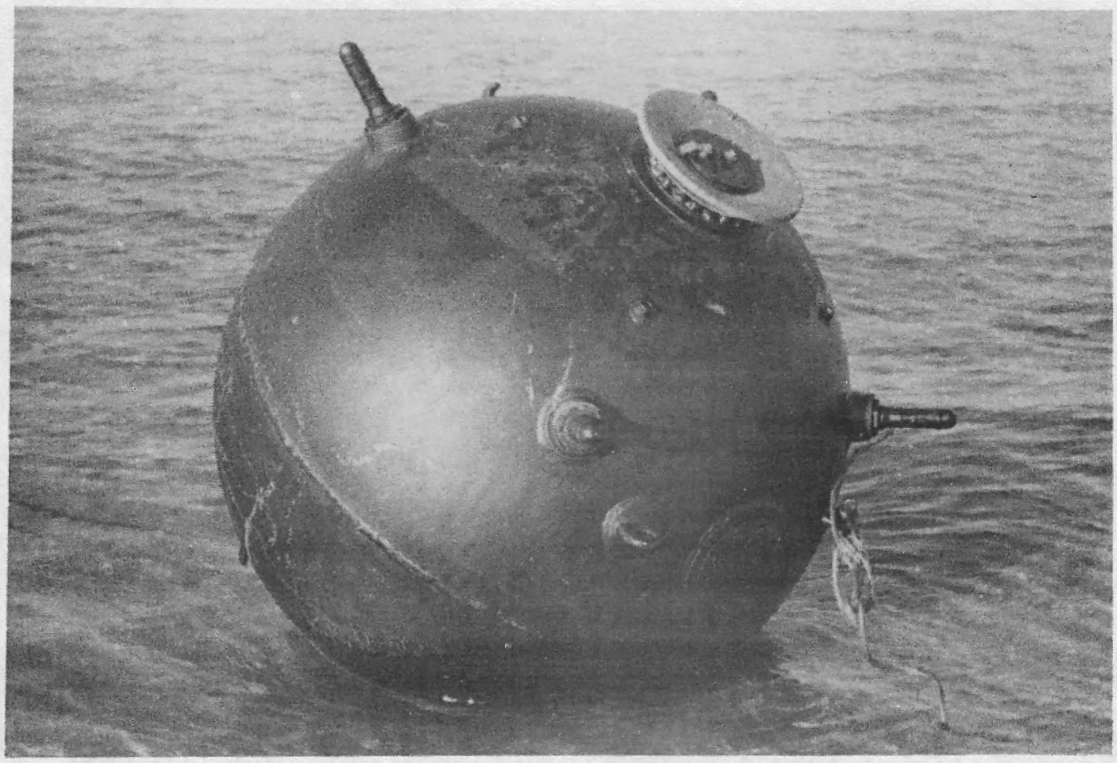


The first enemy antenna mine is sighted

Seeing that Speirs was longing for a job on his own, I told him to go and unshackle the wire off the dan and to get away clear while the drifter weighed the dan. The slack wire on bottom held the mine rather close to the dan and also the tide was running pretty hard. Spiers got well up tide in tow of the "Frons" but then, instead of keeping his boat stemming the tide and dropping down to it under control, he turned her across tide and went straight for dan. I saw with horror what was going to happen. They made a wild snatch at the dan and missed it and I next saw the boat heeled on her beam ends while they all rushed to one side to hold the mine off. Speirs adopted the technique used by the Canadian cow boys when rednering bullocks safe: he seized the mine by the horns and held it while another brave made fast the boat's painter to one of its lifting eyes. I felt my stomach gradually settling back out of my throat as I saw the boat drop astern on the end of the painter. I made him a signal "Do nothing till I come" and went across in "Cypress's" dinghy. We soon got the job sorted out and mine in tow of "Frons Olivae" for Ryde Sand.

The chaps had a bit of a shock but were quite ready to man their boat again to repeat the process.

8th September. I went out in "Cedar" with "Pine" and "Frons Olivae" in company. "Cedar" carried port cutter grabber gear and "Pine" starboard.



Safely ashore

The two mines had given us a rough line about N. 40° E., S. 40° W., so I sent Speirs in "Frons Olivae" to lay a dan 2' N. 40° E. from dan marking No 2 mine.

I then swept S. 40° E. leaving dans to port and working against the tide for 1½ hrs., then turned down tide to sweep leaving dan again to port. "Pine" turning "against" her gear took a big circle and was nearly round when she exploded a mine in sweep. Ten minutes later we did the same. I didn't like the look of it much as tide was getting near low and beginning to slack and I formed the idea that these mines were pretty close to the surface. I held on till I could clear the N.E'ly dan as I was afraid "Pine" would sweep it and then was glad enough to turn out N.W. and get clear.

"Pine" got in her sweep without incident but when our cutter grabber came up there was a mine sitting on it and making digs at the ships' side with its horns. Cundell, the Sub., ordered "Veer away" pretty quick and we then went full ahead and the mine came off clear. We found that the cutter grabber had fired but had not

released owing (as we discovered later) to 2 or 3 threads being left in clearing holes of shearing pins. The mooring had cut and so had the rubber insulation but a few wires of the antenna braiding had passed through the cutter and held there and this had held the mine. Mooring wire had pulled out of grabber leaving some wires behind. It was bad luck as, if it had cut clear, even without releasing, we should have seen the mine float up and should have stopped the hove in and would probably have had sinker. Sunk the mine and went home. I went to Fuckpool later and took clock out of No 2 mine, burnt the charge and brought back the case.

The next week or two various things stopped us - weather, anti-invasion requirements and sweeping commitments. I had three or four days sweeping towards the end of the month, working with two trawlers and two danners. We covered a good deal of the area without getting a mine and then I had to go off elsewhere and leave it.

I returned from Falmough on 17th October and the next day got a report of a mine on the surface at sourthern end of line. I borrowed a trawler and a drifter and went to have a look but the mine wasn't watching. Next day I took "esmeralda" out to try to ping it but weather came on rough and we failed.

Monday 28th October. I went out in a fast motor boat and had a good search at low water slack but couldn't find the mine, so I went on board "Cypress" off St. Helens to be ready for the next day's sweep.

29th and 30th October. Sweeping in "Cypress" with starboard cutter grabber gear with Portsmouth Flotilla but didn't get a bite. The ship ahead got two mines but none came our way and the operation closed.

Three times we were very near scoring during the job, which was spun out over a long period.

These antenna mines were found to be fitted with the most beautifully made and intricate clocks, used in these mines to blow them up after an interval. The mines off Portsmouth were set to blow up on 15th September. This date had some significance in view of invasion threats.

HMS "MIRTLE"

No mine stripping could be allowed in "Vernon" after the explosion on 6th August, and immediate action was taken to find a suitable investigation range in the vicinity of Portsmouth. Hayling Island was tried first but was never very satisfactory. We tried a large bunker at the Portsmouth end of the golf course first, and later took over the yacht club at Sandy Point. Then we went to Paulsgrove chalk pits behind Wymering race course. Bombs were dropped pretty close the very first night and that was not encouraging. Finally we took over the disused lime works near Buriton and the necessary work to house the X-ray unit was pushed ahead. A name was required for this "hush hush" establishment and "Mirtle" was the most pleasant name we could think of beginning with MIR (Mine Investigation Range).

For many months following, the investigation and stripping work proceeded at "Mirtle" day in, day out, and often far into the night. Soon corpses, stripped of their mechanisms lay in unattractive rows. This number grew at an alarming rate. At last an urgent call came for empty mine shells and this, together with our own uncomfortable feeling in the presence of so much explosive, led to a grand steaming out week. "Mirtle" was invaded by numbers of unearthly looking machines and teams of busy enthusiasts. The explosive ran away in molten streams; the empty carcases were stored for trials or taken away for scrap.

"A grand steaming-out week"

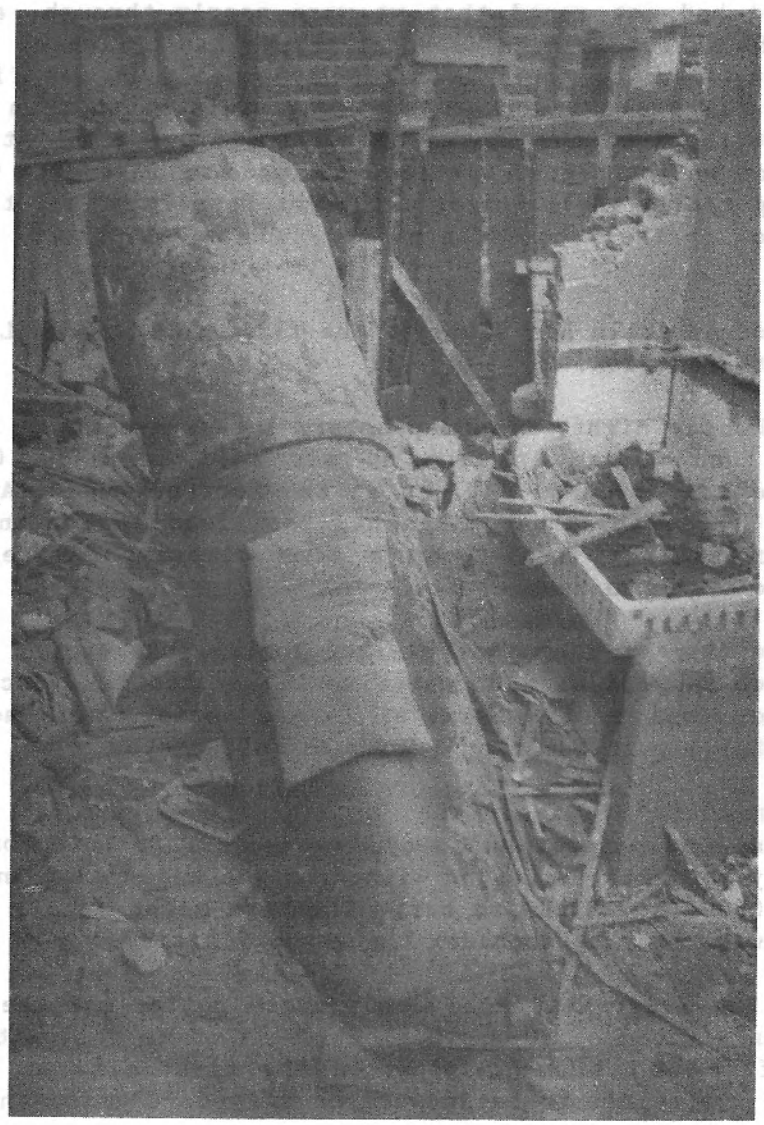
London Mined

In the middle of September, 1940, the Germans dropped mines on London. It was a devilish way of spreading terror and destruction. Fortunately, however, a large percentage of them did not go off and could therefore be rendered safe.

The use of mines on a large scale for destroying our towns and terrifying the people had not been envisaged; an organisation had to be created rapidly to deal with the unexpected development. Until this organisation could be created, "Vernon" helped to fill the breach. Commander Thistleton-Smith relates his experiences of the first 24 hrs:-

> For reasons not wholly unconnected with the possibility of a crisis I decided to spend the week living in "Vernon". The Captain always generously put a bed at my disposal when I felt like that.
>
> It was about four o'clock on Tuesday morning when I was awakened with a signal from FOIC London requesting the removal of three magnetic mines from Edmonton in North London. Further telephone messages informed me that about two thousand people had been evacuated from the area, that everyone was in a bit of a panic and a mad Irishman had already tackled one of the mines.
>
> I decided it was a job for our 1st team and that a few stripes would be advisable to take the responsibility. Armitage, Hodges and I thereore set out in a Dockyard car as soon as we could get the necessary tools, etc together. We were met by a police escort on the Great West Road and piloted through North London feeling very important. On our way we passed the remains of a German aircraft on Brentford Green. A banner flying over the top shouted "They bombed our borough. Help to bomb theirs". And the money rolled in.
>
> One unexploded mine had fallen fortunately on some hard tennis courts in the centre of a recreation ground. It lay entangled in its own parachute and was obviously a Type "C" mine. The other had fallen in the tiny backyard of one of a row of small houses. It had smashed the roof of an outhouse and buried itself in the floor. The bomb fuse was visible on top of the mine, and there was a nasty smell around from broken pipes. The mine hand landed just outside the back door. The little kitchen showed signs of a hurried exit. The table was still laid for supper. A dish of tomatoes and dirty plates were still in place. A thin layer of dust covered everything. I left Hodges there to make preparations and proceeded with Armitage to render safe the tennis court mine. All went smoothly and the explosion of the bomb fuse shortly after its withdrawal did not bother us.

At the other mine Armitage attached the withdrawal tool and took off the keep plate without accident, finally withdrawing the bomb fuse with a line rigged over a wall and out into the street through a narrow alley. After this there was the job of getting the mine out into the street. This was successfully done by the demolition squad of the local ARP. They were a tough lot and had been waiting near-by during our work, straining at the leash. As soon as we gave the word, they were at it, soon surrounded by falling bricks and a cloud of dust. It took them two hours to dig out the mine, clear a way for it, and finally to bring it out into the street on a trolley.



"The mine had landed just outside the back door"

Meanwhile Armitage and I had our sandwiches and two pints at the local pub and returned to the tennis course mine. Hodges was attempting to load the mine on a lorry using the breakdown van from the local garage. This van belonged to an enthusiastic little man. For one brief moment he was on important work and he was making the most of it. But the lifting crane on the van bent under the strain and the little man went disconsolately away, the limelight passing to others. By five we had the mine dumped on Chingford Common. By five-thirty Armitage and I were surveying the damage done by the one that went off - a sorry sight. At the ARP Headquarters we found its tail cap and the remains of its parachute. The controller there was glad to see us.

By six we were doing the final rendering safe operations on the mine now dug out, and it was loaded into the lorry. By this time word had got round that we were nearly through, and at each end of the street a large crowd of people had collected in the hope of getting back to their houses. Eventually it was finished. I lined up all the ARP workers and congratulated them on their good work. We received the thanks of all and drove off. At the end of the street we got a good ovation. It made us feel that we had done something really worth while; I thought happily of all those people going back to their homes in safety, and we slept most of the way back.

Lieut. Hodges tells his story of the first few days in London until he was put out of action:-

On Monday night, 16th September, I happened to be Duty Mining Officer, and coming in from an air raid alarm at 0345 got a telephone call from an Officer at the Port of London Authority to say that three parachute mines had been laid in London. One had been successfully tackled by a bomb disposal officer and they though we ought to know.

Here then at long last was the logical use of the deadly bomb fuse which many of us had feared would in time be launched against polulated areas by the Germans. These three mines had failed to fire. They lay in Edmonton (two) and Walthamstow.

Commander "M" was in the Captain's house, but it was hard to waken him; but he soon got away fast and after telephone calls to Admiralty he left for London with Armitage and myself and necessary gear by 0800 in a Dockyard car. The work might entail new methods and "M" was ready to shoulder the responsibility.

In the Great West Road motor cycle police met the car and we agreed on a speed of 40 m.p.h., but declined to follow them against the traffic lights. We inspected the first mine at Edmonton by noon and I was left to begin work on a Type "C" mine that lay in a kitchen.

"M" and Armitage went to the second and I got to work. A shoe brush was handy to clear the grit from the bomb fuse, an easy chair made a splendid nest to pull the bomb fuse out into, the laying of the line easy and 'The Hide' reasonable. I fixed the withdrawal gadget and loosened the keep ring and awaited the others' return.

Meanwhile on a hard tennis court the bomb fuse of the second mine had fired on withdrawal, but they were well positioned and Armitage completed the job safely. "M" decided that on his experience Armitage should tackle the first also, so we swopped over and I was left to supervise the removal of the second mine. The ARP squad was good and co-operated very well, though momentarily dismayed by the overloading and bending of their crane derrick.

We then took the mine to Chingford Marshes where a sort of mine dump was formed.

The ARP squad, quick to learn, then did their par-buckling again on the other mine. Our part in this by now had merely to be that of "cheer leaders", and "M" had a word of praise for them which went down well. At 1900 we drove off amid a cheering crowd who swarmed home to prepare their suppers.

We dined at the "Cricketers Arms", Bagshot, and reached "Vernon" at 2300.

On Tuesday night Armitage was the Duty Officer to be dragged out of bed by a report of more parachute mines in London. He dug out "M", who arranged for a party consisting of Lieut. Speirs, Sub. Lieut. Wadsley and myself to leave under the command of Armitage in a Dockyard car at 0800. We reported to Admiralty and found the work already started by Lieut. Commander Ryan and Commander Obbard, who had come up from Chatham to help.

We were detailed for work and put into Admiralty cars and sent off, and agreed to work without safety horns.

Speirs came with me and we had a good trip. Our first lay at Woolwich and we found it already dealt with by Sub. Lieut. Danckwerts - a former pupil of mine at school - and we merely completed the job by removing the clock. Armitage and Wadsley joined us, having had the same experience. We all agreed that we were in luck and Armitage left to warn Admiralty to get in touch with Danckwerts lest his keenness should bring him to grief, while we arranged for the removal of the two mines. In the case of one at Kidbrooke Park an old lady (she had paid her rates and taxes) insisted on seeing inside the mine, and could only be persuaded to go away, unbrella and all, by a policeman. This was a typical instance of the amazing fortitude of the Londoners which none of us will forget.

Speirs and I left for Swanley, where he had his "first net" with me, and we dealt with a Type "C" mine that had crashed by an Observation Post hut to their great discomforture. Here we used the parachute cords to make our safe distance rope.

We then left for Dartford where Speirs carried out the operation on a mine that lay in an old quarry. It was now dark and we got in touch with Admiralty and were told to stay out of town for the night.

On Thursday we reported to Admiralty by 1030 and while getting our orders Armitage and Wadsley arrived to say that a Type "D" mine on which they were working near a building had fired but they had got clear, Armitage having been knocked down at about 30 yds. This report was made calmly and further he said they were both ready to continue work.

Speirs and I were detailed for work on two mines at Hammersmith, one in Barnes and another in Willesden. I had a talk with Armitage and agreed to try the safety horns if possible. We went our several ways, Ch PO Godwin coming with us.

At Hammersmith one mine had fired on falling and we went to the other in Loftus Road. This lay jammed on the front staircase with the bomb fuse most inaccessible. Speirs and Godwin removed the detonator and we then prepared a "Hide" in a basement across the street, cleared the way and I walked over the course before tackling the bomb fuse. It proved simple, the fallen plaster over the fuse came away easily, a hair brush was handy to clean off the threads of the fuse, etc and it came out just nicely; though I was nearly slain a minute later by a brace of falling slates. We left for Barnes, sending back Ch PO Godwin and the driver to take their lunch and supervise the removal of the mine.

In Clifford Avenue a Type "D" mine lay on a Metropolitan Railway bridge. Here as usual the Police were excellent, and all houses were already evacuated for 1000 yards.

The mine lay in the gutter with the bomb fuse underneath. The carrying lug was a modified pattern. Speirs took out the detonator while I stuffed the parachute round the mine to prevent it rolling over on us, and then tackled the clock keep-ring. It was stiff and I began to tap it round with a punch, heard the bomb fuse whizzing and we ran for it. Speirs ran about twice as far as I did and the mine fired as he touched down. I lay 35 yds. from the mine and so got shaken up by the hot blast, and remember that Speirs was admirable and that he got a good report through to the Admiralty. He also arranged for me to go to Richmond Hospital suffering from shock and a discharge from the ears and feeling bruised.

Speirs then proceeded to Willesden to investigate and carried on for the remainder of the week.

It was a fortnight later that I learned that Ryan and several others had been killed, including Ch PO Ellingworth with whom in January I had tackled my first mine.

On Thursday, 19th September, C in C Nore, was asked to release Commander Obbard from his duties in charge of the Torpedo School at Chatham in order to help in the RMS work. Obbard wasted no time in getting busy. He relates:-

I left Chatham at 1800 that day in my own car. I took with me Chief Petty Officer Ambrose, one of my Staff Instructors, and the necessary tools, and crossing by the Gravesend Ferry made for Southend.

Southend was not reached until dark and the night was spent there. The following morning we left early and dealt with four mines which had been dropped as follows:-

At Cold Norton

Two German Type "C".

At Chelmsford

One German Type "D".

In the neighbourhood of Epping.

One German Type "C".

The usual tools supplied to render safe magnetic mines were used throughout these operations and those on the following day. I was not, however, in possession of the "bulb horn" used for extracting the bomb fuse. Consequently all bomb fuses were withdrawn by a long length of "sailmaker's" at the end of which was a "noose" with a grocer's hitch had been made. This noose fitted over the threaded portion of the bomb fuse and was then drawn taut.

The Military at Cold Norton were very keen to lend a hand but their real use was in the provision of guides, as all signposts had been removed on account of the Invasion Scare.

Just after the second mine at Cold Norton had been rendered safe, a parachute was seen descending and a real point-to-point ensued. Entrants were mounted on Army cars, lorries and motor cycles. Much to my regret I did not see the end of this race, as I got away with a bad start, both Chief Petty Officer Ambrose and I still having the primers and detonators of the mines in our possession.

Chelmsford was reached later on that day and here the Superintendent of Police was not at all helpful. No guide was provided to find the mine and I was regarded with the greatest suspicion when I returned and deposited the detonator and primer in his Police Station.

At Epping, however, the Superintendent of Police was quite a different character. He received us with open arms and personally conducted us to the mine. This entailed almost a mile walk as cars had to be parked on the roadway to prevent them becoming bogged.

No other mines had been reported in the Epping neighbourhood, so after a late cup of tea at the Police Station, I left Chief Petty Officer Ambrose to the hospitality of the Police and proceeded to London to report to DTM. Actually I already had what is known as a date in Town that evening, so I managed to combine business with pleasure, reporting in person.

Saturday, 21st September, was a really good day. I returned to Epping and collected Ambrose again. He had been looked after ery well by the Police and had been lodged in the women's cells for the night. Ambrose told me he had achieved one of his life's ambitions as he had been called that morning by a policeman with a cup of tea.

More mines had been dropped the previous night and there were now six unexploaded in the Epping district. These were all German Type "C" and were all dealt with that day. There were only two, however, that proved interesting.

Found in London

One had been dropped in a tank trap at Lodge Road, Upshire Turning. It was standing vertically and was embedded in the clay. In consequence minor digging operations had to be caried out to obtain access to the bomb fuse. The fuse and gaine fired on withdrawal, which gave quite a thrill to all concerned, especially the Police.

The other had been dropped on the railway embankment at Stonards Hill, Epping, and was lying between the permanent way and the edge of the embankment. The German ground staff had carefully painted on it "Aus Liebe". The embankment at this place is between fifteen and twenty feet high and the mine was lying so that the bomb fuse was not accessible. Rolling the mine inboard, ie towards the permanent way, did not give access to the fuse either, as the mine fouled the railway line before the fuse became clear.

Consequently the mine had to be rolled outboard, and although the greatest care was exercised, the mine took charge of both of us and rolled down the embankment. I will say that Ambrose and I wasted no time in sliding down the disengaged side of that embarkment. However, the result of this accident was not disastrous. I was not quite certain about the state of my personal linen, but after a pause in which we both smoked a cigarette, the mine was rendered safe.

I returned to London that evening and reported to DTM the following day. I had to return to Chatham straight away, otherwise I have no doubt I should have had several more days of this RMS work.

The London pioneers were honoured for their courageous work by HM the King. Armitage, Ryan and Danckwerts received the George Cross; Hodges, Wadsley, Speirs and Obbard received the George Medal.

The days immediately following the initial mining of London were days of intense and never-ceasing activity. Many volunteers were obtained from "King Alfred", instructed by Ouvry, provided with tools and sent off to the first line. The Mine Design workshops were busy most of the night in an effort to provide the tools. Tragedies occurred, lessons were learned, new methods were thought out and new tools made. An organisation of RMS officers and ratings was set up at the Admiralty. Captain C N E Currie, RN (ret.) was called in to take charge and "Vernon" was eventually relieved of the responsibility of dealing with mines of known type which had not been covered by water.

The Fable of the Mine and the Experts

After this there were really three organisations interested in the recovery of mines, ie the Admiralty RMS section, "M" department "Vernon", and the Mine Recovery Flotilla. In addition, there was the Torpedo and Mining Department information and intelligence section who frequently sent scouts to follow up information received, and, of course, the various Shore Command RMS Officers. These many organisations, all manned by exceptionally zealous officers, often led to some confusion on the spot, as is demonstrated by Commander Hamond in the following story:-

Once upon a time there was a Hun whose name was Fritz. He was a pilot of the Junkers 88 or a Messerschmitt or a Focker Wolfe or some other darned thing which carried mines anyway.

Fat Herman sent for him and said "Heil Hitler!" Take your machine, Fritz, and on the Verdampt Englanders your mines drop, is not?".

Fritz said "Heil Hitler! I them ge-droppen will". So he flew to England where he found guns that fired at him; so that, being unaware that their shells would invariably burst several miles behind him, he became afraid.

He therefore pulled the plug and returned to Hunland to report that he had obtained direct hits on the target, for which he was awarded the Iron Cross and thus passes out of the story.

One of his mines fell on a desolate part of the Essex coast at a point where the salt marsh meets the sea wall, where it was found next morning by an old shepherd.

Some days later he mentioned his discovery in the "local" and after much discussion, the telephone wires began to warm up with urgent priority calls.

After a suitable lapse of time the rough marsh track became congested with unwanted car traffic, and the marshy shore was soon thronged with earnest young men in various grades of Naval and Military uniform.

The first to arrive was a soldier who was marked BDO. He approached the object and was about to plunge the tool he carried into its innards when there was a cry of "Stop!" Up rushed a perspiring officer in the uniform of the Wavy Navy who said, "Don't touch it. It is not a bomb but a mine. It is on the high water mark and therefore belongs to DTM. I will deal with it".

As he spoke there was a rattle of chain cable, and a drifter anchored off the edge of the mud flats. A dinghy came up the creek from which disembarked an old man of rough appearance, with a grey beard, whose language was so foul and whose lack of coherent thought so obvious that the contestants welcomed the next diversion.

Over the sea wall appeared a tall Australian who carried a short length of chain, a ball of string and an aggressive manner. "I am about to test this mine with my little chain", he said, "so you birds had better buzz off. The mine is below high water mark and is therefore the property of "Vernon".

During the altercation which followed, no one noticed the arrival of a small man wearing RNR stripes, until the rasping accent of Clydeside drowned the exciting din.

"Gentlemen", he said, "Ye may go, I am the Mine Watching and Dock Clearance Officer. In my view this may be regarded as a dock area, and with your permission I'll watch the mine.

At this the row broke out again with devastating intensity and the situation showed signs of assuming threatening proportions. "Evacuate to one thousand yards!" said a loud and authoritative voice.

The newcomer was a Lieut. Commander, RN., whose open jacket displayed a revolver securely harnessed to his left armpit. He was followed by myrmidons carrying kits of gleaming tools, explosive charges and coils of cable. He surveyed the silent group with an air of conscious superiority. "I am the RMS Officer and my district extends from the Thames to the Mississippi. My name is -." As he breathed it a gasp of awe came from the throats of the assembled experts.

"Do you regard this mine as washed up on shore? asked the grey bearded old ruffian.

At this pandemonium broke loose, every one shouting at once, "The mine's mine".

Meanwhile the mine had not been consulted. Its bluff inscrutable face was buried in stiff clay and the smile which spread over its homely features was invisible to the contestants, even if they had not been too busy to look for it. Neither were they aware of the internal laughter which was ever so slightly disturbing his innards. The din of battle drowned a slight buzzing which came from a small growth on his left side.

The explosion shook the pub two miles away and caused the beer to slop over the edge of the pint pots. "Touched 'ee off then" grinned the old shepherd.

Fritz's next cargo was quickly dealt with by an entirely fresh organisation.

The Discovery of an Acoustic Mine

The following is an extract from Commander "M's" report dated 5th November, 1940:-

On the night of Sunday, 27th October, a mine was dropped by an enamy aircraft in about 25 ft. of water at the entrance to the river Ogmore, near Porthcawl in South Wales. The mine dried at the subsequent low water and was reported by the Flag Officer in Charge, Cardiff. It was first investigated on Monday, 28th October, by Lieut. Commander Chapple, DSC., RNVR (Unit Officer of 3rd MR Division), who was on leave at Cardiff, and later that day by Lieutenant S Baker, RNVR and Sub. Lieutenant P A Cummins, RNVR., who had at once been sent down from the Admiralty (DTM Dept.) to render safe.

2. The mine appeared to a normal Type "C" aircraft-laid mine, its number being L d335. The double letters before the number had not been found on a mine before. The primer release mechanism was seen to have failed; the ring of its safety gear was still in position, although the safety fork had been withdrawn.

3. At low water a.m. Tuesday, 29th October, the bomb fuse, detonator, clock, and finally the primer with its release gear were taken out in accordance with normal procedure by Lieutenant Baker and Sub. Lieutenant Cummins. The detonator was found to have fired, but the primer, not having been released, was intact. The clock was Mark I (no soluble plug) and was found to have behind it a nin-volt battery similar to that recently found in several recovered mines. Previously where this battery has been fitted the mine had been found to have no actuating unit, the battery being wired up to fire the detonator as soon as the clock had run off. Used in this way, four electric leads led to the clock, but in this particular mine, six leads were found.

4. The mine was recovered from the beach after the rendering safe procedure had been carried out, shipped in a lorry and sent to HMS "Vernon" on Wednesday, 30th October. It arrived there that evening and was sent out to the X-ray photography range at Sandy Point, in order that work could start on it the following morning.

5. On Tuesday, 31st October, the six-lead clock, bomb fuse and primer release taken from the mine arrived in "Vernon". The examination of the primer release showed that the primer had not been released owing to distortion of the top of the release spindle. Examination of the clock together with the initial X-ray photographs suggested that the mine was of a new type.

6. Heavy rain on Thursday seriously hampered X-ray work, but Friday, 1st November, was a better day and considerable progress was made. Examination of the photographs by Lieutenant Armitage, HMS "Vernon" and Mr Walden, Mine Design Department, suggested that:-

(a) The arrangement of gear inside the unit compartment bore little resemblence to previous aircraft mines.

(b) The compartment was fitted with "prevent stripping" mechanism, ie an auxiliary charge fired electrically on removal of the rear door.

(c) A clockwise mechanism, possibly similar to the rendering inert mechanism or period delay mechanism recently found in enemy aircraft mines, was attached to the unit.

(d) An opaque mass was situated in the middle of the compartment.

7. The recognition of the clockwork mechanism led to further intense listening. Both Lieutenant Armitage and Mr Walden considered that when listening alongside the pocket of the main clock they could hear an irregular high-pitched and very faint click. This was reported to me on Friday evening. Previous to this no ticking had been heard even using headphones.

8. In deciding on the best action to take the following facts had to be borne in mind:-

(a) The clock mechanism recently found in an aircraft-laid mine could be set for any period up to six days, and although in that instance it was fitted to render the mine inert after a set period, it could be easily adapted either to make the mine active or explode after this set period had run off.

(b) The main detonator having fired and X-ray photography having failed to locate any other primer in the main charge, there was no object in attempting to remove the main charge explosive. If anything blew up, it would be an auxiliary charge.

(c) The mine had been laid on the night of Sunday 27th/Monday 28th October. If the clock mechanism found by X-ray had the same period as that previously discovered and was used in this instance to fire an auxiliary charge, it was clear that the unit would be destroyed some time before the night of Saturday 2nd/Sunday 3rd November.

9. All things considered, it seemed best to make full use of Saturday, 2nd November, ie the following day, in an endeavour to prevent any chance of losing the mine mechanism. I instructed Lieutenant Glenny to take charge of the necessary work under my direction.

10. Listening at the mine on Saturday morning convinced me that a mechanism of some sort was still working, though it was certainly not the normal ticking of a clock. A few very necessary shots were taken of the rear end of the compartment and arrangements made to cut a hole as quickly as possible.

(a) To render safe the PSE auxiliary charge.

(b) To see where the ticking came from.

11. The mine was therefore moved out to the investigation range by lorry without further delay and a 4-inch diameter hole cut over the auxiliary charge. The detonator was successfully removed and it was confirmed that a clock was running in the compartment, though it could not be seen where this was situated.

12. The second hole was then cut over the end of the battery mounted in the rim of the unit frame in order to be able to sever the leads. This was done satisfactorily, and it was then felt that little chance remained of the clock mechanism initiating any electrical destruction device. This second hole gave us a glimpse of a clockwork mechanism similar to the previously-found rendering-inert mechanism. A hole was therefore next cut over this clock mechanism. This operation necessitated a hole being cut in the rear door between two of the fins. Special adaptors had been made to support the cutting machine in this position, and the result was very satisfactory. This hole led to the discovery of two additional batteries. One of these batteries accounted for the large black mass shown by the photographs in the centre of the unit, and the other consisted of two small torch batteries. Both these were rendered inoperative by disconnecting the leads.

13. On taking off the tail parachute casing to get at the rear door the parachute housing was examined. A screw was found located in the centre of the rear door under the soluble plug attachment. A similarly placed screw had only previously been found in the Type "E" mines found at Piddlehinton and North Boarhunt, where subsequent reconstruction showed they had been fitted in connection with the operation of a mechanically-operated destructive device; this discovery renewed fears of a similar device in this mine, though the photographs of the rear end of the compartment showed no signs of it.

14. By this time it was dark. Rain had fallen continuously the whole day, and everyone was drenched through. The clock was still ticking, but there was felt to be little or no chance of it being able to explode the main or any auxiliary charge, and operations were concluded for the day.

15. On the morning of Sunday, 3rd November, the clock was still ticking. A further hole was cut in the rear door in order to find any evidence of a mechanically-operated destructive device. On returning to the mine after this cut had been made it was noticed that the clock was no longer ticking, and considerable relief was felt. The hole showed no sign of any further destructive device and the work of taking off the rear door therefore proceeded. For this operation the special gear designed for holding the after door tight while the securing nuts are withdrawn and then releasing and pulling it off from a distance was used with success. Finally the whole mechanism was withdrawn from the compartment and dispatched about 1300 to the Mine Design Department for investigation. This mechanism was all mounted on a disc fitting in the fore end of the compartment, with the exception of a microphone mounted on a bar welded across the dome to the rear door. Rain had again fallen continuously throughout the forenoon, but this had failed to damp anyone's enthusiasm.

16. Examination has since shown the unit to be acoustically operated.

17. The investigation of this new type of mine brings to a successful conclusion the special work which commenced in August, 1940, when the recovery of a mine fitted with mechanism to prevent it being stripped was first discovered under tragic circumstances, and the laying of the "booby trap" mine at Piddlehinton and North Boarhunt led to the suspicion that the enemy was about to use a mine of new type housed in a similar shell. Since then efforts have been unremitting in order to recover and investigate mines laid by the enemy; new methods of investigation including the use of X-ray photography and remote controlled trepanning machines have been applied. There have been many disappointments, but much experience has been gained and this experience was an immense help when, finally, the acoustic mine was found.

The successful investigation of the acoustic mine was an event of outstanding importance, second only to the original discovery of the magnetic mine. Since early September there had been many "unexplained" explosions and casualties all pointing to the use by the Germans of a new type of mine, but little could be done to combat it until more positive information was obtained. The discovery in early November provided that information and it was not long before we had an adequate sweep to deal with the menace.

So 1940 drew to a close. Comparative calm succeeded weeks of stress and strain and enabled the organisation to be strengthened and methods of work to be reviewed and improved. We felt on top of the enemy and had every intention of staying there; and we looked forward to the future with a confidence founded on hard won success and keen determination.

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