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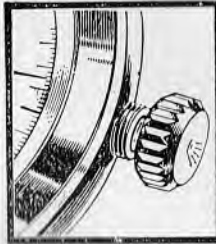
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Contents

EDITOR'S NOTES	3
DIVING WORK ACCOMPLISHED IN 1965	4
WORDS FROM 'WHITBY'	5
DIVERS AND THEIR BONES	6
COMMERCIAL DEEP DIVING	7
H.M.S. 'PALLISER' REPORT	9
ADMIRALTY EXPERIMENTAL DIVING UNIT	11
U.S. NAVY DEEP SUBMERGENCE PROGRAMME	13
H.M.S. 'HECLA' DIVING NEWS	13
DIVING WITH THE GHANA NAVY	15
H.M.S. 'ROTHESAY' — DIVING IN THE WEST INDIES	17
NARCOTIC MANIFESTATIONS	19
H.S.C.D.T., H.M.S. 'DINGLEY'	23
R.N. DIVING SCHOOL OPEN DAY	25
SCOTLAND COMMAND DIVERS DINNER	29
'CENTAUR' DIVING	31
DIVER'S EFFICIENCY	31
THE BLACKFRIARS BOMB INCIDENT	33
H.M.S. 'ALBION'	34
SALVAGE OF THE FUTURE	36
WHAT TO DO WITH THE DIVERS	37
PROMOTIONS AND ADVANCEMENTS	40
NEWS FROM BOSSINGTON	41
TIN FISH	41
A BRIEF SUMMARY OF THE HISTORY OF THE TORPEDO	42
MORE ABOUT SHARKS	44
THE NATIONAL UNDERWATER INSTRUCTORS ASSOCIATION	45
LETTER TO THE EDITOR	48
FOR THE VERY OLD DIVERS	49

R.N. Diving Magazine

Vol. 13

Spring 1966

No. 1

EDITORIAL STAFF

<i>Editor</i>	P.O. R. NEAVE
<i>Treasurer</i>	S/LT. J. E. THOMPSON

EDITOR'S NOTES

A PART from having survived the move to our new quarters in Creasy (W) building, a Sub/Smash exercise when several poor unfortunates were dragged screaming from their R.A. beds to go to sea with the duty Tug and duty Destroyer. This has been a fairly quiet Spring Term.

Divers Dinner

Following a questionnaire being circulated around the Diving World it has been decided to bring the date of the Dinner forward to October. The exact date will be made known later.

Horsea Island Open Day

In keeping with the Navy's policy to encourage civilian interest in diving and diving safety, the Diving Section of *Vernon* is holding an Open Day at Horsea Island on Sunday 22nd May.

The centre pages of this volume have been devoted to the programme of events and a line drawing of the lake.



Diving Work accomplished in 1965

by

B. HOLFORD, W. BLACKNELL, M. VINCE AND B. THAIN

Fisheries Laboratory—Lowestoft

IN March, 1965, the diving team of the Ministry of Agriculture, Fisheries & Food's Fisheries Laboratory at Lowestoft became operational. The members of the team are Bruce Holford, Warren Blacknell, Martin Vince and Bernard Thain, all having been trained at H.M.S. *Vernon*. Lowestoft is situated on the east coast of East Anglia where unfortunately diving conditions are far from ideal, the visibility rarely exceeding two feet, so most of our diving had to be carried out elsewhere.

In 1964, before the team was formed, Bruce Holford had already done some diving for the Laboratory, filming the action of seabed drifters and trawls on the seabed. The first task to be undertaken in 1965 was to place a continuous temperature recorder, encased in fibreglass, on the end of a groyne near the Laboratory. This enables the sea temperature to be observed from within the Laboratory at any time.

Our next expedition was to Anglesey in Wales, to carry out a sampling programme in Red Wharf Bay. First of all a general bottom fauna survey was made in about twenty feet of water, using our aquaplane which is towed behind the research vessel *Tellina*. Penetration into deeper water was hindered by the poor visibility, a condition not unfamiliar to us. Seabed samples were then taken, both by grab and by core samplers, i.e. perspex tubes which were hammered into the seabed. It was then decided to compare a normal grab sample with that taken

by a special suction apparatus constructed by the team. This apparatus consists of a tube, running from the boat to the seabed, which is joined (at about two feet off the bottom) by another tube leading from a compressed air cylinder controlled by the diver. When the air is turned on it travels up the tube with considerable force. Consequently a suction effect from the tube takes place at the bottom and water with seabed contents is drawn up into the boat. This method was found to be less dependent on the type of bottom than was the action of the grab.

Filming entailed work with a bottom plankton sampler; this is a metal-framed nylon-meshed net which runs along the seabed on skids. It is towed behind the ship, sampling the floating animals living just above the seabed. When the sampler is lowered onto the seabed a door on the net is automatically opened, and when it leaves the seabed the door closes again. At first this operation was not always successful, but after various defects had been discovered and corrected it worked satisfactorily. We also did some filming of a small trawl in action, to see what fish, if any, were escaping from the trawl mouth. An interesting result was found, in that the larger fish escaped more readily than the smaller ones.

Our next dive was a return to the groyne near the Laboratory, to see whether the holes in the seawater intake to the Laboratory were free. This was necessary because, try as the engineers might, they could not

get any seawater up to the Laboratory. The intakes were found to be encrusted with barnacles but still free enough to allow the intake of water. The engineers then had to recheck the whole of the pump system to find the cause of the trouble.

Another expedition took place in September when two of the team went to King's Lynn with Bill Vaughan, the Laboratory's authority on seals. We donned our wet suits and travelled by boat to one of the many sandbanks in the area. Our target was in fact a herd of seals which were basking and swimming about one mile away. We decided to leave our S.C.U.B.A. sets behind and just use snorkels. We then swam towards the seals, trying to imitate them as best we could, and managed to approach to within 15 yards of them in the water, the seals being very curious as to what we were. As the majority of the seals were on top of the sandbank we tried to crawl up

to them, and in this manner we managed to approach to within 25 yards of them before they made their escape. This proved that seals can be approached successfully using this technique, a fact which will no doubt prove valuable when observations and captures are required.

Our last task this year was to pay another visit to the end of our groyne and nail in place a piece of plastic, said to be proof against fouling, to see whether it is resistant to barnacle attack. The result will be known later.

Next year much the same type of work will be carried out. We are all hoping that we can obtain more experience perhaps diving deeper and with better visibility, so that the scope of our work can be increased.

Finally, we would all like to thank the instructors of H.M.S. *Vernon*. Our confidence and knowledge of diving are most certainly due to their efforts.

Words from *Whitby*

NOW that *Whitby* is on her way home again from a Far East commission, and almost safely through the Canal, a few words from the divers may be of interest. Led by our Captain, Commander J. G. Wemyss, R.N. our diving team has generally been 11 strong, who were:

Lt. H. H. F. F. Thurstan
Lt. I. P. Whatley
Sub.-Lt. J. E. S. Thake
L. Sea B. Richards
L.R.E.M. P. Worley
A.B. G. F. Mallott
A.B. E. J. Hills
A.B. M. J. Nicklin
A.B. I. K. Major

A.B. P. Shepherdson
A.B. P. Houghton

Of these Messrs. Richards and Shepherdson left us to go home to go outside.

Although we have not done anything spectacular (yet!) it has been an interesting commission diving-wise and we have covered a lot of ground. We have dived in four oceans (Atlantic, Pacific, Indian and Southern) and from four continents (Europe, Asia, Africa and Australasia). In short we get around.

Whitby recommissioned in the spring of 1964 at Pompey and after finishing refit, workup and leave,

sailed for the Far East in November 1964. We got sidetracked to Mom-basa for Christmas and New Year. An interesting spot, but not for too long. Incidentally, we had no shark trouble here, although it is reputed to be a bad shark harbour. Away then to Singapore where the ship spent most of January—November 1965 on patrol and exercises.

During this time we had two months away in Tawau (Borneo) on patrol. This is busy diving country for a frigate. On most of our stand-off days anchored off Tawau, a minesweeper or patrol boat would arrive with a foul screw to be cleared or underwater damage from hitting one of the many floating tree-islands in the area. When the ship only had a few hours stand-off, Sipidan or Sibuan (Battleship) Island were popular spots to visit. These are tropical islands just off the Borneo coast with excellent beaches for swimming and coral reefs for diving. The visibility is good, little tide, amazing coral colours and shoals of fish, and shark-free.

Apart from Borneo patrol, a week in Hong Kong and a few days in Manila, all our time till November

1965 was spent in the Singapore Straits or Naval base. Here one had the usual day and night routine diving training to do, but mud, tide and Indonesian problems do not make Singapore a 'fun-diving' centre.

Since then however we have had a first class visit to Australia,—Sydney, Hobart and Bunbury W.A. The Australians were most hospitable, the beer was great and the visit was definitely one of the highlights of the commission. Some of us dived with the R.A.N. Diving School from Rushcutter's Bay at Sydney and tried out the R.A.N. S.S.B.A., their equivalent of S.D.D.E.—very light and simple and with much to recommend it. We had also met the R.A.N. Mobile Clearance Diving Team before, earlier in the year.

After a memorable Christmas in Western Australia, we are now heading home via the Suez Canal and will be back by the time this is published (I sincerely hope.) Right now, leave is first in everyone's minds and next drafts after that. It has been a good run but we shall be glad to be back, even in mid-winter.

With best wishes from all of us to all our readers.

Divers and their Bones

A number of divers have been expressing their anxiety recently about the condition known to doctors as 'aseptic necrosis of bone.' They fear that they, like some of those who work in compressed air, may become crippled in later life by this form of arthritis which attacks the hips and other large joints. However, like so many things which are not fully understood, bone necrosis is a bogey to divers more by being 'unknown' than by the damage it actually does. The purpose of this

short review is to put it into perspective.

There is no doubt that there is a definite link between work in compressed air and bone disease. For instance, of some 500 workers employed in building a tunnel at Glasgow almost one fifth were shown to have some changes in their bone X-rays, but of these only some three of four men needed a surgical operation. The important finding was that most of these signs of apparent damage were just 'early warnings.'

It is now thought that these less serious forms of bone disease get better even if the patient **continues** to work in compressed air! This sort of effect is the worst that could happen to divers if one uses the yardstick of compressed air workers. But what are the differences between diving and tunnelling? Commercial work in compressed air is done in shifts of up to 8 hours and the decompressions are, by Naval standards, rapid. Their first stop is half the absolute pressure and from there they 'bleed off' at rates of up to 9 minutes per p.s.i. These workers do one such shift every day for months on end. So it can be seen that if, as is thought, bone necrosis is due to relatively rapid decompressions following very long dives, then these commercial workers each have many hundreds of such exposures. In general therefore one can say that a

Clearance Diver just **does not** hazard himself to this degree.

One would like to say that divers do not get bone damage, but there are a few awkward exceptions. These rarities are some commercial 'hard-hat' divers who would appear not to have followed current decompression schedules in the Diving Manual. In fact one patient was a diver who was over 60 years old and who had been getting bends about once a week for 40 years, usually on a Monday! It is because of divers like him that the Navy remains vigilant and bone X-rays have been taken, all of which were normal. X-rays of clearance divers will continue to be taken periodically but I think it is true to say that **no case of aseptic necrosis of bone has ever been reported in a diver serving in the United States Navy or in the Royal Navy.**

Commercial Deep Diving

TWO British firms have recently got together to form a company that will provide divers and equipment for operations down to depths of 600 feet. The system to be used by the divers is an extension of the 'transfer under pressure,' the diver being taken down and operating from a submersible chamber subsequently surfacing under pressure within the chamber and transferring to a decompression chamber on the diving vessel. There is nothing new in this technique. It has been practised by Naval divers for many years but the design of the chamber the firm intend to construct for the purpose, is new. It is a two compartment chamber separated by a watertight door. The upper chamber is normally maintained at atmospheric pressure and accommodates the attendant or an observer. The

lower chamber is open via a hatch to the sea and is pressurised to keep it dry, as for a normal S.D.C. This is occupied by the diver(s). In an emergency the upper compartment can be pressurised to the maximum operating depth of the chamber to permit the attendant to pass into the lower chamber. Both diver and attendant will breathe an oxy-helium mixture.

The use of such a chamber has many advantages:—it allows diving to continue when adverse surface conditions would restrict diving by conventional methods; it speeds up the diving operation; the diver can also decompress in comfort and under direct supervision, and if necessary the diver can carry out a combined dive without decompressing between each dive.

H.M.S. Palliser Report

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WHEN *Palliser* commissioned in January last year, her complement of divers was one Ship's Diving Officer and one Shallow Water Diver. However, volunteers were soon persuaded and one of them, Leading Seaman Lewis, is now going through for C.D. Our activities have been very varied and so have the water conditions, changing from black Port Edgar mud in January to beautifully clear water around the Western Isles of Scotland in September with dives inside the Arctic Circle to relieve monotony. Our greatest field days were at Lerwick where, in one forenoon, we recovered a silver salver dropped overboard in 25 feet from H.M.S. *Penelope* a few weeks earlier, surveyed the harbour bottom for the Harbour Master, under the eyes of a Russian Water Carrier, who were convinced we were somewhat amateurish 'Buster Crabbes,' and then, for a suitable reward, recovered the moorings belonging to a local fisherman, who claimed he'd lost them six months previously. However, as the dive dragged on, the six weeks turned into 3 years, and they were found under two feet of mud.

On another notable day we were in a secluded anchorage in the Western Isles when we recovered 30 crabs in almost as many minutes, topping our Gemini up completely. One of the monsters even managed to grab hold of the fuel line between the outboard and the fuel tank and he took some very gentle persuasion before he let go, fortunately leaving the pipe intact.

Our other activities have ranged from the usual exercises to trying to convince an R.N.R. vicar, the Rev-

erend Talbot, to start converting under-water.

As far as equipment goes, we still are awaiting our S.D.D.E. but have at last succeeded in acquiring D.U.C.S. which is a great help when doing husbandry jobs, but not much use when fishing! Our best asset though is our Gemini which has proved invaluable, as it will easily take our four sets and 5 or 6 men, which necessitates slipping the sets in the water alongside the Gemini.

Being on trickle draft, our major headache has been in training enough divers for a team, and exercises have had invariably to be adapted to suit the number of divers on board at the time. However, after a year in commission we have now received our first Ships Divers not trained from the ship, so the fleet diving programme must be working at last.

On completion of this article in January, the following have at varying times been in the team during the past year—those 'starred' having now left the ship. Those listed with a 'Q' are those that qualified on board:—

- Lt. Taylor S.D.O.
- Lt. Gavin S.D.O. (lent from *Phoebe*)
- L.Sea Crees S.D.
- L.Sea Lewis* (Q) S.D.
- M.E.I. Phillips* (Q) S.D.
- M.E.I. Barnes (Q) S.D.
- Cook Logan* (Q) S.D.
- A.B. Broady* (Q) S.D.
- A.B. Davies* (Q) S.D.
- A.B. Didwell* (Q) S.D.
- L.Std. West (Q) S.D.
- E.R.A.I. Davies S.D.
- M.E.I. Stout S.D.
- L.R.O.(T) Anderson S.D.

Admiralty Experimental Diving Unit



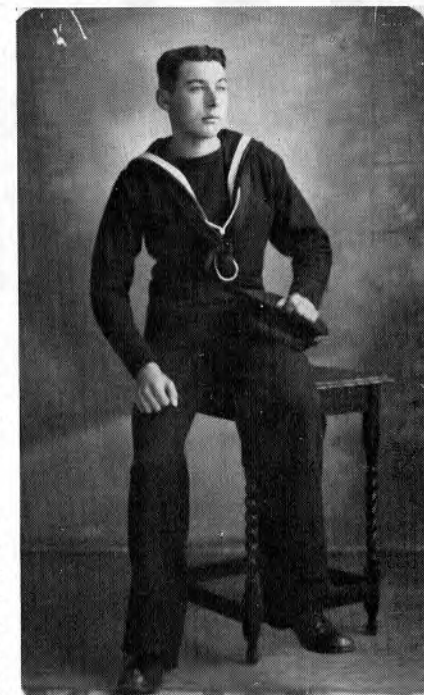
CDR. P. WHITE, Superintendent of Diving, *H.M.S. Vernon*.

CONSIDERABLE changes have taken place in the A.E.D.U. during the last few weeks. I have relieved Morty Drummond and now Commander Phillip White has taken over the chair as The Superintendent of Diving. To many of the old hands like myself it is indeed a thrill to see a qualified Clearance Officer in command. This is not meant in any way to cast reflections on the non-diving Commanders who have looked after us so well over the last fifteen years. Indeed, we thank them for being so tolerant and looking after our interests so well. It does mean, however, that we have a diver at the helm who knows from first hand experience the problems that we have to face. Indeed, the A.E.D.U. should now be in a position to offer help on any aspect of diving, although of course we must aim to operate within our terms of reference.

The editor has asked me to produce a screed to bring you all up to date on the various projects which we are working on. This, I am afraid, is not quite so easy; all our items have to remain classified until they are in production. I can at least tell you that we are now on the final lap of the Wet Suits. I know that they have taken a long time and I agree that it is pretty disgusting, but I can assure you that the delay has not been the fault of the A.E.D.U. I never really appreciated how many people were involved in what would appear to be a very simple shopping exercise.

Anyway, to get back to more pleasant things, at last the new A.E.D.U. building is in sight. With a bit of luck we shall have a respectable centre within eighteen months. As you all know the present building would be a disgrace to the poorest sub-aqua club let alone the

head of all diving in the Royal Navy. What some of the distinguished foreign visitors whom we have to entertain must think of us I hate to imagine.



If any of you have any suitable articles that could be used to give our new headquarters the essential underwater atmosphere I should be delighted to receive them. We shall have three stories and plenty of demonstration areas so get cracking and send us all the amphora, coral and photographs you can—in fact, anything of interest please.

Finally, we are delighted to see any diver who happens to be passing through Vernon and, if you are too far away to visit us, write a letter and let us know how you are getting on.
J.W.



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U.S. Navy Deep Submergence Programme

THE U.S. Navy have embarked on a five year deep submergence programme aimed at improving the capabilities in four major underwater operations. The first, which has already received a certain amount of publicity, is the creation of an underwater dwelling for use to depths of 800 feet, involving the study of the problems created when divers live and work at this depth for prolonged periods. Sealab 2, which was reported on in the last edition of the magazine, is the second stage of this project, the ultimate aim of which is to operate divers on the seabed with a completely autonomous existence for a period of 90 days. The second project is the development of an underwater vehicle which can operate to depths of 20,000 feet, for the purpose of oceanographic observations and the recovery of small objects. A number of underwater vehicles have been constructed by commercial firms ranging from Cousteau's Deepstar to the recently completed Aluminaut, but they do not have the depth capability. Piccard's Trieste 2 is, as far as is known, the only vehicle with an operating depth of 20,000 feet. A detailed list of underwater vehicles

is given in Volume 11 No. 3 edition of the magazine.

The aim of the third project is research into deep sea rescue of personnel from a bottomed submarine. It is envisaged that this will be accomplished by the development of a small submersible vehicle with similar capabilities to that of a submarine, but which is sufficiently light to be transported by air and/or by a parent submarine. The rescue craft with accommodation for 12 to 15 men would lock on to the distressed submarine and so permit transfer of the trapped personnel.

It would be a form of mobile diving bell which can be operated without divers. When not employed on rescue operations the vehicle would be available for general oceanographic work. The last project is a requirement to improve the existing salvage equipment to enable recovery of ships of up to 1,000 tons from anywhere on the continental shelf that is from a maximum depth of 600 feet. This is the immediate objective but it is hoped that if the equipment is successful it would be improved to cater for larger ships from deeper depths.

H.M.S. Hecla Diving News

H.M.S. *Hecla*, the first of three new Oceanographical Survey Ships commissioned on 8th September 1965. Unfortunately since then the ship has spent most of her time at sea and the opportunity to don the rubber suit has been limited. With only three divers onboard (including the Diving

Officer) it is only possible to have one diver in the water at a time, attendants being recruited from four junior rating's that have successfully completed the aptitude test since commissioning.

Facilities are first class onboard, with a large air conditioned diving

store, a medium Gemini craft, four S.A.B.A.'s, two S.D.D.E. sets and numerous pin-ups of non-divers (all with built in water wings).

Although Diving has been limited we have managed to be submerged in water temperatures ranging from -3°C to 28°C and visibility from zero (in the River Foyle) to 50' in South Africa.

In December, a two day visit to Akureyri in Iceland, gave the Ships Divers the chance of swimming in really cold water only 60 miles south of the Arctic Circle, with the Air temperature at -12°C the sea water at -3°C was relatively warm (or so they told me once they started breathing again). The locals couldn't believe their eyes and we collected quite a crowd, but when one fishing boat Captain was observed arming his harpoon gun, we called it a day. In complete contrast our dives in Simonstown Dockyard were a piece of cake. *Hecla* is equipped with a transverse thrust propellor in the bow and the two large metal doors that seal the ends of the tunnel were giving trouble and the Diving Officer's report was that a week in Dry Dock in Capetown was the only answer! Needless to say, we sailed on schedule.

During our stay in Simonstown the South African Navy gave us the run of their well equipped Diving School, and we were able to rub up on ditching drill and free ascent in the beautiful clear and warm 32 foot tank (a change from burning and welding in the cold murky tank in Londonderry). Readers may be interested to hear that, that old rogue I, C.P.O. Fawcett, C.D.I, R.N.Ret. is making a nice little empire for himself as the underwater demolition expert in the South African Navy. He maintains that South African Naval Divers are hard

up and that he won't be able to exchange that little Citroen car that he got in Singapore for at least another pay day? He seemed to be genuinely pleased to see a face that he knew (even if the last time that he saw the face all he said was 'get down, your not a bloody sun worshipper'), but even so the Bosun couldn't get one of the super South African 'wet suits' out of him.

We say goodbye to A.B. Dobson, Sh. Diver; he starts his C.D. course in June and we wish him good luck (he will need it) and hope that his relief passes the ship's diver's course or we will be in dire straits.

Remarks overheard:—

(i) By a Maltese steward about to do his aptitude test in Loch Ewe, and watching two 12' porpoise jumping the height of the M.F.V's wheel-house.

'O.K. Senor! I punch him on the nose if he come near me, eh!'

(ii) By the Ship's Divers when confronted with *Hecla's* flat bottom.

'Just like walking along the M.I. upside down at night.'

Diving Team

S.Lt. Brydon. (S.D.)(B) Sh. Diver
A.B. Dinnage, SR*. Sh.Diver
A.B. Dobson, U.W.*, Sh.Diver

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Diving with the Ghana Navy

THIS cry from the wild will give readers in the outside World some idea of diving in the Ghana Navy. The team consists of Lt. Riley, R.N., C.P.O. Slim Welsby, P.O. Arfer Fisk, P.O. Tex Titmarsh and S.Lt. Oppong, G.N., at Tema which is Ghana's Guzz.

Equipment-wise, we have 2 S.A.B.A., 2 Minstrals and 1 set of underwater burning/cutting gear. The diving part of our job is small because as yet there is no proper diving branch in the Ghana Navy and the team are all Cox'ns and the officers, 1st Lieut's of ships. So we are spread about a bit, except when small routine jobs such as screw fouling crop up. We also dive and give assistance to any Government undertakings.

One which occurred recently was 135 miles from the sea in a crocodile river, at Dunkwa-on-offin. On the 20th August, a Ghana State Mines Inspector approached Naval Officer in Charge, Takoradi, for the assistance of the Naval Diving Team in repairing a Gold Dredger, which was holed and sinking at Dunkwa-on-offin. The dredger of some 450 tons, was listing to port and that side of the after deck was under water. The dredgemaster, Mr. Currie a Scot, reported that he had located some large holes in the bottom of the port 'fwd' pontoon by using a sounding pole and he required a more accurate report of the damage.

P.O. Fisk dived in the area of the hole, reporting it to be 3ft. by 2½ft. with edges torn and twisted upwards. A smaller hole about 2ft. square was also found together with a split on the edge, where the dwarf bulkhead joined the deck.

The damage was apparently con-

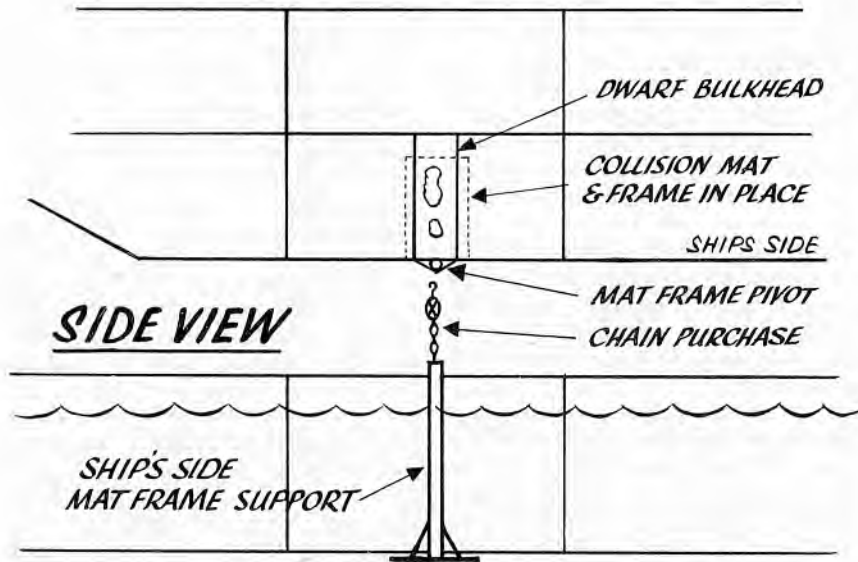
finied to a space between the dwarf bulkhead on the bottom 3ft. apart and approx. 8ft. 6ins. from the side of the dredger. It was decided that two splinter boxes of local manufacture would be able to cover the damage. Another diver would be needed to help place them accurately. Lt. Riley explained the splinter boxes to the engineer, who started right away and manufactured some.

Lt. Riley and P.O. Fisk proceeded back to Takoradi to collect more Diving sets and Slim Welsby, together with respective wives, who thought a couple of days up country would do them good as well. We arrived back on Sunday night, 22nd August. Starting Monday morning, the divers tried to place the splinter boxes in position but due to the corrugation of the deck and clearances needed, an effective seal could not be made. So it was think again all round. The Engineer in Charge had not been idle and had constructed a rubber pad. This was built on a framed swivel pivot outboard and sunk to below ship's bottom then pivoted through 180 degrees. A diver then went down inside and picked up a wire strop in the centre of the mat, passing it through the damaged hole and on to a Weston purchase. Then both ends were hauled tight to give an effective seal.

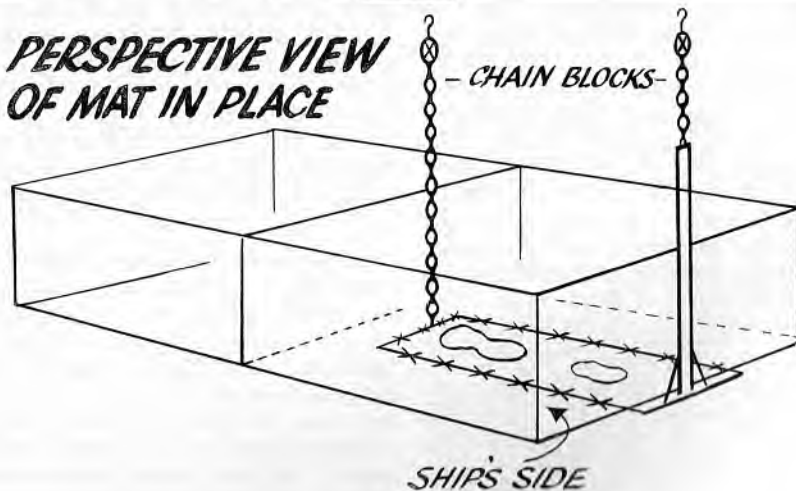
It was then decided to winch back the dredger on its tailings, as it was thought dangerous to lose buoyancy that had been gained. Further assistance of the divers was required to make the sealing of the collision mat more effective by laying 'fondu cement' between the dwarf bulkheads. Eighteen bags of cement were spread over the area and worked into gaps in the seal. Next morning

DUNKWA GOLD MINING DREDGER EXTENT OF DAMAGE

PLAN VIEW



PERSPECTIVE VIEW OF MAT IN PLACE



the cement was rock hard, but as a further precaution two plates were laid and wedged on top with shores on angle bar frame. The pumps were started and 12ft. of water was down to 3ins. when—calamity—a power failure occurred and the pontoon was flooded again, buckling the effective seal on the holes. With three large pumps in action the water was just contained at 12ft. Three more were put down to hold the plugs while all six pumps were set pumping. One hour later the water was down to 3 ins., and minor leaks around the mat were easily contained. This enabled the Eng-

ineer to build a permanent coffer dam over the area, thus putting the dredger back into operation in a week, instead of three months as at first thought.

For the 'Barons', there was gold dredged from the river bottom and even some diamonds too. Funny, but all the big bits go unnoticed and are pushed back during the wash, only the flakes being separated. What a waste and no free samples either! We had heard a rumour that all the 'croc's' evacuated this river as they do not like the taste of 'Dunlop and sweaty blue undersuits.'

H.M.S. Rothesay—Diving in the West Indies

DURING the foreign leg of her General Service Commission on the West Indies Station, H.M.S. *Rothesay's* divers have been in action in a variety of ways and places. Activities have varied from searching (unsuccessfully) for the British Ambassador to Costa Rica's ceremonial sword (lost over the side), to entertaining (most successfully) children's parties in Martinique and Puerto Limon, Costa Rica.

In the ideal conditions out here, everyone is naturally very keen to get into the water, and it is often difficult to find sufficient work to keep nine Ship's Divers fully occupied and in practice, although of course the thought of lobster on the menu is enough to make any First Lieutenant encourage Expedition Diving — in vain so far in *Rothesay* I regret to say! However it has been possible to organise one particularly successful outing, which would also be open to other ships on the station.

During a recent visit to Key West Naval Station, a very friendly liaison

was struck with the United States Underwater Swimmer's School. As a result a joint diving expedition was arranged for the ship's divers from the American Underwater Demolition Team. Unfortunately wind and weather conditions meant that we were not able to see the famous Florida Reefs at their best, as our hosts had hoped. However, we were able to do a great deal of diving both in S.A.B.A. and in the American set, S.C.U.B.A., and both teams of divers were able to use the other's equipment.

We all very much enjoyed diving in S.C.U.B.A., although it did at first seem strange to be wearing a half-face mask, and to be able to remove the breathing tube at will (though this is not recommended underwater! We were all impressed, however, but were attracted most of all by the United States Navy's standard Wet Suit. In the West Indies these are ideal, and we have frequently lamented our lack of them, whilst being grateful for our own Dry Suits in the

cold waters of England. However, we were assured by American divers that they have worn them under the Ice Cap—and we admired their courage! Two or three of the ship's diving team have been moved to buy their own Wet Suits, however, and we should have even more by the end of the commission.

Somewhat to our surprise, the American divers enjoyed using S.A.B.A. and were favourably impressed—although their minds bogged slightly at the thought of the maintenance involved, a problem they do not really have with S.C.U.B.A. In particular, they were impressed by our full face mask, and had we been able to follow it up, a good avenue for trade would have been opened! All agreed, however, that the outing was a great success and the hope was expressed by the Americans that the liaison would be continued by Royal Naval ships visiting Key West in the future.

The commission is now slowly drawing towards its close, but diving plans are still very full. We hope to dive with the Territorial Army in Bermuda, with whom we have a liaison, which will give us another opportunity to dive in S.C.U.B.A. We also expect and hope, to have diving jobs given to us by anyone who needs our help—variety being the spice of life underwater too! So, an enthusiastic diving team should have their hands full until we finally pay off in May.

H.M.S. Rothesay's Ship's Diving

Team:—

- Sub.-Lt. J. J. Blackham
- L.S.B.A. J. Evans
- A.B. J. E. Cook
- A.B. J. E. Horne
- A.B. A. R. Pitcher
- R.E.M.T. Meakin
- Mne. K. A. Gates
- Mne. A. Cardwell
- Mne. D. C. Powell

Narcotic Manifestations

by 'B.F.'

'RAPTURE of the Deep' may be a somewhat poetic phrase for Nitrogen Narcosis but it is, nevertheless, a very apt description of the effect that air diving has on the majority of divers at depths somewhat deeper than 200 feet. Shallower than this the effect of breathing air hardly merits such strong terms and I find it difficult to assess whether the loss of mental efficiency, particularly in the field of memorising things, is due to narcosis, or to the fact of being in an unnatural environment. Impairment of one's ability to memorise facts seems to happen at very shallow depths indeed and I feel sure that I am not the only diver who has had to go back and recheck when making a detailed inspection of what was a comparatively simple situation, in only a few feet of water. Nobody would suggest that this mental inefficiency was Nitrogen Narcosis but most divers would, I think, agree that extra mental alertness is necessary as soon as one submerges and this applies whether breathing air or oxygen. In the latter case of course nitrogen narcosis does not enter the picture. Accepting that there is some loss of mental efficiency, even at very shallow depths, I have always regarded the additional mental reaction when one goes deeper to somewhere between 90 feet and 200 feet, as being 'depth awareness' and I do not think Nitrogen Narcosis comes significantly into the picture until the 200 foot mark is passed. I say this because, although there is a sensation of depth, there does not seem to be any significant further decrease in mental ability as a result of going deeper. Beyond 200 feet, however,

the picture changes rapidly. Firstly, the senses become muddled and do not really seem to want to know what is going on. A surrealistic noise exists rather like that of high revving machinery three decks down and a voice speaking over the telephone seems at first to be coming from another world. This is 'depth awareness' plus and should be regarded as a warning to the diver to call up all his reserves of self control in order to stay 'with it' and perform the task at hand. Those most affected between 200 feet and 230 feet either just 'float' away to the arms of Morpheus, begin to talk a lot, make corny jokes, sing or provide other garrulous drunken-like manifestations. Nitrogen Narcosis symptoms at this stage are indeed very similar to those of drunkenness and the simile even goes a stage further, inasmuch that those who can carry their liquor well usually make the best deep divers.

We now come to the 'depth barrier' as far as diving on air is concerned i.e. 230—250 feet. This would appear to be the last obstacle to getting to 300 feet, beyond which oxygen poisoning becomes an even greater hazard. The last obstacle in this case is, as one would expect, the toughest and in the 'hard hat' days of deep diving with air it was only those of iron will power who arrived at 300 feet with mental processes reasonably intact. The most extraordinary things happened to otherwise excellent divers, when trying to descend through this depth barrier. I know of a few incidents which I will recount briefly here, but I am



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sure many more are known, particularly to older divers, and as each one fully told is a story in itself I hope readers will write in and recount them for the benefit and amusement of us all.

The first incident of severe nitrogen narcosis that came to my mental album was truly incredulous and impressed me immensely. It happened during the 1930—1933 deep diving trials to a diver of excellent calibre and character whom I later knew very well and whom I admired for his ability and quiet personality. On hitting the 'depth barrier' this diver actually had the hallucination of seeing himself in his faceglass, dressed in his No. 1 suit, ready for shoregoing. This prompted him to tell the surface personnel over the telephone that he was going to remove his faceglass and go ashore. Sure enough he began to do just this and the noise of the faceglass being unscrewed could be clearly heard over the telephone. Fortunately, he didn't get 'ashore' until much later due to prompt action from the surface in hauling him up slowly with fast talking over the telephone, dissuading him from the hazardous action he was taking and encouraging him to screw his faceglass up again. The outcome was that the diver returned to his normal senses at about 200 feet and, somewhat peeved at finding himself being hauled up, demanded to be told why!

My next incident is first hand as it occurred to me whilst I was qualifying Deep Diver. I had appreciated that it was all a question of mind over matter and had made up my mind how I was going to overcome the problem. Firstly, I would firmly resist all temptation to sing or joke and in fact I was determined to make

no unnecessary utterance whatsoever. Secondly, I was determined that I would keep my mind alert and not allow it to drift away into unconsciousness as I knew it would too easily in the inky black depths of a Scottish Loch. To do this I figured that, on the way to the bottom, if I should feel myself 'going off' I would stop and concentrate like mad on the shot rope as a point of mental focus, and if I was near enough to the underwater lamp, I might even see the shot, though I couldn't count on this. I made progressively deeper dives as required by the syllabus and satisfactorily performed the tasks allotted for each dive without being unduly affected by nitrogen narcosis—then it hit me! I may have been getting over confident and careless and was probably not alert to the danger soon enough. Whatever the cause and regardless of the delay of appreciation I brought all my defensive forces into play and gripped the shot with both hands just as hard as I could, furiously telling myself where I was in an effort to relate myself to this material thing—the shot rope. My resistance was not strong enough or was applied too late, for, although I still retained a vivid picture of my leech like attachment with both hands to the shot rope, that picture had superimposed on it even more vividly the idea that I was beginning to gyrate around the shot rope at ever increasing speed, just like a catherine wheel nailed to a post on Guy Fawkes night. Fortunately, before the centrifugal force from the gyrations reached the point for my disintegration I became aware of the Chief Diver's voice coaxing me back to consciousness and sanity, accompanied by the realisation that I was progressing, complete with shot, towards the surface. The mental processes seemed to return immedi-

ately and although I did not continue this dive I was able to take numerous turns out of the shot and make a reasonably dignified ascent via the S.D.C. to the surface. Although my ego suffered badly from this experience it taught me a valuable lesson and for my subsequent dives in deep water I never permitted my concentration to flag for one second with the result that I didn't get caught again. Concentration became an obsession and, rather like ear clearing I put it into operation from the time of leaving surface with the result that I manage to lick both problems before they build up and get too big for me.

The third and last instance of Nitrogen Narcosis which I will recount occurred very recently and surprised me immensely as the diver was breathing from S.D.D.E. which uses a demand valve with mouth-piece non return valves, thus practically eliminating the possibility of C.O.₂ build up. We have always been led to believe that C.O.₂ is an important contributory factor to Nitrogen Narcosis and in 1947/48 a lot of work was done on the deep diving equipment which almost doubled the circulation rate in the helmet. As a result the performance of the divers markedly improved. With this knowledge at the back of my mind I was totally unprepared for Nitrogen Narcosis with S.D.D.E. It happened however during a series of dives to 250 feet in the Deep Trials Unit when the divers were instructed to operate the swim machine. This particular diver, who I must add had recently performed some excellent operational dives, spent his entire time 'on task' appraising the machine in a manner, which suggested to those of

us watching on closed circuit T.V., that he was either going to take the machine to pieces or 'render it safe' as he might have treated a mine. In fact, he did nothing constructive throughout his dive and told us quite frankly afterwards that he didn't have a clue as to what he was supposed to be doing, although he understood well enough before leaving surface. Another diver in this series who worked extremely hard on the machine left it for a few moments and came to the surface before returning to his task. He said afterwards that he suddenly found himself on the surface but could not think why he was there. We put it down to the fact that he had 'floated away' to the 'narcotic regions' for a brief spell before returning to duty.

What about Helium Narcosis? At what depth is it likely to be experienced and will it manifest itself in a similar manner to Nitrogen Narcosis? On the basis of the molecular weights of the gases we might anticipate significant narcosis problems with Helium at around 1,400—1,500 ft., but diving physiology seldom follows theoretical extensions of what we already know. Our divers who have indulged in Oxy-Helium breathing at a pressure equivalent to 800 ft. have not experienced symptoms which can be positively identified as Narcosis. They have, however, met a new diving physiological phenomena, which we call the 'shakes'. This is an involuntary trembling usually of the arms and legs, which has so far proved more of a nuisance than a real threat. The reason for it and its potential danger have yet to be ascertained and I am not even guessing at either answer.

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H.S.C.D.T., H.M.S. Dingley

TOWARDS the end of Christmas leave 1965 the 1st Lt. and five members of H.S.C.D.T. were recalled from leave to proceed to Scotland in order to complete the recovery of a Shackleton aircraft lost in Moray Firth on the 5th December. The Shackleton was based on R.A.F. Kinloss, and was carrying out a normal landing approach to Kinloss airfield when it ditched in 130ft. of water about 3 miles offshore.

The first ships on the scene were the Boom Defence vessel Barfield and H.M.S. *Kirkliston*. The aircraft was located fairly quickly and *Kirkliston* proceeded to search a large area in order to ascertain whether or not it was in one piece. Lifting operations were started soon afterwards and, in spite of very rough weather a good part of the Shackleton was recovered

and sent to Kinloss, where it was laid out in a hangar for inspection by boffins to ascertain the cause of the crash.

After an overnight journey by rail and air to Kinloss the members of H.S.C.D.T. were briefed on the work to be carried out. This entailed the recovery of one crew member and the tail section of the aircraft, which was considered vital to the investigation. There was some concern amongst the pilots since it was thought that the tail unit may have dropped off in the air. Their concern was understandable in the circumstances.

The team was accommodated ashore at Invergordon and was to be transported to the job by R.A.F. Rescue launch daily. This entailed a journey of approximately 20 miles, which took 1½ hours. You may have



"Parts of the aircraft being raised onto the Bar Boat."

gathered that in view of the short daylight hours at the time of year, departure was at an unholy hour.

The equipment used was C.D.B.A. with 40/60 mixture, D.U.C.S. which proved extremely useful and light jackstay gear. Divers were limited to 17 mins. with each diver having one dip daily. The visibility was extremely good, up to 25 ft. at times. It was found that the most favourable time for diving was late forenoon and early afternoon when the sun was at its highest point. Most of the dives were rewarding materially, and it must be stressed at this point that the crew of *Barfield* backed us up admirably by providing lifting wires in sufficient time for the diver to shackle on his find before running into stoppage times.

The method employed by the divers was a series of 50 ft. circular searches off the shot outside the main area of the wreckage, while dropping two divers on the shot with several 50 ft. stray lines to secure to any small pieces of wreckage. This was to confirm that a wide area away from the main wreckage was clear and also to clear up an area where wreckage was known to be concentrated.

The remaining body was found and recovered by one of the civilian divers and the bulk of the tail and one of the fins were recovered by the clearance divers. Apart from these, miscellaneous bits and pieces such as seats, radar sets, flaps, ailerons and even the galley sink were recovered on different occasions.

Co-operation between the Admiralty Salvage Divers and our own divers was very good, and the crew, and particularly the chef of *Barfield* were A.1. in all respects. It must be

appreciated that *Barfield* had been on the job at anchor almost continuously for over 5 weeks. To remain helpful and cheerful over that period of time gives you some idea of their form.

The job was completed in due course and the team returned to Portsmouth.

The team were:—

- S.Lt. Lombard C.D.O.
- P.O. Bray C.D.1.
- P.O. Davies C.D.2.
- L.S. Allardyce C.D.3.
- L.S. Pastides C.D.3.
- L.S. Evans C.D.3.

OBITUARY

It is with deep regret that we have to announce the untimely death of P.O. Jock McKenzie C.D.1. Late member of the Portland Diving Team. P.O. McKenzie suffered fatal injuries when attempting to remove an unexploded shell from a dredger hopper bucket in Poole Harbour.

On behalf of all divers in the Royal Navy I would like to extend our sincere condolences to P.O. McKenzie's wife and relatives.

THE JOCK ELDER FUND

The amount raised on behalf of Jock Elder and forwarded to his wife so far is £193 11s.

Mrs. Elder has asked me to thank all concerned for their sympathies and donations. Ed.

ROYAL NAVAL DIVING SCHOOL H.M.S. VERNON

OPEN DAY HORSEA ISLAND

13.00 22nd MAY, 1966

PROGRAMME

Admission to the Open Day will be by application only. Obtainable from established Sub Aqua Clubs.

Foreword

Some years ago it used to be the practice for Sub Aqua Club's to visit the instructional Diving Section at H.M.S. *Vernon* Portsmouth, to see the diving equipment used in the Royal Navy and learn about the underwater techniques that Naval divers employ. These visits established a firm liaison between service and civilian divers which was to everyones benefit.

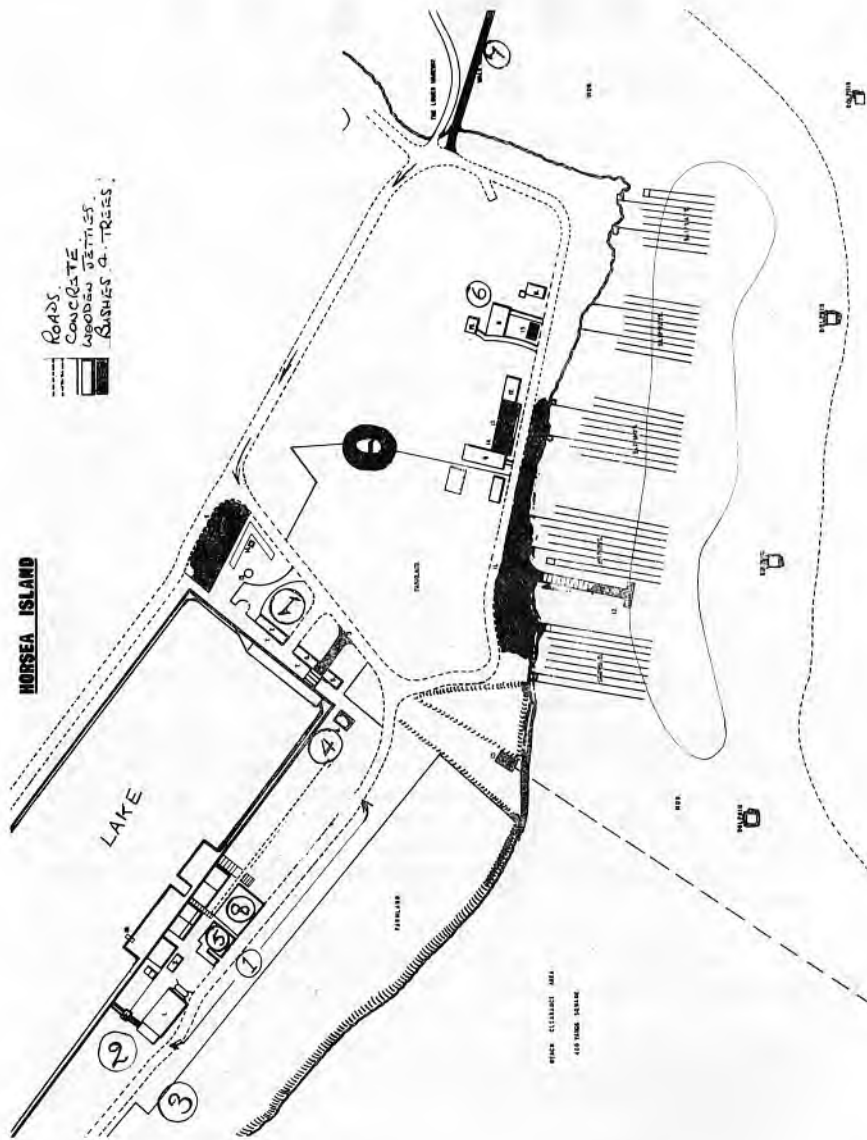
It was with the greatest regret, however, that the visits were stopped some two years ago. Since that time there have been many clubs who have written to the Captain for permission to visit the Diving Section once again and it is in answer to these letters that the 'Open Day' has been established.

On Sunday 22nd May 1966 the Instructional Diving Section will play Host to Sub Aqua Clubs from all over the country. There will be a series of static and live displays, cinema shows, with plenty of divers to answer questions or merely discuss the many problems common to all divers. The Compression Chamber will be on display and so will the Standard diving equipment, with a selection of underwater tools.

This whole day is designed for the benefit of the members of all Sub Aqua Clubs whatever their experience and so your comments and suggestions for the future will be most welcome.

Unfortunately the one activity the visiting sub aqua Club members will not be able to do is to dive, except for very limited numbers using the standard diving equipment. With the numbers involved this poses too many problems as any Diving Marshal will understand.

We are grateful to our friends in the Southsea Sub Aqua Club for all their help with organisation.



Key to Chart:—

- | | |
|-------------------------|-----------------------------|
| 1. Static Display Areas | 5. First Aid Shelter |
| 2. Army Display | 6. Cinema |
| 3. Refreshment tent | 7. Footbridge from mainland |
| 4. Children's Creche | 8. Toilets |

Static Displays

- Life Saving.
- Compression Chamber Dives.
- Underwater Tools.
- Bomb and Mine Disposal.
- Mine Identification and Disposal.
- Diving Equipment and Tools.
- Gas Analysis.
- Diving Training in the Royal Navy.

Main Display

The main display will take place in the lake and will commence at 1400, visitors are advised to take up positions around the lake by this time.

Compression Chamber

Practical operation and dives to 80ft. in the chamber will be carried out to a maximum of 10 persons per dive.

Cinema

Continuous film programme which includes:—

Emergency Resuscitation.

Physiological effects of breathing gases under pressure.

Physical effects of pressure.

Underwater Vehicles

It is hoped to demonstrate the use of small underwater vehicles.

GENERAL INFORMATION

Car Parks

Matapan Road, and overflow into H.M.S. *Phoenix*.



Please do not hesitate to ask the Naval personnel any questions which may arise. They are there for your assistance.



Visitors to Horsea Island do so at their own risk. No liability will be accepted by the Secretary of State for Defence, his Servants or Agents, for any injury (including fatal injury), damage or loss to person or property whether due to negligence or otherwise.

Scotland Command Divers Dinner

DURING one of our few afternoons off it was decided that it would be a good idea if a Divers Dinner were held up here. This was due mainly to service commitments and the lack of free railway warrants permitting many of us attending the Dinner held at Portsmouth.

After some consideration a questionnaire was sent to all divers in the North asking if they would like a 'stag' or an accompanied run and where would they like it to be held. We had a good response to the questionnaire and forty divers decided to bring wives or girl friends. Once we knew the numbers to be catered for we decided to hold the 'run' in South Queensferry. To house forty or so divers and partners required a pretty large place, so we approached the Commander of H.M.S. *Lochinvar* for the use of the Hottila Club. With permission granted, and a bar extension thrown in, the date was fixed for the evening of the 3rd December. We had to have some capital so a £1 per 'couple' was charged to include eats, band, punch and late night transport for the normal drunken drivers. After the cover charge had been collected, we at B. & M.D.U. promptly renewed old friendships and started a full scale 'bum's rush' which included swapping our extra issue for Chinese 'nosh.'

Everything went fine until the afternoon of the 3rd when the Tay Bridge collapsed and looked like endangering our run ashore that evening. However, we managed to make it back in time and the panic was averted.

Finally the doors were thrown open, Bob Frazer having been sent to the Forth Bridge Hotel to pass the 'word'. On arrival, the guests coats were promptly whipped from their backs and stamped by George Porter, who incidentally made enough from tips to keep him in drinks all the evening. On to the main hall where the punch was being dished out for those first conned into buying raffle tickets. The punch itself was made strictly for the ladies, consisting of 1 bottle rum, 4 bottles vodka and one full teaspoon of blackcurrant juice. Needless to say many of us did the old *Oliver Twist* job and went round the buoy again.

By 9.30 p.m. everything was in full swing with dancing to a very good quartet, who turned out to be off watch C.I.D. officers, and the strains of 'all divers who can't tap dance are queer.'

Later we had an interval in which nosh was served. Many thanks to our chef and steward who cooked and served up a very fine chicken chow mein, also during the eats we were entertained by an up and coming group from the *Reclaim*.

As the evening drew to a close it was pointed out that the raffle had not yet been drawn, this was not surprising as we hadn't any prizes. These were promptly borrowed from the canteen manager until we got the money in! The committee got together and decided it would be a fixed raffle and anything we made would be sent to the 'Jock Elder fund.' Ginger Bryant excelled himself in that he confiscated the prizes after they had been drawn and put

them up for auction with the result that a bottle of vodka was sold for £7 10s. and four old copies of the Diving Magazine for £2 2s. 6d. All in all, with the money from the other

prizes and the raffle tickets, we were able to send £31 7s. to the 'Jock Elder Fund.' I think you will agree it was a fine way to end a great evening.
C.B.J.



Centaur Diving

CENTAUR divers again, but the ship paid off last September.

The D.O. suggested 'Take your leave in Guernsey, excellent diving with full board and lodging on the Pusser.' Wife trouble and new drafts kept numbers down but spare billets were eagerly filled by *Victorious* divers. The Chief Stoker came as chef and what a job too with that D.O. wanting his plaice poached on a flaming M.F.V. coal range. Diving conditions were no disappointment with trips each day by gemini. It was a case of take your choice with underwater photography, spearing fish or collecting scallops. Socially most successful judging by the hours kept by some members, the final bottle party will be remembered by both the locals and the crew who faced a Force 7 gale on sailing.

SOLUTION TO POMPEY DOCK-YARD PARKING ?

One final event before closing. What does a diver do when he finds a car on the bottom ? Portsmouth City Police were most interested for the car was stolen in 1963. The possibility of bodies in the car led to various dives to knock in the windows, forcing the door, but have you tried entering a Ford Anglia in nil vis with a S.A.B.A. set on ?! Next step was to salvage the car, hence the picture.

Editor's Note

The tread on some of the tyres still look reasonable. I wonder if they were salvaged ?

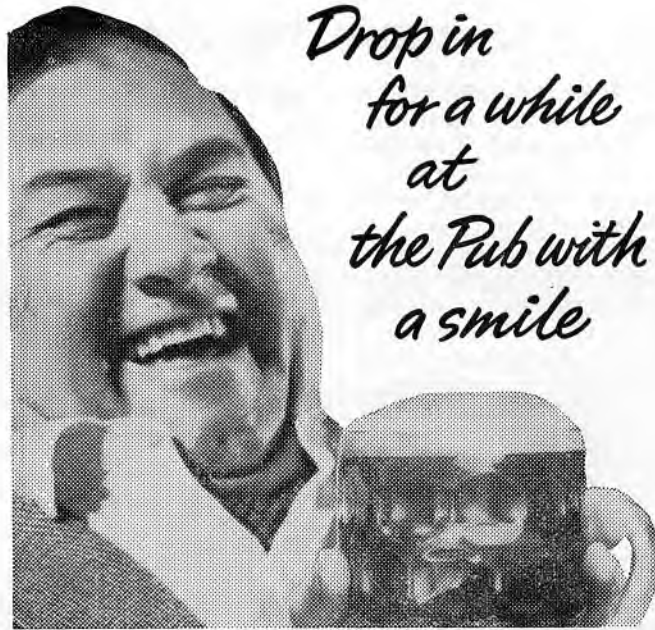
Diver's Efficiency

IT is a well known fact that at high pressures nitrogen has a narcotic effect and thus it must be removed from the breathing gas when at depth. Generally divers are not seriously affected by this narcosis at depths to 240 feet and air can be breathed safely by a well trained diver at this depth. However because of its advantages there is a trend to use oxy-helium instead of air when diving below 200 feet, but helium is expensive and is not readily available like air, so the relative merits of the two gases must be considered when planning an operation. This problem met by a group of University divers and the Applied Psychology Research Unit of Cambridge University have recently completed a series of comparison tests using air

and oxy-helium as the breathing gases. Firstly simple arithmetic tests carried out by the divers at a depth of 200 feet showed that the mental processes were slowed down by 15 to 20% than when at the surface. Secondly small manual tasks undertaken at the same depth took 32% longer on helium and 47% longer on air than at the surface. Also during the first tests more mistakes were made when breathing air than when breathing oxy-helium.

Thus it is reasonably concluded that the diver's mental efficiency and his manual dexterity are impaired at depth but that this limitation can be reduced when breathing a oxy-helium gas mixture.

G.A.F.



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for a while
at
the Pub with
a smile*

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JUDO				FIRE ARMS
BADMINTON	RUGBY	UNDERWATER EQUIPMENT		TENNIS

The Blackfriars Bomb Incident

ON the evening of the 1st February, 1966, a unit of Portsmouth Command B. & M.D. team were called hurriedly from their homes after a civilian diver had reported that he had found what he thought was a bomb on the river bed under Blackfriars Bridge.

The unit arrived at the Thames river police H.Q. Wapping before midnight and, as it would be impossible to dive until 0300 because of the fast flowing current, the time waiting was spent in reconnaissance of the area and in conference with the Port of London Authority representatives and the City Police.

Diving commenced at 0345, A/C B.M.D.O. making the initial investigation at a depth of just over 20ft. and with a tide running at about 2½ knots. It was immediately obvious that the object was a bomb, two thirds of which was buried at an angle of 45 degrees. An empty transverse fuse pocket could be felt and, from this and estimated dimensions, it was identified as a German 250 KG bomb*. The Port of London Authority could not supply a lifting vessel until 1100 so the remaining period of slack water was used in digging out the bomb with diving knives. By 0505, when the tide was again running too fast to continue, the whole of the bomb was uncovered.

The possibility that the bomb may have been fitted with an anti-disturbance fuse was discounted when it was noticed that the bomb moved very slightly. This was caused by the fact that the civilian diver, when marking the bomb, had secured his line to a large buoy, which was

'watching' at tides other than low and had a lifting effect with constant tugging from the fast running current. In view of this fact it was thought that it would be more of a hazard to the bridge to attempt to remove the fuse in situ than to remove the bomb and countermine it in a safe area.

Operations recommenced at 0930, depth being 45ft. when the lifting vessel was in position and the first task for the divers was to fit the lifting straps. By 1120 everything was ready for the lift. This was considered to be a hazardous part of the operation, during which the bomb could have been inadvertently jolted and therefore full safety restrictions were imposed. These included stopping rail traffic over Blackfriars Bridge, stopping river traffic and evacuating the North bank within a radius of 500 yards from the bomb. However, by 1130 the bomb was placed into a prepared bed of fenders onboard the lifting craft, which immediately 'slipped' and proceeded down river. Further restrictions were imposed as the vessel went down river. Each bridge and each tunnel was closed as the ship passed. Ferries were stopped and other shipping was asked to pass slowly. It was quite a sight to see all bridges empty with traffic piled up at each end. It was with a sigh of relief that the team watched the bomb go up in a 'full order' explosion 1½ miles off Southend Pier.

The incident got wide publicity in the National Press and the unit were guests at the Palladium Show and also entertained to a civic luncheon at the Guildhall by the Lord Mayor or London.

The unit consisted of

- Lt. C. Churcher C.D.O.
- C.P.O. R. White C.D.1.
- L.Sea R. North C.D.11.
- L.Sea G. Denton C.D.11.
- A.B. R. Altoft C.D.11.
- A.B. W. Pert C.D.11.

* Later identified as a German 250 Kg Type SC11 fitted with a Type 5 fuse (elect. impact).

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H.M.S. Albion

AS my term of office in one of the 'Flat Tops' draws to its close, a few words about life in H.M.S. Albion during the past two years may be of interest. Not content with being a C.D.O. in a commando Ship, I also became the N.B.C.D.O. the combination of these two abbreviations produced my title N.B. (C.D.)2.

On commissioning at Portsmouth in May '64 we had only ten divers, but during the following six months refit, this rose to 24, all ships divers, including the 'toothy' as the second diving officer. Our 'work up' began in November and ended in February. Some of this time was spent at Gibraltar, so we managed some enjoyable diving for a change. In March we sailed to begin our Foreign Service Commission in the Far East.

Travelling via Suez, Aden, Mombasa and back to Aden again, we finally arrived at Singapore at the end of April. At Aden we assisted the Services Yacht Club recovering and relaying moorings and also repaired the shark nets at the bathing beaches. Some of the team also spent three fruitless days searching the eastern end of Aden harbour for a helicopter rotor blade. This blade had not dropped off a helicopter but

was a spare being flown ashore slung underneath a helicopter. Unfortunately it began to lurch around and had to be slipped by the pilot.

At Mombasa our assistance to remove a concrete pile was asked for. This was some 3 feet across and was reinforced throughout its length with steel bars. It was sitting vertically in about twenty feet of water at the entrance to a new slipway belonging to a local shipyard. Four of us arrived with all sorts of explosive machinery. We tried all day to make a hole or at least crack the concrete. Unfortunately it was completely smooth and seemed to be impenetrable. Finally, using a rod drill we made a hole in it, breaking half a dozen drills in the process. This hole was gradually enlarged using small quantities of P.E. By the way, there was a beautiful newly constructed office block only 50 yards away all made of glass!

In the end the beast was broken off using many turns of 'Cordtex' around the pile. I am not sure which was harder, the job, keeping the spectators away or drinking the beer on completion!

On arrival at Singapore we began the usual Commando ship routine of Singapore to Borneo, Borneo to

Singapore as often as you care to mention. Part of our helicopter squadron is always ashore in Borneo—originally at Sibuluan, but later at Labuan where we have had some very enjoyable 'exped. diving', even if the crayfish have escaped through the fern leaf coral.

Ship husbandry has kept us very busy during maintenance periods and our longest task was cleaning off a chalk like deposit from the propellers this Christmas. This took us a total of 36 man-diving hours to complete, using the only tool that would touch this very hard deposit—a Mk. 1++ paint scraper. However, the result of our labours was that the ship would go $\frac{3}{4}$ knot faster, so it was worth while.

Exercising the ships divers in harbour is almost daily routine in Singapore. The Diving Officer was almost made to promise the ships company that the next time he wanted a late night or early morning swim, he would not wake them up as well. It is amazing how many people you can wake up at 0400 with one little thunderflash underneath the ship.

We don't have any 'geminis' that we can use for diving but have four L.C.A.'s (or L.C.V.P.'s to give them their up to date name). These are excellent diving boats, lots of deck space and a ramp to get in and out of the water—all very easy.

That seems to be all the news from the Albion—I am now looking at

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Flight lists for my relief's name due any day now—he is Lt. Cdr. Lovell-Smith. To any others of you who may find yourselves drafted to a big ship may I say that it is not as bad as it seems at first. There is facility aboard for everthing always, and a web-footed human is a stranger to those onboard, so you may find many friends quickly.

Finally may I correct an error in the Winter Edition of this magazine—Surgeon Lieutenant Commander Beckingham belongs to *Albion* not *Victorious* please.

See you at Guzz.

N,R,B.

Salvage of the Future

ONE of the projects that it was hoped to undertake during the U.S. Navy's Sealab II operation was the salvage of a section of flooded hull using an injected foam plastic technique. The principle involved in this method of salvage is simple and could revolutionise salvage operations. The diver takes a hose down to the sunken craft and inserts the nozzle into a flooded compartment. A plastic compound is then forced under pressure through the hose and as it emerges from the nozzle into the compartment it expands and solidifies into a polyurethane foam. This foam displaces the flood water thereby lightening the ship and thus facilitating the lifting operation. Although the project is still in the trial stage it has been used successfully to refloat a U.S.N. Destroyer aground on a coral reef in the South China Sea. When all conventional methods of freeing the ship had failed, foam was pumped into the flooded compartment displacing the water and providing the necessary buoyancy to enable the ship to be refloated.

The second development in the

salvage field is the use of flotation bags which use rocket fuel as the flotation gas and which can be attached to the sunken craft by remote control. An American company claims to have developed this technique using hydrazine, a rocket fuel to inflate the lifting bags, and a means of attaching the bags to the object to be lifted by remote control from the surface. An underwater camera is used for means of location but the actual method of attachment has not been disclosed. It is reported that the method has already been used to raise a 16 foot cabin cruiser from a depth of 720 feet, and there is no apparent reason why the technique should not be applicable at deeper depths and for larger vessels. The problem of controlling the rate of ascent once the craft is clear of the seabed is not stated but undoubtedly this has been considered.

G.A.F.

What to do with the Divers

MOST of you will agree that a big problem for any Ships Diving Officer is thinking up new things for his divers to do during their underwater exercises. Contrary to popular belief (popular, that is, amongst those who have never got their heads wet), there *is* a limit to the practising of bottom searches. One of the well-known alternatives, matching up two dozen assorted nuts and bolts twice as fast as the next man, has also been known to pall before the commission is half over. And is there one amongst us who has not searched for those elusive Coca-Cola bottles in Lazaretto Creek? At least that was a diverting pastime for there was always the chance of making enough money on them for a couple of pints of beer between four divers and their attendants... Regretably, the shift eastwards in defence thinking has taken most of us away from Malta, and those meagre pickings.

After having spent more than one commission figuring out what to do with ten or a dozen S.W.D.'s I was pleased at least from one point of view to be appointed Diving Officer at the Britannia Royal Naval College: exercising divers there would be easy. And so it was, at least in the summer, with crabs, lobsters and odd jobs for the Dartmouth Harbour Master providing plenty of work and fun for the Britannia Sub Aqua Club.

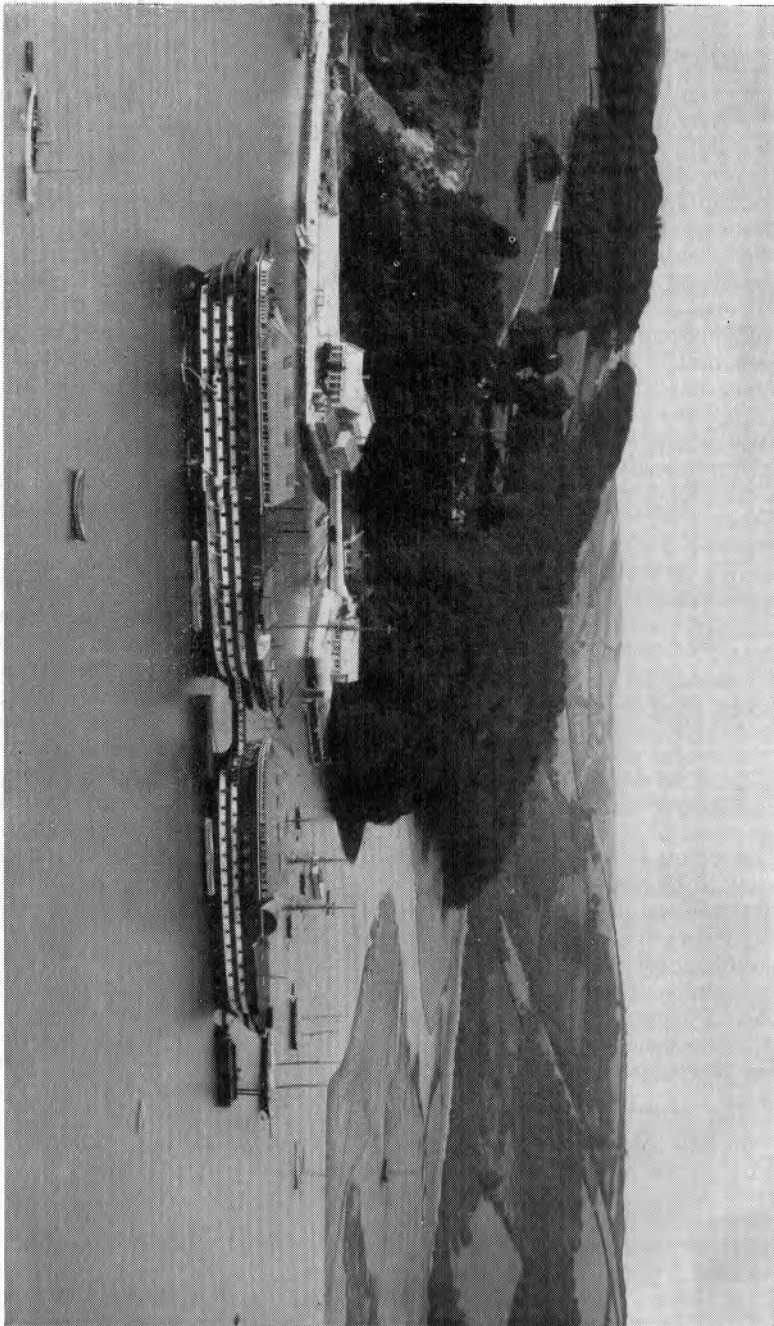
The winter changed things, however, and high winds and seas forced us to spend most of our time in the river Dart. That river proved no more interesting than the average; no more interesting that is until one afternoon in March 1964... It was High Water Springs and visibility on the river bottom, forty-five feet

down, was about three yards. The last diver of the day gave four pulls halfway through his dip and surfaced with a piece of heavily-bar-nacled crockery. At first it seemed a useless find, but some quick scraping with a diving knife changed everyone's opinion; our diver had dug up a naval cup from the last century, obviously a relic of the old *Britannia*. It was soon confirmed that the diving boat had anchored by chance, over the site of the moorings of the old 'wooden wallers' that laid in the Dart from 1863—1916.

There were two ships, secured head to stern, the *Britannia* and the *Hindustan*; they formed the centre of naval officer training for over fifty years, until the college opened in 1905. The old '*Brit.*' as she was affectionately known, was the living ship, and despite the fact that there were sullage agents even then, a good deal of the gash and a proportion of the messtraps found their way over the side. 'Tinkle, tinkle little spoon; knife and fork will follow soon' was evidently just as applicable one hundred years ago.

Having found a solitary cup, the obvious plan was to press on and establish the complete range of china. This was not, of course, as easy as one might imagine (What diving operation is?). The tides in the Dart are strong and visibility frequently very low—no great obstacle to ship's divers but not so easily overcome by the relatively inexperienced cadets of the Sub Aqua Club. Apart from being tidal the Dart might also be called 'Seasonal,' because in the summer time its lower reaches are infested by pleasure craft of every sort, not a few of which like to get close to a diving

Britannia and Hindustan at their moorings in the River Dart before the turn of the century. upper slopes of the hill to the left of the picture.



boat to show their passengers those dashing Hans Hass types (usually a Size 3 cadet in a Size 6 suit).

The pleasure boats finally won and we took to chasing lobsters and crabs round the Mewstone for the rest of the summer, eventually returning to the Dart in the late Autumn. A small selection of the many pieces of china, found during the winter 64—65, is shown in the accompanying photograph. Except for the ginger beer bottle, all are from the last century. The patterned plates at the back of the photograph are about 80 years

day's tubes but hardly likely to have had '3d. Off.'

Dating the ware was difficult and help was sought from the pottery firms and many other people, including retired naval officers and victuallers (members of the Department of Victualling, which, incidentally, has a museum of Uniform and Messtraps at Royal William Yard, Devonport). Old Naval china may not be an immediately fascinating subject it is agreed, but trying finding some for yourself—in Portland Harbour for instance—and



A selection of the china, both naval and civilian, recovered from the bed of the River Dart by the Britannia Sub-Aqua Club. The breakfast cup and saucer to the left of the picture is approximately 100 years old.

old, the mess bowl and matching plates date from 1896, the wardroom breakfast cup and saucer at the left of the picture are the oldest pieces, having been made in 1865. The mineral bottle in the foreground belonged to 'J. Scheppe & Co.' and was made sometime between 1800 and 1880. Flanking it are two toothpaste pots—rather more decorative than to-

you'll soon get bitten by the bug.

Most of the cadets who helped surface the china ware are now grizzled old acting S.Lts. and too numerous (if they'll forgive me) to mention. The stanchion of the Sub Aqua Club during this time and indeed for four whole years at the College, was Chief Diver Ken Peak.

(C.N.D. has missed his chance to send Chiefy to the Far East though as he went outside six months ago). The Diving Officer until July 65 was Lt. Gavin, helped by Supt. Lt. Booker and Lt. Cdrs. Schofield and Canning.

Finally—did we find all the china? Well, it might have been possible to grid up the area and pick it clean, but

that would have left our successors with that recurring problem of what to do with the divers. . .

P.B.G.

Editors Note:—

At present in the chair at Dartmouth is Lt. Kempself with P.O. C.D.I. Scott. Any would-be crockery fiend will have to fight his way past that formidable opposition.

PROMOTIONS and ADVANCEMENTS

To C.D.I.

- P.O. Jones W. D. D/JX 819973
- P.O. Hodge D. E. P/JX 905998
- P.O. Page R. J. P/J 966697
- P.O. Richardson W. J. 05558283R
- SAN
- L.Sea France G. P/JX 899352
- L.Sea Moss, M. J. P/J 938036

To C.D.II's

- L.Sea Lee T. P/O59947
- A.B. Moore B. K. P/O 64849
- A.B. Birch P. J. P/O 84029
- C.K.(s) Percival A. P/O 54903



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News from the Bossington

Dear Ed.

Well, you asked for news from the boats and after many 'gibbery' tot times discussing the same we have finally decided to 'put pen to paper.' We commissioned on the 1st October at Chatham, and, after initial teething troubles we sailed for Scotland for our work-up and arrived on the 7th January. This date just happened to be Bill's birthday, so we joined up with the other Hunters' teams for a quiet run in the 'Stag'. I am glad to report that no one took his trousers off, but I am wondering if I upset Ted, because my 'Sampan' station was changed the next day to Forward Vickers.

The geminis we have named after two Scottish gentlemen who place great emphasis on cultural activities, and are well known to members of the branch, namely Benny and Charles! We had a great time in Scotland, but we didn't have much luck at minehunting as the weather was very rough, and diving was down to a minimum. During our stay we met many friends. Funny how they always seem to call at 1145. Ted's namesake Tony brought his lads onboard for a quick preview of the Hunters, although Darby Allen didn't need any dragging. We were all looking forward to getting back to Chatham, one final mad fling in the 'Stag', and Oh! those beautiful memories of the Boness Beasties.

I am sorry that we do not have much diving news for you. We seem to work to a very tight schedule and we don't get much time for diving. However I can confirm, if anyone is still in doubt, that I personally saw Jan G. in a rubber bag. We hope that this will make the Easter edition because we would like to see this in the magazine by the time we reach the Far East, and no doubt we will meet many of our friends at 1145. Passage so far has not gone too well, rough seas diverting us into 'Brest.' But the 'Bossy' still goes on. The reason we are coming to the F.E.S. is because you need help out there—but don't get us wrong. We are not going to take your work from you shore going lads. We are just going to help you all out. As we say (and note) 'you name it, we can do it.'

So friends far apart, hope to see you all very soon. Good diving and don't drink too much. Remember there is always another day.

The team consists of:—

- Lt. Waddington Our Man from Uncle
- P.O. Rose Our Representative from Saville Row
- L.Sea Turner Named only Beak
- L.Sea Savage Our team Member
- L.Sea Thomson Our 'Walls' Representative
- A.B. Whatley Our Answer to Charles Atlas

Tin Fish

HAVING received in July, 1965, a 'pierhead jump' from the Proof and Experimental Establishment at Pendine, Wales, to the R.N. Torpedo Factory at Alexandria,

Scotland, I thought a short article on torpedoes might be of interest.

The R.N. Torpedo Factory at Alexandria was originally the Argyll Motor Company's works and was

opened in 1906 by the present Lord Montague of Beaulieu's father. The designers of this factory were very foresighted and workshops and offices were built with facilities well ahead of their time. The factory was partially derelict, having lain idle since 1924, when the Admiralty bought it in 1935 during the Abyssinian crisis. During the Second World War the factory was producing from 70—100 torpedoes per week. Torpedoes from the R.N.T.F., Alexandria, are denoted by the letters 'AA'. Having been a 'chief fore end coolie' (i.e. T.I. or Torpedo Gunner's Mate) during the war, and hence at the receiving end of the production line we fore end chaps got to know our torpedoes really well and were wont to place them in this order of merit. The best were always reckoned to be 'AA'; next would be 'AW' (made by Vickers at Weymouth); then 'ER' (made by Morris Motors); and finally, and these came in about 1944, 'CL' (made at Cleveland in the U.S.A.)

Twenty-three miles to the northwards of the factory of Alexandria lies the R.N. Torpedo Range at Arrochar, Loch Long, first opened in 1910. This is used for proving torpedoes of new manufacture and for submarine discharge trials. The range is probably familiar to quite a

few divers as they are sometimes called upon to look for lost torpedoes. I recall one occasion in 1953 when a new torpedo had been lost, and prolonged and arduous searches by all the local diving teams, both Naval and civilian, had failed to find it. As a last resort I, Diving from *Vernon* was detailed by signal to send up a team from the recently formed C.D. branch. A small team, or 'shower' would probably be a more apt term, led by the intrepid Sam Stanley, arrived at Loch Long after a long and hazardous trip from Portsmouth. Amid raucous calls of 'You'll never find it' from a throng of onlookers, the *Vernon* team steamed off in a range boat and were back alongside within 10 minutes with the torpedo! Jim Rushton, a C.D. of fair renown, had spotted it amongst some very long weed just before he hit bottom. An extremely lucky dip one might say, but it was a good boost for the fledgling C.D. branch. Torpedoes have always been expensive items and, like all other missiles, are becoming more complicated and more expensive. Therefore, the importance of the diving search for lost torpedoes cannot be over-stressed, since the recovery of one particular torpedo may often save months of further development and research work.

A Brief Summary of the History of the Torpedo

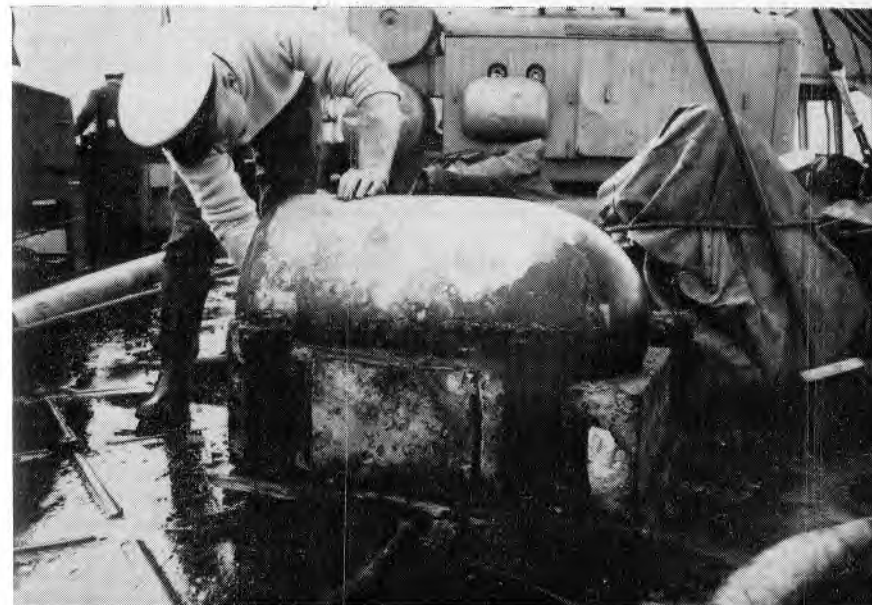
1870—1871. One 14in. and one 16in. torpedo were brought back to Britain from Fiume in Italy by Mr. Whitehead.

1872. Manufacture of 16in. torpedoes started at Royal Laboratories, Woolwich Arsenal.

1887. Manufacture transferred from the Laboratory to the Gun Factory

at Woolwich Arsenal. The torpedo had first been regarded as a missile, now it was being thought of both as a gun and a missile.

1888. Horsea Island Range opened as a Torpedo Range. Prior to this a canal at Woolwich and the dockyard basins at Chatham and Portsmouth had been used.



21" Mk. IV Warhead (1918) recovered from Victoria Channel, Belfast, 8/11/58.

Golden Rule for Mine Disposal: "Use as few hands as possible."

1889. Depth keeping of torpedo improved by the introduction of the Servo Motor.

1898. Torpedo Range at Bingleaves, Weymouth, opened.

1910. 21in. Mark 1 and 2 Torpedoes introduced. Previous torpedoes had been 14in., 16in. and 18in.

1912. R.N.T.F. transferred from Woolwich to Greenock.

1916. 21in. Mark IV torpedoes introduced. The object shown under Golden Rules for mine disposal is a 21in. Mark IV Warhead made in 1918, laid in the Victoria Channel, Belfast, in 1940, as a control mine and recovered in November, 1958.

1918. 21in. Mark 5 torpedo introduced.

1924. 24½in. enriched air torpedo introduced. These were used in the

bow tubes of the battleships *Rodney* and *Nelson*.

1926. 21in. Mark 7 enriched air torpedo introduced. Used mainly in County class cruisers.

1927. 21in. Mark 8 torpedo introduced. (The first of the Burner cycle type).

1935. 18in. Mark 11 torpedo introduced for aircraft dropping. Stokes Bay range was used as a dropping place for these torpedoes.

1936. 18in. Mark 12 torpedo introduced. This was the torpedo which together with the Duplex Pistol (Contact and influence) which was used so successfully against the Italian Fleet at Taranto in November 1940.

1951. R.N.T.F. transferred from Greenock to Alexandria.

1952. 18in. Mark 30 torpedo introduced. This is the torpedo at the gates of H.M.S. *Vernon*.

1954. 21in. Mark 20 torpedo introduced and this is the torpedo used in submarines.

I think this is enough fish for today's menu, but looking forward to seeing you all at the Diver's Dinner.

Yours aye,
MAC.

More about Sharks

In the Bahamas, Doctor P. W. Gilbert of the American Museum of Natural History, has been conducting investigations on the hearts and sense organs of the shark. A number of sharks were captured and kept alive in pens for close study, and certain experiments were carried out. As a result of this work the Doctor now states that sharks can sense their prey by vibration at a distance of a quarter mile, and beyond this range they rely on their sense of smell.

Their eyes are of little use until they have closed to within 50 feet and at 10 feet their vision is their primary sense.

So, if you don't vibrate, and you don't smell, and you keep the shark at a range of over 50 feet, then you are as safe as a bikini beauty would be at Horsea during a C.D.1s qualifying course!

G.A.F.

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The National Underwater Instructors Association

by LT.-CDR. S. A. WARNER, D.S.C., Royal Navy

JUST over twelve months ago a meeting was called of all interested people to enquire into the need for a National Divers Instructor Qualification that would be recognised, not only by all organisations in Britain, but also by those abroad. This meeting was chaired by Partick Wall, M.C., V.R.D., M.P. and its aim was the establishment of a standard for underwater Instructors, both amateur and professional.

At the meeting it was unanimously agreed that there was a need for a British Instructor Grade that would be universally recognised. The high standard of the French grading was discussed and it was agreed that any British Standard should be at least as high.

A working committee was then set up to sort out the numerous problems involved and to propose a syllabus for the first British National Underwater Instructors course.

I hate to think of the arguments and machinations, that went on within this committee but I do know that the end product—and possibly the last resort!—was that the Royal Navy were asked to conduct the first course and test. I would like to add that I think that this was the correct decision because, apart from being able to employ probably the most highly qualified group of divers, medical and physiological Instructors in Britain, it also meant that the first panel of examiners were completely unbiased. In other words we were asked to convert the working parties translation of the French Federations National Moniteur Grading into a workable course, with a series of examinations.

With the chasing, chivvying and persuasion of Jack Atkinson the first part of the course was started just before Christmas at Ironmongers Row Swimming Bath.

I must admit that the first night was not the complete and unqualified success that one would wish, but at least we got to know each other and even at this early date it was obvious that the knowledge and enthusiasm required was present to have a jolly good shot at making this project work. This was followed by a weekend in Portsmouth during which the weather added a very appreciable handicap to an already tough programme.

Another weekend at Stoney Cove, during which the elements were a little kinder, enabled us to complete the syllabus apart from the written and oral examinations.

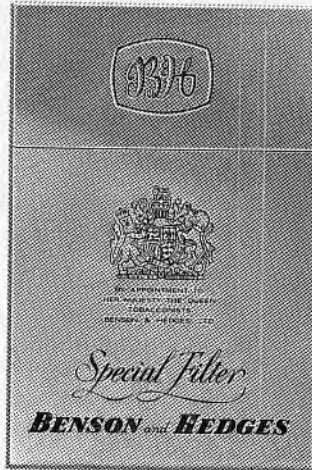
The final weekend of the 15/16th January hailed the completion of the first British National Underwater Instructors Course and Examinations. As a result of all the trials and tribulations (and I might add, some pleasant sessions) over a period of one swimming bath evening, two weekends at Portsmouth and one at Stoney Cove I am pleased to say that out of an initial 9 candidates 6 have successfully completed the course.

In my own opinion this is an indication of success and there is now a nucleus of qualified Instructors who have endured the problems of the pioneer course.

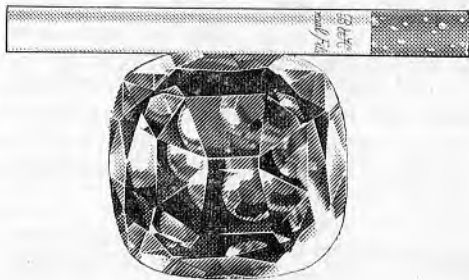
Probably the first reaction of a Naval Diver is:—How does he compare with us? The answer is that the N.U.I. should be as knowledgeable

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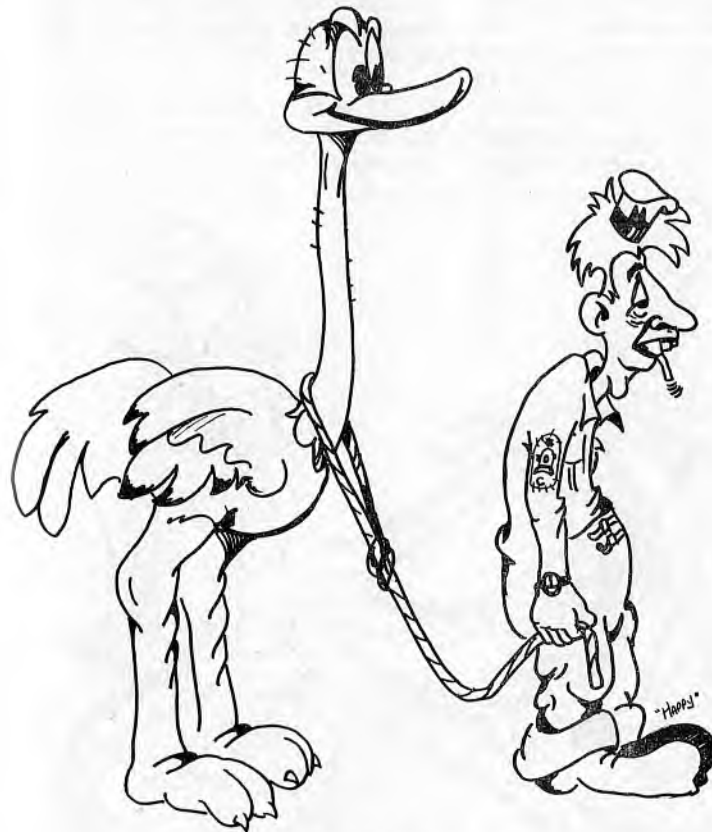


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on purely self contained compressed air sport as a C.D.1. He, of course, will never be as experienced as a C.D.1. Indeed, he is not required to cover the wide field of professional knowledge that a C.D.1. does. After all a C.D.1. is probably the most highly qualified diver in the world. The N.U.I. diving ability on compressed air is above that of a ships diver but obviously does not cover the wide field of training carried out by the C.D.2.

It is hoped that examinations will be organised to cross train and cross qualify any C.D.O. or C.D.1. that is interested in sport diving.

I am sure that we shall all find very much in common in the future because there is no doubt that the sports world is now coming to realise that there is a need for discipline in diving and that the slap happy approach only leads to accidents.



I COULDN'T GET ANY D.U.C.S CHIEF, — SO!!

LETTERS TO THE EDITOR

Dear Ed.

I read with interest an article in a back number 'The passing of the Copper Hat.' The writer paid tribute to the great work done by 'steamers.' It was more like a funeral oration! Let me say this:—the day you buried 'standard' was the death knell of the Naval Diver. Without training in standard no man can call himself a diver. Once manipulation of standard (which is an art) has been mastered, any other type of equipment comes as easy as drinking water. That's no 'bull.' If classes could not be better employed doing a few tasks in a hard hat and 'spindling up' from 30—40ft. etc, than swimming around in that pond you have at Horsea Island, send me to the 'bagracks.'!

The powers that be may consider that 'standard' is outmoded but I

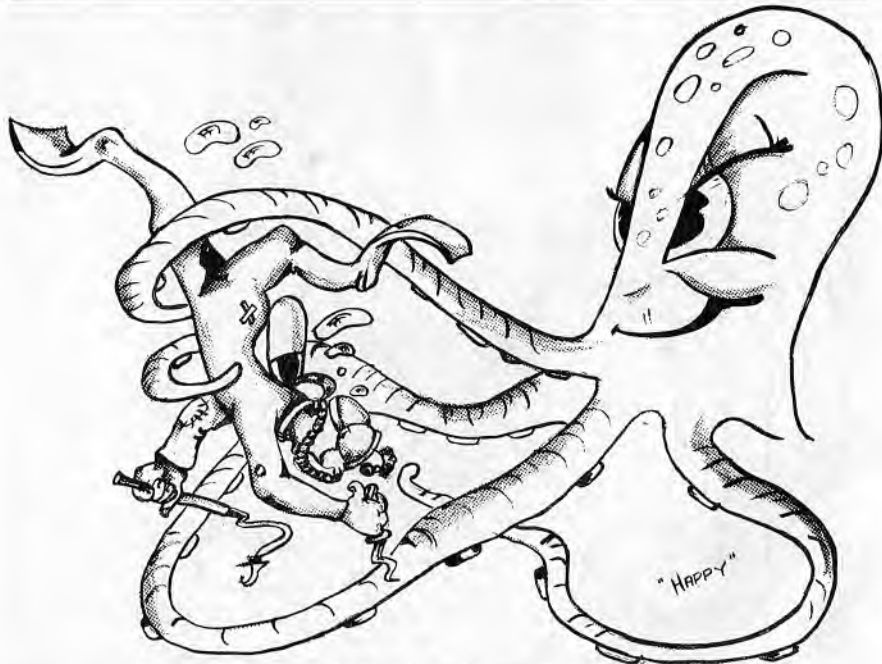
consider it to be still the best media for training divers, or is it long distance swimmers that the 'Andrew' wants? It's safe to say that one hard hatted man is equal to three self contained divers on the bottom. Finally if I were still in the *Andrew* I would suggest the return of Standard for training but I suppose the new types will open fin on this.

DAB DAB

Editor

1. Strong words from an Ex Steamer but I trust some Cork Head will be able to give a good answer!

2. A week's Standard Diving is included in the present course for Clearance Diver 2nd Class.



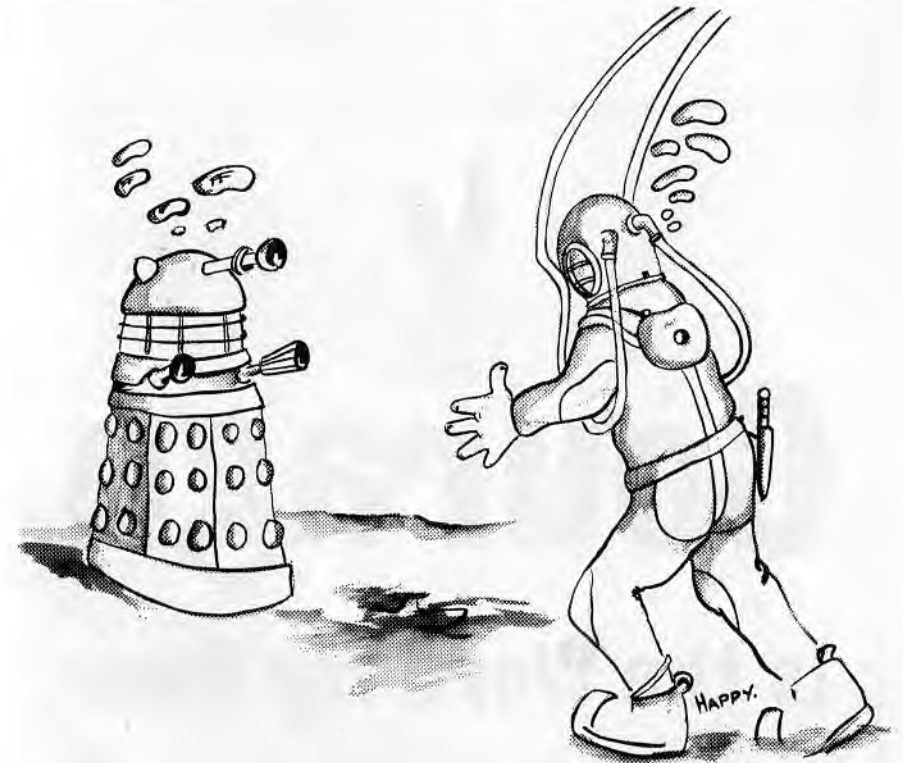
Strewth! I'll be glad when these three weeks at Horsea are over!!

For the Very Old Divers

ARRIVING at R.N.B. Devonport in June 1965, I was amazed to see them knocking down Jago's Mansions, and as the crain driver swung his heavy steel ball, there were cheers from the on-looking matelots when he made a direct hit, and down came the crumbling masonry. My mind went back to 1931 when I first went into Jago's for a one days gas course from *Defiance*. Ah well, on to the Diving School in comparative silence, for the gun battery did not echo to the screams of Gunnery Instructors.

I fell in with class SDC 11, and cast my rheumy eyes around in the vague hope of seeing one of my contemporaries. 'Don't they train them young these days? Blimey! The instructor's in an ugly mood this morning—wonder why they call him 'Red'. Please God, no mud runs—just yet anyway!

After three days of cruelty I was staggering back from the 'Matapan,' heavily laden with stand, weights, set, etc. and completely exhausted, when I saw a familiar face set in



MUM!!

black rubber. The face and figure were nearer my age group, and were showing visible signs of distress after a 'Matapan' search.

'Hello Jan' I said, 'all go isn't it?'

The face smiled politely and nodded. I wondered what ship I had been in with him. I was puzzled.

Two days later I was 'fell in' with the class, when the Face staggered up the last few steps to the school.

'Alright Wack?' I called in a loud whisper with sympathetic concern.

Again the polite smile and a nod of the head.

The chap next to me said 'You're very chummy with Wack aren't you?'

'Yes we are old ships.'

'Do you know who he is?'

'No, I can't place him.'

'That is Captain Butt.'

'Well, you never can tell; when they are in a rubber bag they all look the same.'

If, like me, you have served in a coal-burning battleship, there is not much hope of seeing an 'old ship' at the Diving School—anyway, not now that Lord Louis has left the service!

R. LENNON, C.P.O., R.N.R.



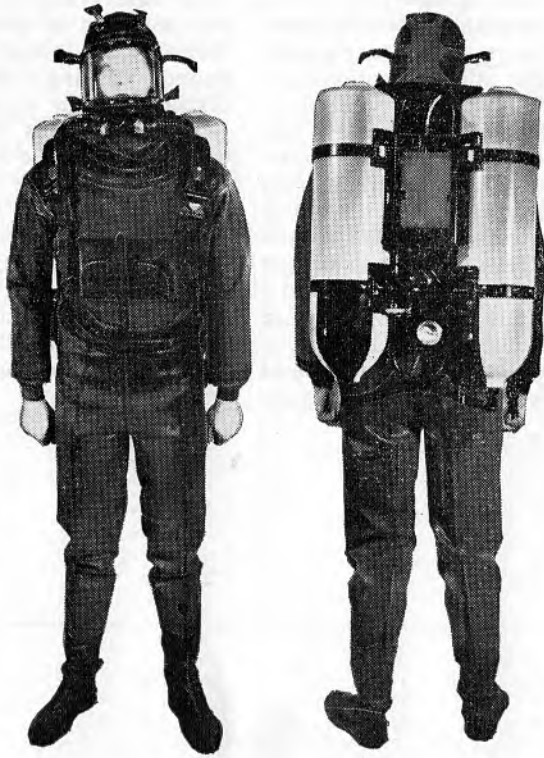
Courage

is the Word for Beer

Doctor Pinto, an American dentist and an enthusiastic SCUBA diver, claims that many of the unpleasant symptoms and ailments suffered by divers can be traced to distortion of the jaw because of mouth piece breathing. The effort required, often subconsciously, to hold the mouth piece in position imposes an unfair load on the teeth and joints of the lower jaw. This can result in serious consequences—pains in the jaw and a numbing sensation of the teeth are common complaints, and if the dive is for an extended period, nausea and sickness may develop. In the very

worst cases it can cause inflation and accumulation of fluid in the Eustachian tube, which results in impaired hearing, headaches and, dizziness. To overcome all this Doctor Pinto has designed a mask which fits over the lower part of the face and under the chin, leaving the nose and eyes free. The mask has no mouth piece and is so designed to permit speech at close range without electronic aids, and tube feeding of the diver. No other details of the mask is available but it is understood that a prototype is being tested by the U.S. Navy. G.A.F.





The diver is wearing an Underwater Swimmer's Dress made from rubber-proofed crimped knitted nylon, and is using SABA (Swimmer's Air Breathing Apparatus).

The suit is manufactured by Dunlop General Rubber Goods Division of Manchester, and the breathing equipment by Dunlop Aviation Division of Coventry.

Dunlop have for many years produced various types of underwater equipment for the Admiralty, playing a leading part in the design and development of apparatus for different specialized branches of underwater operations.



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CFH/AV/24



Since 1949 TYPHOON DIVING EQUIPMENT has been manufactured for the Sports Diver in the United Kingdom. Today the most comprehensible range comprises equipment of our own manufacture, such as Typhoon Suits, Fins, Masks, Snorkels, etc., as well as selected imported products, Diver's Watches, Underwater Cameras, Harpoon Guns and two-stage, single hose compressed air Demand Valves.

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