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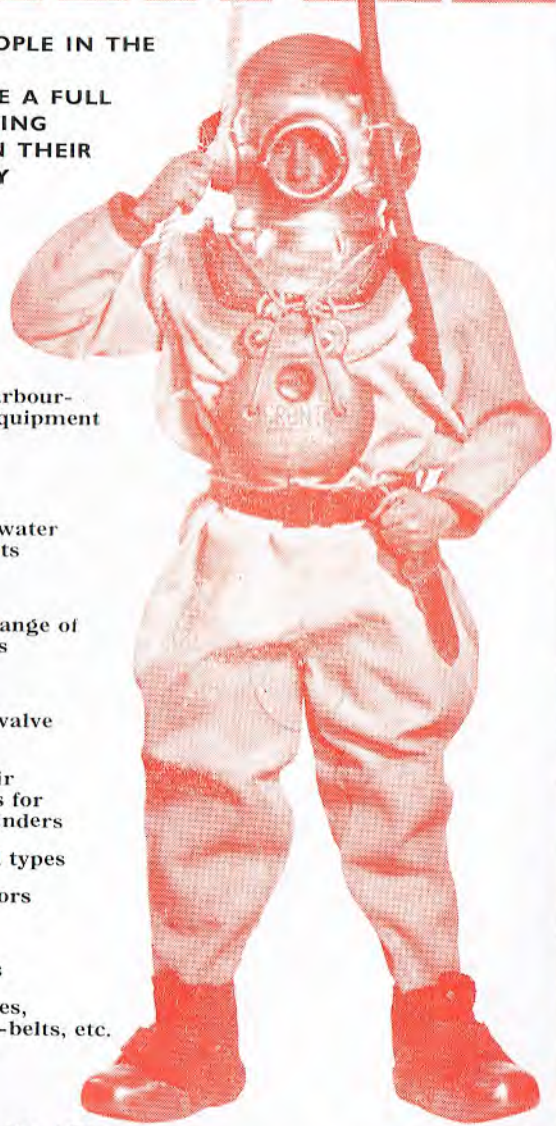

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R.N. Diving Magazine

EDITORIAL STAFF

Chief Petty Officer R. L. Benfield, *Editor.*
Lieutenant H. Parker, *Treasurer.*
Instructor Lieutenant R. M. Smart, B.A., R.N., *Secretary.*
Able Seaman A. Lyden and L/Sea. M. J. Brassington, *Cartoonists.*

Vol 7 Autumn 1960 No. 4

Treasurer's Notes

THE BALANCE SHEET

THE cost of producing the DIVING MAGAZINE keeps rising steadily and has now reached nearly £140. Our income from the sale of 1,000 copies and advertising is about £10 less than this. The deficit has been reduced slightly by the profit made on the sale of ties, but we are still out of pocket.

The two alternatives are to lower the quality of the magazine, or to raise its price. We believe that the latter is perferable, and that most readers would rather pay more than see a lower standard.

Accordingly, the price of future issues will be two shillings. Magazines will be sent to regular subscribers in the usual way, and you will be notified when your credit is less than 2/-. We suggest, that, if you have not already done so, you make sure of receiving every issue by paying an annual subscription. Copies are sent post free. An order form can be found in this issue.

Sad Farewell to Deepwater

(*By kind permission of 'Portsmouth Evening News'.*)

BALEFUL bugle notes, a 21-thunder flash salute, and a parade of croaking frogmen — that was the H.M.S. *Vernon* farewell to the good ship *Deepwater* today.

Deepwater, jumping-off platform for 4,000 naval divers who passed through the establishment, scene of 12 years' barnacle breeding, is too old to be a fixture any more.

She leaked, fire risk was great, and divers were afraid of rasping their suits against the crustacea. Even practice limpet mines would not stick.

So *Deepwater*, the ex-German experimental torpedo boat *Walter Holzapfel* (he invented the electric torpedo) was condemned, and is now on her last voyage to a Southampton breaker's.

Watching the black hull slide from its berth at the end of Vernon Creek was *Deepwater*'s one and only Commanding Officer, Capt. W. O. Shelford, R.N. (Retd.), who gave the

vessel her new name after she had been brought from Hamburg in 1945.

'I took over in March 1946, we refitted, then became the headquarters for the Admiralty Experimental Diving Unit,' he told me, as his former command was manoeuvred into mid-stream.

On her first voyage under the White Ensign, the ship lived up to her name. The crew found themselves in deep water, trying to understand the German markings on equipment and in the engineroom, where an advanced kind of diesel was installed.

'For the first time in the Royal Navy oxy-helium deep diving trials were carried out from *Deepwater*. This eventually led to the establishment of a new record descent of 600 feet from our successor, H.M.S. *Reclaim*,' said Capt. Shelford.

Another officer who was sad to see *Deepwater* go was Lieut. William Barrington, R.N., of Green Road, Southsea, who was on board during her single commission.

Beside him stood his 14-year-old daughter, Susan, who was christened in a diver's helmet on board.

Susan Barrington and Capt. Shelford

Vernon is not to get a replacement 'dummy'. Instead, divers will now have to train around the hulls of the Reserve Fleet.

'There will be just as many barnacles under those', I heard one diver mutter.

NOTICE

The Divers' Annual Dinner, 1960

ADVANCED warning is hereby given that the Diver's Annual Dinner for 1960 will be held at Kimbells, Osborne Road, Southsea (same place as last year but larger dining space and improved bar service) on THURSDAY 15TH DECEMBER.

It is regretted that favourable arrangement could not be made for a Friday date, which might possibly have been better.

DEEPWATER'S LAST VOYAGE

GUARD OF HONOUR

The Life of 'Deepwater'

by CAPT. W. O. SHELFORD, R.N. (Retd.)

SO, *Deepwater* has gone at last, and with her passing ends a period unique in the history of diving, and possibly in the history of the Navy.

At the Annual Divers' Dinner last year a Senior Officer asked me if she had ever been to sea. All you divers who have qualified, requalified, or just loafed on board her probably don't know the answer to that question either, so here is the true story of *Deepwater* by the only British Officer ever to have handled her at sea.

Deepwater is an ex-German ship, originally named *Walter Holtzapfel* after the German expert in Torpedoes of the First World War. She was designed and built as an experimental Torpedo firing ship and seaplane carrier in the late nineteen-thirties. As we all know what experimental torpedoes are, she obviously had to have diving gear. She used to carry a huge mat which unrolled from her square stern, and up which the returning seaplane would shoot like a water-ski-jumper, and then be hoisted in on that vast travelling crane, which I believe has long since been removed.

She was in commission as a sea-going (duty-free !) ship from 1946 to 1948 as a 'fill-in' between *Tedworth* and *Reclaim*. I commanded her for those two hectic years in which she produced more surprises and excitements than the average 20 year old Battleship.

Her very acquiring was unorthodox. In 1945, I was sent over to Germany as S.-of-D. to see whether we could learn anything from German diving developments during the war. I was also told to look out for a possible relief for *Tedworth*. This latter ship was a twin screw coal burning minesweeper, or 'Smokey Joe', of 1916 vintage, and had been continuously at sea during the last War. Although still capable of 8 knots she was very worn out. The story goes that her Chief discovered that he was sounding the harbour through a hole in her hull when he thought he was sounding the feed water tanks.

My contact in Kiel was the Chief British Salvage Officer, a remarkable character — Commander Griffiths, R.N.R. While helping him to deal with some captured stores at the bar of the Kiel Yacht Club one night I told him of my quest. He said he knew of just the right job which he was using as a crane ship to clear explosives from the Torpedo Depot.

Next morning we went by launch to look at her. She looked very different from the silhouette that has been so familiar along-side *Vernon* all these years and as high as a battlecruiser as I stared up at her from the launch. Her bridge was crowned with a vast Radar aerial, her sides shook to the vibration of her three generators. The 60 foot jib of her crane was topped right up and was swinging three torpedoes at once off the jetty. My eyes nearly popped out of my head when the crane trundelled along half the length of the ship and deposited its load in a lighter tucked under her stern. On her fo'c'sle was a triple torpedo mounting, and a quadruple one filled in the fore end of the quarter-deck. I quickly spotted the diving door in her port bow.

I was taken all over her by her German Captain, a man whose first and only love was obviously his ship. He almost prayed me to take her when I said that we would keep her as a sea-going concern. There was certainly much to be said for her and I sorely wanted to say I'd have her. Those enormous deisels down in the engine room; the rows of air-compressors; the radar, echo- sounder, and Asdic, all had been so sadly missing from *Tedworth*. But as I made my way back to the captured stocks in the bar with Griffiths I told him regretfully that I thought she was too big. Later he showed me some tenders that were too small, but I fell in love with one, whose German name I can't remember, but was later known as *Clearwater*.

However, I began to dream about the *Holtzapfel*. I saw S.D.C's and observation chambers swinging from that great crane; those cavernous torpedo parting shops down aft full of diving gear; the compressors feeding a deep diving panel on the quarterdeck. This could be a floating home for not only the 'Deeps' but for the A.E.D.U. as well as S.-of-D. and would have a floating, mobile, duty free headquarters. All this went down on paper to the Admiralty before I returned to England.

Back home, I was soon embroiled with routine matters and heard no more of my proposals from Germany. I dismissed the whole idea as a dream engendered by too much German gin and got on with trying to hasten *Reclaim* forward.

Then one day in early 1946, six months after my German trip my 'phone rang and a voice said:

'This is Deputy D.U.W. speaking. You remember that ship you wanted from Germany? She's due in Portsmouth the day after tomorrow; her crew are under guard and must leave her on arrival. You must be ready to take her over.' Then he rang off.

Take a ship over!. The A.E.D.U. in those days consisted of two officers besides myself, Tom Grosvenor, Jock Campbell, and a gorgeous Wren. To make matters worse, K.H.M. refused to put her alongside and allocated her the buoys opposite Camper and Nicholson's. This meant duty watches, running generators and boat routines. Luckily one of my two officers was the late Lieutenant Chadwick,the redoubtable 'Chads'. I promptly appointed him First Lieutenant because I knew that 'Chads' would, if necessary organise a freeze-up in Hell provided you didn't enquire too closely how he did it.

Between us we managed to beg, borrow and steal some sailors and stokers from *Vernon*, and the Diving School lent us a boat and some divers.

When the ship arrived we went aboard. There was time only for a quick walk round because Marines with Tommy Guns were shepherding the crew into a landing craft. The German skipper had tears running down his cheeks as he finished packing up his cabin. I remembered that I had half my tickler ration in my Burberry and stuffed them into his grip. We shook hands and then he was gone. 'Chads' and I were left alone in a 1,500 ton ship that we had apparently bought for a hundred fags !

Now we had to turn to and convert her. While waiting for the Dockyard to take her in hand we proceeded to get rid of all the unwanted fittings and stores. Luckily the torpedo tubes and their control gear were apparently of a design never seen before,

and an enthusiastic gang of experts came aboard and removed the lot. The divers were turned loose with burning gear to get rid of unwanted fittings particularly in the torpedo flats aft. We landed altogether 22 tons of scrap steel; unfortunately this had to include the radar array because we found that there was no radar set to go with it !

Then we were taken in hand by the dockyard for conversion. There were of course plenty of snags. For instance, the 10 ton crane only had enough wire on the purchase to reach the water line, so we rigged a minesweeping winch underneath it and led a 600 foot non-spin wire up the jib through snatch blocks; the stern anchor although fitted with chain cable and its own cable holder was obviously too light to hold the stern against any tide or wind. I hoped to lift *Tedworth*'s stern anchor eventually, but she was half our tonnage and something better was needed. We 'won' a 15 hundredweight Admiralty pattern kedge from somewhere and I felt confident that in this monster we had a 'spade' that would dig in against anything.

The recompression chamber fitted in the diving compartment for'd was only a single compartment affair, so we asked for *Tedworth*'s two-compartment chamber to be transferred. By an incredible piece of crane juggling, the dockyard extracted this chamber through one of the diving doors (a lot smaller then *Reclaim*'s), put it on a truck and dumped it on our quarterdeck where I presume it has rested ever since.

At long last the refit was over, and I arranged that we should be berthed alongside the *Tedworth* to transfer the crew and stores. If you tell off a crowd of divers to literally gut a ship you may rest assured that they will do it efficiently and thoroughly. By the time 'Operation Locust' was over we found we had 40 coal shovels neatly stacked between the main diesel engines.

Our first trip down harbour took a dozen or so years off my life. I had no means of knowing whether the Cox'n or anyone else could operate the 'press-button' steering, nor did I know whether the 'black squad' down below could throw those monster engines into reverse if I rang down for the brakes in a hurry I have never been so glad to see *Vernon* and Blockhouse dropping astern on either side of the ship, instead of both finishing up on the same side as I had half expected. It was not until we were well out to sea that we found that the Port engine had developed a defect that prevented it from being stopped at all !

We put her through her paces and in a burst of confidence swept past the Nab Tower at 18 knots. Then we moored and tried out the diving arrangements. Apart from some petty scathing comments from the divers, who had been used to *Tedworth*'s easy access and were now asked to 'crash surface' up an 8 foot freeboard, it all seemed to work fairly well. We returned to harbour to await our first serious assignment.

This came more quickly and dramatically than I had dared to hope. I was told that a French ship, the *Alaska*, had been rammed and sunk during the war off the Isle of Wight carrying a cargo of copper ingots. With the price of raw copper standing at over £200 a ton, it was a salvage job worth tackling and the Admiralty were considering tendering for the contract. Would I take *Deepwater* out and survey the wreck so that the Admiralty would know what they were up against ?

The position given me was some 20 odd miles East of St. Catherines and due South of Selsey Bill. My chart showed a depth of 37 fathoms at low water springs, so here was a wonderful opportunity to try out every technique of seamanship and diving in the book. I also learned in *Vernon* that this was a well known 'non-sub', on which every Channel convoy escort had been in the habit of emptying its 'eggs' just in case, and since the War had been used as practice depth-charge run so I didn't expect it to be in very good shape.

A survey M.L. located a wreck exactly on the bearings given and we sailed on the next neap to start our survey. Unluckily the marker buoys had drifted and we had some trouble in locating our object, but we got in enough dives to know that she was a very battered, but large enough ship to be the right one.

On subsequent trips we learned fast and the hard way at that. I found that the chief trouble was to stay over the wreck between slack waters, even though the weather was comparatively kind to us. Even *Deepwater*'s big bower anchors had a nasty habit of sliding through the shingle when the tide was at full force. On the other hand she was a wonderful ship to moor; her powerful engines, backed by a rudder abaft each propellor, helped to splay the mooring across the wreck; a factor which I found sadly lacking when I tried to do the same job in *Reclaim* later on.

Dan buoys were pretty hopeless. they either ploughed under in the tide or simply drifted away. I watched one go sailing happily away towards Dungeness, and six hours later it turned up back alongside. One high water a buoy which we knew was firmly on the wreck could be seen 'watching' some 30 feet below the surface. Pat Higgins, my D.O.1, sent a diver down to tail it. This involved going down with a spare buoy wire and a line to hold the old buoy. The diver had to unshackle the buoy and hold 250 feet of wire between his knees, then secure a line to the buoy, and shackle the new wire to the length leading down to the wreck. The tide was running about one knot all the time. Try it some time when you have nothing else to do !

Another time we ran things a bit close and had a diver decompressing on the shot as the tide was making. He was swept off the shot rope at 90 feet and appeared on the surface 'blown-up' and streaming out on his gear under the port bow. It was an anxious few minutes till we had him safely back on the ladder aft.

We started our diving using Standard gear and 'crash surfacing' as the top of the wreck was barely 200 feet down. It is not without interest that Tedworth, starting with the *Thetis* operation in 1939, had used no other method throughout the War. One evening Pat Higgins pointed out to me that even on top of the wreck at high water the depth was really beyond the limits then laid down for surface decompression and that if we wanted to penetrate down to the sea-bed we would definitely have to use some other method. I didn't realise in replying that we would, in that case, have to use the S.D.C., that I was in fact making history. Pat pointed out that in the 15 years the gear had been in Service, it had never been used in the open sea outside of a Scottish loch !

Hoisting the Chamber out in a rolling swell was exciting. It swung across *Deepwater*'s wide deck in an alarming way, but once again the reach of the crane jib helped us; we

simply dumped it in the sea well clear of the ship's side so that the water acted as a damper, then bowsed it in alongside against two torpedo fenders ready for manning. We found this effective even with quite a motion on the ship, which would have prevented us using it if we'd only had derricks.

In spite of a good deal of ingenuity and continuous diving on every slack water, we didn't seem to get much information from our survey which tallied with the details of the ship I had obtained from the owners, the Compangie Generale Transatlantique. Bill Filer for instance came up one day and triumphantly announced that he had found the collision damage right forward under the Port bow, whereas *Alaska* had been rammed on the starboard side amidships.

For one thing I felt that we were wasting too much time on each trip re-locating her because our dan-buoys, as I have said, either drifted off or were rammed by the Channel shipping when we were not there. Trinity House laid a wreck buoy on the spot, but it also disappeared the next time we came out.

Also we seemed to veer about all over the wreck between slackwaters. Having had a good look on one tide, the first diver down on the next slack found himself in a totally different part of the ship so we were unable to get a coherent picture.

I therefore pinned *Deepwater* down with no less than five anchors laying two of them miles away with the motor cutter. Nevertheless in a sudden blow one night we swivelled through 90 degrees and had to unmoor as quickly as possibble efore we were in a hopeless bunch of knitting with the wreck below us.

The Stern anchor was very reluctant to come up and both the after capstan controller and the Chief E.A. were very hot and bothered by the time it appeared on the surface. There, neatly impaled on one fluke with a great verticle gash the shape of a ship's stem, was our wreck buoy. While we dis-entangled the mess of the two cables I secretly congratulated myself on some pretty accurate mooring !

The only answer seemed to be a proper light buoy, but Trinity House, whilst having a buoy ready could not spare one of their ships to lay it. I therefore volunteered to lay it from *Deepwater*. Those of you whose only acquaintance of a light buoy is to watch it bobbing around in the sea, probably have no idea what a formidable contraption it is in close up. The lighter which came alongside from Cowes the evening before our next sortie, brought a monster weighing five tons standing about 10 feet high and with a bulbous bottom full of gas cylinders and things. Flaked down in the well were 90 fathoms of two and a half inch square link cable, while the whole lot was topped off by a flat eliptical three and a half ton iron sinker.

By the time we had finished there was little space left on the upper. The Trinity House man produced a key and inserted it somewhere and started the light flashing. Remarking that it would go on like that for the next six months, he took his leave. Later that evening the Officer of the Day could have been seen climbing up the cage and fitting his sea boot stockings over the light after a signal from C.-in-C. to 'investigate and report forthwith on green flashing light in vicinity your berth !

The next problem was to lay it all. My plan was to locate the wreck, hoist out the buoy and do a slow run up with it towing astern. When

the wreck came up again on the echo-sounder we would stop, and lower the sinker to the bottom on a wire, paying out the chain cable as we went To this end the cable was flaked down on' the quarterdeck with each fleet stopped to an athwartships jackstay.

All went according to plan. Over the echo sounding contact we lowered the sinker, but after the first two fleets of cable had gone decorously over the stern, the lowering wire of the sinker chafed through and the rest of it left us in a deafening roar and a shower of rust, guard rail staunchions and loose deck fittings. Thank God, everyone had been ordered to stand clear outside the crane rails so there were no casualties. In the shocked silence that followed 'Chad's' voice was heard reporting: 'Light Buoy well and truly laid, Sir'. There the thing was visible through the fading rust cloud, serenely floating off the quarter and winking at us with its infernal green eye.

With our location problem now solved we began to make more progress but were suddenly brought to a halt by a signal ordering us to cease diving forthwith and return to harbour. Gladly leaving the Wreck Buoy for someone else to recover, we sailed from the *Alaska* site for the last time. A 'phone call to the Admiralty on arrival told me that a well-known civilian Salvage firm had been awarded the contract to raise her cargo and not unnaturally had asked the Navy to stop mucking about with their wreck.

I wrote out a copious report on our findings and our experiences and sent it up to the Admiralty who flogged it to the Salvage firm for a hundred pounds. Much later we heard that they had eventually found the *Alaska* five miles further East and were recovering copper from her. I'm sure the profits on the job must have amply covered that £100, but I wonder what ship we were diving on, and who rammed her under the port bow ?

Nevertheless the 'pseudo-*Alaska*' operation, as we christened it, had been of immense value to us, if not to the salvage firm. We had proved that *Deepwater* worked, not only as a ship, but as a practical deep diving ship. Not that she hadn't played her little jokes, like the galley catching fire almost daily, the lighting generator crankshaft coming in half, and the port engine frequently refusing to stop till the fuel was shut off. Bill Filer, who acted as Navigator when he wasn't being D.O.2, and I had certainly learnt a lot about finding a wreck for the most part out of sight of land and mooring over it. The Ordinary Seamen had laid out anchors so many times that they must have described it in answer to every question in their seamanship exam, while the coal shovelling stokers from *Tedworth* had been highly successful in dealing with an ultra-modern set of diesels.

Personally I thoroughly enjoyed our slightly piratical days out there in a reasonable summer. away from all routine and almost out of touch with authority as we could only keep W./T. watch on a commercial wave length. In any case the staff always forgot us once we had sailed, as was proved when they allocated the exercise area in which we lay to a destroyer to do full speed trials and live depth charge practice !

I felt fully confident that we could tackle a much needed deep training course and made arrangements to go up to Inveraray after the summer leave period. If the Editor will allow me some space in his next issue, I will tell you of the mishaps and adventures which beset this comparatively unambitious programme.

(To be continued

Tyne Divers

THERE has been no article from *Tyne* in this magazine for so long that you can be excused for thinking she doesn't carry divers, but she does !, and if only to get some peace and placate the persuasive but rather hairless gentleman who keeps getting on to me, here goes:—

We are a select nucleus of C.D.O., D.1, D.2 and D.3, with S.W.D's to Draftie's taste but no sooner do we get a bunch trained up than Bang they all go on draft. We try to keep the numbers up by running courses when the ship's programme gives us three weeks clear to do so, and we have succeeded in running two so far.

We had the usual trouble, about 50 volunteers for the twelve places, but still it gives scope for choice even after knocking out anyone who has less than six months to do in the ship, and we did manage to get six from the first course last November— half of whom have been drafted since — and five from the last one, so we now have about sixteen.

The middle of February saw us sail, all set for Spring cruise and sunshine and we wended our slow way to Gibraltar for the usual fleet meeting calling at Bordeaux and Bilbao on the way.

Bordeaux seemed to be an excellent run ashore judging from the stories swapped in the diving store on mornings after; but not an ideal place for dips as the river was tidal, thick with suspended mud and extremely fast flowing, but some clown managed to lose a floodlight over the side so dips we had until it was found, well downtide.

Attractions ashore included tours round some of the local chateaux (where they make and bottle wine, you ignorant lot) in St. Emilion — with samples of course, and during one of these we found out why Champagne and similar wines are so expensive. There was a vast cavern hollowed in a hillside with hundreds of thousands of bottles of wine maturing, and during a certain stage in the process which lasts about three months, each bottle has to be given a quarter turn every day by hand !

There was also a bus expedition to Lourdes for the faithful to gain merit and the others to gawp. Most of the Church buildings are in the High Victorian style and quite hideous, and you have to visit the fort to find anything dating back to Bernadettes' time. The fort which was held by the English in the 13th century has been turned into an excellent museum of local art and crafts.

Next we called at Bilbao in Northern Spain where the wine was even cheaper, and the Spaniards proved to have all the right ideas — one member of the team was invited to lunch at 2 o'clock. The meal started at 3 after a few wets, and hadn't got past the coffee and cigars stage by 7 !

While we were there the Agadir Disaster occurred, and signals were soon flying around saying '*Tyne* available if required' so we proceeded to Gib. at our best speed. We got in there at 0800 on the Friday and sailed again at 1800 loaded with stores of all kinds — bedding, timber, lime — medical stores, water tanks, and a large pile of foodstuffs under tarpaulins on the welldeck. We arrived at Agadir at first light on the Sunday morning and we were very surprised to see lights ashore, in fact the whole place looked quite normal except for the conglomeration of N.A.T.O. warships anchored off.

As dawn broke and you could see the town it still looked fairly normal, but once you got ashore or used a powerful pair of glasses the damage was incredible — the normal looking buildings were either just shells with no floors inside, or had lost one or more walls, The hill where there had once been a luxury hotel was quite bare except for rubble, and over all hung the smell of dust mingled with lime and D.D.T. All the time you could see clouds of dust rising from demolitions, and the streams of D.D.T. dust falling from light aircraft in the attempt to prevent an outbreak of disease, similarly all bodies found during the demolitions were covered in quicklime and reburied.

We landed tons of lime for this purpose, bedding and other stores by a Spanish L.C.T., and by our own launches — meanwhile the timber on board was being turned into prefabricated huts which were landed by launch everyone working all the hours God gave. We had of course hoped for some diving jobs, and a chance to use our B.G.T. outfit, but the only job we got was examining *Darlaston*'s screws and rudders after she had berthed in the harbour as her captain thought he had hit something. Lots of vis in the water, and the memorable sight of all the cranes on the jetty on their sides, as the rails on which they ran differed in level by 5 or 6 feet now !

We had arrived rather too late for any dramatic rescue work as there were thousand of Morroccan troops on the scene by then, so we returned to Gib. to get on with things like 'Awkwards' and our bread and butter jobs of examining submarines and picking up things that clots dropped over the side. The visibility was very good by home station standards, and we even managed to retrieve a chef's signet ring !

On our return to Pompey we started to refit in preparation to reverting from submarine support to escort maintenance, and to while away the time we ran our second S.W.D. class, although according to our loan list we were and still are down to two suits — no more being available in the dockyard, which makes life difficult. Also the diving party have got the liferafts on their slopchit as well now, and it's surprising how much time they eat up.

Towards the end of the refit our new toy and new complement arrived — the toy being a Dome Exchange outfit Mk.2, and the complement allowing us C.D.O., C.D.1, C.D.2, two C.Dx, two D.1, two D.2 and two Artificer Divers, so who's for a draft to *Tyne* !

That's all for now from the Select Four, Lt. Edwards, C.D.O.; P.O. Falk, D.1; M.(E)1 Cooper, D.2; A.B. Flynn, D.3.

Testing Table II Decompression Stops

by 'B.F.'

ANY loose thinking diver who imagines that H.M.S. *Reclaim* does not do much diving these days would have received a rude awakening to the truth had he been in my shoes recently. I joined *Reclaim* at Plymouth and after a pleasant and uneventful passage we arrived at Santander two and a half days later. In addition to being a business trip

this was also the annual official foreign visit and we spent the first few days in exchanging calls and fulfilling social functions. Under the latter category undoubtedly the Children's Party for 150 youngsters (including 40 orphans) was the most strenuous. Children are internationally appreciative of much the same things, and slides, see-saws, space ships revolving on the forward capstans, smugglers cave in the diving flat, cruises in the piratical diving boat, Aunt Sally adorned by diver's helmet, and comic films produced the usual delightful and excited expressions that one sees at such parties held under more conventional circumstances.

With the Official and Social duties attended to, we quickly got down to the tedious but very necessary business of testing Table II Decompression Stops. The reason for these trials is that Table II stops have been formulated from theoretical considerations using the fully tested Table I as the foundation on which to build. If the limitations of Table II can be fully assessed it is to be hoped that the decompression rules for multiple dives and surface decompression can be extended to permit longer and more frequent dives. The extent of the trials and the limited availability of *Reclaim*, has delayed the practical proving of this decompression table until now.

If my earlier use of the word tedious in describing these trials appeared to be laying it on a little thick, let me quickly show you that if anything it was a gross understatement. I was very kindly given the very doubtful privilege of making the first dive in the 70 foot series. It sounds a cissy depth doen't it ?, and maybe it is, but it wasn't exactly the depth that impressed me, rather was it the fact that I was required to remain at that depth for 2 hrs. 40 mins and subsequently to be decompressed in the water for 2 hrs. 10 mins. making a total dive of 4 hrs. 50 mins. I must admit that during the long drawn out, soul destroying decompression I did casually wonder if this might be a record for the time spent at this depth, and thought it almost certainly must be, for time spent on stops in the water. However this did little to boost my morale, particularly as I was becoming increasingly impressed by the impelling influences that water has on the desire to perform a certain natural function. The somewhat metallic reproduction of Spanish music relayed through the diver's intercom system did much to relieve the monotony. Similarly the fascinating performance of the bubbles cascading upwards from the divers below me provided further distraction.

The dive itself was not allowed to become boring because of the wide variety of jobs that descended to me in rapid succession. There was 'Roulette', two circular plates with numerous different sized holes, that had to be bolted together by selecting the correct sizes from an equal number of nuts and bolts. There was also the usual chain unravelling lark, except that this chain was six fathoms long and the characters that knitted it into a hopeless tangle lost their tots if the diver was sussessful in sorting it out. The chain did actually get shorter as we progressed because the next task was to cut six links (3/8″) off with a hammer and chisel which had already been somewhat blunted on a wire chopping chore. The hardy annual of hacksawing 1/4″ angle bar was used as a fill in job when the really swift operators overran the speed at which the topside personnel could get the

occupational hazards prepared. A rather surprising and completely new form of underwater torment appeared when later the divers were invited to make an eye splice in 2″ wire rope, and just to show that the ridiculous can become perfectly reasonable, one erstwhile diver put an Admiralty splice in one end and a Liverpool Salvage splice in the other. Excursions from one shot rope to another and around the sand silted bottom were also made, but although several sizeable fish were observed amongst the sparse vegetation, they apparently realised that gun play was not permitted, and merely ambled casually away from our threatening, but cumbersome advances. No matter how difficult the task or how long the dive there could be no complaints with such a variety of occupations to be pursued, even though it was realised that the stops to follow would be inevitably dreary.

Apart from the very long dives which may never have been performed before, we felt that history had been made when a Spanish Navy Chief Diver named Rubio, with Lieutenant Alfredo Rios acting as Diving Officer and interpreter, made an extremely valuable dive to add to the inevitably slow accumulation of practical proof of this decompression table. Lt. Rios and C.P.O. Rubio travelled 1,200 kilometers from Cartagena to be with us. We hope they enjoyed their stay as much as we did because they fitted into the team perfectly and became such good shipmates that it seemed all wrong to have to leave them on the jetty when we finally sailed for Falmouth to continue this lengthy, but vital research into decompression schedules for the benefit of divers wheresoever they may submerge.

Footnote. In all fairness to the reader I must confess that we only did two dives of 4 hrs. 50 mins. duration, after which we decided that it was not right that we who were testing decompression tables should apply the cautionary measure used in practice of taking the next deepest schedule for stops when the diving depth occurs at the limit of the bracket. Stops thereafter were consequently decreased to a total of 1 hr. 30 mins. making a total dive of 3 hrs. 10 mins.

Mudlarking

J. R. JONES (*Hon. Secretary*), *Underwater Explorers' Club, W.A. (Inc.)*

TWO members of the Underwater Explorers' Club of Western Australia were recently called in to help in attempting a feat of salvage under abnormally difficiult crcumstances.

A little way outside the City of Perth a small lake is being reclaimed for future playing field developments. At the south-east corner a causeway of rubble and sand has been laid across it, leaving in the corner a lagoon about 50 yards wide and 100 yards long. A truck filled with sand, while backing along this causeway, veered from the centre and fell over into the water and mud, leaving the narrow causeway so broken down that it was impsosible to get it back to the point from which it had slid. The first attempt at salvage involved towing the truck through the water to the other side of the lagoon, but in the middle the cable broke, and the vehicle sank into what was later established to be three feet of water and 20 feet of mud.

The U.E.C. was called in to help, and after the truck had been found and buoyed, two divers were sent down to attach a fresh cable. Here the diving problem became almost insuperable. The deep mud into which the truck had sunk was so thick swimming was impossible, and demand valves, jammed by the ooze, ceased to work.

An answer to this was found: the divers taking it in turn to go down, carried a hose pumping water. This could be used to dilute the mud sufficiently to work a passage through, and, when played round the demand valve, kept it working. Visibility, of course, was zero, and since the lake has been an unofficial rubbish dump for about a century, decomposing vegetable matter, decaying dead dogs and other rubbish, made the smell and taste of the water memorable. The divers could not come up through the mud unaided, but had to be hauled out by the tender.

Chains, in spite of the difficulty of towing them through the mud, were attached to the front assembly of the vehicle. But at this point, fortune ceased to smile. The towing gear took the strain, but then the front assembly proved to be too weak, and the front axle broke off. A further dive produced a wheel, and it was proposed that a dive should be made for the other wheel, so that the Club could at least get a trailer out of the affair, but by this time the divers (Len Cohn and Mo McCarthy, for the record !) had had enough. Although the truck wasn't recovered, they deserve full credit for a series of dives which tested ability and confidence to the full. But when you have a job of this sort to be done in the future, don't ask them to do it: they've made a vow to stick to water with at least 6″ visibility in future.

Reversed Ears

by S.-of-D.

MANY interesting conversations take place in my office, while I struggle with the ebb and flow of papers, and a recent one has provoked this appeal. Quite a number of people have had reversed ears but practically all the available information on the subject is hear-say and we have very few reported cases. This is unfortunate for there are plenty of theories as to how they occur and too little evidence to substantiate any of them.

To those, like me, who rapidly get out of their depth with medical terms, a 'reversed ear' means bleeding from the outer side of the ear drum, which can occur with or without pain at any period of a dive. Unlike a failure to clear the ears going down, which can result in a perforated ear drum, a 'reversed' ear is rarely serious; if there is no infection it may only mean a fortnight off diving.

In general reversed ears are associated with underwater swim suits and C Type Hoods but I have heard of a case in standard, so we must not be too restrictive in our search for the cause. The ear pad gets most of the blame, perhaps because it's the nearest thing and there have been lots of suggestions as to what should be done with it, not all very helpful.

There is an idea that reversed ears occur more commonly in winter than

summer and may be connected with colds; others hold that it is all a matter of going down head or feet first; some think that the proper use of suit inflation can eliminate all risks. One thing alone is certain from the discussion that I listened to — we just don't know what really causes 'reversed ears'.

Of the theories that have been propounded, two seem most reasonable and offer some line for investigation —for simplicity I'll call them the 'blow out' and the 'suck out', though I realise that these are not very precise terms.

The 'Blow Out' or 'Ear Seal' Theory

If you go down in a C Type Hood it is quite possible to imagine the external water pressure acting on the hood and pads in such a way that it seals off the outer ear; further, the hood material around the ear may be insufficienty flexible to permit the hood to respond completely to the external water pressure. As you continue down you will clear your ears thus balancing the inner ear and the water pressure — however, pressure on the inner ear acts on the ear drum, the outer side of which was sealed off at lower pressure, and so tends to blow it outwards thus effecting the injury.

Thought on these lines has led to slots in the pads, tubes leading out of the ears and faith in a 'fo'c'stleman's lock' pulled out of the front of the hood.

For this theory to fit one must assume that the injury occurs always when descending and this isn't always so.

The 'Suck Out' Theory

Let us suppose that the shape of your head is such that the ear pad and hood do not seal the outer ear, at any rate not continuously, during your dive. When you go down the air from your suit is exhausted through the blurt valve, the underclothes are pressed in and the fabric of the suit may be stretched in forming folds. On coming up a bit the water pressure is reduced and the springingness of the under clothes tries to re-assert itself but if there is no air available it sucks in vain — if at this stage we return to our supposition, and imagine that you move in such a way as to break the seal of your hood over the outer ear, the suit could suck out the air from your ear in the same sort of way that it sucks in air at the surface when you stick your fingers in the side of your hood and break the seal round your face. The suction could lead to a differential pressure which would account for the ear injury — the doctor tells me that half an inch water gauge may be enough.

This theory is a bit more involved but could account for those who think their injury occurred on the way up.

Some cases are believed to occur when a diver has been swimming about for some time near the bottom. Either theory needs a bit of stretching to cover this case and I have not been fully satisfied by any explanation up to date.

Suit Inflation

When suit inflation was introduced it was hoped that it would significantly reduce 'reversed ears'. If used during a feet first descent it avoids the risk, according to the 'blow out' theory, by breaking the seal round your ear each time you 'guff' up. This is all right for booted divers but delays a swimmer getting down. Using suit inflation at depth should nullify the 'suck out' theory. On the face of it suit inflation, properly used, is a theorical solution to the problem of reversed ears at the expense of added complication in equipment and operations.

Neck Seals and 'Wet' Hoods

By sealing the suit at the neck, any effect it might have on the ears is eliminated and we have only the problem of the wet hood to consider. If such a hood live's up to its name there is water in the outer ear and little prospect of a differential pressure acting on the ear drum provided ears are cleared. The wet hood, however, often keeps the head quite dry and the 'blow out' theory might apply. Whether because of the lack of hoods or the extensibility of the neoprene, there does not seem to be any trouble to date. At present the hoods are only issued experimentally but they should become available on a 'Do it yourself' basis to Clearance Divers in the near future. If this proves a popular solution to the reversed ear porblem it can be extended further.

Ear Cups and Compensators

Another approach used in a civilian application is to make ear cups which seal over the ear and compress during descent. These impose a depth limitation or become unduly large. A variant would be to provide depth compenstated ear cups, like the goggles used by the instructors in the submarine escape tank.

Tubes Leading to Face Mask

Provided a face mask is worn, a tube from it to the ear should avoid difficulty as everyone soon learns to equalise the pressure inside his mask. Trials with this arrangement were done some years ago but proved inconclusive, partly because it was thought that the tubes flattened and sealed off. Some experimenters have

connected tubes between the ear and breathing gas; this is not a scheme I like because it extends the amount of equipment on which life depends, but it should insure the same pressure both sides of the ear drum.

Action Information

We are planning a programme to try and stop reversed ears, but it would help a great deal if we really knew what it was we are trying to avoid. This is where you come in — if you've had a reversed ear. Will you, please, send me by post card or letter (an official paid one will do) the information asked for below. In these days of T.V., form filling should come easy but alas there is no prize and I cannot even undertake to acknowledge them. I will promise that all will be carefully studied and we will try and find a solution. Meanwhile use suit inflation or neck seals whenever you can and cut down the evidence !

Address card to—
The Superintendent of Diving,
H.M.S. *Vernon*,
Portsmouth, Hants.

Head it: **Reversed Ears.**

Give following information relating to the incident — or incidents:—

A Name and age at time.
B Month and year.
C Diving area and depth of water.
D Rig (e.g. U.W.S.S. or U.S.D., C Type Hood or Neck Seal).
E Did you feel it happen ?
F If so, were you going down, coming up or at steady depth ?
G One or both ears affected.
H Any (printable) comments !

H.M.S. 'DINGLEY' H.S.C.D.T.

WE were last in print during our refit which happily came to an end in May. Unfortunately no diving was carried out during the refit as all hands were required onboard; thus it was with a certain amount of pleasure that we commenced out summer programme.

We had a fortnight in Loch Eriboll exercising with units of the Home Fleet and also a couple of Norwegian ships. The Norwegians seemed to have similar ideas to the French over the conduct of their divers. Each man had his own set and suit and was left to get on with the job of looking after his own safety. Maybe the time is approaching when we will relax our rules as S.A.B.A. and S.D.D.E. come into service. The air sets appear to be so much safer and then the diver can more often than not look after himself. The diving was superb in Loch Eriboll, extremely good visability and no tide. There were an abundance of scollops and flatties but no lobsters which surprised us.

At the beginning of July we made our way via Keil Canal to Copenhagen. This place certainly lives up to its wonderful reputation and we all had an excellent time. Whilst there, however, we had the opportunity to meet the Danish divers and see some of their set up. Their mine museum would gladden the eye of any C.D., having every type of known mine all in perfect condition. Many of these mines are in working order and it gives a very vivid demonstration, when one scratches the case, to see a minature detonator fire. Lieutenant Honour, who came as our Social Secretary, was in his seventh heaven when he saw the museum. The whole team were shown round and apart from the interest and amusement much was learnt. The day before we left Copenhagen, several members of the team went by road to Kongshore which is the Danish equivalent to Horsea Island. We took C.D.B.A. and everything else we could lay our hands on to show them. The Danes use Drager O_2 set for swimming and below 33 feet used either a very light standard type suit or else aqualungs. I hope they were as interested in our 5561A and its uses as we were in their equipment and training. anyway it was a jolly good liaison visit and I hope the first of many.

On returning from Copenhagen we took a fair beating coming down the North Sea and *Vernon* were surprised to see us back as our radio had been swamped out very early in the trip. However it was not long before we were put into good shape again and set off to Alderney with the *Acceptance* Trials Team aboard. A week of S.D.D.E. photographic and one man pot trials, there was good value; especially so because non-trial team divers were able to see and use the gear in question. It is always heartening to know what is coming out of A.E.D.U., apart from curses. The more people who can use experimental gear before it is in service the better.

So we return to *Vernon* for our summer leave and a battery of letters demanding an article for the diving magazine. There have been two changes in the team since the last article; Sharpe has arrived, Carter is about to depart and I hear Newman is taking his place. So from all of us to the rest of the firm, happy ships.

R.N. Lands First Frogman on Table Mountain

(*Reprinted by kind permission of 'The Cape Argus', South Africa.*)

THE Royal Navy has conquered Table Mountain in The Argus £1,000 Tip-to-Top Contest. Yesterday evening 23 men from H.M.S. *Leopard* put their frogman contestant on Maclear's Beacon after a struggle of nearly nine hours to get him there.

Their Tip-to-Top run was an outstanding feat of sheer strength and stamina. Their programme was planned with the precision of a full-scale assault.

The team's tenacity in getting their man from the Tip, the old lighthouse at Cape Point, to MacClear's Beacon, the Top, puts them well in the running for the £500 Ingenuity Stakes.

Leopard's candidate was Ordinary Seaman Michael Fennell. Wearing a heavy frogman's suit of black rubber, he went from the sea bed to the peak of Table Mountain without once touching ground.

CAPTAIN FOLLOWS

Cdr. R. G. Gaunt, *Leopard*'s captain, was at the tip to watch the team of 18 men and four officers start. He became so enthusiastic, that he followed them right to the Top.

At 0900 hours the team set off with Fennell strapped in a mountain stretcher. They plunged through dense undergrowth down a steep, rocky slope to the sea on the False Bay side of the Point.

Fennell swam to a waiting fishing-boat.

SWAM ASHORE

He swam ashore to Kalk Bay harbour and surprised a crowd buying fish.

Nine seamen carried him on a chair to the jeep, which rushed him straight to Constantia Nek.

There another party of seamen had an old Austin Seven, painted yellow and lettered 'Tip-to-Top'. Behind the wheel was Sub.-Lieut. R. C. Francis-Jones — the son of the man who in 1928 drove the first car up Table Mountain. That car was also an Austin Seven.

Leopard borrowed theirs from Downing's Auto Spares to repeat that historic drive — another touch of ingenuity.

CAR TOWED UP

The Tip-to-Top rules forbid four-wheel motor vehicles from using the jeep track from Constantia Nek to the Hely-Hutchinson Reservoir on Table Mountain. The *Leopard* men got around this by taking the engine out — and hauling it up the six miles.

Fennell still in his frogman kit, sat beside Sub-Lieutenant Francis-Jones. The 18 men attached drag-ropes, and started heaving.

They had trained for weeks for Tip-to-Top, but they streamed perspiration.

THICK DUST

Their booted feet skidded in the thick, loose dust on the steep track. They had to heave the loaded car bodily round hairpin bends.

Yet they reached the reservoir in 2 hr. 50 min., with only three brief rest-stops.

Fennell had the toughest part of this programme. The blazing sun beat down on his thick rubber suit until he was almost stifling inside in his regulation woollen underwear.

At every stop, one of his mates would stretch the neck of his suit while another shot in a long jet of cooling oxygen.

HARDEST PART

The hardest part was still to come. Fennell was again lashed in the mountain stretcher, and the team set off up the mountain.

Their route was an easy climb for a walker, but not for stretcher-bearers. For nearly three hours they heaved and struggled up the leg-wearying slopes, hazy with exhaustion.

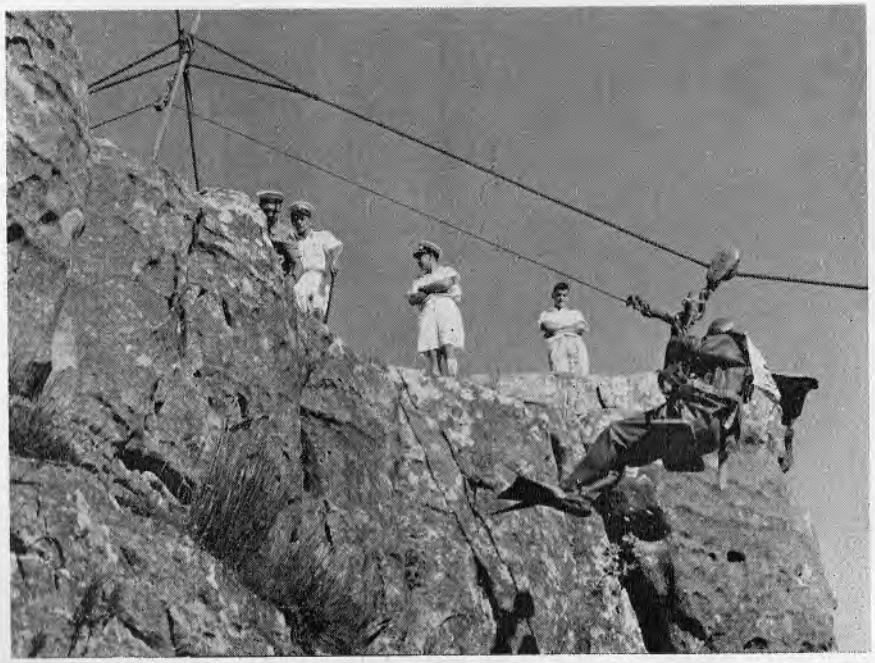
When they reached the top of Table Mountain, a few minutes rest set them right before they started for the beacon.

There they rigged up a jackstay and at 1749.10 hours whisked Fennell in a bos'n's chair to the top of the koppie on which the Beacon stands.

Four seaman lugged him the few yards to the beacon and stood him upright on his flippers, in full diving gear. He became the first frogman ever to get there.

Officers and men all stood smartly to attention, dirty dog-tired, but successful, while a bosun's pipe shrilled the finish.

Officer commanding the operation was Lt. Ian Lennox. The other officers were: Lt. Tony Smith, Sub.-Lieutenant Francis-Jones, Sub.-Lt. John Wilkinson.



News from H.M.S. 'Gambia'

THE diving work up at the start of the commission consisted of Ship's Bottom familiarisation and searches, ending by three nights' Diving exercises in Spey Bay, N.E. Scotland. This was inspected by the H.F.C.D.O. and attacks were made by his team. Diving continued regularly after the ship joined the Mediterranean Station and in early September a week's general revision and familiarisation with the new Swimmer's Air Breathing Set was obtained at the Malta Diving School. In December the ship arrived in Aden and assistance was given in rigging the largest nylon anti-shark net in the world. A very good plan of this was published as a drawing by G. H. Davis in the April issue of the *Illustrated London News*. At Mombasa a search and survey of jettisoned ammunition outside the harbour was carried out. This was carried out over the Christmas week, work only stopping for Christmas Day, when an aqua-lunging outing was organised. At nearly every port of call, diving and recreational aqua-lunging continued until the ship was diverted to lend assistance in the Mauritius cyclone disaster of March this year. Here a most interesting task occurred. This was to repair an old reservoir dam sluice. Underwater demolition had to be carried out and valuable experience was gained in underwater timbering. Some 2,600 million gallons of precious hydro-electric and drinking water were saved.

Useful and pleasant training has also been gained by the use of private and ship's aqua-lungs. At nearly every port and stop, aqua-lunging banyans have been possible. The wonders and beauty of fish life and coral in the Maldives and Seychelles were sights never to be forgotten.

Extract from
Plymouth Temporary Memoranda

(*Short Title*: *D.T.M.*)

Office of the Commander-in-Chief,
Plymouth.
26th July 1960.

COMMENDATION FOR GOOD SERVICE

On 29th June 1960, a Sea Venom crashed in Belfast Lough in a depth of 38 feet of water. The Port Diving Unit of H.M.S. *Sea Eagle* was sent to Belfast to assist in the salvage of the aircraft and recovery of the bodies of its crew.

On arrival at the scene of the accident on 2nd July,

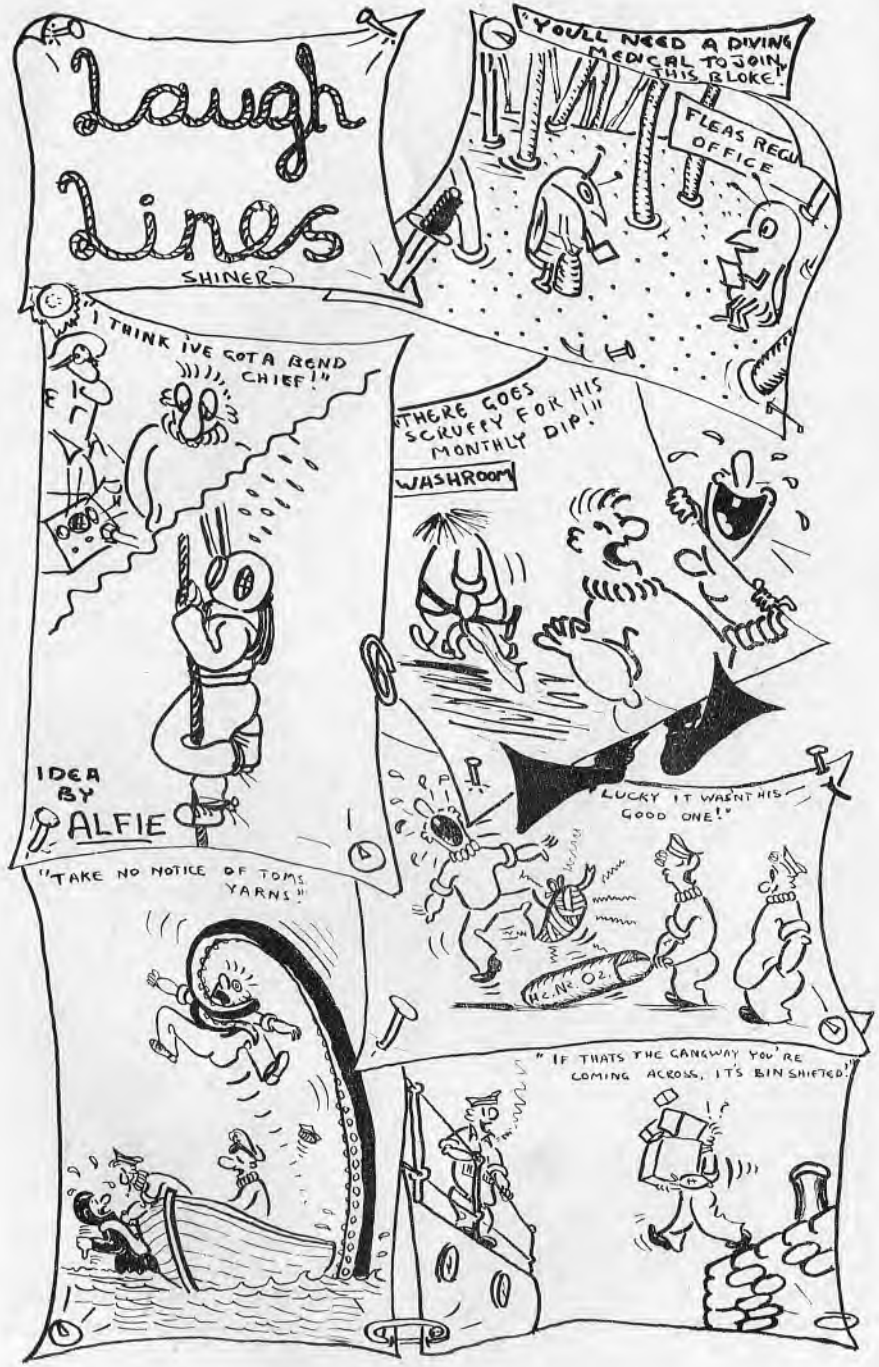
HAYWARD, PAUL WILLIAM,
C/JX.942267,
Able Seaman (Diver 2nd Class)

dived and identified the wreckage, and despite difficulty, succeeded in securing the lifting wires. As a result some 90% of the aircraft was at once recovered.

On 3rd July, in extremely unpleasant and difficult conditions, Able Seaman HAYWARD recovered the bodies of the pilot and observer.

Throughout the operation Able Seaman HAYWARD showed courage and devotion to duty of a high order.

R. G. ONSLOW,
Admiral,
Commander-in-Chief.



www.mcdoa.org.uk

Life Saving Techniques

by SURGEON CAPTAIN S. MILES, R.N.

AUSTRALIA has always played a significant part in the development of 'Life Saving Techniques' and has developed a very efficient system, largely voluntary, of patrols lookouts and rescue teams which have greatly increased the safety of the beaches in the face of a constant menace of surf and sharks. So much so that in spite of the immense popularity of the beaches, the death rate from drowning is remarkably small and indeed only 20% of the drownings occur in the sea, the remainder being in inland water ways, lakes and pools.

It seemed fitting therefore that the Joint International Conference on Life Saving Techniques should be held in Sydney as it was in March this year. Sponsored jointly by the New South Wales Post Graduate Medical Committee and the Voluntary Life Saving and Allied Organizations it attracted delegates not only from Australasia but Britain, the U.S.A. and European Countries.

The Conference was divided into three groups, Medical, Trained (Royal Life Saving Society, St. Johns Ambulance, Police, Fire and Fighting Services, etc.), and the General Public. The groups spent half the time discussing their problems privately and then held a combined unrestricted and very profitable meeting.

Diving Personnel of the Royal Australian Navy took an active part both in discussions and demonstrations, the latter making a valuable contribution to the various beach displays arranged as a practical part of the Conference. Civilian diving groups, Spear Fishermen, Skin Divers, and an Underwater Research Group also took part.

Although all aspects of rescue and resuscitation were studied both on land and in the water it was inevitable that the main business of the meeting was a consideration of all aspects of the causes, prevention and treatment of drowning with particular attention to methods of artificial respiration.

Causes of Drowning

It has been estimated that of all cases of drowning (and this applies equally to diving accidents) 75% are due to personal ignorance, neglect, carelessness, a lack of appreciation of well known hazards or a failure to observe simple safety precautions.

Few people realise that swimming, even with fins, is an exhausting and inefficient means of locomotion. It takes about as much energy to swim at 1½ miles per hour as it does to run on shore at 10 miles per hour. Also very few swimmers are able to reach 1½ miles per hour and this is is often exceeded by tides currents.

In spear fishermen and others who use schnorkel tubes or dive without apparatus, there is a further risk of drowning which may follow hyperventilation and an energetic underwater swim. It is a common practice before entering the water to hyperventilate in order to prolong the breath holding time. An energy consuming underwater chase may lower the oxygen content of the lungs to a dangerously low level so that the swimmer must surface. However at this stage the very act of surfacing will further reduce the oxygen pressure in the lungs and may cause unconsciousness with drowning if help is not at hand. On land minor faints and loss of consciousness are rarely dangerous but in the water loss of consciousness from any cause may be a prelude to drowning.

It is important to emphasise that to make all forms of aquatic activity safer it is necessary to insist on a full appreciation of the environment, thorough training and the establishment and acceptance of a comprehensive set of safety regulations.

The most important of all Life Saving Techniques is therefore an active attempt to prevent accidents from happening. In Australia this outlook is uppermost in the minds of the responsible authorities and voluntary bodies. An example of this is the nation wide 'learn to swim' organisation which makes it possible for every child to have free swimming instruction from an early age and most take advantage of this. Indeed it is the boast of many Australians that their children can swim before they can walk. This no doubt is an important contributory factor to the relatively low incidence of drowning in New South Wales.

Rescue Techniques

Beach and sea methods are generally well known but many modifications of practice and apparatus were shown to the delegates. Efficient drill was shown to be the major factor in reducing rescue time to a minimum and ensuring the safety of the rescuers. Life Line and belt teams demonstrations and though routines differed somwhat, particularly in different countries, there was little to choose between them for effectiveness.

Also shown was a torpedo shaped inflatable life buoy which could be towed out by the rescuer without impeding his progress, and then quickly clipped round the victim to give them buoyancy.

One of the newest and most promising devices was a hollow life line with belt. The reel was so arranged that oxygen could be continuously passed through the rope to a demand valve and mouth piece at the rescuers end thus enabling him to breath oxygen himself if needed, as in passing under surf. But more important still, it could be administered to the victim during rescue.

Resuscitation

The most important and controversial topic for discussion and one which occupied the majority of the time was that of artificial respiration. An assessment was made of available methods and recommendations for future policy were stated.

The Convention was unanimously in agreement that the most efficient method of artificial respiration was that using 'expired air'. It was impossible to agree however whether 'mouth to mouth' or mouth to nose' should be adopted as both were highly efficient.

The following points summarise the recommendations of the Conference:—

(i) Expired air is the best method of artificial respiration, either mouth to mouth or mouth to nose.

(ii) No gadgets, tubes, etc. should be used except perhaps by trained first aid workers who are likely to be frequently called upon to give artificial respiration.

(iii) Manual methods of artificial respiration, e.g. the Holgar Neilson and Sylvester Brosch (a modification using a pillow

to raise the shoulders), must still be taught. Although they are less efficient there are some cases of asphixia in which the expired air method cannot be used.

(iv) In all methods to get the most effective ventilation, the head should be brought well back. In the Holgar Neilson method it should not be turned to the side but the chin should rest on the hands.

(v) Oxygen should only be given by trained personnel.

Expired Air Resuscitation

There is no doubt that this method will be universally taught. It is simple to learn, easy to carry out and efficient. It can be used on victims whilst still in the water or in other unusual situations.

The aesthetic objection of direct mouth to mouth contact can be discounted in an emergency. For training, films and manikins can be used to eliminate the risk of infection.

Whether the mouth to mouth, or mouth to nose method is used, must for the present, depend on personal preference but it may be established in time by scientific investigation that one or other is the better.

It is likely to be some time before the new method is introduced officially into the Navy, but meanwhile many medical officers are teaching it.

If circumstances arise where it can be used efficiently on a possible victim, he should not be denied its obvious advantages.

E.C.D.U. Notes

The bell did strike, the whistle blew,
The music stopped and we moved round two.

* * * *

FOR the past three months the Experimental Clearance Diving Unit has salammed to Haslemere who have commanded us to 'Change Round'. We have said *au revoir* to Lieutenant Mike Hodgson, who has gone to seek fame and fortune in the outer darkness (sighs of relief from dog haters, trees, flowers and folk who don't like dogs eating diver's dinners) and to George Robbie who has been called back to the land of his forefathers. Strange as it may seem the unit has made a profit in numbers on these changes, because we welcomed Able Seamen Redford and Martin (the last in name only at the moment) from C.D.II's course to the unit. The roll-call now reads: Lieutenant Caisley, C.D.O.; Petty Officer Hills, C.D.I; Leading Seaman Hough, C.D.II; Able Seaman Redford, C.D.II; Martin, C.D.II; and Futcher, C.D.

At the time of writing this article the unit is in the glorious Highlands at Glen Fruin, still struggling to become the First Underwater Pilots and C.D. Aircrewmen. There is no truth in the rumour that we are paid flying pay as well as diving pay, but we do think we are qualified for a unit crest with a flying fish pre dominant.

Earlier in the term we spent a fortnight in Falmouth carrying out trials on a container and dispenser for a new Shark Repellent. I hasten to repeat that we were testing the container and dispenser and not the repellent properties of the contents. The weather was on the Shark's side and when the wind and rain did not stop us the sharks were not around to play. As is well known, this unit does not normally look for trouble, but we wondered after reading certain reports and articles in the national press about the record Porbeagle and Mako sharks caught off Falmouth the week before, whether or not, trouble was going to find us. After reading the tale of a press reporter cum amateur diver diving to fight sharks off Falmouth Bay we wondered if he may have turned the local big fish against us pro's, so we spent a very busy day making spears, harpoons, and 'shark billies' each to his own design. Various shark 'authorities' were consulted both in and out of *Vernon*. The only thing we learnt that might be of any use to us was that it is impossible to generalise on shark behaviour and that a shark is as unpredictable in its day to day temperament as a Prima Donna on an off day. To cut a long story short we did not see a shark. Some members were glad some members were sorry (in retrospect). Some of the latter blamed a human element for their lack of fun and were heard to mutter something like 'It's the trials team that are pinching all the sharks mackerell. Just because '. . . . . .' are short this month there's no need to feed all of them on shark bait.' Although there were no sharks we did get some promising results with the container. One very good thing we did learn about the repellent's power was that, it's wonderful icky stuff for clearing the wheelhouse of an M.F.V. of meddlers, and it works a rare treat on courting spider crabs. They didn't like it a bit. The scollops did not seem to mind it however and they tasted as good as ever.

I cannot finish this article without paying a tribute to Flight Lieutenant Melville, Royal Air Force and his gang from 1102 Marine Craft Unit of the Royal Air Force in Falmouth. They gave us help and advice far above and beyond their normal call of duty in every field of military and social endeavour, and gave us a send-off well worthy of the high standards of the Royal Air Force. We thank them.

T.C.

The Nitrogen Threshold

by P. B. BENNETT, B.Sc.

Royal Naval Physiological Laboratory Alverstoke, Hants

REGULAR readers of the DIVING MAGAZINE may remember an article, 'Nitrogen Narcosis and the Brain-Wave Machine', published in the September edition of 1957, in which Dr. Glass and myself described the background and results of experiments we made using an electroencephalograph (E.E.G.) to measure the electrical activity of the brain, in men at high pressures of compressed air.

You will remember that three types of activity could be recorded from any group of men. The 'Responsive' individuals, 'block' to mental stimuli. Thus if asked a mental problem the normal waveforms recorded by the amplifiers of the E.E.G. disappear, to be replaced by little or no activity until the answer is given and the subject relaxes. The normal activity of the brain which is 8–13 cycles per second then reappears. The latter is known as alpha activity and its disappearance on alerting as alpha blocking. 'Persistent' subjects do not re-act to an alerting response and the alpha activity continues unchanged. The remaining group of 'Minus' subjects shows no alpha activity and cannot therefore exhibit alpha blocking.

We found that 'Responsive' individuals, who represented about 47% of our group of subjects, showed certain changes at pressure. The blocking response normally seen on the surface was abolished during diving, so there was no interruption in the alpha activity when the diver was asked to answer an arithmetical problem. The time to this abolition of the alpha blocking response varied with the pressure or depth. At high pressures it was short so that at 200 feet abolition of the response took three minutes, whilst at 15 feet the time required was eight hours. The time also showed a variation between individuals, so that whereas one man might show an abolition of blocking at 100 feet in five minutes another might take 25 minutes. However, for the individual the time is amazingly constant for any given depth and fits the relationship $P.\sqrt{T.} = K.(\text{constant})$. It would seem probable from this mathematical relationship and other results that nitrogen diffuses into the brain and after a time dependant on the pressure, exceeds a critical concentration. When this concentration is exceeded, there is a depression of the activity of the brain, possibly of the brain stem, which to a large extent controls the conscious state.

This technique therefore provided a method of determining the relative rate of saturation of nitrogen between individuals. However, the use of this threshhold in the selection of divers prone to decompression sickness or nitrogen narcosis will be discussed in later articles. For the present I intend to discuss further the 'nitrogen threshold' and its determination.

Now the E.E.G. only enables one to measure the time to the threshold in 'Responsive' subjects. Another method was required which would be as accurate and repeatable as the E.E.G., but suitable for all subjects. The method chosen was the Fusion Frequency of Flicker (F.F.F.) which is the rate of flashes from a stationary light source at which the flickering sensation disappears and the light remains steady to the watching subject. It is accurate and repeatable and there is good reason to believe that it is representative of the brains excitability or alertness. The apparatus used to produce the flicker is shown

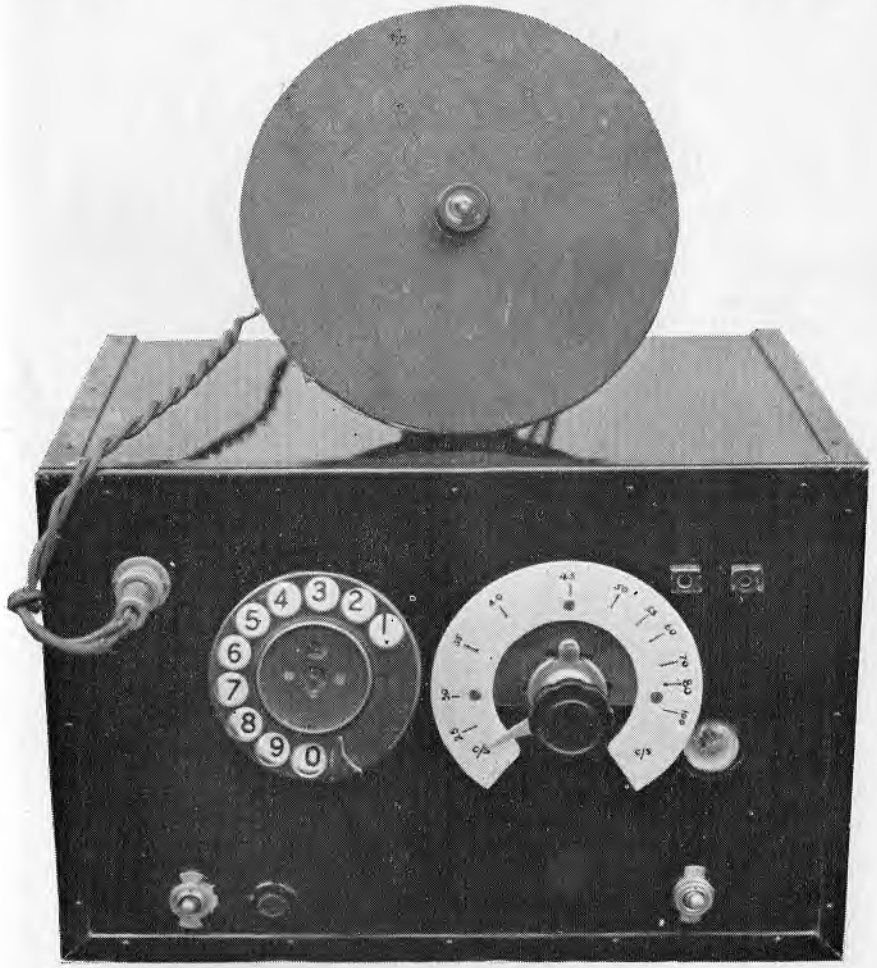


Fig. 1

in Fig. 1. The light source is a small neon lamp mounted in a wood surround, which is fitted to the port of a Siebe Gorman Recompression chamber. The subject sits in the dark inside the chamber and watches the light, whose frequency of flicker is gradually increased until he indicates he can no longer see any flicker. This is his fusion frequency. In general it is unusual for a normal individual to observe flicker much over 40 cycles/second, although if one looks out of the side of the eye instead of looking directly at the lamp. higher frequencies are possible. Thus you will sometimes observe a 50 cycle fluorescent lamp flickering, if you look out of the corner of your eye.

With our present equipment, the average frequency at which the light became steady to the subject was 28 cycles/second. At pressure there were changes in this frequency. These changes occurred in all subjects, including the 'M' and 'P' types of the E.E.G.

After a time 'T', which depends on the pressure 'P', there is a maintained change in the frequency of fusion of the flickering neon as seen by the subject. The majority show a depression of about one flash per second but a few show a rise of the same order. The time to this alteration of the F.F.F. is also inversely proportional to the square of the pressure, i.e. $P.\sqrt{T}.=K$.

A typical result is shown below.

	Time (mins.)	*Fusion Frequency (c/s)*
Surface	—	28
Compressed to 100 feet	2	29
	4	28·5
	6	28
	8	28
	10	28
*Nitrogen Threshold ..	12	27*
	14	27
	16	27
Decompressed ..	18	27
Surface	—	28

The initial increase in the fusion frequency compared with the normal surface result is thought to be due to carbon-dioxide building up in the body, due to the increasing pressure during compression. This prevents normal breathing and the inrushing air dams back carbon dioxide in the lungs. The high carbon dioxide tension, together with the high nitrogen, causes an increase in the effects of the well known nitrogen narcosis and shows itself in the flicker recordings by a slight rise. Once pressure is reached, the carbon dioxide soon returns toits normal value and the narcosis becomes less. It is possible, by controlled breathing, to overcome this effect as has been shown by Dr. Cabarrou a French research worker at Toulon. Once this effect disappears the frequency is then constant, until between 10 and 12 minutes the critical threshold is reached and the maintained change, in this case a depression, occurs.

The next question was whether the change in fusion frequency of a flickering light was due to the same mechanisms, involving a 'nitrogen threshold', as caused a change in brain-wave activity. A number of experiments soon confirmed that this was the case.

The times to both abolition of the aplha blocking response and a maintained change of the fusion frequency of flicker were measured for a number of 'Responsive' subjects. Some of the results are shown below.

Time to N_2 Threshold (Mins)

Subject	*Depth*	*F.F.F.*	*E.E.G.*
C.P.O. F.	50 ft.	38	37
C.P.O. F.	150 ft.	9	9
L./S. C.	100 ft.	19	19
L./S. C.	150 ft.	15	15
P./O. N.	100 ft.	12	10
P./O. N.	125 ft.	8	8

It can be clearly seen that the times to the change in F.F.F. and abolition of alpha blocking in the E.E.G. are the same and it was thus proved that F.F.F. was another method for determining the 'nitrogen threshold'. In fact this method is very much better than the E.E.G. It is easier to use and gives more accurate results, without the complex analysis required for the E.E.G. results. The accuracy is so great that the difference in times between two dives to the same depth on different days by a subject is only a matter of a few seconds. It is also worthy of note that a Flicker machine can be made locally for about £5, whereas the manufacturing price of an E.E.G. is in the region of £2,000 ! The most important point however is that it can be used for all subjects.

Now this is all very interesting you may say but what is the use of being able to determine the 'nitrogen threshold' anyway? First let us remember that the present diving tables in the Royal Navy are in fact based on square root principles, as is the threshold. Whether or not however one will be able to determine the susceptibility of a subject to bends is still an open question, as the 'nitrogen threshold' is related only to brain saturation. The classic bend sites of the joints may well saturate nitrogen according to different relationships. Further, saturation and desaturation may not be the same. However, it is interesting to note that the American safe no stop dives from various depths also show a relationship between Pressure and Time of the square root type, i.e. $P.\sqrt{T}.=K$.

Table of Diving Time Allowable without stops.

Depth	*Max. Mins. For Dive*	*Constant K (From $P.\sqrt{T}.=K$.*
60	70	501.60
70	50	494.97
80	40	506.00
90	30	492.93
100	25	500.00
130	15	503.49

On the other hand, preliminary experiments with pilots, who are graded according to bend susceptibility, suggests there may be no major connection between bends and the 'nitrogen threshold'. However the experiments are based on bends in pilots in a decompression chamber at 37,000 ft., which are a little different from those found in diving. It has also been impossible to control the experiments effectively, in that the pilots dived at H.M.S. *Dolphin* a day or so before coming to R.N.P.L. and some had drunk alcohol during lunch. This would materially affect the results. A controlled trial on divers is required to determine the answer to this problem.

The effective use of the 'nitrogen threshold' to select individuals sensitive to nitrogen narcosis is still not confirmed, although preliminary evidence suggests that the man who takes a short time to his threshold may be more sensitive to both bends and nitrogen narcosis.

Another use of the threshold is for the investigation of antinarcotic drugs to control nitrogen narcosis. Present trials suggest that such a drug may soon be found.

Another interesting finding is the effect of frequent diving on the

nitrogen threshold'. At shallow depths if there is less than five days between dives the diver appears to become acclimatised to nitrogen and the time to his threshold becomes longer than predicted. Conversely at deeper depths over 80–100 feet he becomes more sensitive and the time becomes shorter. Such finding could help to explain the effectiveness of decompression tables I and II in the prevention of bends and account for the discrepancies between them.

There are also a large number of basic scientific facts obtainable now that we can objectively measure man's reaction to nitrogen. For example there is the relationship of other inert gases to nitrogen. In fact the 'nitrogen threshold' should be called the 'Inert gas threshold' as other physiologically inert gases produce similar changes. Thus helium has been found to be 11 times less narcotic than nitrogen and argon 2.4 times more narcotic. This means that the same time to reach the threshold for both Helium and nitrogen would require the subject to breathe 20/80 oxy-helium at 1,100 feet or air at 100 ft. We are able by such knowledge to learn more of the mechanisms involved in the production of nitrogen narcosis.

Much of this investigation, by its very nature, takes some time to produce concrete answers. However, the facilitation of the research is not helped by the extreme shortage of subjects for the experiments. As we must always be sure that the subject has not been under pressure for at least five days previous to the experiment, it is understandably difficult for divers to participate. At present we have trawled a few local commands for volunteers and only managed to obtain four, now reduced to two, in spite of a small monetary inducement.

If any of the readers of this magazine are able to participate in the experiments, I should be most grateful for their services, divers especially, as it is you who will in the end benefit from such research.

Admiralty Experimental Diving Unit Notes

by T.H.G.

SOME news from the back-room section is overdue — the blaze of publicity resulting from the articles on S.D.D.E. and D.U.C.S. in the last magazine has aroused a conscience amongst us! The main personnel changes in the last 18 months have been amongst the E.C.D.U. divers— but these will be covered in their own notes elsewhere in the magazine. We have, however, had one change in the Drawing Office — Mrs. Nichols having decided to celebrate married life by becoming a Mum retired at the end of June and has been replaced by Miss Unsted — introductions in strict order of application !

The main job we have been concerned with — strange though it may seem — is tidying up the family of air breathing sets so that they can come into service. There have been very considerable 'teething' troubles between experimental design and production but they are rapidly being ironed out, and the next six months or so should see production flowing. I am often asked why equipment takes such a long time to come into service and it might be of interest

to run through the development of a typical breathing apparatus from our view-point. Firstly, then, the Navy must decide that a new piece of diving equipment is needed. This can happen in a variety of ways — shortcomings of existing gear — new requirements — criticisms and suggestions from the user — to name only three. Having decided that there is a problem, it is posed to a meeting consisting of the Naval Staff, user representatives and us.

If it is decided to go ahead we have to find answers to the preliminary questions which are:—

(*a*) Can existing equipment be modified to meet the new requirements ?

(*b*) Can commercial equipments readily available be used, modified or adapted ? If so, can the Navy be sure of always having its full requirements satisfied at reasonable price ?

(*c*) If the answers to (*a*) and (*b*) are 'No', how can we meet the requirements with new apparatus ?

As you can see this programme calls for a fair amount of investigation and test, and in the case of (*c*) will lead to models designed, made in the Workshop, tested out underwater and finally to a 'breadboard' model being constructed. It's purpose is to illustrate the way in which we propose to meet the requirements.

There is then a second meeting at which it is decided to progress further or to start again. Users and designers generally have quite an argument at this meeting especially if either wants to alter the original requirements as a result of the work done. The next step is to take the 'breadboard' design and engineer it for production. It is at this stage, generally, that liaison between ourselves, a manufacturer and the Production Branch, begins. From our breadboard design, and its early drawings, must emerge a number of prototypes which meet the following conditions:—

(i) They must be produced to full service standards of engineering, and meet the basic user requirements.

(ii) They must have been produced to drawings which are complete and to Admiralty requirements.

(iii) They must have satisfied the full service inspection standards.

These prototypes are then handed over to Acceptance Trials. The trial programme is usually discussed with Superintendent of Diving but it is the Trial Officer's prerogative to subject the gear to any test that he thinks necessary. After the trials are completed there is one more meeting to decide whether the gear, the drawings the inspection information, the instructional pamphlets, packaging and the ship installation are satisfactory. If so, all is handed over to the Production Branch, contracts placed and then the long struggle by Production to get the equipment into service begins.

In this necessarily brief summary I haven't included timing, but the timing of each stage can vary from six months to two years or even longer. It is designed to ensure that before any apparatus gets into service, the user, designer and manufacturer are all well acquainted with it, with its purpose and with the snags. Diving Apparatus is meant for the most individualistic users anywhere — if they weren't markedly individual they wouldn't be divers. This means that we get very divided opinions on almost everything and

so development progress is never fast. I'm not complaining about the divided opinions — I think its inevitable and not at all a bad thing — but it is sometimes a bit frustating !

In the last notes some news of our various projects was promised. We've a fairly full list — first up to date news on D.U.C.S. and S.D.D.E. We're still struggling with the D.U.C.S. cable but hope that the end is in sight now. Fuller details next time, I hope. S.D.D.E. is nearing the end of trails, so far — touch wood — without any major snags.

S.A.B.A. has started off the production line and has been issued to some ships. We hope all the major snags are ironed out now.

The Drawing Office is very busy with the drawing work arising from getting D.C.B.A. and S.D.D.E. into service — the Laboratory is now more concerned with modifications to the 5561A and with research into improving the C.D. Outfit and eventually producing a new breathing apparatus. Odds and ends being progressed are still Depth Gauges and Compasses; and the new Swimmer's Knife is almost finalised. It is expected that do-it-yourself notes and kits for wet hoods and gloves will soon be published — but the equipment has to be available first.

Until next issue, when perhaps we shall have heard your re-actions to some of these new ideas — dry dips and happy surfacings to all.

H.M.S. 'Vernon' Sports

A.B. BURTON SETS NEW RECORD FOR THE STEEPLECHASE

(*By kind permission of 'Portsmouth Evening News'.*)

TWO records — those for the discus and the 3,000 metres steeplechase — were smashed during H.M.S. *Vernon*'s athletic championships at Pitt Street.

Highlight of the day was the brilliant 3,000 metres run of the *Deepwater* team's Able Seaman Burton.

He led all the way to win in 10 min. 15.2 sec. — 44 4.5 seconds inside the previous record which had stood for three years.

His performance slightly overshadowed another brilliant victory— that of Lieut. Graham Neilson in the discus.

Throwing 116 ft. 1in. Lieut Neilson smashed the year-old record by 4 ft. 10 in.

It was a great day for Lieut. Neilson. He was awarded the Victor Ludorum trophy.

But all his efforts could not give his team — Long Course — the team cup. They were beaten by Ordnance who gained 101½ points to Long Course's 93.

Last year's Champions, *Deepwater*, were third, with 83½ points.

RESULTS: (Abbreviations — (W) *Warrior*; (V) *Vulcan*; (Ves.) *Vesuvious*; (D) *Deepwater*; (S & S) Supply and Secretariat; (T) Tenders; (M) *Mariborough*; (H) *Heela*; (ST) Sea Trials; (O) Ordance; (Ma) Maintenance; (LC) Long Course):—

100 Yards — 1, O.A. Casey (O); 2, O.A. Nash (O); 3, Lieut. Wilson (LC), 11 sec.

120 Yards Hurdles — 1, Sub.-Lieut. Jones (D); 2, Lieut. Harvey (S and S); 3, O.A. Casey (O), 19 sec.

220 Yards — 1, O.A. Nash (O); 2, Lieut. Neilson (LC); 3, Lieut. Wilson (LC), 24.2 sec.

440 Yards — 1, Lieut. Neilson (LC); 2, O.A. Burville (O); 3, A.B. Snowdon (W), 57.4 sec.

880 Yards — 1, L.S. Maple (H); 2, M. Tillett (M); 3, Lieut. Roberts (D), 2 min. 15 sec.

440 Hurdles — 1, Sub.-Lieut. Jones (D); 2, A.B. Cameron (D); 3, Lieut. Blackman (LC), 68.4 sec.

Mile — 1, L.S. Maple (H); 2, A.B. Tillett (M); 3, A.B. Harman (M), 6 min. 6 sec.

Three Miles — 1, A.B. Burton (D); 2, L.E.M. Claridge (Ma); 3, A.B. Warner (D), 16 min. 38·6 sec.

3,000 Metres Steeplechase — 1, A.B. Burton (D); 2, Lieut. St. Quinton (LC); 3, J. S. Gallagher (Ves), 10 min. 15.2 sec.

4 x 110 Relay — 1, Ordnance; 2, Long Course; 3, *Deepwater*, 49·2 sec.

High Jump — 1, J.S. Miles (M); 2, Lieut. Harvey (S & S); 3, Sub.-Lieut Jones (D), 4 ft. 11 in.

Long Jump — 1, O.A. Casey (O); 2, O.A. Timms (O); 3, Lieut. Harvey (S & S), 18 ft. $5\frac{3}{4}$ in.

Hop Step and Jump — 1, O.A. Timms (O); 2, O.A. Casey (O); 3, O.A. Burton (O), 49 ft.

Javelin — 1, A.B. Olivant (M); 2, Lieut. Neilson (LC); 3, Lieut. Blackman (LC), 127 ft. $1\frac{1}{2}$ in.

Shot — 1, A.B. Jackson (Ves); 2, Lieut. Partridge (LC); 3, Lieut. Commons (LC), 31 ft. $2\frac{1}{4}$ in.

Pole Vault — 1, A.B. Pickersgill (M); 2, O.A. Westbrook (O); 3, 3, Sub-Lieut. Jones (D), 8 ft. $10\frac{3}{4}$in.

Discus — 1, Lieut. Neilson (LC); 2, Lieut. Sears (Invidual); 3, A.B. Ollivant (M), 116 ft. 1 in.

Tug of War — Ordnance beat Long Course.

Medley Relay — 1, *Excellent*; 2, Royal Marine 'A'; 3, H.M.S. *Sultan*, 3 min. 47.4 sec.

International Conference on Underwater Medicines

by D. E. MACKAY

FROM 15th to 19th June 1960, the First International Conference on underwater medicine was held at Cannes on the French Riviera. At short notice Mr. H. V. Hempleman and myself were sent to represent R.N.P.L. and Admiralty. Right away let me say that the conference was professionally very much worthwhile and socially very pleasant. There were three days of lectures and discussions from 9.30 in the morning till 6.30 in the evening with a two-hour break for lunch. There were official receptions or dinners or film shows in the evenings and on the 4th day, a demonstration of diving and a picnic lunch on the beautiful Iles Des Lerins in Cannes Bay. The weather was gloriously hot — even at night. The actual meeting place was the Palais des Festivals, lately the scene of the Cannes Film Festival, though we found no refugees from that

conference in the building itself — only on the beaches. 17 countries were represented including Russia, Hungary, Bulgaria, Israel, Sweden U.S.A., Japan, Morocco and the remaining West European nations except Belgium and Portugal. I did not meet the Uruguayan delegates so I don't know if in fact they arrived.

Language turned out to be a difficulty as the papers were delivered in French, Russian, German and Italian translated into French. We had been confident that we could follow the prepared lectures but that the discussions that followed would probably be too fast for us. We were wrong. We managed to get the gist of the papers and did boldly take part in the discussions (Dr. Pierre Cabarrou translating into French) but, only in the arguments over meals or beers with the many good English speakers, did we get down to details. However, these social pow-wows and the opportunity to meet so many men (about 100) interested in the subject was worth more than the cost of the trip.

The first day was devoted to 'plongee en apnee', known better to us as skin-diving, i.e. diving without breathing apparatus, especially for the purpose of underwater hunting. Straightaway, the difficulties of proper descriptive terms arose. I must say I favour the French ideas as the other suggestion of 'Free diving' means something quite different to us, but I haven't been able to think of a concise English description. The phrase underwater hunting is also more descriptive, except for the 'huntin', fishin', and shootin',' people than spear-fishing. In this particular field, Britain is relatively behind other countries and the only comparable knowledge we have of value is that obtained from *Dolphin* tank instructors who do 'drops', though by vurture of their circumstances they do not expend nearly as much energy in their dive as an underwater hunter.

Among the many interesting points brought up was 'hydrocution', a term to explain the cases of sudden death on immersion in water though the actual method of death in the body was hotly debated. Another argument arose over the proposal to limit underwater hunting to 15 metres (just over 45 feet) but the practical difficulties of applying this in the various competitions seem to me to be too great, even if desirable. A speaker also brought forward the suggestion that, contrary to practical experience at the various 100 foot escape tanks, a diver can not hold his breath longer under pressure than on the surface — and this led to another argument. A theme that occurred throughout the conference but was more prominent on the first day, was the medical examination for divers and the value of E.C.G. and E.E.G. ballisto-cardiograms, blood analysis, psychological test, etc. (There was no argument on X-rays), and a most impassioned debate followed between the boffins and the doctors who have the job of actually certifying people as fit to dive. In the end, I feel that the ideal is unattainable, particularly in countries where the would be diver has to pay for each of those examinations, i.e. almost everywhere except Britain.

The second day was confined to diving on air. Here the two main problems discussed were decompression and narcosis. Some very interesting work on those bends we know as 'spinal' was reported following animal experiments which showed the real site of the trouble as being in the grey matter of the brain and not in the spinal cord. The work also

suggested a new line of attack on the problem of exactly what is a 'bend' and where precisely does it occur. Another interesting paper discussed the changes on X-ray that one finds in the long bones of the limbs of civilian divers (so far this is not a problem in either British or American naval divers, presumably because they follow a more adequate decompression routine). Reports were also made of some diving accidents, the most unusual being of a fatal one in a pressure chamber which exploded giving the inmate a drastic explosive decompression (my French did not quite cope with what exactly went wrong with the chamber). The final episode of the morning was a demonstration of the emergency squad in Cannes who on receiving a telephone call came dashing up with their specially equipped van and a portable one man R.C.C.

In the afternoon narcosis was the theme. Again, nomenclature was discussed as 'nitrogen narcosis is not accurate when helium, argon, xenon, all have similar effects and in 'ivresse des grandes profondeurs' how 'grandes' is 'grandes'. Various theories were put forward such as the old faithful that in fact the effect is due to carbon dioxide being retained in the tissues of the body and another that nitrogen and oxygen combine under pressure in the body to give nitrous oxide (the anaesthetic more familiarly known as laughing gas). this of course is a very controversial subject due to the lack of definite knowledge, in spite of all the experimental work that has been done, and certainly other countries give it more importance that we do in Britain since we tested the arithmetic of the *Reclaim* diving team last year and found they were as good at 180 feet as they were on the surface.

The third day was spent in tidying up the loose ends. In the morning, oxygen diving and mixture diving came in for some discussion with special reference to anoxia. A report was also given of a Hungarian diver who had inhaled a tremendous amount of a soda-lime cocktail and he eventually had to have the damaged part of his lung removed by surgery. The major subject in the afternoon was resuscitation from drowning. A heated argument developed between the supporters of mouth to mouth artificial respiration and those who maintained that drainage of lung fluid contents was the only worthwhile procedure with perhaps oxygen given through a tube inserted into the windpipe in the front of the neck. The other odds and ends included a description of an oxygen breathing apparatus for use in a chamber which vented the excess oxygen outside the pot, and descriptions of diving in Sweden and of the Sub-Aqua Club practices in Russia. Demonstrations were held, both static and live on the last day, of the diving equipment made by Spirotechnique of which the items that caught my eye were a spherical compass and a neoprene suit whose trunk part went on like a jacket with a 'press to close' strip of material instead of studs or zips. Also available were the various sizes and shapes of underwater sleds 'torpedoes' and other means of taking the work out of swimming.

All-in-all a very interesting programme, which was hard work because of the constant effort of trying to understand the language but relieved by champagne receptions The Comet flights there and back were extremely comfortable and relaxing and kept up the feeling of being an extremely fortunate person to have

been sent on such a duty. There is no doubt that in two or three years time another such conference must be held and perhaps Brighton might organise it.

Loch Ewe Incident

THE H.M.S. *Reclaim*'s 'steamers' had finished for the day and settled down to enjoy a sordid love scene from a third rate film which was being shown on the quarter patch (Slim's Junkyard we call it), when, with a thunderous roar, a blinding flame and billows of smoke, a thunderflash erupted among us — present from our dear friends next door — ruined the atmosphere of passionate intrigue and amour.

Thus it started. We 'steamers' got our heads together and planned. 'That diving helmet on their mast is too good for them', said Tom. 'Anyway they are not entitled'.

'Can of beer for each of you if you get it', said Chief Panche Powis, Taff to his friends, Walter to his kin, Uncle Jim to his 'Coolies' — us. (No B.E.M. yet). 'It could be arranged', was the reply murmured by all.

The plan was quite good by itself, but with beer to be won it was now imperative that Brenchley's trophy— so coveted — had to have a draft to us. With the boats alongside, what could be easier ?

At 0230, each member got a shake, arose and crept stealthily out on to the upper. There it was, gleaming in the moonlight. Two spanners, one diver and a few lookouts, it was a piece of cake. It disappeared down the 'Glory Hole' and was well hidden. In its place was put one 'C' type hood, neatly stretched over a dummy's head. 'That's more in keeping with their trade' the chief had said the night before.

The next morning when we turned out we glanced with apparent innocence to see if the switch had been spotted, but to all intents and purposes it had not. At dinner time we all had a beer from Chief and drunk to the success of our little escapade. By this time we were anchored out in the straits, safe we thought. Had we underestimated our adversary ? All was quiet, too quiet, as the boats went past us.

Eventually at 1530, *Brenchley* was seen to be bearing down on us at a steady rate of knots, ESSO-Blue and SEVEN UP, battle ensigns flying high, fairly bristling with C.D's topped up with spuds, thunderflashes in bags of proto, in fact anything they could lay their hands on. Macrea-Clifton, hat askew, was grining over the wheel, a self statisfied, sadistic look on his face. Then they let fly. Three holes in the Q.D. awning, Navigators cabin blown up by a neatly placed flash, all the P.O's shell-shocked and screaming, 'This ain't the Hood', (not inferring that they are all O.B's), gash and garbage all over the ship. They certainly paid us back. But ,we had the bonnet and had every intention of keeping it.

Unfortunately the higher authority on the ship decided against having it flown from the mast head when we returned to Port Edgar in July, and so two days later it was handed back to the *Brearley*, who in

turn, handed it to *Brenchley*. The reason being: 'We wont have a stick of naval stores left if those C.D's get the chance to repay in kind'.

We have since learned that it took the *Brenchley* a forenoon to get the bright red paint off the helmet that we painted on it, just as it took us an hour or so to repair the awning. It seems that Steamers' and C.D.'s just cannot live in peaceful co-existence, no matter what.

B.V.S.,
H.M.S. *RECLAIM*

THE SHIP THAT DIED OF T.A.S.

POISONION

Salvage in Singapore

(*by* 'BOYO')

A large Japanese freighter entering the Western entrance of Keppel Harbour, Singapore was approached by Singapore Harbour Board Tug *Pitho*, 340 tons. When the 9 inch tow was passed the freighter swung on to the Tug causing it to list to port and capsize. The entrance is very narrow (approximately 100 yards) and bottle-neck shaped.

The tide whipping through was very fast and unpredictable. The depth of water is between 75 and 80 feet at high water. This accident caused the western entrance to be completely blocked to all vessels other than very small harbour craft. There were only four survivors from a crew of approximately 20.

Singapore is an international port and the busiest port in the Far East; also the fact that the Royal Yacht *Brittania* was due to enter Keppel Harbour through the western entrance in 10 days; caused considerable concern to the Singapore Harbour Board Authorities.

The Singapore Harbour Board Diver dived on the *Pitho*, buoyed the wreck and reported it as lying on its starboard side. The Far East Bomb and Mine Disposal Team was called in and carried out a complete survey of the wreck. They found *Pitho* was upright on the hard rock bottom, not holed, and appeared undamaged. Visibility was two to six feet.

The Navy was asked to undertake the salvage and took the job on. This was undertaken by the F.E.B. and M.D.T. using C.D.B.A. rigged for swim 60/40 mixture, the divers working in pairs. The Boom Defence Officer was in charge of salvage with Mr. Brown assistant Admiralty Salvage Officer. Boom Defence Vessels *Barfoam* and *Barmond* laid their moorings and made preparations to assist with the final lift. Lieutenant P. J. Messervy M.B.E., G.M. was in charge of the diving team. The two Bar Vessels moored over the wreck.

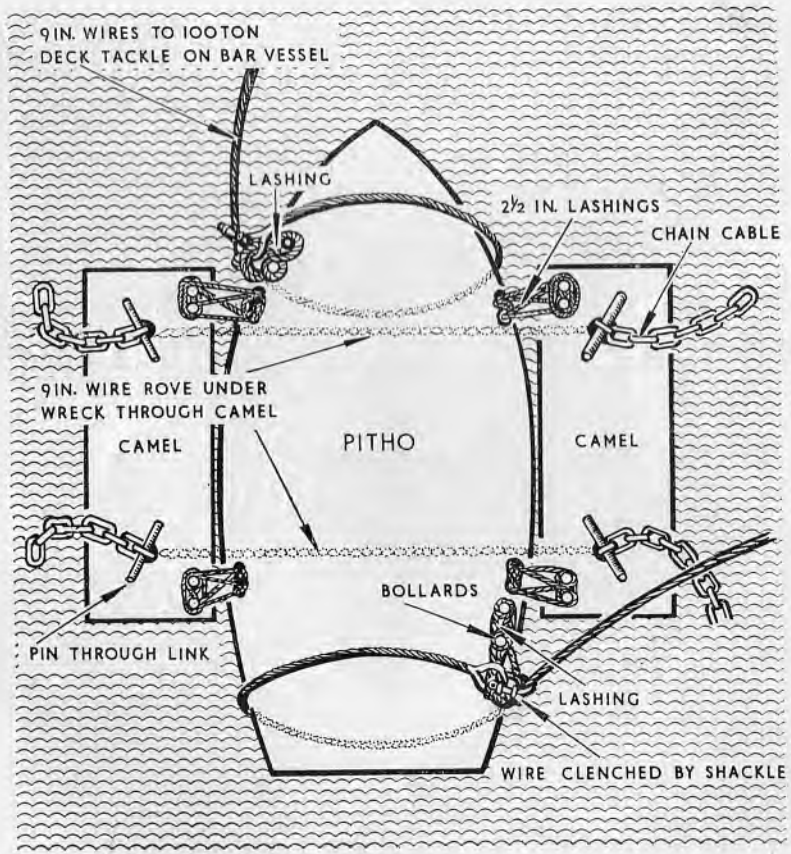
The next phase was to clear the wreck of all obstructions, i.e. wires, tow ropes, etc. This merely involved diving down and ditching all the gash in the same way that one has to clear up after a refit in Naval Dockyards.

It was decided to use four Camels for the lift, backed up by the two Bar Vessels. This entailed see-sawing two wires under the wreck from the bows for the forward Camels, a third wire was passed direct through a convenient gap between the keel and the sea-bed and

the after wire was passed over both propeller shafts, forward of the 'A' Brackets.

With the four 7 inch wires in the correct position the four Camels were flooded down for positioning on the wreck.

Stoppers were slid down the 7 inch wires when in position, the wedges were driven home, the camels were blown until they took on to the stoppers. The 4½ inch wire Main from *Barfoam* was passed down and secured on port bow of the wreck and the 4½ inch main from *Barmond* was secured onto starboard quarter. Two tidal poles were secured to forward ends of forward camels and two to the after ends of the after camels. Everything was now ready for the lift. The camels were blown and the strain came on the 7 inch wires, the 7 inch wire parted due to the nip on the keel; this caused the after ends of the after camels to come up, bringing the strain on the mid-ship camel lashings and No. 3, 7 inch wire; these also parted. The two after camels shot to the surface. Fortunately no one was hurt. Able



Seaman Lockwood and Able Seaman Smith, beat the camels to the surface by about 30 seconds, having just dived for the final inspection prior to lifting.

The scene presented a very heart rending and demoralising sight to the divers, and all concerned, particularly as everybody had worked from five in the morning until eight everynight, Saturdays and Sundays, giving of their very best for nearly a month in Tropical heat and very hazardous conditions. But the divers sense of humour prevailed, as one was heard to remark to the other, 'Well we can always say we diverted the Royal Yacht and Prince Philip'.

It was now left to the divers, to swing the remaining two camels, clear away the parted wires, etc. The four camels were sent back to R.N. Dockyard for repair to the timbering. Captain Fell R.N. (Retd.) Admiralty Salvage Officer was flown from U.K. to supervise the next attempt. It was decided to use two Camels and 9 inch wires. Both ends of the 9 inch wire were tailed with chain cable. The lift was to be backed up by two 9 inch wire pendants from each Bar Vessel and 100 ton deck tackles. Instead of stoppers, pins were passed through the Chain Cable on the end of the 9 inch wires. The 9 inch wires were heaved around underneath the wreck, the ends rove through the Camels, the camels flooded down into position and pinned down. The ends of both camels were lashed to the wreck. The forward and after 9 inch lifting wires were passed clenched and lashed to bollards on the wreck. The camels were then blown to the pins, the deck tackles heaved the 9 inch wire taught, the divers made a final inspection and Captain Fell decided everything was ready for the lift.

At slack water the camels were fully blown and the two Bar Vessels heaved in on the deck tackles until the wreck was approximately 10 feet off the bottom. The Bar Vessels moorings were slipped and, with the assistance of two small tugs and a slight breeze the wreck and its salvors drifted until the wreck touched bottom at 30 feet. The wreck was then lifted another 10 feet off the bottom and allowed to drift until grounding once again. The final heave was made causing the wreck to break surface. When the wreck's bulwarks were well out of the water and the decks just awash, a pumping craft came alongside, and assisted by a salvage pump on one of the Bar Vessels the wreck was pumped out until on even keel and taken in tow. After a refit the *Pitho* was put back in commission.

The first attempt took approximately three weeks, then there was a week clearing up followed by the second attempt which took five days.

The only casualty throughout the operation was Able Seaman Newman who contracted a bend in the right elbow which was successfully treated in *Terror's* Re-compression Chamber.

'Vernon' C.D. Acceptance Trials Notes

IN spite of the new basic rate of pay for C.D's the Acceptance Trials team spent more time underwater this term than ever before. As was mentioned in the last issue of the magazine trials have been continuing with the new Surface Demand Diving Equipment which is to replace

'Standard'. The target of 1,000 hours underwater has been reached and the equipment has been used by every type of diver in the service. I think the last time in history, everybody is unaminous in aclaiming it's merit.

I have no doubts that S.D.D.E. will be welcomed by all divers as soon as it comes into operation in the fleet.

During the trials many places have been visited including Falmouth, Alderney, Portland and Tobermory but I feel that Portsmouth is still the most attractive of bases from which to operate.

The team has changed but little since the last edition of the magazine but in the very near future Petty Officer How will be relieved by Chief Petty Officer Hopewell and Able Seaman Egan will be leaving to become a 'springer'.

Lord Byron on Skin Diving

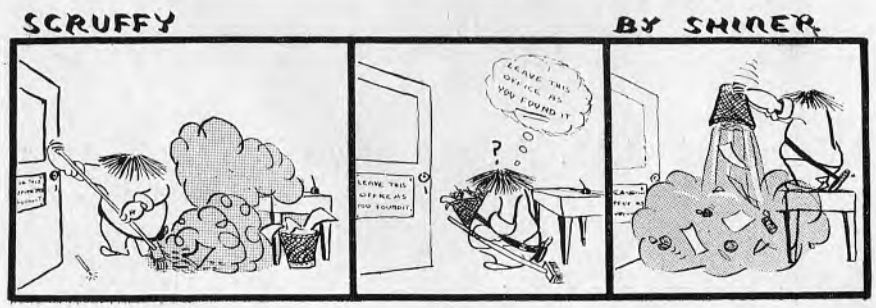
There is society, where none intrudes
By the deep sea, and music in its roar
I love no man the less, but nature more.
From these our interviews, in which I steal.
To mingle with the Universe, and feel
What I can ne'er express.

The Age of Chivalry is not Dead

MRS. Jane Baldasare, the American underwater swimmer with a model's figure shook her long blond hair out of her eyes and said, 'It really is mighty friendly of the Diving Section, H.M.S. *Vernon*, to charge my Aqua Lungs for me. I think you divers are just wonderful'.

Mrs. Baldasare (24) who is 5 ft. 5 in., with 35 – 23 – 35 figure was treating holiday-makers at a Holiday Camp near Bognor Regis to demonstrations in the camp pool (before attempting to swim the Channel underwater) when she found difficulty in getting her equipment charged. She appealed to the Diving Section, H.M.S. *Vernon*, for help. The age of chivalry not being dead (among divers anyhow) we rallied to her cause.

Her photograph reveals the reason why we could not possibly say no. We almost said 'For you we'd swim the channel'. P.A.W.



Best wishes to all the boys,
H.M.S. 'Vernon' Diving School.
Jane Baldasare.

Buddy Lines

CONGRATULATIONS TO:—

LIEUT. RON TITCOMBE, R.A.N. on the award of the M.B.E. for the part he played in salvaging a Helicopter from 170 feet off Portland.

LIEUT ARTHUR CHECKFIELD, R.N. and C.P.O. R. H. G. MCKINLAY, C.G.M., on their award of the Queen's Commendation for Salvaging an Aircraft which crashed into the sea at Kai Tak, Hong Kong.

* * *

DIVERS WE HAVE MET.

Taking us back a few years to the days when the Deep Diving Ship was H.M.S. *Tedworth* — a coal burner — we have recently met the following divers who either served or qualified in her:—

CHARLIE ('YANK') SUTTON — who has been in Customs at Southampton since he left the Service, so watch your 'Rabbits' down that way; they don't just get myxamatosis, they get confiscated as well.

FRED ('LOFTY') WHITFIELD — the man who could mend anything from a simple fuse to the latest radio set and was a most dependable diver into the bargain. Lofty still dives regularly with the Portsmouth Dockyard mooring service.

GEORGE KILLICK looks a picture of health as he tends the Reserve Fleet Recreation Grounds at Hardway, Gosport with his customary patience and good humour. You could always rely on George for a good dip and youngsters never wanted for advice and help.

DICK OLIVER — he really was the Chief, respected and admired by all who served under him. Dick commanded rather by example than by the spoken word and was a source of inspiration and encouragement to all who came in contact with him. We are more than pleased to see him at the Annual Dinners and appreciate that it's a long way to come from Chingford.

JACK DYMOND — Petty Officer Willie Wyvill one of the few still serving that were shipmates with these stalwarts, met Jack at Bude, Cornwall, where he operates as Beach and Harbour Master. What a cracker from the west country Jack was! Divers didn't come better than Jack.

THE FLYING DIVER — We are proud to have among our numbers, Petty Officer J. C. Burgess, Diver 1, who, apart from being the expert on S.A.B.A. spends his leisure hours as Chief Instructor to the Gliding Club at Lee-on-Solent. In addition to his gliding prowess he holds a powered pilot's licence and did his first solo after a mere two and a half hours dual instruction. What an ideal operator for the Rebickoff Pegagus or the Aerojet Minisub! (see Edition No. 1, Vol. 7).

POLICE LIASON — From the bridge of H.M.S. *Reclaim* en route from Plymouth to Santander the familiar figure of Lieut. 'Badger' Otley was observed through the binnoculars puffing intently at his pipe with a distinct Sherlock Holmes expression. We hear that Badger and his 'oggie' stalwarts had abandoned the case of the Barnpool lobsters for the more serious pursuit of some jetisoned evidence required in connection with a murder case.

Believe it or not! — A certain very senior Clearance Diving Officer was inadvertently checked into a temperance hotel, whose manager operated a midnight curfew.

SARGE — Mr. Sarginson to you, recently did his first dip since having his arm amputated and 'ditched' his set into the bargain. Sarge plans to have his unwanted sleeve sealed off at the wrist and fitted with tongue valve for rapid venting.

LIEUT CDR. JOE BROOKS — Joe, now aptly Skipper of the *Enterprise* (Evershed's Trials Vessel), was recently observed tripping the 'light fantastic' at H.M.S. *Vernon*'s Wardroom Summer Ball, on his latest artificial legs. Underwater is not the only place that Joe gets mobile!

LIEUTENTANT KHOSROW AZADI, the King of Persian Divers, paid a flying visit to *Vernon* late in June this year. This visit to the U.K. with a CENTO officers course was his first since he qualified in Clearance Diving at *Defiance* in 1955. After renewing several friendships he went on a quick tour of the establishment. His vast knowledge of pattern numbers caused looks of unbelief in the Diving Store but enabled him to carry away much booty in the form of neckseals, washers and other sundry items.

We look forward to his next visit, but until that time we are assured that any diver who happens to be on a quiet week-end in Teheran will receive a warm welcome at the Diving School only a couple of hundred miles to the northward.

Stop Press — Congratulations to Lieutenant Commander Pete Messervy and Lieutenant Jim Grace on their recent promotions and the credit reflected on the Diving Branch.

Divers' Employment Bureau

The Bureau continues to function, and if you wish your name to be recorded please forward the undermentioned to the Employment Bureau.

Applicants must be either serving R.N. Divers or Ex-R.N. Divers who are subscribers to the *Diving Magazine*.

Full Name .....

Rating ..... *Off. No.* ..... *Age* .....

Time Expired or Expires .....

Private Address .....

Willing to Serve Abroad .....

Diving Rate ..... *Date and Place Qualified* .....

Equipment Experienced in .....

Diving Experience .....

This information will be filed and referred to as and when diving employment is required. The Bureau does not assure you of a job, but it will advise applicants on vacant diving situations.

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