The Royal Naval Diving Magazine

Volume 2. No. 2

JUNE - SEPTEMBER 1953

PRICE ONE SHILLING

Diving Magazine

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VOL. 2. No. 2 July - September 1953

EDITOR'S NOTE

Dear Readers,

A new boy in the chair again. Your last Editor is now ploughing the ocean in *H.M.S. Warrior* for his sins. I am certain that you will all join me in wishing Lt. Worsley all the very best of luck during his spell of exile in General Service and a speedy return to the Diving fraternity.

It is regretted that this issue of the Magazine has been rather delayed by the late arrival of some of our material. Do try to send in your articles early, thus giving the staff a break.

We made a slight error in the last publication, the use of the name "Mine investigation and disposal" to supersede "Render mines safe" has not been approved. We had rather warmed the bell, so it is back to the old "R.M.S."

Editor.

SECRETARY'S NOTE

To date this is the easiest post that we have ever filled, for our present flow of letters and contributions could easily be brought by a lame carrier pigeon.

In order to promote the need for a pack mule to carry the mail (we know a friend who has one for sale very cheap) we repeat the suggestion that each unit elects one intellectual to the office of correspondent. Send along his name together with your next load of articles, then we shall know whom to chase up.

Any of you Divers whether "Steam" or "Tadpole" who are shortly leaving the Service and would still like the Magazine, please let us have your home address. We will do the rest.

The main point, however, is send us your stories and keep us happy.

We are glad to welcome members of the Jersey (C.I.) Aqua Lung Club who are included among our subscribers.

NOTE . . . . . OUR ADDRESS—

The Secretary,
Diving Magazine, (Deepwater),
H.M.S. VERNON.

TREASURER'S NOTE

I am glad to report an improvement in the financial position of the magazine, this being due mainly to an increase in circulation and the wholehearted support of our subscribers.

It is intended to utilise our increased assets to produce a larger magazine at the same price, and a comparison in size of the last three issues will give you some idea of the progress in this direction.

To achieve a really good standard we require (a) more contributions, and (b) an even greater increase in circulation.

The former depends entirely on you, our readers, please try and send in something for publication.

An increase in circulation would follow automatically with the increase in size and value of the magazine. Our potential circulation is really very large.

Finally a word of thanks to our advertisers, without whose support publication would be difficult.

Au Revoir, with the promise of bigger and better issues in the future.

Treasurer.

A TALE OF TOBERMORY

Most members of the diving branch have heard of the galleon hunt which took place in early 1951 at Tobermory, in the Island of Mull. As many of the public are interested in such an operation and know that it was carried out by naval divers, a brief, but quite unauthentic, account of how it all happened may be of interest to readers.

The tale began during the winter of the year 1588/9. One of the ships of the Spanish Armada, having escaped the English fleet in the Channel, made its way north of Scotland, rounded Cape Wrath, and finally put into the sheltered harbour of Tobermory in Mull, one of the larger islands on the west coast of Scotland. There, peace, quiet and provisions after their hazardous voyage, would be available to the crew of the ship whose name was *Florentia.* (Little did they know).

At that time, the resident English baiter was a gentleman by the name of McLean of Duart. He had, as was the custom in those not so barren days, a large family, most of whom were sons. The family was not renowned for its academic distinctions, but when it came to seeing off the Master of some visiting ship there were few in that part of the world to surpass them.

However, all went well at first. McLean was in the midst of a domestic quarrel with some of his neighbours on the mainland and, in return for food and water, the Captain of the *Florentia* lent him a Sergeant and six to help find a solution to this inter-family tiff.

Having found the solution and buried the opposition they returned to Mull. Provisions and water, and repairs to the galleon, had not been forthcoming on the agreed scale however, and the Spaniards began to grow rather warm under the corselets.

Shore leave for the troops was becoming unpopular owing to the unfriendliness of the inhabitants. Most of the landing places were steep too, and the 1630 liberty boat provided good sport as the target for the local spear club.

One party, armed to the teeth, did manage to penetrate inland for some distance one day and, due to an unlucky twist of fate, came upon McLean of Duart, Jnr., doing C. and M. on his bagpipes, alone and unarmed. He was invited to join the party and to return on board the ship with them; his reactions to this invitation are not recorded.

Of the tragic occurences which subsequently befell the ship, her crew, and young McLean, little is known. Various rumours allege that the yeoman of the gunners party, not satisfied with his magazine temperatures put an electric radiator in "X" turret handing room. Others say that the diving Gunner was analysing an oxy-hydro mixture in the engine room. It is suggested that the duty Leading Stoker slipped, in his hob-nailed boots, while siphoning petrol for his motor-cycle from the welding generator.

Whatever the cause, we know with certainty that at some time during the morning watch a great and powerful explosion took place within the galleon. Before one could say "four and four" the waters

of the bay were smiling serenely in the morning sunlight and the *Florentia* had become history.

Slowly the years slipped by and various attempts to salvage the treasure from the sunken galleon were made. As soon after the explosion in 1607, or thereabouts, a member of the Clyde Diving unit, using a home-made diving bell, made the first effort.

Being a gunnery rating, he thought that the only valuable items on board were the cannons and duly recovered two beautifully made Italian guns. He worked in the wreck for some years, but with little more success, until one day his attendant failed to spot a leak at the top of the bell and its occupant died from a surfeit of water on the brain.

This ended the first serious attempt.

It may be as well to mention at this stage how the Duke of Argyll came into the possession of the wreck by legal title. He was Lord High Admiral of the Western Isles at that time, and as the late Captain of the galleon no longer had any use for it, it became the property of the aforesaid Duke.

At about this time one of the Kings of England was somewhat short of ready cash. He therefore told the Duke that he thought the galleon should be Crown property, hoping by hook, crook, or grab, to get at the treasure. The Duke was disposed to argue the point and blocked the Royal demands at every turn. Royalty, however, not to be outdone, turned the Duke over to a more material block and thus resolved the argument and the Argyll succession.

Subsequent Dukes, several of whom bit the dust on much the same count, persisted in claiming the galleon as their property until finally their patience was rewarded. The galleon, and all that was in it, should henceforth be the property of the hereditary Dukes of Argyll. And so to this day it remains.

To continue however, with the tale.

Early in this century the biggest expedition so far to attempt the salvage began operations at Tobermory. It met with moderate success and continued to work for several years. Rumour has it that the divers in this party used to go around the ancient castles in Mull, purloin any equipment that looked sufficiently old, and lower it onto the sea bed at night in the neighbourhood of the sunken ship. Brought up by the grab next morning, the hopes of the shareholders were again raised and the divers continued to be employed. It is difficult to believe that divers would stoop to such subterfuge, and the rumour could certainly have no foundation in truth.

This expedition ran out of funds about 1910 and, although sporadic operations continued until the mid-1920's, no further major effort took place until the all-naval expedition in 1951.

The story of this expedition will be related in the next issue.

"UMPING IN THE 'IGHLANDS"

By "B.F."

Nothing less than a pint for me please was my imploring reply to the question "What was I going to have?". We had spent a profitable, though very exhausting, day shooting stag under the kind auspices of His Grace The Duke of Argyll on his lovely estate at Inveraray. Our bag was nine beasts including two "royals" (not marines) and a good time was had by all. My "good time" however was based entirely on the satisfaction of knowing that I must have detached at least a stone in weight from my rather portly torso. Whereas my comrades had bagged at least a couple of beasts apiece, I, in spite of every assistance from the patient "Gillie," had failed to improve the venison ration and accordingly was given the major share of "umping" the dead beasts down the mountainside to the awaiting transport. I believe I am right in saying these handsome animals turn the scales between twelve and sixteen stone though by the time I crawled to that beautiful bar in the George Hotel my estimate of their weight would have made an elephant feel small. Although the overall task was to get the beasts down the mountainside I would like to make it quite clear to the unsuspecting reader that there are a lot of "ups" as well as "downs" in the process of descending from the summit to the base of "them thar hills," and although the "downs" are, logically, in the majority, if the ultimate objective is to be achieved, the "ups" are far more painful, especially when one is covered from head to foot in anti-gas clothing to effect camouflage.

Having taken the top off the most beautiful pint of beer that it was ever a barmaid's privilege to draw, I slumped back into the nearest chair and felt a little better. My comrades, elated with their success, were absolutely gorging themselves relating the prowess of their stealthy upwind approaches and the accuracy of their shooting. According to them, every beast was shot clean through the heart. I said that judging by the weight of the beasts they must have all fired at each of the nine stags with cannon balls.

The events of the day had proved to me that I was not strong, and I did not see why I should be silent either, so I proceeded to hold forth, in no uncertain manner, as to why people who could shoot such lovely animals were the best ones to drag them "down" the mountain side. There were the usual remarks about being blind and that I qualified as a gunner at Whaley and therefore could not be expected to shoot straight. The fact that when face to face with a beast of such elegance, grace and beauty I found I had not got the heart to shoot it, seemed to hold no water at all.

I have not mentioned so far that on our return to the "George" we found "Chads" carrying out his usual arm-raising gymnastics lest he should inadvertently be overtaken by the "bends". I probably did not mention "Chads" presence before because it was, after all, quite

the natural place for him to be, but he really provides the reason for my relating this narrative.

You see, as the glasses were replenished, so the elated success bubble grew bigger and bigger, and as the size of the stags grew and grew I had even greater difficulty in getting them down to the transport. Now "Chads" is not the man to be outdone by stag shooting stories, or any other stories for that matter, so in spite of a certain amount of alcoholic disturbances prevailing at the time, errors of paralax were corrected and ears brought to the first degree of readiness when "Chads," whilst stuffing his 4oz. pipe and with gin glass esconced safely in his breast pocket, announced his intentions of telling us just how an elephant sized stag should be brought down the mountainside. Now, said Chads, you blokes ought to be a little more crafty about this business of getting the venison down to the hearse. (I should explain that he used the term venison quite naturally as in addition to being First Lieut., he was also the victualling officer).

"After all," he continued, "it has got to be fit to eat". Chads then proceeded to unfold his scheme for the dual purpose of alleviating the labours of "stag 'umping party" and the preservation of venison. What we had to do was to get some specially designed missiles developed. The missiles, in addition to having adequate propellant charge, should be charged with helium at high pressure and have attached to them an adequate length of coston gun line coiled down in such a manner as to run out freely when the missile was fired.

"The point of aim should be the beasts lungs," Chads explained. "Now when the missile had penetrated the lungs a small delay action fuse would operate and release the high pressure helium which would expand inside the beasts lungs and gradually relieve him (stags only) of the boredom of having to stand on his hooves. At this time the coston gun line should be paid out until the stag has gained sufficient altitude to clear all trees and other obstructions on the way down to the transport. When at the desired height, the line should be turned up round a boulder of weight such that the stag and boulder just have positive buoyancy thus giving finger tip control.

The beast is now conducted down the mountainside with no more effort than a child would need to hold a balloon. The slight positive buoyancy will enable the versatile huntsman, with a smart push off from the ground, to clear hillocks, shrubs, etc., which would otherwise necessitate a tiresome detour. "Now to be Rolls Royce about it," said Chads, "the transport should be fitted with a multi-drum winch, each drum operating independently through a selective clutch so that when the huntsman arrives at the winch with his airborne prey all he had to do is to secure the coston gun line to one of the drums, put in the clutch and heave in until his prize is at sufficiently short stay to pass under all low lying obstructions.

"Of course," said Chads, for the benefit of the locals now gathered round listening, "if this system is to be operated by divers

I ought to explain that the transport should be fitted with flooding and blowing arrangements to allow for the accumulated buoyancy due to the large number of beasts likely to be shot."

We thought Chads had finished but with a significant glance in my direction he continued, "Should there be those among us who do not shoot very accurately, they will be pleased to know that my invention has novel application for them, for in event of a miss, the fuse is self destroying and will release the high pressure helium causing a terrific blast wave which has the effect of concussing any living creature within a 200 yards radius". Chads then turned to me and said "You don't expect to miss by more than that do you? As this blast wave passes it leaves a terrific vacuum with the result that the victims of the blast are sucked up into the centre of the vacuum and are now available for the shaky marksman to 'ump' down the mountain side". Of course we did not take this part of the Chads invention too seriously.

SETS OF OLD

Present-day users of self-contained breathing sets may be inclined to look upon them as a modern innovation, or at least, think that the design is modern.

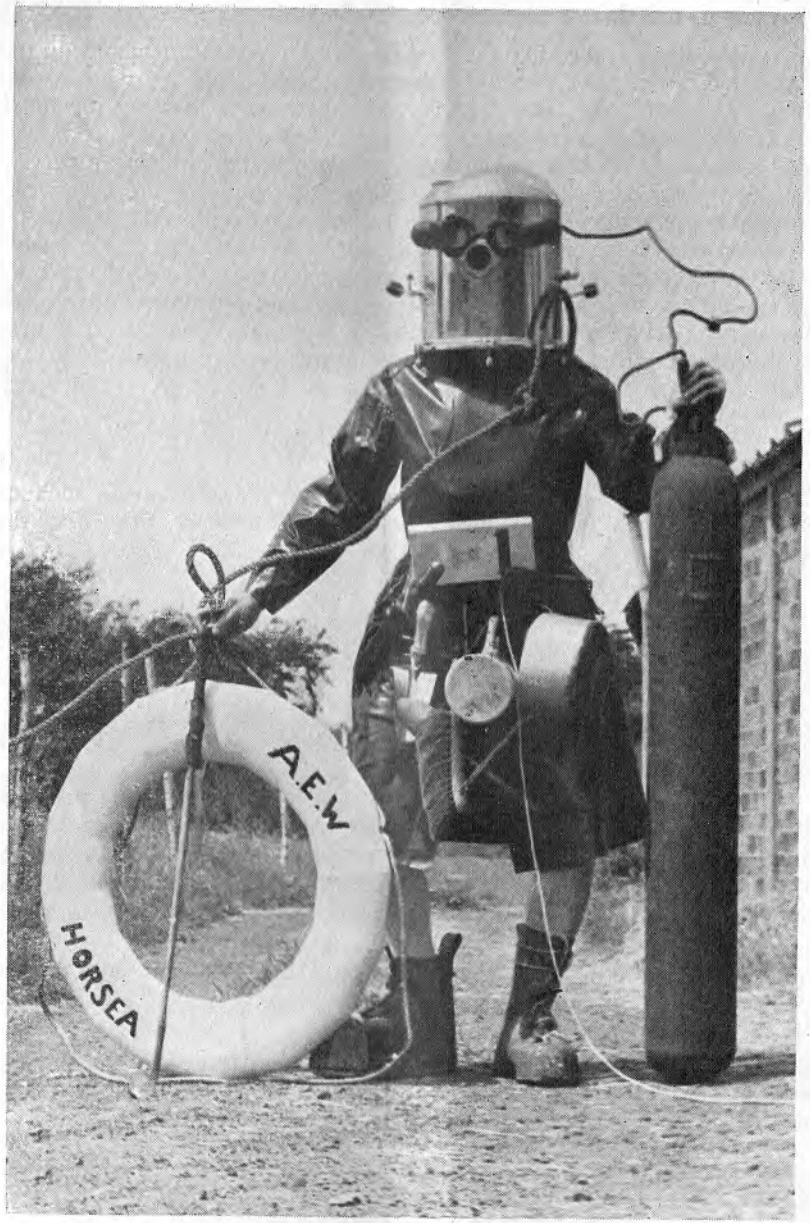
Let them be disillusioned!

The first practical self-contained diving gear was made in 1878 by Siebe Gorman and Co. under H. A. Fleuss patents. This set has essentially the same principles as used today. It consisted of a copper cylinder containing oxygen charged to the pressure of 800lbs. per square inch, a large container of caustic potash to absorb the CO_2, a breathing bag and a face mask.

This apparatus was later adapted for use with an ordinary closed diving dress (in much the same manner as the present M.R.S.). The CO_2 absorbent was a caustic soda mixture and twin steel cylinders replaced the copper one, these being charged to the familiar figure of 120 Ats.

In later types a reducing valve was fitted complete with a by-pass valve, the flow from this reducer being about 4½ litres per minute. Cylinders were filled with equal mixture of oxygen and air (i.e. for the theory lovers, a 60/40 mixture).

If any doubts exist as to the effectiveness of this equipment, the exploits of Alexander Lambert, in the flooding of the Severn Tunnel incident should dispel them. Using the gear described, this diver worked for stretches up to one-and-a-half hours in 40 feet of water, 1200 feet along the flooded tunnel, using no lifeline and in complete darkness.



C.D. Trials Team produce their own answer to the "Boffin's" Theory

"NIAGARA" RECALL

The rattle of teacups in the odorous pantry heralds the dawn of another day and the stewards, tousled, unkempt, busy themselves with the tannin compound that will resurrect life in all hands.

The salvage vessel "Foremost 17", weatherbound at the Reotahi anchorage, swings in the tide rip, and a long belch of oily smoke pollutes the early morning from her rakish funnel.

The light off One Tree Point blinks its fitful message into the murk.

"Main engines at 6.30, please Chief."

The skipper, early astir, cocks a wary eye at the dawn gloom of the New Zealand autumn, and, satisfied that the weather is improving, seeks confirmation in the early weather report.

The crackle of atmospherics blends with the staccato announcements.

"Good—let's go!"

In the wheelhouse the steady drone of the gyroscope links with the occasional "tick" as the ship frets in the tideway and the stand-by helmsman, hat arake, cigarette glowing, awaits orders.

"Weigh-forward."

Arthur, the mate, supervises the cable snaking inboard, jets of steam from the drain cocks obscuring him at times.

The cable clatters down the locker, creating an all too familiar bedlam within the confines of the awakening forecastle.

In silence, the telegraphs are ordered to "Stand By" and down in the engine room Chief complies.

As the anchor comes home the mate signals the bridge the decreasing number of shackles, and, looking overside, notes with satisfaction that all is clear.

"Aweigh."

"Half speed ahead. Hard a-starboard."

The strident cacophony of the steering engine destroys the last semblance of peace on deck and the Asdic Officer groans in unison from his nearby bunk.

"Steer 130 degrees."

The wheel spins under the guidance of Arty and the little vessel noses seaward, rippling of bow wave under forefoot and milky azure astern.

The two cooks, busy in their galley aft, whistle tunelessly as they prepare breakfast.

"What! Eggs and bacon again!"

Products of hen and hog spatter and crackle in the pans and their aroma vanishes into early morning air through vents and fiddley.

Helmsmen and firemen alike notch their belts—it's not breakfast time yet and the smells are tantalising.

Gathering speed and threading tortuous channels "17" pushes a furrow to her rendezvous in between Bream head and the Moke Hinau Islands, where, hundreds of feet below, the stricken "Niagara" lies.

The Sugar Loaf and Smugglers Bay drop astern to port.

Half naked men, betowelled, splash noisily in buckets or jostle for a wash in the tiny washplace, and the watery sunrise glows on the tattooed forearms and matted locks.

" What's the prospects, Skip?"

" Looks fair enough, I think, Frank."

Breakfast over, a haze of tobacco smoke fills the messroom and saloon and dispels as all proceed to their duties.

The clatter of crockery being washed up emerges from the pantry, mingling with the din of winches on deck. Wire hawsers veer and haul, a trap for the unwary.

The Salvage Officer returns to his room, pipe aglow.

The divers, long versed in their duties and craft, repair on deck.

" Watcher, Chads."

" Howya Dick."

" Watcher, Frank."

" Hiya."

The ship curtsies in the long swell outside and forges along steadily, leaving a smoky signature skyward.

Salvage hands, under the mate, prepare the hawsers while the greaser, oilcan in hand, does the rounds on piston slides and cocks. The donkeyman, Harry, sunlight aglint on spectacles, sounds the tanks with a flourish, logging their contents with a stubby pencil. All is well, and to-day, maybe, a few more bars of gold will be snatched from the deep.

The recompression chamber door clangs open as Charlie, the diver's winchman, assists with the tools for the day's diving.

" Chamber and Iron Man?"—" Yes."

Soda lime rustles into canisters and the clang of spanners betokens the changing of oxygen cylinders for the job. The Iron Man hisses a little and gives a metallic hiccough to acknowledge his cylinders are full, and continued to gape owlishly at the world in general, steel arms crossed in idleness. Soon he will be feeling nearly 200 pounds pressure all round him, with his steel mate the Observation Chamber.

" There's the buoys." The Captain lowers his glasses as the ship closes smoothly on the wide circle of yellow topped conical buoys, bobbing in the seaway.

" Stop engines. Out boat." The ship's momentum eases and she rides easily to the swell. The giant derrick swings over obediently under the watchful eye of the winchman and the purchase wire snakes down to Willie, the launchman, who hooks on with the ease of long practice.

The reek of petrol assails the nostrils as the boat is fuelled. Watching the roll, the Mate hoists out the boat, the mooring party scrambling into her as she becomes waterborne. With a stutter, the engine roars into life. Rapid orders from the bridge and Willie, tiller in hand, hurtles off with the snakelike hawsers trailing astern, to make fast to the appropriate buoys.

For about half-an-hour the air is strident with commands and replies until the salvage ship lies snugly over the wreck. In the control room, the " tch tch " of the echo sounder reveals the outline of the prostrate ship in her watery tomb.

The boat is hoisted inboard, swaying into her crutches. Busy salvage hands haul the chamber and iron man to their appointed places, while Dick runs out the attendants phone leads. Frankie, the electrician and " ping " man, checks over the amplifiers. The job of attendant is a vital one, he being the sole arbiter of the accurate interpretation of the submerged diver's orders. Inaccuracy means fatality on this operation. Frank, the diver, briefed and ready, checks his canister and cylinder and slips into the chamber, chamois leather to hand and throat phones dangling ready for connection. " On lid." " Up Charlie." The chamber lid is hoisted gently, with submarine light attached, and clangs into position. Spanners fly as the diver is screwed down. With a crackle of distorted fuse, communication is made as Frank plugs in.

" Hello surface. Can you hear me." " Hearing you loud and clear, over." " All ready?" " O.K. " " Up Charlie." The chamber rises from the deck, swings overside, and plunges into the greeny blue murk.

" Ready to leave." Frank adjusts his mask and settles in his seat as, smoothly, with pauses to lash cables together he descends, through schools of curious fish, to the ghostly fastness holding the erstwhile pride of the New Zealand waterfront.

" Last stop." Just above the wreck Frank awaits his partner. Peace reigns below. On deck, Chads appears, incongruous in waders. Adjusting harness, canister and phones, he climbs into the Iron Man, and, with difficulty, slips into the steel limbs. Tools waggle, free to use as required. Oxygen, main ballast and fan motor are tested.

" Right, on lid." The dome is raised and once again spanners clank closing the air and light from lungs and vision.

Frank, immersed hundreds of feet below, links up with a cheery wisecrack, control and bridge check and Dick confirms all communications.

" O.K.". " Over the man. Up Charlie." With a nip of the limbs as the cradle is cleared, Chads becomes airborne in one third of a ton of steel. " Lower Charlie." With a splash he enters the water, and floats. " Flooding ballast." A gurgle of entering water is heard as the ballast tank floods up—then, all is silent.

" No leaks." " Good." " Nice change." " Ready to leave." From the sunlit blueness to green, green to semi-darkness, the Iron Man descends, surrounded by fish, goggle-eyed at the strange intruder. Kingfish rasp at the ballast tank, very chummily. " Last stop "—from the surface. " Hiya Chads." Through the eerie gloom, Frank appears, chamber rotund and red-eyed, and beneath both human denizens of the deep, the dim lines of " Niagara " appear. " Lower both together." Obedient to commands, the Iron Man and chamber approach the wreck. Two passenger decks, ripped apart by explosives, gape and protrude with penetrating fingers. The chasm of fatal mine explosion appears.

The bullion room lies beneath us, its contents still and ever coveted by man. " Three feet to port." Frank's command is heard and obeyed on deck, the resultant movement being transmitted through the suspending hawsers to submerged divers both. " Heave aft on the traverse." Cheek by jowl, chamber and Iron Man are aligned to lower, and slowly enter the bullion room.

" On light." The stygian gloom is alleviated a little by the light. An eel glides into further gloom. To both divers, a picture is etched sharply on the mind—tortured steel atwist, gaping rivet holes, debris, oily mud—and—bullion boxes inaccessible to previous salvors. Scrabbling in the watery murk Chads is watched with interest by Frank, his eyes wary, too, on the slack cable. With iron limbs pinned by slurry of the wreckage, the search continues, until the peak of salvors dreams —GOLD—is wrested from the deep. " Lower the grab."

Meanwhile on deck the favourite cry " Teasup," mingles with the clatter of winches. Robbie, the sailors " peggy " circulates with tea and biscuits. In due course Frank and Chads will emerge, sunshine scintillating on cascading water—sometimes successful, and sometimes not.

" Dick's turn now." The weather holding, the little ship, small world of endeavour, will chafe at her buoys as the sun sets. The Moke Hinau Island light renews its winking warning to mariners.

And far into the night, the wail of Jock with his bagpipes and Mike his accordian will blend with, far to the west, the songs of New Zealand.

DIVER'S BOOKSHELF

" ABOVE US THE WAVES " *(Harrap)*

By C. E. T. Warren and James Benson.

This is the first book to deal solely with the story of the Chariots and the " X " Craft. It has been a long time in coming, but the result is well worth waiting for.

It is always pleasant, when reading a book, to know that its author, or authors, really know what they are talking about, and in this case there is no doubt of that. The lines of the initial idea, the development of equipment, the selection and training of personnel, and the authentic accounts of many undersea operations are traced with delicacy, firmness, and a ready humour.

All divers, of whatever branch, will undoubtedly agree that the performance of the Charioteers in particular, and to a slightly lesser degree, the " X " Craft divers, was diving " par excellence ". If, with the more encumbering regulations which peace time forces upon us, we can approach the standards set by these men, we shall do well indeed.

This book is a " must ".

(Lt. Cdr. J. L. Crawford, R.N.)

ROUND THE SCHOOLS UNITS AND TEAMS

PORTSMOUTH

Still busy. In addition to the usual training routine, the last quarter has included *Vernon* gymkhana, which was a great success. A diving demonstration was given in the forenoon, and during the afternoon's sports activities, the branch was able to keep its end well up. Even if P.O. Collar, who led most of the way in the obstacle race (after making use of his experience at running in " standard " boots, at the start) could not muster the energy to stand up after being the first one to crawl out from under the last obstacle.

Emsworth Water Carnival involved a large turn out, and the remarks about giving demonstration and jumping from high platforms into four-and-a-half feet of water were rather choice.

Who was the Clearance Diver (Q) who was heard to say after these two shows that he supposed " Flaming leaps on flaming bicycles would now be included in the flaming syllabus "?

P.O. Allen, the divers' sports secretary, has been doing a grand job and sport is now flourishing, with full marks going to the soccer team.

CHATHAM

I have it on very good authority that Mr. Dodds is making a cat-of-nine-tails, and that we shall soon have bags of news and articles flowing in.

DEVONPORT

St. Luke. Ch. 11. V.33.

SAFEGUARD

This year we have had a complete change round of staff. Mr. Wookey relieved Mr. Rock who was appointed to *Reclaim* and C.P.O. Gates relieved P.O. Emmett who is now diving in Takoradi, engaged in the construction of the outer sea wall. P.O. Jackson has been relieved by L/S Robinson. Jackson it may be remembered, had an accident which resulted in a partial fracture of his leg. He is now A.1. again and has been drafted to Chatham for demob, after doing eighteen months call up.

Our boxing champion, in the form of P.O. Lester has been relieved by P.O. Foreman. The civilian staff at the tank remain the same with the exception of Len Steen, who has been sent to Greenock to work on the wreck of the French destroyer, which some of you will remember, sank in 1940.

Mr. Finch and Mr. Brown, the two Admiralty Salvage Officers, are still here and rendering their invaluable assistance and knowledge to the diving classes.

For information we totalled up the amount of oxy-arc rod used over a period of twelve months from 9th June, 1952, to the 5th June, 1953, and it amounted to the total of 5,250 rods. During this twelve months, classes were comparatively few and small in number, so in the past the amounts used must have been gigantic.

From the actual work point of view here, as regards practical diving we have had very little to do since Christmas. Mr. Wookey and P.O. Jackson had to fly to the Shetlands with diving equipment, to recover a motor boat belonging to H.M.S. Challenger. The mode of transport was by fighter aircraft, probably a unique means of moving divers and equipment.

As well as this, one of the staff, one of the divers first class (Q) and myself had to dash off post haste to Lossiemouth to recover a crashed aircraft from the sea. Needless to say, all that could be found was the engine.

Future classes must now be prepared to do their own messing, because *Safeguard* is now on the canteen messing system. This is possibly due to a few home truths told by the last diver first (Q) class. A typical expression of classes in the future will no doubt be "If you want a duff—" well, you all know the rest.

It seems that all classes arriving here are out for a little relaxation, with their noses off the grindstone of mixture breathing, V1=P1 etc.

Social life here has been rather quiet since the last class left us. The W.R.N.S. of Donibristle are now at the Wailing Wall praying for more Divers.

The last social given by the Divers proved a great success, the same having received their hard-earned "lolly" that day.

FLATHOLM

Busy working in the Thames, the boys must be covering some interesting ground because they are keeping fairly quiet.

Taff sent us a useful suggestion about this section of the Magazine ("No! Not what you blighters are thinking!). It was to include more local items of interest from each unit. As can be seen we are using this advice, but first of all, you must keep the staff informed of your doings by letter, the secretaries having lost their crystal.

Flatholm's poet presents:—

Sippers or Gulpers

A mighty bowl on deck he drew
And filled it to the brink
Such drank the *Flatholm's* gallant crew
And such the gods do drink

This ancient cloak did *Vernon* wear
Was drenched within the same
And by its virtues we all swear
And GROG derives its name.

(Signed) "2 & 1"

PORTLAND

We read with interest a report taken from the "Dorset Daily Echo" on the Portland Navy Day, and were very pleased to see that the efforts of the Portland team had captured the imagination of the

spectators. To quote from the report "It was definitely the underwater men who stole the show". Full marks for the completely new and original show, including a drop, and pick up of swimmers, using a T.R.V. and rubber dinghy.

ANNET

It has been observed with pleasure on board that we are mentioned in the last issue of the *Diving Magazine*. It was therefore thought a good idea to submit an article for the next copy.

Annet, commissioned in June, 1952, including in her complement 10 Clearance Divers and one Clearance Diving Officer. *Annet*, it might be explained, is not the name of a Windmill Girl, but is a barren, rocky islet in the Scilly group, infested by innumerable "seabirds". The ship is an Isles class Trawler, formerly used for wreck dispersal.

After commissioning, *Annet* proceeded to Harwich. Now Harwich is quite a pleasant place for working and shoregoing in the summer, but should be avoided like the plague in the winter. If the weather ever permits any shore leave, it is quite possible that it won't permit the return. On several occasions it was impossible to return to the ship at night, due to gales or fog. Normally no one would worry unduly about returning at night, but unfortunately Harwich is a place destitute of cheap sleeping accommodation, and the Base Regulating Office, a cold and bed-less place. Certain railway coaches, parked nearby, received their full quota of *Annet's* ship's company on such occasions. It is said to be a fact that Divers have unnatural powers in the winning of female hearts. Many of these were left fluttering when *Annet* departed from Harwich in February, 1953. It has been said that *Annet's* wash, plus farewell tears, caused the great floods in the area just after she left.

After a short boiler-clean-cum-refit in Chatham, thoroughly enjoyed by the Chatham natives, *Annet* left for the Humber, the motor cycle enthusiasts on board frantically requesting for week-ends in order to take their machines up to Hull. Perhaps this would be a good stage in the narrative to explain about Divers and their motor cycles. On commissioning, there was only one enthusiast on board (at least only one, who possessed a motor cycle)—but the infection quickly spread, and very soon a certain firm in Colchester was in practically direct receipt of all S.9.s earned on board. The original enthusiast, it was darkly whispered, was looking round for a gold plated Rolls Royce, presumably from his commission.

The ship arrived in Hull at the end of March, and lay berthed in the Albert Dock for the month's stay. A list of the pubs and dance halls *not* to be frequented was posted on the notice board. This information was duly noted and promptly utilised.

The ship's company were made particularly welcome by the civilian population and also the local R.N.V.R. division. The latter invited *Annet* to their annual dance. We replied by inviting their W.R.N.S. on board to tea. The charm of these civilian W.R.N.S. was so great that it induced the Diving Officer to suggest giving them a grant from

the ship's welfare fund (an unheard-of occurrence). This was carried unanimously.

The ship left Hull for Immingham at the end of March, leaving more "fluttering" hearts behind. A week of hard work was put in at Immingham, but the less said about the social activities the better.

The ship then proceeded to Harwich for Easter leave, and on return in the middle of April sailed for Grimsby. At first Grimsby seemed very quiet after Hull, and the locals not over-enthusiastic about *Annet*. Gradually, however, the place was sorted out and clubs and pubs were invaded by *Annet* hordes. During the time berthed alongside, the ship was visited by Sea Cadets, G.N.T.C., and Army Cadets. The Divers, after showing them round the ship, gave frogman displays to all and sundry. One Petty Officer detailed to show cadets round the ship was trying hard to explain the complexities of the engine room, about which he knew nothing. After a very patient five minutes, one of the Sea Cadets, whose father was a Chief Engineer on a trawler, took over, and the P.O. retired very chastened.

At the beginning of May the ship moved out into the stream. This involved running the boat to land libertymen, and as the sleeping ashore situation was on a par with Harwich, a hut on the jetty was promptly requisitioned for sleeping quarters, and named the "Waldorf-Astoria". This hut measured only eight feet by six feet, giving the coxswain of the early morning boat good cause for amazement at the number of people that would tumble out on the arrival of the boat, the Divers murmuring learnedly about the Hydraulic theory, particularly pressures and confined spaces, the remainder about the Black Hole.

The ship left Grimsby at the end of June leaving still more broken hearts behind. Perhaps the whisper of civil action may have disturbed one or two minds, but of course this was only rumour.

Annet has since been in Chatham once more for boiler clean, when our chummy ship *Flatholm* lay alongside, much good-natured banter being exchanged.

Soon we shall be seeing new faces on board to replace chaps due for civvy street. So if you are looking for a good sea-going billet with lots of diving, put your name down and join a good team ('cause we sure can use you).

PUSSER (and ghost)

MEDITERRANEAN TEAM

Paradise ? You Can Have It !

Bronze bodies flashing, the thrill of plunging into the bright blue Mediterranean Sea. All that lads can be yours, plus congenial company, in bright surroundings at *H.M.S. Phoenicia,* which can boast excellent accommodation and cuisine. Do not delay you Clearance Divers, get a request form today and apply for a draft to the sunny Mediterranean Station.

Malta, Island of the Brave, Jewel of the Med., awaits you with

arms wide open. You can spend pleasant hours pursuing the hobby of your choice. For the historian, what better chance is there to examine at leisure the path of this colourful island through time. The amateur photographer will find scenes that delight even the most inartistic of visions. Whilst those with doubtful interests may pleasantly pass the time in Straight Street Valletta or the Mall Floriana, where it is said by those in authority that the girls are the prettiest, the wines the choicest and the entertainment without compare anywhere in the world.

Have you seen the moonlight over the Peloponnese, the lights of Toulon, street cafes with gay laughing throngs or sheiks and veiled maidens with flashing eyes? No! Then it's time life began for you my friends, and all these can be yours when you cruise with the Med. F.C.D.T.

For the more serious minded of course, the chances of promotion are high indeed. Fleet boards are held frequently and the Flotilla School will further your education no end.

What are you waiting for? Grab a request form and a pen. Come and find yourself a tan, become a star of films, dive where the visibility is never less than 60 feet.

Don't delay—request today!
Why? We want reliefs!!!

By CLEM

FAR EAST TEAM

This we hope will be the first of many screeds from the team, so first a short introduction to our members and the work we have been doing.

We formed up two-and-a-half years ago, and started with a strength of seven. For the first year most of our work consisted of training S.W. divers for the fleet, and giving day and night attacks for the ships as they came down from Korea.

1952 saw the whole team carrying out a survey round the Station, returning "home" (Hong Kong) in mid-summer. 1953, another trip away to dispose of a couple of hundred tons of Jap bombs. Which brings to mind the remark made by the C.D. Officer, who said in surprise as he blew one pile of bombs "——! Did I do that?". Also the remark of a Chief C.D. who said a small island off Singapore reminded him of a tropical island.

The first of July saw the whole team saying farewell for the time being to C.P.O. Carter, who sailed for home in the *Empire Clyde.* On the 25th July we welcomed P.O. Ted Butler as his relief, now known as "Never again" Butler due to the Hong Kong week-ends.

A.B.s David, Robbie and Waller are leaving us sometime in October, and Lt. E. E. Gash the C.D.O. next February. No word has yet been received about a relief for P.O. Ben (Leslie Welch) Claxton, the L.W. being for the exceptional memory he has *not* got.

John David is hoping to take his release here, and settle as a Colonial Boy, after having been for two years our "Wild Colonial Boy".

The whole team agree with me that the past thirty months have been the happiest we have ever spent, and look forward to repeating it some time. Could we have that recorded as a hint please?

L/S Larkin and A.B.s Alderton, Chaplin and Sayor, the new reliefs to them we extend the hope that they may have a commission as enjoyable as that of the old team. By the way the next time any of you at home meet C.P.O. Nick Carter, just ask him what a Gloptomologist is . . .

C.P.O. Soper, Diver I, who is pining away as Chief Buffer on the *Unicorn* was in to see us a few days ago, and some very hectic runs were had by one and all. Which reminds me of certain Divers who thought they were members of the Everest team until the O.O.W. caught them at 0330 one Sunday morning. Some friction ensuing because they could not get down, and the O.O.W. thought that they would not.

I hate to mention this Mr. Editor, but the other day the B.D.O. (Steamers) had to call for the C.D.s to do a certain lifting job for them, much to their embarrassment we did the job in 15 minutes. One other bit of news before we close, is that the team successfully disposed of two mines recently, one being dealt with by P.O. Butler and the other by A.B. Waller.

Now from all Divers in Hong Kong cheerio, best of luck to our Mag. and the best of luck to the Fraternity everywhere.

"BEN" CLAXTON

Two well-known C.D.s discuss mixture theory

SPORT NOTES

VERNON ATHLETIC MEETING

The annual athletic meeting was held at usual at Pitt Street. The Divers' tug-of-war team won their event in a very convincing manner. The field events did not bring out any unusual talent from the branch, but a first place was taken in the track events.

AQUATICS

At the meeting held in the Pitt Street baths, the Divers, feeling more at home, did well. L/S Lardner kept the colours (T.E. Flag 7) flying high with a magnificent effort. He swam two lengths ten feet under water to gain first place in this event. Second place was also a Diver, A.B. Davis, two lengths; the nearest challenger to these two completed just over one length. L/S Lardner also took first place in the obstacle race and second place in the two lengths breast stroke.

Mr. Barrington Q.D.D. was first in the Diving events while our A.B. Cannon took second.

FOOTBALL

Great things are expected of our football team this season. To date three friendly games have been played, and selection is still in progress. The team will consist mainly of *Vernon* first and second eleven players—we are therefore hoping to be able to bag the inter-part knock-out competition.

THE BARMAID KNOWS

She knows all our sorrows and all our joys,
She knows all the girls that chase the boys.
She knows all our troubles and all our strife,
She knows every man that steps out on his wife!
If the barmaid told all she knows
She would turn all our friends to bitter foes.
She would start forth a story which, gaining in force,
Would start all our wives to sue for divorce!
She would get all our homes mixed up in a fight,
She would turn bright evenings to sorrowful nights.
In fact, she would keep the town in a stew,
If she told one tenth of all she knew!
So when out on a party, from home you steal,
Drop in for a drink—the Barmaid won't squeal!

REHEARSAL AT EMSWORTH WATER CARNIVAL

I fired a rocket
Into the air
It fell to earth
I know not where.

No! That is wrong
For its terminal feat
With its speed still quite strong
Pierced a newly-washed sheet.

A cry crossed the millpond
Reached I.D. and crew
"Come down off that platform
My Mum wants you."

SINKING FEELING

I had twelve bottles of whisky in my cellar, but my wife told me to empty the contents of each and every bottle down the sink, or else!!! So I said I would, and proceeded with the unhappy task.

I withdrew the cork from the first bottle and poured the contents down the sink, with the exception of one glass which I drank.

I extracted the cork from the second bottle and did likewise, with the exception of one glass which I drank.

I then withdrew the cork from the third bottle and emptied the whisky down the sink, with the exception of one glass which I drank. I pulled the cork from the fourth sink and poured the bottle down the glass which I drank.

I pulled the bottle from the cork of the next and drank one sink out of it and threw the rest down the glass. I pulled the sink out of the next glass and poured the sink down the bottle. Then I corked the sink with the glass, bottled the drink and drank the pour.

When I had everything emptied, I steadied the house with one hand and counted the bottles, corks, glasses and sinks with the other, which were twenty-nine. To be sure I counted them again, and when they came by I had seventy-four, and as the house came by I counted them again, and finally had all the houses and bottles and corks and glasses and sinks counted, except, one house, which I drank.

A.E.D.U. NOTES

(FROM THE DEPTHS TO THE HEIGHTS)

It is perhaps a little difficult to understand quite how the A.E.D.U. became involved in the Everest Expedition—at first sight the two outfits seem as far apart, in function, as in space, as anything could possibly be. In diving we are used to rapidly increasing pressures, so at depths below 33ft. pure oxygen can be lethal. Our surrounding atmosphere is non-breathable water, but as you know, we take care that what we do breathe contains a supply of gas, which under the very worst conditions contains never less than 14% oxygen, and is good, heavy pressurised stuff, very comforting to the lungs, warm and moist. At the top of Everest the pressure is only 4lbs/sq. in. absolute, that is 11lbs. vacuum as compared with the surface; the air is thin, dry and cold, and contains the equivalent of 7% of atmosphere oxygen. No wonder they want sets!

The association of A.E.D.U. with these sets is a first class example of how, in the strange world inhabited by "boffins and such", information gets around. It starts with two quite unrelated pieces of work—the experiments carried out to improve the efficiency of soda lime canisters, and some work we did in the "German Pot" on *Deepwater* to help scientists from the "National Gas Turbine Establishment". The N.G.T.E. man took quite a lot of interest in our work and set-up, and, on his return discussed it, in general terms, with his colleagues. One of these was Tom Bourdillon who, you will remember, climbed to 28,500 feet wearing closed-circuit breathing apparatus. Another was Mr. Lloyd, who became a member of the Expedition Committee. The A.E.D.U. was first approached, early in 1952, by Mr. Lloyd for information regarding weights and absorbtive capacity of our CO_2 canisters. He was very impressed with the figures which had been achieved and very soon after this it was arranged for Tom Bourdillon to pay a visit.

That first visit put us right into the picture! Tom had just then been "lent" by the Ministry of Supply to the Everest Committee to work solely on the problem of design and supply of adequate and efficient oxygen apparatus for the projected 1953 expedition. The Swiss climbers were just setting out, we knew that they had some form of breathing gear, but were without details. It was obvious from the start that time was vital. If the Swiss expedition failed, our people would, for many reasons, have to be right on their tails. This meant that there were from six to eight months in which to design, manufacture, and test, sufficient apparatus for an expedition which at that stage, had not even decided upon its numbers. Admiralty were sympathetic but adamant. In the opinion of authority A.E.D.U. were too heavily committed on top priority work to help in any but a purely advisory capacity.

The directive was short, but pithy—"All aid . . . short of work!"

At any rate, our terms of reference were clear—and it is good to be able to say that all of the many people that we met during the next few months in connection with the gear, seemed as glad to receive advice as we were to give it. A.E.D.U. was represented at several meetings of the "Working Party" that was formed to ensure the timely production of the apparatus, and in the light of following events, particularly the eventual success of the expedition, it is interesting to record decisions that were taken, and the way in which they worked out.

The first, most important, question was the one with which all self-contained breathing apparatus designers are vexed — how much endurance, and how to get it into the smallest possible space? There are two available methods for this mountain-climbing gear. First the "open-circuit", in which a regulator supplies a small fixed flow of oxygen to a mask. This oxygen is "made up" with atmospheric air inhaled through a demand valve. Exhale is to atmosphere. The second is the "closed-circuit", in which there is a "reducer flow" to a breathing bag, inhale from the bag, exhale through a CO_2 absorbent canister back to the bag. Each of course, has its own particular advantages, the "open-circuit" is much more easy to prepare, service and maintain, but is wasteful with gas, which it supplies cold and dry. The "closed-circuit" apparatus requires more care and maintenance, has to carry the extra eight of CO_2 absorbent, but is economical with gas, which it supplies warm and moist. It was finally decided to concentrate on the provision of "open-circuit" apparatus as the standard equipment for the expedition. The main reason for taking this decision was that there is a great deal of information and equipment available in the R.A.F. on the use of this type of apparatus at high altitudes. Sets could be provided by the modification of standard equipment, immediately available, thus saving valuable time and effort. It was, however, decided to continue the building of a small number of closed circuit apparatus in order to test out their possibilities under climbing conditions.

Having settled the type of gear, it was next necessary to agree on numbers and size. Several factors governed numbers, firstly the composition of the assault and support parties—that is the number of people working and climbing above the 23,000ft. level, and the length of time during which they would be wearing sets—secondly the amount of oxygen which they would consume, and lastly the amount of bulky equipment which the Expedition would be able to transport.

It was at this point that the greatest amount of discussion took place, and the final decisions were:—

(1) 30 lightweight equipments for assault climbing, set to four litres/minute for six hours.

(2) 60 standard equipments for support work and for sleeping—one litre/minute for as long as possible.

The lightweight equipments were, of course, the biggest problem since we were faced with the provision of cylinders carrying 1,440 litres of oxygen per climber (for comparison the large cylinders of the Patt. 5561 B/A carry approximately 400 litres each). It was on the design and provision of these cylinders that the A.E.D.U. were able to help most. From the experience gained in the design of lightweight, aluminium cylinders and with the ready co-operation of Messrs. Reynolds Tube Co. Ltd. and R.A.E. Farnborough, we designed and supplied 64 cylinders to the expedition. They were charged at 3,600 p.s.i. and at this pressure contained 800 litres of gas. Empty, they weigh only 7½lbs. each. We were also able to advise on the design of face mask, and put the Committee in touch with Messrs. Veedip Ltd., who have done much development work for us.

Once the design was settled and under way, there was little more for A.E.D.U. to do, but it is interesting to note that the meeting at which the final decisions were taken took place in September, 1952, and that the completed equipments were being flown out to India by the R.A.F. in March, 1953— a terrific achievement by those concerned.

Old friends, and new, to the diving world, some of the firms concerned—

Messrs. Normalair of Yeovil acted as co-ordinators, assemblers and packers of the gear. They modified the lightweight regulators and designed and manufactured the carrying frames.

Messrs. Siebe Gorman of Tolworth modified all the standard regulators for the support and sleeping sets.

Reynolds Tube Co., Ltd., manufactured and tested the cylinders and pared down the weights by machining the outsides.

Veedip Ltd., supplied the face-masks.

Events on the mountain showed that the decisions taken were the right ones and there is no doubt that the use of oxygen on what seemed at first an extravagant scale was fully justified. All the "boffins" on the "Oxygen Working Party" had some shocks to get over, as Col (now Sir) John Hunt and Mr. Lloyd very gradually made the full wants of the climbers known; for example, the first tentative shot at the number of cylinders wanted was 20—it finished up at 64; but the teamwork in the preparation stages was only exceeded by the teamwork on the mountain.

Tom Bourdillon pressed on with his "closed-circuit" design and A.E.D.U. awaits details with particular interest—both of design and performance. We have been assured that it was based on the figures that we supplied—but do not know yet whether that's to be proud of! If you are still interested — and you must be if you have ploughed through this lot!—full details will be supplied in the next issue. We do know that two members of the expedition — the designer Bour-

dillon himself and his companion Evans, climbed to within 500 feet of the summit wearing this gear, actually reaching higher than the "best till then" Swiss expedition. They started from a point lower down than the final camp set up by Hillary and Tensing.

We have put in a bid for one of the assault sets for the A.E.D.U. museum—placed alongside Wilfy Bollard's "Deep Bowler" it will show that we have been involved in a vertical height difference of 29,540 feet with a pressure difference of roughly 240 p.s.i.—who will work out the stops for that? And what price the S.9's!

Four members of the Clearance Diving branch recently had a spell in hospital, after an argument between a car and a wall. However we are glad to report that the only person on the Danger List was the Ward Sister.

DIVER'S HOWLERS

"The pressure effects upon a diver whilst he is submerged rules his life, and in a few cases whilst he is on the surface."

Q.—What is the meaning of a succession of three bells.

A.—I am all right, but will foul myself if left alone.

BREAKING THE WORLD'S DEEP DIVING RECORD (1948)

By Lieutenant H. WARDLE, R.N.

Part 3—Oxy-Helium Trials (Deepwater 1947)

With the diving procedure modified as described in the previous issue, the next diver carried on down making bottom at 301 feet. Again whilst on the bottom the diver reported feeling better than on air and after 12 minutes on the bottom he was called up and decompressed using the modified procedure without incident.

I was the next diver and needless to say, it was with every sense alert that I entered the water. The air was switched off and the Oxy-Helium supply opened up. After a short period of counting I was aware that the Oxy-Helium had arrived by the almost unrecognisable high-pitched sound of my own voice.

I was then given the order to "carry on down". This I did without incident, giving the S.D.C. the usual kick as I passed it at 120 feet. When I arrived on the bottom and I had opened my injector, I had sufficient time to analyse my initial sensations.

The first, most outstanding, fact was the complete absence of that oppressive sense of depth which a diver on air is increasingly aware of as the depth becomes greater.

The second factor was the feeling that all senses were functioning correctly, there was no necessity to concentrate on the gist of messages from the surface as is usually the case on air. The underwater light was suspended nearby clearly visible instead of appearing through a greenish narcotic haze. There was no sensation of being in another timeless world. In fact, all appeared to be normal, a strange thing for a diver at 300 feet!

The third factor took a little longer to notice, I was aware that something that went with a deep dive was missing but couldn't place it. What was clear, was the fact that all seemed very "still and quiet." I then realised that what was missing was the throbbing of my own pulses which one gets when on air. This is rather similar to the sensation experienced during the early stage of going under an anaesthetic.

It was soon time for me to come up out of the glue-like mud at the bottom of Lock Fyne and it was with a feeling that I had got over the first hurdle that I left the bottom.

It was during my ascent to the S.D.C. at 120 feet that I experienced my first discomfort. As previously mentioned the rate of ascent when decompressing from an Oxy-Helium dive is very slow, in fact about 25 feet per min. As all divers know, when the diver is ascending,

the air, or in this case the Oxy-Helium supply is throttled right back to allow for the gas expanding in the diver in the diver's suit as he ascends. This of course means that the diver is receiving little or no ventilating air. From 300 feet to 120 feet meant about 7 minutes under those conditions and by the time I had clambered on to the ladder of the S.D.C. I had more than a touch of CO_2 poisoning.

It was on the ladder of the S.D.C. that I received my next shock. My front glass was removed and as the S.D.C. was being supplied with air I was naturally breathing a large proportion of air. The effect was most startling and like a physical blow. I felt that I had suddenly been dropped down to 300 feet on air and momentarily experienced all the discomfort, The only explanation for this was that my tissues were still saturated at the pressure experienced at 300 feet.

After this, I completed decompression without incident except during my 1 hour 5 minutes on oxygen I felt a slight touch of apprehension! This I considered to be due to my wondering whether I was next one up for oxygen poisoning rather than a symptom of slight oxygen poisoning.

By the time I had surfaced the next dive was under way. This dive was an exact replica of the two previous dives until during the decompression when the diver had been at 50 feet on oxygen for 6½ minutes. He then stated that he was not feeling well and immediately went into a convulsion. The S.D.C. was broken down to surface and with difficulty the unconscious diver was transferred to the main recompression chamber. During recompression he was violently hysterical, screaming to be let out and could only be restrained with difficulty. After he had been quietened the remainder of the decompression was uneventful.

In both the oxygen poisoning cases in the S.D.C. warning was negligible, the convulsions severe and the unconsciousness very deep. The second case appeared inexplicable in view of the precautions taken after the first case. All known possibilities for a reduction in oxygen tolerance were considered and eliminated, viz:—

(i) Oxygen depth was not excessive, 38.6 feet and 33.8 feet respectively. Such oxygen tensions have been frequently encountered in deep diving on air.

(ii) Cold was eliminated in the second dive and excessive heat was never present.

(iii) The Oxygen-Helium mixtures were re-checked by analysis and found to be correct.

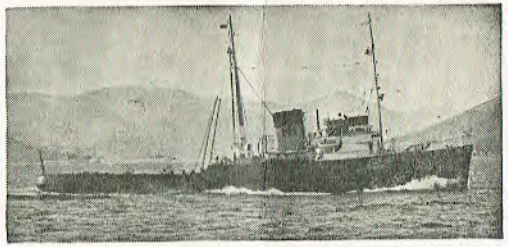
(iv) The divers did no undue amount of work during the dive.

(v) Both men were experienced deep divers and had carried out many oxygen decompressions, and it seems highly improbable that they could both be unduly oxygen sensitive.

(vi) It was considered improbable that undue concentration of CO_2 in excess of 3% (which had been accepted as the lower limit affecting O_2 tolerance) were present anywhere during the course of the dive.

It was clear that some of the points would require re-checking but would need to be done in controlled conditions ashore and not afloat. As no guarantee against a recurrence could be given, and it was considered dangerous to risk repetitions in active service conditions, the 1947 deep diving programme was suspended until a more thorough investigation into the causes of these mishaps could be undertaken.

Part 4. Finding during winter of 1947/8 will be included in the next issue.



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