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Vol. 4

H.M.S. VERNON

No. 3

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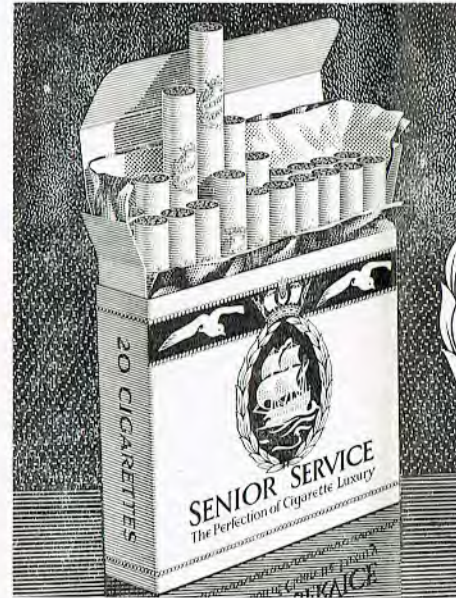
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R.N. Diving Magazine

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 Mr. S. J. NEWMAN, Snr. Cmd. Gnr. (T.A.S.), R.N., *Treasurer*.
 Petty Officer R. W. COLLAR, *Editor*.

Vol. 4

September, 1956

No. 3

EDITORIAL

Dear Readers,

Many of you will have read in the national newspapers of the unfortunate 'shark' accident that occurred during last term at Falmouth. Our deepest sympathy is extended to the families of all concerned. A Commander-in-Chief's commendation has been awarded to one of the diving unit for his action after the accident, and it gives me great pleasure to reproduce same in this magazine.

Time passes quickly! December will be upon us soon, which of course means another edition will then be due. May I take this opportunity to ask you all, to send in your news of interest, photographs, and stories, as early as possible to enable us to have the December magazine in the post before Christmas.

Since our last edition, we have regretfully said *Cheerio* to Instructor Lieutenant Lewis, the previous Secretary of the magazine, who has returned to his home hunting ground in the capacity of a civilian. His work on the magazine staff will be missed, but I am happy to report that we have been able to obtain the services of Instructor Lieutenant Kelly as his relief.

That is all the news for the present, so *Cheerio* readers. EDITOR.



TREASURER'S NOTES

Dear Readers,

It seems as though the Editor must have read my thoughts, for he has covered several of the points of interest I had intended to put into print.

The magazine, I am pleased to say, is still growing in strength, and our circulation continues to expand around the globe—we are frequently

receiving requests for information about the magazine from people in places hitherto unknown! The magazine must be obtaining favourable comment from you our readers, for this to occur. May I take this opportunity of thanking you all for this service, and thereby making each fresh edition a pleasure to produce.

Our next edition is due in December; for those concerned, will you please take note of the renewal forms enclosed so as to ensure that you continue to receive your regular supply of this magazine. Last but not least please ensure that you inform us of any change of address.

Cheerio. TREASURER.

SPECIAL ORDER OF THE DAY

COMMANDER-IN-CHIEF'S COMMENDATION

ERNEST HENRY CARTER,

Official Number D/Jx 158827, Chief Petty Officer (CD1), H.M.S. *Vernon*

On 24th July, 1956, free swimming trials at considerable depths were being carried out in Falmouth Bay. Chief Petty Officer Carter and Leading Seaman Robbie were carrying out the final dive of the day to the depth required.

During the descent, whilst approaching this depth, Leading Seaman Robbie's breathing apparatus ceased to function; he lost consciousness and at the same time lost control of his emergency breathing apparatus. When Chief Petty Officer Carter, to whom Tobbie was linked by a short line, became aware of this he immediately tried to revive Robbie at this depth; he correctly appreciated what was wrong with Robbie's equipment, and, taking charge of him, began to ascend.

At the first decompression stop at 80 ft, Robbie partially regained consciousness and struggled sufficiently for Carter to lose control of him; he therefore had to be brought straight to the surface, where artificial respiration and oxygen were successfully applied. Both divers were then transferred to a recompression chamber to recover from the severe 'bends' which the Trials Officer appreciated they would suffer because they had been unable to make decompression stops during the ascent.

Leading Seaman Robbie required 10 hours' treatment but Chief Petty Officer Carter, because of the considerable physical effort he had had to make in bringing Robbie up, required 44 hours' treatment and was then transferred to hospital for a further two weeks.

Chief Petty Officer Carter correctly assessed Leading Seaman Robbie's difficulties and took the correct measures to bring his unconscious body to the surface, thereby saving Robbie's life and considerably increasing his own likelihood of getting severe 'bends'. I consider that he showed coolness, courage and devotion to duty of a very high order with complete disregard for his own safety and I have commended him for his prompt and gallant action.

GEORGE CREASY,

3rd September, 1956 Admiral of the Fleet, Commander-in-Chief.

COMMANDER-IN-CHIEF'S COMMENDATION

P. H. ALDERTON,

Official Number P/SSx 865649, Leading Seaman, H.M.S. *Vernon*

On 25th July, 1956, H.M.S. *Burley* and H.M.M.F.V. 766 were engaged in special trials off Falmouth, involving the use of clearance divers. At about 1230, for the second day in succession, a shark was seen circling the M.F.V. and it was decided by the Diving Trials Officer to kill it before diving was resumed.

A motor dinghy put off from the M.F.V. with the Diving Trials Officer and three occupants. When the dinghy was near the shark, two 14 oz charges, joined by a length of cod-line, were successfully thrown across its back. The dinghy promptly turned away but the shark swam underneath it and the charges then exploded. The boat virtually disintegrated and the occupants were hurled into the water.

Leading Seaman Alderton was on the forecastle of the M.F.V. at the time of the explosion. He immediately took charge of the M.F.V., ordering it to proceed towards the wreckage. Shortly afterwards he was relieved in the wheelhouse by the Coxswain who had been below, and he then arranged for the medical chest to be in readiness.

When the M.F.V. was among the wreckage, four men dived into the water to bring in the survivors. Leading Seaman Alderton appreciated that two were dead and two conscious but seriously injured. He therefore brought the injured men inboard first, where he applied first aid to the Diving Trials Officer and checked that the other casualty's injuries were being treated.

I have commended Leading Seaman Alderton for his initiative and prompt action which undoubtedly saved the injured men from drowning and ensured that they were given first aid at the earliest possible moment.

GEORGE CREASY,

31st August, 1956

Admiral of the Fleet, Commander-in-Chief.

DEEP DIVING AND OBSERVATION CHAMBER TRIALS

At a depth of 1000 ft, water exerts a pressure of 30 tons per square foot.

With this fact in mind, we surveyed, rather dubiously, the steel shell which stood on the well-deck. About nine feet high, and shaped rather like an overgrown mushroom, with walls $\frac{3}{8}$ " thick, we wondered how it would stand up to the tremendous crushing effect of 1000 ft of water. However, the orders were that it must be tested, and with a man inside.

After a couple of days we were more resigned to the idea, and the general feeling was—let's get on with it.

So, on Friday June 8th, we sailed for Scallastle Bay in the Sound of Mull, where we planned to carry out the preliminary dives to a depth of 200 ft.

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While on passage, all divers learnt how the chamber and the control valves worked. A diver, to test the endurance of the air in the chamber, sat in it for nine hours without any appreciable effects from carbon dioxide. There is one innovation we hoped we would never have to use seriously. It is a method by which the occupant can, in an emergency, release the slings and cut the telephone cable, thus leaving the chamber clear to float to the surface by its own natural buoyancy and a ballast tank, the ballast tank being blown clear of water by the operator.

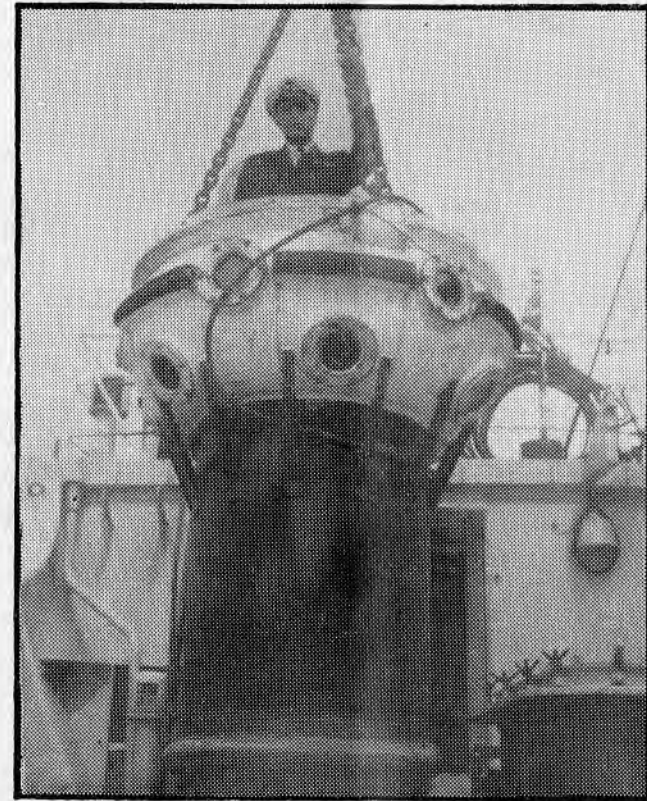


Photo by kind permission of the *Portsmouth Evening News*

We arrived in Scallastle Bay on Sunday night, and moored the ship head and stern across the tide. Next morning, bright and early, the work began.

The chamber was dived eight times that day, and each time the diver was ordered to carry out emergency surfacing drill. We had taken the precaution before each dip, however, to insert a short piece of cable in the cable guillotine, in order to keep the main cable intact. The main cable made a tenuous link with the surface, which was comforting (to say the least) to each man as he did his emergency drill. To be really on the safe side, the motor-boat was employed as a recovery boat when the chamber surfaced too far away from the ship.

The eight dives proving successful, it was decided to re-moor in deeper water and try a real emergency ascent by releasing the slings and cutting the phone cable.

The ship was shifted accordingly into 220 ft and the chief diver was the first guinea-pig. It took about two minutes before the chamber broke surface from the time the telephone went dead, signifying the break had been made. The motor-boat was quickly alongside and before many minutes the chamber was hanging on the winch wire, and strapped safely to the ship's side.

Mr. G. Wookey was the next to go down. The routine orders were passed over the phone. A few seconds later the phone went dead with a sharp click and we knew the chamber was clear of the slings and cable. Checking on watches we scanned the water for the first appearance of the chamber. Two minutes went by. There was no sign, not even a bubble. After three minutes there was dead silence on the well-deck. Thirty pairs of anxious eyes peered over the waves. The fourth minute ticked inexorably by. Suddenly there was a bellow — 'There she blows.' All eyes followed the line of the outstretched hand, and there, fifty yards away, a frothing mass of foam and bubbles churned to the surface like a miniature whirlpool. Seconds later the chamber came surging to the top, leaped three feet clear of the water, then fell back and canted gently over on its side.



The stand-by boat was quickly on the mark and the chamber was taken in tow. When alongside, the slings were very quickly assembled and in a few moments Mr. Wookey stood on the well-deck. He reported that after he had blown the ballast tank nothing happened, and he realised the feet of the chamber had sunk into the soft mud on the bottom and

were holding him fast. This caused him to break out into a cold sweat and a momentary feeling of panic. He conquered this, however, and once again opened the high pressure air bottles. He said he could feel the chamber trying to free itself from the clinging mud, and it seemed an age until at last he saw particles in the water begin to float down past the observation ports, and he realised that the buoyancy of the chamber had triumphed.

After this unnerving experience it was decided to proceed to the head of Loch Linnhe and carry out some diving practice in order to get everyone acclimatised to deep work in flexible suits.

The passage up the Loch was uneventful, the Corran Narrows were safely negotiated, and about 2200 we dropped anchor off McBrayne's Pier. Yes, it is that ubiquitous firm about whom some wag has written: "The Lord made Heaven and Earth, and rules all they contain, Save the Highlands of Scotland, which belong to McBrayne."

A week was spent in northern Loch Linnhe and a number of routine deep dives on air were carried out without incident. Diving ended on Saturday morning and everyone relaxed for the week-end.

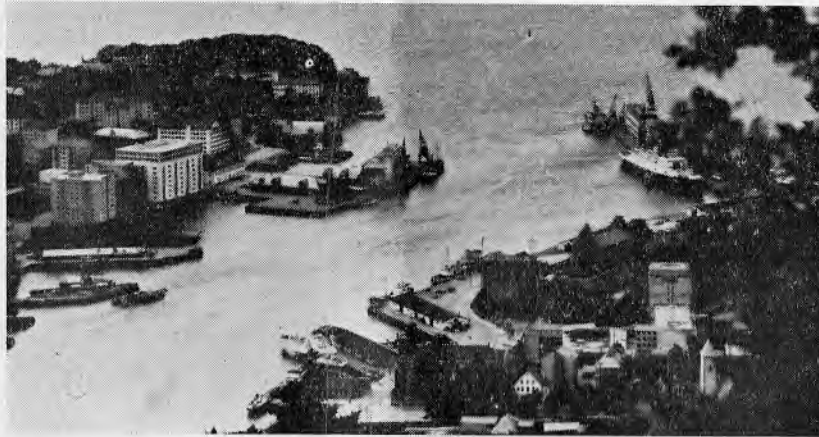
Monday came round all too soon, and early afternoon saw us weighing anchor and sailing for Bergen. Being mid-June we hoped naturally enough for fine weather and we were not too disappointed. There was some fog off Ardnamurchan, and Rum, Eigg and Muck were shrouded in mist, which was a pity. The Western Islands of Scotland are among the most beautiful in the world and it was rather a disappointment not to get a close up as we passed.

Next evening we arrived at Lyness and, in the teeth of a fierce wind, we managed to get alongside to fuel. Scapa brought back memories to many of us, and to those of us who had been there during the war the sight of so much bare water, which, during those far off days, had served as a haven for so many of our ships, was saddening. During its heyday, Scapa never looked really hospitable, but now it looked desolate, lonely, forgotten.

Late at night we slipped and sailed from the fuelling jetty. We met a five knot opposing tide as we passed Muckle Skerry which slowed us up. Luckily the sea was calm and we had little trouble getting through the channel. About 0200 on Thursday we raised Marsten light after a very pleasant crossing, assisted by a wind from WNW. Although it was quite light we cruised up and down outside the entrance to the Kors Fjord until about 6 a.m. to give everyone in Bergen a chance to wake up. On the way in we picked up an old friend, Lieutenant Peter Salen, head of the Norwegian Diving School. He was our liaison officer on our previous visit and it was a pleasure to see him once again in the same capacity. We secured alongside Nordre Nostekai just after nine a.m.

We stayed at this berth until next morning, when we moved to a more congenial billet, Festnings Quay, practically in the centre of the City. On the way round we did a couple of runs over a wreck in the Puddefjord. During the forenoon, various Norwegian officers were given a deep diving demonstration and saw the underwater television in action.

A pleasant week-end was spent alongside, and on Monday morning we slipped ready for work. It was decided to give the chamber a trial run on the wreck in the Puddefjord, and so we moored across it. Mr. Grace and Petty Officer Soulsby did the observing and, as a result of their reports, quite a clear picture of the wreck, its condition, direction etc., was given to the Harbour Master, Captain Tidemann.



Having unmoored, we sailed up the Byfjord, a most beautiful stretch of water, to the mouth of the Sorfjord, to look for a suitable anchorage. Although Norway has the deepest inland waterways in the world, her fjords having been carved out of the coastline by the gigantic glaciers of the Ice Age, this proved no easy task. The depth varied from three to three hundred fathoms in about half a mile. After quite a long search, we at last found a fairly large patch with a consistent depth of 100 fathoms, and there we moored.

Next morning, Tuesday June 26th, we started deep trials with the chamber. By 1800 we completed all dives from 400 to 600 ft safely, and now the problem of finding a good anchorage in 1000 ft presented itself. We thought we had solved the problem when we discovered an old German pillbox, built of solid granite, on the water's edge. The idea was to secure the bows to the pillbox after dropping a stern anchor. Unfortunately, this did not prove a feasible proposition, and so the hunt was on once again for our elusive 1000 ft. A similar idea was tried out, this time using a huge boulder on shore. Two shot ropes were led out when the stern anchor had been let go; these were secured to the boulder, and brought to the capstan. The stern anchor was then hove in, but to our dismay we found the anchor was coming home. The bottom in this particular area was obviously like a mountain side, so that was no good to us.

We then sailed deep into the Sorfjord, sounding all the way. This was kept up for hours, and but for the beauty of the fjord and the surrounding hills would have been most boring. At long last, however, we

found a fairly level bottom with a depth of 175 fathoms, and we moored. Again, as we muddled up fore and aft, we found the stern anchor coming home. The order was given to weigh and another snag cropped up. The bower anchor, with 13 shackles of cable, hanging almost vertically, proved too much for the forward winch. The Chief Stoker plied his wheel spanner, the winch heaved and groaned and belched steam, but it would not lift that anchor and cable one foot. At last we coupled the after winch with the forward one, and with an almighty effort they started the cable coming in.

All this proved most depressing. Everyone was tired, but we thought, one more go. This time we just let go the stern anchor, and by a tremendous stroke of luck it fell in the right place, held and the ship lay to it beautifully. The time was 2 o'clock in the morning, so tired and dishevelled we went to our bunks and hammocks, feeling we really deserved the peaceful oblivion of sleep. Short though our sleep was, we rose refreshed to start a series of dives varying from 700 to 900 ft. It was a wonderful summer day, and the waters of the Sorfjord spread cool and blue around us. On either side the green hills rose steeply up. Gaily painted wooden Norwegian houses were scattered from the summits of the hills down to the water's edge, where the water lapped the doors. Masses of rhododendrons made vivid splashes of colour amongst the verdant green of the pine trees and the fields. Looking down the fjord, in the dim distance, the white caps of far away mountains shone like burnished silver as they reflected the rays of the rising sun. A small fishing boat glided swiftly by, and small smoke rings spat from its exhaust keeping in time with the put-put-put of the engine.



Instructor: 'What the *** is this?'

Trainee: 'But you did say 'feet first' chief,'

Fascinating though the scenery was, we could not allow it to distract us from the work in hand. The chamber was hoisted over, and the first descent began. All day long the well-deck was a hive of activity. Shouted orders, the hum of the winch, the thin voice coming through the telephone . . . Then the day ended, and we had dived everyone of the divers down to 900 ft. We were tired but satisfied, we knew the chamber was going to be a success.



Photo by kind permission of the *Portsmouth Evening News*

Thursday was just a repetition of the drill of the previous day, except that we put the chamber even deeper. Nearly all divers reached a depth of 1000 ft or over, but the one that made the day was a dive to 1060 ft by Mr. Wookey. This is a record, without any doubt, for the conventional type of observation chamber. It was a worrying dive while it lasted, as the ship had a slight yaw on, not noticeable particularly to the man in the chamber, but very noticeable to us standing on the well-deck. We knew the rocky mountainous nature of the bottom, and our great fear was that the chamber might get fouled beneath an overhanging ledge. A tape recording of the operation was made, which was eventually broadcast by the BBC. After about an hour the chamber was hoisted, and it was with a distinct feeling of relief that we watched the door being opened and Mr. Wookey coming out looking very cheerful.

That evening, the work having finished, the stern anchor was weighed and we returned to Bergen, and were very kindly given our favourite berth at Festnings Quay. The week-end passed quickly, helped along by the festivities that sailors from any nation know how to promote.

At 9000 on Monday morning we slipped from Bergen and sailed for Fort William. Once again we were favoured with fine weather, and having fuelled and received Customs clearance at Lyness, we moored in 60 fathoms in Loch Linnhe on Wednesday night.

A number of dives were made on Thursday and Friday to just over 360 ft. Compared to the Observation Chamber the depths seemed trifling. Unfortunately the results were not so good. We had a number of bends, one of which was a triple recurring one. Watchkeeping on the recompression chamber was the order of the day from then on. Scarcely a day



went by without someone going into the pot for relief. It was all rather an anti-climax after our exploits in Bergen. Eventually we moved to shallower water and did a number of bend-free dives in about 240 ft.

During our last week-end in Loch Linnhe, we managed to borrow the local Sea Cadets whaler, and an inter-part pulling regatta was organised. This was a very popular event, and every department in the ship entered a team. The Wardroom crew of youngsters, coxswained by an old and heavy Diving Boatswain, came in second in their race, which wasn't bad, considering there were only two crews in the race! It was hard to pick the winner from the Seamen, Engine Room, or Miscellaneous. They all proved pretty good, and it wasn't until the final, when the Seamen pipped the Stokers by a yard, that we knew who was really best. An all-comers race afterwards was an excuse for aquabatics, and was the most amusing highlight of the day.

We sailed for Portsmouth on Monday evening, and jogged gently along in very good weather. Our old billet in Fountain Lake was waiting for us, and we secured alongside on Thursday evening 19th July. Summer leave, a good long rest, and make and mend every day for fourteen days was something to look forward to, and well earned by every man in the ship. Cruises are good and everyone looks forward to them, as usually there are plenty of interesting things to see, people to meet and presents to buy; but what better feeling than steaming up the home stretch with the joyous feeling that soon one will be on the train and heading for Home, sweet Home.
J.G., H.M.S. *Reclaim*.

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CONVERSATION FROM THE ETHER

From H.M.S. *RECLAIM*
To H.M.S. *KINGFISHER*

'The time has come Old 'Hooky' said,
To talk of many things,
Of chambers, dives, and squalus dips,
And disengaging slings.

But when it comes to record runs,
Reclaim has got you beat,
800 isn't deep enough,
We've done a thousand feet.'

From H.M.S. *KINGFISHER*
To H.M.S. *RECLAIM*

'*Reclaim* has recorded many things,
Some good, and other amusing,
World's deepest dive—first T.V. ship,
And all that pleasure cruising.

Now at last, you send us news,
That your chamber has been tested,
Congrats to the one who did the dive,
And *Kingfisher's* record 'bested'.

We made a start—you followed on,
As down into the depths we sped,
It's now obvious that the pair of us,
Must 'keep a level head'.

Although we admire and must admit,
The record of your dive,
You must confess it remains with us,
To 'bring them back alive'.

MEDITERRANEAN FLEET CLEARANCE DIVING TEAM NOTES

Since we last communicated with you, the team has had a large change round. We welcome to the team CPO Fawcett, L/S Clark and A/Bs Graham and Carter, who are reliefs for CPO Stanley, L/S Sharp, and A/Bs Gould and Jackman. The latter changing their abode of toil from the clear waters of the Mediterranean to the somewhat dirtier waters of the United Kingdom.

We are about to commence our annual Malta Exercise, where for a week, during the wee small hours, the team will nauseate various ships and shore defences with various forms of skullduggery.

Our little Empire here is at present painting inside and out in preparation for a visit by the First Sea Lord.

The FCDO has just returned from Toulon, where, during NATO meetings, all the aids to divers were thoroughly thrashed out. We are now experimenting with Army Compo Rations Packs, to get over the problem of food when operating away from base.

This will be my last contribution from this particular team, but no doubt my relief or some other bright youth will continue to contribute.

Yours, SAM.

DIVING, UNDERWATER WELDING AND CUTTING

PART 2

OUR DIVING AIR

In conclusion of my article, let us now pay a little attention to the compressed-air we breathe in these and other underwater operations.

In view of the ever widening scope and use of Self-Contained Breathing Apparatus, the need for a closer supervision and a better understanding of the many dangers involved when charging these high pressure cylinders to the very high pressures of 1800–2000 lb \square " and more, is becoming daily more urgent, and it is my hope that this short article (as non-technical as is possible) will help towards a clearer understanding of these problems by all of you 'would be' Dip Chicks about to qualify, also the ever growing groups of non-service Free Divers.

The free diver outside of the service has a very limited choice as to where he can obtain the high pressure air charge for his cylinders and in this regard we as divers are very lax in our standards.

The business of selling air for 'lungs' has grown with the popularity of free diving but without the proper caution and improvement in the quality of air, the facilities for obtaining it, or the price per charge.

The victims of slipshod air compression techniques are divers – air is being used that is filled with noxious gases, contaminated with hydrocarbons, and it frequently contains droplets of water and oil. The dangers accompanying the use of such air are: retching (gagging) from taste, involving choking from toxic vapours, flooding of the regulator or mouthpiece from suspended water, aspirative pneumonia as the result of a fine coating of mineral oil or other contaminants being deposited on the lung tissues, anoxia resulting from breakdown of oxygen content in the air under compression and heat, and other undesirable effects. Compressing air for diving use is a very difficult job if the air is to be safe.

No mineral oil must enter the lungs with the air, because, after several cylinders of air have been breathed, the body will react with a dangerous case of pneumonia. You will remember from your school physics' lessons that gases under compression undergo chemical changes. These chemical changes alter the characteristics of the air and give the air some interesting qualities not found at atmospheric pressure. In chemistry we have learned that compression of gases will produce a solid (dry ice), that heating a liquid will produce a gas (steam), and that releasing high compressed gases will produce snow or fog. This molecular interaction of solids, liquids and gases under pressure concerns divers very directly.

When we strap our apparatus on our backs and go down to 60 or 80 ft, we are unaware of the mysterious chemical changes taking place in our cylinders.

When we breathe this air through our regulator and demand valve more changes take place.

AIR CHARGING

Starting from an atmospheric pressure of 14.7 lb \square " we exert pressure on air. The molecules are jammed together and rubbed shoulder to shoulder; they don't like this cramped condition, they get hot and fight back. The resultant heat stirs up other chemical changes and creates new chemical forms within the cylinder; the air is then pushed, still all formed together, into a newer confined space where again the compressor piston hammers the molecules into a denser crowd and disturbs their orderly form; more heat is released in the process. This heating is best illustrated by pounding a hammer on a cold iron anvil—the hammer head heats as its molecules are smashed one against the other; air reacts in exactly the same manner. As this heating takes place we are creating a new gas in the cylinder. We know that heating water creates steam; this air compression process also creates steam, a steam that is more finely vapourised due to its extremely high compression. At this point another law of physics interests us; the slower the process of compression, the fewer changes take place in the gasses with which we are working. In other words, the more stages of compression we go through, the fewer the radical changes in our air when finally compressed in our high pressure cylinder charged to 2000 lb \square ". Conversely, our regulators determine how slowly our air is decompressed and how much it resembles normal atmospheric air according to the depth we are at.

We divers are primarily interested in the breathing qualities of our air, so I will skip a few hundred other relevant laws of basic science and concentrate on the air we breath. In the creation of high pressure, resulting in heat in our compressors, we vapourise the lubricating oil on the cylinder walls of the compressor; this oil blends in gaseous form with the oxygen, argon, nitrogen and other gases in the air we are compressing. When we decompress this air via our regulators, the oil resumes its original form and we have the taste and coating qualities in our respiratory passages. If the oil is of the vegetable origin type, the effects are not too pronounced—the body will strive to absorb it into the system without ill effects; if, on the other hand, the oil is of the mineral type, it remains as a coating on the respiratory tissues and causes inflammation and subsequent breakdown (aspirative or divers' pneumonia). Water taken into the compressor is vapourised almost immediately by the combination of heat and pressure; some of this water is dropped into the moisture trap on the compressor by cooling the air, but much of this water is still in suspension in the gases due to the high pressure. It goes into our cylinders and we carry it into the sea with us; when the pressure in our cylinders is reduced, the water resumes its liqued form, collects in our regulators and frequently floods our mouthpieces. This water has done some additional work too. It has absorbed some gas and perhaps some other impurities which it carries in diluted form to our lungs.

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Other impurities exist in the air we pump too—these are in the form of minute particles of dust, pollen, organic matter, etc., which constantly float in our atmosphere. Filters on the compressor intake will remove most of these contaminants, but not all. Millions, I repeat millions, of molecular sized particles get through, and go through changes under compression. It is little wonder that the air coming through our mouth-pieces tastes slightly -!-!-!-? different and has a different effect on our systems than the air we breathe on the surface.

With the foregoing facts on our minds re compressed air for diving use, it will pay us to study the methods used for producing this compressed air.

- (1) It must be delivered to our tanks, cylinders, at pressures in excess of 1800 lb², in quantities of 70 cu ft per cylinder.
- (2) It must be free of oil droplets and toxic oil fumes.
- (3) It must be completely free of water in suspension.
- (4) It must be free of dust and other contaminants.
- (5) It must contain no noxious fumes.
- (6) It must have at least 20% oxygen.
- (7) The 'air intake' of the compressor must be away from any internal combustion engine exhausts (danger of CO (carbon monoxide) poisoning).

Compressors that will manufacture this high standard air are specially designed and built just for this purpose. Far too few divers realise that such a compressor requires special lubricants to avoid vapourising and contaminating the air as they are compressed. It must have an efficient cooling system to reduce carbon formation and prevent explosion within the cylinders. It must have a high pressure rapid outlet to insure reasonable filling times on tanks. It should have several filtering systems to insure purity. For all these reasons, every diver should be familiar with the dangers involved.

AIR CYLINDERS AND OXYGEN CYLINDERS

Never fill your compressed air cylinders with oxygen—this is a highly dangerous practice. As explained earlier in this article, oil from the compressor in some form is almost certain to have entered the cylinder when being charged with compressed air. Oxygen to oil under pressure is equally as dangerous as putting a naked flame to a can of petrol—result, fire and explosion—so the rule is, oxygen cylinders OXYGEN ONLY, air cylinders COMPRESSED AIR ONLY. Also remember that 'Oxygen Pete' awaits beyond thirty-three feet.

I trust this short article will have helped some of you Dip Chicks service (and more especially non-service) Free Divers, in preventing possible accidents from the want of a little knowledge of basic first principles on compressed air charging, and also towards maintaining and obtaining a higher standard of air in our bottles, tanks and cylinders.

Your remarks, comments, and criticisms would be appreciated.

My own cylinder is about empty, so will surface, wishing all of you good clean air diving. Cheerio, Dip Chicks.

VINCENT RODNEY FOSTER,

H.M.S. DIVER 50th CDT NOTES

Well, much water has passed under the bridge since sending our last bulletin; we too have passed under it many times for divers reasons.

'They' (the powers that be) have kept us pretty well involved in the last few months with many varieties of jobs concerned with sweeps fantastic and frivolous, with us doing our own job and somehow managing to do half of theirs. This latter no doubt being due to a greediness for labour found in all CDs. No? Well perhaps a natural impatience with the incompetent. Nevertheless we have done a full season's stint in the Forth and worked all through the summer one forenoon in late April.

The Boss, Lt Cdr Filer, has in the last few weeks been suffering from a slipped disc, but we are pleased to report that he is now recovered apart from a certain gingerliness when doing his morning PT. There is some mystery as to how he aquired this injury, and a few cruel people have hazarded guesses as to its origin; they might be true but it is still unkind to say it. He spent a couple of weeks in bed laying flat out on a board to assist his recovery, and after this time the doctor called to inspect the patient and the progress. On leaving he happened to mention that the board should be under the mattress as well as the sheet. He might have suffered in silence till then; but his blood pressure is back to normal now. His sick room had several visitors from the ship but they were all singularly lacking in sympathy and derived great amusement from his apparent agony. He must have been very bored with some of the jests that the low fellows made at his expense. Still he is fit now and getting his own back.

A few weeks back Rosyth had its Navy Days, and of course we played our part as a trot boat taking trippers round the Forth Bridge and ships in the stream; for a small fee of course. Unfortunately the money was collected by honest people on the pontoon (or fortunately perhaps, depends on one's point of view). Never knew there was so many assorted sizes and shapes of people, until after a few trips of assisting people on and off one realized that everyone is not blessed with a shapely pair of lower limbs; after this it became a matter of selective assistance on the part of some of our amorous types, who even then had a drip on that all the lush dishes were escorted by extremely huge and virile mates or redoubtable momas; or perhaps it was just a lack of charm that would not impress a python. L/Sea Harrison's horse arrived aboard for its bale of hay and bucket of water and then galloped into the galley with another volunteer of like proportions to prepare the ship's supper. Not bad for obvious amateurs, there was a plate underneath it. NAAFI provided an ice cream tub full of assorted ices for sale to the public; the majority of the sales were to hairy chested (it is chested isn't it?) tars aboard here; though quite a few smaller boys got ices free; provided that their big sister was good looking of course, and partial, to ice cream that is.

After Navy Days had finished on the Sunday we packed our bags for a wee jaunt to the south to take part in an exercise with the *Brenchley* and *Dingley*. Unfortunately we were unable to take our mighty vessel

with us due to the Captain's indisposition so it had to be by train. Risking all the hazards inherent in a bunch of divers on draft together we had to have recourse to *The Pilgrim's Progress* and other good books to steer us past the pitfalls laid by the evil for the unwary Christian. We did until we stepped out of the train then the heavens opened and poured forth their wrath and with that our tribulations started. The trot boat deliberately dawdled all the way to the *Mull of Galloway* so that all the returning libertymen could start the week with a good drip that must have almost equalled the noble effort of the celestial one. After humping our kit up and down over the *Mull* it but remained for us to find the *Dingley* as naturally enough the QM hadn't the faintest idea or interest where it lay among the conglomeration of ships cowering in the downpour.

So it still remained for us to go look for her. To do this we had to navigate a series of miserable little cats that not only behaved as though they were on hot bricks, due to the inclemency of the weather, but had another hazard in the form of an outlet that was the eventual exhaust of a messy and odiferous natural function. The cats were led in a fiendishly cunning manner right past this 'orrible orifice that belched forth its measure of muck at frequent if by no means regular intervals, so that its safe passing was a matter of prayer, speed and luck. Not everyone is lucky. Such are one's first impressions of Harwich.

Dingley was found and we spent the first twenty-four hours aboard her where old acquaintances were renewed, new ones made and yarns swapped as is the manner usual upon meeting. One fellow solemnly informed us that when walking into a three-knot tide it was best if one leant slightly forward as this assisted in making headway; the advice came in quite useful, just thought we'd pass it on.

Sailed that evening for the area, where diving took place for the time that the tide would allow, and then again diving after midnight. It was quite a busy time, and our lads just loved keeping the anchor watches after all the fuss and travelling the previous night. Well, came the dawn and we were transferred to *Brenchley* and we like to think that we might have assisted them. It was in *Brenchley* that we remained for the rest of our stay in the south, and though for the first three days we had no kit whatsoever we were still accommodated most nobly, and they made our sojourn aboard most comfortable despite lack of space.

It was whilst in her that we met a most entertaining chappie, who tails life lines with the countless fathoms found on a fenders tail! The same fellow that insisted that the blue line in pussers canvas could be scrubbed out.

Well we left *Brenchley* to go gadding off to the continent for the summer season and we returned again to our ice-bound fastness to take our leave. Thank you *Brenchley* for looking after us.

Leave has been taken and we are now beginning to get over it, and to assist us is the thought that we are going to the Oulton Broads for their regatta week during which time we are required to perform for the amusement of a fee-paying public. Wonder who'll collect?

There is a foul rumour abroad that in the near future we are to commission a new 'type two'. We heard this with disgust as the thought of paying this vessel off (which is ideally suited to clearance diving) and taking over one of the inshore things that are not at all useful as diving platforms or recovery vessels, is a buzz to sicken any who has served aboard *Dipper* or *Diver* and knew these wee ships' capabilities in a diving vessel role. We are hoping that it is only a buzz and that the clearance diving branch won't lose one of its finest vessels.

That's our lot from the north, and we wish all dipchicks all over the place all the best, and a speedy recovery to Lt. Cdr Brooks and PO Spicer.

Cheerio, NANOOK.

EXCERPT FROM THE EDINBURGH EVENING NEWS ON PORT EDGAR FROGMEN

The following is condensed from an article published in the *Edinburgh Evening News*.

'To all appearances it was just another stretch of water. Not so much as a tiny bubble disturbed the surface, and even keen scrutiny would have revealed nothing. But manouevring around on the sea-bed some 20 ft below was what to all intents and purposes resembled a monstrous frog. It was, in fact, a man—a frogman.



Photo by kind permission of the *Edinburgh Evening News*

For Lieutenant Commander William Filer, R.N. the senior diving officer at Port Edgar, it was just another day's work. He regards dressing up in a rubber suit and flippers and swimming about under the water as his job. But few can appreciate the dangers that beset a diver, groping

about often in pitch blackness on a muddy, ice-cold sea bottom, with not even a life-line to connect him with the world above water.

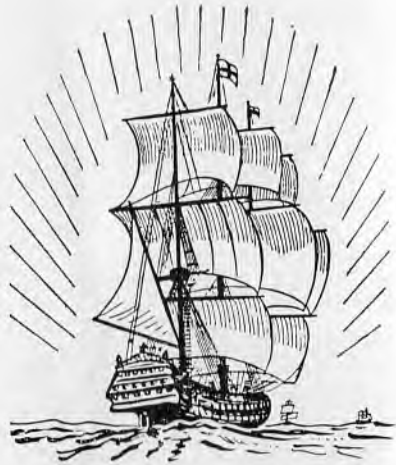
'I occasionally have my moments of anxiety even yet,' stated Lieutenant Commander Filer, 'It's rather like flying in a way, it gets you and there is a lot of individualism about it. After a while you realise it is a job in life you can do—perhaps the only job. Rather like an exclusive club in a way.' Any similarity to an exclusive club however, ends with that comparison.



Photo by kind permission of the *Edinburgh Evening News*

Diving is a man's job, and if the man enjoys emulating a fish and half the time looking like some denizen of the deep in his frogman's suit, so much the better. Strange to say there is no shortage of volunteers for this hazardous business. The duties of the clearance diving branch of the Royal Navy includes mine location, identification of all underwater explosive objects and the subsequent rendering or destruction of them, protection of shipping, pre-assault reconnaissance, surveying enemy beach-heads, and so on.

Lieutenant Commander Filer was one of the team of divers who searched for the doomed submarine *Affray* found after six weeks of intensive searching. He regards the actual sighting of the *Affray* as the most outstanding moment of his career.'



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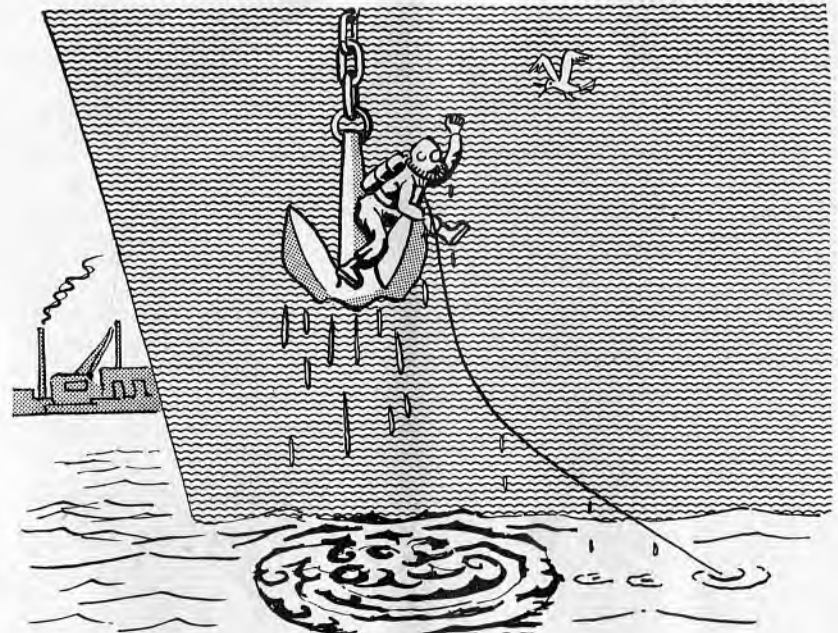
PORTSMOUTH DIVING SCHOOL NOTES

Due to the present situation, quite a few of the Diver Is have left the home comforts of Pompey for destinations unknown or which cannot be disclosed. The people in question are 'Ginger' Bryant, 'Nuttty' Hallum, PO Jones, and the previous Editor 'John' Peach. On the other side of the house we have said 'So long' to 'Ted' Butler, not forgetting to mention of course quite a number of junior rates to support the above mentioned stalwart 'Characters.'

The engagement of PO A. Dean to a young lady from Heanor, Derbyshire, was announced on August 21st, and the 'grape-vine' has it that he will take the plunge sometime around Christmas. It looks as though one more of the gang will be going on R.A. (Deadbeat).

At the time of going to press, things are pretty hectic as there is a shortage of instructors owing to the above drafts, but we are hoping that the situation will be eased somewhat when the next class of Diver Is finish their course sometime in October, as a few of them have taken the opportunity offered by the Admiralty, to request to change depots. Whether their requests have or will be granted remains to be seen.

ANONYMOUS.



When the left hand knoweth not what ...

A DEEP-SEA DUEL WITH AN OCTOPUS

by
JACK HULL
(COPYRIGHT)

For the first time in my sixteen years as a professional diver I knew fear, cold and intense terror that froze the blood in my veins as I stood on the lower deck of the Japanese freighter which was sunk off Rabaul, New Guinea. This should have been an easy job: 'Go down and examine the wreck and find out if she was carrying anything of value when she was sunk', I was instructed.

Around the nine-years-old wreck lay four other wrecks, victims of devastating American air raids on Rabaul when the Japanese troop ships and freighters were literally wiped out.

Below her was a tangled mass of shattered steel, the rusted remains of vessels either sunk at their moorings or as they tried to escape the flaming havoc that rained down from the azure blue New Guinea skies. The freighter lay on a ridge, as I soon found out, which plummeted down into the depths for some 450 ft. The ocean runs out on a shelf here and then suddenly drops into the dangerous black depths of the Bismarck Archipelago.

Not that the depth frightened me; I had worked at fantastic depths; what scared me a little was the thing that scares all divers working on wrecks—Becoming Entangled In Wreckage. I inched forward on the rusted wreck and descended carefully into the lower compartments, trailing my life and air lines behind me with the utmost care in case any jagged edge should cut into my air lines or fray my life line. Once or twice I spoke to the bobbing boat on the surface over the telephone in my helmet, but as yet I had nothing to report. The freighter was laying on an almost even keel and practically up against a low submarine cliff all covered with coral and submarine growth. I judged that the fore-part protruded some twenty feet over the edge of the drop, but the boat was stable enough, wedged on the reef where she sank. I was working alone to-day; my partner, Alf Thompson, of Sydney, was ill. Under foot the steel was slippery as I moved towards the captain's quarters where the strong room would be. I would first locate the strong room and examine it before making my report and returning with undersea burners to open it.

Around me down here in the ship it was cold and dark; my undersea torch threw an eerie glow of light ahead of me as I moved through the silent passage from which doors opened, some swinging lightly on their hinges with the sea's motion, others jammed by the force of the explosion which had sunk the ship. I glanced into a cabin here and there as I made my way; some flamboyantly coloured fish swam lazily past me; a small shark nosed up to me inquisitively but I clipped him on the snout with the foot-long wrench which I carried in my left hand and he scampered off. The captain's cabin door was half-way open but jammed. I battered at it with the wrench and it suddenly swung open. I half expected to find the

Japanese captain sitting at his desk, but there was only silence and desolation as I entered and studied the strong room door. It was locked, rusted over and would require more than a burner, I thought; possibly a charge of underwater explosive. 'John' I called over the telephone, 'the strongroom's locked all right. It doesn't seem they had time to get anything out'. 'Will you have much trouble opening it?' John Martin asked from above. 'Need some explosive,' I said. 'I'll come up and give you the plan'. I started out of the cabin and as I put my foot in the passage I saw a massive arm-like object moving slowly from a cabin almost directly opposite the captain's. I turned my torch on it and froze as the second and third arms appeared and behind them the immense head, or body, of a giant-sized octopus.

The huge creature was between the captain's cabin and the exit to the upper deck; I had to pass it to get to the ladder. I saw one of its tentacles half curl over my life-line as the great beast emerged into the narrow passage. I hooked the torch over my leather belt and whipped out my keen-edged dagger with its 10 in blade. I couldn't get past that monster. I looked back; the captain's door was as I had left it, open. I could dodge into there and wait until the octopus went away—but would it go away? 'John,' I called up urgently, 'John, octopus! A giant octopus between me and the ladder. I can't get past. Can you send down a burner?'

John was shouting something, and then, almost instantly, his voice cut off. I felt the air growing heavier in my helmet; I turned the inlet wider open and saw that the octopus had moved right into the passage and that one of its tentacles was curled right round my airline and lifeline.

Something snaked around my shoulders and fastened to my left arm. I swung with a circular motion, handicapped by the weight of my diving suit and the pressure of the water and struck frantically at the enormous tentacle which encircled me. But my blows seemed feeble and yet another tentacle closed around me and began drawing me inexorably towards those terrible eyes and beak in the centre of the tentacles.

'JOHN! JOHN!' I screamed into the telephone as I began to labour for breath, but the dull sound of the telephone told me it was dead.

My left arm was clamped to my side, but my right arm was still free, I raised the dagger as high as I could and plunged it straight into the mass in the centre of the tentacles—into the eyes and beak of the octopus.

The air in the helmet was stale; I was getting giddy; I knew what had happened. The octopus had probably clamped my airline shut or nearly shut so that there was only a trickle of air into the helmet.

Again and again I plunged the dagger into the thing's head; the water around me grew jet black as the octopus shot its fluid to confuse me, but I knew where the head was.

I was growing rapidly weaker; I felt my knees begin to sag; unconsciousness was overtaking me; I didn't have the strength any more to raise the dagger and plunge it down. All I could do was to slice into those heavy sinewy tentacles that held me in their unrelenting grip.

I felt my dagger slice right through something; I guessed I had severed a tentacle. My right arm was cramped and my fingers were stiff from gripping the dagger. Once more I raised it and plunged it into the soft horrible face of the octopus.

The thing jerked violently and then began to sag down, carrying me with it. 'God!' I thought, 'Have I hit it in the brain?'

I searched around frantically until I found the tentacle which was resting on my airline. With the bit of strength remaining to me I lifted it a fraction and at once felt a surge of air into the helmet. I took two or three deep gulps of air and tried to drag myself from the grip of the beast which I thought was dead.

As I moved, its hold tightened. 'Reaction', I told myself, 'It must be dead. It must be!'

I felt for the tentacle that held my left arm and began literally to saw through it with the dagger until the tentacle broke away from the parent body. Then I took the dagger in my half-dead left hand and began to saw at the massive tentacle gripping me around the body.

Dazed and with blood dripping from my nose and ears, I began to crawl along the passage away from the terror. Something brushed against me in the darkness and instantly I froze up, but it was probably only a fish.

On the lower step of the ladder I gave my lifeline three short tugs, and a few seconds later felt it draw gently tight around me as I crawled up the steps to the middle deck and then upwards until I stood swaying, dizzy and near fainting on the upper deck and gave the signal for them to haul me up.

Four days later Thompson and I descended together and found the passage way blocked by the massive body of the dead octopus. Together we shoved it into a cabin and dragged the door closed, then we entered the captain's cabin and set to work opening the strong-room door.

No, there was no treasure, nothing worth risking one's life for—only stacks of worthless Japanese-printed banknotes, sodden and rotten, and a handful of silver coins, a few of which I have kept in memory of the octopus which nearly killed me.

UNDERWATER-SWIMMERS' SECTION

During my association with the various underwater swimming clubs I am constantly asked about oxygen breathing, so in this article I propose to discuss briefly the set in general use in the Royal Navy.

It probably is not generally known that the Royal Navy use an enclosed circuit breathing apparatus with oxygen or oxygen mixture gas for all their self-contained diving operations, and of course there is good reason for this. The requirements of the Royal Navy in these operations are many and varied, from underwater swim attack to recovery of bodies and equipment from ditched aircraft. The set in use can, with slight

variations, fulfil any of the many requirements and is rightly called a universal breathing apparatus. What are the requirements of a self-contained set?

Firstly, a breathing gas that is enriched with oxygen, that can be cleansed of CO_2 when exhaled, and thus used again. Secondly, the means of carrying out this purifying operation, and for this a cannister containing the chemical for absorbing the CO_2 is necessary. Thirdly, a bag to hold the exhaled gas after purifying, and lastly a reducing valve to reduce the high pressure gas from bottles to a working pressure, and supply this gas to the bag throughout the dive.

The gas circuit is thus from the bottles through the reducer to the bag (counter lung) through the CO_2 cannister and into the mouth when inhaling, and back through the cannister to the bag when exhaling. So, we have a closed breathing circuit with a continuous flow of fresh gas coming in from the bottles via the reducer. As in Compressed Air apparatus, all breathing is done through the mouth, and a nose clip is worn to assist in this.

So much for the set; now what of the breathing gases? Oxygen is the obvious choice as this only requires the minimum of consumption and thus quite small bottles can be used. Unfortunately oxygen under pressure becomes toxic and the depth when using pure oxygen is limited to 33 ft. So if we wish to go deeper we must reduce the oxygen content by the addition of an inert gas. In the Royal Navy nitrogen is used and there are two standard mixtures in use; these consist of 60/ O_2 and 40/ N_2 for depths up to 80 ft, and 40/ O_2 and 60/ N_2 for depths up to 140 ft. Of course larger bottles are required when using these diluted mixtures, and the working pressure of the reducer must be increased as the O_2 content of the gas is reduced.

Endurances for the set used in the Royal Navy are as follows:—

- 0 - 33 ft on pure oxygen — 80 mins.
- 0 - 80 ft on 60/ O_2 40/ N_2 — 90 mins.
- 0 - 140 ft on 40/ O_2 60/ N_2 — 84 mins.

The endurance of the 0 - 80 ft dive is limited by the capacity of the cannister and not by the gas.

Any mixture can be made up to suit the depth of the operation, and the necessary reducer calculated.

Before closing, I would say that this article is a very brief description of the equipment and does not deal with the theory of oxygen or mixture breathing. You are therefore advised not to act on what little information you may have picked up from this article, and to leave oxygen breathing apparatus to those who are properly trained and experienced in its use.

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H.M.S. SAFEGUARD NOTES

All the Staff having returned from summer leave full of energy and vigour, the Diving Officer decided over a cup of tea in the office that it was high time we sent a contribution to the magazine—if he could trap anyone who could write. In view of the fact that I was reclining in the armchair I was last to reach the door so I duly volunteered and have the bruises on my arm to prove it.

Mr. Dodd, Senior Commissioned Gunner (T) Q.D.D. (at the present time we don't know if Mr. Dodd has been relegated to a Commissioned Boatswain) has taken the chair in this out-post of the North. He didn't settle too well. He deserted us for two periods of a fortnight on the pretext of courses in H.M.S. *Dryad*; by a strange coincidence, one of these excursions South covered Rosyth Navy Days. Mr. Mac. Barrington was only too pleased to relieve Mr. Dodd, and it took us two days on each occasion to persuade him to return to his armchair in Portsmouth.

Leading Seaman Skiggs, Diver II has left us to drag his anchor from H.M.S. *Kingfisher* on the West coast. We wish him all the very best of luck, and no hold up in his demob in 5 months' time.

We have overcome the Navy Days and Flag Officer, Scotland's inspection this term, with no trouble or complaints—except about the weather. The Shallow Water Divers Qualifying have kept us busy between Salvage Classes, by the number of applications for Shallow Water Courses from naval air stations. The first few naval airmen we qualified must be very good ambassadors for this branch of diving. The Salvage Classes have enjoyed their stay in *Safeguard*—the last class in particular, one member of which, will, I feel sure, never forget his introduction to the B.T. Department. The Home Fleet divers paid us a visit during their stay in the Forth; if half the tales are true, we should move our base en bloc to the Baltic—for any details please contact Petty Officer William, Diver I (Bungy). Our chums from *Lochinvar* appear every week possible to view the inside of our recompression chamber; we hear that one gentleman slipped a disc dashing to catch the boat over, we hope he has recovered and we will see him again soon. Mr. Dodd is going to take the CDs on a course in model construction, he having spent much patience and blue pencil language building a model cruiser for u/w swimming displays.

Outside of training, our only job has been changing defective units on the D.G. Range. As is usually the case, no jobs during the summer when we can sunbathe, but plenty in the winter when we have to break the ice.

We are sorry to hear of the accident in which Lieutenant Commander Brooks and Petty Officer Spicer were injured; we send our sympathy to all relatives and friends of those involved in it.

Having reached mid-August it's time we aired our winter woolies. Best of luck to all dip-chicks. FOR DIVERS STAFF *Safeguard*.

FAR EAST CLEARANCE DIVING TEAM NOTES

For the benefit of the uninitiated that is 1, 2, 3, 4, in Chinese. From that you will gather the turnover of CD officers in the Far East is complete. By this time in fact, Lieutenant Commander Wardle will be propping up the deputy S of D's chair with all the associate comforts of H.M.S. *Vernon*. It is hoped that he will be able to hasten so many of those delightful pieces of new equipment that one hears so much about, but rarely—and sometimes never—sees.

Life recently has been a little more varied although training takes a great deal of the time. The CDBA and MRS have been resurrected and even the gas analysis equipment has been put into action, in fact the school looks rather like an apothecary's night-mare.

The shark menace still presents quite a problem, H.M.S. *Modeste* was operating divers the other day and sighted three big ones in the near vicinity. Discretion being the better part of valour, the divers were brought inboard. Very soon afterwards one of the sharks was hooked and actually brought alongside. It was between 15 and 20 ft long, but unfortunately was lost whilst being lifted inboard. It is hoped to carry out extensive trials with shark repellents during our annual visit to Singapore. We believe that this vast problem has only been 'nibbled' at in



the past and it is hoped that some definite information might be forthcoming. At least we know that every theory put forward so far has been proved wrong at some time or other.

Last Sunday we had our first 'Team Ban Yan' party, and Wednesday was a 'Team Run', both of which were very successful judging by the thick heads the next day.

A frogman bold flipped into the hold,
of a ship with a cargo of tea,
And after a while was heard to burp,
'Tis a froggie's life for me'.

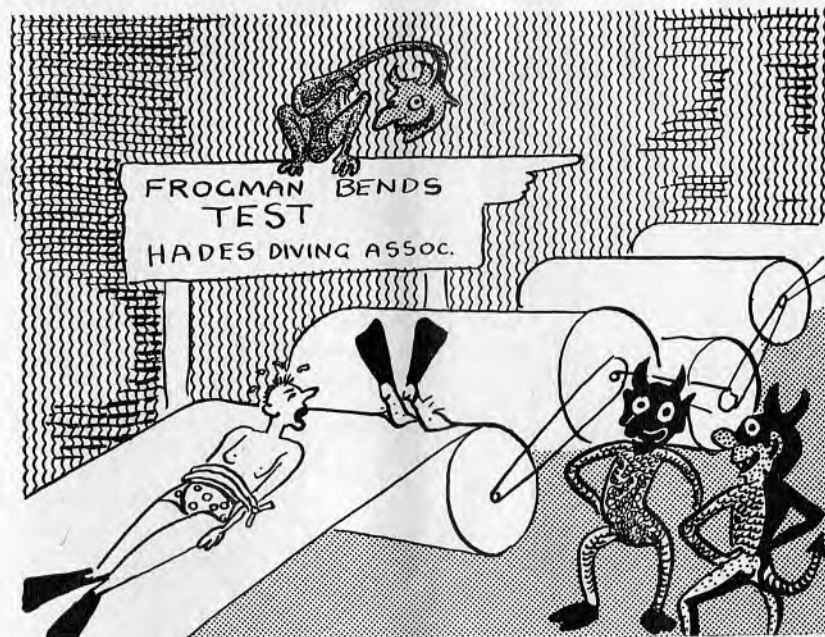
Now a fish swimming by, who'd been giving the eye,
bubbled out with a dirty old grin,
'If that's to your liking just come on with me,
the next wreck's topped full up with gin'.

With a guff of O₂ away went the pair,
to paint the bed red you might say,
But guarding the gin in that dim hold,
was a horrible great Manta Ray.

Now our hero was tough and he knew his stuff,
read books by Hass and Cousteau,
And these he now showed to that awful thing,
that a right he had there down below.

With a frightened bray the ray backed away,
to let the thirsty pair in,
And to their delight in that dark place,
were hundreds of cases, pure gin.

With a bottle apiece they spun many a yarn,
of life down there in the sea,
But such a tall one as this,
though hard to believe,
I wish it would happen to me.



'Who's next?'

PRINCIPLES AND TECHNIQUE OF FREE ASCENT IN SUBMARINE ESCAPE

by
SURGEON LIEUTENANT COMMANDER W. E. CROCKER, R.N.

PART 2 100' ESCAPE TRAINING TANK

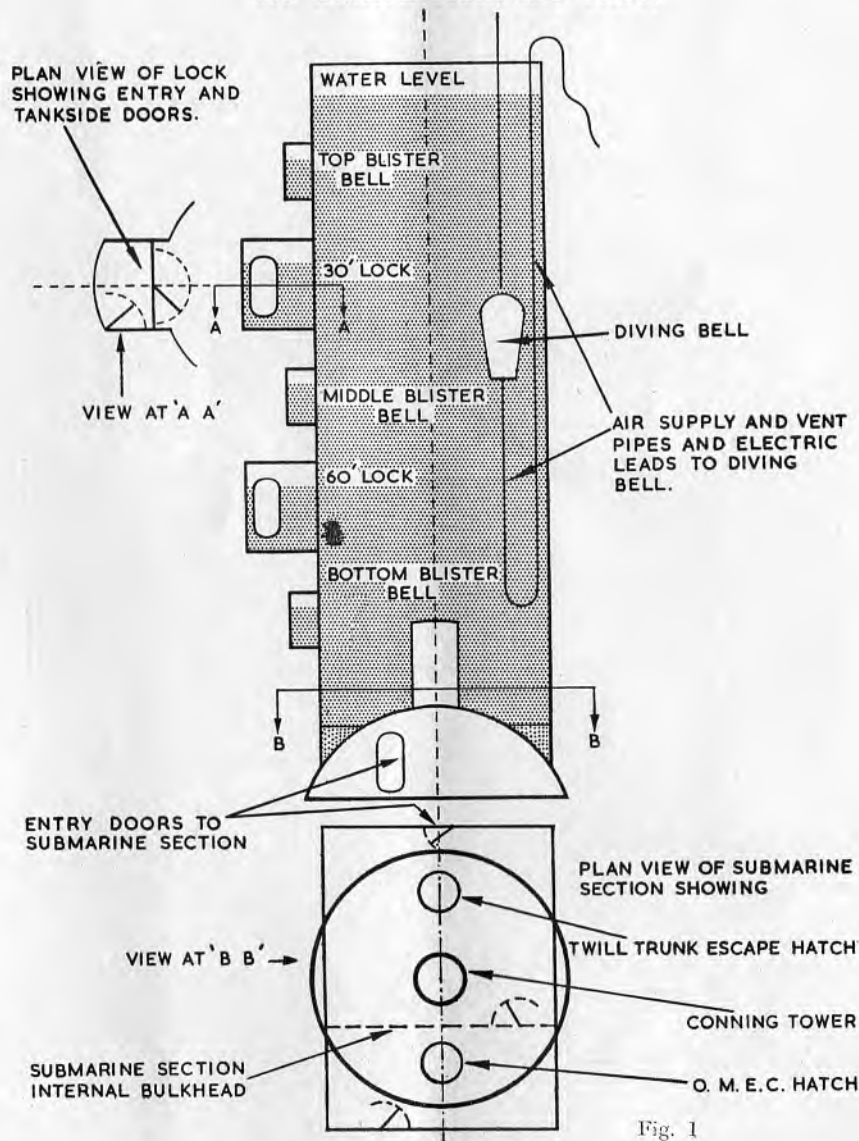


Fig. 1

In the British method, the subject wears an inflatable life jacket of 14 litres capacity so that his buoyancy is no longer dependent upon his lungs. He can therefore breath out fast and keep his lungs relatively empty with no danger of sinking.

Fig I is a diagrammatic drawing of the tank. It is a cylindrical tower of water 100 ft high, inside a ten storey steel-framed building which contains a lift shaft and a staircase. The spaces on each floor between the tank and the outer structure are used for offices, changing rooms, classrooms, etc. Fig. 2.

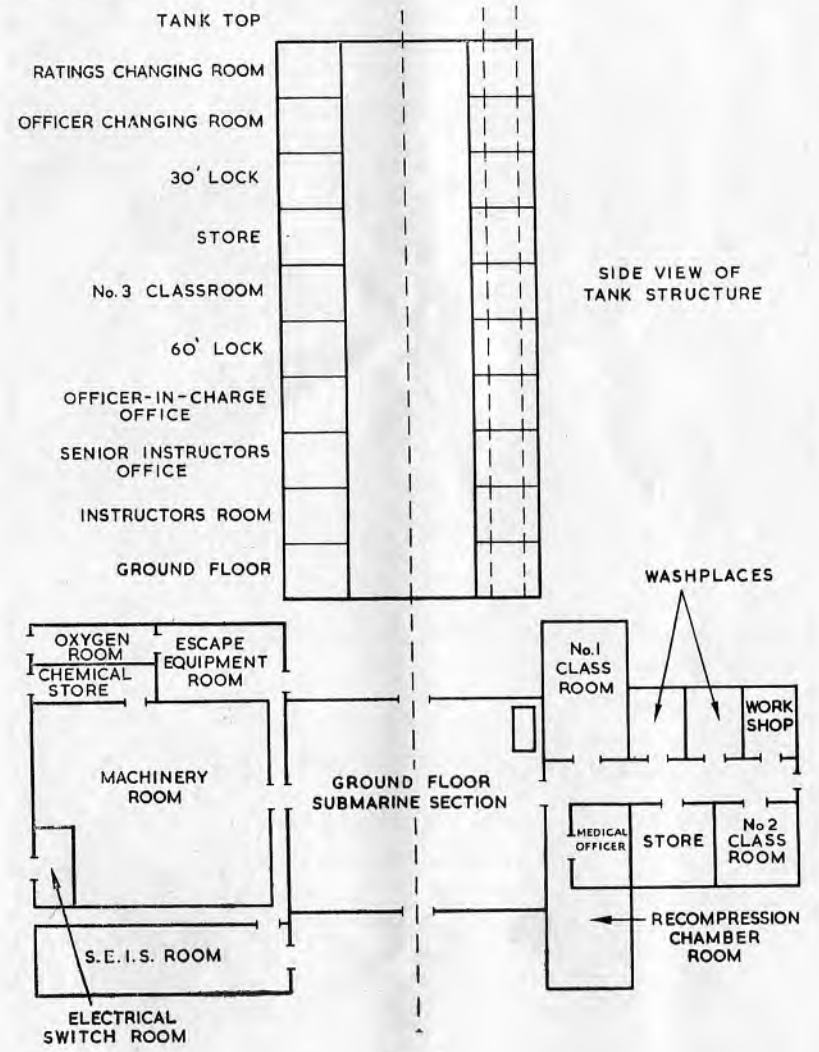


Fig. 2

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Air locks are fitted into the side of the tower at 30 ft and 60 ft below the surface. These chambers are large enough to hold eight men standing and have two watertight doors, the outer opening on to a landing and the inner giving access to the tank. The trainee enters the lock from the landing with the tank side door, of course, closed. The landing door is then shut and the chamber is flooded through a valve communicating with the tank, until the pressure is equalised leaving an air space in which the man can breathe. The tank side door, which is now submerged, may then be opened in readiness for the trainee to commence his ascent.

Ascents are also carried out from the chamber beneath the tank which has a hatch and twill trunk similar to those fitted in submarines.

TRAINING TECHNIQUE

While training is in progress, instructors are at various levels in the water without breathing apparatus. Their function is to escort the trainees on their way to the surface and see that they exhale correctly.

DIAGRAM OF BLISTER BELL

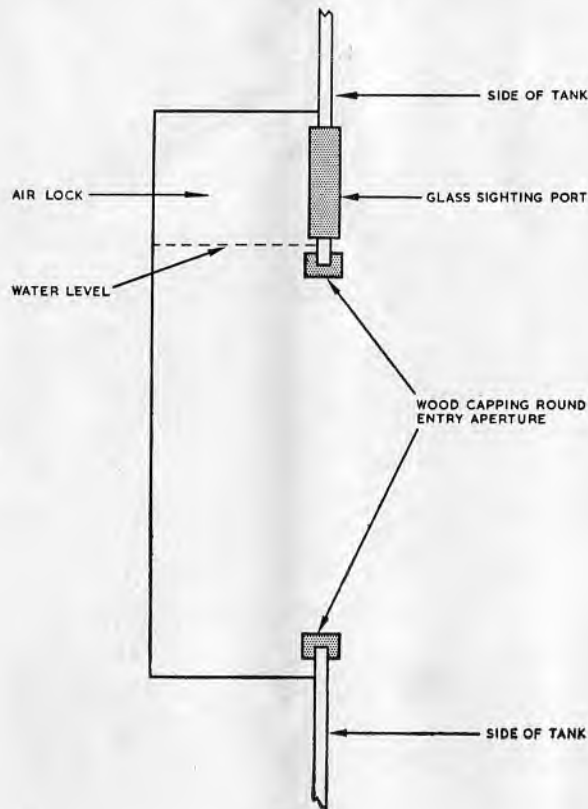


Fig. 3

These men have reached a high degree of amphibious proficiency and are accustomed to holding their breath for long periods under water. Three or four work from a diving bell, containing a pocket of air, which can be lowered to the depth from which the ascents are starting. Instructors patrolling other levels use 'Blister Bells' which are small recesses built into the wall of the tank at 15, 45 and 75 ft from the surface. It will be seen from the diagrams that the roofs of the blisters are higher than the entrances, leaving an air pocket in which the instructors breathe while resting between each ascent. (Figs. 1 and 3.)

At the top of the tank, there is a control position manned by the Escape Training Officer who directs operations on an intercom system connected to the air locks, the submarine compartment, and the diving bell.

There is also a Recompression Chamber at the top of the tank for the treatment of cases of decompression sickness or embolism should they ever occur.

The following description of the procedure when ascents are starting from the 30 ft lock is given as an illustration of the training technique.

Upon the order STAND BY being received over the intercom, two instructors from the bell swim across and station themselves outside the lock. Another descends from the 15 ft blister bell and waits in a position just above the lock so that he can see the trainee's mouth clearly as he emerges. The latter, having inflated his life jacket, takes a deep breath and ducks out through the door backwards whereupon he is grasped by the belt by the two instructors and held there until he is seen to be exhaling correctly.

When the third instructor above him sees the bubbles leaving his mouth and is satisfied that all is well, he taps four times on the side of the tank with a small hammer—the trainee is released and ascends rapidly to the surface.

When ascents start from 60 ft an additional instructor is stationed in the 30 ft lock, and when the submarine compartment at the bottom of the tank is being used both the locks above are manned. The instructors from the locks and others on the surface patrol the 30 ft of water beneath them while an ascent is in progress, ready to go to the assistance of any trainee in difficulty.

At the time of writing, 1,288 subjects have completed the course which is compulsory for all submariners. Each man makes five free ascents, the first being from the bell at 15 ft, without buoyancy so that he may become accustomed to breathing out under water while ascending slowly under the control of an instructor. The remaining ascents are carried out with artificial buoyancy in the manner described. Over 6,000 ascents have been successfully completed and no cases of pulmonary barotrauma have occurred.

It is early to draw conclusions but it seems that the risks, if any, that the British free ascent technique entails are slight. Indeed the only medical problems that have arisen have been concerned with minor damage to ear drums and sinuses during compression in the locks. The

subjects affected are usually suffering from catarrh or other temporary conditions of the eustachian tubes, middle ears or sinuses, and are, therefore, unable to equalize the air pressure in these organs with that of the exterior while the ambient pressure is increasing.

CONCLUSION

The prospects of having to escape from a sunken submarine is not pleasant and submariners, not unreasonably, dislike undue emphasis being placed upon the hazards of their calling. Escape training was formerly carried out with the DSEA in a small tank 18 ft deep and was regarded by many as an irksome though necessary interlude in their general training. Those, however, who have been trained in free ascent, have, with few exceptions, found it an exhilarating experience and have returned to their submarine fortified by the knowledge that they can, if necessary, escape with the help of nothing but their own bodily resources.

I would like to express my thanks to the Captain, 5th Submarine Squadron and Flag Officer, Submarines, for permission to publish this article.

By kind permission of Journal of the Royal Medical Service

Editor's Footnote

PARLIAMENT INFORMED OF NEW METHODS.

The following is reproduced from the Admiralty Monthly News Summary August 1956, for the interest of all our readers who have I feel sure followed the coverage we have given to this important subject in the last four editions.

In reply to a question in the House of Commons on July 25th, the Hon. George Ward, M.P., Parliamentary Secretary of the Admiralty, stated that the methods of escape from sunken submarines have been reconsidered in the light of the most recent progress. A method has now been developed by which men trapped in a sunken submarine can escape in rapid succession in immersion suits by floating to the surface through canvas trunks which extend down into the submarine from escape hatches. A system for providing purified air to the men before they escape is built in the submarine.

The Parliamentary Secretary continued: 'Trials have shown that this method gives the best chance of escape from depths down to about 299 ft, and it has therefore been decided to fit all present and future submarines with this system.

'In addition, future submarines will be fitted with a hatch at each end to which a rescue bell can be attached by rescues working outside the vessel. [See Volume 3, No. 4, and Volume 4, No 1.] The use of this method is limited, because it depends on the presence of a ship with a rescue bell; but it can be used at depths greater than 200 ft.

'More extensive trials of the one-man escape chamber previously intended for new submarines have shown it to be inherently unreliable when needed. Its performance is therefore unlikely to match the weight

and space requirements which it imposes. Future development of this device has therefore been abandoned.'

NOTE:

All submarines at sea, with the exception of two, are now fitted with BIBS system. The two not equipped will be fitted when they end their present commissions, by the end of this year.

ARTIFICIAL RESPIRATION

Recently at a seaside resort on the South Coast a boy was carried from the water unconscious and obviously suffering from the effects of drowning. He was laid on the beach and the inevitable crowd soon collected with the usual well wishers offering 'good' advice. One man even attempted artificial respiration, but it was quite obvious he had little idea as to what to do. Fortunately, a Petty Officer Diving Instructor who was passing was attracted by the crowd, and curiously pushed his way through it. When he saw what was going on he immediately took charge and, having confirmed that medical aid had been sent for, commenced artificial respiration. By the time the ambulance arrived the boy was breathing well, and he was subsequently discharged from hospital perfectly fit and with no after-effects from the accident.

The prompt and efficient action by this petty officer possibly saved the boys' life, and it is interesting to note that the PO appeared to be the only one of the 40 to 50 people present who knew how to apply artificial respiration. It is the duty of every responsible person to be familiar with at least one method of artificial respiration, and to practise it regularly.

Nearly all diving accidents require manual artificial respiration initially as the treatment, and the various methods that can be employed should be part of every underwater operator's curriculum.

For many years Schaefer's method has been taught as the standard because of its simplicity and ease of operation, but the lung ventilation by this method is very low and there are other methods that are far more efficient. One that has recently been adopted by the Navy is the arm lift back pressure method, in which by lifting the patient's arms and so applying tension to the chest, air is sucked in to the chest. This is expelled in the normal manner by applying pressure to the patient's back. This is no more fatiguing than Schaefer's method, yet it more than doubles the volume of the tidal air.

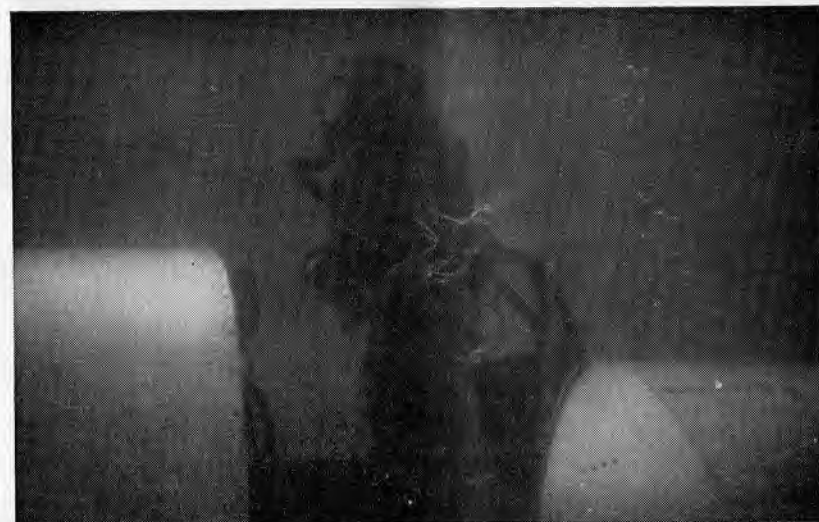
Should the shoulder or chest be injured, there is an alternative way of applying this lift system of respiration. This is accomplished by lifting the hips of the patient, and so allowing the abdomen to sag and suck in air.

The arm lift back pressure method with its alternatives is without doubt the one that should be taught, and for those interested details of this method can be found in the Royal Life Saving Society Handbook.

EXPERIMENTAL TRIALS TEAM NOTES

'I'll tell thee everything I can,
There's little to relate,
I saw an agéd agéd man . . .'

As he pushed his wheeled chair across the polished floor the sun glinted on his kindly face and snowy locks, then Chief and I got down to talking about 'the books', bath chair driving licences and the immense profit steaming from Schweppervesence in the blood brought on by George. But I digress backwards. 'Begin at the beginning . . . and go on till you come to the end, then stop.' So I will.



The Experimental Trials Team have as usual been swimming at Falmouth this year but have thought of moving on as it is now far too popular with people we just don't know. During this time, as you will see by the photographs, we have learnt to fly aeroplanes further under water than any other Service but on the whole, find the minisub to be more easily handled—George 'did' that too. Amongst other things we now feel entitled to the prefix 'DEEPS' as we have shown that the Steamers have no monopoly of the English Channel which is in fact penetrable in all its length and depth by Cork-heads. We even feel sufficiently worthy to challenge them to a race over the thousand feet mark, unfortunately being denied the earlier race over the 100 fathoms.

But seriously, may we presume to proffer one word of warning to those who would a-swimming go. Safety does NOT lie in UP it lies in relaxing, deep breathing, guffing-up until you have enough to get a lung-full but not so much you put a pressure in the counter lung, avoiding a

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build up of pressure in the counter lung. If you must come up fast obey the free ascent procedure and avoid a build-up of pressure in the counter lung. For further information look out for the new AFOs'.

'There's little to relate', anyway all we care to.



BOOK REVIEW

COMMANDER CRABB, *by* MARSHALL PUGH. Price 12/6

Very few of the older fraternity could help but know Commander Crabb. For those younger members of the diving world who did not know him, and many of our Civilian readers, he must be quite a mystery man. I am sure this book will help to give you all a clear picture of Commander Crabb and his activities from the time he was first introduced to the diving world to his mysterious disappearance in 1956.

Looking back over the years which this book covers, it makes me wonder which star was his guiding light. Had he known at the beginning of his diving career all the things we know today regarding diving in Self Contained Oxygen Breathing sets, no book of this nature would ever have been written, since various feats and encounters with the enemy that this book describes would never have taken place.

I feel sure that had it not been for people such as those mentioned in this excellent book, there may full well have been a vastly different story to relate with reference to the Italians' few successes at Gibraltar and other ports throughout the Mediterranean.

I found this book most interesting reading.

S.J.N.

WE DISCOVER A CAVE

AN ACCOUNT OF A DIVE BY 'THE CAVE DIVING GROUP'

This magazine contains (hardly suprisingly) many stories about naval diving. This account is written from a completely different point of view - that of the Cave Diving Group.

We cavers spend a disproportionately large part of our time underground, exploring the galleries and potholes to be found in the limestone areas in this country and elsewhere. Some of us just do it for fun, but sooner or later we become 'serious' cavers and turn to cave photography, surveying, biology, geological study and the like. About twenty years ago a party of cavers decided to extend an already well known one, using home-made diving apparatus - and the passing of Sump 1 in Swildons Hole by Jack Sheppard and Graham Balcombe marks the beginning of serious cave diving work in this country. Curiously enough, to be a cave diver one has to be a caver first, and diving experience in itself does not seem to be sufficient without the necessary background of caving enthusiasm.

Nowadays, of course, matters have progressed and the Cave Diving Group has its own equipment and its own trainer divers, and the training of already experienced cavers proceeds according to a definite code of practice. This article contains an account of a recent operation by the Group, in which two divers successfully passed a sump in a Yorkshire cave to discover a whole new section of cave passage.

Near Threaplunds Farm, at Cracoe, near Grassington, a small stream emerges into the daylight from a low cave entrance. Inside, this can be followed along a low passage over wide sand-banks to a point where the roof dips quite close to the water surface. This is the so-called 'duck,' and a few yards further on roof and water meet in a complete sump. My fellow diver John and myself crawled with our kit to this point and rested for a few minutes making final adjustments.

On a previous occasion I had carried out a solo recce of this sump on the end of a rope and we knew that there was a passage underwater. Consequently on this occasion I tied a wire on to a lump of rock and prepared to reel it out as we went forward. We had our lighting equipment, depth gauges, etc., mounted together on what we call our 'aflo' and the diver carries this in one hand as he moves forward.

Once underwater I could see a low rock arch with a sand floor about a yard below. We were diving in a resurgence and therefore moving upstream. Although the visibility for the man in front was about ten feet the man behind had to navigate chiefly by touch - in these conditions close contact between divers is essential. As the man in front I could see what was happening and sometimes looking back I could see the dull glow of John's light through the mud. The sand underwater is very mobile and had been formed into regular ripple marks about four inches apart and we were able to make good progress by moving at right angles to them.

After a few feet, we passed under a small air surface and continued on our way over the sand along a passage about a yard high by ten feet wide. My mask was leaking slightly and I kept blowing it out. The sand had been washed away lower at the sides of the passage so I followed the crest of the sand bank. I was careful to examine the side walls to make sure that there were no cracks which might hide the wire and so add extra hazards to the return journey.

After about fifty feet the passage became wider and less high. My depth gauge indicated less than 10 ft. Slowly the muddy water swirled around in front of me and a rapid decision was needed if we were to save the dive. Fortunately the ripple marks came to my aid and I moved off smartly to the left at right angles to them and therefore upstream.

After a yard or so the roof became quite low and I had to plough my way through the sandy floor. In these conditions the small size of the oxygen apparatus is a great asset and I was able to force my way up through a very low slot and my head broke through into air a few moments later. Unmasking, I was able to watch John's light as he too forced his way through the slot and reached the air surface. He was wearing one of the wartime 'P' Party sets and therefore took a bit longer to reach fresh air. He unmasked and we were able to remove our breathing sets and leave them on a nearby sandbank.

Having removed our kit we were back in our natural element - we were cavers once more! Our friends were waiting for us, however, so we were limited to a comparatively brief recce of what lay ahead. Using my hand torch I led the way through a low duck and into a passage beyond. John heroically carried his aflo a few yards before leaving it on a sandbank and then he, too, used his emergency torch. We were in a low passage of the same general type of the one we had left a few minutes before, and we pressed on to see where it would take us.

After crawling a few yards we reached a boulder ruckle, where we left the stream for a few moments before rejoining it a few yards further on. (Up above was an opening which we didn't enter.) After a bit we were able to walk along a gallery with some stalagmites in it before the roof dropped again and we were obliged to crawl once more. After a few yards the water became deeper and once again water met roof in a sump, at a point about six hundred feet upstream from the sump we had passed. We considered the situation and decided that a party of four divers would have to pass the first trap in order to carry two complete outfits along the two hundred yards of difficult cave passage to mount an attack on this second sump. We contented ourselves with submerging for a few moments in order to kick around underwater and verify that there was a decent-sized passage to be explored.

Returning through the sump the way we had come turned out to be a bit of an adventure. Visibility was absolutely zero and all we could see was the friendly brown glow from our diving lamps. The squeeze was as tight as ever and I was accompanied through it by John's feet and aflo

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which were banging around my ears. We had tied the wire with about a yard of slack in case of corners and this made it very difficult to follow. Holding the wire in both hands I was able to make my way along it and a few feet behind me John was doing the same sort of thing. On the way in I had satisfied myself that there were no tight places for the wire to hide in but on the way out I began to have my doubts . . . once again I was thankful to be wearing an oxygen kit as I groped along with the breathing bag cover scraping along the roof and the cylinders only an inch or two above the sand. However, it was soon over, and we surfaced and rejoined our friends, seven minutes after diving on the return journey, and one and three quarter hours after we had left them.

Thus ended a successful dive by the CDG and we only delayed our departure from the cave to initiate a couple of trainees in the delights of totally opaque muddy water on the ends of suitable lifelines. I hope that I will be forgiven for remaining anonymous and signing myself

'PIPSQUEAK'

P.S. The word *aflo* is short for *afloaun*, or 'Apparatus For Laying Out Lines And Underwater Navigation.' In practice this might include a 24 watt headlamp, depth gauge, compass, waterproof watch, writing pad, 'parking lights', hooter, and line reel. The idea originated within the Group and seems to work very well.

Editor's Footnote

Many of our readers may remember an article published in our Volume 3 Number 2 edition May 1955 entitled A DIP IN WOKEY HOLE written by 'Bubble and Squeak'. As a result of the article I have received an interesting letter from the chairman of the Cave Diving Group, and it gives me great pleasure in publishing the following quotation from his letter:

It is confirmed that 'Bubble and Squeak' did reach the Seventh chamber, since their description of the 'Giant's Staircase' which leads down into the Second Deep is unmistakable. The way on to Eight is under a rock arch at the bottom and dry land is reached in Nine not far away. Seven is the furthest point reached by the 1936 explorers with their copper helmets and standard diving equipment, and nowadays we have a rule about divers visiting the place the necessary number of times before going any further upstream.

We favour the closed circuit type of apparatus because of its small size and because a diver lost in muddy water might well be glad of an extra hour's duration. Our next operation is planned for the near future, when we shall be carrying supplies to Nine in preparation for our push upstream from Thirteen.

The Cave Diving Group has dived extensively at Wokey Hole and our records are probably the most complete set of cave diving records in existence. It was pleasant to have these impressions of a naval diver to add to them.'

'REACH FOR THE SKY'

Since the Battle of Britain, Douglas Bader's name has been a by-word for courage. Now that his life story has been filmed, millions will admire his successful fight to live a normal life despite the loss of both legs.

Few know that Bader is one of the leaders of the British Limbless Ex-Service Men's Association—BLESMA—which, formed between the two world wars, had grown steadily until there are now 119 branches, situated in the chief centres of population.

Limbless men and women do their utmost to overcome their disabilities, and to lead normal lives. It is a measure of their independence and ability to play their part in the life of the nation that so few people know of their Association. BLESMA members do not make a fuss over the loss of an arm or leg, or even both arms (there are 72 of these men and women), or both legs (over 1,000 of these), but have banded together to help one another. The objects of BLESMA are: to promote the spirit of comradeship, to look after members' welfare, and to serve as a watchdog over the Government by ensuring that the needs of the limbless are met with regard to pensions and artificial limbs, for example.

The work of every branch is done by the limbless men themselves. Those who are able to, help those who are less fortunate, and here lies BLESMA's strength, for needy members are aided not by outsiders, but by comrades, suffering the same pain, the same discomfort, and the same sense of frustration on occasions.

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However, the members of BLESMA are not too proud to accept a helping hand, and are always glad when others take an interest in local branches. There may be a branch near your establishment and, as all members have themselves served in the Forces, they would be very glad of any contact with present serving members. Can you do anything about it?

The Editor of *The Navy News*, Royal Naval Barracks, Portsmouth, will be glad to give information of a branch of BLESMA in your area.

CHATHAM NOTES

Exiled here to this school of mud-diving, the 'Badger' has at last been cornered and forced to write this school's contribution to the magazine.

Well, the office will have a completely new look by September 1st when the chair will be taken over by our old friend CPO (Nobby) Hall.

Navy Days went with a swing, the only injury apart from a few wet shirts was our fireman, who used his head to ring the fore bell instead of his hand. Apart from that, the Monster duly swallowed 'schoolgirl' Heatley twice daily and Big Bertha—the pride of the NAAFI—duly blew her own canteen at each performance, ably assisted by Ali the Wog and his skinless canoe.

This term has seen the retirement, properly celebrated at the 'Jolly Sailor', of two old hands, Tom Welsh (now working at the Royal Mint) and Bill Bailey. We have been joined by CPO Foggin, and, just for the record, 'Patch' our goat has had a draft at her own request just after his arrival—who could not stand who?

Now I will close this rather shaky article. Cheerio dipchicks of both types, look us up whenever you are around here. 'BADGER.'



THE PHANTOM DIVER

An interesting photo taken of a standard diver's air bubbles.

Diver is actually 10 ft under.

Photo by kind permission of K. Pratt

DIVERS'

CLUES ACROSS

1. A wet bandage and an electric particle causes a state under which one's ears are the first consideration (11)
9. Manner without number produces a bad eye (4)
10. This Canadian ship is really wonderful! (11)
11. A small building to be finished without the end (4)
14. A pace or a dance which can be an open set (7)
18. Benny London has this next to his skin when he dives (5)
19. Has this tree lived longer than another (5)
20. Before a long time ago (3)
21. You'll find fungus returned in the West Country (3)
22. Brought before the magistrates (3, 2)
23. Accustom (5)
24. Employ in amusement (3)
26. Browsing without taking makes a four footer (3)
27. Prohibit and reverse lap curtailed to be commonplace (5)
28. I have 50 in a reversed colour for a lazy fellow (5)
29. Could be running or covering (7)
33. You could ruin your diet for this effect of the moon (4)
36. Curious bingo lumps of turf would give you feet of lead (6, 5)
37. You can get music from Borneo without the Navy (4)
38. They illuminate the traveller (6, 5)

CLUES DOWN

2. Hopalong has a stone (4)
3. After a long swim maybe (4)
4. Like a fairy (5)
5. Discharges (5)
6. You would come in once for a small sounding 'wait' (5)
7. Moving twice as fast (2, 3, 6)
8. Would a person of this age be good to eat (6, 5)
12. A diver reporting this would not necessarily be sitting down (2, 3, 6)
13. I doing Lords (anag) Don't get caught (7, 4)
14. Would a campanologist check the diver with this? (3, 4)
15. A direction in the diocese (3)
16. A child would not draw this (3)
17. Back the wire in an animal for top covering (7)
25. Fruit from the middle of 29 across (3)
26. This runner often ends up in Russia (3)
30. Live in an existentialistic world (5)
31. Jewel without a number around the edge is dirty (5)
32. Half the day is a strange thing (5)
34. She sounds miserable but looks cheerful (4)
35. A street and a small operation make a halt (4)

NOTES FROM H.M.S. ANNET

Sorry we have not been writing lately, but the sun this way makes one so lazy.

Work still progresses to a set routine—monotonous but plentiful. A few changes in the team recently were welcomed:—PO Macrae-Clifton who, I hear, has just won a 'talking-the-hind-leg-off' competition, Ldg. Sea. Harrison, not a bad fisherman up to now, Teddy boy, always on time, wide awake Ellen, and Young fair haired, Keel—sorry (Killer) Kilby—to the fair sex. I hope the last word is allowed in the magazine. Just as I was about to roll the presses we were joined by Mason CD III.

Over this same period we have said goodbye to AB's McLean, Dales, Sharpe and Fatcher. Good luck to them.

The outdoor sporting activities have been confined to football and a good team was scraped together, they being unbeaten in Southampton. Indoor sports are fair, competitions having to be played off in the lunch

X-WORD

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33						34	35
		36					
37							
		38					

The solution to this X-word will be published in our next edition.

hour for the benefit of the 'Natives'. Runs ashore are pretty quiet, but life can be found if you know where to look.

I would like to mention, all aboard here are a happy-go-lucky crowd. There is one real candidate for the diving world!—PO Writer Murrey. He has been known to turn in early, get up and then proceed ashore for a run. It's love!

As regards to our future, we are going *foreign* in the near future to Ostend. Most of the lads are preparing for the crossing, all kit bags and lockers have been emptied in readiness for topping up with coal, just to make sure we have enough for the return trip. If the trip is a bit lippy things should be OK as the majority of the Stokers take things a little easier then.

We return to Chatham for leave, then Southampton and on with the job until about October and then, rumour has it, Chatham for a long refit. Cheers for now, Best of Luck to all, from *Annet*. THE MERRY MACS.



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