The Royal Naval Diving Magazine

To all interested in Diving

Volume 2, No. 3 - 1954

Diving Magazine

EDITORIAL STAFF

Editor: Mr. E. Mappley, Cd. Gnr., (C.D.)

Secretaries: C.P.O. Foggin, C.D.I., C.P.O. Peach, D.I.

Treasurer: Mr. S. G. Currie-Davis, Cd. Bos'n (C.D.)

Vol. 2. No. 3.

EDITOR'S NOTE

Dear Readers,

It is encouraging to see the response to our plea for material for the magazine—we have received articles from as far afield as Australia.

This last quarter has seen a large change round amongst Officers and ratings in both branches of the diving world—1954 should go well with many new brooms and ideas in every corner.

As many of us are familiar with the redoubtable "Chads" you will be glad to know that he has made a good recovery after his illness in Haslar.

Congratulations to Petty Officer J. C. Burgess, Diver I, for winning the Goodhart Trophy of the Royal Naval Gliding Club for the year 1953. (You can't keep a good diver down).

Editor

TREASURER'S NOTE

Contributors, Subscribers and Readers,

May I offer my rather belated wishes for your good fortune during the present year, and Scrooge-like, remind some of you that your subscriptions are now nearly due, due, or overdue!

In order to ease the burden of my task I should like to suggest that you now forward the balance to complete the annual subscription for the year 1954. In other words if you have subscribed four shillings, commencing with last July's issue covering you up to July this year, please do not send a further four shillings, but simply send two shillings and thus cover the period of 1954 only. Having got all subscribers in phase with payments, only one round up a year will be required.

Please cross all Postal Orders, and Cheques, /& Co./ and make them payable to "The R.N. Diving Magazine."

Recently there have been one or two cases of subscribers not letting us know their changes of address and their copies have been returned to us.

Finally, if you know anyone who in interested in the magazine, let me have their address and I will send them a back number gratis with your compliments.

"Bottles closed."

Treasurer.

A TALE OF TOBERMORY

(Conclusion)

Author's Note.—The date given in the last issue of the Magazine for the Naval Expedition to Tobermory should have read 1950 and not 1951.

In the first part of this tale of a galleon hunt, an outline of the back history was drawn. The author having developed writer's cramp by the end of the second page, he resorted to the old dodge of serialising the story. The cramp having worn off, and the Magazine only delayed by the odd few months, the last part is now presented for the edification of our readers.—*Editor.*

At the beginning of January, 1950, the Duke of Argyll, who had recently inherited the title, approached the Admiralty with a view to obtaining the services of naval divers to establish the position of the wreck of a galleon known to have sunk in Tobermory Bay.

Considerable controversy existed over the identity of the wrecked galleon, although no one ever disputed the fact that a wreck actually existed. Some supposed authorities claimed that the wreck had been a troop-carrying vessel and not likely to contain anything of much value. Others asserted that no troopship would have mounted two such fine guns—manufactured by Benvenuto Cellini — as were found in the wreck by an earlier expedition.

Be that as it may, the Admiralty agreed to hire out an M.L., an M.F.V., and a team of clearance divers for the purpose of finding the wreck. The total party consisted of a senior officer, the officers and ships companies of the two vessels, a clearance diving officer, an officer under training in clearance diving, six clearance divers and about six C.D.3's under training. (For security reasons it is not intended to divulge the names of the individuals concerned. The reader will draw his own conclusions, no doubt).

The information available was quite good. The position of the wreck was known within a few hundred feet. The depth of water was charted at about 70 to 90 feet. There was very little tide in the bay and the weather was typical of the west coast of Scotland. Easy, you say. And so it would have been had we been sure that any part of the wreck was still showing above the sea bed. On this point past records were suspiciously vague.

However, the expedition sailed from Port Edgar on about the 1st of March and after a pleasant passage reached the southern end of the Caledonian Canal on the 5th. The diving officers joined at this stage having travelled by road from H.M.S. *Lochinvar.*

Alighting from the car a few yards from the M.L. we saw a tall, thin gentleman in full Highland dress approaching the bow of the M.L. Seeing him make to go on board, an alert quartermaster, who was supporting the funnel, called out in a cultivated Liverpool accent, 'Hi! Jock! Where do you think you're going?" "To visit your Captain," replied the Duke of Argyll, gently.

And so from Corpach, past Castle Duart, up the Sound of Mull and into the land-locked bay of Tobermory. The natural scene was one of impressive grandeur. Tall, sharp mountains, sweeping pine forests, and tumbling streams made the setting in which we were to work for exactly two months. Looking at the small town, or large village, three landmarks were clearly distinguishable. The lounge bar of the Western Isles Hotel, the bar parlour of the Mishnish Hotel, and the public convenience halfway between them. We were to become well acquainted with all three.

News of our coming had gone before us and quite a crowd was waiting curiously on the jetty as the ships tied up. The Duke's factor was there, with the charts and papers compiled by previous salvage parties. The Fourth Estate was represented with some sixty or so reporters and photographers. The local populace, which appeared to be 90% female, laughed decorously at the merry quips and sallies emanating from the galley of the M.F.V. where the cook had just scalded himself.

After a somewhat hectic settling-in process which lasted over the week-end, work was started at first light on the Monday. All the divers were naturally curious to know what conditions were like on the bottom, and our method of carrying out the search would depend largely on what these were found to be.

The first dive fulfilled all our most hopeful expectations. In 90 feet the bottom was hard; the visibility was 30 to 40 feet; the water temperature was 48 degrees Fahrenheit; there was no tide worth mentioning. There was little sign of fish but large numbers of scallops.

The position was this. We had to find the wreck. If it were practicable we were to enter it and see what could be salvaged. But, knowing the reluctance of the average man to disclose the secret of where he has hidden his nest-egg, we were not sure that a true position had been passed on to us by the previous expeditions. The Duke himself, however, possessed a faded photograph of the salvage grab operations which had been taken in 1910. From this we got a rough position and it appeared to confirm the other records. We could not discover whether any part of the wreck was showing on the sea bed, unfortunately.

It was decided, therefore, to search out an area one hundred yards square around a datum point. To do this the two ships were used as diving platforms and grid searches laid between them, using 300 feet jackstays. Although the visibility was so good underwater, jackstays were laid 20 feet apart to give the divers a good chance of finding any small pieces of the wreck, coins, or other useful evidence.

The main difficulty, as always in this type of search, was to anchor the two ships in the right place and hold them there. In deep water, with very light ground tackle, the slightest breeze was enough to cause one or other of the ships to drag. If five jackstays were laid, and two divers down on them, the fun that took place when a drag occurred was quite something!

There were many lighter moments, of course. Some of the officers of the party lived ashore at the Western Isles Hotel, where they quickly became firm friends of the management. The owner at this time was very proud of a trick he could do on the bar billiards table, and so convinced was he that no one else could do the trick first time, that he bet certain officers the title deeds of the hotel against the M.L. and the M.F.V. The trick was duly done first time and you can imagine his face the following morning when two officers with brief-cases and a policeman arrived to take up the hotel ownership!

The search proceeded steadily, however, and although no part of the wreck was showing, the position of the earlier grab operations was clearly visible. Several objects were found in the vicinity of the grab holes and eventually we were satisfied that we had found the position on the sea-bed beneath which the galleon lay. To prove this, however, required the use of a technique quite new to Clearance Divers, although well known in the salvage world.

The first step was to obtain boring equipment, or "lances" as they are commonly called. For those who do not know, a lance is a length of tubular piping, with a nozzle at one end, holes drilled at random along its length, and an ordinary hose connection at the other. If you wish to probe down into the sea-bed you simply connect the lance to a pump by ordinary fire hose, turn on the pressure, and the lance sinks into the hole created by the jet of water under pressure coming from the nozzle. If deep boring is required extension pieces of tubing can be joined on to the lance.

If the exact position and outline of a buried wreck is required, the first action is to drill a straight line of boreholes at right angles to what you think is the fore and aft line of the wreck. The lance will go down to, say, 35 feet on the first three holes, coming up against the true bottom of the harbour each time. It is easy to judge whether the true bed is rock, packed clay, or some other substance, by raising the lance six inches or so and banging it down hard. If a diver on the sea bed holds the lance in his hands when it is being banged up and down he can tell by the nature of the jar or impact what is stopping the lance. Rock will give a definite, hard jar. Wood, which we were after, gave an equally distinguishable thud.

If, therefore, you are outlining a wreck, you would expect the first holes at 35 feet to hit true sea bed. If a subsequent hole only goes down 20 feet, and comes up against wood or metal, you know you are on the edge of the wreck. You continue the line of holes, getting perhaps four more at 20 feet with a wooden response and then one at 35 feet, on rock this time. The line of holes has obviously crossed the wreck and gone off the other side.

It will be evident that the whole wreck can now be plotted in plan and elevation, if enough holes are drilled.

This was what was done and the plotted results of the boring showed us a wreck some 125 feet long, 25 feet in beam, and varying between 25 and 18 feet in height. The boreholes in the centre section of the wreck did not give a distinct outline, as on many occasions the lance was felt to come up against wood, but when banged up and down it would often break through and eventually go right down on to the true sea bed. This confirmed what original records had stated. The ship had reputedly sunk after a violent explosion amidships and the centre section had apparently been well broken up.

By this time we were as certain as we could be that we had located the sunken galleon. Everyone was keen, however, to get some incontrovertible piece of evidence from the wreck so that no shadow of doubt could be left. It was decided to borrow an air-lift from H.M.S. *Safeguard* to see if any part of the wreck could be uncovered. Anyone with any experience of operating an air-lift will undoubtedly raise his eyebrows at the thought of one being operated from an M.L. and a 75-foot M.F.V. However, by parking the compressor on the starboard side of the M.F.V. and slinging the air-lift from the derrick the job was done. The M.L. was secured alongside the M.F.V. to aid stability and provide a diving platform.

The idea was simply to sink a shaft down to the wreck, waggle the foot of the air-lift round, and hope that something interesting would be sucked up. The spoil from the lift was passed into a large, small mesh, net slung between the two ships.

The reader can imagine the sort of shambles which existed on the upper decks. The M.L. had a large fire pump on the fo'c'sle with all the hoses and lancing equipment, not to mention the diving gear for relays of three divers at a time. The M.F.V. had an Ingersoll Rand air compressor on one and about 100 feet of 8-inch tubular steel piping hanging from the derrick over the other side. If high pressure air hoses, stays, preventers, shores, head ropes, springs, nets, cables for light anchors, two Jap engines, leads, and equipment for underwater lighting are added, some idea of the picture can be gained. Finally, imagine the wind springing up and both ships dragging with 20 feet of the air-lift buried in the sea-bed.

The routine we worked was to have two divers down, one in M.R.S. as communication number and one in S.W.D.D. and "P" party breathing apparatus as the working hand, and the standby diver in the water, sitting on the air-lift on the surface, on air.

The air-lift was lowered vertically on to the sea bed, placed in position by the divers and the derrick, and then, with pressure on, swung from side to side at the top end.

Eventually, after many disappointments and scares, the lift came up against the wood of the wreck at a depth of 22 feet below the sea-bed—a total depth of about 100 feet. As the pipe was swung around on the surface, the bottom end could be felt crunching through wood and quite sizeable splinters began to pour out of the lift into the net.

The net was emptied at intervals and the contents sifted thoroughly. The great occasion came at tea time on the 2nd May. During a routine sifting two coins were discovered. They were apparently religious badges of some kind and clearly of great antiquity. They must have been broken away from some panel by the movement of the air-lift.

Here, then, was our final piece of evidence. The medallions were photographed and a message sent to the Duke of Argyll. It was unfortunate that they were accidently lost before the Duke had seen them, but the photographs and the fact that all the divers and several of the local populace had seen and inspected them, obviated the possibility of their discovery being classed as a fisherman's tale.

Throughout the expedition's stay in the Mull the most wonderful hospitality was afforded by the Islanders. There were many long faces on the final day, when the ships drew away from the quay and headed out into the Sound. The only memento left was a large dan-buoy, wearing a white ensign, marking the postion of the ill-fated *Florentia*.

LT.-COMDR. J. L. CRAWFORD.

P.O. J. C. Burgess with the Goodhart trophy

DIVER'S BOOKSHELF

By JAMES BENSON

In his *Down to the Ships in the Sea.* (Hutchinson: 15/-), Harry Grossett has produced a very readable, informative and fascinating autobiography of a deep-sea diver. This book is remarkable, first of all, because it is the story of a man, now seventy, who has been diving for exactly fifty years and who still takes an occasional dip when an interesting and congenial job comes his way.

Harry Grossett has had an interesting and varied career. He was trained as a civilian shipwright and his only inside experiences of the Navy were his initial diving training course at Sheerness and his First World War service as a Petty Officer and, later, Chief Shipwright-Diver. Much of his work, however, has brought him into contact with the Service and the Naval diving world from the outside. Some of his comments on this subject are both interesting and unusual.

During the Second World War Grossett was senior diver on the laying of the Accra Pipeline. Between the wars he played a leading part in the raising of the scuttled German Fleet from the waters of Scapa Flow. In the chapters dealing with this epic work is to be found some of the happiest writing in the whole of the book in the shape of the author's references to the abilities and character of Commodore "Tom" Mackenzie, now of Metal Industries.

In an early chapter Grossett emphasises that, as he must, he has written for the lay reader and not for the diving technician. At the same time he has managed to include many details of esoteric interest to the diving fraternity and the whole story provides young Service divers with an invaluable picture of the diving employment position in inter-war times of national depression. Too often Grossett was able to rejoice that he was a shipwright first and a diver afterwards. There is surely a valuable lesson to be learned from this.

Looking back on this book I can say that it is a long time since I have enjoyed anything of this nature quite so much with one grave reservation. The great majority of the content is written extraordinarily evenly and readably. Only in one place does the author's personal philosophy obtrude to a sufficient degree to halt the flow of a fast-moving, humorous and lively narrative. An obvious knowledge of and acquaintance with the ways of the sea get over with a facility often lacking in the work of professional writers.

All of which leaves only my one major complaint. The author has a rather considerable bone to pick with the Admiralty and this he proceeds to do in no uncertain terms. Now I am by no means of the opinion that Their Lords Commissioners should be sacrosanct. Nor do I think that on the subject of the salvage of sunken submarines for the purpose of saving life—for this is the subject on which he chooses to cross swords—Grossett is necessarily wrong. But I do most strongly feel that his observations are in the worst possible taste. He has seemingly given no consideration to the feelings of bereaved relatives or, indeed, of relatives of submarine personnel still serving or of such personnel themselves.

For the most effective helping of submarine crews in the more efficient performance of their duty I suggest that the author should have contented himself with submitting a reasoned and reasonable statement of his views to the proper authority. I am sure it would never have been unsympathetically received. Having had the honour to serve in a branch of the Submarine Service for a short period during the recent war I know I can say that the men in "boats" have every confidence in the arrangements that are made for their safety and in the wise and understanding direction which their particular branch of the Naval Service receives from those at its head.

Phillipe Diole is a diver of the renowned Cousteau school. He is a naturalist, scientific observer, lover of poetry and writer of philisophically intense and rather poetically inclined prose. His book—*The Undersea Adventure* (Sidgwick and Jackson, 18/-)—is well illustrated with the type of photographs which Cousteau has already made famous, which fact should be recommendation enough for this department of the book.

Naturally, Diole's book suffers somewhat by comparison with Cousteau's masterpiece, *The Silent World,* which I reviewed in a previous issue. It covers very little new ground except for several analyses of the possibilities of the extension of underwater activities in general and self-contained diving in particular for the international good. M. Diole envisages a new race of men: diver-archaeologists, diver-biologists, diver-scientists and diver-poets. He wants to see a great development in the intensive cultivation of the products of the sea, from sea-weed farming to fish-breeding. He broaches the subject of extracting minerals from the oceans.

In fact, *The Undersea Adventure* is more of a naturalist's than a diver's "must." If this were my only criticism I should be very happy, but I feel I cannot ignore Chapter VIII, entitled "The Poetry of the Sea." The following quotation shows what I mean:—

"Now comes the worst stage: the liquid sky over me is blotted out and I know that it is no longer any use my looking for it . . . I am in the body of the sea . . . Oppresive majesty of the solitude in which I move, dazzled and blind."

It may be that I am insensitive, that my aesthetic appreciation is blunted or undeveloped, but I cannot reconcile passages such as the above with any of my self-contained diving experiences. I am inclined to think that M. Diole's imagination has been running away with him in some of the more purple passages, but at the same time I want to place on record my ready avowal that the fault in this incompatibility may well be with me and not with the author.

Anyway, I do strongly urge you to read the book for yourself and find out. Even though I feel critical towards large parts of it, I would not have missed reading it. It is always fruitful to stimulate new avenues of thought concerning the techniques with which one earns one's bread and butter. And *The Undersea Adventure,* at worst, is a

very unusual book full of signposts to lots of new avenues. At best it could be something approaching a work of genius. I honestly wouldn't know.

As on one or two previous occasions I am including in this column a book that is not a recent publication. Rachel Carson's *The Sea Around Us* (Staples Press, 12/6) first appeared in this country in October 1951 and largely repeated the best-selling success it had enjoyed in the United States. It is, I suppose, really a book for the "professors" among us, but Miss Carson's literary ability and knowledge of her subject are such that even the more technical chapters hold much of the fascination of a good novel.

The book is a work of oceanography. Thrown in for good measure are discursions into primeval geology. Discussions of the sea-lore of our ancestors and disbursements of information on such widely differing subjects as the locating of oil deposits beneath the ocean bed, the effects of coast erosion on Great Britain and the economics of refining gold from sea-water. This last is actually possible, but not profitable.

But it is to its oceanographical content that the book owes its widespread appeal and for the appreciation of this one needs only an inquiring mind. The whys and wherefors of tides, the vagaries of the Gulf Stream and other ocean currents, the habits of fish both well known and obscure, the significance of flora and fauna, the incidence of types of rock and the characteristics of waves: all are described, explained and annotated.

If you have ever wanted to know more about the waters in which you dive, then this is the book for you. One short warning—don't let the first chapter put you off. The geology is necessary and it doesn't last long.

The first claim that *The Angry Admiral* by Cyril Hughes Hartmann (Heinemann, 18/-) makes on the attenion of past and present members of the diving fraternity is that it is a biography of Admiral Vernon, whose name is perpetuated in the Portsmouth shore-establishment, which we all know so well. Through his nick-name of "Old Grogan" the same admiral has also achieved immortality in the form of probably the greatest of all naval traditions: the grog issue.

Vernon, as the book's title indicates, was renowned for his fierce temper. And although it is true to say that he received uncommon provocation from Whitehall while flying his flag both in the West Indies and in the Channel, he was never a man to think before he spoke. This biography, which plainly sets out to justify Vernon in all his doings and sayings does not always leave one feeling completely sympathetic towards him.

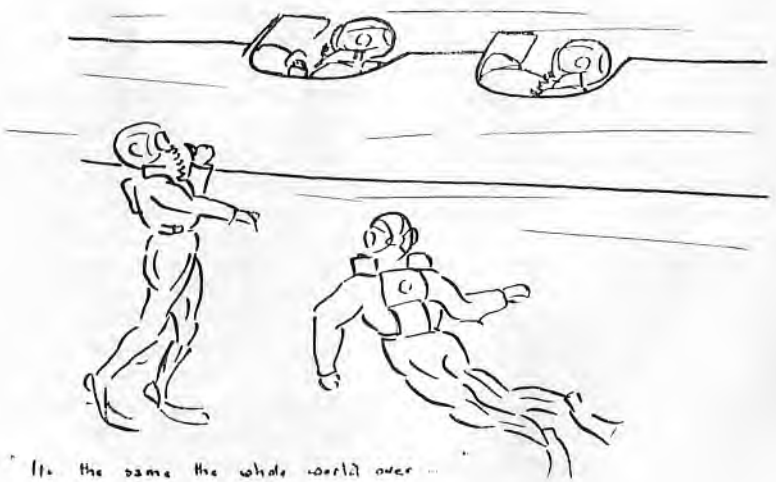
It is perhaps a pity that Mr. Hartmann should have chosen to emphasise this aspect of Vernon's make-up by the use of a title with an unwarranted suggestion of the humorous about it. For the book is a serious and an accomplished essay in naval history, dealing with a vital but little-known period in the growth of British sea-power. In the late 1730's and early 1740's Britain was following up the colourful "Jenkins Ear War" in the West Indies with the action by sea and

land against Bonnie Prince Charlie, the Young Pretender. In these theatres Vernon's deeds were more than enough to justify his reputation as one of the greatest of our pre-Nelson admirals.

The Sea Shall Not Have Them by John Harris (Hurst and Blackett, 9/6) is a good workmanlike novel of the Air/Sea Rescue Service in the Channel during World War II. It contains an assortment of "types," recognisable even though slightly exaggerated, such as all of us have met whatever our branch of whichever service.

This book has achieved the rare distinction of collecting the *Daily Mail, Daily Sketch, Evening Standard* and *Book Society* "Book of the Month" awards.

An aircraft with a V.I.P. passenger is shot down in the Channel; impending bad weather threatens to cut down the period of search; air-sea rescue launches, fighter aircraft and a Naval "Walrus" sets off to patrol a rather indefinite area; and so the plot thickens. It is a simple story of what was once an everyday happening and there are no really startling denouements. What gives the book its class is the way in which the story is told. Again, there is no brilliance. Harris writes as a craftsman rather than as an artist. But he is a master of his craft and, apart from a nuance of disappointment which I cannot quite place—unless it be on account of the exaggeration and occasional crude drawing of some of the characters—my feelings towards this books are entirely and enthusiastically commendatory.



WHAT THE WELL DRESSED DIVER IS WEARING

By "B.F."

Have you given enough thought to your appearance as a diver? Are you all that a well dressed diver might be? For instance, do you always dive in a well pressed suit with immaculate seams, and is your helmet or hood always adjusted to the correct angle? Strangely enough the usually informative instructors and manuals do not adequately stress these matters and yet every diver knows how important to his morale it is to be dressed comfortably and correctly before descending—after all, we none of us know who or what we are likely to meet!

As this matter is of such overbearing importance I propose to deal with a few of the finer aspects of how the "tiddly" minded diver can ensure that his attendant valet will produce a turn out that will impress the underwater world.

Let us first consider underwear. Now underwear should be laundered every six months whether it needs it or not, I mention this point straight away, in case the over zealous types fall into the habit of sending their socks, etc., to be dry cleaned. Although starching generally improves the appearance of under garments and allows a longer period before another wash is needed, it should not be overdone, as the garments are likely to become brittle and break up under pressure, necessitating embarassing and painful extractions when the diver returns to the surface.

The type of underwear chosen is extremely important from the point of view of comfort under H. and C. conditions, sweat absorbtion, and as to how one is going to look when removed to the morgue following an accident. (It is always as well to look ones best on these latter occasions).

Waterproofing underwear is a useful and long established practice, it being a generally accepted fact that most diving dresses leak. A lot of underwater operators wear a sweat rag round their neck, outwardly this gives the impression that the wearer is going to work hard, but many divers have told me in strictest confidence that they merely use the sweat rag to mop up the water that inevitably leaks into the suit.

Don't be a slave to "frocks woollen" or "woollen drawers, divers for the use of," just think of how this pusser's terminology would shock your wives and girl friends, and the frightful pictures they would conjure up in their minds at the mere mention of such things. I know they are well tried and proved garments but you really ought to be fair to your delicate skin chaps, and not let these woolly monsters come near you. The ideal material next to your skins is undoubtedly silk and no self respecting diver should be without his silk combinations, the fact that the pusser hasn't got many should not deter anybody who owns a sister. The freedom and sense of well being when wearing this garment is only bettered by hearing the hands called when one has a "guard and steerage." Don't be dull about colour either. Red or yellow will

always catch the eye of the Diving Officer and does away with the necessity for a flag in the boat, white is not recommended as it shows the dirt and by the time it matches your hair you're too old for diving anyway.

When we consider "stockings long woollen" we realise that the pussers rate book has again put us at a disadvantage, thereby unwittingly preventing us from purchasing his wares. I need hardly say that Nylons are the hallmark of the successful operator, fishnet being the best, as they come in handy for shrimping when the weather is suitable.

Next we ought to consider what to wear between what one might loosely term our negligee and our actual diving dress. Here I am sure you will have to be both individual and selective, in fact each diver should, during one of his commissions in the far flung outposts of the British Empire, ascend into the hills or venture out into the desolate wastes and *select* himself a woolly creature that compares favourably to his individual dimensions. Having selected the beast, both for its ability to keep warm under below zero conditions and its similarity to yourself, it should then be pole-axed between the eyes with one round of Temple Cox air belt ammunition. One uses air belt ammunition for the same reason that I advocated the use of helium filled bullets when shooting stag, in the last issue of the magazine. Needless to say, a bad shot, although it may fell the beast, will spoil the future garment and any animal thus treated should be written off charge and an entry "lost by neglect" with the appropriate mulct of pay made in the ledger against the offenders name.

Although warmth and correct size are the primary factors in selecting this intermediate garment it must be emphasised that woolliness should not be mistaken for shagginess, because in the latter case there is a distinct danger of outlet valves becoming clogged.

We now have the diver psychologically and physically prepared to endure whatever other encumbrances we may drape on his person to enable him to survive sufficiently long underwater to complete the job in hand.

We next come to the diving dress, and it is here we realise how restricted our range of choice is because most divers dressed in the conventional outfits resemble humpty backed cockroaches carting a sack of spuds up a mountain. This discouraging picture is to be avoided and we must look elsewhere for a suit in which we shall look our best. For the underwater swimmer there is the "bikini," but that is being frivolous whereas we are really faced with a serious problem because the average tailor is not given to waterproofing his garments. After deep research into this problem I have come to the conclusion that the solution is a long and arduous one. The first step is to purchase a really good hard-wearing suit, pattern and colour according to taste, though a plunging neckline is recommended for Clearance Divers in view of their tendency to enter the water from high places. Hacking jackets should be avoided due to the tendency to leakage at the slits in the

back. Standard and Deep Divers should go for padded shoulders to avoid the necessity of wearing a "horsecollar." The selected suit is as yet not waterproof and to accomplish this final phase one needs a contact either in the Engine Room Department or in the Galley. The process to be followed is really quite simple and is analogous to the curing process carried out on the more conventional diving dress. Having selected a reliable "plumber" or "sloshy" you hand him the suit and tell him to wear it continuously for three months in the double bottoms or in the galley as appropriate, during which period it can be guaranteed that the suit will have become efficiently waterproofed. This guarantee is given after a lifelong study of stokers emerging from double bottoms and of cooks wrestling with divers dishes in a seaway. The double bottom stoker is on the whole the best bet for this job as he gets S.9's for the job and should therefore be most understanding.

In conclusion I should like to say a few words about the accessories that the well dressed diver should wear, after all the best outfit obtainable will be spoilt if the accessories are not right—you know "spoiling the ship for a ha-porth of tar" or "charging a breathing set without putting any C.O.2 absorbent in," that sort of thing.

The helmet or head chosen should tone in well with the remainder of the outfit and should give a complete freedom of the head, good vision and be suitably adapted for inlet and breastrope connections, outlet valve, spit cock and for taking a snooze when the weather is suitable. The correct size is essential because whereas most hats are well supported on the ears your hat must be located on the shoulders if a watertight seal is to be obtained and ear clearing easily achieved. Generally speaking you can't go wrong with a "topper," it is readily adaptable and looks distinguished. "Pork pies" should be avoided as they are liable to become messy when immersed in sea water. The angle you should wear your hat is most important — the "jaunty" angle may appeal to some but usually only leads to the Commander's table, and a hat "flat a back" is liable to be displaced in a tideway.

A breathing set is a rather tiresome and reluctant necessity as an accessory to some forms of diving, its nuisance aspect being that we are in the hands of the designers who seem to consider safety of life before appearance. I have had several battles with the manufacturers in an effort to procure a bright, attractive and somewhat imaginative breathing set but unfortunately they have remained obstinate and for some obscure reason never seem to take me very seriously. However, I shall press on regardless and hope to be able to recommend some breathless style of breathing apparatus in the near future.

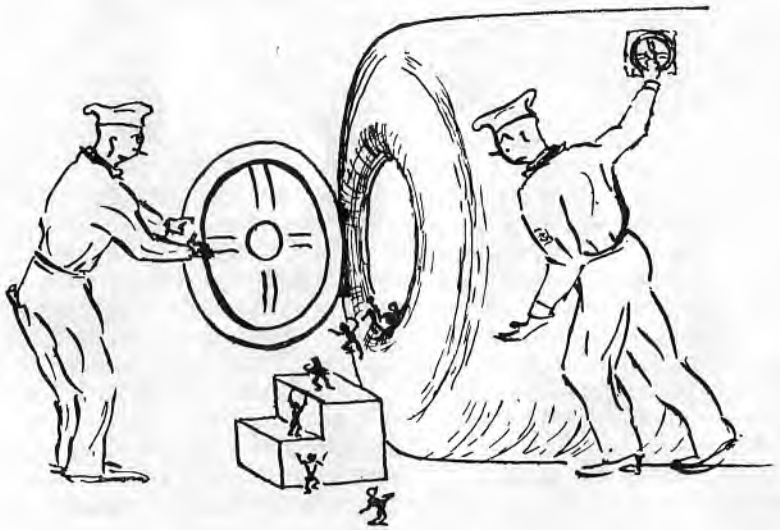
Weights can be re-moulded in many attractive ways and hung most decoratively about the person. A few designs that occur are stars, crescents, sporrans, etc., according to national taste. Hanging the weights as ear-rings is not recommended as it involves piercing the headgear as well as the ears. Stringing the weights on the corselet lanyards and wearing as a necklace is quite a good idea for Standard and Deep Divers. Having large slabs of lead and numerous balls scuttling around is after all somewhat depressing.

For the rest there are boots or shoes, according to the dress regulations of your unit, gloves and possibly a walking stick or umbrella, according to the weather. I won't enlarge on these commonplace articles which have already been exploited to the full in other walks of life. As a final word of advice I would recommend that all divers desiring to acquire and maintain this high standard of dress should take the "Divers Vogue" regularly to keep abreast of the changing styles and fashions.

The Sartorial sense of a Diver,
Is important as everyone knows,
Whatever you be in the depths of the sea,
You simply must wear the right clothes.

Now I've always held the notion
That one must look trim and neat,
When searching the depths of the ocean
For you never know who you might meet.

Don't be hide bound by convention
Look self possessed, natty and dashing,
Wear one of "B.F.'s" inventions—
You may die, but you'll look simply smashing.



Wasn't there something about "stops" ?

DEEPS

The old suit leaks, and the cuffs are worn,
Reducer's packed in, and breathing bag torn,
Woollens are wet, and an ice-cold morn.
Diving ain't all hay, is it?

Going down the shot, getting lower and lower,
Haven't had a dip, for six months or more,
But I've heard it said and it's true I'm sure,
That too much diving weakens you.

Pain in my ears, came down too quick,
Nose clip refuses to do its trick,
And this here cannister sure fells sick,
Can't be a darn thing in it.

There's too many weights, and my breathing's queer,
Guess that's last night, the girl, and the beer,
Now I'm foul round the shot, and I can't get clear.
You just can't depend on nothing.

Relief valve not working, feeling so forlorn,
The tiredest diver that ever was born,
Now the left boot is pinching my favourite corn,
Diving's dismal, ain't it?

I've lost the jackstay, but I don't care,
Never did figure on going nowhere,
Just stuck in the mud, it makes me swear.
Life gets worse than ever.

Lifelines all round me, should sort it out a mite,
But it's caught on a rock and I'm trapped in the bight,
The inboard end's beside me, this can't be right,
Diving's deadly, ain't it?

Can't get my knife out, it's rusted in,
Never did write a form out for next of kin,
Hope they don't tell Ma, how dumb I've bin,
Not much longer now.

S.9's and taxes, debts and woes,
Anoxia, Narcosis, and so it goes,
And now the clip's fell off my nose,
Diving ain't all hay, is it?

"WIGGY"

AN INTERESTING SMALL SCALE SALVAGE OPERATION IN COCHIN

(Extracts from a report to the Commodore-in-Charge, Cochin, by Lieutenant Commander C. J. Alldridge, R.N.)

This report is of particular interest to those of us who have met and worked with divers of the Indian Navy.—*Editor.*

SALVAGE OF WATER BARGE VYG 144

History

The water barge capsized at sea from an unknown cause while in the tow of H.M.S. *Wren.* The inverted tow was brought to Cochin, passed to the Harbour Tug at the Fairway Buoy whence it was taken up harbour on Sunday, 8th April and made fast to the South Oiling Buoy.

After consultation with the Commanding Officer of H.M.S. *Wren,* it was decided to engage the Port Trust Floating Crane, *St. George,* and try to right the barge there and then. On this occasion, the first of many in the course of this operation, the staff of the Diving School at Cochin did a very commendable job in so quickly securing the wire slings with which to parbuckle the vessel over.

Three wires were passed in this manner but, in order to hook on the crane, it was necessary to lower the crane purchase. This caused the bow to submerge with more loss of air, and, when the full strain was taken, the dead weight proved too much for the crane which managed to lift the barge a few feet only. At the third attempt she slipped through the slings stern first, settled on the bottom and expelled her remaining air.

Salvage Operation

Preliminary enquiries on Monday, 9th April, elicite that the Port Trust were not prepared to undertake salvage work and, after further debate, it was decided on Tuesday 10th to commence salvage operations immediately with every possible Naval facility available at Cochin.

An inspection dive by Mr. N. Ashworth, Senior Commissioned Boatswain, Royal Navy, on Monday 9th, revealed that the barge was on an even keel, fortunately, but down by the stern in the deep viscous mud and this latter fact rendered it imperative that salvage operations should be expedited to the full. In the absence of drawings, etc., or any detailed knowledge of the vessel, the initial plan was to fit suction hoses to Nos. 1 and 3 fresh water tanks — then believed to extend the full width of the barge—and pump them dry. It was calculated that this, if not successful in bringing her to the surface, would at least provide her with sufficient buoyancy to prevent her sinking further into the mud.

Working in complete darkness and in strong tides with simple tools, divers eventually succeeded in unshipping the starboard hatch covers of Nos. 1 and 3 F.W. tanks. These were promptly taken ashore and fitted with valves—ingeniously designed and made up from limited local resources by Mr. J. Humphreys, Commissioned Shipwright, Royal

Navy—with suction hoses and air adapter inlets. Some difficulty was experienced in re-shipping these hatch covers, with their extra fittings, due mainly to lack of accurate knowledge of the internal structure of the tanks, but, by the concerted efforts of two divers—including Mr. Humphreys—they were both back in place on Thursday 17th April.

The intention was to suck the water out of the tanks, but, in view of the possibility that the trailer pumps might not be able to cope with the head of water, it was thought prudent to assist the pumps by injecting air. This latter idea proved most fortunate for, when pumping began, it transpired that the pumps were not functioning—nor, indeed, did they appear likely to function, and a party was put on to repairing them at once.

During the night of 21st/22nd a minor tragedy occurred when *Madras,* acting as winch ship, dragged two of the three kedge anchors with which she was moored astern. In doing so she pulled off the M.F.V. and parted the air lines and suction hoses. The air lines were quickly replaced on 22nd and the stern of *Madras* made fast to the buoy to prevent further dragging aft. Her second bower anchor was also let go forward. The suction hoses, however, had broken and could not be rejoined to the fittings on the barge. They were, therefore, abandoned and the outlet valves at the tank tops closed.

To blow the main body of the barge around the fresh water tanks, it was necessary to fit some kind of non-return valve and while this was being pondered, Mr. Bagg, Senior Commissioner Gunner, T.A.S., proffered a very useful suggestion and recommended the use of Torpedo Kingston Valves for this purpose. These were accordingly extracted from torpedoes and fitted to pipes long enough to reach the bottom of the barge internally. One air inlet was also fitted to this section and, after some subsidiary, but annoying, leaks had been discovered and stopped, the whole modified arrangement was tested on the morning of 25th April, using torpedoes as a source of air supply.

The result was most disappointing, for it was discovered that the seatings at the junction of the fresh water tanks and the coaming of the main hatches were not watertight by a long way. To repair these, especially under water, was beyond the capabilities of this Base and the idea of emptying the main compartment by air had reluctantly to be abandoned.

Meanwhile it was very desirable to overhaul the diving equipment and, at the same time, provide some respite for personnel who, like the equipment, had been working practically incessantly since 9th April. It was, therefore, agreed to resume operations at the scene on Monday, 30th, but, owing to the adverse affect this commitment was beginning to have on the normal work of the Base, it was also agreed to terminate all operations on the barge on Saturday, 5th May, whether successful or not.

On the following morning a wire was secured to the forward end of the barge and the bight hooked on to the crane. Three fully charged Torpedoes were brought to the scene and, at 0850 all was ready for the attempt. Air was at once applies to Nos. 1, 2 and 3 F.W. tanks and,

after half-an-hour, a 15-ton pull was applied by the crane, the foreman of which immediately reported a movement. This was indeed cheering and he was instructed to maintain a steady but limited pull.

At 0950 the barge broke surface with a heavy list to port, and with her fore peak and main compartment hatches just clear of the water. Her port quarter, however, appeared to be under the M.F.V. and she was allowed to sink again while the M.F.V. was hauled clear. Opportunity was also taken to shorten the length of the sling which had originally been made long enough to pass right under the vessel, but which was now restricting the scope of the crane purchase. At 1010 she surfaced again and, as soon as possible, suction hoses were passed to the two tanks which were above water. At this critical moment the pumps were once more found to be not working, nor, once again, did they appear likely to function. The reason tendered was that the hoses were too long. On the contrary, in these cases it is not the length of hose which matters but the head of water. The condition of the suction hoses, too, left much to be desired.

It only remained now to pump water from as many compartments as possible and by 1800 the barge had sufficient positive buoyancy to enable the crane sling to be eased. She still had a list of about 20 degrees to port, but the whole of her upper deck was above water. It was, therefore, possible to disconnect the air lines and diving shot ropes and concentrate on removing the heavy chain towing bridle which had been draping the port side. This latter was slipped altogether and one almost felt the barge heave a thankful sigh of relief as the mass of cable, wire, shackles, rings, etc., disappeared over the side. She was taken in tow by Mr. Irani's launch and secured to the Naval Jetty where operations were immediately commenced to pump her completely dry. The broken mast and towing cable, etc., were recovered the following morning.

The following is a record of diving hours:—Ord. Seaman C. Ram, 133½; Ldg. Seaman A. Bhattacharjee, 116; Mr. H. Ashworth, D.S.C., Sr. Cd. Gnr. (T.A.S.) 40; Mr. J. C. Humphreys, Cd. Shpt., 35; Mr. K. R. Blagg, Sr. Cd. Gnr. (T.A.S.), 2½.

THE IDEA IS A MILLION YEARS OLD

Man likes to think he is lord of the universe for he can fly in the air, travel at high speed on the earth's surface, and dive below the level of the sea.

Let us regard one of these lordly ones. He is at London Airport watching the arrival of a Comet airliner, his ears filled with the noise of four powerful jet engines. Unbeknown, one of the insect world has carried out a reconnaissance of this member of homo-sapiens—man the sap—and is now coming in to land. The mosquito, hum drowned by the whine of the jets, achieves a perfect six point landing on his neck and thrusts a hungry probe into a suitable spot. The man, stung into action, slaps with aimless futility. It is too late, the mosquito replete, has gone to look for another homo to sap.

Let us now make a journey into time and space. It is two or three hundred thousand years earlier and the place is Piltdown. A man is sitting in contemplative fashion looking down into the water of a small pond. One hand rubs the back of his neck which has just been bitten by a mosquito, the other supports his chimpanzee jaw, later to cause so much embarrassment to the British Museum. This man cannot fly, dare not stay under water more than two or three minutes, and moves with a shambling gait at a pace which few creatures cannot beat. Already, however, he is able to watch two divers in the pond. One is using a prototype Standard Diving Equipment and the other is carrying down his own air supply like any present day diver in a Self Contained Breathing Apparatus.

The " Standard Diver " is a mosquito larva, living under the surface of the water and breathing through a tube stuck upwards into the fresh air. This is why it can be killed by covering the surface of water with paraffin.

For hundreds of years man has sought to dive in a similar way by breathing through a hollowed bamboo shoot or other tube with its upper end in the air and the lower end in his mouth or connected to a crude helmet. Unfortunately the idea will not work. Let us suppose that the tube is six feet long and that the diver's chest has a superficial area of a hundred square inches. This dimension probably underestimated being nearer that of a puny chest of a civilian than the hairy, barrel chest of the typical diver. At a depth of six feet the pressure is about two and two-thirds pounds per square inch more than the atmospheric pressure, so that the total force against which the diver must expand his lungs is about two-and-a-half hundred-weight. The diver will not be able to undergo this torture for long, and torture it is,

In the days when England was Merrie, men who refused to plead "guilty" or "not guilty" in court of law were taken below to the dungeons, spreadeagled, and weights were piled on their chests. They usually pleaded before long. But to return to diving. This was not possible until men realised that air had to be pumped down to the diver so that his lungs contained air at the same pressure as the water outside. He could then inflate and deflate his chest in comfort. All this, however, had to wait for the invention of an efficient pump and the discovery of rubber for flexible gas-tight tubing.

Now for the "self-contained" diver in the pond. It is a beetle who builds an underwater nest and carries down an air bubble from time to time in his hairy legs.

The self-contained diving equipment was not possible until man had learned to make a powerful pump, valves, and a cylinder strong enough to carry gas under pressure. But man still needs to breathe air at the same pressure as the water outside his suit. To do this he had to design the counter-lung which is a flexible bag. Boyle's Law operates under water and as the depth increases a flexible gas bag will maintain the right pressure by allowing a change in volume. Until the discovery of modern material h[illegible]ade once again a diving suit was impossible.

By the way, next time you are in your local listening to an old salt talking about his diving adventures, his fights with octopodes and sharks and the beautiful mermaids he met below, don't call him a counterlung. He might think you were calling him a flexible windbag.

INST. LT. TAYLOR, R.N.

BREAKING THE WORLD'S DEEP DIVING RECORD (1948)

By LIEUTENANT H WARDLE, R.N.

Part 4.—Findings during winter of 1947-48

The first trials were to test the divers who had taken part in the 1947 trials for oxygen tolerance "in the dry" at 50 and 60 feet. The time limit on oxygen was set, so as to cover the average long oxygen stop from the American Oxy-Helium tables.

The tests were conducted in the recompression chamber on board H.M.S. *Deepwater* with the subject breathing from the "Novus" apparatus normally used for oxygen decompression.

The routine carried out was the same as for when decompressing from a deep dive, i.e., the subject breathing on "open circuit" and exhaling direct to exhaust for [illegible]es and then going over to a closed circuit and re-breathing [illegible]en th[illegible]h a carbon dioxide absorbent for the remaining period, emptying and flushing through the counterlung every five minutes.

The three divers who had mishaps during the 1947 trials all had completed their full time without showing symptoms of any sort.

It was thought that the difference in oxygen tolerance between "wet" and "dry" conditions might have some delayed action or "off effect" so that when a man came straight out of the water and started breathing oxygen under pressure in the "dry" chamber, he would in fact be still under "wet" conditions as regards oxygen poisoning.

The next trial therefore was to put the divers down in standard dress over the side in 12 to 26 feet of water for 12 to 20 minutes, the equivalent to the time spent on the bottom by the helium divers. On completion of the dive he was "crash surfaced" and immediately put to oxygen breathing at 60 feet in the recompression chamber for 75 minutes.

Again the divers in the 1947 helium team showed no symptoms. Of other subjects tested only one showed symptoms, but he was already suspect. It was therefore concluded that "wet" conditions did not apply once the diver was in the S.D.C. and breathing oxygen.

In discussions on this problem the question of the effect of small concentration of carbon dioxide on the sensitivity of divers to oxygen poisoning was raised.

Experiments carried out by Doctor H. J. Taylor, had indicated that much lower concentrations of $C.O._2$ tensions than those previously

considered to be effective would produce a shortening in the time required for the onset of oxygen poisoning.

It could be stated with reasonable certainty that unless a positive defect exists, concentration of $C.O._2$ as high as 3% are rarely met with in diving equipment. It had, however, been previously shown that such a concentration can be achieved in standard and deep diving if the gas supply is inadequate for efficient ventilation. It has also been shown in comparative trials with the U.S. and British deep diving equipment with different absorbents that 3% $C.O._2$ could be reached and exceeded when incorrect absorbents were used.

When however, concentration of $C.O._2$ of less than 3% are considered there is no guarantee that they will not be met within various forms of diving equipment, and especially in the complicated train of events in full scale deep diving.

The next series of trials to be initiated was one in which oxygen tolerance was tested with a small percentage of $C.O._2$, deliberately introduced into the breathing oxygen. Cylinders of special mixtures were prepared so that at the depth of the test the partial pressure of the $C.O._2$ would be 2%, 1%, 0.5%, etc. The mixture was to be breathed on "open circuit" to prevent the possibility of a $C.O._2$ accumulation during the test. Respiration and pulse rate was to be taken as in previous trials.

The first trial brought immediate results, with oxygen containing 0.71% of $C.O._2$ at atmospheric pressure subjects were put down to 60 feet "in the dry" giving a partial pressure of $C.O._2$ of 2%. The first two subjects remained at 60 feet for 68 and 63 minutes respectively with no symptoms. The third subject's pulse and respiration became rapid after 28 minutes, he then felt twitching of the lips and stomach muscles and rapidly became unconscious with no convulsions.

The fourth subject reported lip twitching after 20 minutes, at 21 minutes he spat out his mouthpiece, gave a long moan and became unconscious with violent convulsions lasting about two minutes.

Both the third and fourth subjects were experienced deep divers and as such had done many oxygen decompressions. The fourth diver had taken part in the two previous oxygen trials with no symptoms. There was, therefore, no reason to suspect either diver of being in any way oxygen sensitive in the normal sense.

It appeared, therefore, to be quite clear that the results conformed with Doctor Taylor's experiments and showed that the oxygen tolerance of a man was being positively reduced by a partial pressure of a $C.O._2$ as low as 2%.

Furthermore, the two cases of unconsciousness were very similar to those experienced in the S.D.C. in 1947 in that the onset was severe and unconsciousness followed so rapidly on the warning symptoms that it could not be prevented.

The question of the diver who became unconscious on the bottom remained. Assuming the initial diagnosis of "acute claustrophobia" to be correct the diver was sent to a Psychiatric Specialist for psychoanalysis. The diver co-operated most willingly and although twice taken right through the dive at no time did he show either fear or excitement when he reached the crucial point. The psychiatrist therefore reported that there was no psychological reason for the diver's loss of consciousness and that it must have been physiological reasons. In view of Doctor Taylor's experiments and our trials and bearing in mind Doctor K. Donald's finding, viz., "When breathing *high tensions of oxygen,* the classical picture of respiratory stimulation, and *increasing* ventilation and *distress,* are not encountered as the *carbon dioxide mounts.*" It appeared that this diver must have suffered from a severe and sudden attack of oxygen poisoning, without any warning symptoms.

With these important findings the remainder of the oxygen poisoning investigation became a "witch hunt" for the presence of $C.O._2$ in the process of carrying out a deep helium dive.

The process for surfacing the diver was considered first as it was certain knowledge that two divers had suffered from oxygen poisoning during decompression.

The following stages were considered separately:—

(a) *The period between leaving the bottom and arriving at the S.D.C.*

During this stage the diver's injection recirculation system is shut off and he relies on natural ventilation through the helmet. His outlet valve must be closed at the beginning of the ascent to give him buoyancy and once he is ascending the expansion of the gas in the suit and helmet make such a demand upon the capacity of the outlet valve that only a minimum supply of gas from the surface can be accepted. With the slow helium ascent, the gas supply is almost nothing. The possibilities of $C.O._2$ accummulation at this stage was therefore considerable.

(b) *The period when the air stops are carried out in the S.D.C. between the first stop at about 130 feet and the commencement of the oxygen stops at 60 feet.*

Prior to the divers entry into the S.D.C. the lower hatch is open and air is supplied from the surface at approximately 1.5 cubic feet per minute, at pressure corresponding to the depth. As the diver comes in a considerable amount of physical effort is required by both the diver and attendant to get the diver in and unrig him. Once the diver is in, the lower door is shut and ventilating air practically ceases. Here again the possibility of a $C.O._2$ build up is considerable.

(c) *The period during which oxygen is breathed from the 60 feet stop to the end of decompression.*

Theoretically, this period should be the safest as the diver is now using an apparatus fitted for $C.O._2$ absorption. In practice, however,

a defect in the apparatus might allow 2% to accumulate *unnoticed* (Donald's findings), and the diver would be in considerable danger of oxygen poisoning.

Of the three stages above $C.O._2$ will have the most direct effect during the third and last stage. Any accumulation during stages (a) and (b) may have an "off effect" on the diver when he subsequently breathes oxygen under pressure.

The first series of the "witch hunt" trials was the examination of the efficiency of the standard "Novus" apparatus used for oxygen decompression.

The fire sets used in *Deepwater* in 1947 were numbered and tested in turn. Routine preparation was carried out and the set used on the surface for 45 minutes, using the normal decompression drill. Gas samples were taken from the mouthpiece at the end of insiration after 7½, 15, 30 and 45 minutes. In the poorest set the readings were as follows:—7½ mins., 0.26%; 15 mins., 2.25%; 30 mins., 2.70%; and 45 mins., 3.03%.

This set obviously had some defect, the other sets gave readings of between 0.15% and 1.35% approximately; fairly reasonable results but not as efficient as desired. The defective set was examined in the Superintendent of Diving's Design Section with the following results:

(1) All three non-return valves leaking.

(2) One valve had a defective join between the valve body and the valve seat, leaving a space through which a certain amount of ambient atmosphere could be inhaled.

(3) The cannister was found to be improperly filled, granules having "bridged" across the filling orifice giving a false impression that it was full.

Unfortunately the records of the 1947 dives did not include the number of the "Novus" set used. It was obvious however that a set in the state of this defective one would allow sufficient $C.O._2$ to accumulate to cause a serious reduction in oxygen tolerance.

It was obvious that there were too many vulnerable points in this set when defects could occur, in addition to this complaints of "hot breathing" and undue resistance had been received from time to time. A re-design of this set appeared essential.

The second series of trials to cover stage (b) were designed to determine the $C.O._2$ content of the S.D.C. during typical deep diving routines. For this purpose it was decided to simulate the conditions where the two divers had become unconscious through oxygen poisoning.

The trials gave the following results:—

Stage at which sample was taken	*First Dive*	*Second Dive*
Just before diver entered chamber.	Time, 26½ mins. $C.O._2$ 1.13 p.c. (Chamber at 130 ft.)	Time, 42 mins. $C.O._2$ 1.6 p.c. (Chamber at 90 ft.)
Diver in chamber, lower door closed.	Time, 36½ mins. $C.O._2$ 1.23 p.m.	Time, 49 mins. $C.O._2$ 2.57 p.c.
Air stops completed diver about to start breathing O_2	Time, 61 mins. $C.O._2$ 1.86 p.c.	Time, 63½ mins. $C.O._2$ 3.10 p.m.

These results were significant. They showed that a serious rise in the C.O.2 content could occur and that a diver could be brea... 3% or more $CO._2$. The S.D.C. procedure obviously required amending to obviate this possibility.

There now remained the question of stage (a), the ascent to the first stop. To take samples during the diver's ascent was difficult and during the winter the depth of the water was not available. The cure for any possible build up was simple, namely to haul the diver to the surface whilst maintaining adequate ventilation through the helmet.

These trials covered the period of ascent, there now only remained the case of the diver becoming unconscious on the bottom. The possibility of helium diffusion through the air pipe giving a higher percentage of oxygen at the diver. From these trials it was calculated that the diver actually received 20.5/79.5$O._2$/HE mixture when supplied with 20/80. No largely disproportionate loss of helium through diffusion is likely to have taken place during the dive.

There now only remained the question of an undetected $C.O._2$ accumulation due to the defective functioning of the injector system.

A specimen cannister and injector assembly was tested in the laboratory in *Vernon*— the apparatus was set up so that a mixture of 5% $C.O._2$ in air could be supplied to the cannister. Rates of flow of the gas through the injector and through the diver's helmet were measured while samples of gas were taken as it emerged from the cannister.

The results showed a most variable performance. Not only did the rates of flow vary according to no recognisable law, but the C.O.2 content of the samples varied from minute to minute. Other cannisters gave similar results although some gave good performances.

Tests under pressure equivalent to 300 feet, gave satisfactory results and showed that pressure did not affect the performance.

Examination of the cannisters and injectors showed that the injector systems were, in some cases, fouled by corrosion and others were out of adjustment. When all had been thoroughly cleaned and adjusted they gave faultless performances.

The injectors, however, were found to be of a design whose performance was liable to be upset by corrosion, soda lime, dust, or other foreign matter. To obviate this, a re-designed injector system was required.

During these trials it was found that cannister itself could be left incompletely filled although it appeared to be full. Owing to the deep narrow shape of the cannister, a considerable amount of care was required in packing When improperly packed, the C.O.$_2$ content of the "purified" gas rose. It was clear, therefore, that these also required re-designing.

The foregoing trials left the following work to be completed before the next helium dives could be carried out.

(1) A re-designed Novus Breathing Apparatus for use during oxygen decompression.

(2) A re-designed injector and venturi system giving a steady performance.

(3) A re-designed C.O.$_2$ absorbent cannister to prevent "chanelling" of gases through the absorbent.

In addition to this a new "drill" for deep diving to reduce the C.O.$_2$ effect during the ascent up to the time of "breathing O.$_2$" was essential.

Much had been learned during this winter and the next period for Oxy Helium diving was anticipated with great enthusiasm.
(Part 5.—The commissioning of H.M.S. *Reclaim*, will be included in the next issue).

TRIBULATION

To Haslar he was taken
Chads was very very sick
If the Doc. was not mistaken
It was pressure did the trick.

For Chads there was no joking
As miserable sin
The Doctor said, "No smoking",
"No beer, No rum, No gin."

We hear the glooms now lifted
The four ounce pipe's aglow
And having noggin shifted
Will tell of feats below.

JOHNNO'S STORY

Job was to clear away an obstruction to the outlet valve of a small town reservoir (I will reapeat that, a small town reservoir). This was run by the town councillors, who were responsible to the ratepayers, maybe 200, probably less, but, owing to the depression (year 1931) the ratepayers were well in arrears, and the Council coffers at a low ebb. Over a long distance telephone I was engaged to clear away the outlet valve, and duly arrived on the scene, to be met by seven worthy members of the Town Council, headed by the Mayor, "Joe Bung," the publican, who introduced me to the rest of the "gang." "Joe" explained the financial position, and in order to lessen costs of labour, the "Councillors" had volunteered to be the diver's crew.

Let me go through the list. (1) "Joe Bung," Mayor, I've dealt with; (2) "Jimmy," had a newsagency, blotting paper, and writing paper, besides jotting down "news items" of interest; (3) "George," was the town butcher, big, burly, and good fun; (4) and (5) Two farmers, whose names I've forgotten; (6) "Joe," was a fisherman with a peg leg. Last, was Mr. X—he was tall and very austere, long nose, with a permanent drip, thick pepple glasses behind which two beady eyes penetrated one's inners. He spoke slowly, from deep down (basso profoundo). Now you have the diver's crew.

I detailed each one to his job. The two farmers took over pump. "Joe Bung," the publican, was "Foreman of Works"—he looked the part. Jimmy of the "Newsagency" ably assisted by his wife, wrote up the story, "How we cleared the outlet valve." George, town butcher, assisted with air pipe, and breast rope. Mr. X was "diver's tender," as the rest had turned the job down "owing to the responsibility!!!"

Dressing the diver, Mr. X found quite a job—he really swore when it came to the corselet. His long thin fingers and manicured nails were hardly the thing. However, we managed to talk "town topics" during the dressing. I asked him if his mates had the "stranglehold" on the town's business, what happens to the business while they're all down here? "It was agreed by one and all," he said, "that we close our shops and attend to the diver."

"Your shop closed, too, Mr. X?" I said. "Well, yes! That is, for this morning. I have a funeral this afternoon. You see, I'm the undertaker!!! Makes me own caskets, too. Beautifully mounted with real brass handles. Lovely hearse I have too!!! How do you screw this gadget on?" This gadget was the face glass, and as it was screwed home, I gazed on the long thin nose and beady eyes. I dropped to the reservoir bottom, 12 feet down.

Undertaker, eh! And makes me own caskets, too! I got that valve cleared in double quick time. Didn't wait to decompress either!! Payment! Well, I suppose this comes under the heading of "diver's rewards." Between them they collected 27 bob. In addition, two dozen whiting, four free beers, plus a string of beef sausages, "Fair enough for depression time." Since, I've often thought of Mr. X with his "beautiful hearse, at reasonable prices."

J. E. JOHNSTONE

LETTER TO THE EDITOR

1212, L.A.C., A.St. S. Smith-Field
No. 1 Recruiting Unit,
Leicester Square,
9-2-54.

Dear Sir or Madam,

As the brother of Algernon Eustace Smith-Field I can say that the serial story which started in Vol. 2 No. 1 of your wizard magazine was a damned fine show. I had a letter from the mater, and both she and the pater were frightfully bucked that at last the name of Smith-Field, for some reason always associated with meat and markets, had risen again to its rightful place of honour. The mater asked me to write this letter to you, and she suggested that it would help you a great deal if I disclosed some of our marvellous history, particularly the more printable parts of Algy's. So I had a look in all the cupboards and rattled out a few of the jolly old skeletons.

Our family is as old as the story of the chicken crossing the road, and it starts way back in the days when knights were bold and the current song hit of the day was " Armour, Armour, Armour." Rescuing damsels in distress was the only thing for a gentleman to do, and the first Smith-Field (then plain Hamish Smith) was very proficient in the art for he had a weakness for the gentle sex—a weakness which, thank goodness, has survived to this day. Hamish, known to his swordbearer and to all the local halberdiers as " Ham," was a man of upright character, standing six feet two in his chain-mailed feet, and damsel rescuing was a piece of cake to him (you must remember that this was a very mad era). That was how he met his future spouse, Charlotte Field. The story is a very romantic one. " Ham " had fallen foul of the Lord of the Manor, having struck him below the doublet during a bout of quarterstaff, and was languishing in the castle dungeon, passing the hours writing rude words on the walls, which proved him to be far in advance of his time. Charlotte was the Lord of the Manor's daughter, and besides taking his mail out she smuggled his mail in, so he was able to bludgeon the jailer and flee with the maiden at his saddle bow. That's how our line began. Having followed the fortunes of England in every war and tournament, the Smith-Field earned well of the state, and for distinguished service were given a prefabricated castle by King John and a pension of two pound three shillings and a penny farthing, besides the right to peddle coupon-free steel waistcoats to all the castles in England.

The next Smith-Field was a queer mixture in that he had a decided weakness for music and the dance, so that he always had a minstrel by his side to help him try out all the latest steps, particularly those of the dance which had been suggested to him by the night watchman called " One of the clock jump." This was a pastime he was always harping

on, and he soon perfected a new dance which was adopted by the Court, and which became so popular that the Queen became known to her faithful subjects as Waltzing Matilda. When Henry the Eighth came to the throne the fortunes of the Smith-Fields came once more to the fore, and after only a short while a new mansion was given to the family. However, there was some difference of opinion over the name to be given to this new family seat, Henry being at the bottom of it, as he said it should be called " Henry Hall," while the family banned such a name and favoured " Knight's Castle." The King, however, managed to head them off in the same way that he had done Anne Boleyn, and his final word was that it must be " Henry Hall " or nothing at all. The acquisition of a new mansion gave much more polish to the family, and Smith-Field became a very well-known name at Court, and the added fact that all bearers of this name were exceedingly shapely gave them a leg up in the quest of royal favour. And so we find that Queen Elizabeth owed her dignity to Fitswilliam Smith-Field when she once was about to step from her carriage; it seems that she had to navigate a large puddle, and would have undoubtedly put her foot in it had not Fitswilliam rallied to her aid by throwing the cloak over the mud with a cry of " Step on it, lady," and allowed her to pass on, which she did a few years later, and King James came to the throne.

Joe, a double fisted he-man,

After this the family history becomes more involved, and as I would have you read only the full story of our rise to eminence I must find more details to help you in your study, and this I can do by looking at the family bible and by sorting through the ponderous records of the local sessions, and these records are quite a size I can tell you. So I shall be writing you again next quarter with more pages from the history of the Smith-Fields.

Bung ho for the present then, old man.

Yours ever,

ALOYSIUS ST. SWITHIN SMITH-FIELD

JOE

Though he was a Leading Seaman,
Refused to take a long term view
So he took employment at the Zoo—
Yet re-engagement meant for Joe
The certainty of Chief P.O.

His widow now regrets her guile—
If Joe had not been so docile
There would be no delighted smile
As now worn by the crocodile—
Nor would the keeper have recourse
To treat the brute with apple sauce.

H.G.M.

THE MORNING AFTER THE NIGHT BEFORE

EPISODE 2.—Sarc Son of Satyr

" Algy pursued and the plot unfolds "

In Vol. 2 No. 1 we left Algy, after his encounter with Julia Pembroke during his morning stroll in Hyde Park, waving for a taxi, profoundly disturbed about something. He was lost in the post for No. 2, but now read on for the reason for Algy's discomfort.

Julia was surprised, her pekingese disappointed, for it was most unusual for males to leave so hastily when in her presence, and she was determined to find out the reason why. She had been attracted to this tall, elegant and expensive gentleman, and had already forgiven him for his rather forward behaviour at the " White Lady " the night before, which her worldly wisdom put to imbibing just a little too much ginger wine.

" Algy couldn't live anywhere else but the Dorchester, could he Toots?" The peke made no answer to this question, and it was not repeated. Toots was labouring under thwarted passion for Algy's boot had caught him a glancing blow on the left ear and he was not in his most communicative mood.

" Taxi," and being such a fair young maiden even the most hardened cabby was seduced into stopping. Three cabs pulled up simultaneously. Julia chose the oldest looking of the three—" Dorchester, please," and our Julia was in hot pursuit of this fascinating Algernon.

By this time Algy had reached his hotel suite and was sunk into one of those all-embracing lounge chairs and was awaiting the arrival of a double Scotch, finally brought to him by his faithful manservant James, a man of great discretion, who had seen many of the wild oats sown by his young master and was never shocked by anything that came to pass, whether it wore a dress or came out of a bottle. " Julia Pembroke " muttered Algy to himself. " What, another one?" said James, quietly addressing himself to the whisky bottle, noting with a practised eye the amount left in.

Then Algy remembered where he had seen the name. The *Daily Mirror,* perused by Algy in his more leisured moments, had carried a headline a few days ago—" BANKER'S DAUGHTER RETURNS FROM SOUTH AFRICA. JULIA PEMBROKE SEES LONDON FOR FIRST TIME." Algy let out a distinctly worried " Strewth " and this from Algy carried a wealth of importance.

The Smith-Field family had for a long time dabbled in the Stock Market. Algy's father, Murgatroyd Smith-Field had achieved a certain success, and by an intimate knowledge of racing had managed to supplement his wealth to a considerable degree. Algy, possessing not quite such an intimate knowledge of racing, was in the process of giving the

money back again. Algy always countered his father's attacks with " Sorry, pater, but it can't go on," and Murgatroyd was bound to agree. It wasn't this that was worrying Algy. The family's biggest rivals on the Stock Exchange happened to be Pembroke and Chatham, co-partners in the banking racket, and engaged at the moment in a deadly set-to with the Smith-Fields; and rumour has it that even the rival office boys had declared open warfare. Such a breach in the Office Boys' usually united Union was practically unheard of, and the City was agog with excitement.

It is no wonder then, that Algy worried. Here he was, extremely attracted to this young breath of Spring (his imagination was quickly at work), and she, by all family standards, was taboo, and whatever else happened it grieved him to find himself consorting with one of the hereditary enemy. Something else was also bothering Algy. A certain Hilary Chatham, son of the lesser half of Pembroke and Chatham, was, according to the scandalmongers (who were usually right), confidently expected to announce his engagement to Miss Pembroke within a few months, and this meant that it was an odds on chance that this tragedy would come to pass.

The bell purred softly, and the ever wakeful James glided softly towards the door of the suite. Trinnnnnnng, went the bell again, and James muttered something unintelligible under his breath as he was apt to do on such occasions.

" Is Mr. Algernon Smith-Field in," said a voice, and James, used to saying such things, concurred, " Won't you come in?" But by this time Julia had established a firm bridgehead in No. 504.

A quite perceptible groan came from Algy at James' last remark, " Has the lion come as well?" and with that Toots gave a delighted growl and made the proverbial bee-line for Algy.

" Oh, God, what have I done to deserve this?"—then immediately reconsidered his remark when he gazed once more upon the beautiful apparition that stood before him.

The plot unfolds and thickens, too. Pembroke and Chatham sound very grim to us, and very, very crooked. And so we leave Julia in Algy's flat for another quarter (a whole quarter—you lucky people).

ROUND THE SCHOOLS UNITS AND TEAMS

CHATHAM

Despite a certain amount of misgiving from the wise men of the east, who really prefer to emulate the three wise monkeys, we have at last felt the sting of Mr. Dodd's Cat 'O Nine Tails and so must give voice.

The highlight of the season, or should it be the lowlight, was the visit of H.M.S. *Reclaim* in December. Needless to say we took them along to our divers' pub, " The Five Bells." Unfortunately the majority were unable to give five bells on completion of their serious work of the evening. They are still waiting for four pulls to surface.

We also played *Reclaim* at soccer, but by foul and devious means, they succeeded in locking our best players in their pot until the game had begun. All ended well, however, as it was found that the teams were playing on the wrong ground, and it ended in a draw.

Mr. Rea has now joined the staff and there has been a noted sales boost in the R.M.S. shop. Three real mines in six days!!! He now understands the Yorkshire saying " If tha does owt for nowt, do it for tha sen," after trying to scrounge a carthorse which had done an R.M.S. course.

C.P.O. Hall has flown out to Malta to join " Forth " to relieve P.O. O'Connor.

It is reputed that underwater swimmers are now doing the majority of their training in German waters and there has been a noted trend towards square heads as opposed to the usual 3420, hooded fashion, normally in vogue.

Mr. Dodds' rehabilitation scheme is in full swing and the school completely surrounded by piles of bricks which will eventually, we hope, be transformed into four new lecture rooms. J.R.

FAR EAST C.D. TEAM

Since we last wrote we have had nearly a complete change of team members. A.B. Chaplain, Sayer and Alderton joining. We say cheerio to Ben Claxton next month, who is U.K. bound without relief, though no doubt we shall be having his replacement in the near future. We had quite a farewell party for David and spent quite an enjoyable evening just scuppering " San Migs " and whisky.

The new team members are fitting quite well into our routine, and we have had quite a number of night frog attacks to test them out, and I am very pleased to say that they are fitting in quite well. We are also hard at work doing a Hong Kong port survey of the different

bottoms (no remarks), and we are progressing very well. At the moment we are busy cleaning up the school and M.F.V. for C.-in-C.'s inspection, which takes place next month.

Our new speedster, A.B. Davy, was overtaken recently by a H.K. policeman whilst putting his new Triumph through its paces. He was duly informed that $55 would cover the charge, so now his cycle is just that much more expensive.

P.O. Butler's wife arrived here a couple of weeks ago, on the *Orwell*, so now he is treading the straight and narrow (not that he did not tread it before his wife arrived).

We offer our congratulations to L/S. Larkin on his engagement, and hope he stays sober long enough to get married.

We should have quite a number of L/S. in the near future. Davy, Chaplin, Alderton and Sayer all took the board yesterday, and are quite optimistic on the outcome (I wonder???).

We wish to thank all C.D. teams for their Christmas cards and good wishes, and in turn hope they received ours. That's the lot for now so all the best from us here to you there. " BUTS "

CLEARWATER

After stagnating in the [illegible] year, Old Faithfull was brought to life once more in September. Under Mr. Walker, Cd. Bos'n. Q.D.D. (newly arrived from *Reclaim*) the crew really got down to making her taught—tight—and tasty.

In spite of heavy diving and sea time, the team yet managed to give *Clearwater* a thorough overhaul and clean up. So much so that on being inspected by the Captain H.M.S. *Vernon* in October, he stated that *Clearwater* would most probably be used as his cruise yacht in the coming summer.

All credit is due to the following, who I feel should be named, each having worked unstintedly to give the vessel her present smart appearance, and to maintain operating efficiency. C.P.O. Marsh, P.O. Bonham, P.O. Tappin, L/S. Frost, Tomkins, Clayton, Salter, and A.B.s Davies, Boardman and L/S.M. Adshead deserve special mention in the latter respect.

A hatch falling on the Buffer's hand almost severing three fingers placed him in hospital for a spell. We are all glad to see Tapp's practically back in harness again.

Frost, Davies and Adshead are all on draft, with Tomkins " retiring " from the " active " way of life.

Obviously this year will see new faces in *Clearwater*. Best wishes to all, and remember, Keep a Level Cranium.

Should your suit be somewhat porous, and your brasses not fit tight,
With your outlet valve all heedless to your touch,
When your lines are fouled up somewhere and you don't know left from right,
The texture of the mud you find too much,
Then do not feel forsaken, and view everything with dread,
Or break out in a sweat with fear or fright.
Just pause awhile, and think my son, remember do not panic
For it's *most* essential surely, that you—Keep a Level Head.

HOOKY

C.D. TRIALS TEAM

As some of you probably know, P.O. McKinley has left us and has at last been sent out East (yes, Eastney Fort Cumberland) to take over the A.S.R.M. team, relieved by C.P.O. (which lucky girl will be with me tonight?) Fawcett.

The team now numbers seven in all, under the Command of Commander L. K. P. Crabbe, G.M., O.B.E., and believe me there is never a dull moment. We have two Casanova's and a comedian, between them all life never gets tedious.

We have been kept busy with experiments and tests of various kinds and we feel that some of the finished articles will be welcomed by all divers, when they are received in service.

On behalf of the team, " Best wishes to all in 1954."

BUNGY

[Congratulations to C.P.O. Fawcett on his award of the British Empire Medal.—Editor]

H.M.S. ANNET

Not wishing to utter any little burbles about water under bridges, we'll crack off and say quite a lot has happened since we last pushed a screed through. Some months ago we were fortunate or unfortunate enough (divided opinion) to secure alongside *Deepwater* for a week. There we fell under the eagle eye of the " Big White Chief " ? ably assisted by C.P.O. " Nick " Carter, who quite definitely showed us that we were not the divers we thought we were. Anyway we survived it, thanks to Leading Seaman " Snort " Norman and Aqua Flavine. Thanks also to all " Dip-Chicks " in *Vernon*, who could not have been more helpful. One small point, we hope that those who met us had the popular belief that we're a " Hell-Ship " dispelled.

From " Pompey " we made our way back to the London river, and the weary grind. Here we were visited by all available " Brass " and a lot of fog! The C.-in-C. Nore paid us an official visit. The Admiral, we are glad to say, had a keen and almost unusual interest in divers and an equally tolerant ear for the quacking of " Dip-Chicks."

We have been fortunate enough to be presented with the Charles Lott Efficiency Award for some hard graft at Harwich. Coming back to Chatham we were faced with more than a desperate situation—C.-in-C.'s inspection. The question of how to make a little coal burner look like a warship or at least a near approach, our spirits not being raised by the sight of the " Gilded Ladies " secured alongside in the dockyard basin. However, at the expense of the First Lieutenant's temper, untold quantities of " Pusser's Grey " and sailors' resignations we came through. Two more weeks up the river and back to Chatham for leave.

Latterly, we have welcomed to the fold two more poor unfortunates, A.B.s Kernick and Wright. " Shiner " is already showing the traditional " Ham-Handedness " of all good " Steam-Divers."

Under the fatherly eye of Mr. " Mac " we remain not a bad bunch, any time you are near, come aboard. *Nuff said.* J.G.I.

H.M.S. RECLAIM

One dark day in November, P.O. Johnny Bull came aboard and brought with him his Bell. We all said quite a few scathing remarks about taking it away, but no, he jovially insisted on staying. Then off we went to the wilds of Scotland. First to Rothesay (where we found C.P.O. " Ginger " Bryant, who came aboard to find if we had anything he could use, but with P.O. " Spiro " Collar as storekeeper, " he'd had it.").

From there we were escorted by H.M. Submarine *Seraph* to Campbelltown. After several sessions of dashing out and back in, we eventually secured over *Seraph*. Once the divers found the sub. we started the operation of using the Bell—this was a success. In this trial we carried out the first underwater mail delivery.

On completion we went to Greenock, where Mr. Gordon and his right-hand man (Johnny Bull) left the ship. Yes! They forgot to take the Bell with them.

From here we went to visit our friends at Chatham, passing the Isle of Wight with the ship's side crowded with Pompey natives dolefully gazing shorewards. Our last night at Chats was enjoyed by all divers at a party organised by the Chatham chaps at the Five Bells. A grand time was had by all, but—Oh! Dear! Next day, at sea!

Best wishes from us all.

P.O. BRADY

H.M.S. UPLIFTER

Season—May, 1953, to December, 1953

On completion of the refit and the floods, the *Uplifter* lay off Cornwallis jetty at No. 27 buoy. The work in hand was the raising of Caisson 1873, in which the ship played no active part. The diving boat

proceeded to Stangate creek with the three divers who went ahead with the job of stopping up the tidal flat holes. There were eighteen holes in all, eight one side and ten the other. Once the patches were in place, bolts cut off, and having been assured there were no further holes, the Caisson was ready for pumping.

Four pumps were placed down the manhole, one 4in., two 6in., and one 8in. Unfortunately these were unable to discharge to their utmost owing to a bad suction lead. Nevertheless, a workable discharge was obtained. However, in spite of our efforts it soon became apparent that no impression at all was being made, and in view of our impending part in the Fleet Review at Spithead the operation was postponed.

The next job was the raising of Portsmouth lifting craft 17. The ships' divers having no work to do on this occasion as the Portsmouth Admiralty salvage party carried out the underwater work. With the aid of the floating crane the lift took about three hours.

Our next task was the cutting up of an L.C.T. at Stokes Bay. With the aid of the P.A.S.P. we started cutting it into three sections, using oxy-arc. After working on this job for two weeks we were called away to Studland Bay, Dorset. The job here was the recovery of scrap metal and engine castings from the s.s. *Soona,* mainly non-ferrous metals, copper, brass, etc. This took us into September when we moved to Portland. Our first job here was the removal of piles from the old coaling pier. These were extracted by taking two turns with a 5in. strop, which was shackled in turn to the main 100-ton deck purchase, after removing eight piles we came to an obstacle — the remaining piles were secured to the jetty by " H " beams. To free these involved the shipwright surface burning and the divers burning below the surface, so the job was completed. Director of Boom Defence and Marine Salvage came aboard at the finish and complimented us on the work. The next job, clearing up under the 20-ton crane on B.D.O.'s jetty, employed us for a few more days.

We next went out into Weymouth Bay trying to locate lost Bombardons. Having no success we returned to harbour, only to be called out again to try and recover the anchor and cable of F.C.13, but the rocky bottom made it rather difficult; so after four hours diving we had to give it up as a bad job, although conditions were first class diving in 15 ft. of water with more or less unlimited visibility. The rocky bottom made a submarine fairyland, which around these coasts would seem impossible.

The next job seemed at first to have no connection with diving at all—however, we were soon proved wrong. We were to go back to the Bay and lift what appeared to be a solitary 2nd class buoy and mooring. After lifting the buoy followed by an endless supply of clumps, mushroom anchors and cable, we parted the cable. On sending a diver down to survey we found not another anchor but one of the lost Bombardons. The operation of lifting this was comparatively easy.

A 7in. strop was shackled to one of the mooring rings at the end of the bombardon, which was then lifted off the bottom at one end with the deck purchase, then a 4½in. messenger wire was passed under the same end. This brought a 9in. lifting strop through. The lifting strop was taken from the purchase on deck, through the lower sheave of the horns, under the wreck, back over the upper sheave and secured to the purchase. The weight was then taken on the main lifting strop, and another was rove in exactly the same manner at the other end. We then lifted and took the whole lot to the seaplane slip, Portland, where we had to cut it up into three, and take it piece by piece to the 20-ton crane.

We returned to Sheerness on the 9th of December for a refit, so concluding another salvage season. Here's hoping we have a better one in 1954.

THE DIVERS, H.M.S. *Uplifter.*

NOTE.—A *Bombardon* is a large crucifix built in watertight sections 190 feet across the arm and 90 feet fore and aft. Constructed so that it remains partly submerged. The idea was to tow a number of these across the channel on D Day, to break up the swell.

A.E.D.U. NOTES

Our last report, due to the indolence of the present writer, was taken as being represented by our Senior Experimental Officer's account " From the Depths to the Heights." We hope you will enjoy his second instalment of our small but proud association with the 1953 Everest Expedition when it appears in the next issue, but we feel that we should also give you our more general news items.

There have been some changes in staff since last going to press. Mr. Cole has left for other spheres and has been replaced by our Clerical Officer, Miss Barnett. Mr. May, after a considerable amount of advice on service life, has left to do his National Service in the R.A.F. Doubtless he wishes to pursue the " supersonic reducer " through the sound barrier. Mr. May's relief is expected to receive his initiation into mysteries of dead space, recirculation and the art of breathing in the near future. Mr. Hayward and Mr. Rogers joined the workshop staff as Lab. Mechanic and Labourer respectively. Lt. Border is in the process of taking over deputy S. of D. but is having considerable difficulty in levering the present holder of this title out of the chair.

We note with relish the construction of the *Vernon* piggery. The close proximity of the piggery has led us to consider providing nose clips for the staff and has also encouraged some speculation as to what role the inhabitants might play in experimental trials of breathing apparatus, they would for instance, if sufficiently youthful, provide a very good trials team for the Built-in Breathing System for submarines.

Our main projects are coming along very well apart from interuptions occasioned by athletic gentlemen pursuing various shaped air filled leather objects on the soccer pitch. To date our windows have remained intact but the situation became fraught with danger at the period of the *Vernon—Excellent* Olympiad, particularly as one of our staff was participating, complete with bowler hat, wing collar, bow tie, cricket pads, and as a tribute to the game being played, football boots.

The new M.R.S. has advanced to the final prototype stage and is now available for prototype acceptance trials. We have been through a most interesting period with this apparatus in the last few months having given it " dry " maximum endurance trials at R.N.P.L., " wet " compression chamber trials at Messrs. Siebe Gorman & Co.'s works at Tolworth and sea trials from H.M.S. *Reclaim*. The experimental trials at R.N.P.L. produced a paralysis (necessitating a 24 hour soak) and a bend amongst the civilian personnel but left the divers with no doubts about the efficiency of the outfit which was most encouraging.

The " wet " pot trials at Siebe's confirmed our earlier hopes of the set and saw us doing a maximum sustained work rate of 1,000 ft./lbs. min. without experiencing $C.O._2$ or other symptoms. We spent some three weeks at Siebes and a very pleasant time was had by all. The

firm gave every assistance and nothing was too much trouble if it was likely to help us in any way, even the stand-easy tea boat was laid on and George Hayward's advice on how to do the pools has resulted in a substantial win which was previously unheard of.

Sea experimental trials were carried out from H.M.S. *Reclaim* at Falmouth by the U.C.W.E. trials team who also carried out the majority of the trials at Siebes. These trials served to show that the outfit is a vast improvement on the existing M.R.S. and copes adequately with the purpose for which it was designed. Most valuable experience has been gained throughout the various trials and adjustments and modifications made as a result.

Another session at Siebes, found us doing wet pot trials to test the C.D.B.A. fitted with a constant mass reducer. Apart from a filtering snag in the reducer, which has now been remedied, these trials were also very successful.

The Submarine Escape Breathing Apparatus has also been brought to the final prototype stage and has recently been put through its paces by the submariners who appear well satisfied with its performance.

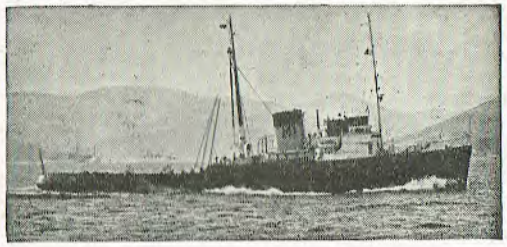
We are now looking forward to receiving an experimental model of the Compressed Air Breathing Apparatus which is being progressed for Damage Control Use and Shallow Water Diving. In its later application we are aiming at an endurance of forty minutes at forty feet.

The new Observation Chamber is awaiting test at the Naval Construction Research Establishment, prior to fitting out.

Other projects are in a somewhat fluid state at the moment and will be commented on in later issues when it is hoped they will have progressed to a more tangible stage of development.

DUNLOP—*Pioneers of Streamlined form fitting underwater* **SWIM SUITS**

DUNLOP SPECIAL PRODUCTS LTD., FORT DUNLOP, BIRMINGHAM 24



MOTOR RESCUE TUG "BUSTLER" 1100 TONS 4000 I.H.P.

METAL INDUSTRIES

(SALVAGE) LTD.

SALVORS & TOWAGE CONTRACTORS

FASLANE PORT

In addition to the "Bustler" the Company's Fleet includes

"SALVEDA"	781 tons	1200 I.H.P.
"METINDA III"	593 tons	1275 I.H.P.

"LYNESS" and "WHIRLPOOL"
Coastal Salvage Vessels

All classes of Ocean and Coastal Towage undertaken on Day or Contract Terms

SHANDON • DUMBARTONSHIRE

Telephone (Day and Night): GARELOCHEAD 351 (3 lines)

London Agents: W. P. JOBSON & CO. LTD.