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# ROYAL NAVAL DIVING magazine

The Torrey Canyon (*see page 33*)

**Vol. 14 No. 2** **2/-**

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# Contents





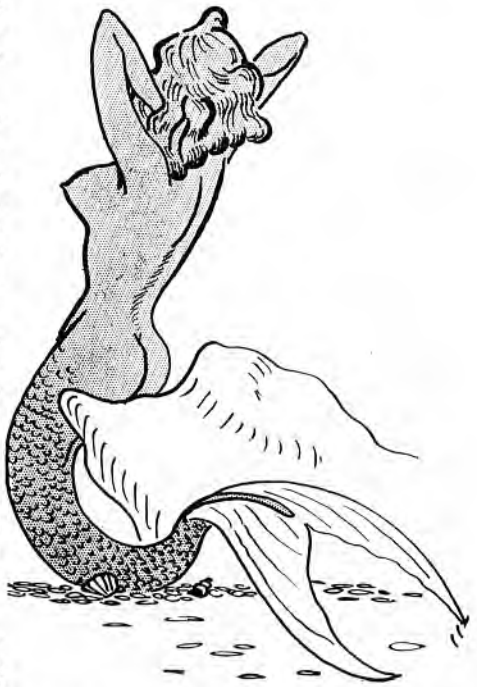
# R.N. Diving Magazine

Vol. 14 Summer 1967 No. 2



## EDITOR'S NOTES

PUBLISHING time rolls round once more and the Editor has his usual sore fingers from pounding a typewriter and a sore head from being pounded.



Lt. J. E. T. Baker, who was the Treasurer, has now moved on. Hardly a move, more of a mess change, as he has gone to the Diving School in H.M.S. *Drake*. Our new Treasurer is known to most of the regular inhabitants of the school, Lt. E. W. J. Smith, Q.D.D.

Contributions, which cannot be paid for as we are a non-profit-making organisation, seem to keep coming in from the same few. A flush of new blood would be very much appreciated and would help to rejuvenate the Magazine. Remember, it is YOUR Magazine, produced for, by, and on your behalf. If you have something to say, write it down, we will print it.

The Magazine does not exist entirely on its own sales and one of the methods of revenue is the sale of R.N. Diving Ties and Badges. The former in Blue or Maroon cost 15/- post free and the Badges are 30/- each, again post free.

The Magazine Office is trying once more to raise interest, from diving firms, in R.N. Divers who are leaving the service. If you are going outside shortly and need some assistance in finding a job, please write to this office. Conversely if you need divers for various tasks, again, contact this office, as we are in a good position to be able to put you in contact with professional divers. Ed.

# E.O.D., 1966

DURING 1966 the Royal Naval E.O.D. Units of Portsmouth, Devonport, Scotland, Portland, Malta and the Far East dealt with a variety of unexploded ordnance in their respective areas.

The Portsmouth Unit's area is bounded by the Wash in the east and Lyme Regis in the west. Having many public beaches in their domain, means that a high proportion of ordnance is quickly discovered. The list is too long to enumerate, but some of the articles dealt with were: 9 mines, 2 torpedoes, 43 bombs and about 600 other varied explosive objects.

Our Western Unit in Plymouth, who cover from Lyme Regis to Barrow-in-Furness, recovered many explosive objects. In fact, their list reads more like an armament store record book than a list of unexploded ordnance. In all about 400 incidents were recorded with many German and British bombs and mines. Even a cannon ball was dealt with!

From our frozen northern wastes, which is by far the largest E.O.D. area in U.K., encompassing as it does all the coast from Barrow-in-Furness to the Wash including the off-shore Islands, comes a tale of road weary travellers. In covering over 60,000 miles by road alone, to many incidents, they have a list of over 1,000 explosive items including: 25 mines, 18 bombs, 4 torpedoes and many others. It is amazing, the seemingly inaccessible places, where people find unexploded ordnance.

Of our sun-bathed counterparts in foreign lands, those in Malta have the whole of the Mediterranean as their domain. In having this area they collect more of a variety in the way of nationality's than other units. To mention a few, they had: 14 German, 5 Italian, 19 British in their total, with many other smaller pyrotechnics and small arms ammunition.

Singapore conjures up visions of eastern splendour, but to the E.O.D. Unit, it is a continuous headache, in that most of the incidents are located in mangrove swamps and due to the heat are in a most dangerous state. The distrubance with Indonesia brought the added complication of home-made bombs, which, because of their inherent simplicity, are liable to explode if one looks at them in an apprehensive manner.

When the list is added up it makes an impressive total, more so when the number of personnel in an E.O.D. Unit is taken into consideration. Six men, is the make-up of a unit, 1 Officer, 1 C.D.1 and 4 C.D.2's. They have a continuous slog day in, day out. The added duties of Port Clearance Diving Team are not calculated to give them much spare time.

To give some idea of the jobs carried out by the E.O.D. Units, two are now described.

The Scottish Unit were called upon to search Coniston Water, after the disintegration of *Bluebird*, for Donald Cambells body. They searched during the period of January 5th to 16th and found the wreckage at 142 feet. It was their opinion that the body disintegrated on impact with the water.

Malta was the site of the other incident. An Italian two-man torpedo was found and disposed of in deep water. In conversation with Italian Divers at a later date, this particular job came up. Later checking, found the torpedo to be of a rare type, which was piloted by Lt. Di Vassallo Francesca Costa, now a Capitano, who after trying to enter Grand Harbour finally entered Marsamxett and baled out of his machine when it failed, but set it to destroy. Although the mechanism worked, it did not blow up the warhead, which stayed exactly where it was, for 25 years.



# *Royal Navy Bravery Awards*

AWARD'S of Queen's commendations for brave conduct by two Royal Navy Clearance Divers were announced in recognition of their great skill and courage when removing a highly dangerous German bomb from the River Avon a few hundred yards from the city centre of Bristol on 1st April 1966.

The divers were Chief Petty Officer William Charles Witherall, aged 35, of Kennel Hill Close, Plympton, Devon and Leading Seaman James Thomas Fielding, aged 27, of Lansdowne Road, Birkenhead, Cheshire. Leading Seaman Fielding has since left the Navy.

The citation states that Chief Petty Officer Witheral accomplished an 'especially hazardous mission' when 'with exceptional presence of mind, clear thinking and great courage, he moved and destroyed a highly dangerous 250Kg German explosive bomb from the River Avon a few hundred yards from the centre of the city'.

'Had C.P.O. Witheral made a wrong decision or had he been in the least hesitant in his actions, it is quite likely that considerable damage to property and loss of life would have resulted', the citation adds.

The citation for Leading Seaman Fielding states that he assisted in the removal of the bomb from the mud in the river bed, and destruction of the bomb, working under the orders of C.P.O. Witheral.

'Throughout this task, Leading Seaman Fielding, fully aware of the potential dangers, worked with great skill and courage', concluded the citation.

C.P.O. Witherall, who has spent 20 years in the Navy, is based at H.M.S. *Drake*, Devonport. He is married and has a 14 year old son. His mother lives at Birkdale Close, Fairways Estate, Newcastle-upon-Tyne.

Leading Seaman Fielding left the Navy after completing a nine-year engagement. He was based at Port Edgar, H.Q. of the Fishery Protection Squadron before becoming a clearance diver.

## GEORGE ROBBIE FUND

THE George Robbie Fund has now been closed and paid to Mrs. Robbie. A sum in excess of £200 was collected from all over the world.

Mrs. Robbie expresses her grateful thanks and said that the generosity of the divers who contributed was overwhelming.

The family were settled in a council house as soon as the local council heard of Mrs. Robbie's bereavement.

If any personal friends of Mrs. Robbie wish to write to her, the Magazine office will gladly supply her new address on request. ED.

# Caribbean Diving—H.M.S. *Zest*

REGULAR deliveries of the DIVING MAGAZINE and equally regular pleas from the Editor for more material prompts us to tell of our progress since leaving Plymouth in 1966. Our team of twelve consists of O.C.R.M. T.A.S.O., 3 Seamen, 3 M.E's and 4 Royal Marines so a nice balance is struck.

We were all very keen to get into the reputedly warm and clear water as soon as possible. Our first chance was in Bermuda during October, but this was something of a disappointment as the water was not at all warm and the visibility on that occasion was similar to Haslar Creek. Soon afterwards however, the warm clear Bahamian Seas fullfilled every expectation and gave us all we wished for — except fish.

Perhaps our luck will change but after starting off thinking that sharks and other monsters would converge on us as soon as we entered the water, we are now at a stage when it is quite an event if anything of over 2 feet in length is sighted. The very few shark sightings have so far been from the ship or boats. The barracuda have, although being small, confirmed their reputation for inquisitiveness but so far have not tried to use us as a meal. Moray eels are quite common, but apart from opening their mouths to show us a wonderful set of teeth as we swim by, do not seem to take any other aggressive action. Crayfish are good news, when we can find them, but a different technique to the one at home on lobsters is required. The crayfish seem to move more quickly and a 2 foot length of cane with a good sized fish hook siezed to the end has proved a handy tool to extract them from their lairs.

Our one fishing accident occured when a sting ray was in the process of being boated, it sunk its sting 1½ inches into the knuckle of one of the Royal Marine Divers. This proved to be extremely painful but the borrowed U.S. Diving Manual was most helpful in suggesting the correct treatment.

Please do not take the impression that fishing has taken up all our time, it is just that it is a most interesting subject on which to write.

One job to which we were called, was reported as an American Experimental Torpedo, 10 feet long, red nose, two propellors and washed up on a remote Bahamian Beach. However, when we saw it, it turned out to be a harmless sonar buoy. We were asked to widen a boat channel leading to a hurricane shelter at Tortola in the Virgin Isles. This we did with the help of a mortar bomb and a good number of one-pound charges. The difficulty was to check on the channel afterwards when the water was still murky. What we did was to fall the team in, in line abreast, and start them walking, when they had to swim we were on the edge of the channel. An attempt that failed, was to raise a ferry boat because of lack of flotation and time, but it provided some interesting experience for the team members. An interesting diversion, as well as good practice, was the job that entailed a two thousand pound bomb in 5 feet of water off Grand Bahamas Island. It was suspected that it was empty, and so, after catching all the crayfish that had made their home underneath it, we opened it up using plastic explosive. As we had suspected it was empty.

We recommend that anyone who comes out here in future should get a copy of the U.S. Diving Manual and form a liaison with the U.D.T. at Key West. Watch your spear guns, as they are illegal in many areas out here. Above all, if you see a shark underwater make the most of it, you may never see another.



# B.S.A.C. Liaison

THE good liaison that sprang up between the Royal Navy and the British Sub-Aqua Club many years ago, is continuing and goes from strength to strength.

During recent weeks I have attended two Sub-Aqua meetings, the first was the 1967 B.S.A.C. Annual General Meeting and also in the same weekend the first part of the National Underwater Instructors Association Examination that was held in a swimming pool in Blackpool.

Needless to say many and varied were the subjects that came up for consideration at the A.G.M. and I would like to mention some of them as they affect Royal Naval Divers as well as B.S.A.C. members. It was suggested that the Government be approached with a view to getting a British Standard of diving equipment as there is some equipment on and coming on to the market that is so greatly different as to be a danger. The 1st class examination is in the process of being re-written to get rid of some ambiguities that have crept in. The national diving coach reported that we (the R.N.) were carrying out trials with distress and recall markers and that the results would be circulated as soon as a decision was reached. He also said that if sufficient support was forthcoming then boat handling courses would be run. The chairman told the gathering that the argument between professional fishermen and sub-aquarists had been resolved to the point where the General Committee of the B.S.A.C. had passed a resolution prohibiting the taking of fish and shellfish for gain by B.S.A.C. members. This in no way stops the members from taking for their own consumption or even from applying for a licence as other fishermen do. It was also thought that if a better link between the local fishermen and the B.S.A.C. Clubs in their districts was wrought then a lot of bitterness and misunderstanding would very quickly disappear.

The clubs medical adviser, Dr. Betts, told the gathering that a divers card, which would be enclosed in hardened plastic, was at the printers and on it would be details of decompression and of chambers, also of their whereabouts and the routine to go through to get a person with decompression sickness to one.

A hotly debated subject was the question of individual clubs using a mixture of gases instead of air in their club diving. It was decided that as there was only a limited amount of knowledge available at club level this should not be done but a club could approach the central committee with a proposal if they thought they had a case to present for a particular occasion.

The feelings of the B.S.A.C's committee on members taking professional diving jobs in their spare time was sought and their reply was in the negative. One or two points about this did come to light however and they were that if a club tendered for a diving job then they would not be covered by the B.S.A.C. general policy and they would, if they got the job, come under the Factories Act and all that it implied. The committee did say there was no reason why, when asked, they should not go and recover minor objects but even so, they should not haggle about a price but should put any money given as a gift in the club funds.

The second meeting was the informative weekend given to the N.U.I.A. Candidates in Portsmouth. To begin they were given a lecture by Lt.-Cdr. Todd, the Officer in charge of the Submarine Escape Training Tower in

H.M.S. *Dolphin*, on submarine escape techniques and this was supplemented by a short demonstration from members of the tank crew. They then went on to R.N.P.L. where they undertook a narcosis test in the chamber at the Deep Trials Unit under the supervision of Lt.-Cdr. Filer. This was followed by a series of lectures given by Lt.-Cdr. Warner and Doctor Elliott which ironed out many misconceptions the candidates had on a variety of diving subjects.

Sunday morning was spent in H.M.S. *Vernon* first viewing the diving films and then discussing them with Lt. McLauchlan who afterwards supervised the afternoons' practical diving, in Naval equipment at Horsea Lake.

The majority of the candidates were from the north of England and all, after a thoroughly enjoyable weekend, left with a great deal of new knowledge spinning around in their heads. J.H.

# Farewell to H.M.S. *Miner III.*

'MINER III' paid off into Reserve, for sale or scrap, on the 13th March 1967 after twenty-seven years faithful service in the Royal Navy.

She was built by 'Phillips & Son, Dartmouth', launched in November 1939 and commissioned as one of twelve minelaying lighters in February 1940 — capable of laying twenty-six mines, thirteen either side through the stern doors, in home waters and also supplying and laying harbour defence cables.

During the war years, *Miner III* served around the coasts of our fortress island — like so many of her kind, little ships that pass in the night, and yet did so much to protect our shores and shipping lanes.

For one brief spell, 1949-50, *Miner III* did have a short rest in reserve, and eventually became a mining tender to H.M.S. *Vernon* in 1951.

In 1952 during a conversion to a diving tender part of her mining rails were removed but she was still able to carry and lay twelve mines, six from either side aft. She was also fitted with a light alloy compression chamber aft, the divers diving from for'ard. This was not successful for surface decompression due to the distance from the for'ard diving position to the chamber aft and also because of the deck hazards encountered, i.e. mining rails and deck fittings for leading blocks, etc. Therefore in 1954 her compression chamber was re-sited for'ard adjacent to the diving doors.

During her latter years she was employed mainly in the training of C.D's, in diving to 180 feet, at Falmouth where the conditions were ideal. So much time was spent at Falmouth that the harbour master, Captain McGregor, always referred to her as his personnal yacht.

She also took part in numerous N.A.T.O. minelaying and minesweeping exercises around the coast, and assisted in the sea training of S.D. officer candidates and juniors in her spare time.

Last October/November she carried out deep diving training at Tarbert, Loch Fynne with a class of C.D.1 (Q) to see if it was possible to train C.D's in the U.K. in winter should our other winter training areas became unavailable. This trip was highly successful proving that even in force 8—9 weather it was still possible to dive from a ship in the loch's of Scotland, because even

at these conditions the width of the loch did not allow the sea to build up enough to stop diving. The only drawback, of course, is getting to and from Scotland in the winter when the gales are very frequent. This was very evident as *Miner III* encountered a force 7—8 on the way north and a westerly force 12 on the return trip making a three-day passage into five days. *Miner III* was hove to in the middle of the Irish Sea, riding out a force 12 in the vicinity of H.M.S. *Russel* when she lost her top mast. H.M.S. *Hermes* who had been sent to find and assist *Miner III*, if necessary, lost life rafts from the side of her flight deck and had two boats damaged by the rough weather. But the only damage sustained by *Miner III* was a broken wheelhouse door and broken securing arrangements on one wheelhouse window proving that the builders made a very good job of her.

It is hoped that someone will buy *Miner III* since, although she is twenty-seven years old, the passage from Scotland proved that she is still very sea worthy in all respects. Of course, the main disadvantage is her maximum speed of only 9·5 knots and the difficulty of obtaining spares for the main engines which are still the original ones.

The role of deep diving training tender has been taken over by H.M.S. *Laleston*, whom we welcome to the fold. She is a coastal minesweeper who has had her minesweeping gear removed and replaced by the Compression chamber from *Miner III* which is fitted aft, the divers diving from special ladders and platforms on her stern. Like *Miner III* she has a dual role, that of diving tender, and also despatch vessel to the C.-in-C., Portsmouth.

We hope that *Laleston* will have as happy a commision with the divers as *Miner III*, and feel sure that she will be made as welcome at Falmouth by Captain McGregor and his staff.

E.W.J.S.

# Marine Biology

OFTEN in the summer months we hear of an invasion by jelly-fish and Portuguese Man-of-War to our beaches. A short description of one of them may help divers and swimmers to get to know them a little better. The Portuguese Man-of-War or Physalia Pelagica to give it its scientific name belongs to the Siphonophore order of the jelly-fish like animals.

It is not a single animal but a whole colony in which individual subjects do certain types of job. Some catch food, others digest it whilst others are in charge of producing the young.

The long tentacles are capable of changing their length from one to fifty feet. These tentacles contain thousands of microscopic stinging cells which have a very painful effect upon the unfortunate swimmer who brushes against them.

The Portuguese Man-of-War, is generally found in warm waters, in good summers however they have been known to invade the British Isles in their millions, causing a great deal of suffering.

J.W.



# Gastronomics — and the H.S.C.D.T.

I seem to recall once reading some correspondence from Mr. Nathaniel Gubbins to 'his TUM' appertaining to a certain lack of gastronomical regulation. Have you ever thought about the trials and tribulations of that portion of your anatomy when you wake up the morning after, with a mouth like a vultures armpit and a head like the other side of the Mersey Tunnel?

In fact, in the Home Station Clearance Diving Team this year, we have had occasions to consider this very serious subject with rather more detail than most divers. After all, most of us tend to regard the staff of life as that something that is wrapped around a lump of cheese or corned dog and washed down with copious quantities of ale, soup or coffee, depending on the hour of the day and the accessibility of the respective liquid. However when your travels take you away from *Vernon* victualling (or the wife's cooking, if you are one of the luxuriant R.A's) for more than the odd day or so some adequate sustenance is called for.

This year, so far, we have managed to achieve a certain amount of that mobility which is written into our brief. February saw the team flying out to Gibraltar to join the good ship *Reclaim* for some oxy-helium trials which were, unfortunately, cancelled due to the onset of troubles during the treatment of a serious bend (when one of our number found himself inside the pot for forty-five and a half hours because he was too near the door at the wrong time). The cramped conditions on board, caused by that bevy of extra imported talent, were somewhat relieved when we took over an M.F.V. from *Rooke* and utilized its accommodation. We did at least find some sunshine, and Mediterranean visibility. A gentle thrill occurred on our return to U.K. when the aircraft burst an undercarriage tyre whilst landing at Colerne.

March was a bit disappointing when three out of the four projected trips to Portland were cancelled at short notice. The Boss wracked his imagination and flogged us around Horsea Lake and Stokes Bay while one other member of the team decided that it was a propitious time to embark on the matrimonial stakes.

April saw the team out in the Persian Gulf where, after a pleasant interlude imbibing more sunshine and wallowing (nought to twenty style) in the swimming pool in *Jufair*, we boarded a *Shackleton* aircraft to fly to Kharg Island. After our previous encounter with flying machines, we were given a lot of confidence by the pilot when he told us that he had never landed under the conditions now being expected of him and that he had a marginal pay load. However, he made a perfect job and our faith in those who go up in the air in those machines was greatly restored. In Kharg, we lived with the Persians and the inner man got used to a diet of chapatis and jam for breakfast and a large plate of rice and something for the mid-day meal. In fact the natives gave way before we did (even if we did cheat and have Sunday dinner with the Army in their L.C.T. *Arezzo*).

Leave followed and then an excursion to Borkum (in case your geography is as weak as mine was — that is an island off the North coast of Germany). Here we found ourselves partaking of the numerous types of sausage, rye and wholemeal bread for which that country is famous. We also discovered that marmalade is jam and comes in tubes like mustard or tooth-paste. There were also organised protests in certain

interiors, accompanied by a quiet demeanour the 'morning after' which indicated painful attempts to mix the grape and the corn — however we survived all, including the smorgasbord on the ferry on the way back, although we suspect that the caterers in *Viking III* may have lost a bit on their mess savings.

Late in June should see us in the land of the Haggis for another exercise but in the meantime the R.A's infant production centres have been busy, so, look out stomachs, the celebration calls for a jug or so of Whitbreads Tankard (obtainable from all reputable Brickwoods houses).

The team now consists of Chief Petty Officer Dave Lardner, Petty Officer Fisher, Leading Seamen Malham (just about to mess change to A.E.D.T.), Evans, Lewis and Lambert and Able Seamen Williams, Harris (both of whom, after a touch of brainstorm in *Namet*, hope to pick up their hooks in the near future), Briggs (who departs for the Far East later in the year) and lastly out tame ex-stoker, Roberts (due for the Mediterranean in October and who has now grown a set so that his old oppos will not recognise him.

## BACK ISSUES

FOR those who keep up a library of the Magazines we have in the office various back numbers. They go back to 1962 and cost 6d. each.

For those who have not had the Magazine in some years here is the chance to catch up on what you missed.

Volumes 9/1, 9/2, 10/1, 10/2, 10/3, 11/1, 11/2, 11/3, 12/2, 12/3, 13/2, 13/3.

ED.





**Editor's Note**:— The following history and article was published in the Magazine *Cuba*, in September 1966.

Until 23 years ago man's knowledge about the submarine depths was not much greater than that of Neanderthal man.

From the invention of the Aqua-lung in 1943, until now, men have started on the conquest of this new space. 'Man is fenced in on land and we need to conquer the three quarters of the earth that is beneath the oceans. The sea will give us incalculable riches and we will be able to found submarine colonies where we can rear fish, as if they were cattle, and sow peacefully.' This is the quote of the famous Commander Cousteu.

In September 1962, the Americans undertook the first experiments in underwater living in the waters of the Bay of Villefranche. The project was called 'Man in the Sea'. Robert Steus spent 26 hours at a depth of 60 metres.

In that same month the Frenchman Cousteu carried out his Precontinent 1 experiment where the aquanauts, Falco and Wessley, lived for seven days at ten metres in the sea off Marseiles.

A year later, in July 1963, this Neptune-like man Cousteu got ready for his Precontinent 2. Seven aquanauts lived for a month at a depth of 11 metres. After which they lowered their house to 25 metres and lived in it for a further seven days.

In 1964 the Americans continued their 'Man in the Sea' experiment. This time the aquanauts lived for 49 hours at 130 metres. The U.S.N. was also interested in this experiment and in June 1964 men lived in the Bond Sea Lab for 11 days at 56 metres.

The U.S.S.R. has also organised experiments. In 1964 the Soviets stayed for four weeks in the depths of the Black Sea.

# *Proyecto Caribe Uno*

A young man awoke at 3 a.m. on Tuesday 18th July 1966 and looked out of his window, he saw a new sight it was a man peacefully floating in space.

The young man, Michael Montanez, was not in the slightest bit alarmed. He laid down again on the bed and in a few moments was fast asleep once more.

The man floating in space approached the house and carefully inspected it. Hundreds of thousands of floating lights were milling around outside and a total silence surrounded everything. After inspecting the house the man checked his equipment, tightened it more to his body, and started to gain height. 20 metres higher he took off his mask and breathed air on the surface; then he started to swim in the waters of the Caribbean.

Seconds later he bumped into the grey flank of a warship and climbed quickly inboard using the Jacobs ladder. 'What a relief', he said, 'The water was cold deep down but warmer on the surface. Will someone give me a cigarette. The aquanauts are well, Maico awoke and watched me for a while but then went back to sleep. The air supply system is well and everything is O.K. below'.

The diver stretched out on the deck to relax. Under the ship's keel, in the depths of the Caribbean, was the scientific project so long dreamed of by a group of Czekoslovakian and Cuban scientists.

The goal of Proyecto Caribe Uno was two men underwater for 72 hours. The Czekoslovakian scientists, without coasts of their own to work on, made an agreement with the Oceanological In-

stitute of Cuba and from this was born Caribe Uno.

In June, of 1966, the Czecks arrived in Havana complete with their yellow house and enough enthusiasm to carry the project through. The Cuban Navy put their ship 012 at the disposal of the researchers, also in the fleet were the ships *Orka* and *Crystal* belonging to the Science Academy, 012 was used as the mother ship for the operation.

The Czekoslovakian part of the project consisted of eight scientists and technicians, whilst the Cubans had seven. Leading the Czeks was Valadimir Mapstek, assistant professor of dynamic geology at Carlos University.

One of each team took part in the underwater endurance in the house, they were Joseph Mergl a technician and diving instructor from the mechanical Institute, Michael Montanez was the other; a military diver before entering the Science Academy.

The underwater house was set up in 20 metres of water some 30 kilometres from Havana. Installation of the house and all its facilities took eight days to effect.

The temperature of the house was maintained at 20° to 30° C. Fittings included electric light, lilos, telephone and a radio with a surface aerial.

Food for the aquanauts was sent below in containers. Preference was for fresh food, fruit and water.

The duties on deck of the 012 were equally shared and every four hours a diver went down to check on the house and its occupants, this continued even through the hours of darkness.

From the time that the aquanauts started their experiment, the Physiologist asked them to carry out various mental tasks with a view to possible changes in thought systems or the nervous system, the result was that no apparent change took place.

As the two Aquanauts did not speak the same language a set of signs and noises were suggested to facilitate communication, as an example Bla, Bla was for the Telephone (how aptly named) and Tac Taca for more air from the compressor.

The Aquanauts set themselves a routine of three sorties daily to work, basic work was carried out at night and on the first sortie most of the fish swam rapidly away but over the hours they gradually returned and made friends with the aquanauts. Principal object was the search and collection of small larvea and plancton as well as the capture of small fish.

**The Diary of Aquanaut Montanez.**

DAY ONE:

10.30 a.m. We arrived at the house and enter. Try the communication system out.

11.30 a.m. Lunch-time, we feel well but very hungry.

2.10 p.m. We go outside to work and inspect the installation. I feel slightly cold.

4.10 p.m. A meal, which went down well, arrived.

5.30 p.m. Vladimir visits us and takes some photographs. I spoke to Jospeh Mergl.

6.50 p.m. Joseph goes out to look at the Narghile that Viera had brought us. Up to now I feel well, everything is O.K. and the temperature is pleasant.

9.20 p.m. Time for bed. We did not go out because we are tired.



DAY TWO:

7.30 a.m. We wake up and all is normal. Last night I woke at 3.30 a.m. but went back to sleep again until now, Joseph's well.

10.30 a.m. We have spent 24 hours here and feel very well indeed. I like the peacefulness.

1.30 p.m. We go into the water, the fishes are not as shy as yesterday. I feel well on the bottom and look at the underwater life which during my years as a diver I have not been able to observe with such calm and leisure.

4.30 p.m. The Doctor went away a little while ago after giving us a complete check over. We appreciate how hard-working he is. Joseph went outside for a swim. I watched him through the window and then started to read.

9.30 p.m. It is night again. We went out to take samples using a light.

10.10 p.m. In the house again. Inside was all quiet and happy. Outside I had seen the most beautiful colours that I can remember, I took samples of plankton, fish [larvae and some young with a net. We swam for a short time and then went to sleep on returning to the house.

DAY THREE:

9.30 a.m. We awoke after having slept well, I was very tired last night.

12.30 p.m. I am tired by the reporters' questions and would like to be left alone.

2.00 p.m. I am going to rest in the water.

5.40 p.m. Doctor visited us. We are all well.

6.30 p.m. We ate roast chicken, a present from the chef.

8.50 p.m. We went out to collect samples.

10.30 p.m. We went out into the water once more. I felt cold, it must be because I didn't put on my diving suit. I watched the night marine life for a long time.

7.50 a.m. We awoke, Joseph is well but I have a slight cold. After a light breakfast we started the work of raising the house by stages to the surface. My notes end.

On Thursday at 1945 the two aquanauts surfaced to be greeted by a multitude of friends and reporters. On surfacing their first words were: 'Why so many people'.

So ended another story in the saga of men living underwater for more than a day, when all the information is gathered together we will have learnt more about the mysterious deeps.

# Horsea Island Open Day

THEY came from near and far, and gathered on the Sunday for another Annual Open Day by the Royal Naval Divers.

About 1,400 people, of various ages and sexes, arrived to watch the demonstrations and look at the displays.

There was active participation by about 400 Sub-Aquarists, who had dips in the R.C.C., S.A.B.A. and Standard Diving. All said, on undressing, that they had really enjoyed the dip.

Weatherwise, we had a fine afternoon until about 4.30, when the rain started, after which the Open Day came to a gradual close.

The event has grown since its inaugaration last year and looks as if it will continue to do so, even to the extent of becoming a rival to Navy Days. Due to the distance some club members travel to attend, a case might be put up for an Open Day in the North.

J.H.

# News from the Deep Trials Unit

*by* 'B.F.'

THE Editor of our Magazine has just surfaced from Bend treatment and as we, the crew, and he, the patient, have to stay at the Deep Trials Unit for the next four hours I have little chance to escape his plea for an article. As our last contribution was the Summer Issue 1965 there is no adequate excuse either, so here goes!

We were about to embark on a programme aimed at providing something better than the combined dive stops when we last went to press. The idea was to discover how soon after a Table I dive a second and then a third dive could be made without the penalty of having to employ combined dive stops. Double dives were made for 20 minutes each dive, with a 200 minute interval between surfacing and commencement of the second dive. Triple dives were made for 10 minutes each dive with 100 minutes interval between dives. Stops for the initial dive were also given for subsequent dives. Divers swam for the whole of their bottom time, to their maximum capability, on the swim machine. Over 400 dives were made, five Bends were treated and four 'niggles' occurred which disappeared without treatment. The Bends resulted from dives deeper than 140 feet and it was deemed unwise to pursue the programme beyond this depth. Sea trials were then arranged with double dives of 20 minutes being conducted in the Mediterranean and triple dives of 10 minutes being carried out from H.M.S. *Reclaim* at Falmouth. The time intervals for the sea trials were increased to 4 hours and 2 hours respectively as these were the practical times intended for use operationally and gave a safety factor compared with intervals used in the D.T.U. Unfortunately although the Mediterranean trials only produced one Bend the sea-trial results were far from satisfactory and *Reclaim*'s programme was abandoned at a very early stage when one of the intended 'triples' produced a Bend after the *second* dive. Much head-scratching went on to establish the reason for the trials falling over at sea but no convincing solution has so far been given. It really was most perplexing, particularly as D.T.U. trials were loaded to ensure failure here, rather than at sea, even to the extent that the double dive programme was concluded by two divers performing double dives on four consecutive days and triple dives were similarly rounded off by two divers on two successive days. The comprehensive report of the trials has yet to be completed but I am happy to say we are already at work with a different approach to the problem and although we were bitterly disappointed with the outcome of these trials we shall pursue the 'new look' with no less vigour than we put into the previous abortive trials. Some say proving something doesn't work is as valuable as proving that it does, but I personnally find this hard to swallow.

We next embarked on a programme of Oxygen consumption trials to prove or disprove some rather high figures obtained elsewhere, which if true, would necessitate close scrutiny of the mixture breathing theory. 96 dives were made in this series wherein the divers swam flat out on the swim machine at various depths for short periods. Oxygen consumption was assessed before and after the dive by comparison of cylinder and counter-lung contents, accurately measured by weight and volume. Results showed some really high rates of oxygen consumption, confirming what was previously indicated in the earlier trials. Our physiological specialists are now planning further trials with rather more sophisticated equipment to gain sufficient information to act on.



Between the 13th and 18th June last year we gave an intensive work-up on Oxy-Helium for the divers taking part in the salvage of the Mk. II *Buccanneer* Aircraft from H.M.S. *Victorious*, which crashed on take-off (see Vol. 13, No. 2). 33 dives to a maximum of 370 feet were achieved in this short time and great was our joy and satisfaction when we learned of the eventual recovery of this most valuable aircraft, particularly as I understand that the information gained from this operation could be valued in figures far in excess of the cost of this unit, which should put us on the credit side, even for the small part we played. This Unit is ideal for introduction to the methods employed for Deep Diving from *Reclaim*. Divers remain in the dry section of the Diving Vessel for descent as they would be in the Submersible Compression Chamber from the ship. 10 foot from the bottom they enter the water and proceed to their task under the watchful eye of the T.V. cameras as from the S.C.C. onboard. On completion of the dive they do their early, shorter stops, in the dry section /S.C.C. and are then transferred under pressure to the Compression Chamber (R.C.C.) for the final and longer stages of decompression. The drill is the same, the orders are the same and the only differences are the lack of the cruel sea itself, with the physical descent of the S.C.C. through the water and the mechanical problem of locking on for transfer under pressure. At the moment it is not acceptable to pressurise the chambers with Oxy-Helium because of the cost of Helium but work has already started on an extension to the Unit which will have large storage of selected Oxy-Helium mixtures for pressurising the chambers. When exhausting the vessels to decompress, instead of going to the atmosphere as the air does at the moment, the $O_2$ He will be collected in inflatable receivers at atmospheric pressure, before being purified and pumped back into the storage groups ready for use again. In this way we visualise 'storing ship' with $O_2$ He initially and a minor top-up after every twelve months.

Early in 1966 the policy of D.T.U. programmes was changed to include Diving Training Classes to give them a preliminary introduction to deep swimming before going to Falmouth or Scotland to do the real thing. This has proved to be of immense value and consequently is very popular with the Training Staff. Most trainees admit to a mild touch of nitrogen narcosis on their first venture to 180 feet and with good briefing are able to recognise and appreciate the symptoms without undue concern. Future diving to this depth is thus made safer and easier for them. Observing their classmates on the T.V. Monitors and listening to the Instructors criticisms helps to polish their swimming techniques as well. We have put twelve classes through to date and from their reactions we confidently expect most of them to be volunteer trials subjects for the future.

At the latter end of 1966 we started on a programme of dives to give the Plymouth Deep Team an $O_2$ He capability. However with the lengthy decompression required for even moderate depths of 250 feet — 300 feet it soon became apparent that this was not on, for what had to be essentially a highly mobile team. Rather than scrap the programme entirely, it became an academic exercise to try and discover the significance between cold and warm water diving and of the value of breathing various gas mixtures during decompression. 165 dives were made in this programme, 11 Bends and one oxygen convulsion were successfully treated. The latter incident resulted in the $O_2$ He

mixture being changed from 20/80 to 10/90 which was maintained for the rest of the trial. Sea trials were then conducted from H.M.S. *Reclaim* at Gibraltar but were not completed and will be progressed at a later date. The outstanding conclusion to date is that for Deep Diving success the divers must be thoroughly worked-up.

With A.E.D.T. and the H.S.C.D.T. away in *Reclaim* we made a start on the long outstanding requirement to monitor a diver whilst at work to obtain a continuous record of his physiological reactions throughout a dive. Our friends and colleagues from R.N.P.L. descended upon us, hairy chests were shaved off, electrodes were stuck on to us in odd places, Oscilloscopes bleeped and sinuated and the Unit assumed the air of a boffins' paradise. With some 60 odd dives and a vast amount of patience we achieved E.C.G., Temperature and pressure recording down to 180 feet. This is just scratching the surface of the project and it will require a lot more to be done before we are using our sophisticated recorder to its maximum capacity of recording eight parameters simultaneously. A possible 'first ever' was achieved during this series when Mr. C. Wilton-Davies and his telemetry team obtained E.C.G. readings transmitted through the water.

Concurrently with the instrumentation and monitoring programme we fitted in 37 dives to the Maximum Depth for Maximum Time on Table I as some doubts had been expressed as to the adequacy of this end of the Table I. These were all done with alternately two minutes hard swimming followed by two minutes rest and resulted in one Bend which occurred 6½ hours after the diver surfaced.

Soon after this we experienced for the first time in two years the mortification of being out of action. In the process of carrying out a modification to the rate of dive meter, undesirable and menacing quantities of oil appeared from gauges. This called for a thorough investigation and degreasing of the system which put us non-operational for three weeks. However, we are back in action again to tackle once more the urgent problem of repetitive dives which I will return to when it is time to write again.

Having recovered from one near miss 'brain drain' to the North Sea I am very happy to say that our 'Ship's company' has remained intact since commissioning with Alec Ferrier, John Peach, Cyril Neal and myself keeping the 'ship' on a steady course set towards the progression of our select profession.

Finally, we would like to say thank-you to all those who have volunteered their services as trials subjects and to those who might, but don't. Why not!

## CIVILIAN DIVING AMALGAMATION

TO give oil companies, and other people who use divers, better resources to call upon and equipment to complete underwater work, North Sea Diving Services and Ocean Systems Incorporated have temporarily joined forces for three years.

This amalgamation gives both more scope in that the North Sea Diving Services bring new areas and personnel into the union while Ocean Systems supply new equipment. Part of this equipment will be the S.P.I.D. underwater tent and the DEEP DIVER.

One of the directors of North Sea Divers is Lt.-Cdr. Ian Frazer, V.C., a midget submariner of the 39/45 war. Oceans Systems have ED Link of underwater habitat fame and the inventor of the wartime LINK Trainer for aircraft.

ED.



# Award of the Legion of Merit

ON Thursday 8th March 1967, in a ceremony at Washington Navy Yard, Vice-Admiral Robert B. Brown, Surgeon-General of the United States Navy, decorated Captain Robert D. Workman, Medical Corps, with the Legion of Merit for exceptional meritorious service as Submarine Medical Research Officer at the U.S. Navy Experimental Diving Unit. Present also were Rear-Admiral C. E. Loughlin, Commandant, Naval District, Washington, Rear-Admiral R. O. Canada, Jr., Deputy-Surgeon-General and Rear-Admiral G. M. Davis, Jr., Commanding Officer National Naval Medical Centre.

Captain Workman was cited for his work on the mathematical theory of diver's decompression, decompression from saturation exposures such as the 'Sealab' experiments, development of a helium-oxygen Scuba diving system, and the evaluation of a new method of treatment for decompression sickness.

Stationed at the experimental unit from January 1962 to May 1966, Captain Workman is now Chief, Laboratory of Submarine and Diving Medicine of the Naval Medical Research Institute and has additional duty as consultant in diving matters to the Bureau of Medicine and Surgery, the Deep Submergence Project, and the Experimental Diving Unit.

Introduced by Commander W. R. Leibold, Officer in Charge of the Experimental Diving Unit and Deep Sea Diving School, Admiral Brown also presented Diplomas to three foreign and ten U.S. Navy Officers graduating from the Medical Diving Officer course at the Deep Sea Diving School.

# DIVERS' DINNER 1967

THE Divers Reunion Dinner will be held in the Rock Gardens Pavilion on Thursday 19th October at 8 p.m. this year.

The cost will once more be 30/- per head. Seats cannot be booked without names and money. Please clearly print the names and addresses on the applications. Tickets will be issued and will constitute a receipt. No money can be refunded after the 1st October for seats not taken up.

It would be greatly appreciated if applications could be received as early as possible. Due to the change in venue confirmation of numbers must be given by the first week in October.

Please note that the Rock Gardens Pavilion provide car parking facilities in their immediate vicinity.

Make cheques and postal orders payable to the Divers' Dinner Fund. Hope to see you there.

E. W. J. SMITH, *Treasurer.*

# Oxy-Helium Diving

*(The following article was published in the May issue of the* JOURNAL OF THE ROYAL NAVAL SCIENTIFIC SERVICE.)

THERE have been in the past century a number of underwater activities which have necessitated men exposing themselves to raised pressures of air. In recent years these activities have increased both in number and in the demands placed upon the men. It is now commercially and military desirable that men should be able to work, and if necessary, live for prolonged periods on any part of the continental shelf. This comparatively new field of activity demands a great deal of study of the physics and physiology involved in order to proceed with confidence. It is hoped to show in this paper some of the problems and the first steps that are being taken to surmount them. When contemplating the possibility of life at pressures in excess of 10 atmospheres absolute, equivalent to a sea depth of 300 feet, one of the first essentials is to decide the nature of the gas to be breathed. There must be sufficient pressure of oxygen to support life adequately, but not such a value that will cause oxygen poisoning effects. It is generally accepted that more than 0·18 atmospheres partial pressure of oxygen is essential for full efficiency but that for prolonged breathing no more than 0·6 atmospheres is permissible. For most normal exposures to pressure, which have a duration of 30 minutes or less, it is generally agreed that the upper oxygen limit may be as high as 2·0 atmospheres.

Having decided on the oxygen partial pressure it is now necessary to rely upon some suitable inert gas for the remaining pressure. Above 10 atmospheres the only practicable gas to use is Helium. Helium is light and relatively easy to breathe at great pressures, and also it exerts the least narcotic effect of all the other possible inert gases. Xenon is narcotic at atmospheric pressure and has been used as an anaesthetic in deep surgical procedures. No systematic work has been performed on Krypton breathing but it has been qualitatively assessed as less narcotic than Xenon. Argon becomes too heavily narcotic for most diving purposes at pressures around 4 atmospheres. Helium does not show any appreciable narcotic effect.

After a man has been exposed to a high pressure helium atmosphere the body tissues have considerable volumes of this gas dissolved in them. The safe decompression of such a man may take several hours or several days depending upon the depth / time combination of the exposure. This entails men living in pressure chambers and breathing synthetic atmospheres for prolonged periods. Some form of air conditioning is essential both for comfort and to avoid complications during the decompression. The two main gas variables are the oxygen and carbon dioxide content. On no account must the carbon dioxide content exceed a partial pressure greater than 1% of an atmosphere. To this end some form of monitoring system has to be devised. If samples are taken from the pressure chamber and reduced to atmospheric pressure, then at 20 atmospheres pressure inside the chamber, the partial pressure of carbon dioxide available for analysis is reduced by a factor of 20. Effectively, this means that with 1% inside the chamber, there is only 0.05% outside for analysis. Detecting changes in such small percentages is very troublesome and this has been abandoned in favour of doing estimations at the pressure of the chamber. Here the difficulty is finding apparatus that will function reliably

under high ambient pressures. Eventually the method which proved to be most effective was to break evacuated capsules containing a known amount of barium hydroxide and phenol-phthalien indicator into a known volume of chamber air. This simple method proved reliable and accurate and fortunately the delay in carrying out an analysis was of no practical importance because there was only a slow rate of change of carbon dioxide.

Oxygen concentrations were fortunately much easier to follow and this was performed with a conventional paramagnetic analyser from samples allowed to expand to atmospheric pressure. The relative humidity inside was nearly always 100%. The only exception to this occured for a few minutes after the men were first compressed with pure dry gas from the high pressure storage cylinders. No attempt was made to reduce the humidity inside the chamber as this gave good protection from any possibility of fire caused by static electricity generated in the brushednylon suits which they wore. The remainder of the atmospheric contaminants were the usual ones from body odours. These latter are most effectively dealt with by two methods. Firstly the use of a multi-compartment pressure chamber which has separate toilets, eating and resting compartments, and secondly by a periodic complete change of the atmosphere. The latter is accomplished by confining the men for a short while to a small pressurised compartment whilst the remainder of the pressure chamber is reduced to atmospheric pressure. After rapid cleaning out operations have ceased the chamber is then re-pressurised and the men released from their temporary refuge.

The diving chamber descends in the sea at a rate of 100 feet per minute. Before commencing descent the chamber has all the air replaced by 20% oxygen, 80% helium gas. This is accomplished by displacing air downwards, the much lighter helium gas is put in at the top and the air is pushed out of a bottom drain valve. A balloon filled with helium gas rests on the interface between the air and the helium displacing it. This gives a good indication of the completeness of the process and subsequent chromatographic analysis has not revealed more than 2% nitrogen left in the chamber. After this flushing out process the divers are lowered to depth in a submersible chamber. The pressure rises rapidly and water enters the bottom opening as the steel door for this is kept open. More gas is supplied from the surface ship, via pressure hose, in order to keep the water level in the lower part of the submersible chamber. When the man reaches his maximum depth he will undoubtedly be feeling unsettled especially if the depth is 600 feet or over. There develops a distinct shaking of the hands and forearms which prevents the diver making fine movements. On the test applied at this laboratory it can be seen that it is difficult for most men to pick up small objects and handle them accurately. Tests on ability to do mental tasks also show a noticeable deterioration. This impairment of performance begins to lessen as the time at depth continues and after about one hour at 600 feet most men are back to normal. This return to normal performance is maintained over the next few hours. The maximum breathing capacity of men at this depth has fallen considerably but nevertheless it is possible to perform extremely hard and continuous physical work without any apparent ill effects.

As a result of the stay at high pressure the tissues of the body have aquired large volumes of dissolved gas. If the exposure has been of only a few minutes then well vascularised tissues will be nearly saturated with gas whereas those such as cartilage, fat, etc. with poor



blood supplies will only contain very small quantities. Decompressing in such complex situations without causing the formation of bubbles and hence decompression sickness has proven to be a matter of trial and error to attempt to define the boundary conditions of the problem.

**Ratio Principle of Haldane**

Goats were first used to assess the following hypothesis:— After a saturation exposure to pressure P.1, it is possible to ascend rapidly and safely to pressure P.2, and that there is some simple relationships between P.1 and P.2 such that:—

$$\frac{P.1}{P.2} = \text{(constant)} \text{ or } P.1 - P.2 = K$$

In the first instance, this was tried on air, using a six-hour exposure at P.1 followed by ascent in 2½ minutes to P.2.

The pressure ratio, which just gave a mild attack of the Bends, is obtained for each goat, for a representative set of values of P.1. These threshold ratios are plotted versus the initial pressure of exposure in Fig 1. As may be seen, the ratio diminishes with increase of pressure and this decrease is most marked in the first 140 feet (absolute) pressure. From 149 feet to 230 feet absolute, the ratio is nearly constant and these observations agree qualitatively with the power function curves expressing the relationship between pressures and ratio in the calculation of the U.S.N. air decompression tables. It is of interest to note that some of the results were obtained by changing from greater than atmospheric pressure to sub-atmospheric pressure.

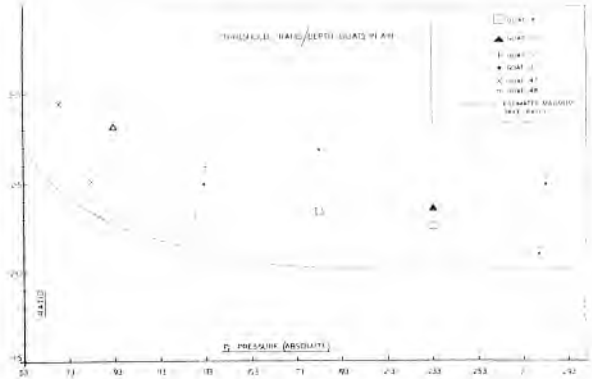


FIG. 1

Similar threshold values are being obtained by changing from greater than atmospheric pressure to sub-atmosphere pressure. Similar threshold values are being obtained using helium-oxygen as the breathing medium. For men it has been shown that four hours at 300 feet. may be followed by rapid ascent to 170 feet without any ill effects in a group of 12 men. In Table 1 is plotted the threshold ratios for saturation or near saturation dives on goats and men. On all these occasions a relatively mild attack of decompression sickness has been taken as indicating the threshold. The cut-back in the critical ratio, on the goats breathing helium, has the same features as on air. In the pressure range of 350 feet to 600 feet there seems to be a definite but relatively small change in the critical ratio, whereas from 350 feet

TABLE 1

Variation of Threshold Ratio Following a Long Exposure to Oxy-Helium Gas:

| Pressure (Guage) | | Ratio for Goats | Ratio for Men |
|---|---|---|---|
| F.T. Sea Water) | P.S.I. | | |
| 45 | 17.8 | — | 2.67 |
| 66 | 29.4 | 3.0 | — |
| 350 | 155.9 | 2.09 | — |
| 600 | 267.2 | 2.0 | — |
| 800 | 356.3 | — | 1.59 |

to 66 feet there is a large change. With men, the critical data are not well established, but it has been shown that in addition to the data on Table 1, a two-hour exposure at 500 feet may be safely followed by a rapid ascent to 290 feet (ratio 1:65). And, using 12 men, four hours at 300 feet may be safely followed by rapid ascent to 170 feet (1:64 ratio). The rule has now been reached that for dives at depths greater than 250 feet a 1:6 ratio or a drop in pressure of 200 feet which ever involves the least pressure change, is quite safe to establish the pressure value of the first stop following dives to depths as great as 800 feet for bottom times as long as four hours.

The goats were next used to establish the form of safe decompression schedules using only oxy-helium as the breathing medium. Fig. 2 shows a series of attempts to reach 165 feet following a dive of 50 minutes at 600 feet by a single stage at 300 feet. A duration at 300 feet of 30 minutes was grossly inadequate to follow ascent to 165 feet, i.e. a ratio change of only 1:68 following a first ratio change of 1:9. A one-hour stay at 300 feet followed by an intermediate stay of one hour at 220 feet was still inadequate to permit safe ascent to 165 feet. Eventually a 3-hour stay at 300 feet was found necessary to ensure trouble-free ascent to 165 feet.

This served to emphasize findings similar to those found on air (Hempleman). The rate of loss of the risk of decompression sickness is not the same as the rate of aquisition of this risk. No difference could be detected in the decompression requirements of a dive of 50 minutes duration and one of six hours. However when decompressing from such a dive, a 50 minutes duration at a stage, is certainly not equally as effective as three hours. This irreversibility was seen during the subsequent three hours stops from 165 feet to the surface. Pressure changes corresponding to a ratio of 1:3 were performed after a stage (stop) duration of three hours. This procedure met with complete success, but an attempt to repeat a



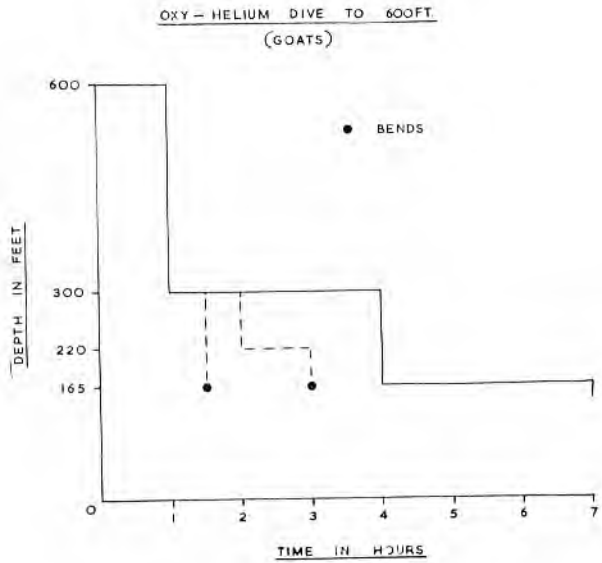
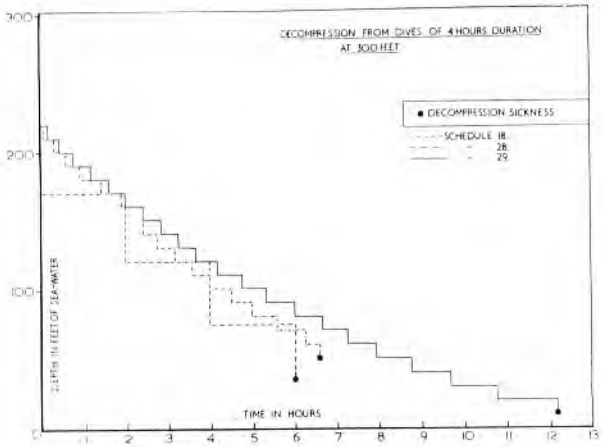



FIG. 2

1:6 ratio, following a three hour stay, met with failure at the 60 feet level. Such a finding demonstrates that even after three hours the tissues of the animal are nowhere returned to normal. Otherwise immediate return to atmospheric pressure would have been possible, giving a ratio change of 2:82. To achieve such a ratio change would clearly require many hours in excess of the three already tested. Viewing this as a reflection of tissue half-times it is possible to state that the half-times necessary to explain the de-saturation data in the decompression procedures are many times greater than the tissue half-times necessary to explain the saturation data. At this juncture it may be concluded that the use of large and sudden pressure changes in the stage method of decompression creates a dangerous situation in the tissues, closely approximating to an attack of decompression sickness. The possibility exists, that if smaller pressure changes were made, then there would be a more rapid pressure-time course back to atmosphere pressure. This hypothesis was tested a number of times on male human volunteers.

Three representative sets of results are plotted in Fig. 3. An exposure of over four hours duration at 300 feet pressure, breathing 10% oxygen, 90% helium, and using unacclimatised exercising subjects, was followed in many cases by rapid ascent to 170 feet with a period of two hours at this stage, and then rapid ascent to 120 feet with a two hours pause here. These long duration stops and large pressure drops can give a successful but lengthy decompression. Several attempts were made to drop the pressure rapidly to only 220 feet and then follow, in 10 feet stages, a relatively smooth decompression back to atmospheric pressure. This procedure clearly did not offer any great advantages in time. In order to avoid the Bends, it was necessary to re-shape the pressure-time course, so that the total decom-

FIG. 3




pression time, was not significantly different from the previous techniques, of adopting long duration stops followed by relatively large pressure changes. There is a third possibility for achieving a shorter decompression schedule. If it is possible to ascend rapidly to a stop value which would normally be expected to give a severe attack of Bends, then there is a latent period for the appearance of decompression sickness. The situation is entirely analogous to the man at atmospheric pressure in the first phase of a surface decompression dive. In this latent period it is possible to change the composition of the breathing mixture and attempt to avert the impending attack. Several successful dives of this nature were attempted where the breathing medium was changed from oxy-helium to air during the latent period, with the result that very short decompression times were successfully accomplished by a team of men, both in the chamber, and in the sea. Unfortunately it was found that when this procedure failed to work there was a very serious form of decompression sickness, and it was decided not to pursue this technique any further.

As well as finding that the decompression pressure-time course when breathing oxy-helium was quite flexible, there were a number of puzzling observations on the role of oxygen in diving. A dive of 16 minutes to 400 feet breathing 10% oxygen, 90% helium gave two Bends out of four attempts. When exactly the same dive, with the same decompression schedule was attempted, breathing 13% oxygen, 87% helium, then 10 trouble-free dives in the sea were performed. This confirmed the generally held view that oxygen rich mixtures were advantageous to the diver, and agrees with previous work (Hempleman). However, when oxygen rich mixtures were used in later stages of many of the prolonged decompressions, necessary from the deep prolonged dives, they did not give any noticeable benefit. This is borne out by the following observations. The schedule to be discussed is given below in Table 2.

TABLE 2

| Depth .. | 300 | 170 | 120 | 80 | 55 | 35 | 20 | 10 |
|---|---|---|---|---|---|---|---|---|
| Time .. .. | 4 | 3 | 3 | 3 | 3 | 3 | 3 | 1 |

Here the divers breathe 10% oxygen, 90% helium at 300 feet and 20% oxygen 80% helium from 170 feet to 80 feet, 60% oxygen, 40% helium from 55 feet to 20 feet and oxygen for one hour at 10 feet. This is a reasonably successful procedure on unacclimatised men and in fact gave two transient niggles at the first attempt by a pair of divers. In one man these transient attacks were noted from 55 feet to the surface, re-occuring at every pressure stage and disappearing after a minute or two. The other diver had similar affects but only on reaching atmospheric pressure. This was considered marginally safe, but in order to test whether the oxygen made any real worthwhile contribution it was decided to breathe 20% oxygen, 80% helium from 170 feet to 20 feet and then to change to 40% oxygen, 60% helium at 20 feet and 10 feet. No oxygen bearthing was performed. This in theory should render the schedule alarmingly unsafe if oxygen has the role usually atributed to it. In fact six men attempted this dive and only one man had a transient niggle during the decompression. Far from being rendered more unsafe it was the impression that the dive was made safer. Following these dives, a number of dives of one hour duration at 300 feet were also tried using schedules involving breathing oxygen from 50 feet to the surface. In order to avoid Bends, in the last 50 feet of the schedule, it became clear that it would be necessary to breathe pure oxygen for times in excess of two hours and such prolonged breathing of oxygen was considered undesirable. A change was made to oxy-helium mixtures without any noticeable increase in the time requirements for a safe ascent. It is now considered that breathing of oxygen during the decompression may cause vasoconstriction, giving a lowered inert gas elimination rate and that this effect can offset any benefit derived from the lack of inert gas pressure in the arterial blood. Breathing oxygen or oxygen rich mixtures during the time on the bottom, or even just prior to the dive, is of course very beneficial for exactly the same reasons operating in reverse.

The main principles are now established for calculating schedules:—

(1) The body tissues effectively saturate in four hours.

(2) It is possible to extend the general ideas of calculating air tables, i.e. stage decompression, ratio cut back.

(3) There is an irreversibility in the uptake and elimination of the gas responsible for decompression sickness.

(4) Oxygen and oxygen-rich mixtures do not confer the benefit expected when breathed during decompression.

In addition to these general principles there are several necessary controls on the diver and his environment:—

(1) It is necessary to test schedules on either only acclimatised men or only completely unacclimatised men.

(2) Hard work whilst on the bottom is essential to give a severe test to the schedule.

(3) Work during decompression must be reduced to a minimum.

(4) Pressure measurements at sea can never follow the same patterns as in the laboratory. This is due to the wave motion and sea swell as well as the fact that in any real situation the diver alters his position in the water from time to time. At depths of 600 feet for instance a variation of 15 feet may well be encountered.



(5) During the dive and decompression the diver must keep warm. In laboratory experiments the temperatures ranged from 80° F. to 90° F., whereas at sea in our recent trials the temperature varied between 55° F. and 60° F. The divers were very cold during the dive and for the first part of the decompression, and this was thought to be influencing the outcome of the decompression.

(6) Atmosphere control must ensure accurate breathing mixtures, and carbo dioxide must not rise above a partial pressure of 1% of one atmosphere.

(7) A schedule is not considered successful unless 10 trouble-free dives are performed by 10 different divers.

Helium diving at sea has always produced more decompression sickness than in the laboratory. At present the effects of cold and raised carbon dioxide pressures are being tested on small animals.

H. V. HEMPLEMAN.

# Special Order of the Day

IT is with pleasure that we publish this C.-in-C's Commendation awarded to an old stalwart of the branch.

Tom King has been a notable figure around *Vernon* and has recently taken up residence at *Drake*, a loss to us but a gain to Guzz.

* * * *

On 4th February 1967, while diving in the vicinity of a sluice gate in the Meon River, a diver was forced into the gate and his head was trapped underneath. The stand-by diver was sent in to give assistance from the down-stream side of the sluice. As the gate was opened the volume of water increased until suddenly the trapped man was projected through the sluice gate, bowling over the stand-by diver.

Petty Officer King (since rated Chief Petty Officer), the attendant, jumped fully clothed into the seething water of the sluice trap. He managed to get a grip on the trapped man and, wedging himself in the corner of the trap, pulled his head clear of the water. Petty Officer King noticed that the man was unconscious and had stopped breathing. While the stand-by diver supported him Petty Officer King gave him mouth to mouth resuscitation. Finally the man was pulled clear.

There is no doubt that the trapped diver owes his life largely to Petty Officer King. By his prompt action in leaping, without regard for his own safety, into the surging water of the sluice gate and pulling the man's face clear, he showed courage and initiative. Petty Officer King's decision to adminster immediate mouth to mouth resuscitation while the man was still in the water showed quick judgement in an emergency.

I commend Chief Petty Officer King for his actions throughout this indicent.

20th March 1967 F. U. S. HOPKINS,
*Admiral Commander-in-Chief.*

# Survey of the *Torrey Canyon*

*by the Plymouth Command Clearance Diving Team*

THE *Torrey Canyon* hit the Pollard Rock in the Sevenstones Reef on 20th March 1967. On March 22nd we proceeded to the stricken ship in the Inshore Survey Ship H.M.S. *Woodlark*. We were briefed to report on conditions around the wreck and to report whether or not conditions were suitable for diving.

Five hours before we reached the wreck the smell of oil pervaded the air and a rainbow film of thin oil sparkled on the sea. We first saw this enormous ship from a distance apparently completely undamaged. She could have been lying peacefully at anchor.

We left the *Woodlark* in a gemini and approached the lee side of the wreck. There was a Force 4—5 North Westerly wind blowing but the vast hulk of the vessel provided a good lee.

Oil on the sea however was so thick that it was impossible to guage how deep the oil extended. Before we reached the ship's side a wave broke over the gemini completely covering both us and our gear in oil. The oil fumes, in our eyes and noses, caused us to cough and splutter and also made our eyes sting. We could not sit on the sides of the gemini without slipping and we were afraid that the water-cooled outboard would object to being cooled by neat, crude oil. However, just to rub in the indignity of our position, a helicopter hovering above sprayed us with oil lifted by its downdraught.

We went alongside starboard side of the vessel but could not possibly dive through the oil. We were overawed by the sheer physical size of the vessel and the deathly silence which, with the presence of the oil, were the only outward signs of the ships' agony.

Going around the bows of the vessel, where there was a 20 foot swell, we secured to the port side in a reasonably oil-free area. We were in a small oil-free patch, the only one around the vessel, just aft of the Fo'c's'le and abreast the spare propeller. Sunddely there was an agonising screaming and grinding of metal. Was the ship going? But from 200 yards away, still shaking with fright, we realised that it was only the vessel protesting in anger at her ignominious capture. We secured alongside her again but eventually decided that diving on her was not feasable. The swell was lifting the gemini level with the upper deck one moment and the next we would be looking at the Plimsol Line. There was a tremendous swell running down the ships' side which could sweep a diver away. Due to the oil we had received inboard we could not handle our equipment properly because of the thick oil on the valves and our hands. To top this, any diving we did would have to be in an oil-free area, but it was the damage we wanted to discover and that was where the oil was thickest.

We made our report to C.-in-C., Plymouth and transport back to H.M.S. *Drake* was by Helicopter.

After the vessel had been bombed and broken up, Lt. Parkes, the Command Salvage Officer and myself flew by Helicopter to assess if all the tanks had been punctured. It was our hope to winch down to the vessel and look at the tanks ourselves. However, a Force 4 was blowing again, the forward part of the vessel had sunk and only the after tanks were showing. The damage sustained by this part of the vessel was awful. The 1½in. thick steel plates had been ripped open and lay twisted in grotesque shapes. Three inch girders were twisted into knots and every wave

surged into the ship and gushed out in 20 foot high geysers through the upper deck tank hatches. There was no point in attempting to land us on the wreck in these conditions and it was obvious from the air that the after tanks were free of oil.

Our recommendation that diving on the wreck, damaged as it was, and on a reef notorious for both its weather conditions and tidal idiosyncrasies, would be extremely hazardous. The Government, however, said that an underwater survey must be carried out, when weather conditions were at their best, as it was felt that there was a possibility that three of the forward tanks might still contain oil.

Now it was just a case of waiting for these conditions. As it happened we were working in Scotland when the weather settled. We drove down on Saturday 3rd June and sailed for the Seven Stones Reef on Sunday 4th. Fog delayed diving, and we were further delayed by heavy seas, until Thursday 8th June.

The wreck was lying with her upper deck in about 70 feet. It was very difficult to ascertain which part of the wreck one was on at any one time as she was a mangled heap of metal. As it happened we found the after end first. It was so broken up that the only way it was recognised was by a broken derrick stowage post, which we later indentified from photographs and plans, as being on the forward end of the after tanks.

The fo'c's'le, the only reasonably whole portion and recognisable as part of a ship, was found next. The tanks we were briefed to check were Nos. 1 and 3 centre line cargo tanks and the centre deep tank, which had contained the vessels own fuel supply, under the fo'c's'le. No. 1 tank was immediately aft of the Fo'c's'le and the ship was broken right across through this tank. She was lying in a deep gully bent up longitudinally around the centre line. The two deck edges and the ship's side was torn out and the centre of the upper deck crushed down, almost to the keel exposing all the tanks. No. 3 tank was situated under the bridge which was found lying as a separate piece of wreckage to port of the main wreck. It was so badly damaged by bombing that it was only recognisable as the bridge by its white paint and the shape of its windows. As the bridge had been blown off the ship it had taken the upperdeck, which was the upper part of the tanks, with it. Exposing these tanks to the sea.

By now we were convinced that there was no longer any cargo oil in the vessel, as we did a more detailed survey than I have space to tell. We were worried, however, by the centre deep tank, under the Fo'c's'le. Previous dives had shown that there was no apparent damage to this tank. As far as we could see it could still be full of fuel oil. A detailed survey of this tank meant working inside the vessel. We opened a vent valve on the tank hatch and no oil escaped. On then to the removal of the tank inspection plates. These were circular plates, 18in. in diameter, secured by 20 bolts. We had removed several of these from other tanks as evidence they were oil free. On removing these two covers, from the Fo'c's'le tank, we found the tank was flooded and presumed a hole somewhere in it, probably in the vessel's bottom where she sat on the rocks.

Diving on the forward part of the vessel was hazardous in the usual way that wreck-diving is dangerous. The ride swirls round the rocks and wreck and it takes some time to become familiar with the conditions and to know when to dive. However, we found that diving on the after section was so dangerous as to be foolhardy. This whole section is still moving and full of jagged holes, as is the whole vessel. Any

opening or doorway creates a tremendous suction, even in slack water, that divers are in danger of getting swept or sucked into them.

Ample evidence of the accuracy of the bombing was found. The damage they caused was frightening. Even though our task was a survey we saw no evidence of unexploded bombs.

There is no chance of wholesale salvage of the vessel. Not a single compartment remains undamaged. The majority of compartments are broken open so thoroughly that it would be impossible to render them watertight again. There is plenty of salvageable metal in the way of copper pipe and brass fitting but in such small quantities as to make such a venture fruitless.

If anyone is thinking of diving on the vessel for salvage, I would strongly advise against it and ask them to think again. We, as a Naval Diving Team, had the manpower and resources to be able to take ample precautions and even so we had our frights.

One diver, who was sent down to photograph the after section wedged himself in a large gap between two plates to steady himself, he suddenly realised that the plates were closing in on him and had to get out, fast!

On every dive, we spent a lot of time clearing our lifelines from obstructions, onto which the tide had carried them. On one occasion with the divers working inside the wreck and a strong surface tide running, but with little tide on the vessel, one pair of diver's lifeline got carried into the fo'c's'le rigging by the tide so that no signals could be passed. It was in such a tangle the divers had great difficulty in clearing it and resort had to be made to D.U.C.S. for directions and signals.

DON'T DIVE ON THE *TORREY CANYON* UNLESS YOU HAVE TO, PLEASE!

Personnel that took part in the operations were:—

Lt. C. F. Lafferty, C.D.O.
C.P.O. G. Witherall, C.D.1.
P.O. J. Wood, C.D.2.
P.O. D. Williams, C.D.2.
L.Sea. J. Curran, C.D.2.
L.Sea. A. Dalton, C.D.2.
L.Sea. D. Higginson, C.D.2.
A.B. T. Sweeney, C.D.2.
P.O., R. Viney, C.D.2.
Ch.Mech. W. Edwards.
L.M.E. S. Puddy. C.F.L.

# Physiological Crystal-Gazing

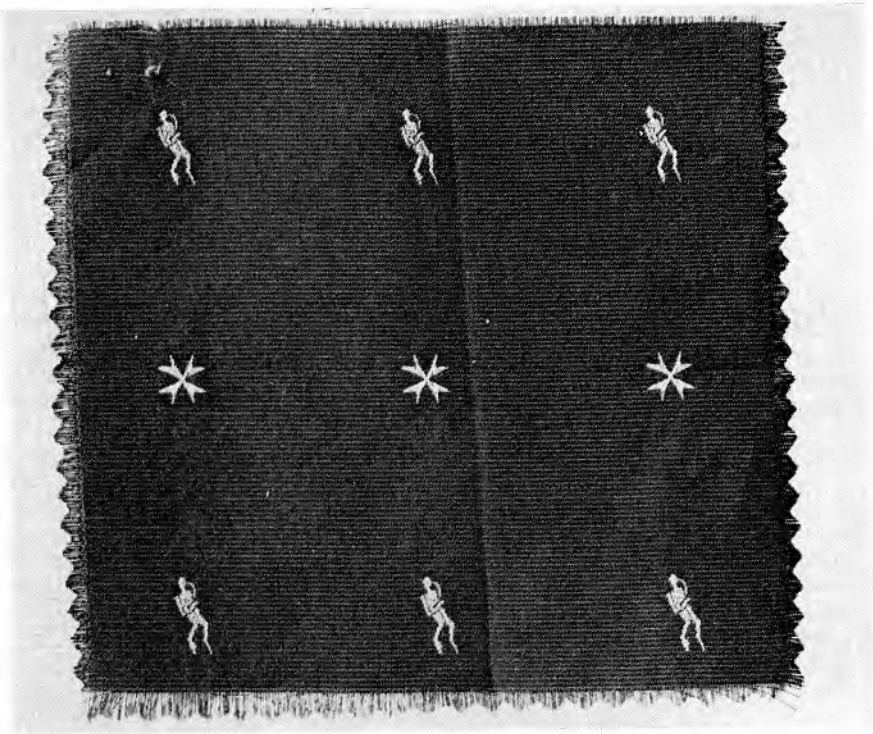
TO study and diagnose respiratory and associated diseases, it is necessary to know the elastic properties of the lungs and the resistance in the bronchial passages. To do this it is necessary for a patient to breathe exactly the same way each time so that the measurements of exhalation are comparable.

How can this be done? An American doctor has found that blowing a wind instrument at a chosen pitch provides the answer. These instruments are sensitive to flow rate and pressure, responding to small errors in the change of pitch which can be audibly recorded.

The American doctor has successfully used a 'Recorder'. One can foresee in the future a 'Wind Section', comprising flutes, piccolos, fifes and basoons, as part of R.N.P.L. G.A.F.



# Mediterranean Clearance Diving Team



THE Mediterranean team have now produced a tie for past and present members. It is in maroon and has alternate, frogmen in gold and Maltese Crosses. The tie costs 16 Shillings, post and package included.

Please apply to Lt.-Cdr. Gratton at the Fleet Diving Centre, Manoel Island, and make the cheques and postal orders payable to him. ED.

# Deep Sea Submergence Programme

THE U.S. Navy's Deep Sea Submergence Programme comprises a number of projects. These are:—

**Man in the Sea. Sea-lab III.**

This is the ability to keep men in the sea at depth for prolonged periods. Sealab III is the third stage in this project. The underwater home to be used for this operation is that used for Sealab II, but with considerable modifications. It will be lowered to a depth of 430 feet off San Clemente Island, California, for a period of 60 days. During this time five teams of eight men will spend 12 days each in the home. The teams will consist of navy divers and scientists who are being trained at the Experimental Diving Unit in

Washington. The teams will carry out various tasks such as salvage, oceanographic and marine biological studies. The personnel will also be studied in that they will be subjected to physiological and human performance tests.

**Deep Submergence Rescue Vehicle (D.S.R.V.)**

This vehicle is designed to lock on to a distressed, bottomed submarine and ferry the crew to safety. The original rescue capacity was for 12 men. This has now been increased to 24 thereby halving the projected rescue time. In addition, the rescue vehicle is designed to carry extra supplies of oxygen mixture gas, to sustain life in the less accessible compartments of the distressed submarine, thereby increasing the survival time of the stricken crew. When employed on its mission the D.S.R.V. will be operated in three stages:1 — transportation of the vehicle and its support unit to the scene of operations. 2 — transfer of personnel from the stricken submarine. 3—return to base of the vehicle. To meet these requirements the vehicle must be portable by both road and air, it must be capable of being carried, pick-a-back, by a parent submarine. This system will replace the McCann chamber system that has been used by the U.S. Navy for the last 35 years and which is limited to 800 feet. The D.S.R.V. will initially be made operational to 3,500 feet and it is hoped to extend its operating depth to 6,000 feet.

**Deep Submergence Search Vehicle (D.S.S.V.)**

This is primarily a search vehicle capable of operating to depths of 20,000 feet. Having a secondary function of recovering objects, weighing up to 250 lbs., from the sea-bed. The vehicle, like its sister the D.S.R.V., will be capable of road, rail and sea transportation.

**Large Object Salvage System (L.O.S.S.)**

This project, which is still in the drawing board stage, will be designed to lift weights of up to 1,000 tons from the sea-bed at about 800 feet. The equipment will consist of rigid and bouyant pontoons remotely controlled from a special surface vessel. G.A.F.

## PROMOTIONS AND ADVANCEMENTS

**To Commander:**

P. J. Messervey, C.D.O.

**To Lieutenant:**

J. Carr, C.D.O.
J. E. Thompson, C.D.O.

**To Petty Officer:**

M. Fellows, C.D.1.
C. Chorlton, C.D.2.
J. Peters, C.D.2.
J. Jervis, C.D.2.
J. Quinn, C.D.2.
J. H. Lett, C.D.2.

**To C.D.2.:**

A.B. Clifford
M(e) Clark
M(e) Steptoe
A.B. Lines
A.B. Swinfield
A.B. Hill

# Prisoner Underwater

*The following article is an extract from the September issue of the Magazine* Cuba.

MILITARY Diver William Betancourt found himself trapped inside a sunken ship in Havana Bay. The light of his waterproof torch, with which he found his way, could not penetrate more than a few inches in the slimy, muddy water that surrounded him.

Six months earlier, an old 900 ton tug, had sunk in the western area of Havana Bay, in the dockyard jetty area. On sinking the tug had settled on its port side. The sunken tug was a navigational risk in its present position.

The authorities requested the help of the Ship's Salvage Section of the Navy. The Salvage Section drew up a plan. As the tug had sunk due to inumerable slits in her hull the divers would weld these up and so seal the hull. Afterwards the water would be pumped out by surface vessels until she floated.

The divers met with difficulty on the first reconnaissance. Through the action of time the hull was even more perforated and the bow section had to be rebuilt The divers were working in the dirty, murky water where all the oil in the harbour seemed to end up. The work was mostly carried out by touch and the intuition of the experienced divers. The only light was from the sputtering flashes of the welding equipment.

Diver William Betancourt was assighed to the task of entering the tug and planning a method of sealing the boiler room and isolating it from the engine room. He had a two-bottle aqua-lung on and carried a torch, the wire of which was covered in thick rubber and would also act as a line to retrace his path in the tug.

The crew of the diving tender watched Betancourt disappear into the dark waters of the bay. Only the cord of the torch remained to show where he had gone. In the first fathoms the diver found the deck on the tug by the light from his torch. 'Dark even in daytime', he thought to himself. A few metres on he found the first hatchway and went through it. As he did so another hatch appeared. The diver shone his torch around him. Marine growth covered the bulkheads and the silent engines were covered in mud. With a slight movement he tried to reach the boiler room but found himself in the same position. He tried again, but to no avail. Betancourt's muscles tense up as he realises that his torch has snagged up somewhere in that dark engine room. 'Caught up', he thought, 'But where?' He looked, using the torch, along the line the lead took but was unable to see beyond his hands. He felt his feet stumble on metal and then started to sink in the slime. He started swimming desperately but did not manage to move from where he was. The lead did not wish to come free and his flippers stirred up the mud reducing the light from his torch even more.

'The way out, where is the way out', he asked himself. At this moment he became aware that he did not know his exact position. He searched for a way out with his arms but only struck metal objects. Then he felt his head sinking into very dense water. 'Mud, I am going downwards'. If he let go of his torch he would lose his only contact with the surface. Agitated and nervous he very quickly increased the rate at which he was using his air and went onto the reserve supply of his set. He started to lose his self-control and thought about his companions on the surface, unaware of what was happening underwater. 'They will realise it is very late', he thought. He was gripping the torch tightly and striking about him at the metal objects in his underwater prison. There were only a few litres left in his aqua-lung and his actions became more desperate. 'If I could only shout'. Betancourt bit tightly upon his mouthpiece and said to himself, 'Quietly, Quietly, or you will die'. He relaxed for a minute, held his breath and started to breathe softly, finding he could do this he relaxed even more. His body floated and he found that he had regained his confidence.

He shone the torch around and above his head he discovered a length of the lead that disappeared out of sight after a few yards, 'The Hatch'. He took hold of this section of the lead and let the torch fall. Using the lead as if it was a scaling ladder he followed it. Nothing could be seen in front of him but he felt his body slowly ascending. A strong and intense light suddenly appeared in front of him. Eagerly he ripped off his mask and breathed surface air.

In front of him the crew of the diving tender were unworried and doing their normal jobs. He let go of the torch lead and climbed inboard.

# *It doesn't blow like it used to*

THE Editor has been up to his usual persuasive tricks with the cry: 'Please produce an article for the next issue of the Magazine, if you could make it serious with a touch of humour any subject will do fine'.

With terms of reference like that where does one start? I suppose I can't go far wrong by commencing, as I have so often in the past, by saying that whatever I say does not necessarily reflect the feelings or the ideas of the Royal Navy or the Editorial Staff.

That means there is less censorship and if perchance I call a spade a bloody spade it is not translated into a garden implement for digging purposes. There have been quite a lot of amusing incidents recently but the amount of humour one sees in a situation really depends on one's own sense of humour and whose side you are on. I, for instance, always get great pleasure in seeing bullies getting a thrashing. Therefore, in spite of the serious international situation of late, I have had a good belly laugh.

My first search for amusing material automatically directs me to politics, here I knew was a subject in which we are leading the world, that is in the production of political clowns. However, on contemplation, the antics of some of our political leaders and in particular their handling of the services, the situation is more sad than amusing.

It has been suggested that amateur diving could provide a source of amusement, and it is in this field that I would like to correct the misguided opinion of many people. I know that on this particular subject the Editorial Staff does agree with me.

First of all, considering the thousands of amateur divers in this country, it is quite amazing that the accident rate is so low. This must reflect considerable credit on the various organisations that cater for this sport and in particular, the British Sub-Aqua Club.

Secondly the problem of divers getting Bends has had considerable publicity recently, but a serious study of the statistics shows that the pure amateur diver provides only a minute percentage of the total. The sport of diving has grown up over the past years and can now be taken seriously. There is no doubt that every section of scientific life in this country is getting involved in some way or other with underwater activities. In the amateur field these activities are generally well directed, well organised and always have an aim at some specific research item. With the situation in the services at the moment, one can look for little progress in the future. There is no doubt that amateurs, with their enthusiasm, keenness and often scientific background may well supply the source of future research breakthroughs and knowledge.

To summarise this short article I would say that at this moment there is very little that is amusing, the country is being run by a crowd of 'Nig Nogs' (or perhaps the term is Trade Unions). They burble about technology but cannot, or will not, see the greatest field of scope that is right under their little noses.

Time and time again, and in this Magazine in particular, I have said that unless we 'pull our fingers out' we shall be overtaken in the race of undersea research and development. This has now happened. I blame the 'Charlie Drakes', of this country for allowing this great nation to fall behind in a technology in which we have always led the world.

Perhaps all is not lost, because as I said before, we have the fantastic enthusiasm of the amateur which may well prove our saving grace in spite of Westminster.

J.W.



# Sports Report

THE Division has still maintained a high standard in Sporting achievements. Here is a rough 'run down' of how *Deepwater* fared in the various Highlights of field sport.

**Rugby.**

Although the *Deepwater* Pirates have amalgamated with *Vernon* to form one team, the main backbone came, in all respects, from the divers.

Organisation was from this office to which a vote of thanks goes to Lt. J. E. T. Baker now down in Guzz.

Half of the 'pack' was made up of divers, many of whom also played for clubs during their weekends.

In the final assessment twice as many points were scored 'for' than 'against', and two-thirds of our matches won. A very good and praiseworthy effort.

The team also managed to reach the semi-finals of the Command Knock-out Competition, being beaten by *Collingwood* 6—5, quite a blood match (literally!)

**Hockey.**

The field hockey throughout the term has been cried off due to lack of support, but deck hockey and six-a-side is just as strong as ever.

Just as strong as ever too, is the Division, in fielding four teams in the deck hockey and the winning cup team in the six-a-side.

The six-a-side was a hard fought fight, all the way through — Boyd Division being the first victim by just one corner. This put is into the semi-finals in the 'Cup' Competition when we came up against the Wardroom — arch-enemies of ours on the field of sport, but we emerged victors by 1—0.

Weapons and Radio were our opponents in the finals and once again *Deepwater* proved to be masters by winning 2—0.

Congratulations to the team, captained by P.O. 'Bill' Cornick who was well supported by P.O. Ron Hartshorn, P.O. Dave Lott, L.Sea. Brayne, A.B. Smith, A.C. and A.B. Bartley.

**Football:**

The Divisional team had a bit of a poor start at the beginning of the season, but later settled down to some good matches.

First match of the 'League' was given away as a walk over by Walker Division, followed up by wins against Craft Group, Engineers, *Osprey* and Boyd — the only division succumbed to was Willis, when we lost 5—6.

This put us equal at the top of the league with Walker Division, whereby a play-off was organised to decide the winners of the league cup. The first half of the match found us under a dark cloud being 3—0 down, but the cloud passed and with a storming comback the matched finished in a draw, 3—3. A further replay took place and the final outcome was a win for *Deepwater* 2—1, thus ensuring us the Cup.

The next hurdle was the 'Knock-out' Cup when the team battled their way through to finish in the finals against Boyd Division. This match was quite a 'Cup Final' and at half-time *Deepwater* had smashed in three goals. In the second half Boyd pulled out all the stops by scoring twice — this made things a little nerve-racking but in the final minutes *Deepwater* scored again, clinching a win of 4—2.

Full praise goes to the team for getting the 'double' after such hard-fought games — all the matches were against worthy opponents.

**Water Polo.**

Interest in this sport has slightly waned, but a team has represented *Vernon*, who managed to win the Portsmouth Command Knock-out Cup by beating R.N.B. in the finals 5—4.

What is a feather in our cap is the fact that four of the team were from *Deepwater* Division, namely:—

P.O. Ron Hartshorn,
P.O. Ken Blaylock,
P.O. Don Stevens,
L.Sea. 'Palbo' Welch.

So although not all divers, the Division was well represented — well done.

**Swimming.**

The *Vernon* Swimming Gala took place on the 21st June and once more a strong contingent from *Deepwater* took part.

Similar to last year two Divisions produced one team. *Deepwater* were amalgamated with the Wardroom who were represented by Lt.-Cdr. Dowling and Milligan.

From the word go the points started to roll in with the Division taking 1st or 2nd place, sometimes both. Apart from the individual events the team races were a resounding win for the Division, in fact I believe that some of the swimmers were in bottom gear.

Credit must go to the old stalwarts of the Division namely P.O's Ron Hartshorn, Jim Harrison, Ken Blaylock who were ably backed by up P.O's Maher, Radford, Jones, L.Sea Bird and A.B. Kidman.

In the final assessment, the Division scored 50 points with our nearest rivals 24 points away. As well as taking the team trophy, which incidently has been won by the Division for the last eight years, a fair selection of cups and shields were gathered by those taking part. An extremely good effort by those who took part.

**Athletics.**

Due to training commitments the Division was unable to turn out in the force that is usually expected of us. It was noticeable that other divisions had the same problem to contend with. This year the tug-of-war has been put off until later in the year.

However of the six competitors who entered five managed to gain places in the finals and a big compliment must be paid to L.Sea. Dadd who won three events.

The result of the Athletics were of course very disappointing and the Division was 5th in the overall classification and had half as many point as the winners.

D.R.

## *Weddings*

The wedding of Tony Wheeler, P.O., C.D.1, to Audrey Thompson of Petworth, Bath Parade, took place on June 10th.

We wish the newly married couple all the best in the world on behalf of all C.D's.

The wedding of Jumbo Jervis, P.O., C.D.2, took place on Saturday 17th June. Again all the best to the newly married couple from all the members of the branch.

# Letters to the Editor

Dear Sir,

It was pleasant to read of the arrival of Lt.-Cdr. Burstal in the 'hot' seat of diving, but objection must be raised to the scurrilous remarks regarding one of his former ships H.M.S. *Annet*. The writer speaks with some feeling on this having served in H.M.S. *Annet* and her opposite number *Flatholm* from May 1952 to December 1954. From June 1952 until August 1957, *Annet* and her opposite number *Flatholm* were engaged in arduous diving work, the results of which were very important and still remain classified.

*Annet*, an Isles class trawler, derived her name from a lonely, rocky, uninhabited, sea-bird infested isle of the Scillies group. In addition to the main task mentioned above, *Annet* was often used for the more usual type of diving jobs such as foul screws, lost objects, etc., and in April 1954, found and recovered a prototype *Sea Hawk* jet fighter which had crashed into the North Sea. The following V.I.P's were frequent visitors to the ship and often went out on the task in the diving cutter: The C.-in-C., Nore (Admiral Oliver), Captain Hezlett, now Vice-Admiral Hezlett, a famous submariner, Commander Steiner, now Rear-Admiral Steiner and last but not least Jackie Warner. Another frequent visitor was Dr. J. N. Carruthers of the National Institute of Oceanography who was mentioned on page 9 of the Easter issue of the DIVING MAGAZINE. One of the instruments of Dr. Carruthers, for checking the nature of the bottom, was a fearsome machine known as a Penetrometer. This was a mass of chains and gear-wheels and had a very pointed spike which could be most unpleasant, if it happened to penetrate the bottom of the diver rather than the bottom of the ocean.

The following amusing incident was one of many which made life more tolerable in these hard-working ships. Diver X had just joined the ship and was busily doing his dhobying in the forecastle when the quartermaster came round piping 'clear up messdecks and flats for rounds'. Diver X not hearing the pipe asked one of the old hands what it was. The 'old' hand jokingly replied: 'Hands muster in the wardroom for issue of free gin'. Two minutes later Diver X knocked at the wardroom door and when asked by the Captain (a very senior and distinguished commander) what he wanted replied: 'I have come for my free issue of gin'. Result — collapse of senior commander and a very embarrassed diving officer trying to explain the strange behaviour of his latest addition to the team.

In conclusion the following lines are dedicated to *Annet*.

**An Ode to 'Annet'**

These lines I pen as a token
In memory of you dear *Anne*.
You may have been slow, but aye steady
And as true as my name is McLan.
So sail on, old ship so fine,
And though no more you'll find the mine
You will e'er be a part,
Of this C.D's heart.
Sail on, old ship so fine. MAC.

**Note**:—*Annet* is still going strong though no longer with the Grey Funnel Line. She now belongs to the Scottish Home Department and is employed on Fishery Protection Duties in the Western Isles. Though converted from coal to diesel she still has the same soul and is expected to last for several more years.

ED. (ex-*Annet* Diver).



www.mcdoa.org.uk

## Letters to the Editor—*continued*

Dear Sir,

I was delighted to see that Mr. Alan Endean, of the Western *Evening Herald*, has gone into print on the subject of Crayfish Divers and their menace to the diving profession.

As an S.D.O., and until recently employed in Fishery Protection, I feel I can add more fuel to the fire in getting something done about them.

Being virtually based on *Newlyn*, during my service in the F.P.S., I came to know, like and deeply respect our 'traditional' shell fisherman who work in the South-West of England. The advent of the money-grabbing opportunists from inland with their beards and tight trousers, was greeted with horror and many a rowdy argument was to be heard in the local pubs.

I feel sure that the only answer is to make these people register as fishermen and in doing so licence them and their diving boats. While doing this, a 'Code of Conduct' could be incorporated as one of the conditions of the licence, ensuring at least elementary safety precautions enforceable both by the F.P.S. and the local Sea Fisheries Committees. This would not be too difficult to supervise, as nearly all countries have their own patrol craft for this sort of job.

I feel very strongly that our traditional fishermen have an inherent right to protection from uncrupulous people.

Yours sincerely,

LT. S. D. J. DE H. LARPENT.

# OBITUARY

PAT HARDING (*Nee* **RUSSEL**)

WE are sorry to tell you that 'Pat' at the A.E.D.U. (the girl with a smile and a 'cuppa') died suddenly on Thursday 22nd June 1967. We are all heart-broken at the A.E.D.U., and our thoughts go out to her husband Paul and her family.



www.mcdoa.org.uk

# Diving and Insurance

*by*

AN INCORPORATED INSURANCE BROKER

PART of our work is to investigate and report upon existing insurance policies and we still find divers who have taken out schemes which have restrictive service clauses, or an additional premium is being paid to cover diving risk.

When an actuary is calculating whether he will charge an extra premium he takes into account not only the actual risk history, but also his company's experience.

If the actuary is not fully aware of modern diving requirements, he may for instance compare a Royal Navy Diver with the work carried out by a commercial diver in connection with oil rigs, with the result—a hazardous occupation.

On completing a proposal form, the proposer must declare all the relevant facts effecting his health and occupation. Should a claim arise the Company would, of course, check and if a true declaration had not been made at the time of the proposal, then the scheme could be null and void.

The broker, on presenting a Life Proposal to an Insurance Company, will make sure that every aspect is placed before them and will try to ensure that no extra premium will be charged. The broker, of course, knows which Company to go to in the first place.

We now have with us the new Royal Navy and Royal Marine Dependants Fund but one will realise that £350 would not go very far on the death of the breadwinner. For some years now, servicemen who require protection have been able to obtain unrestricted life cover at the cost of approximately 15/- every three months for each £1,000 insured. This scheme should be considered in addition to the service scheme.

There are many other policies. Make sure that you have the most economic one for the premium you are paying.

# Wet or Dry

A team of volunteers, at Seafield Park, have been taking part in some evaluation trials as to the insulation properties of Wet and Dry suits. The volunteers wore a wet suit one day and a dry one the next. They immersed in a tank and laid stationary on the bottom. Water temperature was taken down to 5°C. The limits of endurance were either when the diver felt too cold or if his outer skin temperature dropped to 8° C. Temperature was measured in two ways. First by a radio pill to give the deep body temperature and secondly by thermo couples attached to the skin to give outer skin temperature.

On cursory analysis there is very little difference in the insulation properties of the suits when a diver is stationary. A paper is being published on the findings of the trials and it is thought that if further trials can be conducted with the diver swimming then a difference in insultation may show up.