ROYAL NAVAL

DIVING

MAGAZINE

Vol. 16
No. 3

4/-

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R.N. Diving Magazine

Vol. 16 No. 3

Contents

EDITORIAL STAFF

Portsmouth 22351 Ext. 2473

Editor .. .. P.O. J. COBB

Treasurer .. .. .. LT. M. J. HARWOOD

Published by H.M.S. *Vernon* in June/July and November/December. Annual Subscription 6/– post free.

EDITORIAL

I thank our readers who answered the appeal for material so promptly and aided us in getting this issue to print nearly on time, but the same bods seem to be writing the contributions.

A flush of new blood would be appreciated and would help the young divers.

A few drips about anything would be welcome again, also news from teams would be appreciated as they are poorly represented.

Deepwater did well in *Vernon* Sports Day. P.O. John Dadd won the Individual Aggregate Cup. The Inter-Divisional Cup was won by *Deepwater*, more detailed account will appear elsewhere in the Magazine. EDITOR.

The future of this magazine

IT is now a year since the magazine was enlarged to its present size, the price increased to 3/- and the number of editions each year cut from three to two. However the economic miracle hoped for has not happened. Basically, the expenses of production and distribution get bigger all the time but the income remains the same in spite of repeated attempts to increase the circulation and attract more advertising revenue.

In April this year a questionnaire was circulated to ships and teams to find out what people feel about the magazine. It was pointed out that the new glossy look and larger size is more expensive to produce than the old and the increase in price is barely keeping pace with present costs. Future increases in printing and postal charges will aggravate the situation.

The options open are:—

(*a*) To cease publication altogether. This would save a lot of work.

(*b*) A determined effort by everyone to produce worthwhile contributions so that sales can be increased, which will attract more advertisers. Sales are at present about 1,600 per issue and this seems to be saturation point as far as Service sales are concerned. Sales effort would have to be concentrated outside the Service which means that contributions would have to be of wider interest.

(*c*) To get the magazine officially sponsored as some magazines already are. This would mean reducing

FRONT COVER—H.M.S. *Blake* visits Cape Town. *Photograph by* Al Venter

the circulation to Service personnel only as outsiders would not be able to receive it. Material of more interest to Service personnel could be included but we might lose the material of wider interest at present contributed from outside the Service.

(*d*) To carry on as at present in the hope that the future will not be as black as it looks.

(*e*) To ask for financial help from those who would like it to continue, contributions being used to finance production for as long as possible.

The response to this questionnaire was very encouraging. The majority opinion is that we should continue to improve the contents of the magazine, improve sales and attract more advertising revenue. Many suggestions on how this could be done were stated and we will try to implement them.

Some ships and teams agreed with the proposal to ask for financial help and some £50 was sent in. To those who contributed we tender our thanks. Those who promised support in the event of the magazine continuing are asked to send their contribution to the Editor as soon as possible so that we can reap the benefit of their generosity. If anyone else would care to subscribe to a worthy cause we will be happy to receive cheques, postal orders and cash and brighten the life of our Bank Manager.

LT.-CDR. K. G. LEES,
Instructional Diving Officer,
H.M.S. *Vernon*.

H.M.S. 'Blake' visits Cape Town

(March 1970)

MEMBERS of the diving team onboard British guided missile cruiser H.M.S. B*lake* spent much time while in Cape Town as guests of the city's Atlantic Underwater Club.

Diving teams off the ship were taken by club members on dives in the Atlantic and Indian Ocean sides of the Cape Peninsula.

On one dive off Table Bay harbour, in boats provided by the cruiser, three members of the *Blake* team bagged 156 crayfish in 40 minutes. Conditions were not good. There was a heavy swell and ground surge running. (The record incidentally is 1,100 crayfish netted in 66 minutes in 1960 by one of the A.U.C. members.')

It sounds like a tall story, but come to Cape Town and they will teach you how to do it. It's quite easy when they're lying 18 inches deep in places!

Atlantic Underwater Club is happy to play host to any R.N. ships calling this way. The club is open on Tuesday and Friday evenings and when the ships are in, special dives are arranged. The more notice given of a visit, the more we can plan.

Diving Officers please telephone on arrival Al Venter at 411–988 or the Secretary of the club, Dave Levy 491–481.

H.M.S. *Blake's* Diving Team consisted of:—

S.-Lt. Page, S.D., C.D.
Lt.-Cdr. Bush, S.D.
Lt. Bruce, S.D.
Lt. Turner, S.D.
Lt. Humphrey, S.D.
A.B. Scott, S.D., Store Keeper
M.E. Harpour
M.E. Sullivan
M.E. Harrison
M.E. Harris
M.E. Battersbee
A.B. Sykes
A.B. Addington
A.B. Trowse
A.B. Dalby
C.E.A.I. Chadwick
L.S. Edwards

Divers' Vital Role in Vietnam

By a Special Correspondent

By kind permission of the *Sunday Telegraph*.

VUNG TAU (South Vietnam), Sat.—A small but vital Royal Australian Navy unit in South Vietnam has earned the admiration of its American allies.

The unit, the R.A.N. Clearance Diving Team No. 3, consists of only six men. It has a firmly established reputation for professionalism.

The team is responsible for underwater examination each night of ships anchored off Cap St. Jacques, the port for the big Vung Tau Air Base. It also carries out the demolition of time-expired or damaged explosive ordnance.

Leader of the team is Lieutenant Alan ('Snow') Davis, a wiry 44-year-old, of Sydney Road, Warriewood, N.S.W., a World War II sailor in corvettes and gun director in the destroyer H.M.A.S. *Warramunga* in Korean waters in 1951. He has 19 years' experience in demolition and diving work. He is married with three children.

Background

His team consists of Chief Petty Officer Clearance Diver Vic Rashleigh, N.S.W., Petty Officer Clearance Diver John Brumley and three Able Seaman Clearance Divers—Andrew J. Sherlock, Jeffrey L. Garrett and Mick Ey.

They live on a hill known as 'V.C. Hill' overlooking the South China Sea. Their quarters are a former French Legionnaire fort cut into the side of the hill and described by Lieutenant Davis as 'the only air-conditioned cave in the country'. It is part of the U.S. Navy Harbour Entrance Control Post.

Bar 'Walk'

The cave has a living-room with six bunks, an office-recreation room and a bar.

Traditionally, visitors to the bar 'walk' over the ceiling (supported from below, of course) to have their footprints outlined. Footprints of all shapes and sizes grace the ceiling.

The 'cave' also houses a fascinating museum of allied and enemy guns, rockets, grenades and other ordnance. Of special interest is a fine collection of Viet Cong booby traps.

Lieut. Davis' men are all experts in working with explosives.

A typical demolition job was carried out recently when the U.S. Army 148th Ordnance Coy. at Vung Tau requested the destruction of four tons of high explosives.

The explosives included 105mm. howitzer projectiles. 40mm. grenades, 2·75in. aircraft rockets, 12 16lb. packs of satchel charges, 60lb. of plastic explosive, parachute flares, anti-personnel land mines, boxes of T.N.T., smoke pots, boxes of detonators and a mile of detonating cord.

Stronghold

The explosives filled a ten-wheel truck which was driven on to an American landing craft at Long Pier, Cat Lo, near Vung Tau.

Lt. Davis and two of his men, Sherlock and Garrett, exploded the ordnance on Long Son Island, a known Viet Cong stronghold about five miles west of Vung Tau.

To flush out any Vet Cong in the vicinity, a platoon of U.S. troops accompanied them.

The landing craft bumped to a stop on a small sandy cove on Long Son.

For 45 tense minutes the unloading continued.

The Americans and Australians knew they almost certainly were being observed by Viet Cong.

A well-placed mortar at this stage would have been disastrous.

Finally, the stack of ordnance was ready.

The detonating cord burned at the rate of a foot in 42 seconds, so the R.A.N. team selected enough to give a clear 20 minutes before the 'big bang'. This gave the landing craft time to clear the island.

The landing craft slowed to a stop and drifted as the 20-minute deadline neared.

Suddenly, there was an ear-shattering explosion heard 10 miles away. A ball of fire and a heavy smoke pall rolled into the sky. A dead tree beside the stack of ordnance had vanished.

News from the P.M.C.D.T.

(Ex B.M.D. Portsmouth)

SINCE being christened Portsmouth and Medway Clearance Diving team, and due to our area being extended, we have found writing difficult, both underwater and in a moving Landrover (and pub tables are too wet)—that's our excuse.

Our operational area extends as far North as Filey and round down the coast to Lyme Bay. We had to sacrifice the Channel Islands to the Plymouth team but we got Grimsby, the high spot of the North.

Within this area, our responsibilities are for all objects below the high water mark, in rivers, waterways, in reservoirs, wells, village ponds, etc.

E.O.D. (Explosive Ordnance Disposal) wise our commitments are as above, plus all Naval mines on land and sea.

The following are just a small selection of our typical jobs:—

HUNTER AIRCRAFT—5th OF MAY 1969

Whilst the team were at Hunstanton on a bomb job, a call was received from Portsmouth instructing the team to proceed to Wells and join up with the salvage vessel *Kinloss*, to assist in the recovery of a R.A.F. Hunter which crashed into the sea whilst on a combat practice flight. The team arrived there about two hours after the signal requesting assistance was sent, much to the amazement of the R.A.F.

The crash was seen by another pilot who was able to direct fishing boats to the area who were able to pick up some floating debris. The debris included a flying boot and a crushed flying helmet. The fishermen were able to drop a very accurate marker which was within 50 yards of impact.

The following morning the *Kinloss* arrived off Wells, the team embarked, and the search commenced.

The weather was not favourable with high seas and strong tides. The depth was at high water 34 feet, and at low water 24 feet, but there was no visibility at all underwater.

It was only possible to average four hours diving a day. We started by doing circular searches around the fishing marker whilst *Kinloss*, anchored just North of the marker, had her Standard diver (Joe the steamer) carrying out circular searches underneath the ship, which moved back one shackle of cable (90 feet) after each search.

The first success came that day with a piece of cockpit and armoured plate being recovered close to the fishing marker. The next day, in spite of fine weather, no further recoveries were made, and it was decided that the aircraft had broken up and scattered. The day was spent in trawling the area using *Kinloss*'s cutter and two geminis. When we snagged anything we carried out a spot dive on it.

On the third day we began to find numerous pieces of aircraft, none larger than 4 foot. It was obvious that this was the impact position as the pieces were from different parts of the aircraft. A datum was then established in this position.

Kinloss was moored in this position and recoveries continued. The 'steamer' worked on one side while we worked on the other. Later that night some of the *Kinloss* crew were fishing over the side and were bringing up pieces of aircraft on their hooks.

For the next three days recoveries continued but fewer large pieces were being recovered and heavy silting began covering over the smaller ones.

Large pieces found included part of the engine turbine weighing about 4cwt., the nose wheel, a cannon gun and a generator. Various parts of the pilot were also recovered. About 60% of the aircraft had been recovered and it was then decided that no further value would be gained in continuing the search so we returned to Portsmouth to wait for the next call.

* * * *

WALTHAMSTOW

On the 6th of February 1970 we had a telephone call and were told that an Army Bomb Disposal Unit had investigated a call from Walthamstow police at a reservoir that had been drained for cleaning and were shown an object which was indentified as a German ground mine type G.C. In the war these mines were laid either from ship or from aircraft by parachute and were activated by a passing ship in three ways, by the magnetic field, the acoustic sound or the displaced pressure of water of it passing overhead. These mines do not float but lie on the sea bed. They are about 8 feet 8 inches long and 26 inches in diameter and the main charge of explosive is approximately 1,535lbs. of Hexonite.

As all sea mines are the responsibility of the Navy the Army turned the operation over to us (for once) and told us that their steaming out gear would be at our disposal.

We left Portsmouth and made good time to Walthamstow thanks to a police escort which met us just outside London. When we arrived just after mid-day we were told that a 1,000 yard radius evacuation had been carried out. This area consisted mostly of factories and only a few private houses.

The mine was about 50 yards from the West bank of the West Warwick reservoir and was completely exposed, resting in about a foot of mud and water.

The priliminary investigation was carried out by our Boss, Lt. C. Churcher and P.O. 'Roy' Coulson, C.D.1. The mine case was in remarkably good condition, being made out of Rhine-metal. The parachute housing was still intact and the parachute ring bolt and shackle still in place.

The bomb fuse and primer release were somewhat mutilated and the type of fuse could not be determined. The screws on the detonator cover plate and the plastic screw cap under the plate started quite easily after soaking them with penetrating oil. This gave access to the detonator leads which were cut one at a time, the ends taped and isolated. The detonator itself proved to be stubborn and the Boss decided that with the leads out it was relatively safe as it was, rather than use undue force and do something that we might regret later.

As the bomb fuse and the detonator were still in place, moving the mine was not practicable. Therefore the Boss decided that it should be steamed out in situ. With this in mind they started to remove the screws to the front and side filling plates which gave access to the main charge. A listening watch was kept on the mine during the whole procedure by means of an electronic stethoscope.

A coffer dam was then built round the mine and at 1800 steaming out commenced.

This went off very well and just after midnight all

Hazards of Bomb and Mine Disposal

the main explosive had been steamed out. We informed the police of the situation telling them that we now considered the mine to be fairly safe. The next two hours were spent filling sand-bags with the explosives that had been steamed out and placing them on the bank ready for burning later on in the morning.

The arming clock was removed after steaming and was found to be still in working order.

At 0930 on the 7th February the fuse and detonator were blown and the explosive was ignited by an incendiary stick.

We would like to say that the co-operation given to us by the Walthamstow police, operationally, domestically and socially was very much appreciated.

* * * *

OLDE WORLDE

On February 9th we received a call from the Harwich police reporting an object at Peewit Island, near Harwich, and from the description given it appeared to be a kind of bouyant mine.

When we arrived at Harwich, we were led to Peewit Island by the wild fowler who found the object. The Island was on a vast expanse of saltings about four miles South of Harwich.

The mine was not buried and was located wedged in a muddy creek. It was spherical in shape, about 4 feet in diameter, with a top cover plate and a mooring spindle, the two hemispheres were rivetted together. On the whole the mine had a very solid appearance. Holes had rusted through the top hemisphere through which could be felt the main charge.

As the nearest habitation was about three miles away it was decided to use plastic explosive to slice open the top to examine the inside. This was done to reveal a main charge of about 250—300lbs. of explosive block filled into a wooden charge case. The detonator had gone but a spring operated firing striker was still fitted on the top coverplate. A plastic explosive pack was placed on the main charge and it was countered-mined. A full order explosion was obtained.

The identification of this mine proved difficult as it could not be found in any of our publications so we gave the Mine Warfare section the description of 'OUR' mine. After a great deal of searching through old books and papers they found it, it was indentified as a Naval Spherical Mine 1905. The relevant paragraph is quoted: 'As a result of the Russo Japanese war (1904) it was decided to develope and standardise an independant mine as a British Naval Weapon. The type produced was known as the "Naval Spherical Mine". In 1905 orders were placed for 1,000 of these mines. In 1914 at the start of hostilities we had 4,000 of them.'

Two of these mines are now at the Joint Service Bomb Disposal School. Until our Harwich job they had not been identified.

A little more 'Professional' than the Plymouth Team's 'Jersey 1,000lbs. bombs' don't you agree?

ED. Well Plymouth?

* * * *

BEAUFIGHTER

One of our most interesting jobs both socially and work wise was the survey and demolition of a Beaufighter at Cleethorpes (near Grimsby) in March this year.

The team was called in to establish whether the aircraft was carrying any bomb load at the time of the crash which was in 1942, two and a half miles out at sea.

The Beaufighter could carry a load of one 500lb bomb, two 250lb. bombs or one 18 inch torpedo.

Demolition of Beaufighter at Cleethorpes

The aircraft crashed two and a half miles out at sea but it was uncovered at low tide and had been sighted at various times since the war, but the sands are always moving and the most that could be seen at any one time was a propeller blade and/or rear cockpit cowling and/or the top of the tail plane. The salvage of the aircraft was out of the question, due to the soft sand and the limited working time between tides.

After some searching about on our first visit to the scene we located the cockpit canopy which was just proud of the sand, and with the use of probes we found the engines which were buried about three feet below the sand. We started to dig down to them which was very hard work due to the fact that the wet sand was refilling the hole almost as fast as we were digging it out, but finally it was possible to place a charge below the wing and alongside the radial engine.

This charge had the effect of completely destroying the engine and making a crater which revealed a large part of the fuselage and the remainder of the starboard wing. A magazine containing cannon shells was removed from the wing.

Demolition continued in this manner, each blow revealing more of the aircraft and making it easier to place charges at strategic points. We also uncovered a jar of Brylcreem and a comb (identification confirmed R.A.F.) By the end of the day the starboard engine and wing and part of the fuselage had been completely destroyed.

The next day we found that the crater had almost been filled in again by the two preceding tides but as before the first charge uncovered a large part of the aircraft. On this day we managed to get below the fuselage and the undercarriage which was still folded, to confirm that there was no weapon slung below. The port engine was blown clear almost complete; we then destroyed that using a small charge. A second cannon magazine was removed from the port wing and the shells removed for subsequent disposal. No sign of the actual guns were found.

We found a bright green dye marker and this mixed with oil, sea water and wreckage, 'brightened' the whole scene up, and all the team working in it.

At the end of our 'Bangs' all that was left of the aircraft was small pieces of debris which were dumped in the hole and left for the tide to cover.

No bombs or torpedoes were found.

* * * *

HILSEA

At 1740 one evening the Boss had a telephone call from the Officer of the Watch, H.M.S. *Vernon* and was told that an object had been reported in the creek under the railway bridge that carries the main Portsmouth to Waterloo line from Portsea Island to the mainland.

When he arrived at the spot about an hour later he identified the object as a British beach mine MK IV, before the incoming tide covered it.

These mines are usually extremely senstitive and dangerous and hold a 5lbs charge of explosive. Because of this they should be countermined where they are found. In this case blowing this in situ was out of the question, as it was up against the 2nd buttress of the bridge from the mainland side and would cause considerable damage to the bridge.

The Boss went back next morning at 0530 with two of the team and they decided to attempt to transport it 400 yards from the bridge and countermine it. To lessen the blast effect in case of an accidental detonation they decided to carry out this part of the operation at the following high tide at 1100. To prepare for this a small net was made

and worked under the mine in the mud and secured by a line to the under part of the bridge.

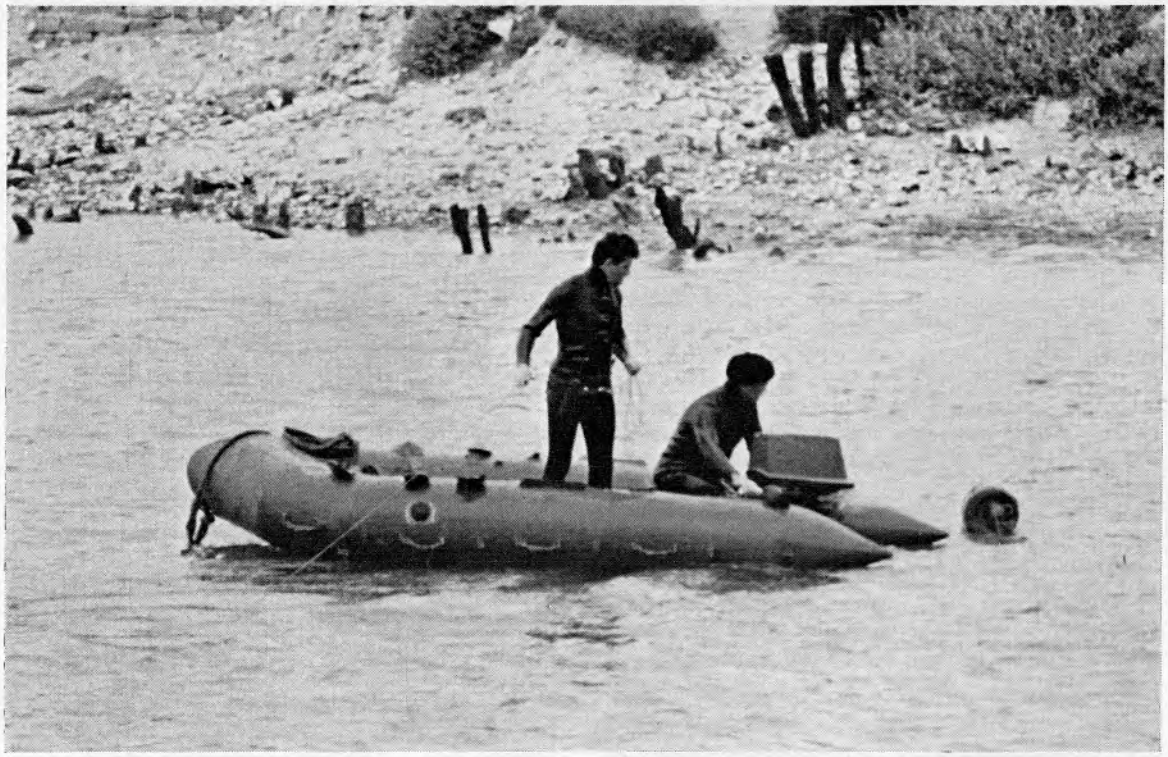
At 1100 the trains were stopped using the bridge. The line attached to the mine had been passed round a bridge guard rail and the end taken to the end of the bridge, the line was then hauled taut until the mine was lifted off the bottom, but still under the surface.

A gemini craft then moved in, took the line and slowly backed off with it to a point 400 yards up the creek. It was then lowered to the bottom, charges placed next to it and counter-mined at 1128.

NOTE:—The British railways for once in its life had a legitimate excuse for being late as train services were held up for 7 minutes.

At the time of going to press our Team is:—

Lt. C. Churcher, Boss I
Lt. T. J. Jones, Boss II (on loan)
C.P.O. 'Tug' Wilson, C.D.I
P.O. 'Joe' Maher, C.D.I
P.O. 'Roy' Coulson, C.D.I
(awaiting entry to Haslar)
P.O. 'Birdie' Brayne, C.D.II
(shortly to join the Police Force)
P.O. 'Trev.' Luter, C.D.II
L.S. 'Snowey' Limbrick, C.D.II
L.S. 'Pete' Powell, C.D.II
L.S. 'Smudge' Smith, C.D.II
L.S. 'George' Sissons, C.D.II
L.S. 'Buster' Brown, C.D.II
A.B. 'Percy' Percival, C.D.II
(leaving to work in a brewery)
Chief Mech. 'Jock' Cook, Art. Diver



Hilsea B Mine

S.S. "Great Britain"

BUILT by the great Victorian Engineer and Builder Isambard Kingdom Brunel and floated in Jefferies Dock, Bristol in 1843. She was the largest iron vessel afloat, and the first screw ship to cross the Atlantic.

She sailed for the last time 1886 when damaged off the Horn enroute to Panama from Penarth. She managed to reach the Falkland Islands, where she was used as a wool storage hulk for the Falkland Island Company until 1933. She was then taken to Sparrow Cove and sunk.

On the 1st March 1970, a British Salvage team consisting of Mr. L. (Spike) O'Neile, Salvage Officer for Risdon Beazley-Ulrish Harms; Don O'Hara, Senior Diver; Stew Watley, Diver; Bob Light, Shipwright and L. Craig Hackett, Diver, flew out to Montevideo and joined the Tugs *Varius II* and *Pontoon Mulus III* en route to the Falkland Islands. We arrived in Port Stanley towing the Pontoon on the 25th March where our equipment was waiting. The salvage equipment was loaded onto the Pontoon and then to Sparrow Cove.

The following day, having inspected the condition of the vessel, my time was taken by making the necessary patches and fixing the gear for the large split down the side to her keel, and the holes in the stern. The two other divers were air lifting a trench around the split so work could be carried out. The shipwright was employed fixing $\frac{3}{4}$ inch thick strengthening plates on her deck to hold the weak side and the German Tug crew were dismantling the three masts which weighed 20 tons each and one yard weighing 6 tons. With all these operations we had the assistance of the Royal Marine detachment stationed on the Falkland Islands.

After the masts were moved and the holes patched we pumped her out and floated the *Great Britain* for three days. The weather conditions were very bad, force 10—11 winds made it impossible to dock her on the pontoon, which we had sank in a suitable position. On the 13th April the *Great Britain* was docked on the Pontoon and air was pumped into the Pontoon and after 24 hours the *Great Britain* was high and dry out of the water and ready to say farewell to the Falkland Islands.

She has now been towed to Avonmouth and the old girl will have a refit to restore her glory.

DON O'HARA, *Diver*.

Decimilisation

DIVERS have been known to spend money like everyone else, in spite of some who tend to hang back at the bar. They are also known for a more practical approach to life and not wasting so much time on theories or mathematics. Therefore the approaching threat of D-Day may well pose a problem or two for them and their more free-spending wives.

The main problem will be to decide whether or not we are being 'seen off' for our pint when we have to pay £0·13 or £0·14. The normal currency conversions are easy because the coins look the same, certainly in size. The decision over the old 6d. remains awkward by being $2\frac{1}{2}$ new pence. There is, hoewever, a simple way to convert the old values to the new and vice versa. It is not dead accurate but within one old penny every time and this is how it is done.

If you divide the old shilling and pence figure by two and put the point in front of the answer you will get the figure in new decimilised currency. Here are some examples:—

(*a*) 10/– ÷ 2 = £0·50 or 50d.
(*b*) 3/6 ÷ 2 = £0·18 or 18d.
(*c*) 15/8 ÷ 2 = £0·79 or 79d.

On the other hand if you want to compare the new currency with the old value just double the new and put the shilling (/–) sign before the last figures as follows:—

(*a*) 38d. or £0·38 × 2 = 7/6
(*b*) 93d. or £0·93 × 2 = 18/6
(*c*) 12d. or £0·12 × 2 = 2/4

If these make more sense to you than me you should not be seen off too badly.

Divers' Annual Reunion Dinner

THE Annual Divers' Reunion Dinner for 1970 will be held at Kimbells Ballroom, Clifton Oak Lounge, Southsea on Wednesday 4th November at 1915 for 2000. Unfortunately due to ever rising costs the price of a ticket this year will be £2 2*s*. 0*d*.

In order to make the best possible arrangements, applications should be forwarded to the Editor as soon as possible. No bookings can be made without the receipt of money. Postal orders and Cheques should be made out to the 'Divers Annual Dinner' and crossed.

K.U.I.K. ACTION CUFF LINKS

Divers Helmet and Border in Gilt relief against Black Background.

Price 17/6 a pair.

Enquiries and orders to the Editor.

NOW IN STOCK

Four only—Blazer Badges. The Price now is 45/-.

TERYLENE FROGMAN/DIVER TIES

The ties are now priced at **£1 0 0** each

GREENBURGH BROS. LTD.

Dear Sir,

As already mentioned, my fears of a possible increase in price of Terylene Frogman/Diver Ties has now materialised.

The manufacturers inform me that 'there has been non-stop increases in cost of material and of labour since. So far we have absorbed these increased costs'.

I regret the increase, but I think you will understand the present trend of things.

I am,

Yours faithfully,

S. GREENBURGH.

Royal Alien Navy—conclusion

San Diego, California.
April 1970.

IN the year that has passed since my last article much water has passed under the bridge, and many changes have taken place within our organization.

The Alien Navy is gradually being dissolved.

Lt. Sutton returned to Australia last month, March 3rd. He was going back to the Diving School in Sydney as Executive Officer.

Major Lafontaine and Bill Lukeman are returning to Canada in mid-June, to a very good and important job, according to the latest 'buzz' from Canada.

Lt.-Cdr. Lafferty and I are tentatively scheduled to return early August, with hopes of a job somewhere?! (Any buzzes welcome!)

So our 'nine-month' visit is coming to an end. It is a pity that we will be unable to see the conclusion of a project, that has called for a lot of hard work and effort by all hands concerned, but we of the Alien Navy wish for them a successful conclusion, eventually.

At the time of writing, the M.K. 2 M.O.D. O. Deep Diving System (D.D.S.) is up at Hunter's Pt. Naval Shipyard in San Francisco, under-going a refit, with the I.X.501, where she has been since mid-October of last year. The refit and modification should be completed by the end of July and ready for its Operational Evaluation by October/November this year.

In review, the past year has been relatively quiet but we have all been kept busy with the usual mountains of paper work.

Major Lafontaine took over as Executive Officer of the unit about May of last year.

Lt.-Cdr. Lafferty is the Training and Operations Officer and as such has had to produce the training curriculums and procedures for all the Mixed Gas diving rigs we use, and the Mk. 2 M.O.D. O. D.D.S. The unit has been tasked with the training of all divers for the U.S. Navy's new Submarine Rescue Ships (A.S.R.), two at present being built, that will have the D.D.S. in them.

Lt. Sutton went with the *Elk River* (IX501) up to San Francisco last year where he remained until his return to Australia.

Bill Lukeman and I have looked after the practical diving training for our own personnel as well as the weekly diving practices.

Bill is at present running the first of the A.S.R. divers Mixed Gas courses, whilst I spend my time between San Francisco with the D.D.S. and San Diego, updating and writing the Operational and Emergency Procedures for the System.

We have also had an administrative change. We are no longer under control of the Deep Submergence Systems Project Office in Washington, D.C., but have been integrated with the submarine Development Group as the Diving Division, under their command. We will still be doing the same job, and at the moment it has only affected the administrative department.

We had a very welcome visit late last year by Lt.-Cdr. Honour, Lt. Cobby, Ginger Andrews, Bob Fraser and Tug Wilson and members of the A.E.D.T. who were over here working with the Mk. 1 D.D.S.; a 'portable' system, which is working out of Port Hueneme (pronounced 'Yneme') about 200 miles north of San Diego (just a short three-hour drive by Freeway).

We managed a very good 'social' visit up there from San Diego prior to their return to U.K. They certainly had Heuneme organized! They also made a very good impression on the Mk. 1 personnel, who have all asked to be remembered to their 'British Guests', including the fisherman aboard the U.S.N.S. *Gear*!

On my return from San Francisco earlier this month I spent three days with the Mk. 1 D.D.S., who are presently involved with an Operational Evaluation on the new Mk. 2 Semi-Closed U.B.A., known as the 'Abalone' rig, because it is entirely enclosed by the divers back and an outer shell. Everything was going very well. Whilst I was there they carried out four dives to 180 feet for 60 minutes with a decompression of about seven hours, with no problems. They have since completed a 300-foot saturation and are at the moment decompressing from a 650 feet saturation, during which the two divers had an excursion dive to 690 feet for two hours and then a three-hours dive the following day. The sea temperature was about 48° F. but the hot water suit heating system they are using gave them adequate protection, and their reports state that they were very comfortable during both dives. Let's hope their success continues throughout the Operational Evaluation, and that the Mk. 2 is accepted, as it is

indeed a comfortable rig to use.

The U.S. Navy has come up with a new Decompression Schedule for saturation diving, which they have had great success with so far on the saturation dives with which it has been used. It gives stops based on time rather than depth, as follows:—

0600—1400	..	Ascent
1400—1600	..	Stop
1600—2400	..	Ascent
2400—0600	..	Stop

with the following rates of ascents:—

Depth Range	*Rate of Ascent*
600 to 200 ft.	10 min./ft. or 6ft. per hour
200 to 100 ft.	12 min./ft. or 5ft. per hour
100 to 50ft.	15 min./ft. or 4ft. per hour
50 to surface	20 min./ft. or 3ft. per hour

The total decompression time works out approximately the same as the Decompression Schedule used on our saturation dive which I described in an earlier article. The idea being that divers should only sleep during the periods whilst they are held at the appropriate depth during a stop, and as already stated they have had great success so far.

If perchance you should bump into a familiar face later this year, around the Portsmouth area, dressed like something out of a 'Western' movie and speaking with a strange accent, bear with him, as I will most probably have just started my repatriation course in preparation for returning to the 'fold'.

Regards to all from a dissolving Alien Navy. Lt.-Cdr. Lafferty and I are looking forward to seeing 'you all' this summer.

Yours Aye. NOBBY.

The Clearance Diving Display Team

C.P.O. E. FOGGIN, B.E.M., C.D.I

THE Clearance Diving Display Team was created to assist the Recruiting and Careers Officers to attract youths leaving school into the Royal Navy. The team, consisting of one C.D.I and six C.D.II's were mustered in H.M.S. *Vernon* in May 1969 and the original team consisted of:—

C.P.O. E. Foggin, B.E.M., C.D.I	L.S. D. Green, C.D.II
	L.S. R. Lougher, C.D.II
P.O. L. Woods, C.D.I.	L.S. J. Clark, C.D.II
L.S. B. Revels, C.D.II	A.B. P. Lines, C.D.II

In true C.D. tradition the first thing was to establish a headquarters. Having searched *Vernon* we eventually found an office which everyone thought belonged to someone. This was duly commandeered then placed on a official basis with the Commander's approval. Next we rented a lay-apart store and vehicles. This done we spent most of our time at Pitt Street swimming baths working up a display and practicing.

In early July we were on the road to our first area which was the London Recruiting Area. The London Region includes the areas of Guildford, Canterbury, Watford, Luton, Chatham, Chelmsford and Croydon, so it can be seen that we had plenty of travelling to do between each school lucky enough to have a swimming pool. Here we encountered some difficulties, for some pools held as much water as a wet deck cloth but the team adapted themselves as only C.D's can.

I am pleased to report that the team were well received by every school, especially those in the country, where as you can imagine we found ourselves in many humourous situations. One thing about this job is that at least we are seeing our own country for a change and the team are in no doubt that this country of ours is the best of any. Long hair excluded we have a fine future generation of Britons growing up with a first class education and facilities.

To illustrate our mobility we have travelled 14,000 miles, visited 91 schools, 8 public swimming baths and two docks, and performed 140 public displays to date (April 1970). These do not include 'off the cuff' talks and demonstrations we have given to the Sea Cadet Units. We have also appeared on T.V. in the East Anglian and Border T.V. channels and appeared in local newspapers. We also had an audience with the Mayor of Walsall where they are real swimming and water polo enthusiasts—in fact Walsall are the national champions.

We have also played the schoolteachers at five-a-side soccer and where possible have played the older schoolboys at volley ball and basket ball.

The one fly in the ointment has been the necessity to change and retrain new members of the team, due to drafting commitments. In fact we have but one member of the original team with us at present. We have three more months to perform to complete the year's programme and though the effect on recruiting cannot yet be assessed it is safe to say, discounting a few rough patches in the winter, that the team have enjoyed doing this worthwhile job.

A Diver's Guide to Sharks

Part 3

THE RULES OF DIVING WITH SHARKS

1. Never go bathing, avoid goggling and think carefully about diving in the following areas and at the following times in tropical or sub-tropical waters.

(*a*) Areas with a reputation for shark attack.
(*b*) Coastal areas or bays open to the sea near or into which rivers flow and particularly if visibility is consistently bad and water temperature high.
(*c*) The outer entrances to passes through reefs.
(*d*) Effluxes of drainage or sewerage systems.
(*e*) In the surf water of reefs whose outer edge shelves gradually down to seaward.
(*f*) In busy ports.
(*g*) At dawn or dusk.

2. Do not spear fish just outside the reefs or in bays open to the sea in areas where there are known to be many sharks unless you are willing to take a big risk. Never attach speared fish to your belt.

3. Always dive with the skin fully covered. Clothes or diving suits worn should be in a sombre colour, dark blue, dark grey or green, black or brown. In tropical waters, a wet suit jacket and a pair of blue jeans constitute an ideal goggling or diving ensemble.

4. Never dive if you have a cut or graze which is bleeding or might bleed.

5. When goggling or swimming on the surface do not allow your swim-fins to break surface and slap the water. Always when duck-diving or moving in the water swim cleanly, making as little commotion as possible.

6. When diving in possible shark waters at least one member of the Diving Team should carry a metal batton or 'Billy' suitable for fending off an attacking shark.

7. If you sight a shark underwater do not panic. In almost every case it will pass you by without so much as a glance. Nevertheless carry out the following procedure:—

(*a*) Quietly close your co-diver.
(*b*) Join left arms in a wrist handshake, each man grasping the forearm of the other near the elbow and go shoulder to shoulder facing in opposite directions so that the two of you can cover a three-hundred and sixty degree arc of observation but can still communicate with each other.
(*c*) Remain immobile until the shark moves away. If the predator continues to circle or you risk running short of air, imperceptibly start moving back, still together, in the direction of your diving platform. Swimming close to the bottom, take advantage of natural cover, particularly vertical faces, on the way back.
(*d*) Be especially careful when starting to move off the sea bottom. It is at this moment that the shark is most likely to attack. Leave the water simultaneously in a single swift motion.
(*e*) If the shark starts to approach, shout underwater and both face it and swim towards it. If it comes into attack:—
  (i) Fend it off with shark Billy.
  (ii) Deal it blows with a knife handle or hard object on the nose.
  (iii) Finally and only if all else fails, attempt to wound the gills with knife or harpoon.

8. Do not let your feet or hands dangle in the water from the Diving boat.

9. The shark is not sport. Never spear fish for sharks nor wound a shark deliberately except as a last attempt to defend yourself.

10. In shark waters arrange to keep the diving platform as close as possible to the divers.

11. If you dive regularly in shark-waters learn as much as possible about the species and habits of sharks in the area.

Treatment of Wounds Caused by Shark Attack:

1. The circumstances in which shark wounds are inflicted and the dreadful nature of the wounds themselves have a peculiar horror. Extensive bleeding and shock are usually the major contributors to fatality.

2. It is all important that a victim should be got to a Doctor with the greatest possible speed. However, a certain amount of first aid can, if applied at once, save life.

The following measures are given in order of importance:—

(*a*) If the victim is not breathing apply mouth to mouth artificial respiration.

(*b*) If the victim is bleeding, every possible step must be taken to stop the flow of blood. This can be done by (in order):—

(i) Direct pressure on the wound with a clean pad. If this fails—

(ii) Direct pressure on the artery feeding the area of the wound using both thumbs then if this fails—

(iii) Apply a tourniquet so that a pad of pressure forces the vital artery against a bone. The tourniquet must be tight enough to stop arterial bleeding and should be slackened for fifteen seconds every thirty minutes and carefully re-applied.

(*b*) If unconsciousness overcomes the victim, ensure a clear air way.

(*d*) It is very likely that the victim will be severely shocked. He or she should be kept calm, warm and dry. Fluids should not be given by mouth if the patient can be brought to a Doctor within one hour.

(*e*) No delays should be introduced by First Aid other than that described above. If a doctor is not immediately available, do not wait—get the victim to the nearest Sick Bay or Hospital where plasma or blood is available as quickly as you possibly can.

Cammell Laird Sea Bed Vehicle

IN 1966 Cammell Laird initiated a survey covering the known and anticipated requirements of the growing underwater engineering industry, from which, it was evident that the area of commercial interest for the next ten years would be limited to the continental shelf, at a depth of say 200 m. Only in rare cases would engineering operations, as distinct from scientific research missions, be contemplated for greater depths.

Most underwater engineering tasks are carried out from the surface, using jetty-like structures or floating craft to provide a working platform, while much ingenuity is exercised in devising means to minimise underwater operations. Nevertheless, the employment of divers at some stage of the work is nearly always necessary. Such techniques become increasingly difficult as commercial requirements lead to a demand for installations in deeper and less protected waters and costs escalate.

There is, therefore, a growing interest in establishing underwater engineering methods in which the major construction tasks would be carried out on the sea bed, by means largely unaffected by water depth and where the work is less liable to interruption by surface weather conditions. Improved underwater work systems will play an increasing role in the inspection and maintenance of submarine installations, such as pipelines and cables, although the original installation may have been carried out by surface craft.

The key element in a true underwater engineering system is a mobile base on the sea floor, providing a stable platform, an adequate load capacity for equipment, power supplies and full diving support facilities. It is these requirements which dictate the basic form and design features of the Cammell Laird Sea Bed Vehicle (S.B.V.) and distinguish it sharply from the numerous small free-swimming submersibles which have been built or are proposed.

Perhaps the most obvious difference between the Sea Bed Vehicle and the conventional submersible is the use of an umbilical cable for power supply, and the wheeled propulsion system. These features stem logically from the basic requirements for an engineering work vehicle.

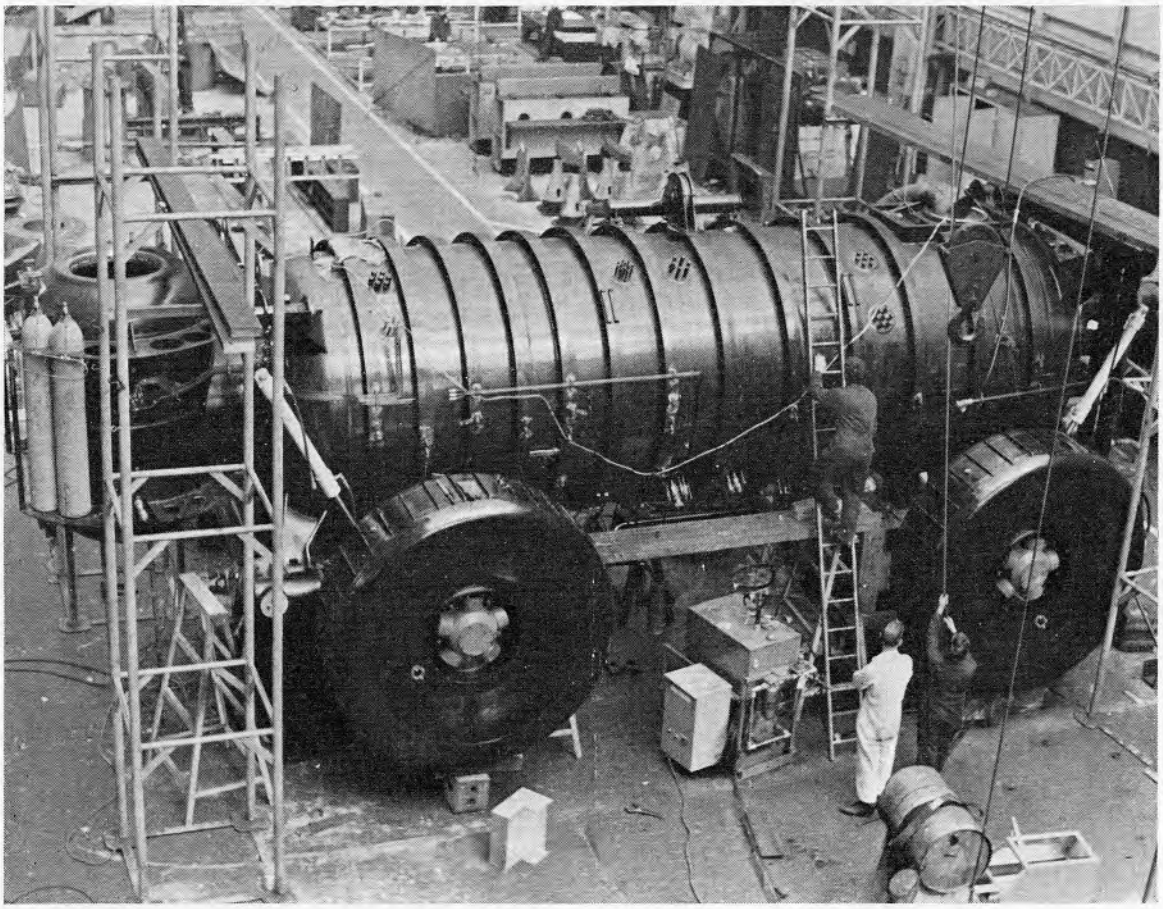
Conventional free swimming submersibles, powered by batteries, have necessarily a limited duration, and are incapable of powering heavy external equipment. The use of umbilical cables with these submersibles to provide unlimited power duration from a surface source, has been considered, but is not generally favoured for manned craft, although the U.S. Navy's unmanned recovery vehicles, powered in this manner, have been notably successful. The objections to the use of a cable on these submersibles are the effect of hydrodynamic forces, and the possibility of entanglement of the cable with the submersibles or other objects. They have little force in the case of the S.B.V., which has adequate stability to resist cable forces, and where the risk of entanglement can be largely avoided in the case of this vehicle, which operates on the sea floor, by making the lower part of the cable buoyant.

For an engineering work vehicle, ability to operate

freely in three dimensions is not necessary. The S.B.V. is designed to be towed on the surface, to descend vertically to the sea bed, and to travel along the bed. With this simplified mode of operation, the requirements for precise trim and buoyancy adjustment are much less stringent than for free-swimming submersibles and the necessary control systems are much less complex.

The requirement for a stable working platform at the sea bed able to resist reactive forces from tools and unaffected by currents, and the necessity for precise positioning, require that the vehicle should bear upon the sea bed with adequate preponderant weight, and should be propelled by wheels or tracks. Wheels were chosen, in preference to tracks, because as well as being mechanically simpler, lightly loaded wheels of large volume can operate on very soft bed material, sustaining load by displacement, in conditions where tracks would no longer give support. The large wheels, with their independent motor drives are carried on a very compliant suspension system, which takes advantage of the buoyancy of the hull to improve the distribution of wheel loading on uneven terrain, and makes capsize impossible.

The complete assembly consists of an inner pressure hull surrounded by steel providing 'hard' and 'soft' buoyancy. The use of these tanks rather than the inflatable rubber bags previously proposed, together with the results of model tests, has led to changes in design, and hence in the exterior appearance of the S.B.V. The forward section of the pressure hull houses the operating crew, machinery, instruments and controls. An air-lock through the bulk head provides access to the rear section which is equipped as the diving habitat. A hatch at the rear



Cammell Laird Sea Bed Vehicle

of this compartment leads to the transfer chamber fitted with upper and lower hatches. The whole pressure hull is designed for a maximum working depth of 600 feet while the rear compartment and transfer chamber can resist an internal pressure equivalent to that depth when the vehicle is at the surface.

The life-support system is designed to maintain normal atmospheric conditions in the forward (isobaric) section, and any desired oxygen/nitrogen/helium mixture, at pressures up to 270 lb./in.^{2}, in the after (hyperbaric) section and the transfer chamber. Facilities are also included for the provision of suitable breathing gas mixtures to divers outside the vehicle. Oxygen, air and premixed gases are stored in high pressure cylinders within the exostructure and fed through control panels to the different compartments. Carbon dioxide absorbent stacks and dehumidifiers are installed in each section. Monitoring equipment indicates gas flow rates and oxygen and carbon dioxide partial pressures in each section. The life-support system provides for a maximum of 20 man-days, normal operation, with a reserve of 40 man-days in case of emergency.

Observation is via closed-circuit television, with two cameras, complete with pan and tilt mechanisms and lights, mounted on booms extending in front of the vehicle. A further camera can be carried by a diver for inspection work. T.V. pictures are backed up by high resolution forward locking sonar. The Navigation system uses a Sperry navigator; communications with the surface are by telephone (through the umbilical cable, which can also carry the T.V. picture), or in emergency by an ultrasonic through-the-water link.

The S.B.V. meets the requirements for a stable working platform, with mobility on the sea bed, and capability of supporting extended diving missions, including saturation diving, at continental shelf depths. The large payload and power take-off availability will permit operation of heavy mechanical equipment, much of which is being developed. The vehicle is expected to find many applications in off-shore petroleum production and in underwater engineering generally. Several petroleum companies are currently working on equipment to operate on the sea bed, thereby minimising the use of platforms.

Specific applications envisaged for the S.B.V. include core sampling, rock drilling, pile driving, pipe laying and trenching, and salvage, using plant attached to the S.B.V., as well as the support of divers with hand-held hydraulic tools. Inspection (e.g. of pipelines and cables) can be carried out using television, with or without diver assistance. The S.B.V. concept also presents the possibility of transferring personnel, 'in-the-dry', between underwater work places, such as have been proposed for petroleum sub-surface completions and processing plant.

On completion of sea trials, scheduled for early 1971, the S.B.V. will enter commercial operation, under the management of Cammell Laird (Sea Bed Engineering) Ltd., a Company formed jointly by the builders and the National Research Development Corporation.

H.M.S. "Vernon" Athletic Championships 1970

Deepwater came first again, and *Osprey* division second.

P.O. Dadd 1st and L.S. Rassmussen 2nd in the 110 Meters Hurdles.

P.O. Dadd 1st and A.B. Warwick 3rd in the 400 Meters.

P.O. Dadd 1st and A.B. Bradford 2nd in the Pole Vault.

Lt.-Cdr. Burstall 2nd in the 5,000 Meters.

A.B. Pauly 2nd and Lt.Cdr. Burstall 3rd in the 10,000 Metres.

Lt. Harwood 1st and A.B. Barker 4th in the 800 Metres.

Lt. Harwood 3rd in the High Jump.

A.B. Pauly came 5th in the Long Jump.

L.R.E.M. Powell 3rd and Lt. Harwood 4th in the Triple Jump.

A.B. Grant 1st and L.A.M. O'Neill 5th in the 200 Metres.

Deepwater won the 4 x 100 Metres Relay, also the Inter-Divisional Cup.

P.O. J. Dadd won the Individual Aggregate Cup.

Osprey (the Young Seaman's Division) ran us a close Second.

NOTE:—The C.D. Basics on Course belong to *Osprey* Division not *Deepwater*.

Final Points:	*Deepwater*	179
	Osprey	161
	Engine Room	101

The Rest also ran! ED.

Is it only in *Vernon* that Divers play sport?

Diving and Insurance

By Hobbs Savill & Bradford (South West) Ltd.

Volume 16—2 was written by Mr. A. H. Davies and the figure of 20 years should have been 25 years. Since last going to Print the market has improved. More up to date information is shown below.

ESTIMATED FINAL PAYMENT FOR A MONTHLY OUTLAY OF £5
ENDOWMENT ASSURANCE PAYABLE IN 25 YEARS TIME

Age Next Birthday	*Average Insurance Company*		*Good Insurance Company*	
	Sum Assured	*Final Maturity Payment*	*Sum Assured*	*Final Maturity Payment*
25	£1,440	£2,592	£1,264	£3,306
35	£1,380	£2,484	£1,220	£3,190

ENDOWMENT ASSURANCE PAYABLE AT AGE 65

Age Next Birthday	*Average Insurance Company*		*Good Insurance Company*	
	Sum Assured	*Final Maturity Payment*	*Sum Assured*	*Final Maturity Payment*
25	£2,400	£5,472	£2,045	£8,820
35	£1,650	£3,234	£1,463	£4,535

THE article published in the last issue of this magazine endeavoured quite simply to bring home to divers the fact that it is possible by taking professional advice to obtain first class life assurance without paying an additional premium to cover the risk of service diving. Unfortunately, the comparison between the 'average' and the 'good' Insurance Companies are now slightly inaccurate due to increases in bonus rates paid by the various Insurance Companies and a revised table is shown below. This once more goes to show the need for professional advice as the life assurance market fluctuates continuously and generally without the knowledge of the general public.

Insurance is of course a long-term investment and we have never advocated that all your savings should be in a long-term insurance policy. There is of course a need for short term investment but until recently such arrangements have not been particularly attractive, or alternatively where there has been a prospect of high return there has also been a large element of risk involved. There are, however, several excellent short term arrangements now available and one in particular which we are able to recommend gives a *guaranteed* return equal to 14% per annum over a 10 year period for persons paying tax at 8/3 in the pound. Since the investment also includes life insurance equal to 180 times the gross monthly investment, it does of course qualify for full tax relief on the monthly investment and is ideally suited to the younger man particularly if he is single and in need of an investment which gives tax relief.

It is of course quite impossible for most individuals to be able to say that they will be able to save a certain amount each month for 10 years and so it is important, therefore, that should it be necessary to discontinue the investment before 10 years that the cash value should be as high as possible. With this arrangement these values are extremely good and as an example we show at the end of this article, specimen values based on a gross investment of £10 per month.

One final point; the life assurance cover is not loaded for persons engaged in diving.

For further details of this scheme or advice on any other investment problem please contact the writer.

Year	*Cash Value*	*Total Investment After Tax Relief*
1	116	100
5	638	501
8	1,094	802
10	1,533	1,003

Go Further with Western

HERE we are again to regale you with the activities of that very excellent band of men, The Western Fleet Clearance Diving Team.

We returned from Christmas leave on 5th January, suitably weary after two weeks celebrating in a variety of different ways. That day we set off for Scotland for a night exercise on 6th January with the 1st M.C.M. Squadron in Aberlady Bay. The weather was foul on the way up with the majority of roads blocked by snow, however we arrived just in time for the night attack. The following day we drove back to Portsmouth feeling on arrival as though we had taken part in the Monte Carlo rally.

A night attack at Portland the next week followed by a trip to Plymouth for a daylight attack on *Bulwark* anchored in Plymouth Sound on 17th January. Needless to say we said 'Hello' to the few members of the Plymouth Team who happened to be around that Saturday morning!

Then followed five weeks of trials with A.E.D.U. Directed by the redoubtable Stuart Honour we spent a week in Langstone Harbour carrying out underwater painting trials—not the best of places in January! Then two weeks in Loch Fyne doing trials on that elusive beast, C.D.B.A. Mk. 2. After this a rush back South for further Operation Awkwards at Portland for F.O.S.T. One of these meant us attacking seven ships of Standing Naval Force Atlantic. This necessitated using 18 divers—quite a number for the Boss to worry about! Throughout these five weeks further trials were carried out on other elusive beasts—cuff relief valves; the Boss's comments are all on paper!

On 23rd February we were once again progressing towards Scotland via Manchester of course! The inhabitants of Gretna Green see us pass so often they now no longer take our photographs for their souvenir albums. Sorry, I'm digressing—not that Gretna is much of a place anyway. In fact, we were heading North to take part in Captain M.C.M's annual jolly off North East Scotland. This year it was called Exercise Fanny Adams. We spent two weeks

thrashing around in the mud off Port Edgar and carrying out trials on the Transit Sonar, of which another screed later maybe! Based on *Laleston* we were having a happy existence, looked after by that venerable diver 'Jack' Smith when out of the blue we were ordered to the Isle of May. During the next three days search for an R.A.F. Lightning in 160 feet, which we recovered, we moved from *Laleston* to *Kellington* to *Abdiel* to *Bildeston* to *Laleston* to *Bildeston* and so on. We made lots of brief friendships, sampled all manners of foods and carried out some interesting and good diving.

On completion of the search we returned to *Vernon* arriving 11th March. There followed a week in Portland for another Awkward before with some relief Easter Leave arrived on 25th March.

Returning from Easter Leave suitably refreshed on 13th April, we immediately headed for Wales and that favourite watering spot for the Team—Aberporth. We were there for two weeks but operations were greatly hampered by bad weather. However *Bronington* joined us and we were able to do a bit more before we left for Portland on 25th April. For those of you who are thirsting to know, Aberporth is still as beautiful as ever and certain members of the Team renewed old acquaintances with the expected determination and devotion to duty.

After several more night attacks at Portland we set off for the west country on 12th May. We set up camp at Woolacombe in North Devon. Here for ten days we practised various methods of beach clearance which we shall need for an exercise in the near future. A very successful time helped by good weather, calm seas and a good beach. By the way I recommend Woolacombe for your leave—especially the bachelors!

At the time of writing the Team is waiting to fly

to Gibraltar with our vehicles, to carry out various differing tasks.

After this we have trips to Denmark, Italy and South of France to look forward to.

The future looks rosy, we are happy, the Team is without doubt the best and has the most interesting jobs of any in the Royal Navy—so put in your draft chit!

Here are the Team members at present, June 1970.

Lt. R. J. Riches—The Boss—now bald.

Chief 'Dutchy' Holland—I am allowed to say nothing after the last comment!

P.O. 'Neil' Primrose—Now O i./c. the 3 Tonner.

P.O. 'Terry' Settle—The Teams' Buffer and Social Secretary.

L.S. 'Ian' Duxbury—Co-driver of the lorry. Terror of the highways.

L.S. 'Woolly II' Wooldridge—Sadly, shortly to leave us.

L.S. 'John' Prictor—Considers Landrovers too low and travels in his Daimler.

L.S. 'Tim' Timberlake—Getting used to the hard life after the Far East.

L.S. 'Fez' Parker—At last—a couth member of the Team.

L.S. 'George' Sissons—A man who has had more draft chits in a day than anyone else.

A.B. 'Woolly I' Woolnough—Will be destitute when Woolly II leaves.

A.B. 'Chris' Page—Our man about Mayfair.

L.M.E. 'Mo' Morton—Seen any Johnsons anywhere?

All the best.

FOUR FINS.

Divers in the Seals' World

by ROBERT BURTON

THE development of free-diving has opened up many new fields to biologists. One of the most exciting is the study of the habits of large marine mammals for, until recently, most of our knowledge of the large whales came from specimens washed up on beaches or hauled into whales factories. Now it is possible to meet them in their natural habitat, as demonstrated in one of Cousteau's recent films on television which showed spectacular shots of a man hanging onto the fin of a whale. One of the drawbacks to this method of research is bad weather: not only is working from a small boat difficult, the water becomes too turbid to see much.

In one part of the world this problem does not arise. The waters surrounding the Antarctic continent are frozen for most of the year and it is impossible for the sea to be rough with 6 feet sheet of ice covering it. Consequently, the water is exceptionally clear. There are four species of seals living in Antarctic seas and one, the Weddell seal, is particularly common near the coast. The Weddell seal is a tubby, placid-looking creature, about 9 feet long with a spotted grey coat. It lives under the ice, breathing through natural cracks or through holes which it makes by sawing with its teeth. In early spring the females haul out onto the ice to bear their

single pups, returning to the sea six weeks later when the pups are weaned. Little more is known about their habits because they live in the water for the rest of the year, coming out only to bask. However, there seems to be some rivalry between the males because, at this time of the year, they bear fresh wounds and sometimes fights are seen. Weddel seals can also be heard calling under the ice; strange trills and whistles, more appropriate to a bird than a mammal that ought to roar like its relative the sea-lion.

It was to this underwater world that a team of American biologists came to study the Weddell seal. Although the water temperature was below freezing and the ice cover cut down the light, diving was made very simple by the provision of a hut built over a hole cut in the ice. Here the biologists, led by Carleton Ray, lived and worked, donning wet suits and S.C.U.B.A. apparatus to join the Weddell seals in their own home. A more comfortable way of watching the seals was to use an observation chamber that could be let through the ice. This consisted of a 12 feet tube with a 6 feet by 4 feet 'box' with six windows giving an all-round view. Its only limitation was that the observer could watch only a small area, whereas the S.C.U.B.A. diver could follow the seals as they swam under the ice and even slept, held in place under the ice by their positive

Weddell seal and pup

buoyancy.

The ability to sleep underwater highlights a prowess at diving that puts the human diver, tied to his cylinder capacity and decompression tables, in the kindergarten class. Another American biologist, G. L. Kooyman, attached depth recorders to Weddell seals, recovering them as the seals surfaced at their breathing holes. Kooyman found that his seals were regularly diving to depths of 1,000—1,300 feet and the record was an incredible 600 metres (approximately 2,000 feet), the depth of the sea in that area. The record duration for a dive was 43 minutes 20 seconds. In these deep dives the seals were surfacing steeply and without a pause but were safe from bends because they exhale before submerging and such air as remains in the lungs is contained in the bronchioles where it cannot pass into the bloodstream. As a result there is very little gas in the blood during a dive. However, it is still not known how the seals survive the hydrostatic pressure of these depths; for instance, what happens to the air in the mouth, throat and intestines.

Carleton Ray and his associates could not follow the seals on their deep dives, but they were able to watch the males stake out territories just under the ice. These territories were not guarded so vigorously as those of songbirds such as robins and blackbirds which can often be seen skirmishing along their borders. A male Weddell seal allows other males into his territory, providing that they show due deference to him. If not, he challenges them with a thumping call and Carleton Ray found that he could attract seals by playing tape-recorders of these calls. One seal even climbed into their hut to challenge this 'interloper'.

The seals seemed unperturbed by the presence of humans in their territories, although surprise was expressed on both sides when a seal and a diver surfaced together at a breathing hole. Peaceful coexistence was to be expected, however, as Weddell seals can be easily approached as they lie, basking, on the ice. But another Antarctic seal is always treated with caution. This is the Leopard seal, named for its spotted coat. It has a large ugly head, a mouth set with long pointed teeth and a reputation as a ferocious killer of penguins. It will also chase men over the ice and follow small boats, and this has given it the added reputation of being dangerous to man. This is very unfair to the seal which has an overwhelming sense of curiosity and would probably lose interest if the man stood his ground instead of running away, so provoking the seal to follow. British divers have met Leopard seals in Antactic waters but, so far, their sense of curiosity has been less than the seal's and they have not waited to test this theory.

Breath-hold Diving

H.M.S. *Dolphin*,
Gosport.
22nd June 1970.

Dear Editor,

After discovering that the National Spearfishing Team had almost no knowledge of the major part of their sport and passed out in the Submarine Escape Training Tank regularly, I thought that it was time to produce a reminder to breath-hold divers. I have sent the enclosed manuscript to the National Underwater Instructors Association, mainly because I am on this council, so they can put it out to any diving magazines they think fit. I know that C.D's don't do much of this sort of diving, but plenty of sport divers do read the R.N. DIVING MAGAZINE and I thought that I might get at them through your pages. Please use my article as you wish.

Is the Editor still P.O. Cobb. If so, my warmest greetings to you, and I shall call and see you when I next pass through *Vernon*.

You may recollect I re-qualified as a Ships Diver under P.O. Scott and yourself in 1964, I am now fully recovered and still in date.

Yours Sincerely,
MATTHEW TODD.

* * * *

AS long as humans swim some will swim underwater, and, human nature being what it is, there will always be contests to prove who can swim furthest, deepest, longest or collect most fish. Being humans in competition we forget our limits, and when we go beyond them in diving we do so outside our normal element. The human body is not 'fail safe' in water.

Then how do gannets, cormorants, seals, whales and other air-breathing creatures survive? The simple answer is that they swim and fish to live, not to win competitions. Not so the human being. He is able to remember his performance, to boast and sometimes lie about it, thereby tempting his fellows into even greater physical extravagances, sometimes to the death.

The aim of this article is not to prevent boldness in human beings: such an aim stems from arrogance or envy. Nevertheless, from time to time a reminder should be published so that those now taking up diving and underwater swimming may know exactly what they face and what to do when they or their friends meet trouble.

First let us consider breath-holding.

What prompts us to take another breath?

It is the building up of CO_2 in the lungs since the last breath was taken. This increases the quantity of CO_2 in the blood which acts on a brain centre stimulating the body to expand the chest and take another breath. Lack of oxygen gives no reliable warning signal.

Under normal circumstances the source of this signal is immaterial because the presence of excess CO_2 in the lungs gives fair warning of the impending lack of O_2. However, in competitive underwater swimming some contestants are tempted to add to their range by massive overbreathing, or hyperventilation, before submerging. This makes them giddy and impairs their judgment for a start, but, far worse, it quite abnormally lowers the CO_2 content of the blood. During the swim large quantities of O_2 are consumed but, having started artificially low, the CO_2 level is late in reaching that required to signal for a new breath. The swim is continued until lack of O_2, hypoxia, takes charge and quietly with no fuss the swimmer passes out and drowns. Deaths from this cause are legion and near misses are uncounted.

Now look at breath-hold diving for depth. The air we breathe is roughly 21% O_2 and 79% N, and this serves us very well at an ambient pressure of 1 Atmosphere. Applying Dalton's Law of partial pressures we are breathing a partial pressure of O_2 of 21% of 1 Atmosphere. If we take a lungfulll of this mixture at 1 Atmosphere and then go to say, 4 Atmosphers, or 99 feet, we get there with our lungs quarter full of 21/79 mixture at 4 Atmospheres. The partial pressure of O_2, allowing little or no consumption during the trip, has then become $21 \times 4 = 84\%$ of 1 Atmosphere. Still at 4 Atmospheres we swim around, reducing our O_2 perhaps to a quarter of our original store. At 4 Atmospheres ambient pressure the partial pressure of O_2 will then be 21% of 1 Atmosphere and perfectly satisfactory. We now return to the surface and an ambient pressure of 1 Atmosphere, and the partial pressure of O_2 is therefore reduced to about 5% of 1 Atmosphere and insufficient to support life. Indeed, anywhere between about 40 feet and the surface the diver is liable to pass out. Normally he will sink rather than float, dying as he goes.

This paints a gloomy picture but regrettably true one for the ill-informed breath-hold diver.

What guidance can we give?

First, never hyperventilate before a dive. Two consecutive really deep breaths and then the final breath taken before submerging provides the greatest flush-out of CO_2 advisable.

Second, do not overwork or linger at depth. Though things may be going well at your working depth, never forget that the partial pressure of oxygen which is looking after you at depth will be sadly reduced by the time you return to the surface. As a rough rule, never stretch a deep dive longer than you can hold your breath doing equivalent work at the surface.

Third, if you can arrange that you are buoyant from 30 feet upwards you will at least make sure that your body floats when you become unconscious during the ascent from a deep dive.

Fourth, always dive in pairs, one to go down while the other watches.

What do you do with the unconscious breath-hold diver?

First, get his head into the air preferably with his whole body or at least his chest out of water. (Expanding the chest by any means requires extra effort if the chest is still under a weight of water). As soon as he can breathe he will normally recover with no ill effects. If he has gone past this, he will require mouth-to-mouth resuscitation, which of course can be given in the water if required. Bear in mind that water in the lungs passes quickly into the bloodstream particularly if it is fresh water, so, even if the patient has revived, get him under qualified medical care as soon as possible in case of after-effects.

One last point, never dive with lungs only part inflated. Some divers who are very buoyant may do this to maintain their depth more easily. Never fall for this, the consequence may well be a 'squeeze', where the pressure in the lungs is less than that on the body, and blood is forced into the lungs from the blood vessels around them. This may reduce the efficiency of the lungs to the point where they can

no longer support life. Immediate application of oxygen or at least mouth-to-mouth resuscitation is the only possible cure.

At first sight it would appear that breath-hold diving should be much safer than relying on breathing equipment. However, mechanically equipped divers, breathing normally, have reached a compromise situation in this undoubtedly hostile environment underwater. If they plan their dives properly they can live underwater almost indefinitely.

The breath-hold diver has nothing on his side because the human frame is poorly equipped for underwater work. Compared with other denizens, even air breathing ones, he is a very poor performer. He is clumsy, slow, weak, often nearly blind and has very poor endurance. He must never forget this. The sea doesn't.

Lt.Cdr. TODD, R.N.

R.N.R. Divex 1970

TO Lt.-Cdr. 'Jock' Tennant, standing in the Booking Hall at Euston Station at 10 p.m. on Friday 12th June, the slow realisation that months of planning were at last bearing fruit—began to dawn, as familiar faces began to converge on him.

So began the first ever Royal Naval Reserve Diving fortnight. in which divers from the London, Sussex, Mersey and Clyde divisions all participated.

As Lt.-Cdr. J. G. Tennant, V.R.D. R.N.R., Commanding Officer of H.M.S. *Isis* and O.T.C. of R.N.R. DIVEX 70 was watching his crew assembling round him at Euston, so was Lt.-Cdr. A. J. Bull, R.N.R., Commanding Officer of H.M.S. *Dee* at Liverpool. Both vessels were destined to rendezvous at Lamlash on the Isle of Arran on Sunday evening and the crew of *Isis* had to join the ship at Greenock.

For H.M.S. *Isis* the passage to Lamlash from Greenock was uneventful, the sun was shining, the sea was calm, calm enough for the O.O.W. to observe at some distance a large basking shark the sight of which made many a diver's toes involuntarily curl. The anchor was dropped in the harbour and as there was no sign yet of *Dee* and the evening was so beautiful 'hands to bathe' was piped. This event became almost a fashion parade as newly bought or newly made 'wet suits' and bootees were given their first wetting and a lot of Sassenachs realized for the first time that Scottish water was colder than English water.

The sun set just after ten and there was still no sign of *Dee* and anxious looks began to be exchanged between the O.T.C. and the Squadron Diving Officer Surg.-Cdr. Frank Preston, V.R.D., R.N.R. because the entire diving equipment for the Divers under training was aboard her. However she was sighted shortly after, having crept surreptitiously into another corner of the harbour. Soon she was alongside *Isis* and the entire team of diving personnel met for the first time.

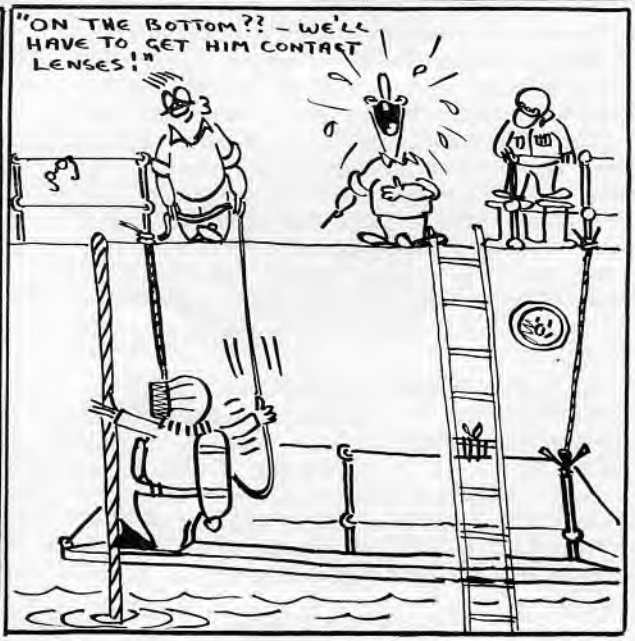
Basically the idea of the exercise DIVEX 70 was to qualify R.N. wise the R.N.R. trained divers of as many divisions as possible and at the same time to enable everyone to get in their annual fortnights training at sea.

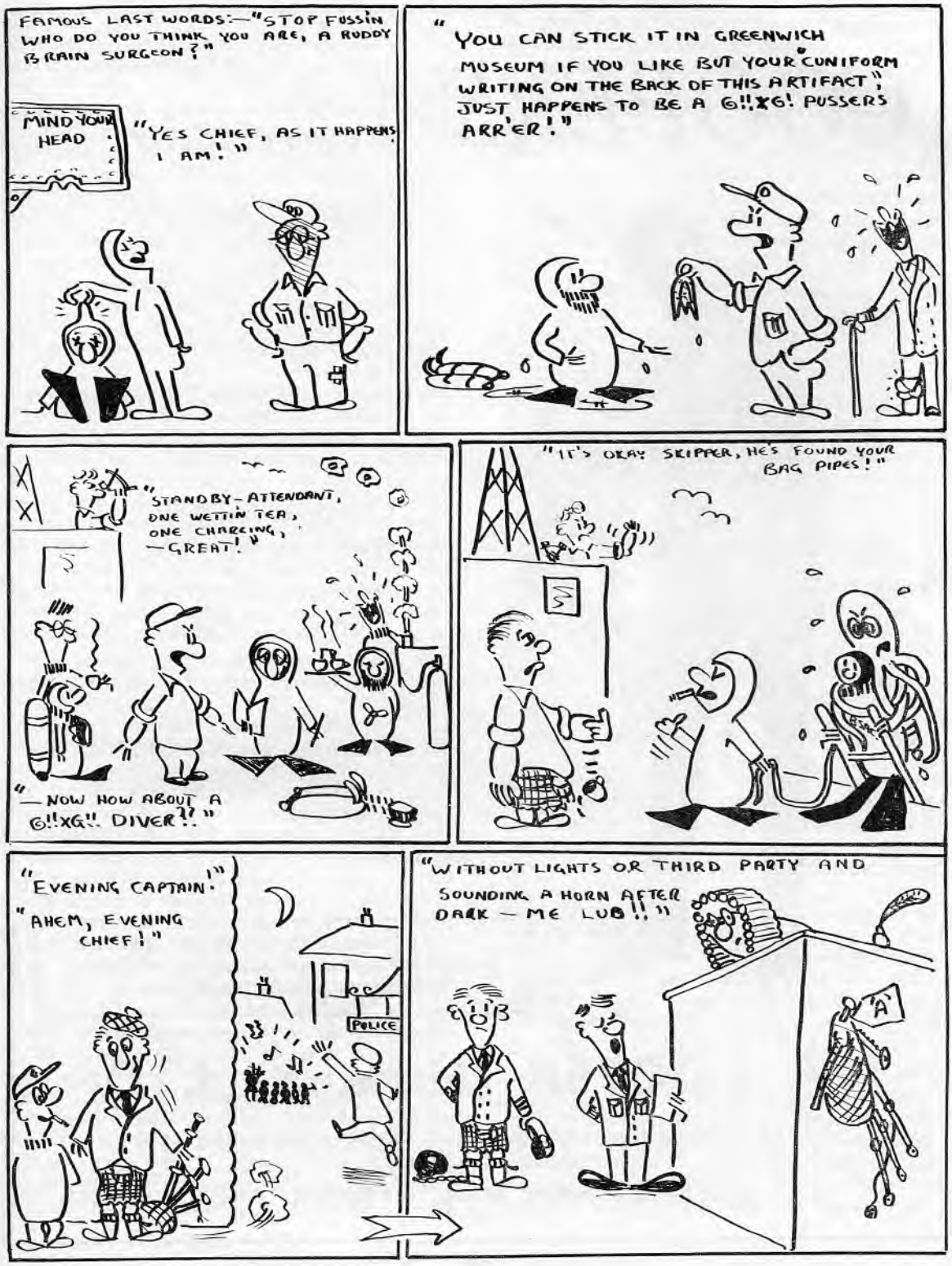
The former project was to be attempted by a staff of highly trained R.N. diving personnel, namely Lt. Bill Grady, R.N. and Chief Petty Officer C.D.1 M. Brassington, R.N. The latter part of the project was to consist of a fairly tight schedule of sea runs.

The vessels left Lamlash in company on Sunday morning and sailed through the beautiful Sound of Islay in glorious sunshine. Almost as breathtaking as the scenery was the sight of so many Distilleries in such a small area with their tall chimneys smoking industriously. 'Lang may their Lumbs reek' someone said. That evening the two ships berthed in Oban.

On the Monday the diving training began. It had been decided that the two ships would sail from Oban into the Sound of Mull to a small town called Craignure and tie up to the pier. This was done and diving commenced from the deck of *Dee*.

It should be pointed out that the entire ships company of both ships with only about three exceptions were either trained ships divers and S.D.O's or divers under training. The form was that the diving training should be carried out aboard *Dee* and that the trained diving personnel would operate from *Isis* on a series of expedition dives. This was carried out the following day when after a night back at Oban the *Isis* returned to Craignure and *Dee* went across to the other side of the Sound of Mull to dive in an interesting looking spot called Innismore Bay. A depth of 12 fathoms had been





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requested by the R.N. Training personnel and minutes later the Squadron Navigator could be seen tearing his hair because the chart said 12 fathoms the echo sounder gave a much greater depth and finally the hand lead line gave a totally unrelated reading. It was finally decided that the chart was unreliable, the hand lead was four fathoms too short and that the echo sounder was reliable. This set the pattern for all future dives because a number of discrepancies came to light on the older survey charts. *Dee* would select the spot and then sound around until the required depth was found. On Tuesday evening both ships sailed up the Sound of Mull to Tobermory and a mad rush for hot baths started. The Mishnish Hotel proprietor, Bob McLeod who was also Provost, very kindly sub-let his bathrooms to the very needy divers as well as supplying impromptu meals to the hungry. On Thursday 18th, after one more days diving in the Sound of Mull, both vessels sailed for Portree calling at Inverie Bay on the Northern side of Loch Nevis on the way for a days diving. *Dee* had preceeded *Isis* which was due to sail from Tobermory two hours later. It was considerably after this that *Isis* finally appeared and looking rather sore about the nose. It transpired that the quixotic engines had gone half ahead instead of half astern when unberthing from Tobermory and they had nearly ended up in the Mishnish Hotel with the ship.

The passage to Portree was undertaken that evening through the Sound of Sleat and the narrows of Kyle Rhea and the Kyles of Loch Alsh and finally through the narrows of Raasay to Portree. This entailed some very tricky navigation and both Navigators who had done a day's diving on top of this were pretty tired by the end of the day. However the next four days were spent in Portree and the mysteries of the S.D.D.E. were explored by the class. Divisions were held on the quay on Sunday morning and it was a fine sight to see both ship's companys fallen in smartly and looking smart in full uniform after days in relaxed diving rig. A large number of the ship's company attended church and the service was recorded by the B.B.C. and broadcast the following Sunday. In the afternoon 'voluntary' diving had been arranged by the 'Chief' with a gemini, and a pleasant bay nearby had been selected as having a nice even depth. However it was while Chief R./E. Woods of Sussex Division was looking for his spear which had slipped from his hand that 'Woods Hole' was discovered. This was a hole the depth of which was a good 100 feet in an area charted as an even 12 fathoms. The depth was verified personally by the Squadron Navigator, Lt.-Cdr. W. G. Constantine, R.D., R.N.R. on a buddy line with P.O. M. E. Ryan of Sussex Division. A 'wee note' is even now on its way to 'Droggy'. A very pleasant days diving was spent in the same bay the next day when the S.D.D.E. gear was taken out in the gemini and a base camp established on the beach. Between diving instruction the Chief gave his class a lesson in survival on a beach in the pouring rain. Within minutes of scouring the beach for driftwood a good blaze was established (the Navigator nearly going up with it when it was ignited) and potatoes were being baked, beans, coffee and mussells all on the boil.

The qualified divers had organised themselves an exped. to the other side of the Isle of Skye on the following day and an enjoyable day was had by all. The vessels sailed for Mallaig on the Tuesday evening 23rd June, arriving shortly after 7 p.m.

After a night in Mallaig, *Dee* set off to find a spot to do her deep dive exercise for the trainees. A bay with the required depth was selected to the East of Ardnamurchan Point (forgotten the name Chief) and the 120 feet dives were successfully carried out, under the additional supervision of two more R.N. staff who had finally managed to join the ship after delays by lack of Ferries and alterations in the ships' schedules. After completing the days diving the *Dee* carried on down the Sound of Mull flashing up the *Isis* who had gone on ahead to Craignure later that morning and the two ships followed each other back into Oban. On the way in the Port engine of the *Dee* blew a gasket and had to be stopped, and *Dee* was brought into Oban on one engine. That night in Oban a farewell dinner had been arranged at Mac Tavish's Kitchen, as the diving training was now ended and the class wished to show its appreciation to their Royal Navy Instructors, to the Commanding Officers of *Isis* and *Dee*, and also the Squadron diving Officer. A most delightful evening was had in the 'Kitchen' with Folk singing in which the diners joined lustily. But to cap the entertainment for the evening a duet on the bagpipes was given by the C.O. of *Isis* and Surg. Lt.-Cdr. Nigel Malcolm-Smith, R.N.R. The evening almost ended in disaster when the diners, on their way back to the ship, were strongly requested by the local constabulary not to blow the bagpipes at 11.30 p.m. in Oban.

On Thursday the R.N. Instructional Team left us to return to Portsmouth with enough documentary evidence to keep them busy for days. Due to bad weather the two ships stayed in Oban all day Thursday and the opportunity was taken of sorting out all the diving gear which had by now got well mixed up between the two ships. On Friday morning

the weather having improved the ships left Oban in company and steamed out through the Sound of Kerrara, back through the Sound of Islay, finally parting company after nearly two weeks, off the Mull of Kintyre as *Dee* wished to continue on to Campbeltown and finally back to Liverpool. Thus *Isis* was left on her own for the long haul back down the Irish Sea round Lands End to Falmouth, arriving at 11.30 p.m. on Saturday 27th June. From Falmouth the crew went by train to their homes for a thoroughly deserved rest.

Horsea Island Sub-Aqua Day 1970

ON Sunday 17th May 1970 at 1100, Horsea Island was invaded by members of the British Sub-Aqua Club for the annual Open Day. Luck was on our side and the weather was fine and sunny.

The usual static displays and demonstrations took place, and approximately 1,500 people crossed the causeway to look us over.

The Standard Diving was once again very popular and it was regretted that many people were disappointed but this was purely due to the small number of staff available to run the display.

"*All join up for the Horsea Island Conga*"
C.P.O. OEA/O K. C. Locke-Scobie, L/Sea A. R. Docherty, AB A. Pauly

The fast dress competition between the C.D. Basics and the C.D.2's qualifying proved very popular and a certain C.D. 1 who shall remain nameless took great delight in showing his talents as the task master. (The slaves responded admirably).

711 Squadron dropped in for the S.A.R. demonstration and this year a Wessex Mk. 1 helicoptor was used, the diver using B.A.S.A.R.*

J.S.B.D.S. (now D.E.O.D.S.) invaded the Island with khaki coloured trucks producing an excellent display of ordnance and equipment.

The new Decompression Sickness film 'Bending and Unbending' proved very popular and this was the first official showing to the public.

The day ended with the fin swim competition, Aquatic 'A' team being the winning club.

Results:

1,000 METRES: 1st D. Parsons, Aquatic 'A'
2nd L. Sell (Miss), Aquatic 'B'
3rd M. Perry, Aquatic 'A'
4th J. Beven, Southsea.

TEAM RELAY: 1st Aquatic 'A'
2nd Southsea
3rd Aquatic 'B'

We hope the visitors enjoyed themselves. Our thanks to *Osprey* Division for backing us up with hands.

* Breathing Aparatus Search and Rescue.

(Joint Service Bomb Disposal School) now (Defence Explosive Ordnance Disposal School).

Advancement

C.D. II—6-3-1970
L.R.O. Miller, *Laleston*,
Diving Tender H.M.S. *Vernon*
A.B. Owen, MIX Section, 62 N2 H.M.S. *Vernon*
A.B. Winston, *Neptune*, Scotland
A.B. Pauly, J.S.B.D.S.,
Bomb Disposal School, Chatham

C.D. II — 3-4-1970
R.E.M. Day, *Laleston*, Diving Tender H.M.S. *Vernon*
L.S. Brown, *Neptune*, Scotland
A.B. Coombes, M.C.D.O's, *Vernon* Officers Course
A.B. Adams, *Cochrane*, Scotland

C.D. I's — 6-2-1970
L.S. Whelan *Cochrane*, Scotland
B.S. Barker, Staff, *Vernon*
B.O. Lett, Staff, *Vernon*
L.S. Trotter, H.M.S. *Drake*, Plymouth
L.S. Clarke, Staff, *Vernon*
B.O. Kneebone, R.N.Z.N., New Zealand
P.O. Tennant, R.N.Z.N., New Zealand

C.D. Basic — 17-3-1970
O.S. Wilson, *Maxton*
O.S. McVittie, *Kirkliston*
O.S. Brigham, *Brinton*
J.S. Cox, *Brinton*
J.S. Neil, *Gavington*

My Favourite Suit

'CLAMMY DEATH' was really an ill-deserved mis-nomer for this warm, comfortable, though not exactly streamlined suit. Although often referred to as the 'Sladen Suit', a name derived from its inventor' 'Clammy Death's' official name was the Admiralty Shallow Water Diving Dress Pattern 3420. The 'P' Party suit was similar although of slightly heavier twill, and both suits gave sterling service during their careers (P. Party 1944—1955: S.W.D.D. 1943—1961).

Advantages of S.W.D.D. and P. Party Suit compared to the U.W.S.S.

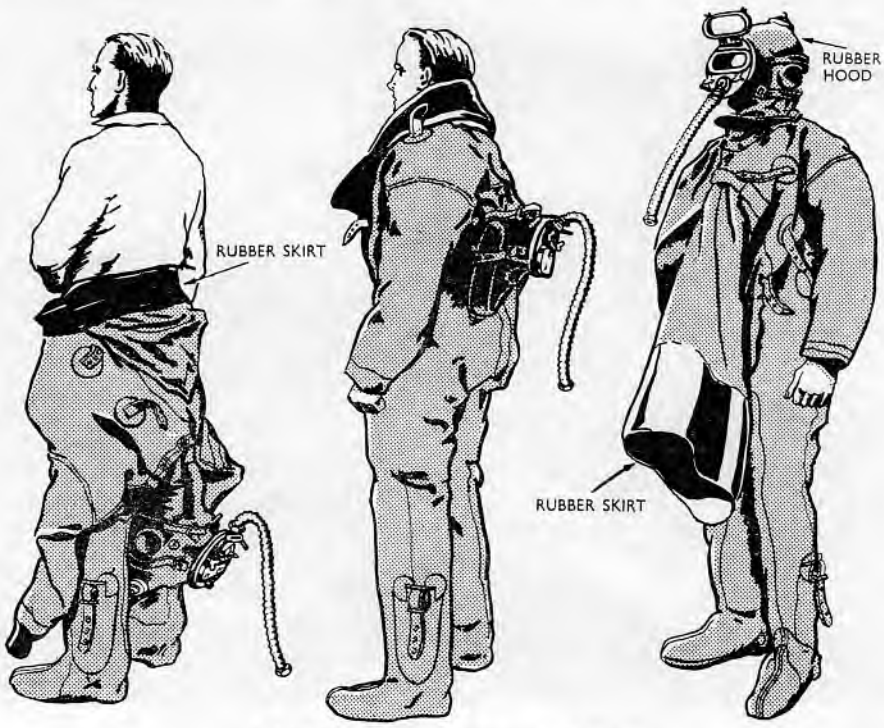
1. More robust than the U.W.S.S. and therefore not easily damaged when working on propellers, wrecks and rubbish strewn bottoms.
2. More comfortable especially in cold weather, when plenty of woollens could be worn without loss of mobility or of negative buoyancy.
3. Could be used for diving on air. S.W.D.D. on air was a most comfortable form of diving, but one needed a good panel operator.

Disadvantages

1. It was impossible to slip your breathing apparatus. (In emergency, boots and weights could be ditched which gave sufficient buoyancy for a quick ascent).
2. The oval face-piece gave limited visibility. The suit usually proved equal to any emergency and the author well remembers being 'blown up' on the wrong side of H.M.S. *Dipper* when diving to 120 feet on a wreck in the Forth Estuary.

Two other funny incidents regarding 'Clammy Death' also come to mind. The scene is the aft deck of H.M.S. *Annet* diving in the Thames Estuary near the Great Nore Tower. It is a beautiful warm summer's day, and the stand-by diver who as per book is fully dressed, is sat on a chair with a pusser's table fan on his knee which he is using to keep cool inside his 'Clammy Death'.

The scene shifts and *Annet*'s cutter is engaged on a



A.S.W.D.D.—First three stages of dressing

cold winter's day on diving operations in the Fish Dock at Hull. Underwater visibility is nil minus, and the bottom is a 40/60 mixture of mud and fish guts. The diver on the ladder about to enter the water keeps complaining his suit is leaking, while all aboard the cutter keep pushing him into the water and tells him it's his imagination. Finally when the diver's complaints of getting wet become unbearable he is hauled unceremoniously in board, and told in seamanlike terms that he's a useless - - - - - - - - - . . . . idiot. However a closer scrutiny of the diver's 'Clammy Death' revealed that there was a large split along the seam under the crutch and this of course was indiscernible from the Diving Cutter.

The author's last dive using 'Clammy Death' was at Horsea Island in 1962. It was one of a series of trial dives implemented by Superintendent of Diving to test if the S.W.D.D. would be adapted for swimming using a neck ring and neck seal. The idea was that the use of this rig would economise in the wastage of suits on rough jobs such as foul screws. Although not as streamlined as the U.W.S.S., one could swim a reasonable distance in this rig and certainly the short distance usually required to start an underwater task. As far as is known the project was eventually shelved.

* * * *

"In Memoriam"

You can talk of neoprin suits and swims
And all the other modern whims
But when its wire round a screw
Or for long hard searches too
And when ice doth freeze the breath
Please give me 'Clammy Death'.

MAC, R.O.F., Bishopton.

H.M.S. "Vernon" Swimming Championships

Pitt Street Baths. July 2nd 1970.

"GLOOM *DEEPWATER*"

We only managed two Firsts in the Final:—4×2, Lengths Medley Relay and the 6×2 Lengths Free-style Relay. Thank you Western Fleet. *Osprey* were 1st which goes to show how well we train the basics. The Electrical Division were second so they must have been switched on. *Deepwater* 3rd and Seaman 4th.

Letters to the Editor

White Hart Hotel,
Pembroke Street,
Pembroke Dock.

Dear Editor,

I would very much like to become a subscriber to the ROYAL NAVAL DIVING MAGAZINE.

Perhaps it would be advisable for me, a 'Leavine' to explain my interest in becoming a subscriber.

Firstly I myself am ex.-R.N., I have a son who is a C.D. at present serving on H.M.S. *Reclaim*. Also I keep a 'pub' which has been and still is 'open house' for any member of the various Diving Teams, that visit Pembroke Dock in the course of their duties.

We have been honoured on several occasions with visits from the Plymouth Deep teams, the Western Fleet Deep team, the Portsmouth Deep team and the various B. and M.D. Units.

My first contact with your Magazine was a few days ago when I was loaned a copy.

I hope you will allow me to become a subscriber, and if so I can give some rather amusing occurences that have happened during the times various teams have stayed with us.

Yours faithfully,

G. RICHARDS.

Now the truth may come out about the Deep Teams. ED.

Dear Editor,

I was most interested to read the article on 'Clammy Death', What memories that evoked! As one who trained in that rig I can endorse your remark at the end of the article that entry was, undubitably, through the front. Not only would I regard it as being impossible to get out of unaided in an emergency, I would also say that it was impossible to get into unaided.

In case you think it may interest your modern divers I enclose a couple of photographs to show what a clumsy rig it all was, as well as being uncomfortable. If you think it worth it, I may be able to raise enough steam to produce a supporting article for your next issue.

W. H. TAYLOR, R.N.R. (Retd.),
Lieutenant Commander.

* * * *

Dear Sir,

I enjoyed very much 'Uncle Bill's' clear and concise article on the improvements implemented at the Deep Trials Unit. Despite the acquisition of the 'Strain Gauge Ergometer' I do hope the Trapeze Machine and the ½ cwt. sinker have been retained as reserves.

MAC,
D.Q.N.O., Bishopton.

* * * *

Dear Editor,

I was amused at the reference to 'Clammy Death'. I was quite proud of it at the time. You're quite right, the entrance was in front. It was called the 'Sladen' suit for security reasons, the words 'Human Torpedo' or 'Chariot' being strictly taboo. Geoff Sladen was in overall charge of the whole Chariot programme.

The idea of the 'belly entry' came from the Italians who had a much lighter suit with a neck seal. But as our first targets were the German Heavy ships in the Norwegian Fiords the demands for cold protection caused Clammy, like Topsy, to grow and grow.

Yours sincerely,
W. O. SHELFORD
Captain R.N. (Retired).

"Clammy Death"—by W. H. Taylor

* * * *

Dear Editor,

Last edition of the magazine contained a reference to 'Clammy Death', and I can confirm your footnote to the article:—'entry was from the front'.

I used this grizly suit during qualifying at Chatham in 1953 as a Diver III, and the articles caused me to look up my old notes from which I quote the following:—

Admiralty Shallow Water Dress A.P. 3420:

"Devised for diving in cold water in a self-contained breathing apparatus and as such restricted to 140 feet. Invented by Commander Sladen, it is made of fanned twill, rubber hood fitted with visor and safety valve tested to 6/8lb. water gauge pressure, which is closed for S.W.B.A. (Shallow Water Breathing Apparatus) and open for air or mixture breathing. Test for leaks by bearing down on the spindle when under the water. D.S.E.A. (Davis Submarine Escape Apparatus) mouthpiece for self-contained breathing, baffle plate for air, both locked by dome piece with cock for atmosphere/air or O2.

'Test for deterioration of rubber:—Clamp Skirt, bottles in sleeves, fit schraeder valve, blow up and test for leaks with soapy water.

"Used now almost exclusively for C.D.B.A. (Clearance Diving Apparatus) only, as 40 feet is the limit for air, as against the depths attained with a Gas Mask and a Mark I suit or even skin diving."

In the photograph taken of the diver on the boat one can see the skirt gathered under the weight pocket. It was rolled, clamped, and secured on the chest.

The only incident I can recall whilst on course, under the eagle eye of Petty Officer B. G. 'Johnny Bull', D.1 was the 'deflation' of one of those characters which somehow every class seem to acquire, 'Smarty—know—all—what's difficult about this diving lark' kind of chap.

" 'Smarty' (better not to mention names, he may be an Admiral or an M.P. now) was sitting at the bottom of his shot in 18/20 feet of water, black, sooty water as only Gillingham mud can be, doing that soul-destroying exercise, cutting a link with hammer and chisel. The day previously he had done it in seven minutes or so—everybody else had either given it up or taken at least half an hour. As soon as we received his 5 Bells and heard him banging away in the gloom, the second dickie of another class clad in a swim suit (having been briefed and promised tots galore) swam gently down his life-line and tapped Smarty on the shoulder and opened his emergency bottle. There was a colossal upheaval, bubbles, and 'Smarty' appeared on the surface full of protosorb.

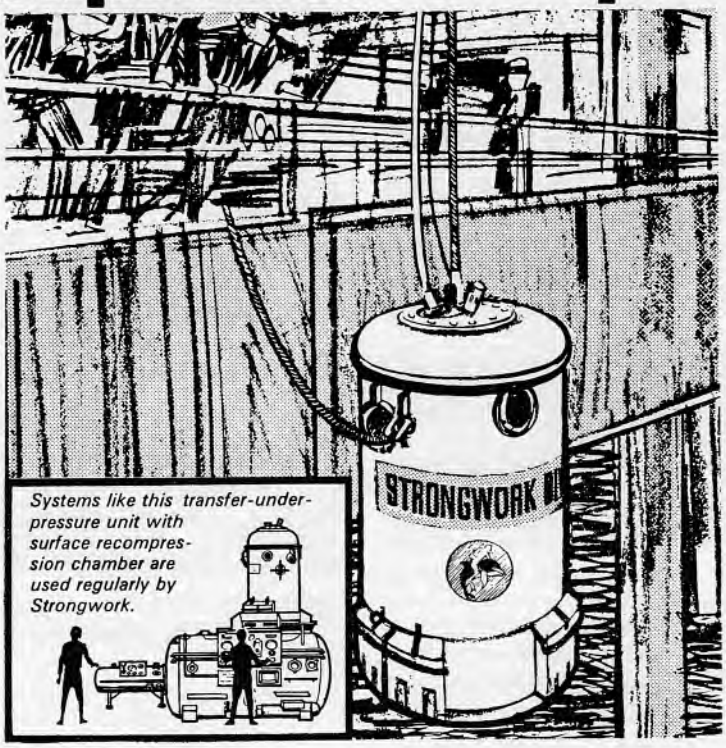
According to his assailant, 'Smarty' nearly escaped through the relief valve in his hat! Amazing how much more reasonable he was after that episode.

Chatham 1953. Diver dressed in A.S.W.D.D. and C.D.B.A. 5561A. Diver has hand on his bypass valve

Cheers,

BRIAN OWERS.

Experience in depth



Systems like this transfer-under-pressure unit with surface recompression chamber are used regularly by Strongwork.

With many years experience of offshore diving to its credit, Strongwork has the technical resources, the experience, and the right men, to carry out contracts — anywhere. Recent development include a deep diving system contained in a complete package. The spherical bell can be off loaded from any of three sides of the frame which houses the decompression chamber.

All of the equipment produced by Strongwork is available for hire or purchase.

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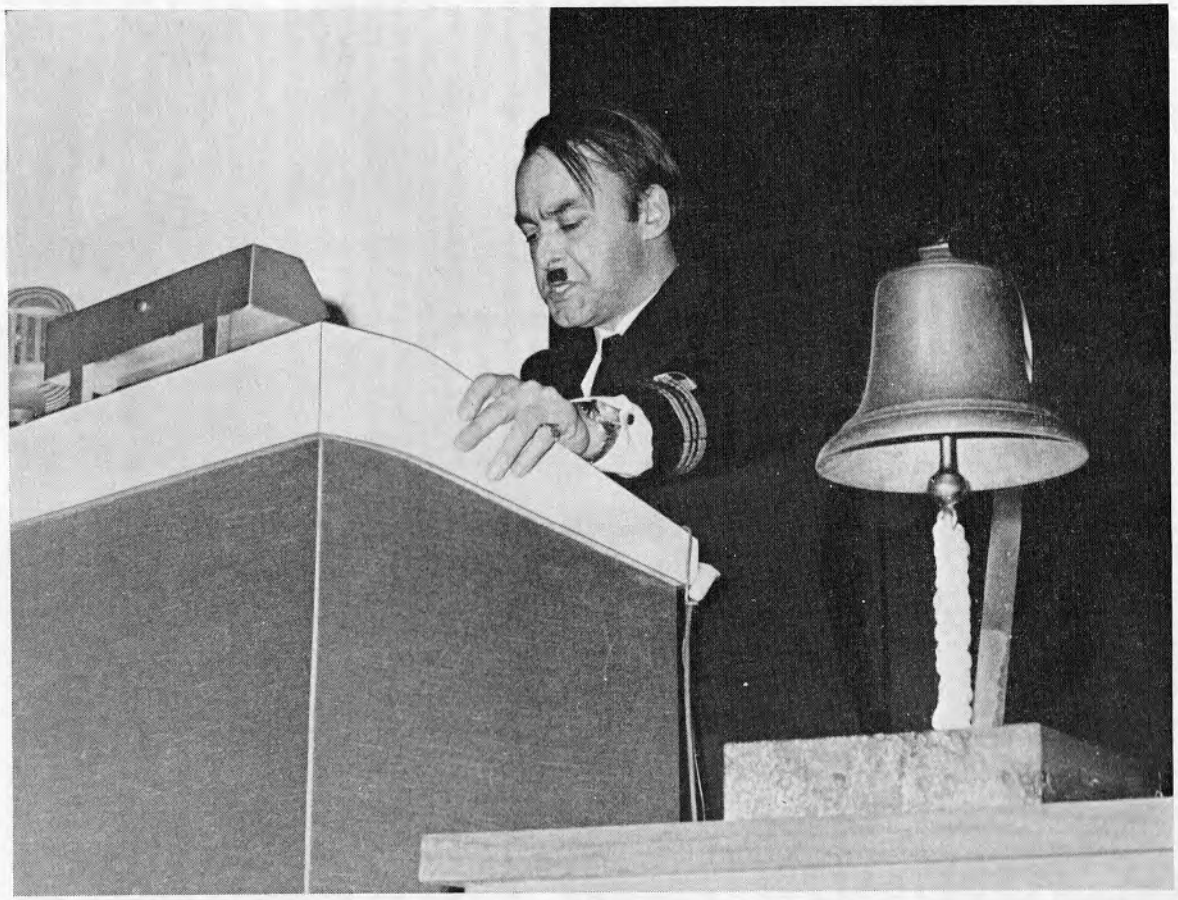

We Always Did Wonder Where He Went! — (Lt.-Cdr. L. J. A. Majendie, on loan service with the United States Navy, addressing a symposium on equipment for the working diver, at Columbus Ohio, in February 1970. Any resemblance to any other person, living or dead, is pure coincidence!)

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The Helium Barrier and Beyond

by JOHN BEVAN

THE existence of a HELIUM BARRIER to free divers was first proposed by Dr. Ralph Brauer (U.S.A.) as a result of an experimental simulated dive to 1,190 feet in 1968.

During this dive in which Brauer was himself a subject, abnormalities in the electrical activity of the subjects' brains (electroencephologram E.E.G.) were observed by the attending scientific crew.

The subjects themselves found that during their brief exposure to the maximum pressure they were unable to maintain consciousness if they did not actively indulge in any specific mental or manual task. This peculiar lapsing into a state of sleep they termed 'micro-sleep' and together with the E.E.G. abnormalities led the attending scientists to assume that the symptoms could be precursors of more dramatic events including epileptiform convulsive seizures. For these reasons the experimental dive was prematurely brought to a conclusion—after only 4 minutes at 1,190 feet.

Brauer's dive was a French-American combined effort executed at Marseille, France. British opinion of the results of this experiment was that the crisis at depth could have been avoided if a different technique of compression had been employed.

In the following year we carried out a similar dive at the Deep Trials Unit at the Royal Naval Physiological Laboratory (R.N.P.L.) as an Anglo-Swiss combined venture. The dive was to a simulated depth of 1,150 feet and the three Swiss divers performed both manual and mental tasks as well at depth as they had previously on the surface. Neither did they suffer from the condition referred to as 'micro-sleep'. The divers also performed heavy physical work under-water in the wet-section of the compression chamber complex whilst at maximum depth with no apparent adverse signs. The success of this experiment at a depth only 40 feet shallower than Brauer's 1,190 feet dive tended to confirm the opinion held at R.N.P.L. and considered together with supporting data from animal experiments it was reasoned that it should be possible to penetrate the so-called HELIUM BARRIER.

At about this time a new high-pressure chamber facility was installed at R.N.P.L. with a simulated depth capability of 2,250 feet. It was decided that a programme be drawn up for the preparation of this chamber to perform a dive to 1,500 feet to test the validity of the proposition of a HELIUM BARRIER.

Human subjects were to be used and the scientific instrumentation, experimental and monitoring techniques were to be prepared and checked for operational use.

Approximately one year's work was involved in the preparation for the dive with many problems arising and being resolved. Amongst these were the sheer mechanical difficulties of ensuring that the high pressure gas connections and associated valve systems of the chamber were absolutely fail-safe and the electrical compatability, safety and stability of the instrumentation was satisfactory. Much of the instrumentation had to be designed and constructed specially for the dive. due to the unique conditions to which they would be exposed including high humidity, high oxygen partial pressure, high hydrostatic pressure and high fire risk.

During this time a volunteer team of potential subjects was 'worked-up'. The team consisted of civilians of the R.N.S.S. employed at R.N.P.L. who were all Royal Naval qualified divers, experienced in compression chamber diving and who were familiar with the techniques and instrumentation employed in this type of research. These qualifications were essential to the success of the dive for several reasons. They ensured the availability of the subjects over a long period (12 months) for testing of their baseline physiology and for their thorough familiarisation with the instrumentation both inside and outside the chamber. Thus should any failures occur in the equipment during the dive the subjects could double as technicians and perform the necessary repairs or installation of stand-by instruments.

Two subjects were to be picked from the team to undertake the dive and it was Peter Sharphouse and myself that were ultimately chosen. We were both very fit and had over the preceding months carried out systems-testing, procedure-checking and work-up dives down to 450 feet. A vast quantity of baseline physiological data concerning the performance of our bodies had been obtained during many days confinement to compression chambers.

As the big day approached Peter and I busied ourselves making final domestic arrangements in preparation for our projected 14 days in the compression chamber. Peter who is married and has a very young daughter was much busier than myself at this stage since the only preparation I had to

make as a bachelor was to cancel my milk delivery for a fortnight.

On the morning of 3rd March, Peter and I reported to R.N.P.L. at 0800 hours when final preparations for the dive began. Three large areas were shaved on our heads, each about 2 inches square, where small silver electrodes were to be attached. These electrodes were to be responsible for detecting our E.E.G's. Next our chests were bared and shaved for the attachment of more silver electrodes. These would be responsible for detecting our heart and breathing activity.

We eventually entered the lock of the compression chamber at 0930 hours. The procedure of the dive first of all involved the substitution of an oxy-helium mixture for the air in our chamber. To do this we breathed from B.I.B.S. whilst the gases around us were changed. It was at this point that we experienced our first set-back. There had been an undetected leak from one of the helium gas cylinders into our breathing supply. This meant that the mixture we finally breathed had too little oxygen. Peter became unconscious within about 5 minutes and I myself was beginning to feel peculiar. I sounded the alarm and within seconds I heard the hissing of good, pure fresh air entering our chamber and I abandoned my B.I.B.S. and its contaminated gas supply. Peter had lost his B.I.B.S. when he became unconscious and soon regained consciousness. The chamber door re-opened and we both stepped out.

There was a very real feeling of disappointment in everyone's minds as we strolled around awaiting the results of the checks. If the fault was to prove to be a big one, then our dive which we had been preparing for so long would be postponed for a long time. Fortunately when the faulty and contaminated gas cylinders had been identified, only a small number were found to be involved and the decision was made to go ahead as planned apart from running about one hour behind schedule.

The second attempt to begin the dive was more successful and Peter and I transferred from the lock into the main chamber at 50 feet. We stayed at this depth for one hour in which time we were very busy connecting up and checking various instruments. With all systems functioning well, the dive continued to 600 feet where we were to remain for the next 34 hours. Most of our waking time was spent performing tests and providing 'outside' with voluminous quantities of physiological information. Whilst I would be carrying out one task such as a hand-eye co-ordination test, Peter would be performing another such as a mental arithmetic test.

The second day followed closely the pattern of the first except that the depth was now extended to 1,000 feet where we were to remain the next 24 hours.

The third day was one of the most interesting since on this day we had planned to exceed the HELIUM BARRIER. We were to do this slowly, carefully feeling out way. The first move was to 1,100 feet where a pause of one hour allowed us to acclimatise and to perform another barriage of tests The next move was to be to 1,200 feet—to the HELIUM BARRIER and beyond. We sat there in our little chamber, backs to the wall, wondering how we would fair. When the descent was resumed the temperature inside the chamber rose, as it had each time the pressure had increased. The humid atmosphere coupled with the rising temperature caused us to perspire profusely and as I wiped the beads of sweat from my forehead I once again noticed the awkward jerkiness of my efforts induced by the helium tremor with which I had been affected for most of the dive. Inquisitive pairs of scientific eyes peered through the tiny port-holes in our chamber, observing our every move. When the hissing of the incoming gases stopped we knew we had just become the two deepest men in the world—we had pentrated the HELIUM BARRIER!

We felt eager to go deeper but stuck rigidly to our schedule of testing and re-testing. We were only 10 feet deeper than the last record-breaking dive (1,190 feet) but we had another 300 feet to go.

Following a stay of one hour crammed with tests at 1,200 feet we proceeded to 1,300 feet—over 100 feet through the HELIUM BARRIER and still everything looked good for the final plunge to 1,500 feet. This was to be after a further 24 hours had passed and so we contained our curiosity and concentrated on the day's schedule of tests.

The fourth day was our big day. We went from 1,300 feet to 1,400 feet, checked and re-checked everything and finally after one hour at 1,400 feet, progressed to 1,500 feet. The descent went perfectly. Unfortunately there was very little time for festivities as the next 10 hours was full with an exhaustive programme.

At the maximum depth of 1,500 feet I recalled the list of possible problems we thought may have hampered the progress of the dive. We did not suffer from any breathing difficulties but the greater 'thickness' of our atmosphere was quite appreciable. The effect of temperature changes was quite surprising. The most comfortable temperature was at 30°C, but if it fell or rose by only 1° then we would quite quickly feel too cold or too hot. It would appear that this will be an extremely important factor to be reckoned with in future deep diving.

'Helium tremor' occurred in myself but not to any significant degree in Peter. Even so, we were capable of performing work perfectly adequately. Happily, we found that no 'micro-sleep' or convulsions occurred.

With perhaps the most successful ten hours of British deep diving behind us, somewhat nostalgically we began the very slow ascent to the surface. A slow ascent was necessary to avoid the 'bends' or decompression sickness. This occupational hazard is a sickness peculiar to workers in unusual pressures such as pilots, astronauts or divers and its cause is the production of gas bubbles inside the tissues of the body. Its symptoms vary from a slight itch, to considerable pain or even complete paralysis.

At midnight we rolled out our sleeping bags and settled down for a good night's sleep. Two hours later, Peter woke me up and complained of feeling very dizzy.

Decompression sickness had reared its ugly head and struck at Peter's sense of balance. Soon Peter was vomiting and finding it impossible to determine which way was up or down. Our ascent was stopped and in an effort to relieve the disturbing symptoms in Peter we began to descend back towards 1,500 feet. As the pressure about us was slowly increased I suddenly became aware of a very subtle change appearing in myself. I was beginning to feel warm and drowsy. I reported this immediately and in the ensuing minutes the sensation increased to such a level that I was finding it difficult to remain conscious. With increasing difficulty and incoherence I continued reporting as objectively and accurately as possible on the progress of my condition to the 'outside'. Instinctively I turned to do anything I could to keep myself from succumbing. I flexed my muscles, tidied up the chamber, crawled around and even tried forcing sharp objects against the sole of my foot. By this time we were being once again brought towards the surface in order to remove the condition now appearing in myself. This therapeutic action was successful and I was soon back to normal. Peter, however, remained as sick as ever.

The condition in Peter had been seen in divers at relatively shallower depths and had been found to disappear over a matter of days. Happily this was found to be the case with Peter but during those first few days of our ascent Peter had a pretty rough time being in an almost perpetual state of dizziness and unable to eat any solid food. It was with considerable relief that I observed his appetite and sense of balance return. When his wife and daughter visited the laboratory during the ascent phase he had almost completely recovered.

Our ascent was to last a total of 12 days—two days longer than first anticipated due to the occurrence of decompression sickness. We continued our tests throughout this time but following a not so quite intensive programme. This allowed us more leisure time which we spent mainly reading, writing letters and drawing cartoons.

With only three more days to go before we were to 'surface', decompression sickness struck again and this time it was my turn. My right leg had begun to ache around the knee and in a matter of minutes it turned into an uncomfortable pain which seemed to be increasing all the time. Our ascent was stopped and once more we began to descend in an attempt to alleviate the condition. The depth at this time was sufficiently shallow to permit the use of pure oxygen which is renowned for its therapeutic qualities in treatment of the 'bends'. Rather sadly, the treatment was unsuccessful and it was decided to resume our ascent and after a little while pain did eventually dissipate.

We surfaced at 1600 hours, Wednesday 18th March 1970. Peter was virtually fully recovered from his complaint and all that remained of mine was a very slight residual ache. The reception we received when we emerged from the chamber was an almost overwhelming experience. We had never imagined that so many people would have been waiting to see us climb out. This very happy occasion was, however, very brief since we were required for an immediate and intensive medical examination and to provide further blood samples for analysis.

Within a few days my leg was completely recovered and the only after-effect of our dive that I could detect was a slight reduction in general muscle tone, mainly in my legs. Within three to four weeks however I was back in competition fin-swimming condition.

Our dive to 1,500 feet at the Royal Naval Physiological Laboratory was a great success. The descent to maximum depth has shown that man can not only survive but even work in reasonable comfort under these pressures. The incidence of decompression sickness during the ascent merely indicates that a different decompression schedule is required and such modifications are fairly easily accomplished. This therefore does not present a major difficulty to future deep diving.

We both feel that we can go deeper with safety and as far as the HELIUM BARRIER is concerned its existence is confirmed but that it can be penetrated if a slow compression rate is used. It remains an arduous task to attempt to predict where the limit to deep diving lies. It could be presented in the

region of 2,000 feet for oxy-helium breathing divers due to the increased density and viscosity of the gases breathed. It could certainly seem that our knowledge of respiratory physiology at increased pressures is becoming increasingly important in the effort to determine the depth capability of man and that careful temperature regulation of the diver's environment will be a further crucial factor in the success of future deep diving.

In conclusion we would like to pay tribute to the team at R.N.P.L. whose work made this achievement possible and especially to Dr. H. V. Hempleman (Superintendent, R.N.P.L.) and Dr. P. B. Bennett (Scientific Co-ordinator). Our high morale throughout the dive was directly attributable to the complete confidence which Peter and I both had in the supporting team and without which such a dive would certainly have been impossible.

Scientist becomes Diver

At a gathering of Scientific Officers and Naval Officers, the Director of the Admiralty Underwater Weapons Establishment, R. BENJAMIN, Ph.D., B.Sc.(Eng.), A.C.G.E., C.Eng., F.I.E.E., was presented with his R.N. Diving Certificate by Captain D. STOBIE, D.S.C., Royal Navy.

Doctor Benjamin is a very keen underwater operator and regularly dives in Portland Harbour once a week regardless of weather. He is certainly the most senior officer in the R.N. Scientific Service to qualify as a diver.

Scientist becomes diver

R.N. Diving Magazine

Owing to the rising cost of postage this WILL, be the last edition to be postage free to the subscribers of none service addresses. The cost of postage will be deducted from any outstanding credits, it is hoped that this will enable the magazine to remain at the current price of 3/–.

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EDITOR

Dear Sir,

Cartoons were 'locked-down' to the two diver-subjects for their amusement and helped to maintain a 'rapport' between divers and surface.

This one in particular I thought might be suitable for publication in the R.N. DIVING MAGAZINE, and is offered for your consideration.

Yours faithfully,

B. A. TAYLOR, R.N.S.S.

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