



The diver is wearing an Under-water Swimmer's Dress made from rubber-proofed crimped knitted nylon, and is using SABA (Swimmer's Air Breathing Apparatus).

The suit is manufactured by Dunlop General Rubber Goods Division of Manchester, and the breathing equipment by Dunlop Aviation Division of Coventry.

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# ROYAL NAVAL DIVING magazine



S.A.R. H.M.S "Ark Royal" (see Page 7)

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# R.N. Diving Magazine

Vol. 13

Winter 1966

No. 3

## EDITORIAL STAFF

*Editor* .. .. . P.O. J. HARRISON  
*Treasurer* .. .. . LT. J. E. T. BAKER

## EDITOR'S NOTES

TALK about the wind of change, it has been downright draughty in the office in these recent months.

P.O. Gibson has gone to sail the crinkly and yours truly has taken over the Editorial chair, best of luck in the new job Trevor.

Many thanks to all the people who sit down and laboriously scribe an article for the magazine, without you we could not survive, but if your article has not been printed do not despair as it may well have reached us too late for printing in this issue, the closing date being six weeks before publication. There does however, seem to be a falling off in articles from Ships. Can we have some brainstorm whilst you are on watch. If you do not tell us what is happening to you, how are we to know.

As offered in the last Editorial, the Letters to the Editor have aroused some people to put their feelings into print, may we hope to see more of this.

The *Deepwater* Sporty Types are again doing their best at rugby by not losing a match so far this season, even beating the Royal Marines at A.T.U.R.M., Poole. The Division won the Autumn Road Race from



### “MAGSERVE”

Valid until Vol. 14/1, this voucher should accompany any advertisement or query.

Vernon to South Parade Pier and back, details further on.

MAGSERVE has also fallen on fertile ground and more articles are asked for and for sale in this issue, don't forget if you send an enquiry for an article in MAGSERVE, send the chit at the bottom of the editorial with it.

It would be very much appreciated by the editorial staff if subscribers on changing addresses would let us know their new ones as soon as possible.

## Search and Rescue

by LT. A. G. KENDRICK, R.N., *Officer in Charge, S.A.R. School.*

"Diver ready for despatch".

"Despatch the diver!"

"Diver gone — move left 3 yards".

A turmoil on the surface of the sea indicates the spot where yet another Search and Rescue Diver has taken the plunge. Literally and figuratively speaking he has done just that! Indeed the crewmen could well have despatched B.R. 155 into the ocean too, for all the good it was going to do the chap in the water.

Many seasoned divers — and I have tremendous respect for them all — might raise their eyebrows. Professional discipline cannot be greater in any branch of the Royal Navy than it is among that of the Clearance Divers. However, the fact remains that once the Search and Rescue Diver hits the water in a real emergency he is entirely on his own without the benefits of Supervisor, Standby Diver or Life-line. A new chapter must, perforce, be written into the Diving Manual.

The advent of the Search and Rescue Diver — or S.A.R. Diver — occurred some eight years ago following a tragic accident involving a *Scimitar* aircraft. It became increasingly apparent that, as far as the Royal Navy was concerned, anyway, it would be of tremendous advantage if one of the two S.A.R.

crewmen in a rescue helicopter was given a rescue role which allowed him complete independence — in fact, a role where he could detach himself from the rescue helicopter.

One large difference between a Naval plane-guard crew and its R.A.F. counterpart ashore is that the former can invariably be on the spot within seconds of an incident occurring. There is, therefore, extra scope for ditched aircrew to be rescued from *inside* an aircraft — an aircraft that could be partially or wholly submerged. Under these not uncommon circumstances, being attached to the helicopter by a wire is, to the would-be rescuer, very restricting, certainly frustrating and therefore, unacceptable.

Having cut this vital life-line it is essential then that some further means of battling the elements be employed.

The requirements are that the rescuer should be able to assist aircrew in difficulties on or near the surface in or out of the ditched aircraft, and in order to do so he should be equipped for shallow underwater tasks. This might involve freeing a man entangled in a parachute harness, or tendering oral resuscitation to an unconscious man on the surface in a high sea state; even perhaps releasing a man trapped in a submerged cockpit,

Everything pointed to a diver of some description, and it was decided that a qualified ship's Diver should be trained specially for this task. In order to make him a fully competent member of the S.A.R. helicopter he should also be properly trained as an aircrewman. This was the birth of the Search and Rescue Diver. Originally all Search and 'Turn 280'. As he turned he saw spray settling and a parachute canopy on the surface 700 yards downwind. One survivor was seen inflating his life-raft and was assumed to be in reasonable shape. The second member of the ditched *Buccaneer* was located lying face down in the water, head held under by his seat pack life-raft riding up onto his neck, his backside held out of the water by air that had gathered in his flying suit, and his arms held to his sides by parachute shrouds. The canopy was submerged and below him. It took about 30 seconds to reach the spot and the S.A.R. Diver immediately jumped 3 yards short of the survivor.

2. The diver noticed that the L.S.W. was not inflated and that the pilot, as it turned out to be, was not helping himself in any way. He turned him over, inflated the L.S.W. and cleared his oxygen mask. Considerable effort was required to operate the C.O.<sub>2</sub> bottle on the L.S.W. The diver then submerged, cleared the shrouds from the parachute release box, and after a struggle, operated it. He then cleared the harness from the pilot's shoulders but found shrouds entangled in the oxygen line. These he cleared by removing the clip attached to the L.S.W. He was unable to clear the shrouds from the pilot's anti-G. suit tube, so he cut through it. Only the legs were now entangled and the diver tackled each line individually with his knife. The diver then surfaced to find the pilot conscious and the plane-guard ready for a run-in. The survivor was hoisted clear, followed by the diver in turn.

look forward to seeing them at the Royal Naval Air Station, Portland where they will spend eleven weeks learning the rudiments of air navigation and the various techniques of helicopter rescue.

There are five types of air crewmen and they all train together for the first time and as he seemed to indicate that he would enter the life-raft and try from there the pilot moved away, dropped a Marine Marker datum 30 yard down-wind and checked on the diver's progress. He was by this time busy submerged. On returning to the Observer, who had *still* not entered the life-raft, a strop was once more lowered. After some considerable effort he placed the strop around himself incorrectly (bight around chest, toggle behind him). 4. Because no injury had been indicated and bearing in mind the survivor's exhausted and dazed condition, the pilot made the decision to hoist him thus. The Observer was still attached to the life-raft and further difficulty was encountered releasing it.

5. A few minutes later the diver was ready to assist the pilot into the strop. The aircraft then returned to the carrier.

\* \* \*

### Comments by S.A.R. Headquarters:

1. This is undoubtedly a case of a man's life being saved through a series of decisions made rapidly and correctly.
2. The pilot was right to locate the submerged survivor first, but sometimes it can be a difficult decision to make.
3. The diver did everything perfectly correctly and *more important* in the right order. Things do not always seem logical under actual emergency con-

ditions, and it is very easy to lose one's head. The diver, therefore, is to be congratulated on a job well done.

4. An exhausted survivor upside down in the strop is an awkward situation indeed, especially with the diver busy elsewhere. It is felt that, here again, the pilot of the plane-guard acted for the best.

5. One can hardly take a dazed, exhausted and shocked aircrew to task over bad life-raft drill and S.A.R. crews must always be prepared for this kind of situation. This once more highlights the need *wherever possible* to use the double lift or diver-assisted lift method. Even an apparently uninjured survivor can still find himself in severe difficulties.

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## CONSHELF 3

**I**N October last year, six divers entered a buoyant sphere in Monaco Harbour, were locked in, and the sphere towed out to a position off Cape Ferrat Lighthouse in Southern France. Here the sphere was ballasted and it slowly sank to the sea bed some 370 feet below the surface, and here in the inky blackness, the six divers were to work and live for 18 days. This was CONSHELF 3, the third stage in Commander Cousteau's programme to have men working and living at any depth on the Continental Shelf, that is up to a depth of 600 feet.

CONSHELF 1 took place off Marseille in September 1962, when two divers spent one week at 33 feet descending to 85 feet to work. CONSHELF 2 was undertaken in the Red Sea in the summer of 1963, when five men lived for two weeks at 36 feet and descended to depths of 165 feet to work. Now this was CONSHELF 3, the next step, a very ambitious and costly one, and one into which a vast amount of planning had gone. Six divers living and working at 370 feet for a prolonged period and almost self-supporting. They had their own gas supply, their own store of food and drinking water, and the tools necessary to carry out their scheduled tasks on the sea-bed.

Cousteau's 'saucer' made daily trips to the house for the purpose of photography and for providing outside light for the divers, but there was no personal contact with the divers, communication being by telephone or T.V.

The underwater dwelling was a sphere 18 feet in diameter, with two floors, the upper housed the dining room, laboratory and communication centre, and the lower floor the dormitory, toilets and diving store. A bottom hatch in the diving store provided access to the sea.

The sphere was mounted in a chassis 48 feet, by 28 feet which also housed 77 tons of ballast, numerous cylinders of oxygen, helium and compressed air, a neoprene reservoir of drinking water and canisters of fruit juices. Thus apart from electric power for lighting and heating, the diving team were entirely self-supporting. The power supplies were, in fact, fed from shore by buoyant cables.

A room in the lighthouse was used as a surface control station and via closed circuit television the divers were observed for 24 hours per day for the duration of their underseas stay. There was also a telephone to a surface attendant ship.

In the event of damage or malfunction of the equipment necessitating an emergency ascent, two three-man decompression chambers were suspended at depth for the whole period of the operation.

The divers breathed a oxy-helium mixture (25% O<sup>2</sup>), both when inside and outside the underseas house. In the house the mixture was supplied from an installation called a cryogenerator which circulated the mixture gas, and on its return to the plant it froze out the carbon dioxide and any other noxious gasses. This equipment also acted as a dehumidifier and as a refrigerator for the food.

When operating outside the house, the divers used a three bottle hookah closed circuit set attached to a 200 foot length of twin hose. A compressor pumped the gas to the divers through one hose, and the exhaled breath was 'sucked back' via the second hose. This exhaled breath was purified, the expended oxygen replaced and returned to the reservoir for further use. In this



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way the valuable helium gas was not lost. The three bottles also contained the oxy-helium mixture, but these were for emergency use only. To ensure that the breathing gas was at all times correct, the house had its own gas analyser, the results of which were transmitted direct to the shore station. In addition there was a miniature mass spectograph that continuously recorded the presence of any gas within the house, thus any change in the mixture was immediately noticed.

The temperature on the sea-bed varied between 50° and 55° F., and as it was necessary for the divers to work at prolonged periods as part of the trial, a good insulated suit was required. The 'wet' suit favoured by French divers was of no use as the pressure at 370 feet would so compress the foam rubber as to destroy the insulating qualities of the suit. Thus an incompressible rubber material was required, one which would retain body heat at this depth, and also keep the diver dry. The former requirement was met by the manufacture of a material comprising two layers of rubber material between which were placed thousands of minute gas filled ebonite spheres. The spheres, no larger than specks of dust, provided the incompressible insulating layer and the material, made up into vests, was worn between two special 'dry' suits.

Within the house the temperature was kept up to around 90° F. by the use of infra red heaters. This high temper-

ature was essential, due to breathing a mainly helium mixture gas, the heat loss from the body was very much higher than when breathing air.

During the 18 days on the sea-bed, the divers carried out a number of tasks both inside and outside the house, as well as undergoing tests and observations. Records were kept and are now being studied, and the results will undoubtedly influence the planning of the next diving operation in the CON-SHELF programme.

The divers were entombed in the sphere for 21 days, three of which were spent on the surface before submerging. At 1100 hours on the 22nd day the hatch was closed, the house tested for leaks and preparations made for the ascent. When all was ready the 77 tons of ballast was released, but nothing happened and there were a few anxious moments before the sphere in its chassis finally shook itself free and rose to the surface at over a 100 feet per minute.

This step in the programme was over, and another step in man's conquest of the sea had been made.

Full praise must be given to the six divers, one of whom was Commander Cousteau's son, for their part in this successful operation, and also to all those behind the scene personnel who made it possible.

The next step CONSHELF IV is looked forward to with interest. G.A.F.

**FUND FOR THE LATE P.O. MACKENZIE**

**T**HE fund for Jock realised £589, and this has been paid to his widow, Mrs. MacKenzie, whose letter of thanks follows. ED.

"To All Mac's Friends,

Just a little letter of acknowledgement to all the Divers, for the lovely contribution which you all made on behalf

of my late husband. I shall always remember your kindness and thoughts.

I am no good at expressing my feelings in words, but would like to thank each and everyone of you again.

Yours sincerely,

ANGELA, GINA AND ROSS,"



## Police Diving Teams

**T**HE need for underwater search units in the police was recognised in the mid-50's, no doubt helped by the accounts of Naval frogmen's activities during the last war. A few forces, acting on the initiative of their Chief Constables, started units with the assistance of a well known firm of diving equipment manufacturers. At this time there was no standard at which to aim, and precious little guidance could be given.

It was not until the 1960's that police underwater units began to grow in numbers, but even then there was an obvious lack of standardisation, and no guidance at all regarding what type of equipment, personnel, or working conditions should be employed.

At this time contact was made with the Superintendent of Diving, H.M.S. *Vernon*, and from then onwards a most

helpful liaison was set up, leading to the adoption of the navy suit, fins, under-wear, compressor, D.U.C.S., and even Divers Log Book. This may sound a small contribution when seen in writing, but it should be appreciated that there is no police diving research centre, or funds set aside to enable the testing of all equipment in order to select the most suitable, so the freely given information of naval research is, to us, invaluable.

Even more pressing than equipment was the apparent lack of specialised training for police divers. Until then forces had sent their men to a firm of equipment manufacturers to learn how to use the equipment, or aid has been sought from branches of the British Sub-Aqua Club, or the team has been self-taught. This situation caused the greatest concern and somehow resulted in the author attending a Free Diver course at H.M.S. *Drake*, which I'm sure

many readers will remember, including the course instructor, C.P.O. Bill Soper.

Much of naval diving training methods are, of course, not applicable to police teams, as fortunately we do not have ships bottoms to search, and the suggestion of a mud-run would cause mass riots.

From this attachment a course of instruction was compiled which adequately provides a man with the knowledge and experience to safely use the recommended equipment, gives him a practical insight into all the problems met with during police diving, and includes a visit to H.M.S. *Vernon* for a dip in the Mining Tank and a pot-dip. This visit is looked forward to throughout the course, and I cannot stress too much the good that comes from it.

Unfortunately there is still no directive regarding police diving at all, so teams of two are able to exist, diving can be done without life-lines, and stand-by divers are frequently non-existent, but there are some hopes for the future.

Frequently I am asked what type of work we do, besides recovering the bodies of drowned persons. This impression that we exist only to cater for drownings is quite wrong, as this work occupies only about one twentieth of our time, most of the work being recovery of property. It is of great value to C.I.D., when units of the evidence are afforded by the recovery of stolen property, frequently showing guilty knowledge on the part of a prisoner. The recovery of valuable property ditched because of identifiable marks is of course always carried out, usually as a result of arrested criminals wanting to make their co-operation as complete as possible, by showing just where they threw it away.

Knowledge of the behaviour of dead bodies in water is slowly being collected, with some long-standing views having

to be altered. On record are bodies that went upstream, wandered about in still water, and even somehow went up narrow storm-gully pipes. The main fact forthcoming is that bodies in fresh water remain heavy longer than was previously thought to be the case.

An average underwater unit in a force of a thousand strong would be eight men, under a sergeant. They would be beat, traffic, or divisional mobile men, available to the unit for periodic practice and as required for call-outs. No diving pay exists, there being no way in police regulations which would allow the payment of anything like 'danger money'. Diving is usually limited to 60 feet, due to the type of equipment in use, and to the small number of recompression chambers available around the country.

To end this article I thought it may be of interest to recount a few incidents dealt with in the past, to illustrate the type of work tackled.

A factory was broken into and a safe removed. A vehicle logbook, known to have been in the safe, was found a fortnight later floating in the Thames. It was decided to search under bridges and 12 feet out from the banks upstream. Subsequently the safe was found, securely wedged under a car that had been stolen two years before, and which had obviously been in the water that long. Both were recovered, and a quantity of documents of great value to the losers were found inside the safe, which had been forced open.

One summer evening a youth was drowned in the Thames. Search was made by directing the diver via his life-line from the bank. On locating the body some 30 yards out, in 15 feet of water, the diver slipped his life-line loose, to tie it round the body. The inevitable happened and he was left with a body but no life-line. Ascer-

taining his direction from the current he struggled back to the bank with his burden, to be met by a wide-eyed stand-by diver enroute. Needless to say the lesson was well learnt.

On surfacing it was learnt that a child had drowned in the river Wey, some 10 miles away. On arrival the sun had set and light was failing fast. Local people in their haste to help, had unfortunately opened all the sluice gates on a downstream weir, in an effort to lower the river level. The sight was reminiscent of a mountain stream in fullflood. The only course open was to put the diver in where the child was last seen — securely on a life-line, and to allow the current to take him along. This resulted in the child being found some 100 yards down river, having fallen into a deep hole which was not being affected by the current. The gratitude of parents in such situations is quite overwhelming, the thought of their child being in the river overnight having increased immensely, the distress already felt.

A report was received that there was a car in the Thames, and a request was made for it to be lifted. Past recoveries had been by crane and slings, but the damage caused by the wires was always considerable. On this occasion it was decided to use a rubber fuel tank, placed inside the car, and to pipe air to the tank to achieve the required bouyancy. The wrong car was selected for this experiment as it had a soft roof supported by wooden slats, from which the inflated tank suddenly burst when lift had just come on. Again, we learnt something.

Anglers reported snagging something bound in cable, in a backwater of the Thames. A search quickly located a plastic covered cable running along the centre of the river, weighted at intervals with bronze rings! A patient diver

followed this cable a quarter of a mile downstream until it suddenly aimed at the bank, from where it disappeared into an unoccupied riverside bungalow. Search was then made upstream towards a weir, but branching off up a side stream after a short distance, before ending in what looked like a hastily cut blank. Many curious locals had followed the divers progress, and latest information is that previously a certain local had had an application to take a telephone extension from his home to his riverside bungalow, and that a chappie from the G.P.O. wanted to interview him. H.W.

**NOTICE IN A.E.D.U. TEAMS OFFICE**

This is NOT the office of The Herbert Lott Fund.



“Kinky, very, very kinky”

## The C.J.B.-Divcon Submersible Work Chamber

*“The following article on the C.J.B.-Divcon Submersible Work Chamber gives a good idea of how techniques devised in the R.N. can be employed in industry. It is of interest to note how the R.N. Transfer Under Pressure technique which was invented by the A.E.D.U. and H.M.S. Reclaim has been, with very little variation put to practical use in the off-shore oil race.”*

**T**HE Submersible Work Chamber will overcome the two main problems currently encountered in diving operations in deep and open water. These problems concern the diver's safety and dependence on weather conditions. At the same time it will almost completely cut out the periods lost by drilling rigs in waiting on the diver's lengthy ascent to the surface.

At the present time, using conventional diving methods, 9 hours are required to bring a diver to the surface from 600 feet after he has spent only 30 minutes at that depth. The work chamber can bring a diver to the surface from 600 feet in 15—20 minutes regardless of the time he has spent on the seabed. This is made possible by the fact that the diver travels to the surface in a sealed compartment, the internal atmosphere of which is maintained at a pressure equivalent to the depth of water at which he has been working.

On arrival at the surface, the diver can be transferred directly into a decompression chamber aboard the tender ship — this decompression chamber being pressurised to the same pressure as the diver's compartment. This renders the work chamber immediately available to take a fresh diver to the sea-bed.

Where weather conditions are concerned, it is impossible to dive when

wave heights are greater than 6 to nine feet because it is dangerous for the diver. Such conditions are, for instance, common in the North Sea during winter months. However, it is only the surface waves which impede the diver. Once through the surface turbulence he can carry on normally. By carrying the diver through the surface conditions of all kinds, the work chamber will allow diving operations to proceed without hold-up.

Such a speeding-up operation can be of great economic value. For instance, in off-shore drilling rigs all drilling operations must be suspended whilst diving is in progress. The running costs of an off-shore drilling rig average approximately £200—£300 per hour and the saving in time and money that can be achieved by use of these work chambers, is, therefore, considerable.

### How it Works.

The Submersible Work Chamber contains two compartments separated by a pressure-tight door. The upper compartment is occupied by a technician and a stand-by diver and is normally maintained at surface pressure (14.7 lbs. p.s.i.). The lower compartment is occupied by the working diver who passes in and out via an open hatch. Water is prevented from entering the lower compartment by the internal atmospheric pressure, which is equalised with the outside water pressure. (The lower compartment hatch is closed before the chamber is brought to the surface).

Under normal circumstances the technician and stand-by diver are not required to undergo decompression since their compartment is always maintained at surface pressure. If in an emergency or for any other reason, it



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should be necessary for the stand-by diver to leave the chamber to go to the assistance of the working diver, the upper chamber can be pressurised to the same pressure as that of the lower compartment - this can be accomplished in approximately 4 minutes. The connecting door can then be opened and the stand-by diver can pass through the lower compartment to the outside.

The equipment worn by the divers is a modified version of the normal deep diving dress, but when exposed to the pressures experienced at depths in excess of approximately 200 feet, both they, and the technician breath an oxygen/helium mixture which has been

developed as a result of research in Great Britain and the U.S.A.

The working chambers will be lowered to the sea-bed by cable winch from a drilling rig or tender ship. In an emergency, the chamber can, if necessary, be totally disconnected from the tender ship and remain on the sea-bed for a period of up to 24 hours without any form of contact with the surface. At any time during this period, an external ballast weight can be remotely released by the occupants of the chamber. The chamber is then buoyant and will rise automatically to the surface.



### WENDY'S PROGRESS REPORT

**D**OWN to 55 feet in lovely clear water I have been doing my visual underwater signal exercises. How very explicit and descriptive these signals are! Of course I have not been allowed off the line at this depth, but

nevertheless I enjoyed my tethered swims.

Must curl up now with a good book *The Sub-Aqua Diving Manual* and learn my life-line code thoroughly.

Best wishes, a further report after Christmas. WENDY, A.E.D.U. D.O.



## Solent Diving Sites

by ALEXANDER McKEE

**THE FORTS.** Spitsand, Horsesand, No-Mans-land and St. Helens. Built between 1861 and 1880 at the sides of the main fairways, to guard against the menace of the new fangled steam warships being built by the French. Constructed of granite, concrete and armour plate at an average cost of £200,000, they had garrisons of up to 120 men, and were originally fitted with 18 ton and 39 ton guns. They were part of the ring of Palmerston's Follies, which included the forts on Portsdown Hill. So successful, they were never used in their original role, but proved most valuable during the 1939-45 war as A.A. and L.A.A. sites covering the Solent Fairways against the low flying Heinkels of IX Fliieger Corps. They are now demilitarised and for sale.

Average depth at low water is 10 feet (except St. Helens, where it is nil), although on the edge of the navigation channels depth may be 90 feet. Jumble of old junk at the bases. Well weeded and in season, holding lobsters. Visibility 5—15 feet (can be more). They provide protection from fast fairway currents and also strong winds. Good diving targets when conditions are poor, or impossible elsewhere.

**THE BLOCKS** Concrete construction, built 1909 as a fixed barrier against the new fangled torpedo boats and submarines. Iron tops were added at the start of World War II. Demolition of these began in 1960. In both wars they effectively closed the Solent, the entrances to the deepwater fairways being protected by floated booms operated from the forts. Depth at low water 8 to 10 feet from 100 yards out, bottom, a jumble of old junk and cables with some dangerous projections. The whole area

used to be well weeded, until a winter gale threw most of the shingle onto the beach (winter 1959-60), but still a good spot for bass as well as flatties, bugs and miscellaneous stuff like wrasse. Visibility 5—15 feet (can be more or may well be less). Best at low slack water, otherwise an uncomfortable fast lateral current (3 knots or so) (which has already produced some interesting effects at the base of the concrete and the tops), has too much power to make it comfortable diving. There is a small wreck further out where the tops have been removed and nothing shows except a swirl at high water, which amateur boatmen occasionally charge and remove the bottom planking in the process. Relatively safe, therefore, from speedboats.

**THE NAB.** Concrete base in layers like a wedding cake, topped by a steel tower nearly 90 feet high. The whole is slightly tilted and has a big crack in the concrete underwater. Depth about 75 feet at low water. Its present position was never intended. In 1918, it was planned to stop 'U' Boats entering the Channel by placing six such towers across the Straits of Dover, linked by boom nets. Their concrete bases were hollow so that they could be towed out into position and then sunk by flooding up. Two were laid down at Shoreham and one was completed when the war ended, but what to do with it was the problem? Replace the old Nab Lightship was the decision. So in 1920 the mystery Tower was towed to the Nab Ledge, an extension of the Bembridge Ledge, and flooded up. At first, it tilted alarmingly, then settled down not quite upright. The water in the base was then forced out and concrete poured in. It has no foundation therefore, but merely sits there. It is not advisable

to approach this enormous object except on a calm day and in a seaworthy boat. On such a day visibility is extraordinarily good but the weather is liable to swift changes for the worse, particularly in the afternoon. Boats are not allowed to secure to the tower and care should be taken when anchoring because of the fast tide and swirling eddies or boilings. Otherwise it is not as bad as it looks, but the boat could easily be banged by the swirl against the concrete.

**CHURCH ROCKS.** One of four rock reefs in Hayling Bay, Church Rocks is the name given to the eastern end of a long narrow reef running roughly East-West, along the line of the current, about two miles out from the Coast-guard cottages at Eastoke, which is one

of the traditional marks for the site. Depth varies between 14 to 28 feet, visibility ranges from nil to 35 feet but a good average is between 4 to 5 feet. Current does not exceed 2 knots except on high springs, and at low water slack, it changes direction as precisely as a Guardsman's about turn and in about the same amount of seconds. Many flatties of all types, pollack, pouting, lobsters, crabs, lumpsuckers, John Dory, angler fish and the occasional bass. This is a favourite fishing mark so watch out for boats when surfacing. The original Priory Church of Hayling together with most of the hamlet of Eastoke was inundated around 1390 and many historians have identified these with Church Rocks, so you may see some signs of the old buildings whilst on the bottom.

## H.M.S. Sheba Diving Team

1965-1966

**I**t all began one hot sticky morning last year when I turned to and found S.-Lt. Carr and his gang setting up shop in the old buffers caboose. Apparently they and six sets of S.A.B.A. plus spares and their 'Gemini', had been flown out to Aden on a priority one crash draft. Being an ex-pupil of Taff Packer and Red Ashton and fresh from the Empire State Building of Chatham Dockyard, it didn't surprise me to see Andy Clyde knocking down walls and foraging in the Naval Base to produce a fuller operational team in a few days. S.-Lt. Carr got things moving very quickly by relaying Sheba's moorings and a night exercise with three C.M.S's cleared in six minutes. Pretty good considering that some of the divers were turned in and others in a bar two miles away at the time.

The highlight of their stay came when

Andy Clyde was lowered down a well in the Sheik Othman District looking for arms and explosives. He almost qualified for Josephs coat of many colours.

The day dawned, when with smiling faces, they had to leave by fast jet for U.K. They were relieved by L. Hewitt, C.D., J. Smith, S.D. and Pole, S.D. Operationally, there was a short pause whilst S.-Lt. Parks, C.D. joined and things then returned to their normal hectic pace. The equipment was standing up pretty well to the usage so far, with temperatures up to 90°F. and no air-conditioning.

S.-Lt. Parks also departed being relieved by S.-Lt. Stewart. Diving continued with the rigging, unrigging and repairing of the Tarshyne Shark Net, moorings and the everyday jobs,

but alas S.-Lt. Stewart soon left, leaving L. Hewitt in the chair.

Here we had a pause, then one day a member of F.O.M.E's staff walked in and told us to pack our gear for a flight out. U.K. ? — not likely, but in a fast *Argosy* to a dusty village called Salala on the Trucial Coast. To our credit, we managed to have our gear ready in the short time allowed us before the flight. 4 o'clock in the morning, we were winging our way across the desert to Salala. For myself a staunch R.A., it was a bit of a holiday, but we ended up in a horrible hut on the edge of the desert with the working site 20 miles away. The Army Liaison Officer took Hewitt away along a road that had to be swept for mines at six every morning, stuck him on top of a small mountain and pointing to a site that resembled Portland Harbour, explained that they had lost a small craft three weeks previously and could we find it. Four days later, bronzed as Greek Gods, with a few crayfish in the deep freeze, and after using all the

searches in the book plus a few of our own we managed to salvage a third of a local Sheik's aluminium aircraft hangar but no small craft.

On returning to bomb-happy Aden, things bucked up with the arrival of Lt.-Cdr. Olsen, S.D. At this time Hewitt and his gang had done seven months on the station and were looking forward to returning to England. This they did, after a small delay caused by a Force 9 sandstorm, in a shiny *V.C. 10* from Khormaksar, Hewitt, now a shiny new P.O., Jim to do a C.D. course and the rest just bronzy.

So here we are holding up the fort, Sam and Ben the diving men. Although our team is small our total diving time is about three times as much per month as a Frigate in commission. A few divers from any of the ships that visit Aden will always be welcome. At the moment we have H.M.S. *Kent* and *Bulwark* plus a few Frigates to do the job here in Aden.

So from bomb-happy Aden, see you soon. C.



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Further to Volume 13, No. 2, here are some more Facts on Condensation and Preservation by Jim Wardle from a Dolphin's Underwater Club News Letter.

Ed.

## Condensation and Penetration of Humidity in Water-Resistant Watches

**C**ONDENSATION presents one of the most controversial problems in the manufacture, servicing and wearing of water-resistant watches. When a misty deposit forms on the crystal of a water resistant watch, it raises a very disturbing question. Is the mist due to the penetration of humidity from outside, or has the water in the air inside the watch case been deposited on the crystal ?

### Condensation Without Penetration of Water

It is a scientific fact that the humidity of the air varies according to the temperature. The higher the temperature, the more water vapour the air is able to hold. If a watch undergoes very rapid cooling, the humidity content of the air outside the case reaches the maximum amount the air can hold at the lower temperature and a fine mist is deposited on the crystal and case.

The average water-resistant man's watch contains about two cubic centimeters of air. If the case is closed at a temperature of 77° F. and a relative humidity of 80% (rather damp), the air contained in it will hold 0.037 milligrams of water.

If the watch is cooled to 70° F., the so-called 'dew-point' is reached and the excess humidity begins to condense on the watch surface. When the temperature is reduced to 41° F., the air can hold only 0.013 milligrams of humidity. The difference of 0.024 milligrams is deposited on the case and is sufficient in amount to be visible as mist.

In the course of laboratory tests, the weight and diameter of the water drops forming this moisture deposit were measured and the scientists concluded that this kind of condensation was not sufficient to cause parts of the movement to rust. The air contained in the watch acts as a protective screen between the damp deposit and the metal that is liable to rust.

### Condensation of Humidity from Penetration

Very often mist will form on the crystal when the outside temperature rises quickly. For example, you may wear your watch when you go swimming then lie on the warm sand afterwards. If the crystal becomes misty, it is *not* due to condensation of the moisture deposit normally found in the air in this case, but to penetration of humidity from outside. With a rise of temperature the air could hold more water than before.

### Exchange of Humidity Through the Watch Crystal

People often assert that unbreakable crystals are porous and that water can therefore penetrate into the watch. This is not quite correct. The Material used in the manufacture of unbreakable watch crystals is *not* porous. It does exhibit the phenomenon known as 'Swelling', i.e., it adjusts its own humidity content to that of the surrounding air.

Whereas an ordinary breakable crystal or sapphire crystal will insure

hermetic sealing, unbreakable organic crystals (usually Plexiglass) will give rise to a change of humidity. This exchange may take several days to complete but it is not harmful to the watch movement. Since this exchange of humidity does occur, casing the watch in an especially dry atmosphere is of little practical value.

**Summary**

If a slight condensation occurs when

the temperature falls quickly, this is normal. Simply warm the watch and the deposit disappears. On the other hand, if condensation occurs when the temperature rises, it is very likely that water has penetrated into the watch. Only a watchmaker can correctly repair the damage.

## The Home Station Clearance Diving Team

IT is an accepted fact that winds of change are continually sweeping through all parts of the Service, and indeed, that hoary corollary that 'It don't blow like it used to blow', has been very true as far as the Home Station Clearance Diving Team is concerned in recent months.

After a hectic period of exercises and a protracted search for a swimming aircraft and its associated bits, during which period several members of the team augmented their not inconsiderable knowledge of certain portions of Great Yarmouth, the *Dingley* staggered through a force 8 gale to berth for the final time in *Vernon Creek* and only just in time for summer leave.

A new management took over for the last throes of *Dingley's* life while the boss went into *Vernon* to become a student for the second part of the first M.C.D.O. course before heading southwards to a most desirable appointment in the Mediterranean. The ship's company coped with de-storing and de-equipping and in addition the divers moved ashore to temporary accommodation in *Vernon*. For store and office we were scheduled to take over the regulating offices from 30th August, but to date we are still waiting for the present occupants to move to their un-

completed but commodious residence on the ground floor of Hecla block.

Official policy now decrees that the team is based ashore and is available as a highly mobile clearance diving team for use anywhere in the United Kingdom. Our mobility is achieved by a lorry which was converted from a Bedford troop carrier chassis by the energetic and efficient services of Devonport Dockyard. Fitted with a one-man compression chamber and its associated compressor we are still experimenting with just what stores we shall carry. In March next year this vehicle should be augmented by a long wheel base Land Rover.

So far we have had a ten-day excursion to Falmouth where we relieved the Plymouth team who were required to go and look for yet another swimming helicopter. In addition we have a steady requirement from Portland to exercise with the ships working up under the Flag Officer, Sea Training. Of course, having just come ashore one of our main problems is to keep fully employed without poaching on the bread and butter jobs of the highly skilled teams which abound in the Portsmouth area. However we have no doubt that we shall be able to cope and survive.

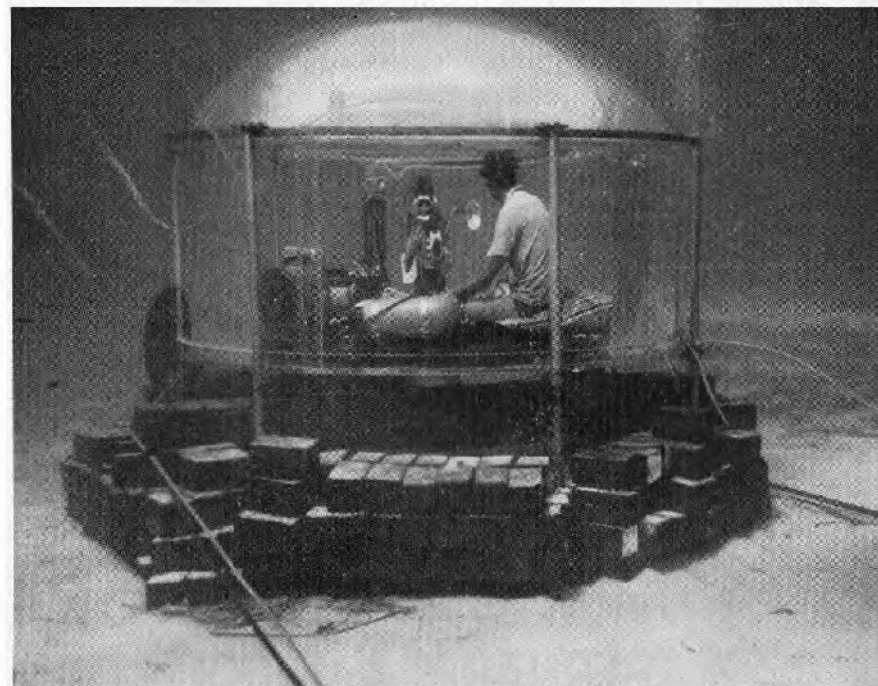
The team at present consists of P.O. Bray (C.D.1.), (the younger — and due to leave us for the Far East at the end

of the year), L.S. Malham, Evans and Coote, and A.B. Deakin, Eastwood, Briggs, Harris, Dunkley and Williams.

## Exercise Seasnail

WITH the general increase in underwater activity in the Army, the Royal Military Academy, Sandhurst has formed a flourishing Diving Section, and it is rapidly becoming a tradition for them to carry out

it at intervals, was a Perspex underwater station. This was originally produced for a display at the International Boat Show, Earls Court. The undersea station is basically a Perspex cylinder, 7 feet 6 inches diameter with a domed



... The Underwater Station was established with 8 tons of pig iron ballast.

an expedition during their summer vacation. Last Spring the Diving Officer approached the R.E. Diving School for ideas for the 1966 expedition.

Locked away in a large shed at Marchwood, and largely forgotten except by storemen who dutifully checked

top and open bottom. Within this is placed a free standing metal floor-frame covered with glass reinforced plastic. Entry into this station is through an opening in the floor. The whole structure is held 3 feet off the sea bed by means of a metal ring fixed around the Perspex at the junction of the wall with

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the dome. Bolted to this ring are six tubular steel legs loaded with sufficient ballast to counteract the buoyancy of the air filled dome.

Since this was available, it was decided that the aim of the expedition should be to establish and maintain the undersea station, and that the most suitable location would be Malta. After a preliminary reconnaissance, it was decided that a camp would be established on the Island of Cominotto, and that the station would be sunk just outside the 'Blue Lagoon' which lies between Cominotto and a larger Island, Comino. At this stage the R.N.P.L. and the Medical Research Council became interested, and it was agreed that while down the station should be put to good use. It appeared that the generally accepted theory that decompression illness cannot occur above 33 feet was considerably suspect. What was even more surprising was that nobody had remained at this depth for any appreciable time 'in the wet' without carrying out some form of decompression procedure. This generally consisted of breathing pure O<sub>2</sub> before the ascent, such as in the case of Cousteau's experiments. It therefore appeared that the expedition could be put to a really useful purpose.

Before the exercise the Sandhurst Cadets who were to take part were given a two week course at Marchwood. As well as giving them a little diving experience this also had the effect of getting them 'on net' as regards what was to be expected on the expedition. They all now agree that when their instructor told them that diving is '90% humping kit and 10% underwater' he was not joking. Throughout the exercise the Cadets all worked extremely hard. Unfortunately it was necessary for a lot of the most interesting work to be left to the R.E. Diving School divers, who were responsible for placing and manning the station.

The party arrived in Malta on 6th August in one *Beverly* Transport, and the equipment went out in a second aircraft. By this time the priority of the exercise had somewhat improved and we were given a Army Air Corps Scout helicopter. This was also flown out inside a *Beverly*, and was to prove invaluable as a 'deluxe' taxi for men and equipment between Malta and Cominotto.

The first job was to set up the base camp and establish the station on the sea-bed. These tasks were carried out simultaneously. Whilst tents were being erected on the Island an Army craft loaded 8 tons of pig iron ballast and delivered it to the site. This was then dumped over the side where the station was to be placed. The site had been chosen very carefully, being in exactly 34 feet of water and 250 feet from the shore. The lip of the station, and therefore the pressure within, was at a depth of 31 feet.

The station was then assembled in the water and sunk close to the shore. Divers man-handled it into position underwater and loaded the 8 tons of ballast on to a prepared grillage of railway lines. This whole operation went remarkably smoothly, and the station was firmly established after one day's hard work. We then blew the dome dry by venting compressed air cylinders into it, and connected up telephone and air lines from a control tent on the shore.

In the time available we were able to carry out seven 12 hour exposures in the station, and two 24 hour exposures. These experiences will certainly never be forgotten. After a few days the activity had attracted literally clouds of fish which became extremely tame. They were regularly fed by hand, and one diver swears he had the hairs stripped of his legs by a swarm of hungry sardines!

Our Diving Doctor collected pages of

information on this exercise and became quite incoherent with joy when a classic joint bend occurred after one of the 24 hours exposures. This was successfully dealt with in the chamber on Manoel Island by the Fleet Clearance Diving Team.

The expedition can certainly be said

to have been a success, and also a very enjoyable experience for all concerned. We gained a great deal of useful diving experience and also learned the advantages and limitations of this particular station. In addition a lot of medical information was gathered which may well prove useful

## Recovery of Diving Equipment lost in Lake Windermere

CONSTABLE James of this force was engaged in practice dives in Lake Windermere using a twin cylinder breathing apparatus with a full mask, when he was obliged to make a 'free ascent' and leave the set below. Several attempts were made to recover the set without success, and this was probably due to the depth of water in which they had been dropped.

In April 1965 a new diving team was formed, consisting of Constables Telford, Nicholson, Andrews, Fair, Ward and Slater, and myself, and throughout the summer of that year the team concentrated in deep water exercises.

On Wednesday 15th September 1965, the team visited Lake Windermere and succeeded in recovering the twin set from a depth of approximately 70 feet. When found, the set was in an upright position with about one-third of the air bottles submerged in mud, and the full face mask floating above the bottles to the full extent of the high pressure air line. The valves of both bottles were in the open position, and were half full of water. A set of lead weights was still attached to the set, but the canvas bag and the webbing strap had perished

considerably. The only other damage visible to the naked eye was small spots of corrosion on the part of the bottles which had been submerged in the mud. The terylene harness, buckles, backplate, cylinder straps, etc. were in excellent condition, the only other noticeable thing being that the colour of the terylene webbing had faded. The full face mask had collected a quantity of very small fresh water mollusca and these were easily removed. No rubber components showed any signs of perishing but it was deemed advisable to replace the rubber diaphragm in the demand regulator.

The air bottles were later sent to a local factory, where they were X-rayed initially, cleaned internally, hydraulically tested, and found to be satisfactory.

Since November 1965, the twin set has been in constant use, in some instances at depths of 85 feet, and no adverse conditions have been encountered.

INSPECTOR L. THURSTAN,  
Preston Borough Police.

## Sea Jeep

THE 'SEA JEEP' is probably the latest in the now numerous list of submersible research vessels produced in America. This particular submersible has been described as a hovering type vessel, and the principles in its design have been simplicity, ease of operation, and small enough to be easily transported. The result is a 5 feet diameter sphere housing the two operators, a cylindrical battery container slung under the sphere, two buoyancy tanks, one on each side and the upper half of the sphere surrounded by a float. Two electronic driving motors are mounted on either side of the sphere, and a stabilizer is sited above the buoyancy tanks. A 2 foot entry hatch on top of the sphere houses a fixed periscope, and below the floats, on the bow of the sphere, is a plexiglass viewing port. The buoyancy tanks normally carry seawater but can be blown by compressed air in an emergency, thus providing additional buoyancy to the craft. Two marker floats each with 3,000 feet of line can also be released in an emergency and used to lower a mechanical clamp on to the vessel. The clamp will lock on to a clevis on the sphere and will enable the vessel to be lifted. Between the sphere and the battery container there are electro-magnets that hold

ejectable ballast. In the event of a power failure, or should the 'SEA JEEP' exceed its operating depth, the ballast is automatically released.

The equipment carried includes a sonar telephone for submerged use and a V.H.F. radio set with aerial for use on the surface, horizontal and vertical sonar sets which give a 30 second warning of an impending collision, and a floodlight fitted on an arm extending in front of the vessel. A C.O.<sup>2</sup> absorbent unit keeps the cabin atmosphere 'clean' and self contained breathing sets are provided for emergency use.

The vessel can operate to depths of 2,000 feet with a maximum horizontal speed of 2 knots, and a vertical movement of 100 feet per minute. It can remain submerged for 5 hours, and can hover over a position with an accuracy of 1 to 2 feet. Trial results indicate that the 'SEA JEEP' may be applied to a variety of deep sea research projects including visual surveys, bottom sampling, underwater photography and sonar phenomena studies.

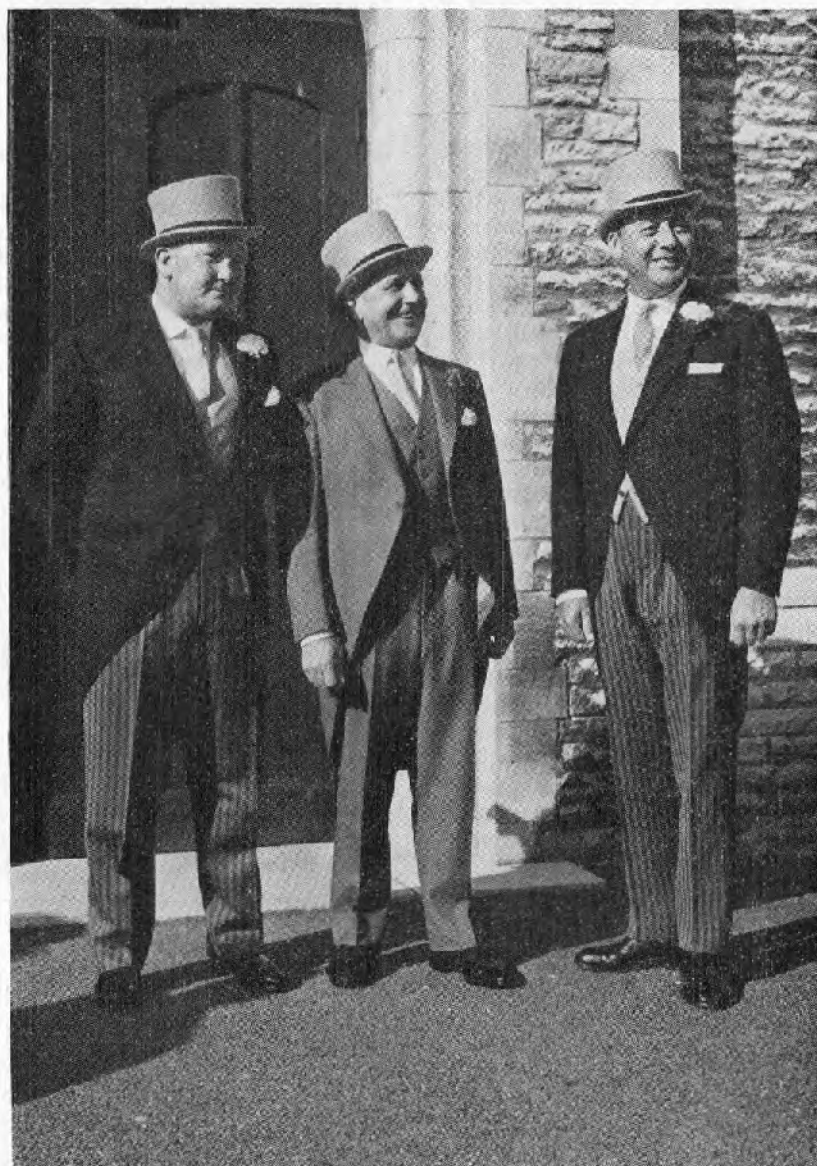
A possible future development is for the use in submarine rescue work, when it would be fitted to lock on to the distressed submarine and lift personnel to the surface. G.A.F.

## H.M.S. Vernon Autumn Road Race

THE race was run on Tuesday 18th October at 1530. The weather was dull and very windy which did not help the runners in any way at all. The course took the runners along the sea-front as far as South Parade Pier and then around the Rock Gardens and back along the same route. Only six teams turned out of a possible eleven. The race was won by E.M. Mitchell of Weapons/radio, the first Deepwater man home was L.S. Dadd who came in

third. After a lot of discussion the other runners said the division had an advantage as a lot of the course was swept by heavy waves coming over the seawall. The positions of the other members of Deepwater, who won the team event, were as follows:— L.S. Brayne 6th, A.B. Kidman 8th, L.S. Smith 11th, A.B. Gosling 13th. As a matter of interest the last four mentioned are on course for C.D. 2. Well done all concerned. J.H.

## Divers' Dinner 1966



Elder Brethren in "Wet" Suits

AND many were the lamentations that resounded through the hallowed halls of the Diving School the morning after. When all the empty gallon jars of sherry had been stowed away and the heads finally encased in their skulls it was decided that the dinner had been a success. 162 people sat down to the dinner, the guests being Surgeon Rear-Admiral S. Miles, R.N., Captain R. E. Lloyd, R.N. and Commander P. A. White, R.N., these numbers being swelled during the drinking afterwards by divers who could not make it in time for the dinner. There was however a noticeable low number of ratings, it seemed as if all the work of beating the ears of the civies and the hierarchy had to come from the older stalwarts.

Bewailing their many sins the gentle-

men from the Western world sent us a message as follows:

Like bedouins by God forgot,  
We divers of the Western grot,  
Once more debarred from the Annual  
Dinner

By *Vernons'* Council of the Inner  
Who chose the date with greatest care,  
To make quite certain we were not  
there.

We send you fraternal greetings,  
In hope one day to attend your  
meetings

Please next time may date be right  
Let us with you be joined that night.  
Oggie, Oggie, Oggie.

And so, with a fervent thanks be that  
it's all over for another year, we will  
try to fix the date more suitable to the  
lads in Oggie Land next year. J.H.



### PROMOTIONS AND ADVANCEMENTS

#### To C.D. II:

L.Sea. Timberlake  
L.Sea. Lambert  
M. (E.) 1 Gill  
M. (E.) 1 Jackson  
M. (E.) 1 Henderson  
M. (E.) 1 Allison  
M. (E.) 1 Ramsay  
N.A.M. Garner  
A.B. Williams  
A.B. Dunkerley  
R.E.M. Ward  
A./L.Sea Framingham

#### P.O. to A./Sub.-Lt. (C.D.):

A./Sub.-Lt. J. Cook  
A./Sub.-Lt. B. Martin

#### L.Sea. to P.O.:

A./P.O. F. Newman  
A./P.O. L. Hewitt

#### To C.D. I:

P.O. R. Fraser  
P.O. B. Cornick  
L.Sea. Fellows

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VIXEN**  
**"SALVAGE"**  
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<b>Successful 2 Hose Cutter</b>		
<b>Nozzle Mix</b>	611720	
<b>Balanced Pressures</b>		
<b>Automatic Shield Feed</b>	594811	
<b>Diver Controlled Striker Plate</b>	603958	
<b>Low Pressure Cutting</b>		
<b>New Shield Feed and Cut Out</b>		

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## Naval Air Command Sub-Aqua Club Expedition — Isles of Scilly — 1966

THE sixth annual expedition of the Naval Air Command Sub-Aqua Club sailed from Penzance Harbour for the Isles of Scilly on Saturday 9th July 1966. Under the leadership of Lt.-Cdr. A. Baldwin, R.N. (R.A.E., Farnborough), the expedition included 19 divers, two scientific officers of the Ministry of Agriculture, Fisheries and Food, two Wren officers and one Wren rating. The 19 divers had been selected from applicants representing all the Naval Air Stations. All personnel were accommodated on board the R.N. Auxiliary minesweeper *Puttenham* and *M.F.V. 93*, these vessels being commanded by Lt.-Cdr. P. London, R.N. (Retd.), and Lt.-Cdr. E. Barter, R.N. (Retd.) The two vessels were manned by a total of eight R.N.X.S. personnel from the Penzance Division.

This Expedition had four basic objects, which, in order of priority, were as follows:—

- (1) To provide advanced sport diving facilities and experience not normally available at individual air stations.
- (2) To search for, and if possible locate the wreck site of H.M.S. *Association*. This warship, a second rate, 96 gun vessel, the flagship of Admiral Sir Cloudisley Shovel, sank on the Outer Gilstone Ledges on October 22nd 1707, along with three other vessels and the loss of some 2,000 officers and men.
- (3) To catch, by hand, as many crawfish as possible. These were to be handed over to the scientific officers of the M.O.A.F.F. who would take various measure-

ments before tabbing the creatures and returning them to the sea.

- (4) Record underwater conditions, features, wreck information, etc., as found and forward this information to the Hydrographic Department of the Navy.

X.S.V. *Puttenham* sailed alone for the Isles of Scilly on the 9th July, since *M.F.V. 93* was required for other duties with the Falmouth Tall Ships Race. This arrangement meant that the entire expedition had to be accommodated on board the one vessel for one night. However, *M.F.V. 93* joined the expedition early on the Sunday after steaming over-night and the equipment and divers settled down to less crowded conditions.

Within a few hours of arrival at St. Mary's, the first crawfish was caught, tabbed and duly returned to the sea, but there was a noticeable decline in their numbers on previous years. Normally plentiful between 60 and 120 feet, this years observations showed there was a decline in numbers of about 60%.

At the first suitable tidal period, both vessels headed out for the Outer Gilstone situated about two miles from the Bishops Lighthouse. A strong south west wind was blowing, about force 4, and once clear of the smaller islands, the sea conditions made any diving quite impossible. The expedition, therefore, had to return to a more sheltered area in the lee of the larger islands and pursue other activities.

The duration of the expedition had been timed to coincide with the most

suitable tidal period, i.e., a neap tide, which limited the times we could expect to dive on the Gilstone. Once Thursday 14th July had arrived, the expedition could expect very unfavourable currents of some 2—4 knots in the area and very little slack water.

Weather conditions worsened on the Monday and Tuesday, with fog and drizzle reducing visibility to a few hundred yards. In addition, the gyro compass on board *Puttenham* broke down, followed by one engine starter, the radar, and echo sounder. However, the majority of these were fixed, at least for a time, and diving continued, although on a limited scale. Finally, in desperation, the expedition attempted a dive on the Gilstone, after the morning has been spent transferring fresh provisions from a Culdrose helicopter of 707 squadron.

Using a service 'Gemini' inflatable dinghy fitted with a 15 h.p. outboard engine, four divers and a cox'n managed to reach the Gilstone, and anchor to the south-west of the actual Gilstone Rock. Two divers commenced a bottom search using a bottom line and actually covered a wedge shaped area some 150 yards, from the Gilstone Rock. Conditions on the surface were far from good, with a swell of some 5—6 feet, and a very strong wind. Upon return of the first pair any further diving on this area was abandoned in the interests of safety. Had the 'Gemini' broken adrift or the engine failed to start the entire party would have been swept into the rocks where nothing could have been done to assist them.

Diving therefore continued to the north and east of the islands, the total of crawfish steadily rising as the divers found better grounds. In the areas of Porthellick Point and Newfoundland Point they were much more abundant, and one particular dive returned a total

of eleven. Great interest was shown in the tabbing of the crawfish by Mr. Hepper and Mr. Simpson. Only adult crawfish are caught off the coast of Cornwall, Devon and South Ireland, the average female weighing some 3—4 lbs., and the males 6—7 lbs. This has led to much speculation as to where the creatures breed, since in that area one will find the baby crawfish. The answer to this question will assist in solving the differences between conventional fishermen and skin-divers who earn a living catching vast numbers of crawfish by hand. Conventional fishermen insist that divers are depleting the stocks of crawfish, the divers say they cannot be since for every one they catch they miss four others. To quote some figures, a professional diver can catch about 3,000 crawfish in a season, lasting about seven months. The overall total for crawfish landed in Cornwall by all types of fishermen and divers alike in one year exceeds 1,200 tons.

The crawfish caught on this expedition were marked in two distinct ways. One method was by means of a yellow, plastic dart with a number, driven into the second joint of the tail, the other being a white disc wire locked to one of the antenna. With some fish it was necessary to sew the white tag to the tail by using a surgical suture. It is interesting to note that the expedition divers managed to catch one crawfish too large for the M.O.A.F.F. standard scale, and one too small. Needless to say, the baby crawfish received better attention than its human counterpart would have done. It is hoped that the tabbed crawfish will now roam the seas and eventually turn up in someones pot or net, whereupon their growth rate, distance covered, size, etc., can be re-checked and hence form the basis of some concrete knowledge of their movements and life span.

A number of interesting wreck sites

were visited or found which included the following:—

- (a) The location and measurement of a number of iron cannon in the Menawethan area near St. Martins. (Thought to be from the Naval brig *Forester* sunk February 13th 1833.)
- (b) The location of two, very large and very old, anchors. Both were wooden stocked at one time and the shanks measured some 15 feet in length. These were found in 100 feet of water close to Newfoundland Point and no doubt mark the site of some lost wreck. The anchor rings, to accommodate a marathon sized eye splice, were some 3 feet in diameter.
- (c) Complete survey of the wreck of the steamship *Italia*, sunk on the Wingeltang Ledges, May 14th 1917, Cargo — coal.
- (d) Inspection of the wreck of the S.S. *Lady Charlotte*, sunk near Porth Hellick the same night as the *Italia*.
- (e) Inspection of the wreck of the S.S. *Plympton*, on Lethagus Reef, sunk 14th August 1909.
- (f) Inspection of the wreck of the German steamer *Harthor*, sank 2nd December 1920. The wreck of the *Harthor* lies right across the *Plympton* and the mass of the two vessels, with a total tonnage of 12,000 tons has to be seen to be believed. One of the divers recovered the ships chronometer from the *Harthor*, a pure luck find amongst tons and tons of twisted steel.
- (g) Location of the wreck of the early Russian steamer, *Aksai*, sunk on White Island, on 26th October 1875.

Some assistance was also given to members of the British Museum and departments of the Birbeck College, London who were engaged in a number of activities concerned with tagging and marking sea-urchins. One of the expedition divers accompanied the Birbeck College students and took a number of underwater photographs of marine life, etc., that they wanted but could not obtain themselves. The negatives and prints of these photographs have been sent to the British Museum authorities.

Further attempts were made to dive on the outer Gilstone area, but the wind and sea conditions made it impossible. At one stage, when turning to give some shelter to the 'Gemini' craft before launching with divers near the Gilstone Ledges the inshore mine-sweeper *Puttenham* was rolling her gunwales right under — causing havoc in the galley.

Finally, the expedition had to return to Penzance without having really even looked at the area in which the *Association* probably sank. Its location and isolation is obviously why it has lain undisturbed for all these years, and is liable to remain so for a long time to come. A final dive was undertaken on the way back to Penzance, off Boscawen Point. Here, six divers went down on the wreck of the M.V. *Juan Ferrer*, one of the more recent losses on the coast of Cornwall.

Overall, the expedition was a success, although weather conditions could hardly have been worse. The advanced diving facilities were available at all times and good use made of the opportunities, all divers carrying out at least two good dives a day. The conduct of the divers both in, and out of the water was excellent and at no time did either the Expedition Officer or Expedition Diving Officer have any cause for concern. During the entire duration of the



expedition, not one diver had cause to give a 'distress' signal which speaks highly of their training and ability. The expedition was invaluable experience in small boat handling, seamanship and small ship life — opportunities not normally afforded the Naval Air Command.

The Naval Air Command Sub-Aqua Club Chairman and Committee would like to express its appreciation to the many individuals and departments who

made this expedition possible. Special appreciation is due to the Royal Naval Auxiliary Service (Penzance Division) and Cdr. Gabbett-Mulhallen, Senior Officer R.N.X.S. *Plymouth*. It is hoped that this will not be the last opportunity afforded the Naval Air Command Sub-Aqua Club to look for the wreck of Sir Cloudisleys fleet, and trust that the next expedition will be favoured by better weather.



“The Marriage Market”

## American Influence

‘EXPLOSIVE Ordnance Disposal.’ How very American and how descriptive. We have to hand it to our friends across the ‘herring pond’ they can certainly think up good ideas. In this case, it is poetic justice since it was they who started off the mine warfare business! (I know some erudite scholar will attribute this to the Greeks—rightly, but many years lapsed before the mine was used again).

In 1776 an American gentleman called Robert Bushnell originated the idea of using floating mines against British shipping in the Delaware River. Although this appears to have caused some damage to morale, if not to shipping, Mr. Bushnell’s idea was not pursued. However the American inventor Fulton tried to influence the British, French and American governments to adopt the mine as a weapon of war. Only Napoleon and Pitt supported Fulton, the three Navies’ reactions were quite different! The French are on record as stating that the proposals ‘are dastardly and cowardly methods of warfare, only likely to be of use to Algerines and Corsairs’. Lord St. Vincent voiced the Royal Navy’s opinion that:— ‘Pitt was the greatest fool that ever existed, to encourage a mode of war which they who commanded the seas did not want, and which, if successful would deprive them of it’. The American reaction was similar, they reported on Fulton’s ‘cheap contrivances’ that ‘they have found, to say the least, comparatively of no importance at all, consequently they ought not to be relied upon as a means of national defence’.

In spite of this barrage of abuse, drifting mines were again used against British ships in the war of 1812, the only success was against H.M.S. *Plantaganet* (a two-decker of 74 guns). Damage was

slight but the effect on morale appears to have been considerable. In an article in the *Naval Chronicle* the following remarks appears:—

“Fulton’s schemes are revolting to every noble principle and he is a crafty and muderous ruffian’.

Those who supported Fulton were described as ‘openly stooping from their lofty stations to superintend the construction of such detestable machines that promised destruction of maritime establishments’. The writer goes on by ‘protesting against the policy of encouraging inventions that tend to innovate on the triumphant system of naval warfare in which England excels’.

He finishes with the following prophetic statement:—

“Guy Fawks is got afloat. Battles in future may be fought under water; our invincible ships of the line may give place to horrible unknown structures, our frigates to catamarans, our pilots to *Divers*, our hardy dauntless tars to submarine assassins. Coffers, rockets, catamarans, infernals, water-worms and fire-devils! How honourable! How fascinating an enumeration! How glorious, how fortunate for Britain are discoveries like these! How worthy of being adopted by a people made wanton by naval victories, by a nation whose empires are the seas.”

In spite of all this, development of the mine proceeded and in 1841 Colonel Colt, the inventor of the Colt revolver, went a long way towards perfection of the controlled mine. Every war since has seen systematic improvement of the mine and of methods of disposing of it.

Now if only Mr. Fulton appeared in the E.O.D. Facility! who knows?

A.G.W.

# Brighton 1966

A Report by Lt.-Cmdr. S. A. Warner, D.S.C.

Conversation Internationale. Com<sup>m</sup>mandant Jacques-Yves Cousteau and le Directeur en Charge de la Plongee Sous Marine 'Grand Bretagne' (S. of D.) together with members of the B.S.-A.C.

\* \* \*

**T**HE International Conference on Underwater Activities was once again held at the Dome, Brighton, during the weekend of the 2nd, 3rd and 4th of September. In my opinion it surpassed all the excellent conferences that have been held in the past, and if old Father Neptune had been casting his net for a haul of 'Sub-Aqua People' he would have had a good catch. With the possible exception of the World Conference of 1962 I don't think that I have ever seen so many experts of International repute gathered together in one place.

The details of all the papers that were read, and the discussions that followed would fill several complete magazines, and I have no doubt that these will be produced elsewhere. It is probably enough to say that almost every underwater subject was dealt with in the programme. In particular, the R.N. team led by the Superintendent of Diving, discussed the Navy's deep diving trials and the R.N.'s possible role in the future. Capt. George Bond, Director of the U.S. Navy's 'Man in the Sea' programme and Edwin Link, held the floor with Captain Jacques-Yves Cousteau discussing their respective experiments of *SEALAB* and *CON-SHELF*. All this was most entertaining and indeed very enlightening, but I sometimes lost touch with the eventual aim, in spite of the fact that almost every speaker was dropping hints about

operating dives in the future at what we now consider to be fantastic depths. A figure of 1,000 metres was mentioned at one stage!

This was, of course, basically a diving conference and I suppose that the natural emphasis was on man as a diver, but time and time again I heard the statement that 'This particular task can only be done by man'.

It is on this particular aspect of diving research that I am doubtful.

I would disagree with the emphasis that the acknowledged experts in this field put on men living at ambient pressure in the undersea environment.

There is no doubt that both Captain Cousteau and the U.S.N. are proving techniques that can be employed to allow man to live for long periods at tremendous pressures. They are also proving that man, given the benefit of these new techniques, can carry out a fairly useful job of work. It is probably also true that man is the cheapest and most versatile machine with which to experiment. Only time will tell if, in fact, there is any long term effect of these long exposures to pressure.

Without any way decrying these tremendous pioneering efforts that are being made into the exploration and exploitation of the underwater world, I would very much like to see the same amount of effort being put into a programme of underwater vehicles designed to simulate the activities of man, but retaining man in an environment of atmospheric pressure running parallel to the man-in-the-sea projects.

This approach is obviously expensive

in the initial stages but it becomes an engineering problem which even at the present state of the art we know can be solved. Closed circuit television can duplicate normal vision — even sonar can replace vision under some circumstances. External manipulators can be operated as delicately as one's own fingers or as a ten-ton grab. Man's thinking can, with practice, be linked with the operation of these external instruments without the inherent problems of breathing gases under pressure. Several years ago I used the term 'encapsulated diver' in a paper that I read at the Brighton Conference and I still think that the long-term future and certainly the very deep future, lies in this approach. One of the problems of this is that people's minds immediately fly to the 'articulated iron man' when the encapsulated diver is mentioned. One should instead, think of the remote-controlled manipulators used in the atomic industry for handling radioactive isotopes.

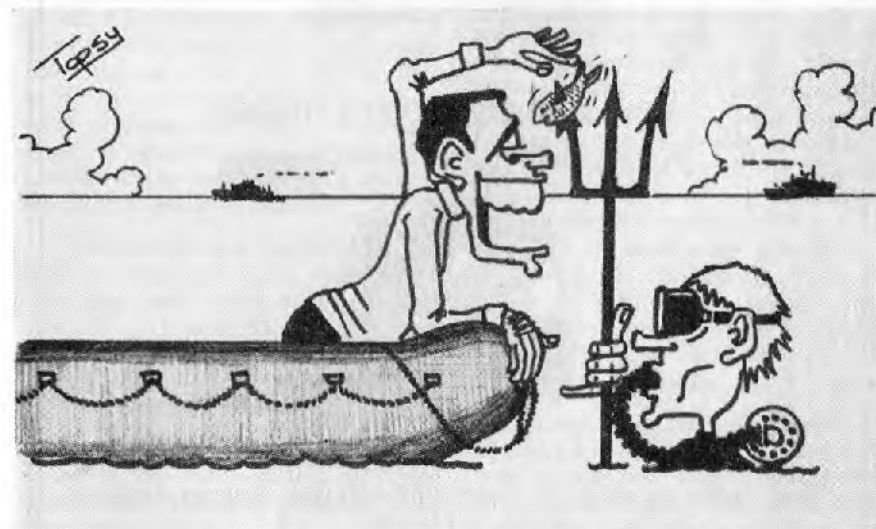
These could be pressure-balanced,

hydraulically operated hands and arms that exactly follow the movements of the operator within the capsule. Unlike the science of diving physiology, the knowledge of which is comparatively sparse, the engineering and electronic sciences are at a stage where we know that, given the money and effort, we can get to every part of the ocean floor. The obvious cry is 'where does the money come from?' and I think that at this stage I must say that everything in this article is very personal.

I believe that in the future the sea will be producing hundreds of times more protein and minerals than is even considered at the moment. The term 'undernourished' could be removed from the world's vocabulary.

Let us withhold some of the millions of pounds sterling that we give each year to other nations. This money could be invested in the Exploration of the Sea with the aim of assisting the entire world in the future, and Britain in particular.

J.W.

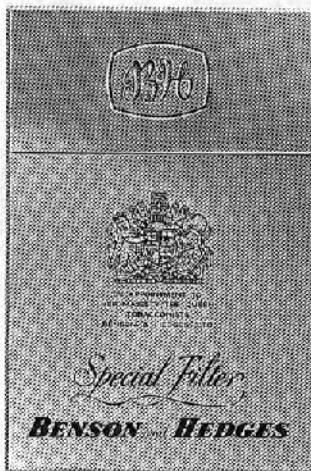


"Shall we eat it now or would you like it stuffed?"

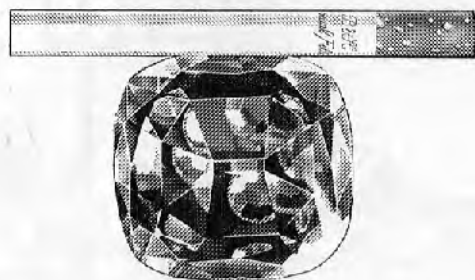
## Summer Holiday

# BENSON and HEDGES

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**I**N spite of the fact that divers are accused of being complete individualists, and that it has been stated that there are as many views on any particular problems as there are divers, I think when it comes to the requirements for a holiday, most divers have the same basic desires — Sunshine, Sea, Scenery, Sustenance and Shelter.

I have carried out practical studies on the subject of holidays over the last few years and have come to some very firm conclusions. First of all let us consider the Sunshine requirement. I am not a typical Englishman, who will sit on a beach and enjoy himself, in spite of the fact that it is pouring with rain and bitterly cold. I like to bask in the warm sun, and swim in the warm sea working up a jolly good thirst. This automatically produces an index error against holidays in Britain, because as a general rule we don't have a reliable climate, we just have weather!

We then come to the sea, like most divers, I feel lost when I am very far away from the ocean, and I thoroughly enjoy having a busman's holiday pottering around with a snorkel and face-mask in warm clear water. I strongly object to swimming in the discharge of town sewers as is unfortunately the case on many of our own beaches.

Good scenery is a logical follow on from sunshine and warm water. It is true that one occasionally sees the beautiful girl in a bikini on English beaches, but more often than not that beauty is spoilt by goose pimples and the blue flush of coldness.

British sustenance is good if you can afford it, but the high cost of liquid nourishment makes it prohibitive for the average Joe!

Finally we come to shelter, and within the term shelter I include one's solid food requirements.

For me, shelter should include a bedroom with one's own toilet and bathroom, which is all the more important if the weather is warm. I also require three meals a day with, preferably, a change from the usual Englishman's diet. This is of course not impossible in Britain, but if you can find a place which fills these needs, the bill is going to knock you sideways!

The all important question is how and where can you fill these requirements within a comparatively small budget?

The answer I have found is quite simple. About this time of year, at Christmas, having had a surplus of turkey, Christmas pudding and wine; you browse through a collection of 'Package Tour' holiday brochures.

First of all cross out all of those which are beyond your budget. Then you make a list of essential requirements. Mine go rather like this:— Small town or fishing village essential, small hotel essential, close to the beach essential, private bath and toilet essential, absolutely no night club in the hotel, absolutely no claim to produce English cooking. At this stage my scope for selection is reduced to a few places on the Spanish Mainland plus a few in Majorca or Ibiza. I then delete those which require overnight travel and those which depart from remote parts of Britain.

Although it is not my intention to advertise any particular travel agency, I must admit that I have found that 'Everyman's' which are part of the Polly-Lunn group, which in turn I believe is a

subsidiary of British Eagle, are absolutely first-class in producing the type of holiday I enjoy and within the cost region that I can just about afford. There is no better time of the year than now to look forward to the warmth, the fun and bottled sunshine of your next summer holiday.

At the risk of boring you, let me briefly describe the kind of holiday that is now becoming my routine.

Having overcome all the problems of paying the bill (which incidentally you have to do about two or three weeks before you go) and having taken all the seamanlike precautions of being vaccinated, etc., the great day arrives when you present yourself at London Airport one hour before take off. At this stage I always don my straw hat which is a clear indication to everybody, and my family in particular, that I am on leave. It means that I have left the world of telephones, unusual diving incidents, decompression problems, and that I am almost human again. Deposit the luggage, a quick drink in the duty free lounge (but very expensive), board the 'plane, take off. A very large whisky and soda (the last until the return flight) plus a very pleasant meal served by a charming hostess, and I reckon that I am once again completely human, and in fact on holiday. To a certain extent this also applies to my family except, of course, they are generally more human than I.

The flight to Palma takes about two and a half hours, followed by the usual passage through customs and immigration, where one is dealt with very quickly in a most charming manner. Our courier then showed us into the correct coach for the forty-minute trip to our hotel in Porto Colom where we were met by all the hotel staff who welcomed us with open arms as they remembered our party from last year.

Bottles of champagne and fundador brandy appeared from nowhere and we started the routine which was to continue for the next fifteen days.

I have found that it is wise to take things comparatively easy on the night of arrival, so that after unpacking, bathing and changing, a quiet noggin before dinner (about 9.30 to 10) is the best approach. This is followed by dinner with a couple of bottles of wine, followed by coffee and fundador. I then take the family to call in the local fisherman's bars where we renew our acquaintances over champagne, and 'so to bed' at the reasonable hour of 1.30 or 2 a.m. This may sound rather hectic for U.K. but as a general rule the evening festivities do not start until about 11 p.m.

The daily routine follows a fairly simple pattern. A leisurely breakfast between 9 and 10 followed by an even more leisurely walk to the beautiful beach situated between two rock promontaries. My first impressions are always the same and always remain throughout my stay — the beauty of the brilliant blue sea with the golden sand imprinted with the brilliant colours of the various sunshades on the sand, and in the sea, the finest collection of scantily clad models of absolutely perfect females I have seen. And by models I do not mean the flat chested, tubercular looking creatures that pose in the grotesque, inhumanlike poses of the fashion world. Even my wife has been heard to say 'Wake up Jackie or you will miss this one'. I suppose that I should add that a vast majority of the visitors to this particular area are Germans and Scandinavians.

Anyway, once on the beach we establish our site fairly close to the beach bar, which always manages to produce the most amazing selection of cold drinks from a tiny thatched hut,

The pattern of activities continues with a swim, sunbathe, swim, sunbathe until about noon when the body liquids need replacing with a bottle of champagne, cold lager or perhaps a Cuba Libre followed by more sun and swimming.

At about 1.30 we wander back to the hotel for a shower and lunch at 2.30 to 3. A four course lunch is always served and is delicious. If I have a complaint about the food, it is that it is not completely Spanish. The reason for this is that the English guests tend to hesitate in enjoying real Spanish food. The manager explained to me one day that he had to modify the delightful Majorcan Paella that he used to serve because the English guests tended to leave the delicacies such as the prawns and mussels in their shells. This, of course, is a tremendous shame, but I suppose, understandable. The fact that all the meals are taken with good supplies of local wines goes without saying. The local water is perfectly fit to drink, but who wants to drink water! The afternoon is for siesta and I always look forward to my one or two hours sleep after lunch. After this our routine tended to vary very little, but we would almost invariably start this phase of the day with either a swim or a quiet game of skittles, then change for dinner which was always a leisurely meal. After dinner, at about 11 p.m., came the time to visit a night club, the local fishermen's huts or even to the beach for delightful moonlight swimming. As a general rule, bedtime was not considered until about 2.30 a.m.

At this stage of the article I am sure that the readers impression is 'My God what a lot of cash? how can anyone afford it'. The answer is simply that everything is so much cheaper than U.K., possibly because there is no Welfare State. The cheerful and happy attitude of the local people costs nothing but is very refreshing. A bottle of wine served at the hotel table can be as cheap

as 10 pesetas (1/3), champagne is from 25 pesetas (3/-) a bottle, fundador brandy from 3 pesetas a glass (4½d.), coffee 4 pesetas (6d.), entrance to a night club is normally free if there is no floor show and about 25 pesetas (3/-) if there is one, drinks in a night club are generally a little more than the average hotel, but not very much more. Beer is about the same as U.K. but Scotch and English Gin are prohibitive. The moral to this is surely, to leave one's U.K. habits behind at London Airport.

Talking about morals, I am often asked if I would recommend young people going on this kind of holiday unescorted. My answer is 'yes'. I have never seen as much public petting and snogging anywhere, as one sees in this country. There is of course an added handicap inasmuch as many people get sunburnt to the point where close contact is quite uncomfortable. The credit squeeze has of course introduced another factor; can one get by on £50 allowance? assuming that there are still people left who try to comply with the government edicts I would say that the answer is once more yes. On a package holiday, one will still have in the region of £30 per head spending money on a fifteen day holiday. This is certainly more than my family average. In fact, 30/- a head per day is good living. If you still have qualms about foreign currency, I should not worry because during the height of the season, you can't help, with notable exceptions, tumbling over vast numbers of M.P.'s of all parties at the more select foreign resorts. This of course may indicate the old Padre's motto of 'Don't do as I do, do as I say'. As for narrow-minded, frustrated old spinsters that scream about police states, etc., my answer is that 'That is not my business', I have always found them to be very happy, cheerful, and extremely charming, nation.

J.W.



## COINCIDENCE

The photograph shows what happened when an airbolt fired from a Cox's Gun during training hit a punch bolt fair and square, that was in the sand-pit beneath the plate and had been fired five rounds previous. This occurred at the Welding Tank, H.M.S. *Vernon*.

# Gamesmanship

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## BOOK REVIEW

From the *New Scientist* — 25th August.

### DIVING WITHOUT AQUALUNG

*Physiology of Breath-hold Diving and the Ama of Japan.*

**I**N recent years there has been a growing interest in military, academic and recreational diving and a considerable amount of research effort, particularly in Britain and America, has been devoted to this subject.

Most people look upon diving as a relatively new development, entailing the use of complicated, expensive and elegant apparatus necessitated by the fact that man's unaided endurance under the water must be limited by his breath-holding ability.

It is, therefore, salutary to reflect that for 2,000 years skin divers have been operating in the islands round Japan with great success and no breathing apparatus.

In any study of man's endeavour, the natural starting point must be to investigate the effects of the environment on the individual in his or her natural state. So important is this concept that the National Academy of Sciences and National Research Council of the United States, in conjunction with the Office of Naval Research in association with the Inter-nation Union of Physiology and Sciences, organized in Autumn 1965, a symposium on the Physiology of Breath-hold Diving and the Ama of Japan. This publication is an account of the proceedings of this symposium which was attended by underwater physiologists from many parts of the world. Herman Rahn who has edited these proceedings is, in his own right, a leading authority in this field. The contributions thus represent

an authoritative exercise in applied physiology which surveys the very roots of the science of underwater physiology. It uses as its subjects a select group of individuals, mostly female Japanese skin divers, engaged in a very specialized occupation.

The environment in which they work is both hazardous and stressful, and they achieve their object without artificial aid. To obtain the maximum benefit from underwater activity their aim must be to work for the longest possible period and greatest attainable depth underwater. The time of submergence is limited by breath-holding ability. Experienced divers can prolong this to several minutes by will-power and training. It is also increased by the practice of preliminary hyperventilation which, by washing out residual carbon dioxide from the lungs, delays the breaking point of breath-holding. This practice has been strongly condemned in skin divers as endangering life, but it is acceptable in this experienced and controlled group.

The depth to which unaided diving may proceed is strictly limited by the effects and chest volume. The diver who enters the water, as is the practice, with lungs full, will find that the volume is reduced by pressure from a position of full inspiration to full expiration at a depth of 100 feet. To go beyond this depth would result in damage to lung tissue and lead ultimately to collapse of the chest wall. Worthwhile periods on the sea-bed can thus only be achieved by rapid descent, which will be aided by carrying a heavy weight or rock and repeating the dives.

It is also interesting to note that women are more often used than men in this occupation due to the more adequate insulation of their skin. In

spite of this they live a full married life, even though it may mean the husband staying at home to do the housework.

Detailed accounts are also given of such basic physiological problems as alveolar gas exchange, adaptation to cold, cardiovascular and renal responses and metabolic considerations, such as energy costs, when diving. The major adaptations achieved are found to be an increase in lung volume and maximum breathing capacity.

Comparisons are also made with other groups of skin divers and include detailed accounts of the occupational hazards such as decompression sickness and chronic otitis media (inflammation of the middle ear).

Not only is this book to be recommended for its physiological value, but it is attractively illustrated and contains fascinating accounts of the daily life of the divers, and a full account of the

harvest which they gather. The basic economical reason for the occupation is primarily to obtain food, mostly in varieties of seaweed, though in addition there is a worthwhile bonus in the gathering of mother-of-pearl and the artificial pearls themselves. The more efficient of these women are extremely well paid, receiving as much as 28 dollars per day, a large reward in this part of the world.

Finally, an account is given as to how even this ancient trade is moving with the times and more modern equipment is being used, particularly in the development of protective clothing.

It is rare to find such an admirable combination of scientific information, colourful drama and fascinating history; as such, this volume may be given the highest recommendation to any reader with any scientific interest.

By Surg.-Capt. STANLEY MILES, R.N.

## Letters to the Editor

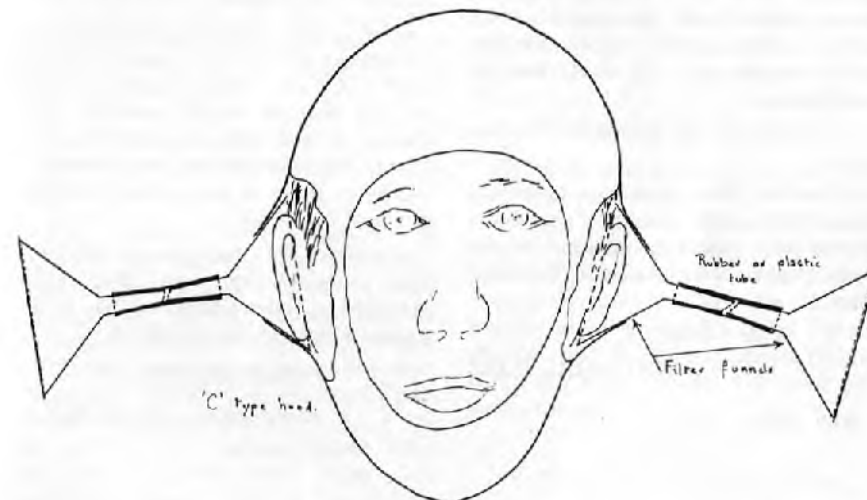
Dear Sir,

Volume 13, No. 2

I noticed with interest that a correspondent of yours follows up the report previously noted in the *New Scientist* and *Science Journal* of the use of electronic apparatus in America to enable divers to sense the direction of a noise underwater. In 1956, while I was with a trials team, I produced an extended ear base for 1/9, consisting of two pairs of 3 inch plastic filter funnels joined with a short length of rubber hose and fitted into a 'C' type hood

since been allowed to lapse through lack of commercial interest, and in *The Principles of Diving*, pages 26—28, published by Stanley Paul, 1965.

I would also mention that, contrary to what your correspondent states, directional hearing appears not simply due to phase differences as he seems to infer, but to a complex process of signal matching, association, amplitude discrimination, and behaviour patterns. Incidentally, the time interval between the arrival of the same parts of a signal at each ear are the same in air and



with the outer end of each pair covered with a rubber diaphragm, as shown in the sketch. Despite considerable departure from the ideal ratio of the relative speeds of sound in air and water, the increased ear base length and acoustic insulating properties of a hood were sufficient to give good results in Horsea Lake and enabled all but one diver, and he was tone deaf, to home onto a source. The system was described in Patent No. 832113, which has

water, it is the instantaneous comparison of phase that is different.

The important point underlined by this article seems to me that we have to await the development of a clever electronic system for achieving a result before we can be convinced of an idea that can be demonstrated with string, sealing wax, and logic.

Yours faithfully,  
MARK TERRELL,

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Dear Sir,

Perhaps you have heard of me and my nation-wide campaign for the cause of Temperance. Each year for the past 14 years I have made a tour of the country and delivered a series of lectures on the evils of drinking.

On these I have been accompanied by my assistant Norman Fortescue. Norman was a pathetic case; a man of good family, of excellent education, whose whole life was ruined by excessive indulgence in whisky, gin and other strong drink. How much better would it have been had he spent his life in a more useful way.

Norman would appear with me in my lectures, and sit on the platform staring vacantly at the audience with bloodshot eyes, whilst I would point him out as an example of what drinking could do.

Unfortunately last July poor Norman died.

A mutual friend has just given me your address and I wonder if you know anyone who would accompany me on my Spring tour and take poor Norman's place?

Yours sincerely,  
JOHN FAIRTOALL, D.D.\*

Any offers! ED.

\* \* \* \*

Dear Sir,

Why Fins Medium? when there appears to be only one size. As a normal big footed S.D.O., swim fins medium play H - - - with my toes and invariably I take cramp in my feet as soon as I get out of the water. What are the prospects of Naval Divers who take size 10 or over in shoes, getting fins that fit?

V.M.T. TOM BRYDON.

Any more opinions? ED.

Dear Sir,

One of my Divers had an endurance in S.A.B.A. of 106 minutes in Horsea Lake. Is this a record endurance at 30 feet or not?

Can anyone cap this? ED.

\* \* \*

Dear Sir,

In reference to your issue of the R.N. DIVING MAGAZINE, Vol. 11, No. 1 Spring 1964 and in particular the article on the Passing of the Copper Helmets by J.W. On behalf of four Admiralty Divers two of which are ex-pusser, we cannot agree with the statement that steamers are finished.

Being an ex-corkhead I can appreciate the advantage of self-contained equipment but, faced with an arduous task on the bottom during summer and winter, it has been proved beyond doubt, that for warmth, comfort and reliability there is no replacement for standard equipment.

Apologies for quoting one of your back numbers but we have been swamped with work and have had to do regular stops (in the local).

Yours faithfully,  
FOUR STEAMERS (Admiralty).

\* \* \* \*

Dear Sir,

Your summer edition is in hand. 'Tis a fine one as always. The Buccaneer Salvage 1966 is a particularly good article and beyond that, a superb piece of ocean engineering. Please express to your fine deep divers our congratulations from this side of the pond.

We have had a few deep ones of late too, but not so deep as that off The Lizard. The Spanish Bomb business, though not a deep dive job, was occasion

for a great deal of diving. At one time we had upward of 100 divers eyeballing, inch by inch, the inshore waters. These included many of Lt.-Cdr. Red Mooney's Explosive Ordnance Disposal Unit (E.O.D.U. 2) men; some from the Atlantic Fleet Underwater Demolition Teams; a number of the Sealab Team; station divers from Rota, Spain; divers from the main salvage base in Norfolk, Virginia; and divers from the two Submarine Rescue Ships (A.S.R.), two Fleet Tugs (A.T.F.), and one Fleet Salvage Ship (A.R.S.) which were employed at one time or another. Lt.-Cdr. Red Mooney was in charge of all diving. Chief Warrant Boatswain David McCafferty (born in Glasgow), who, at the time, was on temporary duty in Pembroke Dock, Wales, preparing two of your 750 ton lift craft for tow to the Phillipines, was also dispatched to the scene.

The beach at Palormares is undoubtedly one of the cleanest in the world!

You have no doubt read in the shipping journals that our newly designed Large Salvage Tug (A.T.S.) will be built at Brooks Marine Ltd. in Lowestoft. She will have all the latest in diving gear, including a two-man Personnel Transfer Capsule-Deck Compression Chamber (P.T.C./D.D.C.). In August the deep salvage divers from Harbour Clearance Unit One, our principle salvage unit in South-East Asia, came back to California to make some training dives. A completely

portable P.T.C./D.D.C. was deck loaded on the fantail of the Fleet Tug *Apache*. The ship lay in a four point moor, in the lee of San Clemente Island, over the prospective site of Sealab III: depth 450 feet. The first working dive was 17 minutes at 450 feet. Total time from P.T.C. lift off to landing again on the deck was 34 minutes. In less than 10 minutes, mating to the D.D.C. had been affected and a second dive could have begun. During one of the dives, Chief Boatswains Mate Villasenor carried down a carefully prepared sign and erected it on the bottom: WELCOME SEALAB III — FROM HARBOUR CLEARANCE UNIT ONE. This office had the good fortune to sponsor this dive and the development of the P.T.C./D.D.C. for our new salvage ships, but the people responsible for the work were Cdr. Eugene Mitchell, Pacific Fleet Salvage Officer, and Lt. Moose Kohl who is in charge of Team of H.C.U.-One.

Again congratulations on your deep dive on the *Buccaneer*. I hope some of your chaps will pay a visit to Lowestoft in the next year or so and take a look at our A.T.S. While we will be coming over from time to time to take a look, there's no substitute for being Johnny on Top of it. Perhaps we should employ Mr. Peter Flett and his troops to play proxy for us.

Very sincerely,  
W. F. SEARLE, JNR.,  
Captain, U.S.N.  
Supervisor of Salvage.

It has been learnt with regret that Petty Officer George Robbie, C.D.2. died recently as the result of an accident, leaving a wife and four children. He was amongst those who qualified in the old Diving School at H.M.S. *Lochinvar* and consequently will be personally missed by most of the branch. A fund will be opened for his family, please send all donations to the magazine. Cheques and Postal Orders made payable to the 'G. Robbie Fund'.  
Ed.

ROYAL NAVAL DIVING MAGAZINE, H.M.S. 'VERNON, PORTSMOUTH,  
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