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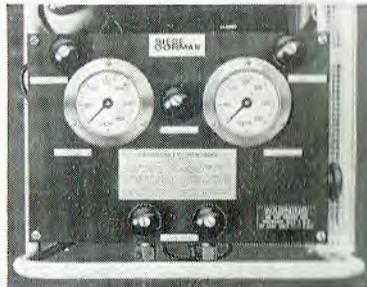
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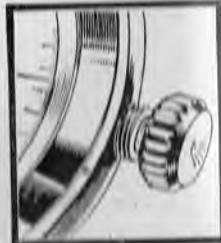
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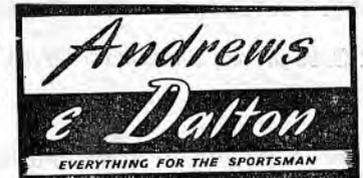
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Postal Address:

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R.N. Diving Magazine

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Vol. 10

Winter 1963

No. 3

Editorial

MOST Shallow-water Divers must consider changing over to Clearance Diver at some time or other, because first, they are keen on diving and second the advantages over normal 'General Service' are obvious.

But what does the average S.W.D. know of the C.D. branch or more important the C.D. course? The answer is 'virtually nothing!' and what he does know is almost certainly exaggerated. For this reason our article 'Is Clearance Diver for you', has been written with the intention of providing S.W.D's with the facts, so that they can judge for themselves if they are likely to successfully complete the course, at the same time those that do come to H.M.S. *Vernon* will know what to expect!

We have a fair representation of 'Team' news. Perhaps I can hope that teams not represented in this edition will feature in the next?

Which would be an ideal arrangement, giving eight months for a team to write about.

The efforts of those who have contributed, particularly the 'magazine regulars', is as usual very much appreciated. Many thanks also to the instructors at the 'Schools' who extract two shillings from their eager volunteer readers, it's very important that we get the largest possible sale in order to boast the best branch magazine in the service, which it is.



Straight from the "horse's mouth" at Haslemere (Ernie has many forms), comes a report on the present state of the branch and its effect on drafting, which would indicate more sea-time for C.D's.

Finally no editorial would be complete without the traditional plea for material, especially for technical items which are of the widest interest. Contributions should arrive by the first week in March. EDITOR.

Letters to the Editor

Lt.-Cdr. McLanachan (Mr. Mac. Retired).

Dear Editor,

Please don't think that in my retirement I have changed from a care-free C.D. officer into a crotchety old basket who writes to the *Times* every time he reads something which upsets his equilibrium. However my attention has been called to an article in the 'Summer' issue of the magazine by one 'Buster' from the Port Diving unit Londonderry. In his article 'Buster' states quite incorrectly that the Pompey Diving team 'TURNED DOWN' a diving job on H.M.S. *Yarmouth*! He thereby sullies the fair name of as fine a bunch of divers as ever donned a nose clip and I write to defend their honour.

The facts are as follows. A dome exchange was carried out on *Yarmouth* at the end of January 1963 by the Pompey team who laboured night and day, so that the ship might sail in time for an important exercise. As the exchange was being completed *Yarmouth's* T.A.S. officer reported that he suspected the 162 window

R.N. RETIRED

All the best in civvy street to:
C.P.O. WYVILL, C.P.O. PEACH,
C.P.O. MELVILLE,
three faces well known to all of us, who between them have survived 76 years of undetected crime.

was fractured, but asked that the task might be left until *Yarmouth's* impending return to Portsmouth after the exercise. In fact *Yarmouth* did not return, her destination being changed to Londonderry.

Hoping these few lines will help to soothe the righteous wrath of the Pompey team.

Yours Aye,
MAC.

Dear Editor,

In the last edition (vol. 10, No. 2) I noticed that there were five articles from various working teams, surely after reading the magazine the teams who did not contribute will have a touch of remorse?

Here we are a Diving Magazine of 56 pages and only seven of them covered by articles from the Naval Diving Teams for whom it is intended to serve.

Might I add one thing, it's not up to the Boss to do all the writing, surely there is someone in the team who can scribble a few lines.

Yours faithfully,
JIM HARRISON.

H.M.S. *Reclaim* sailed from Portsmouth on October 24th, for Santa Cruz De Tenerife in the Canary Islands, to commence another six-week deep diving trials programme. Returning in time to give Christmas leave.

'Ears' and their after-effects

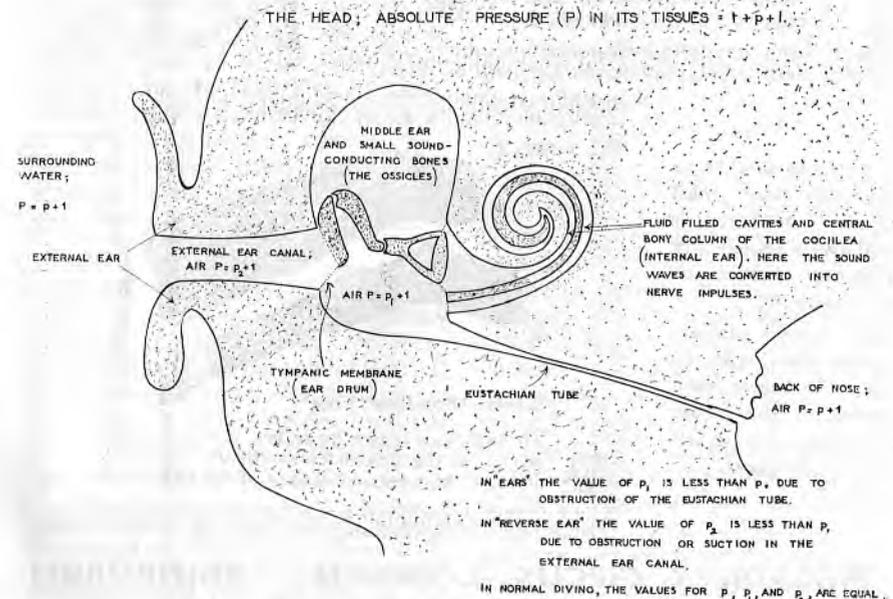
by SURGEON LIEUTENANT-COMMANDER R. R. A. COLES, R.N.

ONE of the commonest causes of failure to pass the initial diving medical examination, or to complete the first diving course, is difficulty in clearing the ears. Later, after training, temporary unfitness for diving can, more often than not, be related to the same difficulty. Similar considerations, though to a lesser degree, affect the selection and fitness of submariners and aviators.

It is not surprising, therefore, that a considerable amount of naval medical research has been directed towards the effects of pressure on the ears and nose. In fact, during recent years studies have been made on such subjects as the action of the Eustachian tube (see Figure), means of prevention and cure of the temporary obstruction of this tube which is frequently associated with colds or

influenza, the cause and prevention of 'reverse ear', and the nature of the disorders of the ear caused by barotrauma (injury due to pressure, and called 'ears' when affecting this organ) or by decompression sickness ('the bends').

The last of the studies named above was carried out at H.M.S. *Vernon* during 1959-60 by Dr. J. J. Knight, of the Medical Research Council, and by myself. It is my object now to give an account of our results and their significance. But first it is necessary to explain the theoretical consideration which preceded and warranted the investigation. In outlining these, a recapitulation of the basic anatomy and physiology of the ear can hardly be avoided, but most of it can be appreciated from study of the figure.



Diagrammatic representation of the human ear, and of the pressures within and around it.

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EXETER

Anatomy and Physiology

Key to Symbols:

P=pressure in atmospheres absolute (normal air pressure at surface is one atmosphere absolute).

p=additional pressure underwater (each increase in depth of 33 feet causes an increase in pressure of 1 atmosphere. Hence at a depth of 33 feet, absolute pressure (P) = p + 1 = 2 atmospheres).

t=normal body tissue pressure above that of its environment. (t = about 1/20 atmosphere for most tissues; for example, if the skin is damaged fluid is released — as in the oozing of serum from a burn or blister. t = about 1/5 atmosphere for arterial blood — hence the spurting of a cut artery).

Under normal circumstances, when a diver descends the increase in pressure (p) of the surrounding water causes an identical rise of pressure in the air or water in his external ear canal, of the air in his nose, throat and lungs, and of all the body tissues. Provided he has been able to 'clear' his ears, by swallowing or by other movements of muscles connected to the Eustachian tubes or by the Valsalva* manoeuvre, the pressure in the middle ear also will be raised.

"Ears"

This occurs if he fails to 'clear' his ears due, for instance, to temporary catarrhal obstruction of the Eustachian tube or to the rate of descent being too great and the valve-like tube locking shut. Locking results if the difference in pressure between middle

*The Valsalva manoeuvre is performed by blowing into the back of the nose when the nostrils are closed by the fingers or by a clip. The resulting rise of pressure in the nose overcomes the resistance of the Eustachian tube and air is forced through it into the middle ear.

ear and nose is allowed to rise to more than about 1/3 atmosphere before a successful attempt is made to 'clear' the ears. Then, as descent is continued, there is a continuous rise in the pressure of the air in the nose and external ear canal, in the surrounding water and in the tissues; but, if the Eustachian tube is obstructed or locked shut there is no coincident rise in pressure in the middle ear.

The first result is that the ear drum is pushed inwards, causing pain. If the pressure difference continues to increase then the drum will rupture. This happens in a normal ear when the difference reaches about 1/2 atmosphere, but it often occurs at considerably lower pressures when the ear drum had been scarred by previous injury or disease.

The other effect is that the thin lining of the middle ear cavity, which normally can retain the excess body tissue pressure (t), fails to hold firm as the tissue pressure rises to t+p (this not being counterbalanced by a similar rise of pressure within the middle ear). The lining tissues of the middle ear then become swollen and bruised, and its cavity fills up with serum or blood.

"Reverse Ear"

In this condition the rise of air pressure (p) in the external ear canal is not as high as elsewhere. The reasons for the development of this relatively lower pressure are as follows. The ear canal may become obstructed, for example by the ear cushion inside a C-type hood, or by ear plugs which for this reason should not be worn for diving. Or, the suction which frequently develops in a diving suit may involve the inside of the C-type hood and thereby the external ear canal. This negative pressure, which is only negative in relation to the pressure of the surrounding water, is due to the elasticity of the suit. Its magnitude

has been measured recently by Surgeon Lieutenant Jarrett (British Medical Journal, 1961, pp. 483-486). He found that it increased steadily with depth of dive; and he was also able to show experimentally that application to the ear canal of a partial vacuum of 120-150 mm. mercury, which occurs in a diving suit at a depth of 30-50 feet, is sufficient to cause a 'reverse ear'.

Assuming that the ears have been 'cleared' and the pressure in the middle ear is equal to that of the surrounding water, the relatively low pressure in the external ear canal then causes the ear-drum to bulge outwards, though seldom sufficiently far to cause its rupture or even pain. In addition, and irrespective of the middle ear pressure, fluid and blood leak from the soft tissues to form blisters in the skin lining the external ear canal or, less often, under the skin of the ear drum itself. The cause of the fluid leakage is the same as that in 'ears', described above, except that the relatively low pressure is in the ear canal instead of the middle ear. Whilst the skin of the ear can resist the normal excess tissue pressure (t), it can no longer do so when this rises to t+p, without a similar rise (p) in pressure of the air in the ear canal. Similar collections of blood can often be seen in the skin of the limbs and trunk where, as a result of wrinkles in the diving suit, a similar degree of suction has been applied; and yet another type of 'reverse ear' has been found in the ears of aviators undergoing partial positive pressurisation of respiration.

It should be noted though that when water is allowed to fill the ear canal there is no risk of 'reverse ear', even if the canal then becomes obstructed. Because of the incompressibility of water, an increase in external pressure would result in an immediate rise of pressure in the ear

canal, without needing any flow of water into it.

Effects of Aural Barotrauma

'Reverse ear' can be disposed of at once by saying that it is not a serious condition; almost invariably it heals without scarring or other undesirable result.

Until healed though, it is unwise to dive and thereby subject the ear to risk of further strain, or infection. 'Reverse ear' is quite common and, as it makes a man unfit for diving for some time, it has a considerable nuisance value.

'Ears' on the other hand quite often results in perforation of the drum. Apart from being painful, this has an immediate danger if it allows cold water to penetrate the middle ear and thereby cause intense vertigo (giddiness). Moreover the ossicles (the three small bones inside the middle ear) may be deranged at the same time, with permanent damage to their function of conducting sound from the drum to the internal ear.

Whilst most perforations caused by injury heal quite easily, this is not always the case. Occasionally the hole remains and the danger then is of the ear becoming infected. Such infection may follow a cold in the nose, or introduction of water or other foreign bodies into the ear, or if its treatment is mishandled. Once infected the chances of proper healing are reduced and indeed a chronic discharging and deaf ear may result. For this reason, men with perforated ears are not allowed to dive. Moreover, even if the perforation does heal, the ear drum is never quite as strong again; with each re-perforation, it becomes more and more easily damaged on subsequent occasions.

The effects of barotrauma are not restricted to the ear drum. The fluid that oozes from the lining of the

middle ear at first causes dullness of hearing by damping the vibrations of the ear drum and ossicles. Later the fluid will be absorbed; but it is a general rule in the human body that at least part of such collections of fluid, particularly if later infected, become converted into scar tissue. Repeated barotraumatic accidents will cause repeated effusions of fluid, each leaving behind a little more scar tissue. Ultimately this tissue may restrict the movement of the ear drum and ossicles, and so interfere with their sound conducting function. Or it may block the opening of the Eustachian tube, ventilation of which is necessary not only for equalisation of pressures in diving but also for normal hearing.

Audiometric Survey

The object of our study was to find out whether barotrauma really does lead to a chronic type of deafness. For this purpose we examined the ears and hearing acuity of 25 standard divers, 21 clearance divers and 11 submarine escape training tank instructors. The results may be summarised as follows:

- (i) The average hearing level of those divers who had not also experienced much gunfire or small-arms noise was found to be entirely normal.
- (ii) The majority of the divers, particularly those over 30, had however previously served in the gunnery branch. These men showed only the typical damage to hearing of high-tones that results from unprotected exposure to gunfire noise; but, as this type of defect is restricted to the inner ear, it was easily distinguished from the other forms of deafness which effect the middle and external ears.
- (iii) We could find no evidence of occurrence of the middle-ear type of deafness such as might,

on the theoretical grounds explained above, have resulted from repeated pressure injuries.

- (iv) In a few cases, the ear drums showed obvious signs of weakness due to past injury. As was proved soon afterwards in one of these men, this kind of ear is prone to rupture by comparatively slight pressure differentials (between external canal and middle ear) and is thereby subjected to an increased risk of infection and deafness. Thus, repeated 'ears' may ultimately lead to a loss of fitness for diving, in spite of the fact that the man appears after each earlier injury to have made a good and speedy recovery.
- (v) Past incidents of decompression sickness appeared to have had no effect on hearing or on the function of the associated organs of balance.

Subsequent to the survey, the cases of three divers who had suffered a more serious and disabling kind of ear disorder were drawn to our attention. In all three there was damage not only to the sound receiving organ, the cochlea, but also to the balancing apparatus, which is part of the inner ear. The result was deafness and giddiness. Whilst the former proved to be more or less permanent, the latter disappeared after a few weeks, as would be expected. It did, however, leave some difficulty in balancing and an increased susceptibility to seasickness.

It is difficult to be precise about the relationship between diving and this type of disorder. Certainly, in the three cases seen, the dives preceding them had been comparatively uneventful. My own belief is that these men were afflicted by one of the ordinary, though uncommon, medical disorders of balance and hearing which might trouble anyone,

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and that the association of diving with it was either incidental or, at most, no more than an aggravating factor.

Conclusions

The principal outcome of the survey was not quite what we had expected, but was nevertheless most acceptable. There appeared to be no insidious form of deafness afflicting divers as a result of repeated incidents of 'ears'.

But this does not mean that every effort should not continue to be made to reduce to a minimum the frequency of occurrence and the severity of such accidents. It should be realised that the men surveyed were selected, by virtue of the fact that they were still active naval divers. Many had had their ear-drums ruptured in the past, and frequently on more than one occasion: if these had not healed each time, they would not have remained as divers and would not therefore have been included in the survey. There have been other cases where infection followed damage to the ear or where the perforation became closed by such a thin scar that it easily ruptured again, for example as from a pressure differential associated with changes of depth as little as 6 feet. Such men would have become unfit for further diving and would not therefore have been included in our survey. Moreover, apart from having had their careers impaired and their specialist services lost to the Navy,

some of these men would have acquired a considerable disability in deafness, ear infection or both.

It is to the credit of the navy's diving instructors that, unlike some of their opposite numbers in the gunnery world, damaged ears or deafness are not looked on as a sort of trademark of their occupation. But it did become apparent during the course of our survey that a minority of senior divers still regard 'ears' rather too lightly. Broadly speaking, rupture of ear drums is preventable and bruising of the ears should be uncommon. Understanding of the cause of 'ears', careful training in its prevention, and due allowance for temporary difficulties in clearing ears, due to colds etc., are the important factors for safety in this respect. An unduly rapid rate of descent, as from a fall, is about the only cause of 'ears' which escape such controls.

Finally I would like to make brief comment on the most positive finding of the survey, which was the deafness for high-pitched sounds found in most of the ex-gunners. This too could have been prevented — by the proper use of ear protection against noise. Divers should not neglect this precaution either, whenever they are exposed to the noise of rifles, guns and other explosives; the best means is by use of the standard naval ear plugs or of cotton wool, though the latter must be moistened or vaselined to be of any real value.

Med. Fleet C.D.T.

FROM the M.F.C.D.T. or even the M.F.C.D.C. if we dare to breathe them together.

Anyway I think it must be at least 12 months since any news came from here so perhaps I should put the world in the picture.

As we know the R.N. in Malta is on the run down. The future for divers as I see it (M.I.5 please do not read). We the F.C.D.T., I put we because I don't think the enemy can write, are stopping. It is hoped that what we have, the buildings, etc., will remain

here and we will continue to operate from Manoel until the policy is changed. The school side of things I should think (once again only buzzes) should be finished by the end of the year. It will be a shame to see them go because they are not a bad shower as things go. There's Lt. Sir Hook Walker, is there any body that doesn't know him? Next in line Pasha Taff Packer now with a Moroccan clan of divers, not a bad chap but he drinks. Then there's P.O. Macrae Clifton and Snowy Boulton. Snowy I think is going to the Moon and Mac. will eventually join us. P.O. Jock Morrison is also with the school, I believe he's going Buffer of Whitehall Mansions. The rest are L.S. Culpin and A.B. Tonks the latter has put in for higher office and may become a C.D.

The team now consists of Lt. Lovall (Kamakazi) Smith, C.P.O. McKinlay

(younger than ever), P.O. Rogers (Golliwog to old friends), P.O. Witherall (we now call him Skinny), P.O. Jones, L.S. Newton, L.S. B. and M.D. Breed, L.S. Steel, A.B.'s Bauckham, Horlock and Wade. L.S. Wright has recently arrived to relieve L.S. Newton. Lt. Mac is still our steady B. and M.D. Officer, and is at the present time on a job in Tobruk.

The working side of life isn't too bad these days. Our biggest commitments are N.A.T.O. exercises which occur every couple of months, some around Malta, others in the South of France, Italy, Sicily, Greece and Turkey. As you may guess our smattering of languages has become greatly improved.

The team have returned from El Adem where we searched for a crashed R.A.F. fighter. The R.A.F. provided the transport from Luqa, one huge uncomfortable Shackleton

and were assured it would be a quick 45 minute flight. Two hours and 45 minutes later El Adem airport hove into sight, when the truth came out, Billy 'Boots' Bauckham had been flying the 'Shack'! nuff said. We were well received by the R.A.F. and really looked after, comfortable quarters and excellent food. Within a couple of hours of arrival a Helicopter was laid on, the plan being to airlift us two at a time to the site of the crash where a launch was standing by. Initial 'looksee's' were done, then work proper was started. Viz. was good so towed searches were employed. No luck.

Three days later we were joined by the R.A.F. Salvage Team, who were in fact 'Sub-Aqua' merchants from Cyprus. They looked, listened, learnt

and left.

A week had now gone by, three separate datums had been established and disregarded, the truth was that no two sets of bearing and distances from the various observers could be said to define one particular spot. So the job was abandoned, and we trundled our weary way back to Malta in a Beverly (Bootsy being lashed to his seat!)

The highlights of the trip were:—

The Chief, Geordi and Bill Jones chasing a pregnant camel across the desert — trying to get a 'photo! The visit to the war cemetery, and the scuppering of Pussers Rum in a R.A.F. camp, gazed upon by oggling 'erks, whiskey at 14/- a bottle, and 'Rabbits' at Aden prices. Let's go back again!
MAC.

R.M.S. IN 1940/41.

'Learning the Ropes'

by LT.-CMDR. HORACE TAYLOR, G.C., R.N.R.

ANYONE who read what I wrote in the last issue of the DIVING MAGAZINE on this topic will realise that 'funk-holes' and their location and accessibility were of some significance and tended to dominate one's thoughts when confronted with a new mine situation. It is better to think about these matters before starting work than after having started the bomb-fuze with rather less than 17 seconds to go.

Thus I was sent to a Type C parachute mine lying snug in Burford Woods, near Oxford. It was doing no harm to anybody but it had new marks on it and I thought that it might be a new type. The Captain thought so, too, when I telephoned him about it and he ordered me to commandeer a camera and take photographs of the mine and then

leave the camera in a safe place before operating on the mine. This I did and then the question of the 'funk-hole' arose; there were far too many trees and shrubs for me to get any distance within 17 seconds.

I had a brainwave and went to see the Colonel of an R.E. Regiment that I had seen to be based not far away. I asked him for the loan of 50 men and equipment in order to clear an escape path for me through the forest. His attitude, at first, was unco-operative; who did I think I was — a Sub-Lieutenant — to think of making such a request, etc. I then requested the use of his telephone and, by our secret priority line, I was through to the Admiralty within a very few minutes. A few minutes more and another telephone call came, this time, from the War Office authorising my requisition.



Rear-Admiral J. H. Walwyn, Flag Officer Flotillas Mediterranean (extreme left) seeing for himself how a team operates.



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So, I got my escape route neatly cut through the woods to a discreet distance and then I started work. In the event, the bomb-fuse came out without any trouble and I then started on the other side of the mine, the bakalite bung which covered the magnetic detonator. This just would not budge and the soft steel spanner which was designed for it became distorted by my efforts. Out of the tool-bag came the inevitable hammer and tommy-bar but these only knocked bits off the bung. I was beginning to feel a little desperate when I sensed that the bung was beginning to turn. Coupled with this realisation came the conviction that it was also beginning to hiss. Thoughts of 'new types' and 'cameras in safe places' flashed through my mind and I took off. But not down my hand-made escape route, achieved with so much trouble. I only associated that, in my mind, with the bomb-fuse and this was different. I was over a stone wall a few feet away and getting thoroughly stung by nettles before I realised what a fool I had been. The hissing was, of course, only release of the vacuum caused by the shrinkage of hot explosive being poured into the mine case during its manufacture. I swore to myself that that wouldn't happen again!

Then came a job in Essex, quite straight forward, and I warned myself when I came to the detonator bung that it would probably hiss when I turned it. It did — and it went on hissing. This was too much for me and I cleared off again. I came back to the job even more humble than to the previous one and mentally kicked myself whilst I removed all the bits and pieces from the mine.

Another job, this time near Coventry, half buried in the embankment of the one railway line which was working to serve what was left

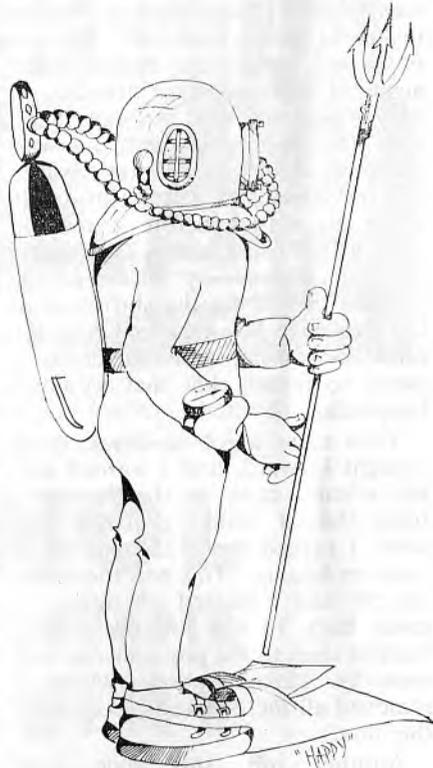
of Coventry. I arrived by tea-time on a dark wet November evening, day-light rapidly fading. But because of the importance of the mines' situation, the Captain told me to get on with the job and to ignore one of the standing orders of our squad: not to work in the dark, as the danger of inadvertently tripping up over things was too great.

Unlike my first job, this one was not 'sitting pretty' its bomb-fuse being buried underneath the mine. Thus, it had to be moved. 'From a distance' was our watch-word. So I returned to the Civil Defence H.Q. and demanded a quarter of a mile of rope and a squad of men to haul on it. I didn't realise what I was asking for; there wasn't that amount of rope (other than clothes lines) in Coventry! Ultimately, I obtained a large number of lengths of different thicknesses which I tied together and laid out between the mine and a large fallen tree behind a slight hill from where my squad would heave at the mine. I arranged check ropes leading to tent-pegs, so that the mine could not 'take charge' and roll over too far and then went to brief my squad on their part in the proceedings. The squad was composed of six dear old men from the Cleansing Department, ostensibly the 'Heavy Rescue'. They took up their stations on the rope to which I had tied a handkerchief to indicate the distance the rope was to be pulled and I warned them that, if the mine should explode, they should open their mouths and allow their cheeks and lungs to relax. Although it was now nearly dark, I shall never forget the expressions on those men's faces as the handkerchief slowly approached the fallen tree. But nothing happened and I went to examine the job; through barbed wire fences, over ditches (and through them). Nothing *had* happened to the mine situation. All we had done was to tighten up on the many knots in

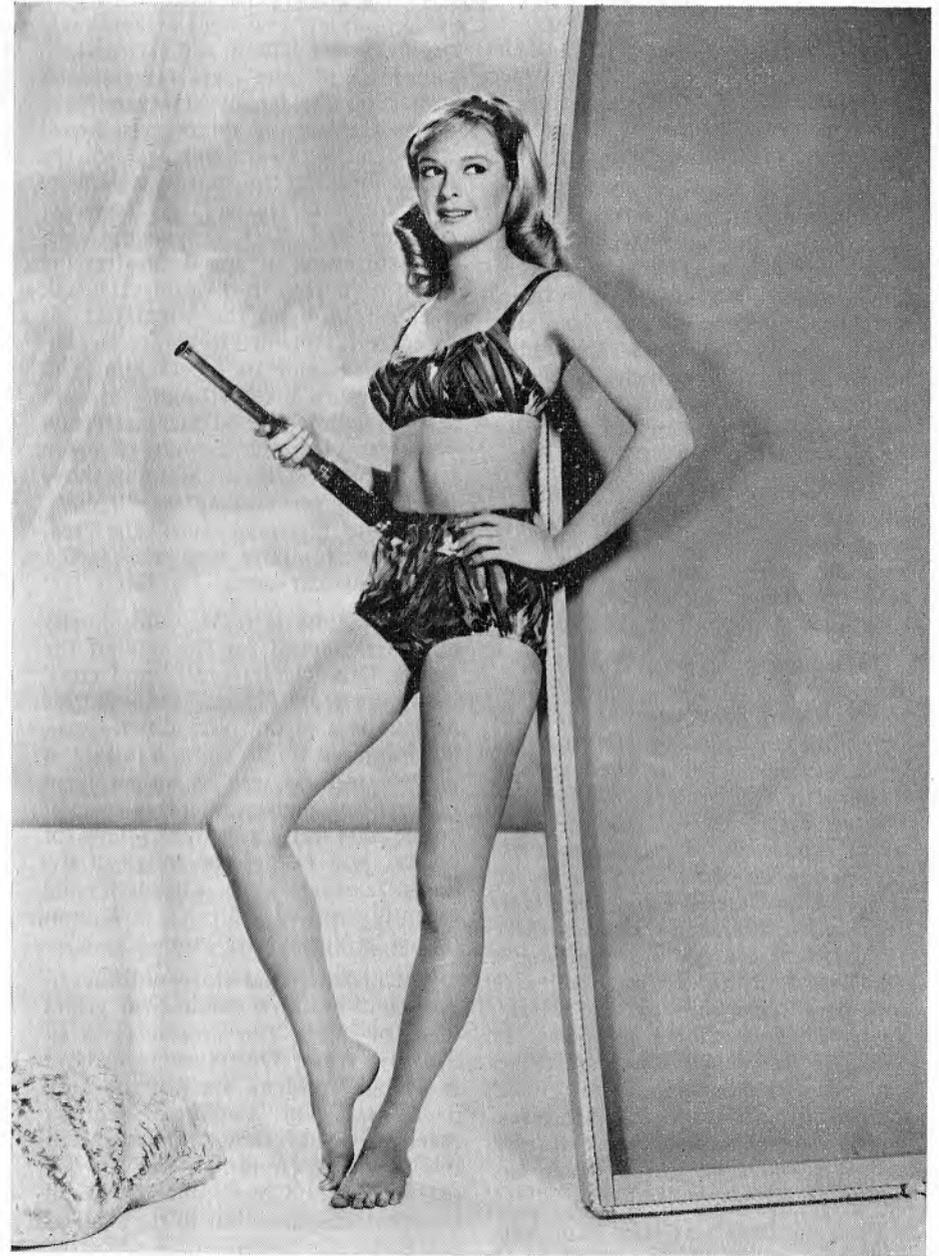
my cables. Back again to base and move the handkerchief further along the rope and try again. Repeat performance and, again, I went to look. Still no change in the mine situation; this time we were just beginning to take the slack out of the rope. I reckoned that I did three and a half miles of backwards and forwards that night before the mine was in a position to work on. I got the bomb-fuse out alright and then returned to my base to report to the Regional Commissioner that the critical part was over and that trains could resume running. Because of the urgency of the job, my squad had now been reinforced by a number of very highly placed gentlemen, whose epaulettes and caps were covered with lace of one colour or another. By now, it was quite dark and I just had to have some light. What better than that my august audience should accompany me with their torches whilst I worked on the magnetic detonator bung? Remembering my previous experiences at this point I felt that it would be only fair to warn them that the mine would hiss, but; not to worry. Everyone stood their ground, albeit with some misgivings, I felt. So, there we were, the officials and my squad of dear old men who I felt were fully entitled to any souvenirs from the parachute cords, etc., which they could take; like a Druid rite being performed in the centre of a ring of torches. The mine hissed; indeed, it shrieked. It could be heard a quarter of a mile away (not that I got so far quite so quickly) but, when I looked out from behind a tree, the field was empty.

It was very re-assuring and gratifying to see the first train come steaming through. I remember reading in the newspapers about that time Letters to the Editor whose contents were usually thus:— "Sir, We know there is a war on but, if a

train has to be stopped, why must it be in a tunnel; why could it not be in a station, etc.?" Reference to "muddled organisation" then followed. Such as I and my job were probably the reason, which, because of its secret nature, we were not able to reply to the newspapers with the actual answers. People just had to have confidence in the authorities. Much that went by the title of 'muddle and mess' was, in fact, the cover for something very urgent and purposeful being done. It is probably the same nowadays, in a different context. Quite a thought!



"At last the 'steamers' are coming round to our way of thinking."



CAROLE WELLS in *A Thunder of Drums*, a Robert J. Enders production for M.G.M. release.

Reproduced by courtesy of *The Bernard Bulletin*

The Far East Team

HAVING seen no mention of the Far East Team in the last two editions of the magazine, I thought it about time the Editor was put in the picture Oriental-wise.

With the combination of the Bomb and Mine Disposal and the Clearance Diving Teams (which everyone except Drafty seems to know about), we now total 24 members including the instructional staff and two coke-shovellers. We all live under one roof which causes a certain amount of stress at times but nothing that a pint or two of Tiger cannot clear.

The Team (as distinct from the instructional side of life) has changed a good deal during the last six months and for anyone wondering who the Hell is out here, see the list of bodies at the end of the article.

Jobs have as always varied considerably from the inevitable 'body' to recovering practice mines laid off the Phillipine coast. During the latter operation, we worked with (I think it was 'with') the American Explosive Ordnance Disposal Team which was a most enlightening experience to say the least. The Boom Defence have been calling for our help and so far we have raised three L.C.M.-type craft and sorted out a bunch of knitting of 6½in. steel wire rope carefully wound around a buoy pennant of a tanker mooring in Malacca harbour. The latest job has been the salvage of a Greek merchantman who beached himself on the coast of Sumatra after starting to take water in faster than his pumps could push it out.

Fleet exercises have been numerous and have provided a number of laughs. There are at least two members of the Team who do not recommend ramming Indian cruisers with anything smaller than an air-

craft carrier (they did it with a canoe) and the well-remembered attack on the Royal Malayan Navy where the ensuing shindig was heard many miles away and led to the locals thinking the Indonesians were attacking in force. A recently-returned-to-U.K. C.D.* gave a classic exhibition of speed un-dressing when preparing to dive on a U.X.B. at Batti Malv in the Nicobars; his attendant happened to glance casually over the side of the Gemini and spotted a fast black stooging around 10 feet below the surface. It took weeks to clear the Gemini of green halfpennies. Other highlights have been living on Tioman for 10 days, parachute jumping into the sea, 'chopper' jumping and the C.D.1 turning his car over.

A new junk is to be built shortly and is promised for the end of the year. This will have all 'mod cons' including a pot (sit-in, go-down-type) as well as a sit-on, flush-down-type), accommodation for eight, a full set of lanteen sails as well as an umpteen horsepower engine and a free issue of coolie hats and chopsticks. This, of course, will extend the range of the Team considerably although the recently refitted M.F.V. 164 continues to do sterling work.

The instructional Staff continues to grow and has now reached the grand total of six. The largest class of Shallow Water Divers attempted yet is 24 but numbers are not the only problem. On a course running recently, two Gurkha soldiers started one of whom couldn't speak a word of English; Chief did a rapid Gurkhalese course but to no avail as this particular pongo didn't get below 10 feet in the pot. (Sigh of relief from Chief who couldn't work out what 'Clear your bag' was in Gurkhalese.)

The Team has also acquired a

dog which decided that the victualled members' Mess was preferable to the remainder in 'Terror' and was promptly taken in hand and christened O2.

The social side of life is, as always, very demanding and to go into details would take a long time. A couple of recently returned members will gladly furnish any information on this, I'm sure.

All that remains now is for us out here to say 'Good Health' to you back there and see you in the 'Shotrope' sometime.

The Team:

F.C.D.O.—

Lt.-Cmdr. D. B. Burstall, R.N.

B. and M.D.O.—

Lt. D. P. Selwood, R.N.

Petty Officers—

T. King

R. W. Atkinson

S. Templeton
R. Lees

Leading Seamen—

D. R. Campion

R. Coulson

B. Sumner

D. Cripps

Able Seamen—

B. Martin

G. Bartholomew

A. Barkley

J. Flynn

S. Russell

J. Wilson

D. Allardyce

K. Templeman

Instructional Staff—

C.P.O. B. Fawcett

P.O. M. Semple

A.B. D. Williams

One other coming shortly

Engineers—

P.O.M. (E) J. McCaw

M. (E) I T. Fisher

Comments on recent Diving Accidents

by SURG. LT.-CMDR. D. E. MACKAY

THERE has been a recent increase in unusual incident reports from Diving units all over the world. It might be of interest to make some general comments on these. I must emphasize that these are my personal remarks and they are not intended to be censorious on any individual. Most reports are well written and include adequate information but occasionally some vital fact is not given. This usually happens in those cases where assumptions are made that the drill was carried out or the checks were made as required. Sometimes this is not so but it is very helpful to know whether the information has been assumed or not, and, if it has been confirmed, to know what it was even if it was what it should have been, e.g. the flow setting was correct or the emergency bottle held 100% oxygen. Such complete

reports avoid useless speculation at best and much correspondence at worst. It is important that reports are made of anything unusual in diving as only when these arrive can the size of the problems be judged and effective action can be taken to avoid or prevent them. Far too often rumours reach the backroom people of frequent minor accidents and attempts to find the origin only get as far as bar room gossip.

The four main types of accidents that have been reported recently concern anoxia, bends, oxygen poisoning, and medical fitness. To take the last one first. Many people have taken part in underwater sport and the feeling is spreading that if you can breathe and stand, that is good enough. However, experience bought by the discomfort of many and by the deaths of a few shows that this

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is not so. A diver, especially a full-time diver, must be fit enough to meet the normal standards laid down and that is P.2. This standard is defined as 'Fit for full sea or field service in any part of the world. Able to withstand exposures and fatigue for normal periods'. In these days of higher standards of living, i.e. more to drink, and eat, and less walking, the greatest single cause of loss of fitness is overweight. There has been a general Fleet Order on this point but it should be emphasized that being overweight is more important for divers than for the general naval population. Once again it has been made clear that divers must feel themselves to be fit to dive and frequently they are better judges of this than a doctor. The practice of diving when a man is not feeling up to the mark in the hope of restoring fitness or to avoid being called 'chicken' can only be condemned and at least two fatalities in past years endorse this opinion.

There appears to be a growing intention of using the main supply from the bottles until there is no gas left and then using the emergency oxygen as a means of reaching surface. While it may be praiseworthy to get maximum endurance from a set, this has complications. Once the bottle pressure drops below 400 p.s.i. the reducer does not match its previous performance; usually it means a lower flow and hence a lower oxygen supply. As the diver rebreathes the mixture from his bag the oxygen content drops further and as less gas escapes by the relief valve more nitrogen accumulates in the bag. Then as the diver nears the surface, the oxygen partial pressure may drop to a level that does not sustain consciousness. Unconsciousness under water has a 50/50 chance of leading to death. The trouble about this anoxia — or hypoxia which is low oxygen as distinct from

no oxygen — is the unreliability it may produce in intention, in performance, and in money. Old-time aviators have reported others who carried out perfect landings — on a cloud, but these others if they survived could not recall the episode. In other words, 'guffing-up' with oxygen when the main bottles are empty may not in fact be done even if the diver realised what was up and intended to do so. This problem may arise when a set is used twice or more without recharging; if the sets are charged inadequately or if there is a leak — and many people cracking the by-pass as a check are worse than a leak. No one can tell within a reasonable margin how much gas there remains in a bottle just by listening to the noise made when the by-pass is cracked. The sets are designed to ensure adequate mixing with adequate flow and to make sure that gas does not enter the bag and go straight out of the relief valve.

Several cases of Bends in divers using C.D.B.A. and with apparently adequate decompression have been reported from opposite sides of the world. The main cause appears to be a lack of understanding of the part played by oxygen in decompression. In some ways, the events leading to hypoxia already discussed also lead to decompression sickness. The tables are designed for use with gas mixtures where the amount of nitrogen present is, at worst, the same as if air was being breathed. If the oxygen content of the bag drops below 21% then the decompression time will be inadequate. Inadequate gas flow and inadequate bag clearing can lead to this state. In addition, as the diver nears the surface the gas in his chest expands and the gas dissolved in his body is carried away to his lungs and both are breathed into the bag, again leading to a decrease in oxygen levels and thus inefficient decompression. It is important that the suggested drill

is properly carried out because it has been devised to avoid this problem. Obviously if the drill, correctly carried out, produces cases of Bends, then changes will have to be made but it is vital that the drill is correct and any complications reported.

A 'Bend' is an injury and it may be that for every bubble that causes pain there are others keeping themselves tucked away somewhere. This means that every case of discomfort or disquiet after a dive must be regarded as a Bend unless there is a very obvious explanation. It is easy to think up an excuse not to recompress a person — until it is a very obvious case and by then it may be too late for adequate recovery. The relatively short time wasted treating cases that are not Bends is well worth the trouble when a short delay in a mistaken case leads to months of invalidism. Besides there are few illnesses — none, in my opinion — which a diver may have which are aggravated by recompression. The only disadvantage is that very occasionally the attendant gets a Bend after a therapeutic recompression but work is going on to avoid this. It is obvious that certain things will make an injury worse and dance-floor acrobatics will certainly do this. There is no suggestion of stopping activity after a dive but a bit of common sense does help; if there is a niggle or a rash it may clear with a shower and a quiet evening. Equally, after a definite serious injury, it helps to speed recovery to have a lay-off period and five days after finishing treatment is being laid down by a forthcoming amendment as a suitable spell for a Bend. This ban applies to any subsequent dive however short, deeper than 30 feet in the recovery period.

The occasional case of oxygen poisoning still occurs and a careful check must be made on the depth of the dive and on how much energy

the diver is putting into his work. Hard work means a shallower dive than moderate work and if the canister is being beaten, the raised carbon dioxide levels may lead to the onset of convulsions even then. Once again if the diver feels things are going wrong, he must stop his dive and take the right action. The convulsions may occur after surfacing — four minutes is the longest interval I have met — but care to prevent the victim injuring himself and plenty of fresh air are all the patient will need to come round. Very, very rarely the attack comes on in most unexpected circumstances, and my records show one such, after 20 minutes at 19 feet.

As my final paragraph, let me restate:— any cause of unconsciousness underwater may lead to a nasty outcome. However if the proper preparations are made and the proper drills are carried out and the diver is fit, the chance of an unusual incident is very small. Most of the time-consuming checks are the result of experience and all reports add to that experience. To cut down the amount dearly learnt from fatal accidents, the instructions should be carried out and all must be ready to carry out emergency resuscitation. The film on mouth-to-mouth resuscitation and closed chest heart massage made under the auspices of the R.N. Medical School with the help of members of the underwater specialisations, has now been distributed. It is three years since a fatal naval diving accident — let's make sure that that one was the last.

Overheard at Guzz Navy Days:—
As Neptune (P.O. White) floats past window; 'Don't worry luv, it's only a dummy!'

* * * *

Jury: Twelve men chosen to decide who has the better lawyer.

Kiwi News Letter

ONCE again I suppose I shall be able to express self righteous indignation to our Editorial staff that the article I'd been intending to write for weeks, and finally finished struggling through, arrived just a couple of days too late for the current edition of the DIVING MAGAZINE. Why is it I wonder, that so many of the diving fraternity, and I am no exception, are so reluctant to put pen to paper?

1962 was a very interesting year for me and I hope, for our Diving School team, and by far the most interesting and rewarding of all our commitments was a diving survey of the Foveaux Straits oyster beds, just before Christmas 1962. This was conducted at the request of the New Zealand Marine Department, and to assist us in the survey, the oyster dredge *Karaka* had been chartered as a diving launch. A Marine Biologist, Dave Steed, and an assistant were in charge of the survey, and

between them they had plotted 15 stations throughout the Straits, in depths varying between 18 and 120 feet, which required direct observation and recovery of specimens by divers.

The procedure for this was as follows: *Karaka* would make one haul in a station using a normal commercial dredge, followed by a haul using a smaller special instrument dredge devised by the Marine Department. On both occasions, the oysters are carefully counted, and in the latter case, measured and examined. *Karaka* then anchors in the same station and the diver descends a shot rope taking six cotton bags and an entrenching tool with him.

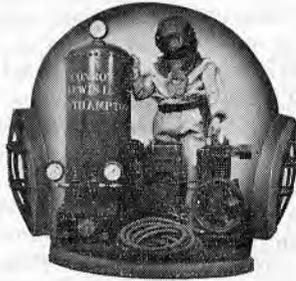
A distance line 25 feet long extends from the shot, and attached to the end is a 3 foot square metal frame which is placed at random in six widely separated places within the circumference described by the distance line, and at each position, all



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the oysters encompassed by the frame are gathered and placed into one of the cotton bags. Thus the diver returns to the surface with six cotton bags with varying numbers of oysters, these are carefully examined by the Biologist, and the marketable ones opened and stowed away, for future reference, by the diving team — usually about tea-time, and the undersized ones returned to the sea to mature.

A marketable sized Bluff or Stewart Island oyster (*Ostrea sinuata*) measures at least two and an eighth inches in length, and appears to reach this stage of maturity in the remarkably short time of about two years after spawning. Survival rate of the Sinuata variety is high, probably the highest in the world, this may largely be attributed to the spawn being ejected from the parent shell already prepared for life in the open sea. As many as 50,000 completely and perfectly formed, though minutely small oysters may be thrust into an inhospitable and ruthless sea at each spawning. Of these perhaps a fraction of one per cent. survive, and attach themselves to the nearest piece of shell. The European oyster (*Ostrea edulis*) however, has no such protection at spawning time and consequently has a much lower survival rate.

Of the 15 stations plotted, 11 were thoroughly investigated by divers, adverse weather preventing completion of the remaining four stations.

The Foveaux Strait, situated as it is between the southern tip of the South Island, and Stewart Island, is notorious for its changeable weather and excessively strong tidal currents.

The density of the marketable oyster population varied up to 27 oysters a square yard, and I believe I am correct in saying, averaged about nine a square yard.

Whilst diving at one particular station, considered by local fishermen to be fished out, frequent saucer shaped depressions and troughs in the sea-bed, about 4 or 5 feet across and 6 inches or so deep, were found to contain hundreds of untouched oysters. One gained the impression that the dredge was being towed across the tops of these depressions and failing to gather more than a small percentage of the live shell. The big question mark remains — just how efficient is the existing dredge? The certainty that the present dredge does not penetrate the surface of the seabed is borne out by the small number of dredged Infauna, or burrowing shell fish. One particular variety, 'Panopea Zelandica', known locally for some obscure reason as 'Horse's Arse', occurred only four times during the three weeks the diving team were operating in the Straits. The local names for many of the vast variety of underwater life were often colourful and undeniably descriptive.

Clearly there is much scope for further investigations and development, of the highly productive oyster beds of New Zealand — the potential for export must be enormous — not only for oysters, but crayfish and scallops as well. There appears to be little or no commercial fishing for scallops, which in so many places are in abundance.

In July this year we anticipate further work on oyster beds, and in particular the actual observation of the dredge in action — should be interesting! A diet of sea food is hard to beat.

In conclusion, we are delighted to learn of Stuart Honour's well merited promotion to Lieut - Commander, and heartily congratulate him.

GEO. W.

The Drafting of Divers

by LT.-CMDR. E. R. HUMPHREYS, ROYAL NAVY, DIVERS DRAFTING OFFICER

IN view of the Editorial of the Summer Edition which deplored the frequent changes of Editor caused by 'the powers that be', I feel a quick word from 'the powers' before the Editor changes yet again (if I am not too late) would not be amiss!

If the Editor will allow me to advertise a rival publication, I would firstly like to draw attention to the detailed article by the Commodore Naval Drafting in the September issue of the *Navy News*. This gave the overall picture and I have restricted the following to items peculiar to divers.

The most significant factor in the Diving world from the drafting aspect is the shortage of C.D.s and Junior Rates and current surplus of C.D.I's/Diver 1's and Senior Rates. This means that the branch is top heavy — all Chiefs and no Indians. This is obviously undesirable and can only be overcome by increasing the number of Able Seamen C.D.s*. To permit the transfer to C.D. of Leading Seamen would only aggravate the problem and that is why this is now rarely allowed. H.M.S. *Vernon* has the personnel and facilities to train more C.D.s* than they are getting, even though C.N.D. provides all available recommended ratings for course. The solution therefore lies in getting more recommended volunteers. H.M.S. *Drake's* Diving School assists in this by selecting likely candidates from S.W. and F.D. courses and by encouraging holding ships to make formal recommendations. However, a keen, efficient, cheerful branch, which I'm sure it is, is its own best advertisement and the more so it becomes the more volunteers it is likely to attract.

Considerably more C.D's are allowed than there are C.D. billets, so that they can spend about one third of their service in non-S.Q. billets (for the regulation-minded B.R. 1066, Art. 0613 (4) refers). This means that even with the current shortages it is possible to fill all C.D. Complement billets, but this is at the expense of this most valuable and, from the advancement point of view, essential general experience.

At the present time C.D's are not getting anywhere near their one-third non-S.Q. time and consequently spend more time ashore and suffer less turbulence than most. They also get a high proportion of the much sought-after L.F.S. billets. In fact all C.D. billets are either L.F.S., H.S.S., or P.S. and it should therefore cause no surprise that it is general policy for C.D's to go to G.S.C. or F.S. when doing their comparatively infrequent non-S.Q. service. It is intended that a C.D. will be drafted to a G.S.C./F.S. ship in which a C.D. Officer is serving in addition to ships that are seriously short of divers.

Please do not think that these remarks are intended to imply that C.D's lead an easy life. This is certainly not so. It is fully appreciated that a C.D. in a so-called shore job may spend as much time away from his home in arduous conditions as a sea-goer and this is recognised in the fact that, as a special case, all Fleet Clearance Diving Teams abroad now get full Overseas roster date adjustment (A.F.O. 1702/63).

The problem of providing enough S.W.D's or F.D's (in future Ships Divers) to form diving teams in ships is also aggravated by shortages in spite of the greatly increased training effort made possible by the surplus of

C.D.I's/Diver 1's. Very considerably more S.W.D's or F.D's are required than there are billets, because drafting regulations, which have been designed to ensure a fair drafting system, dictate that a man is drafted strictly in accordance with his position on the drafting roster for his substantive rating and S.Q. Shallow Water or Free Diving is an additional qualification such as L.S.E., Butcher, etc. To draft a man solely on an additional qualification which is in shortage would adversely affect his sea-shore ratio by denying him the opportunity of Port Service. This would not only be quite unfair, but such treatment would not go unnoticed and a dearth of volunteers for Ships Divers would soon result. Therefore it is necessary to have enough ratings with a diving additional qualification sufficiently widespread over the drafting rosters, so that when required a diver is available at or near the top of the roster. When drafting divers priority is given to ships due to operate in areas away from diving schools (such as the Persian Gulf, South Atlantic and West Indies) and which are therefore unable to train up their own diving teams.

The difficulty of preventing fluctuations in the number of divers in a ship with all the turbulence in Home Sea Service is an additional problem to that of providing divers to ships on a fixed commission, and can best be illustrated by examples showing some of the conflicting points that have to be considered by a Drafting Officer.

Example:— A Leading Seaman (U.W.2) is a S.W.D. and has expressed a preference to go to a C.M.S. in which he has never served before. He is recommended by his last ship as a Chief Bosun's Mate of a Coastal, which is not normally allowed a diver; he is due for Home Sea Service and such a billet is

available in his preference area. Should his holding a diving additional qualification bar him from serving in this popular U.W. billet? Obviously not.

Example:— An E.A. S.W.D. is due to be pulled out on the expiry of his engagement. His relief is not a diver. The Electrical Section at C.N.D. as the Seaman Section to provide a diver instead. An A.B., S.W.D. is available, but there is no billet in that ship for the A.B.

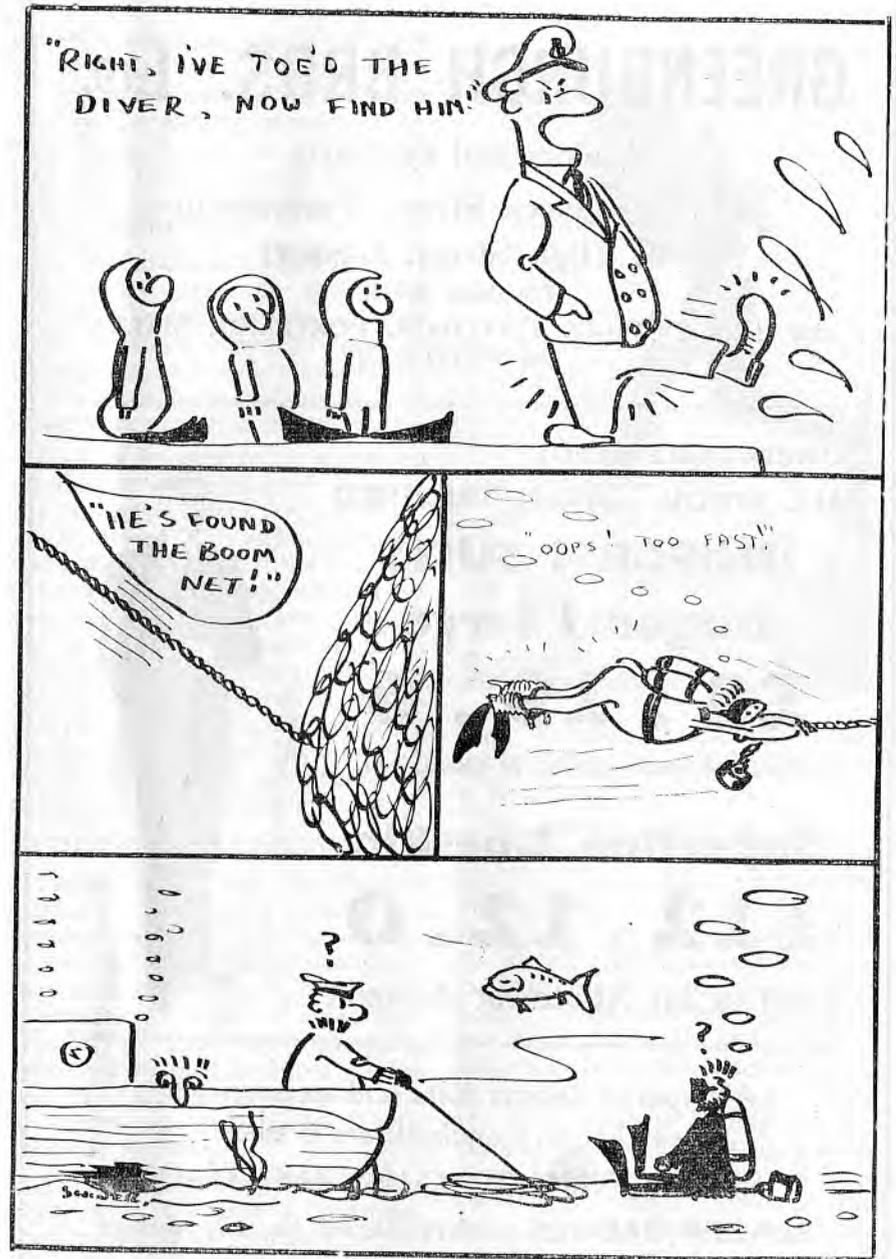
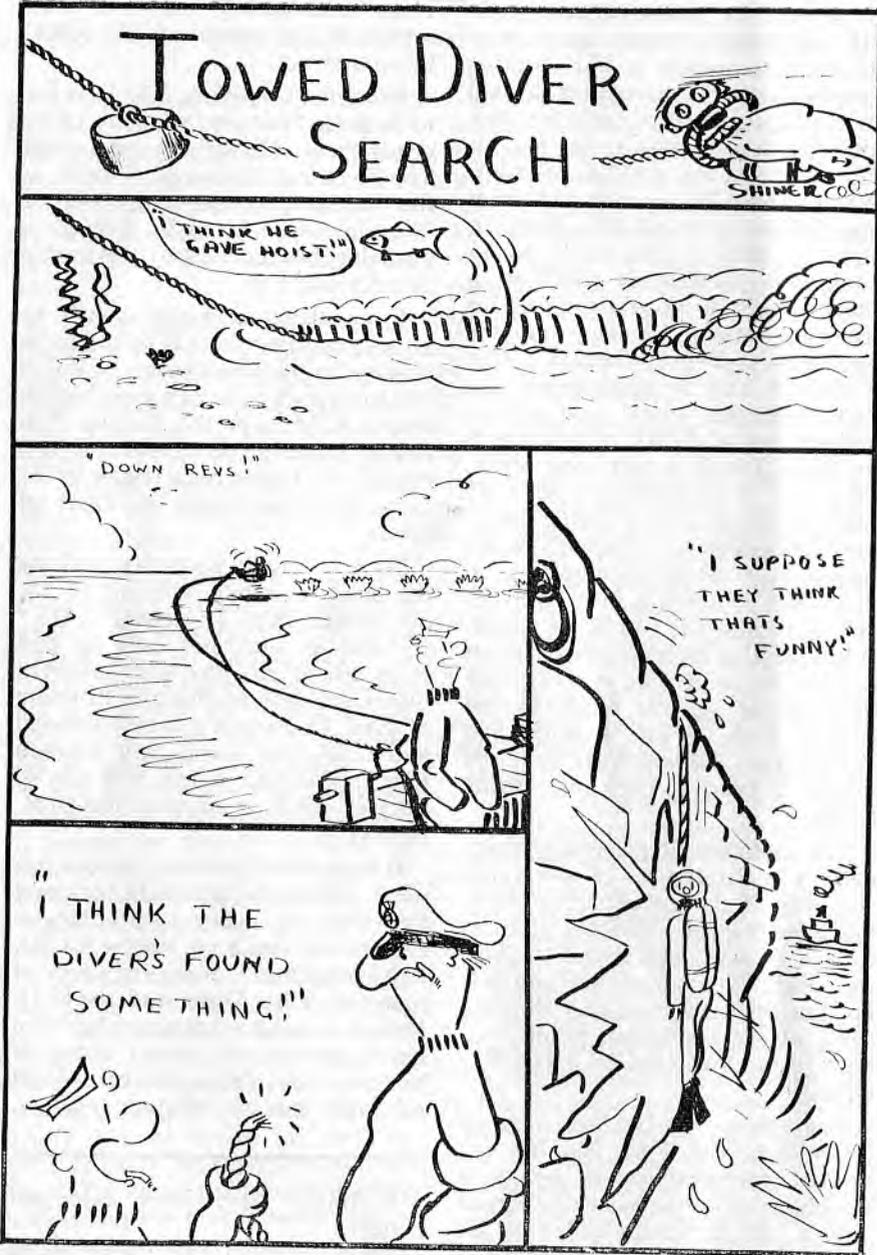
From these examples it will be appreciated that there is bound to be wastage in the employment of divers and there is likely to be a good reason why a C.M.S. in the Fishing Protection Squadron (not allowed divers) has a S.W.D. whereas a frigate of the same Squadron might be short of divers.

To achieve the necessary drafting flexibility, a rapid build-up to the numbers of Ships' Divers and C.D's* required is vital, not only so that ships can be provided with sufficient divers, but also so that the structure of the C.D. Branch can be improved and C.D's can spend their allowed time in non-S.Q. billets, which is so essential for their advancement prospects.

It is essential that every encouragement is given to potential candidates and that the necessary recommendations are made on Forms S.1303. It is considered that the right type of man for Ships Diver and the C.D. Branch is a keen young rating who has a good diving career ahead of him and one whose rate on his left and right arm can advance together.

It might have been expressed better:

Young man to girl's father as he took her out for the evening: 'And don't worry, Mr. Brown — I'll have her in bed by twelve.'



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Is Clearance Diver for You?

THE scene is set as usual in the bar of a local pub, a Sailor, pint pot in hand, is relating to a gathering of oppo's a glowing account of his experiences whilst on course for Clearance Diver. 'I only failed the course because I didn't quite make it on the 10 mile swim!'

So goes the tale related in many ways where ever the subject of Clearance Diving comes up, on mess-decks or ashore. Naturally one has to keep face, so a colourful yarn helps to explain why the narrator is back in the slave market of general duties.

Lack of knowledge, or misunderstanding of anything tends to make it a mystery, a 'Black Art', to be left strictly alone. This and some of the fascinating stories, that can be heard, is known to discourage some otherwise keen candidates from applying for the C.D's Course; perhaps a few minutes reading on the course, and the branch, can disperse any myths and put things in a true perspective for the Shallow Water Diver or Free Diver contemplating on whether to apply for Clearance Diver.

HISTORIC BACKGROUND.

Purists claim that the Italians started it all by making themselves a problem to the Royal Navy in 1940-41 by using a hitherto unknown form of underwater warfare, 'Charioteers', a surprising number of ships were crippled by underwater saboteurs, riding on adapted topedoes placing charges underneath or on the bottom of vessels moored inside heavily defended harbours.

At Gibraltar, the late Cdr. Crabbe, O.B.E., G.M., R.N. then a lieutenant, was appointed to combat this new threat, the story of which has been dramatised in books and films. We in turn explored this field of underwater warfare and evolved the Four



Man Submarine 'X-Craft' which gained distinction with the damaging of the *Tirpitz*.

Towards the end of hostilities in the European Theatre, as the allied armies advanced, it became painfully obvious that retreating Germans were not only demolishing port installations, but were also mining the fairways, entrances and basins of the docks. If we therefore required to use these harbours and wharf's, something has to be done to clear a safe passage for our shipping. Whilst the Army's job of sorting out the demolished installations and unexploded ordnance on land was comparatively straight forward, the Navy's tasks to seaward was, to say the least, complicated.

Conventional Mine Sweeping methods could be employed in open water, but were not possible for

clearing the Dock areas, it was decided that the only way to do this would be by the use of Divers searching for the mines, etc. and rendering them safe.

Up to this time demolition and disposal had been done by Naval Personnel working with the Army and R.A.F., these parties were known as 'P' Parties and with the coming of the new requirement the 'P' Parties gradually moved into a new role, that of underwater search, survey and mine disposal, with the task of clearing inland water ways, shipping lanes and docks of anything forming a hazard to the berthing or operation of shipping.

Working in teams of approximately eight members they systematically searched and cleared the majority of European Ports, enabling the much needed ammunition and supplies required by a rapidly advancing Army to be landed in safety. 'P' Parties continued these operations in almost all the major ports of the continent and many in North Africa.

At the end of World War II it was evident that the role of 'P' Parties played an important part in the requirement of the peace-time Navy, to clear up the debris of battle and deal with any future developments in mining warfare. Also incidents at Haifa, when fanatics attempted to attach explosives to Royal Navy and Merchant Navy Shipping, emphasised the need for a permanent organisation of trained Divers to counteract any future situations.

So in 1949, volunteers from the disbanding 'P' Parties and members of the Standard Diving Branch, commenced training at Port Edgar and formed the founder member's of the Clearance Diving Branch, which was to be on a similar footing to other Branches of the Royal Navy. That is to say 'Clearance Diving' was to be a full non-substantive rate.

CLEARANCE DIVING TODAY.

The present day activities of the Clearance Diver are many and varied, teams and units being situated in many of our Bases abroad in addition to those working in Home waters. Each team has a certain basic commitment, for example a Bomb and Mine Disposal Team (B. and M.D.) operates from Singapore, Malta, Port Edgar in Scotland, Portsmouth, Portland and Plymouth. Each team works in close co-operation with the Police and the other two services, attending to explosives or noxious incidents in their own allocated area. Many relics of both World Wars still roll up the beaches, together with Submarine and Aircraft flares making B. and M.D. a full-time job.

Ship borne teams working from specially adapted vessels are constantly carrying out trials and exercises in conjunction with the Minesweeping Squadrons, developing and improving the techniques originated by the 'P' Parties.

To improve and develop new tools and types of equipment, a trials team at *Vernon* work hand in glove with scientists of the Admiralty Experimental Diving Unit who have many tasks such as the trials to increase the maximum depth to which a Diving team can usefully dive.

Training too will occupy much of a Clearance Diver's time, if not under training himself, he is required to assist in the instruction of others in the branch or exercising the many divers in the Fleet.

For the training of Shallow Water Divers and Free Divers, there are Diving Schools at Plymouth, Singapore and *Safeguard*, whilst *Vernon* deals solely with C.D's and C.D.O's. All these billets require large staffs and the trainer as well as the trainee is constantly increasing his knowledge and experience.

THE COURSE FOR C.D. *.

Having covered a little of the background, we can consider the course itself. H.M.S. *Vernon* runs a number of C.D's * Courses a year, and each course can be roughly divided into four parts:—

1. Diving.
2. Miscellaneous Visits.
3. Ship Repair and Salvage.
4. Bomb and Mine Identification and Disposal.

Candidates are normally drafted to arrive at *Vernon* at least a week before commencement of the course. During this pre-course period they will be medically examined, interviewed by the Diving Training Officer and meet their Instructor, who, if time allows, may take his class 'to be' for Physical Training and Games as an informal 'warm-up'.

Monday of the first week is spent drawing and testing equipment, hearing an introductory talk by the

Course Officer and a preliminary session in the Recompression Chamber.

The following morning the class with all their equipment go by lorry to Horsea Island at the top of Portsmouth Harbour, reached by a scaffold bridge at high tide and by a causeway at low tide, at which time the Island is surrounded by mud flats. This journey by road from *Vernon* will be made every morning by the class whilst at Horsea. In the middle of the Island is an artificial lake with a maximum depth of 30 feet, ideal for oxygen diving.

A typical day at Horsea during the first week might be, 0830 arrive at the causeway, double across to Horsea (three quarters of a mile) rapid dressing on arrival (three minutes), jump from a 30 foot board to practice entry into the water retaining fins, and then commence a surface swim of one mile, followed by a run



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over knee-deep mud flats for about another mile, returning to the Diving Section where the class immediately put on their oxygen breathing apparatus and commence the first of two endurance swims for each of which a minimum of 80 minutes is required. Life-line signals are practised and various tasks carried out.

At mid-day there is a pause for soup, dinner being at 1430 on completion of diving. After dinner there is a period in the classroom, then finally the preparation of equipment for the following day. Operation Awkward is frequently ordered at any time.

Thursday evening of each week the class will dive at night, either swimming underwater or completing a light task.

Towards the end of the four weeks the class will move on to diving in mixture equipment and become experienced in the use of underwater compass by swimming on set courses to named targets. During this time each member of the class is required to reach a high standard in underwater and surface swimming, and to be fully confident in the use of underwater breathing apparatus.

The theory of each part of the course is covered in lectures and demonstrations. Items such as Diving Regulations, Artificial Respiration and the routine maintenance and testing of equipment are introduced in phase with the practical diving.

Back in *Vernon* the fifth week is spent learning and practicing the various methods of searching a ship's hull, carrying this out on Aircraft Carriers, Frigates, etc. in the Reserve Fleet.

For the sixth week the class will carry out sea-bed searches in enclosed waters and Dockyard Basins; during this week they will be examined on Diving Theory which involves

the calculation of rates of oxygen and mixture flows, safe depths and buoyancy; to some, a little rusty on maths, this may sound alarming, but the examination rarely proves too difficult.

Sometime in the sixth or seventh week the class will visit H.M.S. *Dolphin's* 100 feet tank, where they will learn Free and Buoyant ascent, in other words how to come up from 100 feet unaided and without breathing apparatus.

Another visit at about this time is a day spent at the Mechanical Engineering School, H.M.S. *Sultan*, at Gosport. Here the intricacies of operating an outboard motor, and the fixing of minor faults, are explained.

The eighth and ninth weeks are spent on open water searches on the sea bed, gaining experience in tide-ways and working in various types of equipment at deeper depths. Reliable weather conditions and shelter from the elements are necessary during the initial stages, so the class goes to Falmouth in the summer, or Malta in the winter. During this fortnight the class obtain some idea of what the conditions are like in an operational team when the working day is fully occupied by the many jobs involved in operating divers swiftly and efficiently.

Returning to *Vernon* for the tenth week the class is now acquainted with underwater propellor changing on a submarine and learning the use of the various tools.

The eleventh week is devoted to training in the use of compressed air equipment. The maintenance routine and tests of the Swimmers Air Breathing Apparatus (S.A.B.A.) and the Surface Demand Diving Equipment (S.D.D.E.), which has now replaced the Standard Diving Dress in the service. Activities such as ship's bottom searches and underwater

tasks are carried out in both types of equipment incorporating the drills and techniques peculiar to each set.

The following two weeks are spent in the underwater repair section, being taught to use oxy-hydrogen cutting torches and spending several hours underwater practicing on steel plates and tubes. An elementary knowledge of ship construction is required and the art of welding underwater is demonstrated together with the use of the Cox's bolt driving gun.

Now comes the time of judgment, the last two days are allocated to the final Diving Examination, covering all the subjects and operations of the course so far, the required pass mark is 60%, the instructor will also assess each member of the class and submit the marks gained during the period of practical diving. Practical marks are calculated during the course for each diver who is marked on his capability both underwater, and on the surface, the manner in which tasks were accomplished and the ability to work as part of a team, together with general behaviour and reliability all of which must be of a high standard.

For the next four weeks the whole aspect of underwater weapons and explosives is considered. A comprehensive knowledge of explosives and weapon principles is essential to the Clearance Diver to enable him to safeguard himself and to recognise the type of hazard when he comes upon it. He must also appreciate how to render safe the various components and how to safely handle them. One week of the period will be spent on a demolition range where the art of making up and employing demolition charges is studied and practiced. Experience in the methods of Mine Disposal is gained together with exercising the numerous techniques of amphibious warfare.

In *Vernon*, time is spent on such subjects as Torpedoes and Mine Recognition, the latter being effected entirely by feel.

The class is also subjected to underwater blasts at varying distances to demonstrate the effect of explosives as a repellent against underwater attack.

The last two days are set aside for a written, oral and practical examination on Mine Identification and Disposal, (M.I.D.)

As a finale to the course the class now goes to the Amphibious Centre at Poole.

Here the Royal Marines teach the basics of canoeing. The class, working in pairs, learn to paddle considerable distances, for example, a forenoon expedition covers about 10 miles of river and sea travel, over parts of the distance the canoe must be carried by the two man crew, and the knack of doing this is forcibly learned.

Map reading and night time navigation are soon mastered, and the class spends several hours in the use of the latest type of infantry small arms and grenades.

Having digested these subjects the class is next involved in a full-scale exercise, Navy versus Marines. The C.D. Course carry out an Amphibious Attack on a target and endeavour to get away, avoiding capture, to a pre-arranged meeting with an 'Agent', the 'Royals' have the task of apprehending the attackers and a military 'Hare and Hounds' develops, covering much of South-West Hampshire. The penalties for being caught by a team of Royal Marine Cammando's are quite severe. The attackers find themselves in the middle of a wood at the dead of night, sadly deficient in articles of clothing!

Some one once described the scene as a 'nocturnal nudist's camp', but its all experience and the mistakes are pointed out at a de-briefing on completion of the exercise.

For the last time the class returns to *Vernon* — course completed and the successful members receive the much strived for badges at a 'Rating-Up' interview with the Training Officer.

This is not the end for those from the non-seaman branches. They will be rated 'Acting C.D. *' and undergo a four week seamanship course to fully acquaint them in seamanship.

For the practical experience of seamanship they will be sent to sea for a period of about six months, at the end of which time they will be required to pass an examination for Able Seaman, providing this is successfully passed they will finally be rated Able Seaman, C.D. *.

After all the effort what is the lot of the C.D. *? First of course is the fact that, having qualified he will receive 10/- a day extra special service pay. The next move is to an operational team, if possible to one of the C.D. Ship-borne units where the finer points of what was learnt on course are appreciated in an operational light.

WHO CAN APPLY FOR CLEARANCE DIVER?

A.F.O.'s 1495/63 and 1496/63 give the necessary information.

Briefly all S.W.D's or F.D's of able rate or equivalent in any other branch under the age of 28 can apply to be recommended for Clearance Diver, with the exception of ratings who have either a R.P. or U.C. Specialist qualification.

Petty Officers or even Leading Seamen cannot, at the present time, be considered.

Promotions and Advancements



To C.D.O.

Lt. T. W. Trounson, R.N.
Lt. I. B. McKay, R.N.
Lt. C. F. Lafferty, R.N.
Lt. M. F. Wessell, R.N.
Lt. H. Sahney, I.N.
Sub.-Lt. G. S. E. Stratton, R.N.

To C.D. 11

P.O. R. E. Rees
A./P.O. A. Lumbis
P.O. W. B. Norton
A./P.O. V. Gibbons
A./P.O. A. Charlwood
A./P.O. P. Booth
A./P.O. B. T. Gunnell

To C.D. *

A./L.S. J. M. Quinn
A.B. D. Williams
A.B. M. Groak

A.B. O. R. Lee
A.B. L. W. Whelan
A.B. M. A. Lambert
T.O.2. J. A. Day
T.O.2. W. H. Savage
A.B. J. S. Barker
A./L.S. B. Jervis
L.M.(E) J. T. Fielding

Indian Navy C.D. *

P.O. B. C. Mahapatra
L.S. G. Singh
A.B. R. K. Singh
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To Acting Petty Officer

L. Sharp, C.D.11

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History in the Making

By our *Deepwater Reporter*—who wishes to remain unnamed and anonymous

PORTSMOUTH Harbour has been the scene of many Naval historic occasions, such as 'Nelson's departure', or in more modern time, the sailing of *Ocean* and *Theseus* for Suez. But one event took place recently which missed the headlines of the National press which, by virtue of its rarity and nature must be recorded for perpetuity.

It took place half-way between Gosport and the Harbour ferry in the early hours of Friday 20th September 1963. During the R.A.'s rush for the boat, C.P.O. Hopewell C.D.I., who is well known as the Regulating Chief of *Deepwater* Division, was unfortunate enough to lose control of his sandwich laden case. But true to his R.A. and diving instincts, he kept a firm grip—and was last observed disappearing underwater!

Of course no one was unduly perturbed (he could have been getting his minutes in?) He surfaced by ditching his R.A.'s allowance from his pockets

and was helped back aboard the ferry (we haven't found the culprit yet.)

So it was that a bedraggled figure entered *Vernon* and was at his desk as usual — except for a queer com-



combination of dry clothes and ringing out of socks between the tearing up of sub chits.

Here is how we imagine his log book would appear:—

Name/Rate	Equipment	Date
C.P.O. Hopewell, C.D.I.	No. 3 Suit and R.A.'s case	20/9/63
Mixture: 20% O ₂ , 80% N ₂	Flow. On Demand	
Maximum Depth. 4 Feet	Equivilant Air Depth. 1½ Ats.	
Time to call up. As soon as possible.	Duration of Dive. 1 Minute	
Reason for Dive. Qualify for S.S.P. for qtr. 15th June to 15th October.		

George Medal Award

CONGRATULATIONS to Lieutenant (S.D.), (C.D.) K. D. Kempzell, R.N. who has been awarded the George Medal for his efforts in disposing of 24 torpedoes and 29 warheads in a shattered torpedo store.

Two men were killed at R.A.F., Kinloss, Morayshire when an explosion brought down the 19 ton roof of the store, on to the stock of torpedoes and warheads; these were crushed, causing at least ten of the torpedo battery compartments to become activated, making the torpedoes extremely dangerous.

The Scottish Bomb and Mine Disposal Team based at Port Edgar and commanded at the time by Lt. Kempzell, were called in to dispose of the torpedoes by blowing them up.

On the morning of August 17th 1963 a radius of one mile had been evacuated, and Lt. Kempzell, dressed

in an asbestos fire-fighting suit for protection from the acid, crawled into a 20 inch gap between the torpedoes and the fallen roof to place demolition charges against the battery chamber of each torpedo, the job taking one hour and ten minutes to complete. Then he walked away—'it would have looked bad to run'—300 yards to get behind a hummock to press the plunger and explode the torpedoes.

Says the Citation: The torpedoes were hissing and bubbling and were hot to touch, great difficulty was experienced in gaining access to the battery compartments of many of the torpedoes and considerable ingenuity was necessary to get the demolition charges correctly spaced.

Lt. Kempzell did his work with great skill and courage and his efforts resulted in a most effective demolition operation.

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News from 'Reclaim'

IT'S been too long since *Reclaim* wrote a ditty to the Magazine, we reckon we can't beat it, so we'll join it.

The team after a change round, recently left us with Chief Jackson being replaced by Chief Pat Christmas, Lt. Wilson, P.O's Wilson, Corbett, Cornick, L.S. Hodge, Gardner, North and 'Brum' Fowles No. 1 Slave, having already settled down together.

The *Reclaim's* first trip was Commander Task Force 339 for operation Clear Road based at Esberg, in company with seven various mine-sweepers mainly from Lochinvar. We all left Port Edgar on May the 9th arriving on the 11th. After settling 'Alongside' the team got into routine with inspections and foul screws on the sweepers constantly returning to Base from the minefields. Between times 'which weren't' very often, the team managed a daily surface swim and mud-run every morning to keep most of us in trim. The odd man being P.O. Tug Wilson entailed in Loop repairs, the other being Bill Cornick who with great gusto and majesty leapt forth from the 8 foot high harbour wall into 2 feet of water, consequently breaking three of his toes. Needless to say we carried him ashore on quiet runs, which turned out to be not so quiet and meant Bill having to hobble back un-aided. Compass swims also took place with debatable success, the ex-'Steamers' and 'Cork-heads' having their usual arguments, with Mick Corbett finally clinching the argument by swimming in the opposite direction. A month was spent in Denmark with the ship returning to Port Edgar for weekends all round.

The second trip was to Den Helder carrying out the same operation of

clearing a minefield for the G.P.O. to lay telephone cable. We were in company with *Brenchley*, *Shoulton* and the Minesweeping Squadron, acting as Task Force Commander with the same kind of work being done by *Reclaim*, again we managed to fit in the usual sport. After being hammered, 'just', by *Brenchley's* divers at water polo, we repayed the debt by trouncing them at deck hockey, a typical divers blood bath with no rules, and a stick to boot. A challenge was thrown out by the *Brenchley* and *Shoulton* but owing to the work at hand the match wasn't played.

On return from sea an 'at home' was thrown out for *Shoulton's* Team aboard *Reclaim* which turned out very successful until someone mentioned 'Uckers'. The rest can be imagined. The *Brenchley* and *Reclaim* undertook a 300 feet pot dip together, which began with Bill and Jan taking on Bungy Williams and George Robbie. The *Brenchley* were getting a lesson in Uckermanship by *Reclaim* until the first stop. When the mist cleared George was 'blobbed' up with Bungy all over the board. Both disclaim all knowledge of it.

Odd times the teams ran into each other, resulting in odd things occurring. A said diver from *Shoulton* raced a Dutch counterpart across one of their own smelly canals only to find him a handicap. *Brenchley* had its moments with unbiased outcomes, and *Reclaim* had two of the team picked up by the police trying to negotiate the wrong side of the road on a 'borrowed' bike. After some fantastic yarn the police gave up and drove off bike and all.

A month passed quickly with the usual inspections and foul screws, nothing as hectic as a screw change, even though it would have been

welcomed from the dreary jobs of routine inspections. *Reclaim* arrived back at Port Edgar on July 13th for a well earned leave, only to return with the knowledge of having to leave the quiet runs in The Burgh and Ferry on September 4th for operation 'Icescot'.

After five days of Force 8 to 9 we put into Reykjavik for the weekend run ashore. Beer and women expensive. At Akuryri three days later minesweepers began their sweep, with success four in number Type M.K. 14 British Controlled Mines bobbed up. The *Reclaim's* team left within 15 minutes aboard *Yarton* for the area, the plan being to tow the mines inshore and counter-mine them. Jan Gardner had the job of swimming alongside the mine and tying the tow to the same, then with the Boss and Chief, spent an uncomfortable hour towing it inshore. Meanwhile L.S. Hodge and Dudley North prepared for the same routine with the other three mines, only to be seen off by the sweepers gunfire. Ashore the mine's top cover plate nuts came off easily by hand, with the Chief expertly scooping off mussels at the same time for bait. The mine was blown after the Boss has ensured the local inhabitant was safely tucked away and having successfully 'bummed' a fat cigar for his thoughtfulness. The finding of the mines boosted morale no end especially for the minesweepers on the go constantly.

The next and last minefield was Seydisfjord, which produced nothing

in the way of mines but brought out the best in Pat's fishing prowess, there's a buzz he has still got cod in the deep freeze! The two days in the fjord were spent running in the Gemini and Motor Boat with R.M.S. gear aboard. The remainder of the team took no time in flashing up a fire ashore and cooking up a meal. Tea made from mountain water was assured by the Chief to be good. It was eyed with suspicion but drunk all the same. The Sunday we left Seydisfjord the Task Force Commander asked if it was possible to retrieve a souvenir from an oil tanker sunk in the harbour. The bridge being 20 fathoms from the surface, Don Hodge and Brum Fowles went down and returned with one binnacle cover. Which was pounced upon by the Boss, wheeled away, and never again seen.

We left Sunday afternoon with a short stop at Lerwick, Shetlands, for the three weeks mail which had been following us around Iceland. Again with 8 to 9 force gales all the way home, we put into Rosyth for an extended long weekend all round.

At the time of writing *Reclaim* is just across the Bay of Biscay, loaded up with oxy-helium, S.D.C., T.V. and other miscellaneous, Deep Diving Equipment, plus the one-armed bandit 'Sarge', on its way to the land of cheap rum, X! X!, and Baccy! where undoubtedly men with better writing qualifications will carry on with the story.

From the team, all the best.

'Deepwater' Sports

'Deepwater' Pirates Rugby Club.

AT last a game for Divers, played in three halves, first and second halves on the field, third half in the club room, for those still on their feet.

At the beginning of the 1963-64 season it was decided to form our own Rugby club. After a great deal of letter writing this ambitious idea was achieved. Our members, players and non-players at present stand at

98. To join the club a small subscription of 3/- is required, a member is then given a club card and fixture list, this entitles him to free coach trips on our away fixtures, and of course free entrance to the club room, or, if proving himself on the field of combat, a position in the team.

We have purchased our own strip which is a black shirt with a white collar and a C.D.1's badge on the left breast, black shorts and red stockings with white tops.

The season commenced with a trial match, 30 keen enthusiastic divers participating of whom five had played before! However after a few amusing incidents such as L.S. Martin picking up the ball, carving his way through all the opposition and running right off the field with it, the same gentleman is now permanently placed in the second row complete with scrum cap. How about that for progress.

So far we have played seven matches against all opposition, results of which were:—

H.M.S. *Centaur*—Lost 23—3
 Royal Marines, Poole—Lost 19—0
 R.E., Marchwood—Won 3—0
 Victoria Hospital, Netley —
 Lost 11—0
 H.M.S. *Sultan*—Lost 9—0
 H.M.S. *Reclaim*—won 17—0
 H.M.S. *Centaur*—Won 14—6

We have one game a week, sometimes two throughout the season, this includes Saturday fixtures. Our list includes colleges and Portsmouth Police, so you can say we are firmly established. We are also affiliated to Portsmouth Command.

The Manager of the Sailors Home Club, Queen Street has kindly let us have a room for the club, complete with our own bar and barmaid. Brickwoods Brewery are going to present us with a trophy for all the beer we consume, for which we hope to have an annual match against the

rest of *Vernon* (Rugby match of course).

Our Coach is Mr. Ken Edwards, whose invaluable experience and patience has brought the team along from makee learners to the present reasonable side which is still rapidly progressing. In fact since we have started, five of our players are now playing for various United Services teams.

The Committee comprises:—

President:

Sub-Lt. Stratton, C.D.O.

Hon. Secretary:

P.O. H. Roberts, C.D.1.

Coach:

Mr. K. J. Edwards

Committee:

P.O. Snell, C.D.1.

P.O. Maynard, C.D.1.

A.B. Doland, C.D. *

A.B. Cooper, C.D. *

In conclusion the Secretary requires a relief? This is a stop draft job. On joining the section please contact him with your 3/- and be amongst the elite in the sporting world. TAFF ROBERTS.

* * * *

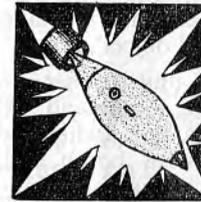
Football.

At the moment the Division is suffering from 'Rugby - Mania'. Which means that the job of finding 11 bod's for the team is proving to be quite an ordeal. What with fighting the Rugby Secretary and losing half the regulars to Corsham, we have fielded a mixed-bag of teams so far this season. Three games we have played, three games we have won! The scores being: 10—1, 8—3 and 4—1. So we are not doing too badly.

I keep asking the boss to get certain divers drafted back into the school, but all I get from him, is: 'You'd better win today or 11 divers will be drafted OUT'!

NICK CARTER,

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Portsmouth Command Bomb and Mine Disposal



Reproduced by courtesy of the Evening News, Portsmouth.

EVER since the end of World War II more than 18 years ago, there have been almost daily reports of 'undoubtedly objects' washed up on the beaches around Britain's coast.

For all those years member of the Royal Navy's Bomb and Mine Disposal Unit have cheerfully faced danger and adversity in rendering safe explosives, or setting the minds of sea folk and others at rest by pronouncing that identified object as 'harmless'.

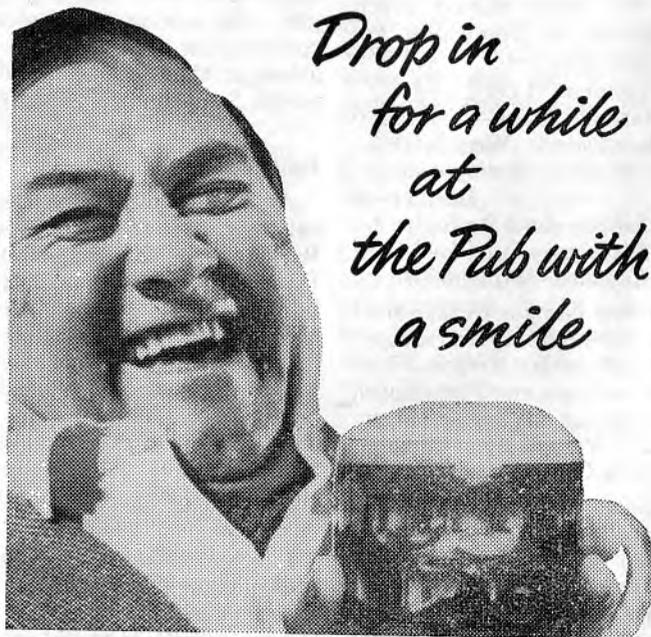
With the beaches now cleared of holiday-makers the time is now ripe for members of the unit to carry out one of the more mundane, yet essential, tasks of clearance searches.

Emergency calls may still be expected, but for the greater part of the winter, the men will spend long hours making routine searches along the coast, peering into nook and cranny, 'poking' among stone and rock . . . looking for the unknown.

Portsmouth Command's Bomb



Washed up on Cromer Beach. A German mine of World War II being prepared for burning out. (Photo by courtesy of Eastern Daily Press.)



BRICKWOODS

and Mine Disposal Unit operates from H.M.S. *Vernon*, and is responsible for the safety of more than 300 miles of coastline stretching from Lyme Regis to the Wash. Their work also takes them inland.

THREE-WEEK TASK.

At present they are engaged on a survey of beaches around the Isle of Wight, a task which will take them three weeks, and in which they are about half-way through.

It is then hoped to start a systematic search of the South and South-East coasts which come within the command of the Commander-in-Chief, Portsmouth.

So far this year the Unit has answered nearly 200 emergency calls connected with the disposal of bombs mines, torpedo warheads and other explosives as well as smaller and less dangerous objects like submarine smoke cannisters.

They have also dealt with as many diving jobs, such as changing ships' screws underwater, clearing fouled propellers, searching for lost property . . . or for lost bodies.

Diving is as much a part of their duties as bomb and mine disposal. The men are, in fact, Clearance Divers by rating (trade), the disposal of explosives being part of their training to become Clearance Divers.

The work is, of course, arduous and sometimes dangerous. Not always — it has its lighter sides as many of the men can testify.

By and large, however, a Clearance Diver must have a high degree of training, have an even temperament and is 100% fit. He is available for duty 24 hours a day, seven days a week, and is liable to be called from his bed in the middle of the night if and emergency arises.

He must be ready, with bag packed at all times to leave for a journey of

some hundreds of miles and work just as long as is necessary to make safe that 'unidentified object'.

The Portsmouth unit consist of six men under the Command of Lt.-Cmdr. Jack Rea, R.N. who has had long experience of bomb and mine disposal work, having previously served in a similar capacity in the Portsmouth and Nore Commands and with the Mediterranean Fleet.

His team is made up of C.P.O. Flanagan, P.O. J. B. Davis, L.S. W. Futchner and A. Vernon, A.S. C. Gardner and W. Curran.

Their most recent assignment in the Portsmouth area was the exploding of four German bombs of World War II vintage (two of 2,000 lbs, and two of 1,000 lbs.) located by a skin diver off the Winner Bank, half-mile seawards from Fraser Battery, Eastney.

Although most of the tasks are concerned with relics of World War II, it is by no means uncommon to deal with objects of the 1914-18 vintage. Such a task was theirs last month when the unit was called to Cromer Beach on the east coast to investigate a torpedo warhead estimated to have been launched in 1914-15.

The unit is a happy one and thrives on good team spirit. It also enjoys the ready co-operation of fishermen, coastguards and particularly the Police Force.

Two office girls discussing their boss.

'He dresses so well', said one.
'Yes and so quickly too,' said the other.

* * * * *
'Now if there is anything you want' said the P.O. of the messdecks, 'just let me know, and I'll show you how to do without it!'

New Anglo-German Partnership Widens the Product Field

FOLLOWING a recent announcement that Dragerwerk of Lubeck and Normal Air Ltd. of Yeovil are forming a new Company, Drager Normalair Ltd., comes a statement of the product range that will result from the partnership.

Of particular interest is the merging of the two underwater interests of the parent Companies — the products and experience of Normalair Ltd. in the field of self-contained and air-line underwater breathing equipment — and the long tradition of Dragerwerk, extending over 50 years, in the design and manufacture of all types of diving equipment.

It is of historical interest, that the present range of Normalair underwater and industrial breathing equipment saw its beginning in 1953, when Normalair designed and manufactured the lightweight oxygen breathing sets that were used on the first successful assault of Mount Everest.

Dragerwerk diving apparatus is, in

its various forms and ranges, extensively employed throughout the world and many military sets are standard equipment in Naval Services and in the N.A.T.O. complex. Many diving schools and experimental establishments use Dragerwerk recompression chambers and deep diving pressure chambers.

In addition to the foregoing, the new Company will market a wide range of underwater and diving clothing and accessories as well as the compressors, air supply installations control equipment and other equipment associated with all forms of diving.

Apart from these activities in the general diving field, Drager — Normalair will provide equipment and services for the supply of piped gases in hospitals, a range of anaesthetic, oxygen therapy and other medical breathing equipment, and will also market breathing equipment to meet a wide range of industrial safety applications.

Interrogative Digit?

by LT.-CMDR. S. A. WARNER, D.S.C., ROYAL NAVY

IS Britain lagging behind in the undersea research race? A quick study of recent results show, that we as a nation are certainly not leading the world.

For France Commandant Cousteau moves from one project to another and there is no doubt that whilst some of his projects and ideas are bordering on gimmicks his underwater Flying Saucer concept might have far reaching applications.

Hans Keller did in fact attain the depth of 1,000 feet but at a tragic cost and whether he intends to con-

tinue his deep diving research only time will tell.

From America, who of course subsidised the last Keller 1,000 feet dive; as far as we know, Edward Link is still progressing his long exposure deep diving technique. It is also an American who claims the Ladies Deep Diving Record, and there is no doubt that they, as a nation, are more than just interested in remote controlled deep diving vehicles.

Doctor Johannes Kylstra, leader of a research team at Holland's

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Leipen University has carried out some amazing experiments with mice and dogs in which they have been kept alive and active underwater without breathing sets. This has apparently been possible by controlling the salinity and pressure and one dog was surfaced after a number of hours and showed no ill effects. I would like to say that in spite of what Cousteau has said about 'Homo Aquatics', if it is ever the intention to apply this technique to humans I am not personally interested. Undoubtedly this research will be invaluable in the field of survival from drowning and possibly in submarine escape.

In Britain the Royal Navy are consolidating their deep diving research and progressing along a logical path. In addition to this there is a vast amount of enthusiasm among the various branches and sections of the B.S.A.C., but in spite of all the efforts of the Undersea Equipment Research Society there is little co-ordination of effort and most of all there is little or no money.

I think that this is the time to clear up the completely erroneous idea

that the Royal Navy will produce all the answers. Unfortunately this is not true. The Royal Navy are only allocated money and effort for research and development into the purely military side of the problem and as much as we would all like to expand into the complete undersea research sphere these problems are outside our terms of reference.

It is a fact that if one studies the efforts put into diving research throughout the world it soon becomes apparent that this work is being done by individuals or small groups of private individuals. In this country certainly it is only carried out by the enthusiasm of individuals on a shoe string budget. Is it too much to ask, I wonder, if there is not some small place for undersea research in the vast expansion of all scientific training and research that this country is being promised? As I see it, money and effort thus spent could pay considerable dividends in the future.

(It is of interest to note that Doctor Kylstra is now working in America and a fuller report on his work has been promised for the next issue).

Scottish Bomb and Mine Disposal Unit

SINCE our last report was submitted to the Magazine we have covered quite a lot of ground and cleared numerous jobs. We have also said goodbye to Lt. Kempself and Hello to Lt.-Cdr. Johnson-Newell and L.S. Adams. L.S. Newman is now a father and L.S. Harrison has been rated to P.O., otherwise the unit is the same.

Outstanding incidents were Filey and Lunan Bay (Angus). Filey is presenting us with a mine quite regularly, all bouyant of the 17 variety. Lunan Bay since the first job of 44 4.2 mortar bombs, has now surrendered a total of 80 odd mortar

bombs and has been handed over to our friends the R.E's who on their first sweep of the area uncovered another 26 mortars.

During the period April to September we have had 44 jobs, of which 18 have been explosive, mines, bombs, etc., and the rest, except for one body recovering job, just odds and ... From Filey one week to Cape Wrath the next we are kept pretty busy most months averaging 1,000 miles in the Landrover, and we, the wee unit with the biggest area, the Wash to Barrow-in-Furness, but only one Landrover.

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WORLD-WIDE COVER

NOTE—Personnel in SUBMARINE SERVICE and NAVAL
DIVERS can normally be placed without extra charge

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CONSIDERABLE SUM OVER THE YEARS

The turnover from one B. and M.D.O. to the other was accomplished by a joint effort in the counter mining of a MK. 17, picked up by a Dutch trawler who landed her catch in Teesport. We leave you with the team sorting out their winter woolies and anyone who fancies their chances at uckers can come and try.

The Unit is now:—

- Lt.-Cmdr. Johnson-Newell, C.D.O.
- C.P.O. Norman, C.D.I.
- P.O. Harrison, C.D.II.
- L.S. Newman, C.D. *
- L.S. Welch, C.D.II.
- L.S. Adams, C.D. *
- A.B. Cassidy, C.D. *

From the land of the haggis,
guid hunting. MAC HARRY.

H.M.S. 'Ark Royal'

'Diving Safari'

THE ship lay peacefully at her birth in Kilindine harbour on the afternoon of Tuesday the 18th June. The following morning she was due to slip from her moorings and steam slowly out of harbour to commence flying exercises and the long passage to Singapore.

Into the sultry atmosphere of the tropical afternoon burst an Army signal from H.Q., 24 Brigade at Nairobi, requesting the urgent assistance of divers in recovering a quantity of small arms. These had been lost during an assault-boat crossing of the fast flowing Athi River, at a point some 80 miles into the bush South-East of Nairobi. Arrangements were immediately put in hand to dispatch four Free divers to Nairobi, to endeavour to recover the weapons as soon as possible. Road transport for three divers and all the necessary equipment was arranged by the Naval Liaison Officer, Mombasa, and the Diving Officer boarded the night train for Nairobi to make preliminary arrangements. Time was short, as the diving team had to return onboard by the morning of Monday 24th June, or miss the ship's departure for Singapore.

At 0800 on Wednesday 19th June, the Diving Officer arrived in Nairobi and the remainder of the team left

Mombasa by road in a hired station wagon. An Army land-rover took the Diving Officer to H.Q., 24 Brigade at Kahawe Camp, outside Nairobi, and contact was made with the Brigade Major at 0900. It was ascertained that a small party of Royal Engineers, including two sapper divers, had been working at the Athi River crossing for one week, but only a small quantity of webbing had been recovered. The object of our search was to recover one Bren gun, nine self-loading rifles and three sub-machine guns.

During the Diving Team's journey up from the coast, arrangements had to be made to accommodate them and keep them operational 80 miles out in the African bush. The first requirement was an immediate inspection of the section of the river to be searched. Brigade H.Q. had made a helicopter available, and with this we were able to reach the river crossing at 1100.

The Sapper divers had been hindered by the lack of a ready supply of compressed air for their sets, and no rubber suits for use in the cold water: The river crossing is approximately 2,500 feet above sea level. Rubber suits were on the way, but a regular supply of air proved more difficult to arrange. We were

fortunate to find a staunch supporter in the Chief Engineer of the British Oxygen Company in Nairobi. Being an ex-Fleet Air Arm pilot, he soon realised the urgency of the operation, and undertook to re-charge our diving sets and endeavour to obtain a large air bottle for ready use at the river crossing. In the event this could only be done by borrowing from East African Airways at Embakazi Airport, so our sources of supply were becoming very diverse indeed.

After a lot of bargaining, and having travelled a good many miles in and around Nairobi, the Diving Officer returned to Kahawa Camp to meet the diving team, which arrived at 1830.

At 0800 on the following morning, Thursday 20th June, the Naval Divers mustered outside the Quartermasters store in Kahawa to draw jungle clothing. One Royal Engin-

eer's lorry from the Athi River crossing had started out at 0400 to transport the Naval diving gear back to the river. A second three-ton lorry was provided to collect the air bottle from Embakazi Airport, and the charging connections from the British Oxygen Company in Nairobi. The Helicopter was ordered to stand-by at Wilson Airfield, Nairobi, to transport personnel to the river at 1000. By 0830 the team were all set to move off.

Further delays were to hamper the progress of the operation, however, for it was found necessary to manufacture a special brass charging connection to charge the S.A.B.A. sets from the portable air bottle. The machining work necessary could not be completed before 1100 that morning, by which time there was low cloud and a steady drizzle over Wilson Airfield. (H.Q. 8th Independent Reconnaissance Flight). Flying to



The Athi River Crossing

the river crossing was not possible, so the three-hour journey by lorry was commenced. Only the Sappers could negotiate some of the obstacles involved!

At 1500 the site was reached, and we now had assembled a variety of items necessary to commence the search for the valuable small-arms.

Diving operations commenced at 1545. The first method of search was to put all available divers in the water, between two jack-stays across the river. The divers connected by buddy-lines, searching in a line across the river. This proved unsuccessful, due to the strong current (3½ Knot). A second method was tried, using a swim line between the jack-stays, parallel to the bank and with sinkers at each end. Using two divers at a time and moving the line 10 feet after each shift. A collapsible boat was used as a marker and diving platform. Due to the shortage of time it was decided to concentrate on one half of the river only.

The conditions for diving were not favourable. Visibility was virtually nil in the muddy water and the river bottom was strewn with dead wood. On top of this the sets were not performing at maximum efficiency due to the severe bumping suffered en route to the Athi River. No crocodiles were seen in this stretch of the river, but a Scots Guard was available with a rifle to cover any emergency. Diving operations on Thursday ceased at 1730.

Diving commenced at 0830 the following morning, the sets having been recharged from the portable air bottle. Unfortunately it was not possible to charge all eight sets to 100%, as the pressure from the bottle decreased. At 1300 one Naval diver boarded the helicopter with three of our sets and one Army set, to fly to Wilson airfield and re-charge. One three ton lorry left for Nairobi

to re-charge the portable air bottle, which arrived back at 2200 that night. Operations again ceased at 1730, by which time 250 feet of the river had been searched.

An early start was made on the following morning, Saturday. The first divers were in the water by 0800, the two main jack-stays having been moved downstream and secured to trees 200 feet apart. This operation took about 40 minutes, some difficulty being encountered in transferring lines across the current from one bank to the other.

By 1300 a 300 foot area had been thoroughly searched, the divers feeling their way along every inch of the river bed, but nothing could be found.

On completion of the operation it was considered that unfriendly elements were most unlikely to institute a further search for the lost weapons. Several factors caused this conclusion to be drawn. The inaccessibility of the diving site, the distance apart of the various sources of supply necessary for a diving operation, and the river conditions, which were unfavourable to divers. It was further considered that owing to the speed of the current, the nature of the river bed, and the time (three weeks) that had elapsed between the accident and the commencement of diving operations. The arms were most probably buried deep in silt and most unlikely to be recovered. Only a comprehensive underwater survey of a large stretch of the river, could guarantee any success but this would take time and be too expensive.

In conclusion it may be said that the Naval divers were most impressed by the Army Heinke diving sets used during this operation. They were found to be simple, robust and easily recharged with standard adapter pieces. Further more they were much lighter out of the water than S.A.B.A.



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.

Dunlop have for many years produced various types of underwater equipment for the Admiralty, playing a leading part in the design and development of apparatus for different specialized branches of underwater operations.



DUNLOP

CFH/AV/24

The diving operation on the Athi River in Kenya was a most interesting one for all concerned, and the lessons learned will prove valuable to the divers in their future activities. It

also showed how closely the Navy and Army can work together when required and how this co-ordination can make a seemingly difficult job enjoyable.

The Case of the Parboiled Diver

by R. LARN

THIS incident, which must surely be unique in the history of diving actually took place and is to be found in the records of the United States Navy (Diving Division) for the year 1957, and concerns a Japanese diver named Yoshis Oyama, who at the age of 37 was a skilled veteran in deep diving. For 20 years he had flirted, unscathed, with under-water hazards, of which the most deadly in his trade was 'Bends', as his small boat and crew couldn't afford a costly recompression chamber — and in 1957, for the first time, veteran diver Oyama contacted the 'Bends'.

From the dinky, little salvage vessel, *Daiei Maru*, which means in Japanese, great prosperity, Oyama plunged into Nagasaki Bay in the hopes of salvaging enough scrap metal from the war to make it worth the effort and risk. Four times in one day he went down to 192 feet with nothing untoward. Raised to the *Daiei Maru's* deck after his fifth hour-long descent, he collapsed in pain. His shipmates, although also divers, but not versed in medicine and with a well grounded fear of the often crippling 'Bends', slapped Oyama's helmet back on him, stuffed his diving suit with extra weights and dumped him back into the sea — and down to 150 feet. The idea to put him through a slow decompression.

In three hours he had only been raised a matter of 50 feet. Then the wind changed and freshened; the *Daiei Maru* had to seek more

sheltered waters. Thus began one of the most amazing treatments in the history of diving. Oyama was hoisted up, the ship moved to calmer waters, and he was promptly dumped back into the sea in 72 feet of water. After 12 hours of sitting there on an iron bar, Oyama signalled frantically to be raised, being chilled to the marrow, wet and had lost the use of both legs. His shipmates took him ashore, put him in a trough used for boiling seaweed, and lit a fire under him! But the air in his suit expanded with the boiling and he kept bobbing out. So they took him out of the suit, wrapped him in straw, and poured boiling water over him.

Taken back on board his ship, Oyama was again dressed and put back into the water, but an accident made him shoot to the surface like a cork. A diver in a passing boat recommended taking Oyama ashore and stretching him out, head down on a steep slope. This too was tried, and for the next 60 hours poor Oyama was alternately parboiled and marinated in the brine of Nagasaki Bay.

By good luck U.S. Navy radio operators had picked up a message about Oyama's plight, and the nearest naval diving vessel, the *Coucal* was sent from Yokusuka to his aid. The *Coucal* clipped four hours off her estimated time to do the 500 mile run to Nagasaki. They took the sorely tried Oyama on board, and ships doctors went with him into the decompression chamber. He spent

38 hours in there breathing a mixture of oxygen and helium to help flush the unwanted nitrogen.

At the end Oyama could stand shakily on one leg, though the other remained paralysed.

Said Oyama, 'If I get well I shall go back to diving, as its the only thing I know, but no more deep diving for me'.

By courtesy of *The Scottish Diver*.

The Last Laugh

Two certified lunatics were given the day off from the Asylum to go for a cycle-ride in the local countryside. They hadn't gone far before one of them stopped, got off his bike and let the back tyre down.

'What on earth did you do that for?' asked the other cyclist.

'My saddle was to high', replied the first.

At that, the second got off his bike as well, took out a spanner, and reversed the handlebars on his own cycle.

'What did you do that for?' asked the first.

'I'm not cycling with you you're mad,' replied the second, I'm going back.'

* * * *

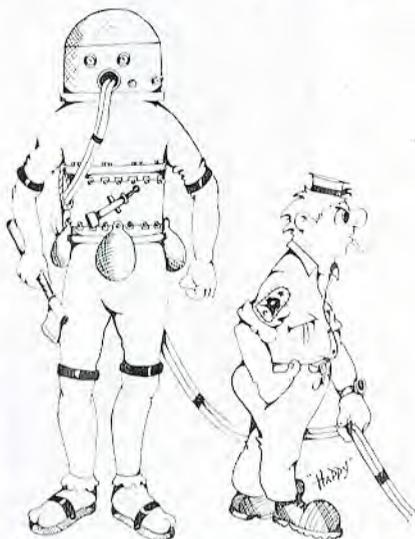
Vicar to one of the ladies of the parish: 'I prayed for you last night, my dear.' 'Well there was really no need, Vicar, I'm on the 'phone'.

* * * *

She was on the verge of tears — her favourite perch.

Warning to Motorists:—
Drive carefully, 90% of the people on the road are caused by accident.

* * * *



'He says he's a monthly Dipper off the *Victory Chief!*'



SPARTAN AND THE WET SUIT

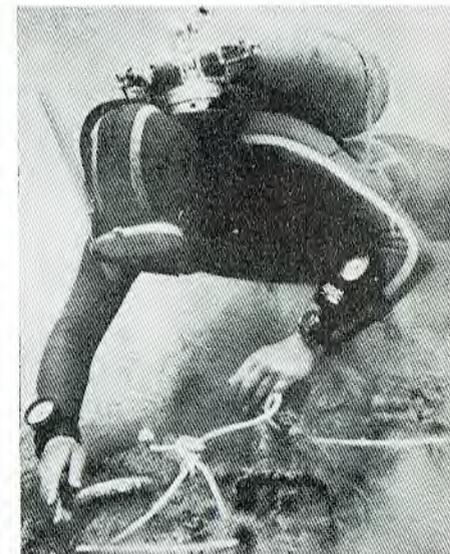
The SPARTAN suit illustrated in this picture has been subjected to 370 dives at an average depth of 120 ft. and to a maximum of 250 ft. during the past Summer by Reg Vallintine, Diving Instructor of the Neptune Diving Club, Giglio, Italy.

SPARTAN suits are available in nine different grades of neoprene and a comprehensive range of designs. Prices for hand tailored suits range from £10 to £20 and delivery is in ten days. SPARTAN suits can be supplied in stock sizes for cutomers requiring immediate delivery. Suits are also available in kit form for home assembly, alternatively sheet neoprene and accessories can be supplied.

SPARTAN suits now feature a new design nylon zip for life-long wear, new sleeve design, and new four-way high stretch nylon fabric for lined suits.

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