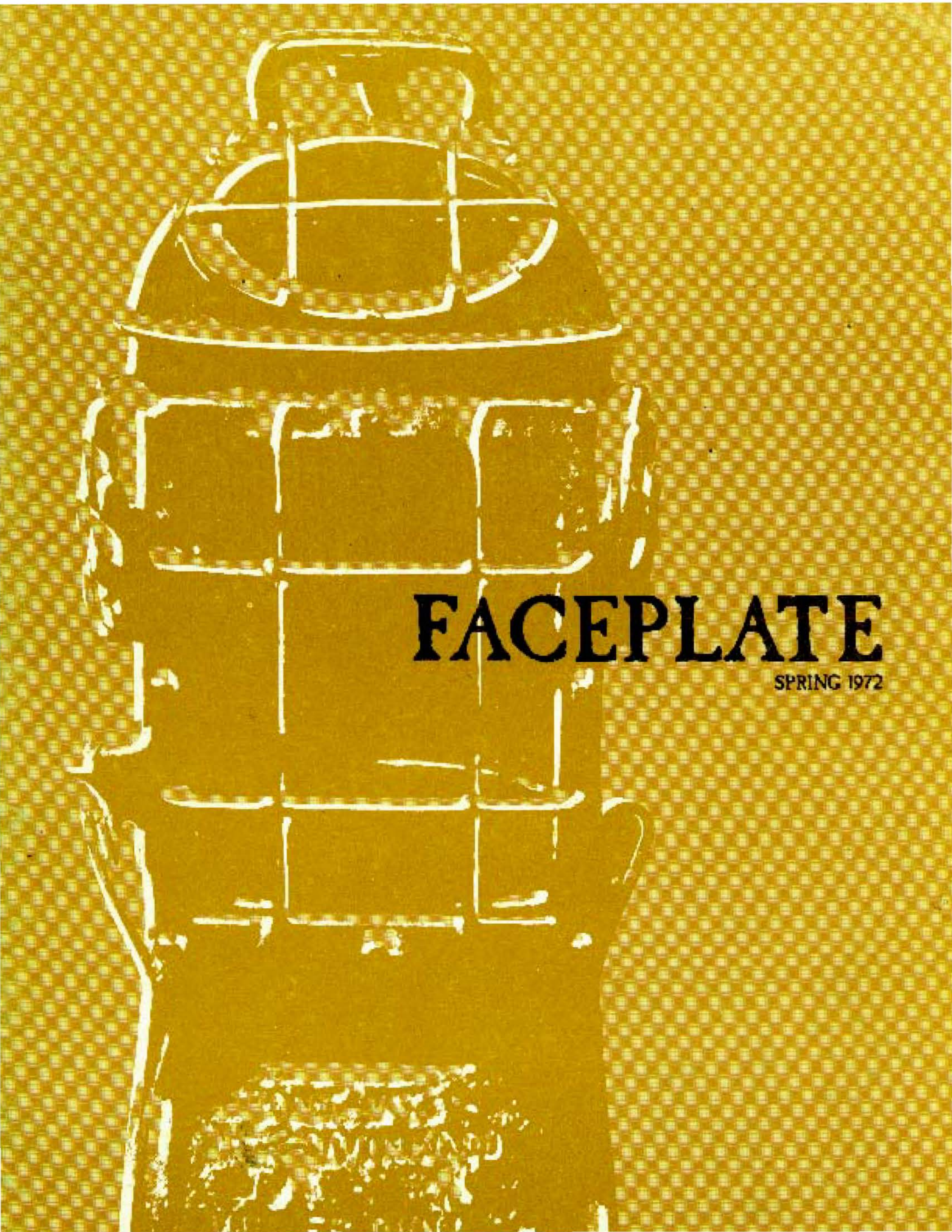

FACEPLATE

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A	Joseph o nossa senhora	19	8	3	11
b	Gulberto confessor	20	9	3	35
c	Beento abade fundador	21	10	3	59
d	Paulo bispo ⁊ confessor	22	11	4	22
e	Pigmenio preste ⁊ martyr	23	12	4	46
f	Theodoro psbi Dia d jaũ	24	13	5	9
g	Anunciaçã de nossa senhora	25	14	5	33
A	Sam castorio martyre	26	15	5	56
b	Joam yrmitam confessor	27	16	6	19
c	Marcello papa ⁊ gronoam	28	17	6	43
d	Quirino martyr custalio	29	18	7	6
e	Sam segundo martyre	30	19	7	29
f	Felice pappa ⁊ balbina vi	31	20	7	51

FACEPLATE

Vol. 3 No. 1

FACEPLATE is published quarterly by the Supervisor of Diving to bring the latest and most informative news available to the Navy diving community. Articles are presented as information only, and should not be construed as regulations, orders, or directives. Discussions or illustrations of commercial products do not imply endorsement by the Supervisor of Diving or the U.S. Navy.

Requests for distribution copies or for changes in distribution should be directed to *FACEPLATE*, Supervisor of Diving, Naval Ship Systems Command, Washington, D.C. 20360. Telephone (Area Code 202)OX2-1400 or AUTOVON 222-1400

...the official magazine for the divers of the United States Navy.

TABLE OF CONTENTS

The Cover: Takes on the popular nostalgic look you will see continued throughout this issue. Old drawings, maps, and figures are featured to show contrasts between old and new; the heritage of diving opposed to articles about the developments of today.

SOUNDINGS

ALUMINUM SCUBA CYLINDERS

In the recent NAVSHIPINST 9940.16A, enclosure 1, page 2, para. 8 states "diving activities which have no requirement for non-magnetic SCUBA shall phase out existing aluminum compressed gas cylinders effective immediately. This statement is not to be taken as an order to discard all aluminum cylinders and replace them with steel immediately. The statement was intended to order the replacement of aluminum cylinders with steel as required. This replacement procedure was to be effective immediately. If some questions as to the replacement of aluminum cylinders remain unanswered with this explanation, contact the Office of the Supervisor of Diving, Washington, D.C. 20360, phone (202) 692-1403.

DEPTH GAGES

As a result of the extensive test program sponsored by the Supervisor of Diving, the following commercially available depth gages are approved for dives not requiring non-magnetic SCUBA gear:

Manufacturer	Model
SCUBAPRO	501
	502*
	505**
	506**
U.S. DIVERS	726400**
	700200**
	702200**
HEALTHWAYS	1969*

*Denotes capillary type gage.
**Denotes oil filled gage.

This is an on-going program and additions to the above list will be made and announced in FACEPLATE.

REPORT PROCUREMENT DIFFICULTIES

Some commands have reported difficulties in purchasing and repairing diving watches. Any command having such problems with those items or any other diving equipment is requested to report them formally or informally to the Supervisor of Diving, Washington, D.C. 20360.

SCUBA GEAR EVALUATED

Since mid-October the Experimental Diving Unit has been involved in evaluation of available mixed gas closed circuit SCUBA gear. The BioMarine CCR 1000, Beckman Electrolung, General Electric MK 10 MOD 5 and the Westinghouse CCM-1 have been evaluated to date. The evaluation includes diving the gear in the EODFAC wet pot, swimming in the EODSCOL pool, and will be concluded with a series of swims at Little Creek, Va.

Taking part in the evaluations are representatives of EDU, EODFAC, Naval Inshore Warfare Group, Atlantic, UDT-21 and SEAL Team Two. Members of the U.S. Army Fifth and Seventh Special Forces Group participated in the BioMarine and Electrolung dives.

Plans are now being made to conduct an exhaustive evaluation in Puerto Rico during March and April. Look for a detailed report in *FACEPLATE* at a later date.

FIRST SAT DIVERS GRADUATE

Sixteen divers were recently graduated from a pilot program to train saturation divers at Submarine Development Group One, San Diego. The first class divers undertook training at Ballast Point and aboard the Naval Undersea Research Center's ELK RIVER (IX-501).

These divers will report for duty with submarine rescue ships and the new ATS's which are equipped with saturation systems.

The program includes a requirement for divers to make at least one 180-foot open sea dive to qualify for graduation. The SUBDEVGRU hopes to train up to 120 saturation divers a year once the new program is in full operation.

GLASS USED IN DEEP VIEW

Deep View, the world's first submersible with a pressure hull comprised of a 44-1/2-inch diameter glass hemisphere at the front, was recently christened at the Naval Undersea Research and Development Center (NUC), San Diego, California.

A three hour manned dive in 20 feet of water near the NUC pier checked out the propulsion, life support, communications, and weight and balance systems. The system is designed for oceanographic research to depths of 1,500 feet.

FORTHCOMING FACEPLATE FEATURE

In response to a request from the Fleet a regular FACEPLATE feature will be initiated in the Summer 1972 issue promulgating lessons learned from salvage and training operations. Inputs will come from all individuals and commands involved in these operations. FACEPLATE readers interested in sharing their experiences should submit a brief (one paragraph) summary of the operation and describe the lessons learned or a new technique which will interest fellow salvors. Photographs, black and white glossies, color prints or slides, sketches and diagrams are particularly desired. Submissions should be made directly to FACEPLATE, Supervisor of Diving, Naval Ship Systems Command, Washington, D.C. 20360.

NAVSAFECEN QUESTIONNAIRE

The Naval Safety Center recently sent a diver's questionnaire to all Navy divers via their local activities. The questionnaire elicits information regarding pertinent medical history, current health status, and occupational experience and qualifications. This information will enable NAVSAFECEN to better analyze diving accidents, when they occur, in light of the divers' health and skills.

NAVSAFECEN is also seeking to update its records of hyperbaric exposures experienced by divers. Since November 1970, an OPNAV 9940/1, Combined Diving Log–Accidental Injury/Death Report, has been required on any such exposure.

As part of the same questionnaire, divers and diving activities are being given the opportunity to verify NAVSAFECEN records of their diving experience.

Any Navy diver who has not had a chance to complete the questionnaire should write (stating the activity to which he is attached) to Commander, Naval Safety Center, Code 8314.

EDU RESEARCH REPORTS

Two reports have recently been published by the Experimental Diving Unit, Washington, D.C. Requests for these reports should be addressed to the Defense Documentation Center (DDC), Attn: DDC-TSR-1, Cameron Station, Alexandria, Va. 22314.

Research Report 11-71. *Incidence of Decompression Sickness in Mice as a Function of the Relative Concentrations of Helium and Nitrogen in the Inspired Gas Mixture.* T. G. Wex, D. G. Long, E. T. Flynn, 12 August 1971. 17 pages.

Abstract: Two hundred-fifty mice were exposed to a pressure equivalent to 400 feet of sea water for 30 minutes while breathing a mixture of 2.09–2.33% oxygen and either (1) 97.8% N_2, (2) 73.0% N_2 24.6% He, (3) 48.7% N_2 49.1% He, (4) 23.7% N_2 74.2% He, or (5) 97.8% He. In each case, decompression to sea level followed an exponential course and was 90% complete in approximately eight seconds. The incidence of decompression sickness, as manifested by hind limb paralysis, convulsions and death, was found to vary with the relative proportions of helium and nitrogen in the inspired gas mixture. The greatest incidence of bends was observed with the mixture containing nitrogen alone; the least with the mixture having equal proportions of nitrogen and helium. The bends incidence with inert gas containing helium was significantly lower ($P < .001$) than with the mixture containing only nitrogen. The differences in bends incidence between the mixtures containing helium, however, were not statistically significant.

Research Report 12-71. *Review and Analysis of Cases of Decompression Sickness Occurring Under Pressure.* J. K. Summitt, T. E. Berghage, 1 December 1971. 54 pages.

Abstract: The increased frequency of decompression sickness occurring while the diver is still under pressure necessitates establishment of a standardized procedure to treat those cases which are beyond the scope of currently accepted treatment tables. Helium diving accident and treatment data were analyzed to evaluate the therapeutic adequacy of the treatment procedures that have been used for treating the helium diver stricken while under pressure; to delineate precipitant factors which may be important in the etiology or treatment of decompression sickness occurring under pressure during helium dives; to extract from the data any parameters which appeared to be related to a more adequate or effective treatment profile; and, finally, to outline treatment procedures which could be used in the management of decompression sickness occurring under pressure.

Fellow Divers,

It is with a great deal of pleasure that I, and the Supervisor of Diving of the Royal Navy, initiate this article dealing with the Information Exchange Project (IEP B-12) with a personal message from each of us. This article, which is the first of a series in FACEPLATE, is the result of several discussions dealing with the subject of providing as many divers as possible in both the American and British Navies with information relative to the IEP B-12.

So that all of you may better understand what the International Information Exchange Agreement is all about, this first article will be primarily a brief of the minutes of the last annual IEP B-12 meeting that was held in October 1971. It is hoped that future articles will include inputs from not only the U.K. and U.S. but other countries as well. It is believed that this column will then provide all readers of FACEPLATE with a summary of diving progress on an international scope.

My best regards to all of you,

E. B. MITCHELL
CAPT., U.S. Navy
Director of Ocean Engineering

In October of 1971 twenty-six persons representing the diving communities of both the United Kingdom and the United States Navies met at the Admiralty Experimental Diving Unit in Portsmouth, England. The purpose of the meeting was in agreement with the originating concepts of the Information Exchange Project B-12. This was established to provide a means for exchanging diving information of mutual interest to both nations.

A wide variety of topics of interest to all divers were discussed during the meeting. Each topic will not be discussed in detail in this article. Rather, a brief generalization of the minutes should give the reader an idea of how the IEP is progressing.

Among the first topics to be discussed was the ongoing evaluation of various Underwater Breathing Apparatus. The British are evaluating a semi-closed circuit apparatus, the Windak MK-3, which is designed to operate with premixed gases at any selected depth range. As soon as laboratory and Deep Trials Unit evaluation is complete, modified Windak's will be put on trial with the HMS RECLAIM to be used with RECLAIM's submersible compression chamber. Future plans for the WINDAK include gas and cannister heating, probably by electrical means. One promising feature of the WINDAK is that the divers consider it comparatively maintenance free.

On the American side the U.S. Navy is rapidly winding up their evaluation of the MK-10 closed circuit UBA. One more cold water deep chamber dive is planned before the 1000 foot open-sea OpEval which is scheduled for this summer utilizing the MK-1 DDS. The MK-10 has undergone considerable modifications during the past two years. The most noteworthy is the heating system which heats the entire unit by hot water from the same source that supplies the diver's suit.

Also being evaluated by the U.S. Navy is a cryogenic UBA which eliminates the necessity of oxygen partial pressure sensors. Future plans for the cryogenic rig are to complete the scheduled tests and await a go or no-go decision.

Additional discussion concerned the Diver Equipment System. This system addresses the development of a totally integrated life support system. It includes all equipment worn by the diver, umbilicals, terminal monitoring, communications, and auxiliary relaying equipment necessary for diver tending from a surface support vessel.

The problem of diver heating was analyzed by both the U.K. and U.S. representatives which provided a most enlightening exchange of information. The Royal Navy is investigating electrically heated suits while the U.S. Navy is continuing their evaluation of the hot water heating system. Some of the electric suits under study include the *Vacuum Reflex*, the *Piel* and the *La Spirotechnique* suit,the latter two from France. Future plans call for the U.K. to maintain its study to develop conducting polymer suits and continue experimental dives with the *La Spirotechnique.* The U.S. will continue efforts to improve the existing hot water systems and in the future investigate a liquid loop suit.

One discussion of particular interest during the first day of the meeting centered around respiratory heat loss from breathing cold gas at high pressures. Two separate studies at depths of 1000 feet have proven conclusively that heating a diver's skin alone does not make up for body heat lost through the respiratory tract. Moreover, it has been concluded that for safety, thermal comfort, and

Dear Readers,

I am honoured to have the opportunity to greet you and express some of my thoughts about diving, here in FACEPLATE. I am looking forward to a lively exchange of ideas in future issues of this publication.

The Information Exchange Project B-12 was initiated as the result of a mutual desire by both navies to share in the research and development of diving equipment, and conduct studies pertaining to the medical and physiological aspects of diving. This project has been an unqualified success. I presently have on my staff two USN Lieutenant Commanders, and one Chief Petty Officer, here at Portsmouth, England. On the U.S. side, we have one RN Lieutenant Commander working for the Director of Ocean Engineering, and an RN Lieutenant and Chief Petty Officer employed with the Mark 1 Deep Dive System at Norfolk, Virginia.

As man descends further into the deep oceans, our boundaries grow even closer together. It is therefore becoming much more important to share our discoveries in diving with all nations that border the oceans.

A. CHECKSFIELD
Captain Royal Navy
Superintendent of Diving

maximum efficiency, a diver's breathing gas should be heated for dives in excess of 500 feet when water temperatures are 40 degrees F. or lower. Unheated gas under the aforementioned conditions would result in a progressive negative thermal balance. For example, during one experiment at 800 feet with the diver exercising in an ambient temperature of 86 degrees F., the experiment had to be stopped after breathing cold gas (32-35 degrees F.) for two hours because of diver discomfort and shivering. This particular subject's body temperature had dropped an alarming 3 degrees F. during the two hours. Under the same conditions a second diver after only 31 minutes of exercise experienced acute respiratory difficulty due to excessive respiratory tract secretion. The results of this study established minimum inspired gas temperatures proportional to operating depths and respiratory minute volumes for U.S. Navy divers.

Helium speech unscrambling remains a major concern in deep diving communications. In recent years, both the U.K. and the U.S. have progressed on both military and commercial fronts. In fact, the Royal Navy has an operable unit called the "GILL" unscrambler (named after its developer) that is considered outstanding. The U.S. Navy is investigating all the available commercial unscramblers as well as working toward the eventual development of a total communication system that can, with proper interfacing, be utilized in all diving situations. In this respect, the British have made a major breakthrough in diver communications with the development of a Bone Conductor Receiver/Microphone trânsceiver. Future plans of the U.K. include development of a through-water communications system incorporating helium speech decoders, and development of transducers to replace magnetic bone conductors so that the frequencies of helium speech can be accommodated.

Decompression schedule development and testing prompted considerable discussion from both the U.S. and U.K. representatives. Most of the discussion centered around saturation tables since existing tables for non-saturation diving are considered adequate for the present state of the art. In this area, the U.S. Navy intends to continue verification of the established saturation tables and revise them as necessary to accommodate deeper dives. Also, special consideration will be devoted to minimization of gas mixtures, utilization of air as a breathing medium during helium-oxygen dives, and elimination of the use of oxygen decompression in the water.

In the U.K. the Royal Navy has developed a unique approach to decompression tables for their saturation program. This is distinct from previous methods in that experimentally derived information is used to produce a table empirically. Previously all tables involved theoretical derivation followed by empirical adjustment. The present approach, it is believed, will lead to an empirical table which can be used to test hypotheses. Consequently, hypotheses which fail to predict what is observed will clearly be inadequate.

The Deep Dive Systems of both Nations are progressing well. The U.K. plans to have a system completely operational to 820 feet by 1975. The USN's MK-1 MOD-0 has been certified to 850 feet and a newer version, the MK-1 MOD-1, is in the offing.

Currently underway in the USN is a project of interest to all divers. The project concerns the evaluation of an entirely new and complete hardhat

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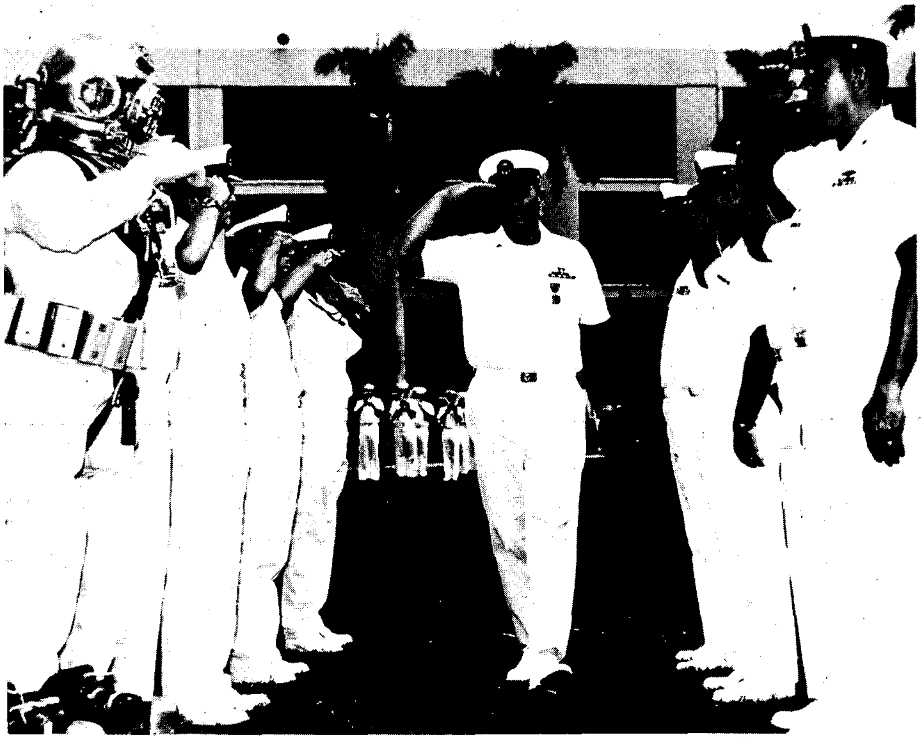
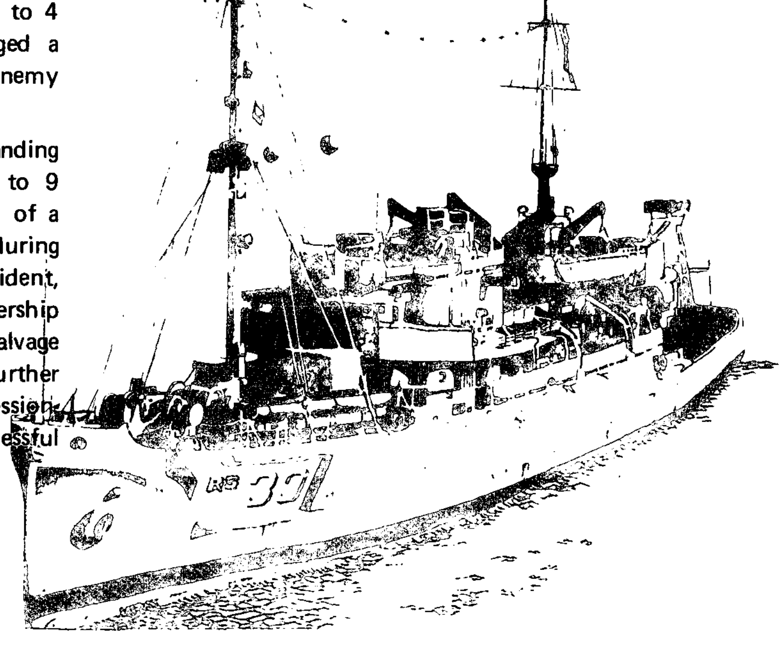
HONORS AND AWARDS



After 25 years of honorable service, BMCM (MDV) Donald A. Jones is piped over the side during ceremonies at Cromwell Circle NAVSUBTRACENPAC. Master Chief Jones was presented with the Navy Achievement Medal and a letter of appreciation.

The USS CONSERVER (ARS 39) was recently honored with the Meritorious Unit Commendation by the Secretary of the Navy. The Secretary cited the ship's outstanding performance while conducting salvage operations in Vietnam from 30 November 1970 to 4 January 1971. CONSERVER successfully salvaged a sunken enemy trawler, recovering 60 tons of enemy supplies and munitions under combat conditions.

In addition, LCDR James R. Nelson, Commanding Officer of the ship from 20 September 1970 to 9 February 1971, was awarded a Gold Star in lieu of a second Bronze Star Medal for meritorious service during his command. VADM M. F. Weisner, for the President, commended LCDR Nelson for his exceptional leadership while directing his ship in the execution of salvage operations in the IV Corps Zone of Vietnam. He further stated that Nelson demonstrated outstanding professionalism and sound judgment which resulted in a successful recovery operation.



Life Support Knowledge Progresses

O.R. Hansen
Office of the Supervisor of Diving

The Navy has made significant advances in diving capabilities during the past few years. The advent of saturation diving, with its requirements for precise knowledge of breathing gas properties and highly reliable life support systems, has provided a productive and sustained impetus to our developmental efforts in many areas. Progress has been particularly evident in defining mission capability and addressing total system design. We have learned a great deal about life support in a hyperbaric environment. Data for designing life support systems has been catalogued and published in the U.S. Navy Diving Gas Manual. The purpose of these efforts has been to provide fundamental data with relevant criteria for applying it to any compressed gas system that would be appropriate to support one of our advanced deep diving systems.

Related requirements for monitoring and controlling the supply of breathing gas and its composition have also received much attention in these developmental activities.

Our efforts with the advanced deep diving systems have also produced a base for "spin-off" into the fleet's conventional diving systems and equipment. We have undertaken a thorough reevaluation of present requirements for our open-circuit, semi-closed circuit (venturi), and closed-circuit systems. We have been examining the life support systems for each type of apparatus in order to validate their adequacy in four significant areas,

- Pressure
- Flow rate or duration
- Control of contaminants
- Storage capacity

A number of productive programs have been conducted in each of these four categories. Their results have ranged from the stipulation of revised requirements to the development and application of certified hardware systems.

The area of contaminant control illustrates how we have been able to transfer our increased knowledge of saturation diving to applications elsewhere in our conventional systems.

We began to realize, as a result of our early saturation dives, that contaminants in the breathing gas could reach existing threshold limit values when used at great depths. They were measured, of course, at surface conditions. Moreover, the threshold limit values had been normally based upon exposure only for an eight-hour working day. Saturation dives extend for much longer periods, often lasting several days or weeks. It could be expected, therefore, that such lengthy dives would expose the divers to undesirable contaminants far above the established threshold limits. Recognition of this problem and its attendant dangers provoked a review of gas contaminants in other existing fleet systems, such as the open-circuit and semi-closed apparatus. The knowledge gained in attacking the problem in the saturation diving systems was applied to establish criteria for reviewing the adequacy of these conventional systems.

We have learned, as a result of this review, that many of these systems are depth-limited and have unusually high contaminant levels. The origin of the contamination was frequently traced to the system's air compressor. These findings led to extensive experimental evaluations of the compressors' effects on the breathing air systems for divers.

The experiments established the need for lubricated compressors in these systems to have these features,

- Isolated crankcase (crosshead type)
- Controlled lubrication for pistons and valves
- Water jacket cooling of cylinders
- Adequate interstage and after cooling.

Our studies have also revealed the importance of staging in controlling the contaminant problem. Compressors must have an excess capacity and pressure to support the defined diving operations. Adding stages increases the probability of lubricant contamination. The required lubrication rates for the higher stages greatly exceed those for the lower stages. The upper stages will therefore introduce lubrication oil into the air stream at relatively high rates. Accordingly, it is important to add only those stages that are needed to provide the specified

Continued on page 22.

Underwater Inspection Made Easy

While underwater television has been in use for quite some time, it has become increasingly useful as a tool for ship hull inspection and damage. The development of a simple, rugged closed-circuit audio/video system, UDATS, now enables surface personnel to inspect and assess damage with a diver and make permanent video tape records. A surface control station presents a television picture from a miniature underwater camera unit carried by the diver. Two-way telephone quality communications is also provided so the surface operator can direct the diver and discuss damage with him first hand.

The Underwater Damage Assessment Television System, developed by the Hydro Products Division of Dillingham Corporation, is shown in photo a. It was developed originally for the U.S. Navy for ship hull and sonar dome inspection. It is now gaining wide use in commercial applications.

The complete diver inspection system is as simple to set up and operate as a portable television set. It includes a surface unit, recorder, diver unit, shown above the surface unit in photo, and a communications mask. Audio and video signals are transmitted to the surface via a small one-half-inch cable.

The diver in photo b is wearing a unit which includes a self-contained television camera and light. The rugged, compact unit weighs less than five pounds in water and is easily handled by the diver.

One of the most unique aspects of the system is its ability to see in low-light level environments and dirty water. Good video pictures have been obtained of ship hull condition or damage with divers reporting only one foot visibility.

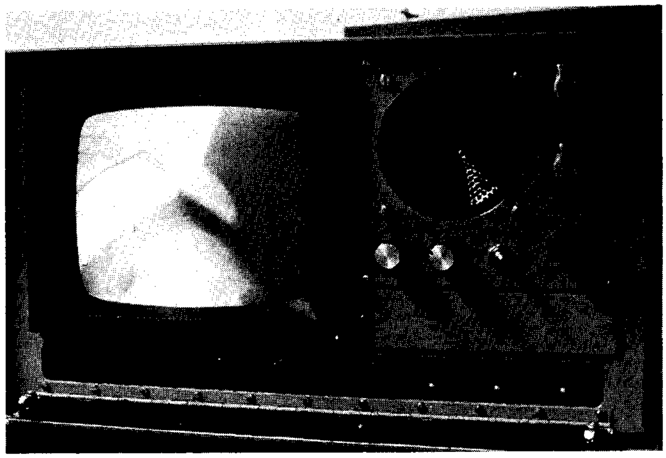
The surface unit, photo c, includes all controls for system operation including television monitor, remote camera focus control (three inches to infinity), and direct on-line communications to the diver. An actual presentation is shown on the surface unit of a propeller shaft on a Canadian Navy Destroyer Tender during a survey at Halifax, Nova Scotia. The diver reported visibility of less than two feet during this survey.

Permanent video and audio records can be made of a complete survey with the recorder included in the system. The photograph of a propeller shaft shown in photo d is taken from a video tape replay of a survey made on a barge with suspected damage. This system takes the engineer's eyes underwater and provides a first-hand view for assessment. The system is diver held but could be robot-controlled for underwater surveys.

The damage assessment system should soon become a real tool in commercial ship hull inspection. The American Bureau of Shipping has already certified blue-water drilling rigs, without drydocking, using this system.

Closed circuit television and underwater cameras may be used to determine the extent of damage, or in the case of routine surveys, to assess the condition of the ship below the waterline, so that surveyors may decide whether docking is necessary.

The first units available will go to selected shipyards. Hopefully, tenders, deployed ARS's, and other ships involved in underwater inspections will some day have a UDATS aboard.



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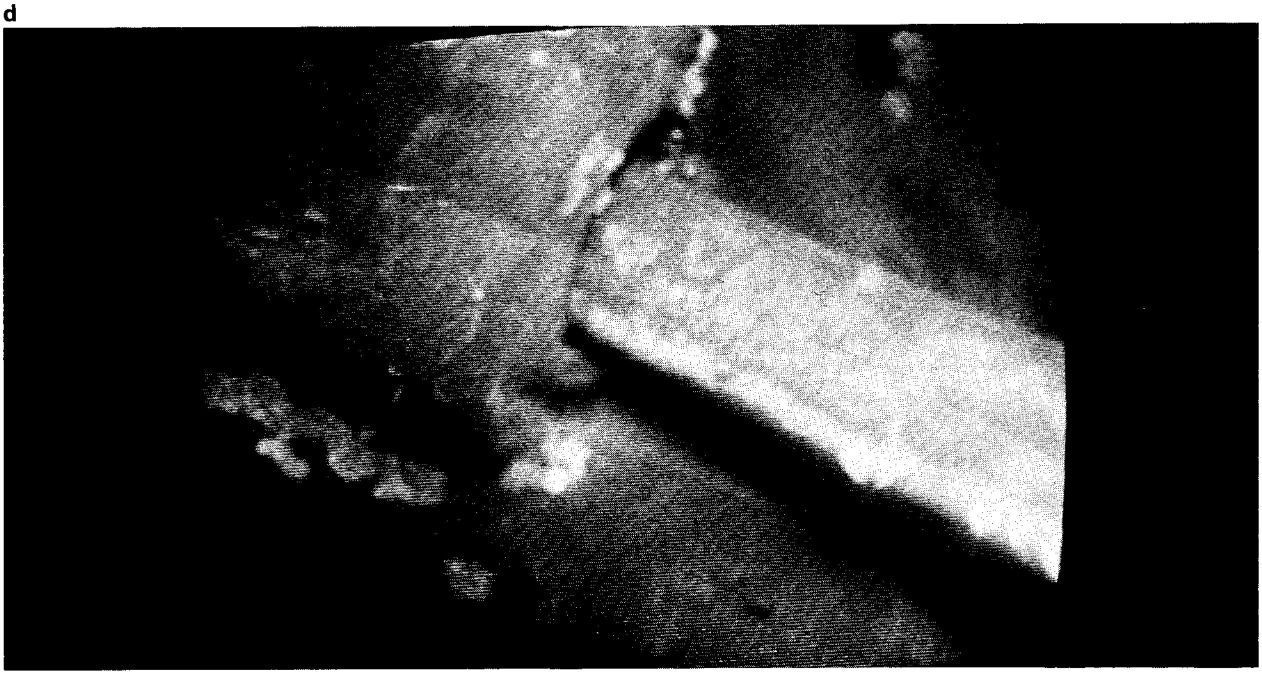


NAUBUC/ CURV III PARTNERSHIP

Last summer saw the establishment of a successful partnership of the unique underwater search, identification and work capabilities of the CURV III vehicle and the equally unique maneuvering station-keeping and cable-handling capabilities of the USNS NAUBUC.

USNS NAUBUC is a ship converted from a net tender (AN class) for the particular mission of cable-laying. In making the conversion for a specific program, very little of the original ship was retained. The entire main propulsion and steering machinery was replaced with four 1225 HP diesel-driven thrusters, each of which is fully rotatable through 360 degrees and individually speed controlled. A complete ship's dynamic positioning control system was installed to enable operation of this propulsion equipment in several different modes, manual, semi-automatic or fully automatic. In the latter mode a pre-programmed computer in the system provides the "brain" to direct the ship completely on the selected courses and headings at selected speeds. With the power available in this size hull, with this sophisticated control system, it is possible for NAUBUC to hold an exact position in 25 knot winds and state five seas. She can turn in her own length, travel broadside at three knots, or spin on one spot rapidly enough to "dump" her own gyro.

Navigational input for positioning is normally effected by means of a Decca Hi-Fix system but Raydist, Hydrodist, Radar, and visual theodylite systems have all been used and other systems would be compatible.

An AN superstructure was replaced by a much-abbreviated version and the installation of the cable-handling machinery so altered her original profile as to render it unrecognizable. The resultant vessel, however, is one of the most useful in the Navy for underwater cable work and her maneuverability is probably unsurpassed.

Her partner, CURV III, is the latest vehicle of a design which proved valuable in the search and recovery of the nuclear weapon off Palomares, Spain in 1965. It is a cable-tethered, unmanned vehicle carrying propulsion motor, lights, TV, sonar, and a manipulator arm to which many different tools can be attached. The control systems are all contained in a 10x10x20 foot closed van aboard ship where the operator receives the information determining the vehicle's location underwater and its relative attitude, position, etc. He can then maneuver it to a desired position and perform the desired task. The entire system of van, vehicle, cable and auxiliary equipment can be air-transported to anywhere in the world for use in underwater search and recovery efforts. By not requiring man to go below the surface CURV eliminates a multitude of problems.

CURV is under the operational contract of NURDC, San Diego. NAUBUC is operated by the Merritt Division of Murphy Pacific Marine Salvage Company under a contract with the U.S. Navy Supervisor of Salvage.

One event which demonstrated the value in the CURV III-NAUBUC partnership was the AFAR salvage operation. The Azores Fixed Acoustic Range is a NATO deep water listening system planted in 1970 in about 3,000 feet of water off the island of Santa Maria. The underwater units are positioned on submerged mountain tops five to 20 miles offshore with electrical cables connecting them to a laboratory on the island.

USNS NAUBUC. The vessel is based at the Underwater Sound Laboratory, New London, Conn.

Implant operations did not result in a usable range. Two towers, NOVEMBER and SIERRA, were successfully planted in the deep waters of the range but another tower, ECHO, and a buoy, BRAVO, were not.

The Supervisor of Salvage was tasked to provide men, ships, and equipment to recover the inoperable cables, renew defective sections, and replant the cables. The mislaid third array had to be recovered, refurbished, and planted in its designated location. An additional task was to plant an environmental buoy 200 feet below the surface.

It was decided by SUPSALV that the Murphy Pacific crew would live aboard the NAUBUC continuously during the AFAR operations. Since the ship was designed for the conduct of only daily operations, much had to be done in modifying and equipping the ship to improve the habitability to such an extent as to permit continuous on-board living. Following final preparations to the ship in New London for AFAR operations, NAUBUC was towed across the Atlantic by USS KIOWA (ATF 72). Upon arrival in the Azores, the CURV III vehicle (which had been flown to the islands) was quickly installed and the project was underway.

The most important task was the recovery of the ECHO tower. This large tower, 120 feet tall, weighing 72 tons and carrying large dish antennas at its top, had to be brought up from 2,000 feet, repaired ashore, and re-implanted in a specific location on the ocean floor. CURV was deployed from NAUBUC to inspect the tower first, and to place a special SUPSALV-designed shackle in the lifting eye. Then, while CURV sat at the base of the tower, information was fed back via NAUBUC to the French lift ship, TEREBEL, to coach the latter in walking its lift line to within 20 yards. Then CURV made the final connection between shackle and lift line to permit raising of the tower to the surface. The antennas had to be locked before towing it to port for a thorough overhaul. Following this, the tower was towed to sea and implanted accurately and correctly in the underwater range system.

Other underwater tasks performed by CURV and NAUBUC together during the AFAR operations included surveying bottom areas for laying cable, finding and identifying previously laid cable, placing specially designed pyranol "torches" against selected cables and cutting them to permit lifts, placing special cable "grabbers" on various cables in a locked position so that the cable could be raised to the surface, providing means for the special cable splicing teams to perform onboard NAUBUC and the major task of implanting the environmental buoy which is designed to feed basic data to the range from its subsurface position. Each of these tasks was successfully accomplished by the CURV-NAUBUC teamwork and their success enabled the NUSC and foreign units to place the range in operational condition.

Under the leadership of E. F. Lawrence, the on-scene SUPSALV representative, and CAPT Townley Wolfe, USNR, the Murphy Pacific Project Manager, the NAUBUC was prepared and deployed from New London in record time. The CURV team under Joseph Berkich, and equipment, were flown to the Azores and the partnership was underway for a successful mission.

"CURV" is hoisted over the side on its way to find previously laid cable.

EDU Installs New Fire Suppression System

By LT Donald R. Chandler

Fires under any circumstances are a danger but in the closed environment of a hyperbaric chamber that danger becomes extreme. The atmosphere in a hyperbaric chamber with an oxygen enriched or high oxygen partial pressure atmosphere is conducive to rapid initiation and spreading of fire. While every attempt is being made to remove combustibles (see FP Spring 1971) and sources of ignition from chambers, a danger of fire still exists. Because of the rapidity with which a fire starts and spreads in hyperbaric chambers, systems for detecting and containing fires must operate very rapidly.

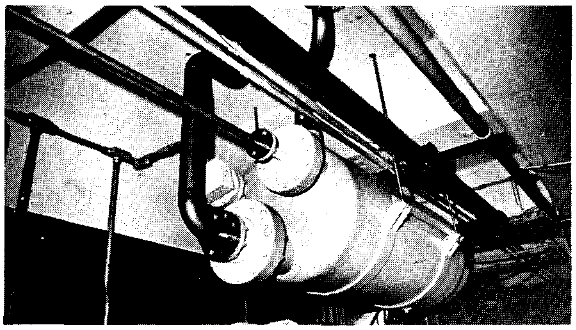
Recognizing the need for a system of fire detection and suppression in their hyperbaric chambers, the Navy Experimental Diving Unit launched a project that recently culminated in the installation of a system that will probably be considered as the prototype for other shore-based chambers throughout the Navy. Basically, the total system at NEDU is actually comprised of two sub-systems.

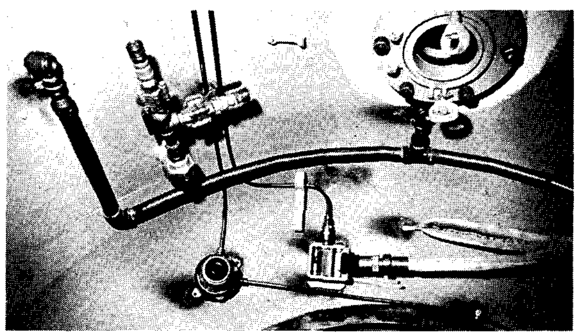
First is the detection sub-system which consists of four Pyrotronic infrared flame detectors, two of which are installed in each end of the chamber. The detectors are nominal one second delay (± 1 sec) modified to a maximum of one second response time. The device will signal a fire if the infrared radiation is modulated at a frequency of roughly 5 to 30 hertz, and if the signal continues beyond some predetermined time (in this case one second).

Second is the fire suppression sub-system which is closed loop and floats at ambient chamber pressure. It's made up of a 200 gallon water holding tank, a Berkeley 5 HP 230 VAC 3 Phase submersible main pump which puts out 170 GPM at a 95 foot head, a Berkeley 1/3 HP 230 VAC single phase submersible handline pump which puts out 10 GPM at 30 psig, and Viking solid cone directional discharge type sprinklers.

The system is designed to respond with a full water spray within two seconds from the time a fire is detected. The normal mode of operation is automatic. However, manual overrides are provided so that the system can be activated in the event the automatic mode fails. When the system is activated water will wet all exposed surfaces and provide 1.0 GPM per square foot on all surfaces supporting combustible material. Additionally, it will provide 2.5 GPM for every square foot of "effective floor area." Effective floor area is defined by NEDU engineers as the area of a hypothetical floor located above the chamber bottom at a distance equal to one fourth of the chamber diameter.

While the system installed at NEDU may not be the ultimate for shore-based hyperbaric chambers, it is a significant step forward in making man-rated chambers safer for humans.





THE OLD DROP IN

BMC (DV) C. W. Bozek, USS OPPORTUNE (ARS 41) contributed this first-hand account of failure and success common to many divers. Divers intending to apply for First Class Diving School may benefit from this story from "An Old Drop In".

I'm sure every diver at one time or another has sat on a fantail and reminisced about old shipmates, ships, and incidents in his career. One particular incident that comes to my mind (with some regret) is being called into the training office at NSDS to be told, "Chief, I have the unfortunate job of telling you we have to disenroll you from the course for academic reasons". Only a person who wants to be a First Class Diver, had put forth genuine effort in school, but hadn't prepared himself adequately, can express the feeling one has at a time like that.

Having been a part of the Diving Navy since 1961, it bothered me especially because I felt I was as good a diver as any on the bottom, besides thoroughly enjoying the work. Being a Chief Petty Officer, I felt my career had reached a dead end. I would now loose my status as a diver completely.

While awaiting orders to my next assignment, I had time to honestly evaluate the situation at the school, and ask myself the following questions:

Was the subject matter presented properly?

I couldn't complain here. We had good instructors who knew their subject and presented it in an organized manner.

Did the instructors give adequate attention and assistance to students?

Yes, and there was a duty instructor at school each night to help. Additionally, the instructors gave students their home phone numbers to call if additional help was needed.

Then why did I fail the course?

Simple. . .my mathematical knowledge was inadequate.
I really tried in class, but I hadn't taken a refresher course nor completed a math course prior to attending school. I realized I had a weakness in math when I'd had to have a waiver to attend Second Class School.

After receiving orders, prior to leaving Washington, I had a talk with LCDR Murry, XO of NSDS. I concluded that talk by saying, "I'll be back" and I meant it.

I went aboard USS SAGAMORE (ATA 208) and took out the course ***Navy Principles of Diving,*** a basic course in math. I got a lot of help from the younger generation and worked diving and medical charts in addition to diligent study. When I got stuck I would consult a diving shipmate who was always willing to help find the answer.

Finally, when I felt thoroughly prepared for First Class School, I reapplied and received a quota. I entered the course with my mind set on completing it, and I did.

So remember you senior PO's, when you make Chief you go either 5342 or NEC 0000. I suggest if you want that diving NEC, remain part of a select group, and draw that extra pay, prepare yourself with a math course prior to submitting for a quota. You'll wind up with the First Class Course complete and not at a dead end.

Tight Fit For NEREUS

The Supervisor of Salvage is rarely called upon for a more daring exercise in ship maneuvering than with the recent transfer of the USS NEREUS (AS 19) to the San Francisco Bay Inactive Ship Facility.

A giant of a nuclear submarine tender, the NEREUS measured 529 feet 6 inches in length and 83 feet 10-1/4 inches in breadth. Draft at the time of the move was approximately 19 feet.

Having been deactivated at the Mare Island Shipyard, she presented a problem as to where to berth her during her retirement. Three solutions were possible, first, send her to Puget Sound. This proved unsatisfactory due to lack of proper space and the expense of the move; second, leave her at the shipyard and send aboard a housekeeping crew for security and other duties which, too, was ruled out because of expense. The third, and most logical possibility was to send the NEREUS to the Inactive Ship Facility at Vallejo, Calif., located about 2,000 yards from where she had undergone deactivation.

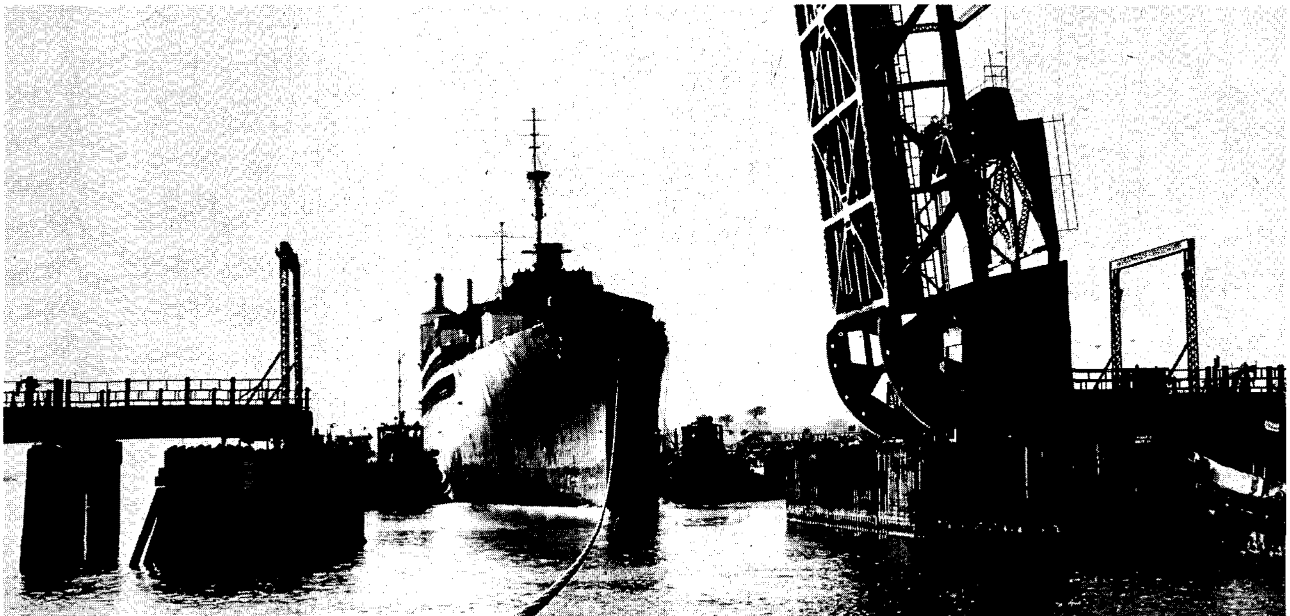
The one drawback to that solution was that a causeway, built in 1937 and providing a vital roadway and railway link to the shipyard, blocked the path. The causeway drawbridge provided an opening of only 84 feet 2-1/4 inches. Industrial material for submarine construction were shipped via the causeway and the chance of that supply being interrupted would not be tolerated.

The Supervisor of Salvage Office was asked by the Director of Inactive Ship Division, Naval Ship Systems Command, to investigate the matter. Salvage Master Earl Lawrence was sent to take measurements to determine if the idea of moving the ship through the drawbridge was feasible. Mr. Lawrence's observations indicated that the problem was solvable and with the use of the MV GEAR, operated out of San Francisco by Murphy Pacific Marine Salvage Company, the NEREUS could be pulled through the drawbridge opening of the causeway with a minimum clearance between ship and port causeway fendering of two inches.

It would be an understatement to say it would be a tight fit. The ship would pass within inches from the drawbridge itself which opened only 85°. This, plus a tricky current, would take expert timing and piloting skills to complete the project successfully.

The plan, to use the GEAR as the main vessel, was approved. After approximately three days of preparation to place buoys, anchors, and lines, all was in readiness. Eight YTM/YTB type tugs were supplied by the Naval Support Activity, Mare Island. They also provided two YTL type tugs, and three workboats, all with crews. Two senior Petty Officers and twenty-eight linehandlers onboard NEREUS came from the Inactive Ship Facility, Vallejo.

The plan called for a port pilot to take NEREUS away from the pier and put her in midstream using tugs to propell the dead ship. From that point Earl Lawrence was to take control to navi-

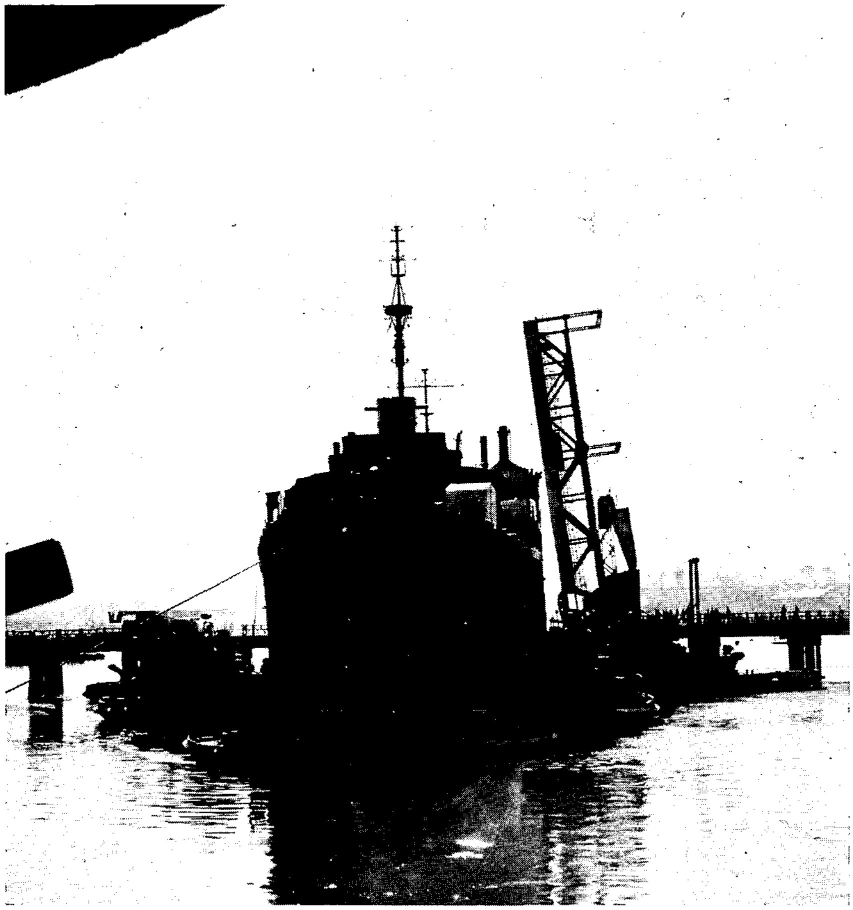


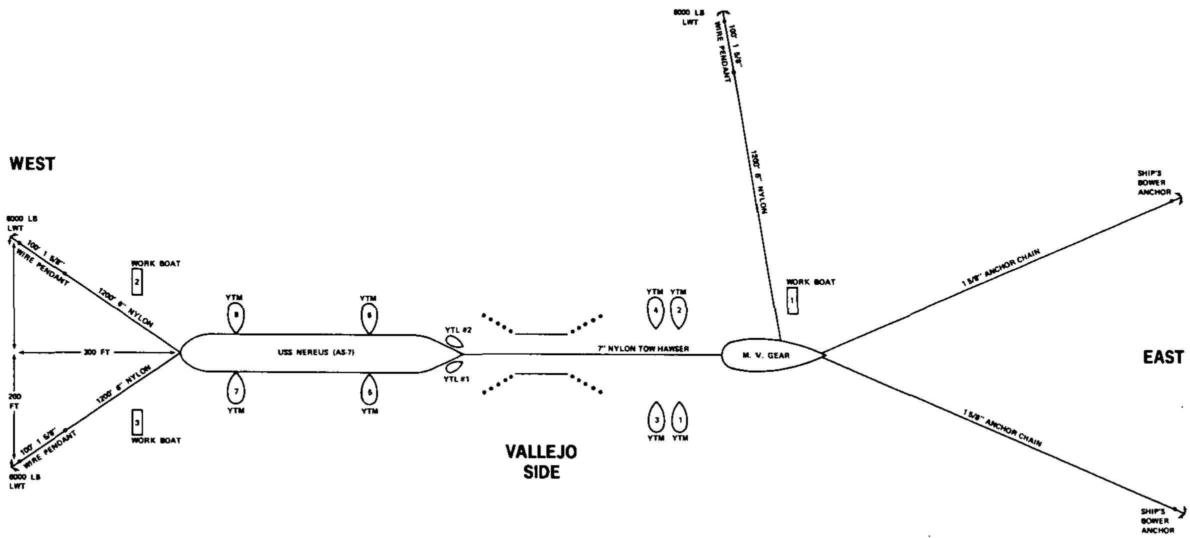
gate the ship through the narrow passageway.

The GEAR and assisting tugs were to get underway at 0530, proceed through the drawbridge, lay anchor, make up the lines, and pass a seven-inch nylon headline to NEREUS. At 0900 Mr. Lawrence would take over and NEREUS would be underway.

With two anchors off her fantail, several tugs on either side to keep her steady, all lines taut, and GEAR pulling from the other side of the bridge, the NEREUS slowly glided through the narrow opening; after taking one hour and eight minutes to travel through it, she slipped into her berth at the Inactive Ship Facility without a hitch.

Aside from some damage to the drawbridge by GEAR during the early morning preparations, the project was an unqualified success. Precise timing, expert coordination, and outstanding professional seamanship contributed to the successful conclusion of this one-time project. There were no previous operations to establish a precedent.





NEREUS READY FOR TRANSIT

French boat saved by SUPSALV help

The Supervisor of Salvage has recovered submersibles at close to a thousand fathoms, pulled destroyers off the beach, and brought up many craft from a watery grave. Not often has that office had to concern itself with a 30-foot ketch owned by an elderly Frenchman. It happened recently, however, when THE ATOM, the home, constant companion and fellow adventurer to 69 year-old Jean Gau ran aground on desolate Asseteague Island, Virginia.

The French skipper had completed nine solo voyages across the Atlantic and two around the world when on October 25, after a 108-day crossing from Spain, the voyage came to a temporary end.

The efforts of local residents to free the ketch failed. The uninsured boat had sustained considerable damage and was taking on water during high tide. The National Park Service was assisting Mr. Gau to find food and shelter as well as providing the necessary four-wheel drive vehicles to travel the rough terrain to the ship.

Under maritime law the first person to reach an unattended, stranded boat and move it to a place of safety can claim salvage rights for a handsome reward. A salvage lien slapped on THE ATOM would have been the end of everything for skipper Gau. The watermen of nearby Ocean City threatened reprisals against anyone who thought of attempting it which averted that problem.

Alonzo Anderson of the local Coast Guard Auxiliary immediately took charge of rescue efforts and along with other townspeople worked night and day on successive high tides trying to refloat the ketch. They also acted to protect it from possible vandalism.

The Coast Guard was prevented from assisting in refloating the ketch due to regulations. After examination by land and sea which revealed that "no real damage to life and limb existed", the local Coast Guard Auxillary stepped in.

The publicity surrounding the stranded ketch reached CDR R.B. Moss, Deputy Director of Ocean Engineering through the local Washington, D.C. news media. In hopes that SUPSALV could assist the Frenchman, CDR Moss sent Salvage Master Earl Lawrence to represent the office to determine how the Navy might help. COMSERVRON 8, Norfolk, was contacted about sending HCU-2 personnel to assist in the refloating attempt. After a one week delay, they garnered approval from CINCLANTFLT and SERVRON 8 representative LCDR Eugene McNiff headed a group of four divers from HCU-2 to aid in the recovery effort. The divers selected were DCCS (MDV) Rizer, HMC Hammer, EN1 Rings, and BM2 Farris. LT William Walker represented SUPSALV.

THE ATOM had been aground for 21 days when the final preparations for refloating got underway. On the morning of 5 November 1971 the Navy team was assembled on the site to survey the situation. At 0600 on 6 November final preparations were begun. With assistance from the Coast Guard Auxiliary and the National Park Service, a large basin was dug around the boat, whose bow was facing out to sea. The digging was done at low tide by Park Service earth moving equipment. The salvage team used water jets to clear away the sand around the hull.

A 44-foot CG vessel provided by the Chincoteague Coast Guard Group, part of Operations Office of the 5th Coast Guard District, Norfolk, arrived shortly before high tide at 0830. The tide came in, the trench filled, and the vessel tugged at the tow line tied on THE ATOM by a bridle which had been rigged by the CG Auxiliary. The plywood patches the Auxiliary had applied with nails and roofing tar held, the ketch slipped off the beach and headed for Ocean City for mooring and repair. The inside was reported to be badly damaged.

The anxious skipper of THE ATOM was late in getting to the rescue, but upon seeing her afloat he said, "I was dumfounded. I felt like a million dollars. I can't believe what everyone has been doing for me."

According to CDR Moss, the Navy decided to get involved "because of the old gent's history with his boat." The Navy is hard pressed sometimes to decide how to enter into these things without creating an international incident. "Helping a Frenchman with a beached boat is not exactly one of the Navy's official duties," he added, "But we try to help out and show compassion."

Jean Gau will winter in Ocean City and begin working on the 30 year-old boat as soon as possible. After the boat is made seaworthy again, perhaps by early summer, Gau is planning to sail to New York for his final transatlantic crossing and retirement upon return to France. His home during the repairs will be THE ATOM, of course.

Hot Water System at NURDC

by CHBOSN CWO2 J.J. Duran
NURDC Long Beach, Calif.

In October 1971, the Diving Locker at the Naval Undersea Research and Development Center, Long Beach Facility, received a Clayton Diving Heater Model HD-550, commonly referred to as "the boiler." Along with the boiler, which came from the Office of the Supervisor of Diving, were two hot water suits with two 450-foot lengths of hot water hose.

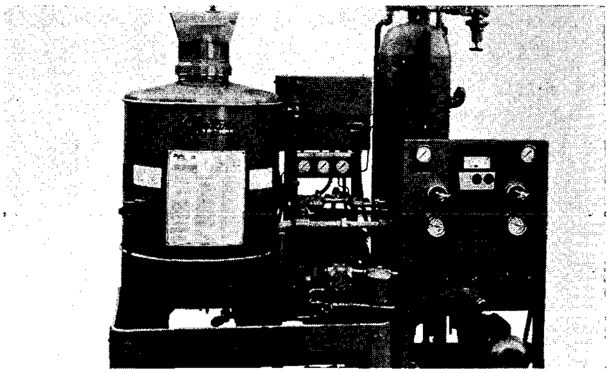
The initial operational test of the boiler and suits revealed that there was a need for an auxiliary pump to get the sea water to the boiler. The equipment for this purpose was ordered from the Westco Pump Company, Los Angeles, Calif. It included a pump centrifuge, Burk Series G, catalogue 10-G-6, 1-1/4 in at a cost of $226. The boiler was then mounted, with an auxiliary pump, on the diving boat, a converted LCM. The first working dive was made in early November 1971 using the Kirby Morgan Band Mask, KMB-8, with the hot water suits.

From that time until mid-January 1972, 116 dives were made using the Clayton Heater, hot water suit, KMB-8 combination. On 14 January 1972, the operation time counter on the boiler read 97.5 hours, all with no major casualties. After 80 hours of operation the burner electrode had to be adjusted. Boiler down time was approximately 45 minutes. At one point the diesel fuel had to be changed because of water in the fuel. The cause was attributed to bad fuel and bore no reflection on the performance of the boiler. The boiler is equipped with alarms that sound when the water temperature to the diver varies from the desired setting.

The divers in charge of the operation and maintenance of the Clayton Diving heater were impressed with the easy-to-understand instruction book and agreed that once set up it was easy to operate and maintain.

The hot water suits are similar to a wet suit but with a perforated hose sewn and glued in on each leg, arm, and in the back. A valve on the right hip controls the hot water which circulates through the entire suit. Also, the option of dumping all hot water into the sea should temperatures become uncomfortable is incorporated into the suit. The extreme comfort of the suit is especially noticable when hanging off at decompression stops; there's no more shivering and shaking. It has also enabled NURDC to double work time on the bottom which in effect increases the diving capability.

Below: The Clayton Diving Heater on board ship. Divers don hot water suits which provide comfort in cold water or long dives. Hot water circulates through the suit via sewn in tubes.

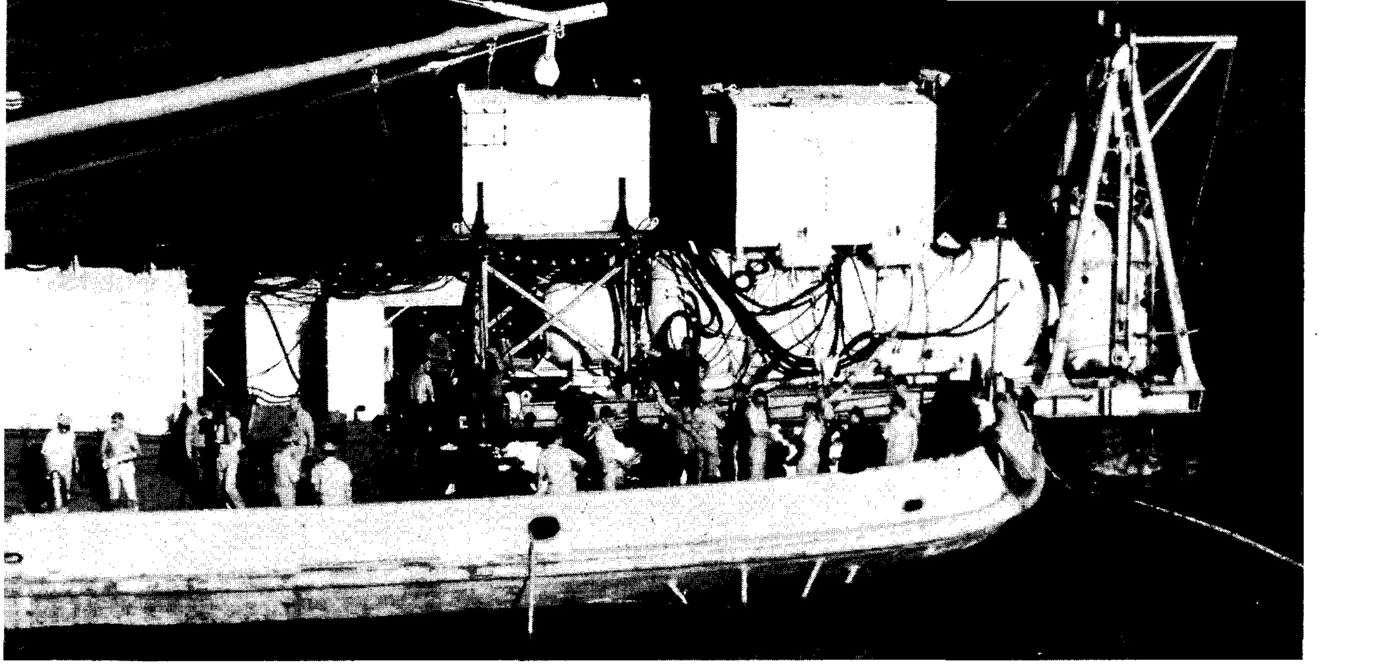


The boiler package described above is recommended for any cold water diving or long duration dives made in moderate temperature water. An adequate diving platform is necessary for the 1,425 pound heater unit. The unit measures 2-1/2 feet at the base and is 5-1/2 feet high.

For divers operating in cold water, the hot water suit is a definite improvement over any previously offered. The KMB-8 used in conjunction with the suit has proven to be an outstanding combination for the type of underwater work conducted at NURDC.

Divers who tested this equipment and are responsible for the findings printed here are, the author, CHBOSN CWO2 R.A. Hester, CHBOSN CWO2 R.A. Owens, BMCM (MDV) E.H. Worthy, BMC (MDV) I.C. Salyers, SFC (DV) J.S. Watts, SFC (DV) W.F. Curtis, ENC (DV) G.W. Power, DCC (DV) O. Robinson, MMC (DV) C. Russell, BM1 (DV) M.H. Atkinson, BM1 (DV) M.J. Nichol, TM01 (DV) P.K. Vaughn, SF1 (DV) R.M. Dunham, SF1 (DV) D.L. Perry, EM1 (DV) J.W. Cole, MR2 (DV) C.M. Weaver, HM2 M.W. Leonard.

More detailed information on the Clayton Heater can be obtained by writing the Supervisor of Diving, Attn: LCDR Dowland, RN.



Divers Go To 372 Feet Off USS GRAPPLE

Commissioned in 1943, the U.S. Navy salvage and rescue ship GRAPPLE is considered by many to be a "salty old dog." Recently, however, she disproved the time honored axiom that "an old dog can't learn new tricks" by successfully testing her compatibility with the Taylor Diving and Salvage Company's Dive System (TDS).

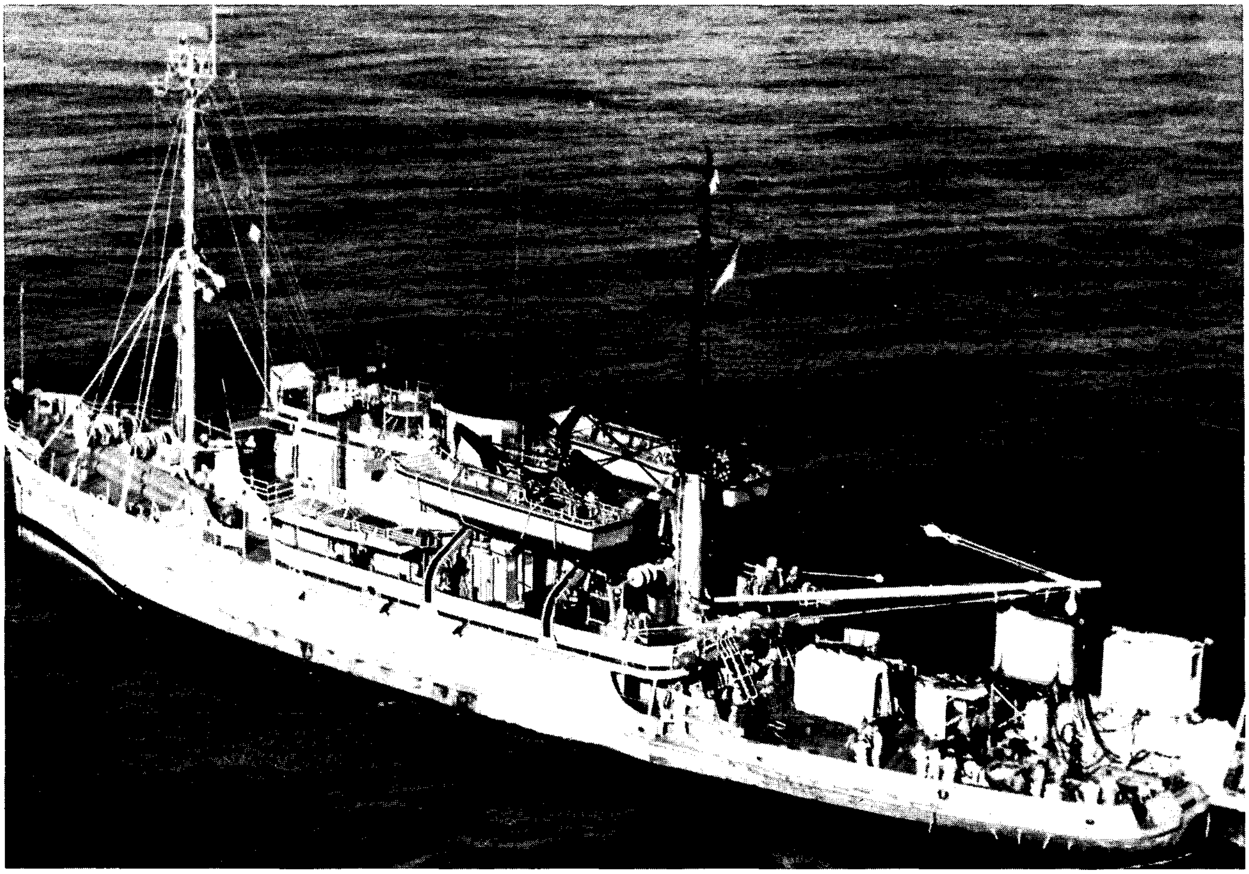
The TDS is a saturation diving unit comprised of a Deck Decompression Chamber (DDC) and a Personnel Transfer Capsule (PTC). Divers are pressurized in the DDC to the depth at which they will work, thus becoming "saturated." Once saturated, the divers transfer into the PTC and then are lowered to the desired depth at which they may egress from the PTC and accomplish the assigned salvage task. Upon completion of the task, the divers re-enter the PTC and are raised to the surface, still pressurized. Finally they transfer to the DDC for decompression and subsequent transfer to the "topside" world.

GRAPPLE, flagship of Service Squadron Five, was selected as the platform on which to mount the TDS. Once the TDS was installed on the fantail of GRAPPLE, all attention was focused on the objective of the experiment, to determine if a civilian diving system and civilian personnel could successfully be utilized on board a Navy salvage ship. To accomplish the above, minor alterations were made to GRAPPLE's configuration and numerous drills were held by all concerned.

Under the command of LCDR L. W. Lonnon, GRAPPLE got underway from Pearl Harbor on the morning of January 24, for the nearby Ewa Beach dive site. Embarked on GRAPPLE and in overall command of the operation was CMDR J. D. Johnson, Commander Service Squadron Five. After testing her seaworthiness with the TDS on board, GRAPPLE moored at the dive site at noon to make last-minute preparations for the civilian dive. At this time, drills were conducted and equipment was checked. At 1800 the same day the divers entered the DDC to be "taken down to depth." Early on the morning of the 25th, with Commodore Johnson and CAPT E. B. Mitchell, Director of Ocean Engineering, observing, the Taylor divers entered the PTC and were lowered to a depth of about 400 feet. Once on the bottom, the divers egressed from the PTC and completed a simulated salvage evolution (shackling in a nylon line to an 8000 pound anchor laying on the bottom).

The divers then returned to the PTC, were raised to the surface and re-entered the DDC. Meanwhile, GRAPPLE weighed anchors and returned to Pearl Harbor. Once in port, critical days followed as the divers underwent the delicate period of decompression. Several hours before dawn on January 30, the divers emerged from the PTC, successfully caping the operational phase of the project.

The success of this demonstration illustrates the Taylor Dive System is capable of being flown anywhere in the world and installed on a Navy salvage ship, thereby significantly increasing the Navy's deep dive salvage capability.



Civilian divers Michael Cooks, Fred Miller, Clark Long, and Charles Eglin used the KMB8 Band Mask during recent saturation dives off Hawaii. Photos above and right show the Taylor Diving and Salvage saturation rig during preparation for the dive aboard USS GRAPPLE.

NEW O in C at EDU

CDR J. J. Coleman has assumed the duties of Officer in Charge of the Navy Experimental Diving Unit. He succeeds LCDR W. I. Milwee, Jr., who was an interim replacement for CDR J. H. Boyd, Jr. A 1957 graduate of the U.S. Naval Academy with additional study at Webb Institute, CDR Coleman reported from the staff of COMSERVLANT where he served as Atlantic Fleet Salvage Officer.

Prior to the Norfolk assignment, CDR Coleman served on destroyers, submarines, and a tour of duty at the San Francisco Bay Naval Shipyard (Hunters Point Division) where he was responsible for the production department efforts on the Deep Diving System, Mark II Mod 0. Coleman was in charge of the salvage of several aircraft in the San Francisco Bay area and the successful unbeaching of the USS CLARK COUNTY (LST-601), and salvage of the USS GUITARRO (SSN 665) at Mare Island Naval Shipyard.

Since reporting to the Experimental Diving Unit, CDR Coleman has been assigned additional duty as the Supervisor of Diving in the Naval Ship Systems Command headquarters. Due to the command's increased awareness of the diving community, COMNAVSHIPS has directed the formation of a separate and distinct diving organization to pursue the effort of ensuring that the fleet diver is the best equipped and trained diver in the world.

The establishment of the position of Supervisor of Diving in COMNAVSHIPS, responsible only to the Commander via the Director of Ocean Engineering, CAPT E. B. Mitchell, will provide much viability in the Navy diving program. A following edition of FACEPLATE will publish the resulting organization.

Continued from page 9.

pressure and maintain the necessary air flow. Adding unnecessary stages only aggravates the problem of contaminants.

A stages system of this type should also contain back pressure controls. These controls are necessary to maintain interstage and outlet pressures at or near rated pressure. This, in turn, causes condensation and emulsification products to collect in the traps in the compressor system rather than migrate downstream into the system. Such traps usually have globe or gate valves. The liquid rises on the periphery of the trap and air blows through its center when the valves are opened. It has been established that instrument-type needle valves reduce contamination when used in these traps. They permit elimination of the fluids trapped under the controlled flow conditions, thereby removing a maximum quantity of noxious contaminants.

We have designed and developed improved oil removal filters as a small but significant by-product of our overall review of the contaminant problem. These filters are for the conventional open-circuit diver's breathing air systems. They are now being introduced to the fleet, initially to ASR/ARS type ships. Selected diving schools will also be included in this first allocation. The filter configuration and design is the result of an on-going program to improve the quality of defined filtration technology, together with experimental performance evaluation. The filters offer a significant advance in filtration technology together with an engineering approach for the development and verification testing required to improve the quality of the divers' breathing gases.

The Diving-Gas Manual has more than fulfilled the promise of providing a basic source document of valuable data and requirements for breathing gas systems, and the behavior and quality of breathing gas mixtures. It, together with the developmental work on saturation diving and deep diving systems, has constituted a firm base of knowledge and experience for our current efforts to ensure efficient and adequate life support systems in each type of diving apparatus that the fleet uses now and will use in the future. We expect to revise and republish the manual as new knowledge emerges from our efforts.

Continued from page 7.

system. Prior to mid-1972, three prototype systems are expected to be delivered. It will include a helmet, recirculator, suit, and auxilliary equipment capable of air or mixed-gas operation to depths of 1,000 feet in any environment. Less weight, lower noise level, greater durability, ease of dressing, and a come-home capability are just a few of the targets planned for this project.

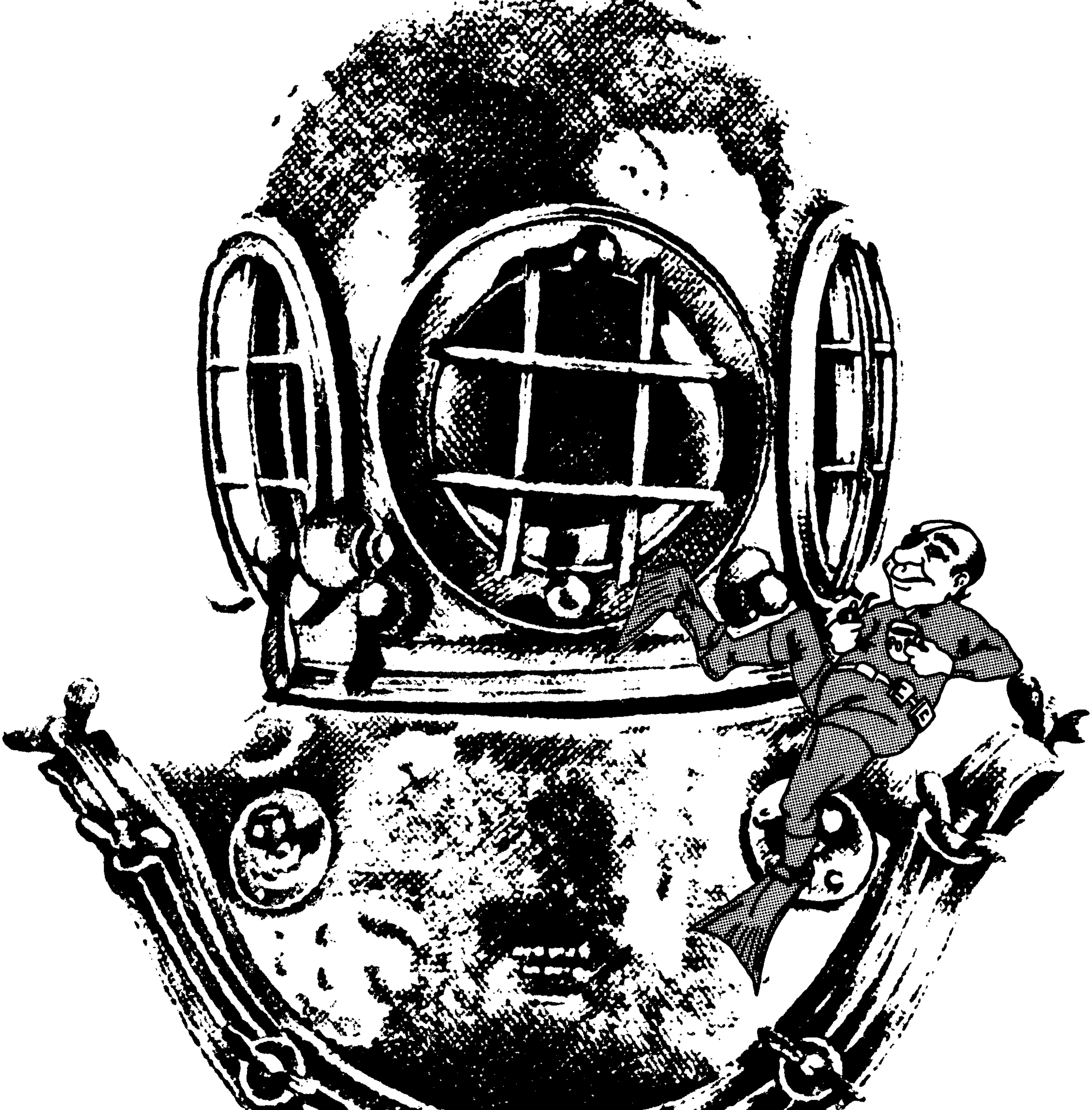
Another interesting project of an on-going nature is the development of a family of hydraulic tools capable of use by divers at very deep depths. In 1969 the Naval Civil Engineering Laboratory was assigned a key role in this project. Consequently, a tool package is currently being issued to the U.S. salvage Navy consisting of a diesel power source, impact wrenches with adaptors for drilling, socket sets, cable and bolt cutters, and a diver operated hydraulic pump. All can be used a depths to 850 feet. Work is continuing on abrasive cutters, saws, and both a bottom sitting and surface hydraulic power source. In the future it is intended to attack the following areas: complete redesign of underwater tools and diver aids, identify and encourage improvements in the design of all newly constructed ship's underwater fittings which are most often worked on by divers, procure and develop existing underwater hull and sonar dome cleaning devices, and procure limited numbers of underwater damage assessment television systems for hull inspections which are now in an advanced state of development.

Other areas of mutual concern that were also discussed included diver monitoring, diaphragm compressors, power operated booster pumps, gas standardization, diver's breathing gas systems, diving manuals, and a glossary of diving terms. Information relating to these latter topics will be discussed in future articles.

This first article has hardly scratched the surface of the total concept of the IEP B-12 project. However, the project is an active and interesting one that unquestionably expands the knowledge of the diving communities in both the United Kingdom and the United States as their combined efforts continue to assist man's venture into the oceans of the world.

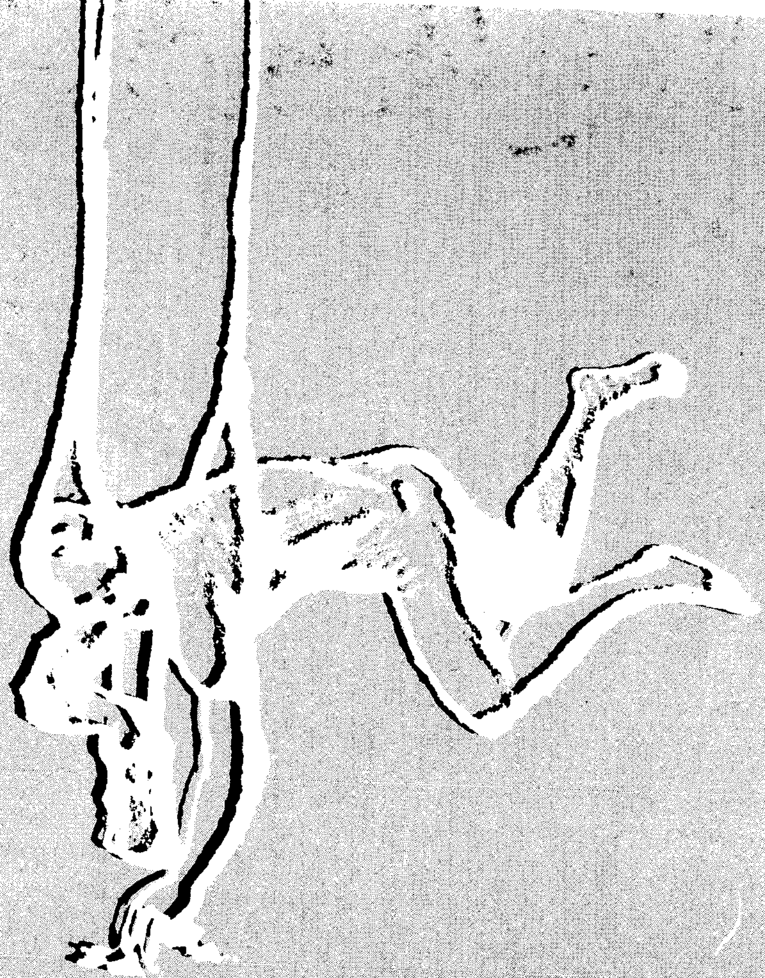
All USN personnel are invited to forward comments or any related information which may benefit the IEP series in FACEPLATE directly to LT D. R. Chandler, USN, Navy Experimental Diving Unit, Bldg. No. 214, Washington Navy Yard, Washington, D. C. 20390. LT Chandler has been appointed by CAPT Mitchell as the single point of contact for the U.S. Navy concerning this project. Similarily, CAPT A. Checksfield, Supervisor of Diving, Royal Navy, has appointed LCDR L. Bussy, USN, as the single point of contact for Europe. LCDR Bussy may be reached at the Admiralty Experimental Diving Unit, c/o HMS Vernon, Portsmouth, Hants, England.

the Old Master says . . .



They don't make 'em like they used to (thank heavens!). Not even the oldest salt will recall ever using or even seeing this model diving helmet. It did work, however, and is the prototype of the modern hard hat.

If you can identify the maker and the year the hat was made, notify the Supervisor of Diving, Washington, D.C. 20360.



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