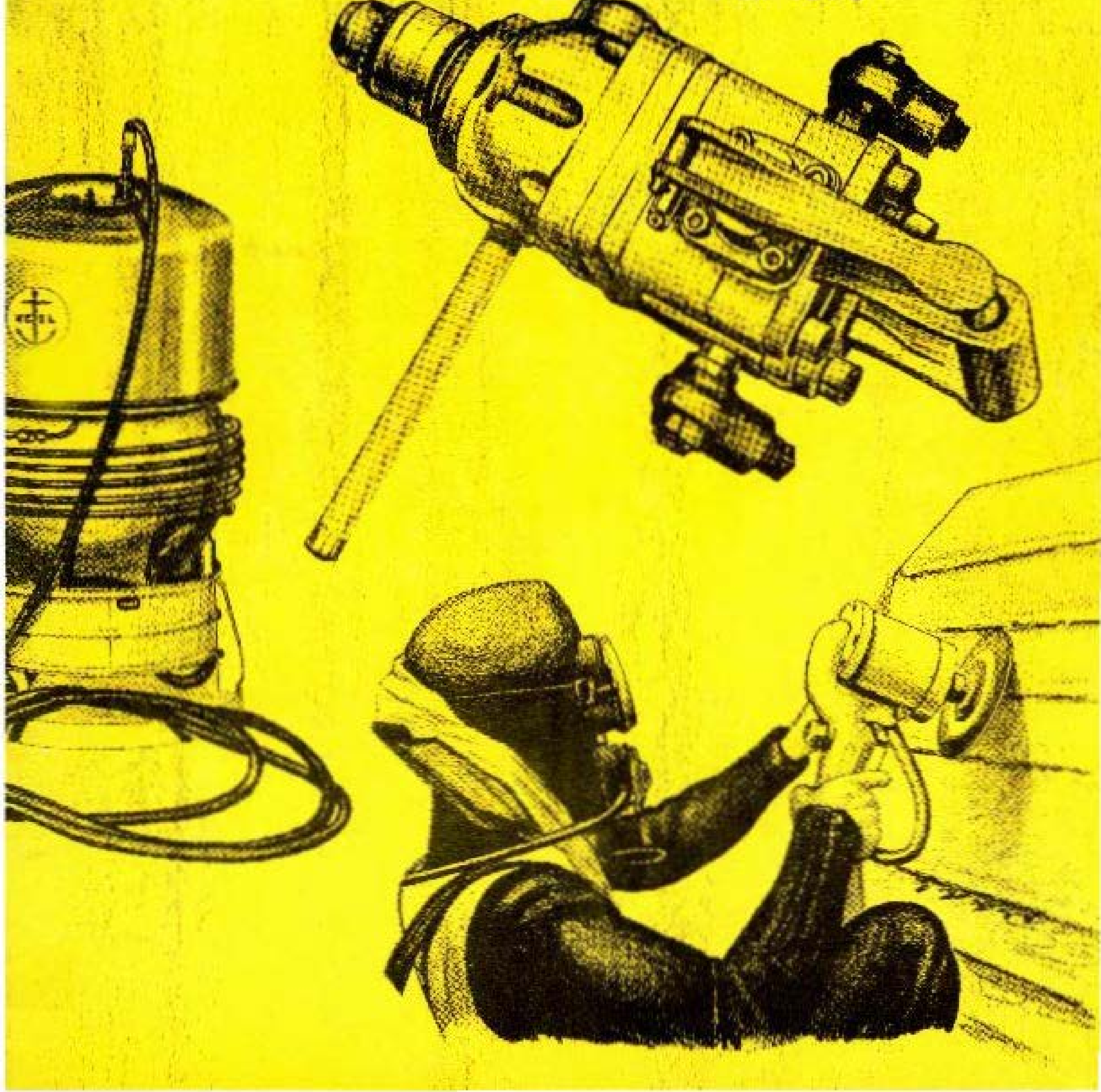
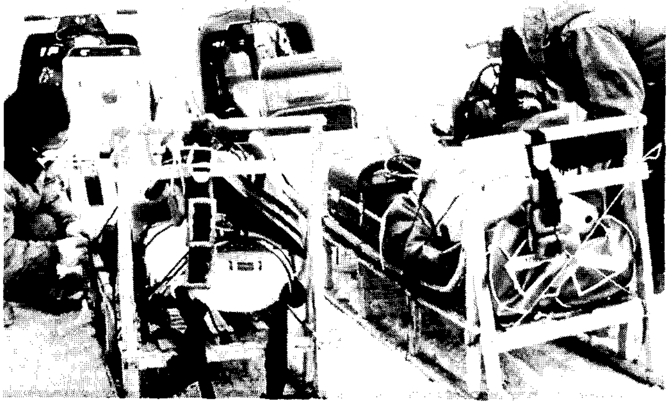
Faceplate

Fall 1970





(See "Arctic Dive" . . . page 17)

Faceplate

Vol. 1 No. 3

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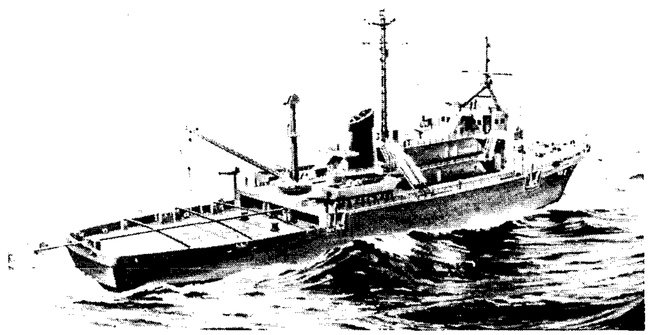
Salvage Tug (ATS) . . . . The ATS is a new type salvage tug which will house the Navy's Mark I Deep Dive System. The first three ships of this class are being built at the Brooke Marine Limited Shipyard in Lowestoft, England under a contract with the British Ministry of Defense, Navy.

The ATS-1, named EDENTON, has an estimated delivery date of December 1970. It will be assigned to COMSERVRON EIGHT at Little Creek, Virginia. The two follow-on ships, the ATS-2 and 3, will be delivered six to eight months after the first one and will be assigned to Pacific Fleet for duty.



Breathing Gas for Divers . . . . A symposium on the "Purity Standards for Divers' Breathing Gas" was held July 8-9 at the Battelle Memorial Institute in Columbus, Ohio. The symposium was sponsored by the Navy's Director of Diving, Salvage and Ocean Engineering Projects, Captain E. B. Mitchell, USN, and was chaired by Commander J. H. Boyd, USN, Officer in Charge, US Navy Experimental Diving Unit.

This meeting provided an opportunity for the interchange of information from scientific and medical research sources, both military and civilian, so that effective cooperation to improve the quality of the divers' breathing gas could be established between medical groups, engineering sources, and the users.

There were many excellent presentations by various research and engineering laboratories concerning purity standards for gases, air purification, tracing of contaminants, toxicity, tests for filters, maximum limits of contaminants, and filtration systems.

One of the most promising filtration systems for compressed air was the one reported by the Bendix Filter Division. This system is specifically designed to deliver high purity air by removing the oil contaminants introduced into the intake by the compressor. It uses three separate purification stages integrated into a single, low silhouette, portable unit. The system is designed to take incoming air with 130 mg oil per m^3 and filter it down to less than 5 mg oil per m^3.

Two prototypes of the Bendix Air Filtration System were built and tested under Navy contract. Factory tests proved successful; one unit was tested at each flow condition for over 200 hours. Additional tests were carried out at high humidity and increased flow rates. All design goals were achieved during the test phase. One prototype has been undergoing field evaluation at the US Navy School, Diving and Salvage. The other unit is undergoing evaluation by application to a specific diving system.

1000-Foot Dive a Success at EDU

On Monday, 22 June, four Navy divers began compression in 200-foot increments to a simulated depth of 1,000 feet of sea water, using the chamber complex at the Experimental Diving Unit, Washington Navy Yard. The four subjects were LCDR James L. A. Majendie, Royal Navy (Exchange Officer on duty with the Supervisor of Diving); LCDR John Alexander, (MC) USN; Chief Hospital Corpsman, Troy Brown; and Engineman First Class, Thomas A. Guzicki.

The purpose of the 1,000-foot saturation dive was to technically evaluate the Mk 10 Mod 3 Mixed-Gas Closed-Circuit Breathing Apparatus and to perform cold gas respiratory studies. The Mk 10 rig was dived at each 200-foot increment to determine the endurance of the apparatus and to ascertain the limiting factors; Carbon Dioxide (CO_2) breakthrough or gas supply. The equipment was evaluated in the "wet pot" by two-diver teams employing weights and the swim trapeze to simulate work periods.

Additionally, a Bio-Marine Closed-Circuit Breathing Apparatus was dived at the 400-foot level for 30 minutes to determine functional performance, and on the first day of decompression, the rig was dived to the limit of endurance.

The Mk 11 Mod 0 Semi-Closed Breathing Apparatus was also dived on the third day of the 1,000-foot level. Two dives were made with this rig for endurance and CO_2 breakthrough; the first on an open-circuit mode from the bottles and the second one on a semi-closed circuit mode.

The Kirby-Morgan Band Mask was also dived on open-circuit on the third day of the 1,000-foot level for about 30 minutes to determine functional performance.

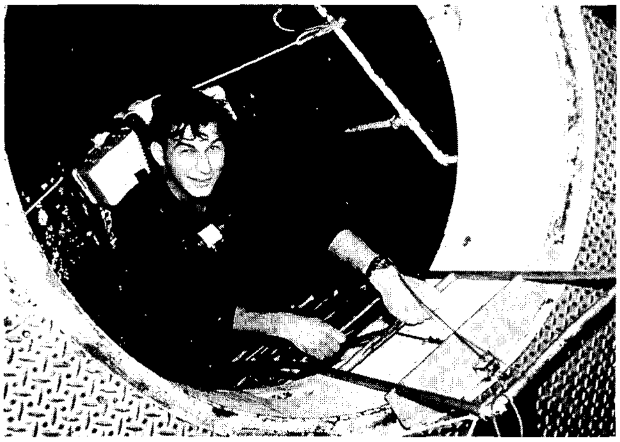
The four subjects, at the start of the dive, descended to 14 feet gauge depth on air. They remained at 14 feet approximately 10 minutes, while the life support equipment was checked for satisfactory performance. Then, they descended to 200 feet using a pre-determined compression schedule. Three days were spent at each depth level down to 1,000 feet. At the 1,000-foot level, the duration was four days. Pure helium was added to the breathing mixture from 14 feet to complete pressurization at the 1,000-foot level, while the oxygen level was maintained at 0.3 atmospheres. The subjects breathed chamber atmosphere throughout the compression phase.

The decompression phase began at 0600 on the 17th day of the dive, which was 8 July. Decompression continued in accordance with the schedule until 1120 on Sunday 19 July, the 28th day after the start.

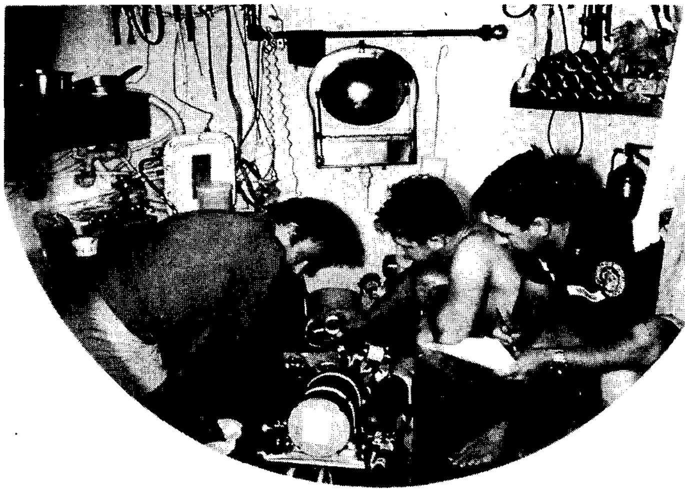
The entire planning and execution proved to be outstanding. The performance of the rigs used, particularly the Mk 10 Mod 3 Mixed-Gas Closed-Circuit Breathing Apparatus, was beyond expectations. The data collected on both the equipment and use of cold gas will be invaluable for future field application by Naval divers.

LCDR James L. A. Majendie, Royal Navy, the diving team leader, the other diving team members and the SUPDIVE/EDU watchstanders, who maintained a 24-hour vigil over the twenty-eight day period, deserve a well-done for the highly professional results.

FACEPLATE will bring you additional results of this dive as they are made available. – Ed.



Engineman First Class, Thomas A. Guzicki

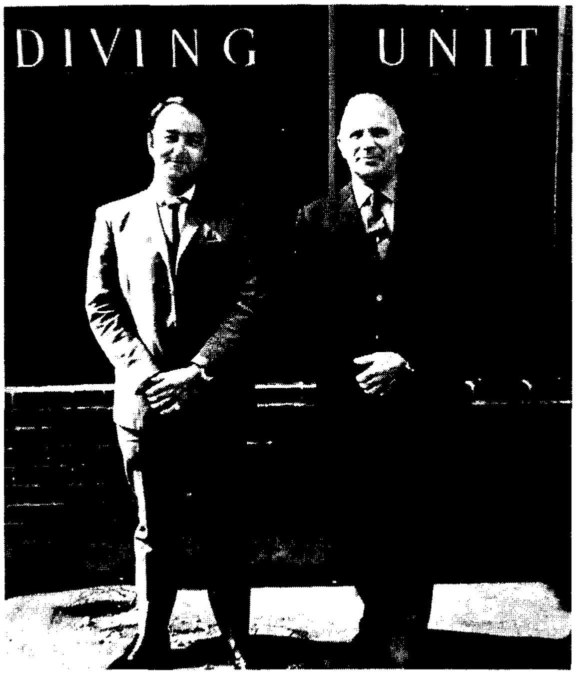


From (L to R) LCDR J. L. A. Majendie, EN1 Thomas A. Guzicki, HMC Troy R. Brown

Diving Cooperation with the Royal Navy

The Information Exchange Project (IEP)-B-12 provides for an exchange of diving information between the U.S. Navy and Royal Navy. The representatives of these two Navies meet periodically to discuss equipment developments, diving/salvage operations, procedures, and results. The most recent meeting was held in Panama City, Florida in June 1970, under the sponsorship of Captain E. B. Mitchell, USN, Director of Diving, Salvage and Ocean Engineering Projects. At this meeting an active in depth discussion of technical, medical, and operational problems common to both Navies provided excellent information to both sides.

One very important aspect of the project has been the Exchange Officer program. The present exchange officers, LCDR James L.A. Majendie, RN, and LCDR James C. Bladh, USN, are scheduled for relief soon. They have been most effective as liaison between the two Navies. FACEPLATE would like to take this opportunity to acquaint you with some of their activities, and to congratulate LCDR Majendie and LCDR Bladh on a job well done.



LCDR James L. A. Majendie, Royal Navy, has been serving in the Office of the Supervisor of Diving and at the Navy Experimental Diving Unit. LCDR Majendie has made presentations at many symposiums and conferences. He has participated actively in many programs such as diver heating, Mk 10 Breathing Apparatus and tool development; as well as being a member of the Arctic Dive Team and the EDU 1,000-foot Dive Team. (Articles on the Arctic Dive and 1,000-foot dive are contained in this issue of FACEPLATE.)

LCDR James C. Bladh, USN, has been serving as the Officer in Charge of the Admiralty Experimental Diving Team at Portsmouth, England. LCDR Bladh has qualified as Diving Officer in the HMS RECLAIM and has participated in dives from RECLAIM for the recovery of aircraft. He also has qualified as the Officer in Charge of the Deep Trials Unit of the Royal Navy Physiological Laboratory (RNPL), has participated in an 800-foot simulated dive at RNPL and has participated in trials of new equipment and decompression schedules.

RADM Long Discusses Fleet Salvage

Admiral Long

Rear Admiral Robert L.J. Long, a native of Kansas City, Missouri, graduated with distinction from the U. S. Naval Academy in 1943. Through subsequent promotions he attained the rank of Rear Admiral in July 1969.

After serving a tour as Commander Service Group THREE, from September 1968 to August 1969, he reported to his present duty as Deputy Commander of Fleet Maintenance and Logistic Support, Naval Ship Systems Command (NAVSHIPS 04).

In a recent address at the seventh U. S. Symposium on Military Oceanography held at the U. S. Naval Academy, Annapolis, Maryland, Admiral Long discussed our fleet salvage problems brought about by the escalation of hostilities in Southeast Asia. His discussion included measures that have been taken to correct the problems, our new salvage capabilities, and problems still facing us today. The following is a condensed version of his address . . . – Ed.

During the period 1965 to 1969, the escalation of hostilities in Southeast Asia pointed up the inability of the Navy's towing and salvage forces to meet the large increase in the need for salvaging and towing services. To correct this situation, ships were leased or activated, obsolete equipment was replaced, and additional personnel were trained.

* * *

Throughout 1965, as forces were being strengthened, the increase in ship movements from both coasts of the United States to South Vietnam created additional demands on the already over-taxed salvage and towing resources. To meet the increasing demands for services, several lift craft were leased, and Harbor Clearance Unit ONE was created to assume responsibility for river and harbor clearance and salvage. This allowed salvage ships and fleet ocean tugs to concentrate their efforts on offshore problems. Then, in 1966, the decision to establish the Mobile Riverine Force for duty in the Mekong Delta created an additional requirement for men, material, and craft to conduct riverine and harbor salvage, clearance and towing. An emergency program was begun to convert assorted landing crafts into workable diving/salvage boats and to procure additional heavy lift craft. Also, the procurement of new diesel-driven pumps, generators, compressors, welding machines and salvage winches significantly enhanced salvage force readiness and contributed to the successful salvage of many ships, craft, and aircraft.

A major effort during this rebuilding phase of our salvage forces was the refloating of the *USS FRANK KNOX (DDR 742).* Initial efforts in salvaging involved the use of tried and true conventional methods; however, it soon became apparent that a new plan of attack was required.

This involved the first use by the Navy of foam for dewatering flooded spaces. This first use of foam showed several advantages. Besides being air transportable, foam can be installed from within or without a space. Also, a means now exists to dewater a compartment which cannot otherwise be made tight for pumping or blowing. The use of foam also proved to have some disadvantages. Its use requires specially trained personnel; it is toxic and flammable; and 100% dewatering is not guaranteed by its use. In addition to being initially expensive, foam is also difficult and expensive to remove.

Although we learned many new lessons in the refloating of *FRANK KNOX,* we still have a requirement for the capability to raise sunken ships, up to the size of submarines. Recently, we have been successful in locating and raising small objects from deep depths. Unfortunately, submarine salvage techniques have experienced little improvement since the recovery in 1925 of the *S-51* from 132 feet. Present heavy lifts continue to be made using salvage pontoons controlled with air pumped from the surface, or by lift craft which use the rising tide to provide the required lifting force. This leaves us with many operational problems. The Large Object Salvage System (LOSS) is a concept which is planned to solve our problem by providing a capability to recover submarines from depths to 1,000 feet.

Other major problems are still facing us. Steps must be taken to provide greater capabilities to the working diver. Now that the Mark I Deep Dive System gives us the ability to dive to 850 feet, with further excursions to 1,000 feet, we require tools such as impact wrenches, stud guns and cutting and welding methods that are certified capable of performing at deep depths. We need certified power sources to run the tools and provide lighting. Certified and service approved breathing apparatus good to 1,500 feet in the near future is necessary. A solution is needed to the diver heating problem that exists below 200 feet. Resolution of the helium speech phenomena is an urgent problem.

Finally, in addition to being able to reach sunken submarines and to safely work at the salvage depth, we need the capability to locate and recover a downed aircraft, even if it should scatter in many pieces over the ocean floor. Our failures in this area far outnumber our successes.

The challenge is here. It is now up to the Navy and Industry to face up to and meet the test.

A MASTER RETIRES

James C. Brown (BMCM) graduated from the First Class Diver's course in October 1959. He completed the Master's course as a BMC in December 1963. On 10 July 1970, he retired from the U.S. Navy as a Master Chief Petty Officer. At the time of his retirement, the Chief was serving as the Master Diver of the Navy Experimental Diving Unit at the Washington, D.C. Navy Yard. Master Chief Brown plans to join the Dick Evans Diving Company of New Orleans.

At left, Master Chief Brown and his wife Laura focus their attention on the mounted ship's clock, barometer, and EDU plaque on the occasion of a retirement party in his honor. CDR J. H. Boyd, Jr., (above center) Officer in Charge at EDU, presents a set of mounted cannons to the Chief. In upper right photo, the Master Chief and LT John Naquin, Assistant Officer in Charge at EDU, hold up one of the Chief's mementoes for a better view.

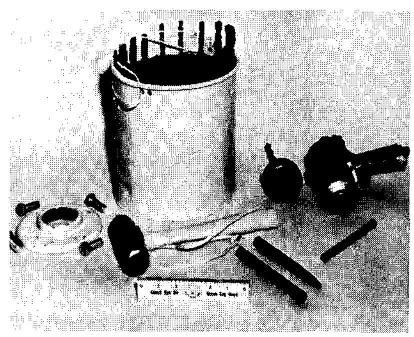
Developing New Underwater Tools

NCEL Maintains Vigorous Program

The Naval Civil Engineering Laboratory (NCEL), Port Hueneme, California, has an active underwater tool program directed toward the development of power sources and evaluation of tools to meet present and future Navy underwater construction and salvage requirements. The various systems under study are being developed and evaluated for diver-depth and for deep ocean application.

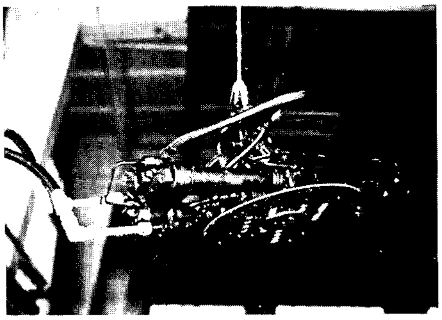
The Laboratory's diving locker, presently under the supervision of LT J. A. Droll, is staffed and equipped to handle practically any job NCEL engineers take from the drawing board to ocean testing. Since the Laboratory locker opened, in June 1967, about 2,000 dives have been made. LT Droll says, "Our mission is to support NCEL and its ocean engineering program, or any other Laboratory project involving underwater construction, observation, evaluation, and development."

NCEL engineers and divers are testing and evaluating tools with pneumatic, hydraulic, and explosive power sources. Operating tests have been conducted at depths to 120 feet and include the use of hydraulic chain saws, pneumatic wrenches, hydraulic and pneumatic drills, and stud guns.



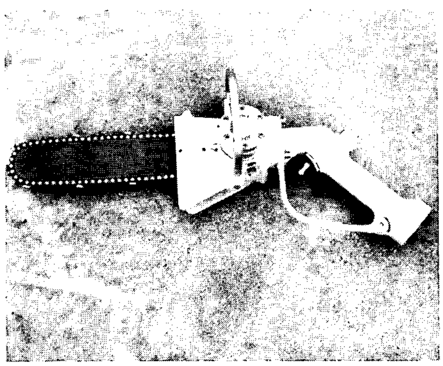
Divers at NCEL perform underwater tests on a variety of pneumatic and hydraulic tools. Some are new designs developed specifically for underwater use; others are off-the-shelf items modified for use under water. This impact wrench has proved to be a most versatile tool. The photos above show the tool being used as a wrench, a drill, and a grinder. The photo at bottom right shows the tool and the holding bucket used to carry the various attachments under water.

We all know that tools used on land do not function the same under water. Engineers must take into consideration the driving force of the tool, buoyancy factors, durability, length of operation, and fatigue of the diver using the tool. A scientist-engineer can only do so much in the laboratory – a team of very skilled divers is essential to the success of the underwater tool project.



A 6 HP hydraulic rotary abrasive cutter.

A 6 HP hydraulic impact wrench.



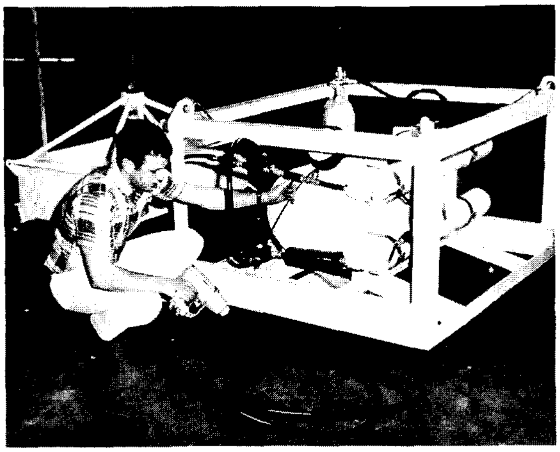
A 4 HP chain saw.

Several underwater tool power systems are currently being evaluated by NCEL.

A cryo-pneumatic power source for operating commercially available tools has been developed and tested successfully. This system utilizes liquid nitrogen as the primary source and is capable of operating a 20 cfm pneumatic tool for 15 minutes at a depth of 120 feet. Extensive shallow water operational tests of the cryo-pneumatic system indicate that this system is reliable and an easily handled power source for diver operations. In normal diver operations, when a 1/2-inch impact wrench (125 cfm) is used for drilling and tapping a 1/2-inch thick mild steel plate and for nut running, a work duration of 3 hours can be expected at a depth of 25 feet.

Submersible, cryogenic module for pneumatic tools; rated at 20 cfm, 90 psi.

Salt Water Hydraulic Power Source. NCEL is presently developing and evaluating two basic approaches to the problem of providing hydraulic power for tool operation. One system receives power from the surface; the other is totally submerged with a self-contained energy storage. These hydraulic systems currently use petroleum base hydraulic fluids. Power sources using salt water as a hydraulic fluid may eventually offer operational advantages in tool systems. A salt water hydraulic motor is being fabricated and will be tested under a related NCEL work unit, with delivery in FY 70. Incorporation of this motor into a diver tool system will constitute a major program objective.



Submersible, battery powered 3 HP power unit for hydraulic tools.

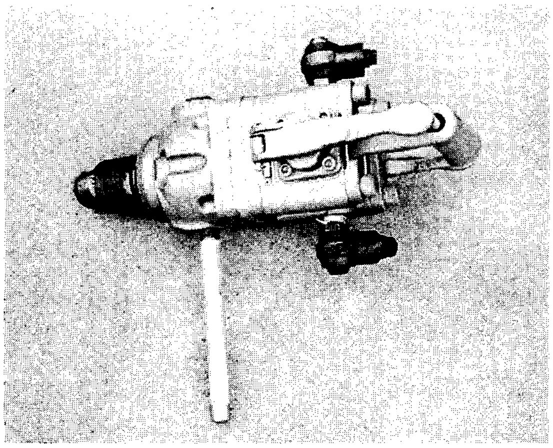
Batteries. A battery-powered hydraulic unit designed for underwater operation without surface support has been developed and evaluated. This system utilizes pressure compensated heat acid batteries and is capable of supplying 2 horsepower hydraulically for 4 hours at depths to 120 feet.

Diesel Powered Hydraulics. A diesel-driven hydraulic unit is also under evaluation. This power source supplies power from the surface to underwater tools through hydraulic hoses. It is capable of developing 8.5 hydraulic horsepower and operating tools to a depth of 250 feet. Another surface diesel-driven hydraulic power unit will use the diesel engine which presently powers Navy salvage pumps and generators. It will develop 12 hydraulic horsepower, and be suitable for tool operation to 150 feet.

Electro-Hydraulic Unit. At great ocean depths power losses in long hydraulic hoses become excessive, and it becomes necessary to transmit power electrically to underwater work sites. An electro-hydraulic power source is presently being designed and fabricated under contract with Marine Acoustical Services, Miami, Florida. This unit will carry power through an electrical umbilical to depths of 850 feet. At the underwater work site the electrical power will be converted to 7 hydraulic horsepower and supplied to tools through short hydraulic hoses.

The evaluation of commercially available hydraulic tools is being carried out with emphasis on human factors. Improvements in various work systems are implemented as changes in diver techniques, modification of the tool, or revision of the support equipment take place. Tools undergoing scrutiny include impact wrenches, chain saws, grinders, pumps, and abrasive cutters, all of which are diver-held and hand-operated.

New hydraulic tools are also being developed to support future Navy salvage and construction activities at depths too great for diver operations. These tools are designed to be self-operating and reaction-free.



A 4 HP hydraulic drill.

A 4 HP hydraulic impact wrench.

The development of tools for use under water is an expanding program at NCEL. Along with the development work, NCEL divers are providing the vital support necessary to evaluate the tools in an actual underwater environment. What will result from this work? Improved tools that will make working under water safer and more efficient for the Navy diver.

AWARDS

LCDR Milwee, having been presented with the Navy Commendation Medal by RADM Sonenshein, accepts the Admiral's congratulations as Mrs. Milwee observes the occasion.

Lieutenant Commander W. I. Milwee, Jr., USN, was presented the Navy Commendation Medal on 29 April 1970 by Rear Admiral N. Sonenshein, Commander, Naval Ships Systems Command. LCDR Milwee is Assistant Supervisor of Diving from the Office of the Director of Diving, Salvage and Ocean Engineering Projects. He was cited for meritorious service from 15 July to 20 August 1969. During this period, LCDR Milwee was serving as the On-Scene Commander of the salvage forces engaged in the recovery of the 15-ton, 23-foot Deep Research Vehicle ALVIN which had been lost in 5,051 feet of water off the coast of Cape Cod, Massachusetts. This was a unique operation since recovery of objects of this size from this depth had never been accomplished previously. The recovery represented a major step forward in the Navy's ability to conduct deep ocean engineering operations.

The citation accompanying the award read in part: " . . . LCDR Milwee participated in the planning effort and directed the salvage forces which successfully salvaged ALVIN from a depth of 5,000 feet. Throughout, his keen understanding of the deep recovery problem, his expertise in salvage technology and his sound engineering decisions were significant factors in the success of the operation . . ."

★ ★ ★

The Secretary of the Navy authorized all personnel attached to and serving with **Harbor Clearance Unit ONE** during the period from 15 March 1967 to 1 July 1969, or any part thereof, to wear the Navy Unit Commendation Ribbon.

The citation reads in part . . . "During this period, HCU-ONE executed over one hundred and sixteen hazardous diving and salvage operations, resulting in major contributions to United States efforts in the Republic of Vietnam. In the face of hostile fire, sapper attacks, and other major obstacles, including heavy seas, strong tidal current, and zero visibility environment during diving operations, Unit personnel expeditiously and efficiently accomplished salvage operations; . . . . By their courage, outstanding professional competence, ingenuity and personal efforts throughout this period, the officers and men of HCU-ONE upheld the highest traditions of the United States Naval Service."

This is the second Navy Unit Commendation Ribbon for HCU-ONE.

★ ★ ★

Lieutenant Herbert W. Tufts, III, USN, was awarded the Bronze Star Medal, with the Combat Distinguishing Device, for meritorious achievement while serving in the Republic of Vietnam with deployed units of Harbor Clearance Unit ONE. During the period 2 October – 28 December 1969, LT Tufts was the Officer in Charge of Salvage Operations for the dredges SANDPUMPER and NEW JERSEY and the USS IREDELL COUNTY (LST 839). Utilizing two heavy lift craft for the first time by US Navy personnel, the Lieutenant devised and executed the salvage plan that resulted in the transfer of SANDPUMPER from mid-channel in 35 feet of water to a grounding site clear of the channel in 19 feet of water. While still engaged in this operation, he was ordered to the dredge NEW JERSEY, sunk by an enemy sapper 1200 yard distant. He refloated this dredge within ten days and then returned to the SANDPUMPER. Once again, he was interrupted and ordered to the scene of the stranding of the USS IREDELL COUNTY (LST 839) at the mouth of Co Chien River; he refloated the IREDELL COUNTY within five days.

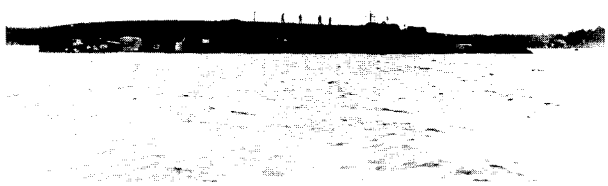
His citation reads in part ". . .Lieutenant Tufts' professionalism, initiative and devotion to duty, despite the constant threat of enemy activity, were in keeping with the highest traditions of the United States Naval Service."

The Salvage of *Reuben James*

DURING the early 1800's, a Boatswain's Mate named Reuben James, achieved distinction by saving the life of his superior, Commodore Stephen Decatur, during battle. Subsequently, two ships were named in honor of Reuben James. The first ship was commissioned as a destroyer, DD-245, in September 1920. While on convoy duty on 31 October 1941, it was sunk by a German U-boat. Only 45 men of a crew of 159 survived.

On 1 April 1943, a second REUBEN JAMES was commissioned as a destroyer escort, DE-153. It served during World War II as a convoy escort and as one of a four-ship submarine "Killer-Group." It was decommissioned in October 1947 and joined the Atlantic Inactive Fleet. On 30 June 1968, it was stricken from the US Naval Vessel Register, thereby becoming the ex-USS REUBEN JAMES (DE-153). Then, as a hulk of a ship, it was transferred to the custody of the Naval Weapons Laboratory (NWL), Dahlgren, Virginia, where it was later used for shock tests. On 14 March 1970, the REUBEN JAMES rolled over and came to rest on the bottom with her starboard side down, leaving one half or more of the hull out of the water. The list angle was estimated at 87^{o}, and the hulk was about 2,000 feet from the nearest land.

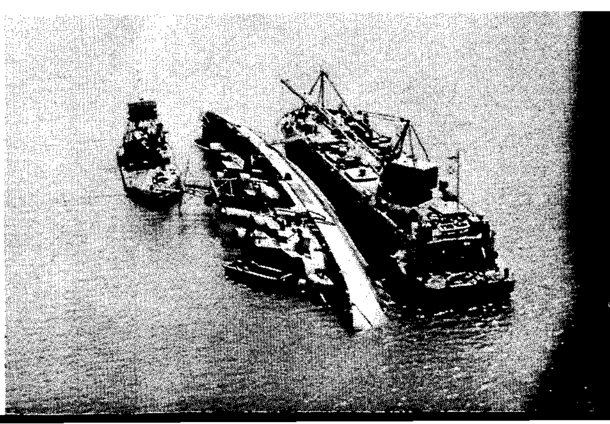
The REUBEN JAMES had been anchored in 10 feet of water, in a dehumidified condition with all interior hatches open and normal portable ducting throughout the ship. Experimental explosive tests had been conducted on 10 March during which time one 5-inch and one 8-inch projectile had been detonated off the starboard side of the hull, 10 feet above the waterline.

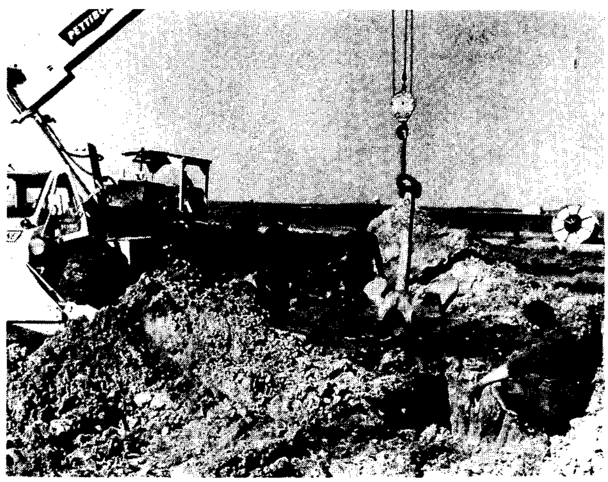


The COMSERVRON EIGHT Salvage Material Officer, the Assistant Salvage Officer, and the Commanding Officer of Harbor Clearance Unit TWO (HCU-2) inspected the capsized hulk and determined that it was feasible to raise and refloat the ship. The CO of HCU-2, LT Jere W. Woodall, was assigned responsibility for the planning and execution of the operation. COMSERVRON EIGHT Salvage Officer, LCDR Karl Keays, provided back-up calculations and stability test criteria with Naval Facilities concurrence.

During the period 21 March through 7 April, preparations for lift were accomplished, beginning with the arrival of YSD-53, LCM's, YRST-2, YC 302, and YC 1060 under tow by ATF's from Norfolk, Va.

YRST-2 to the right and YSD-53 to the left are shown moored in place to prepare the escort for the big pull.

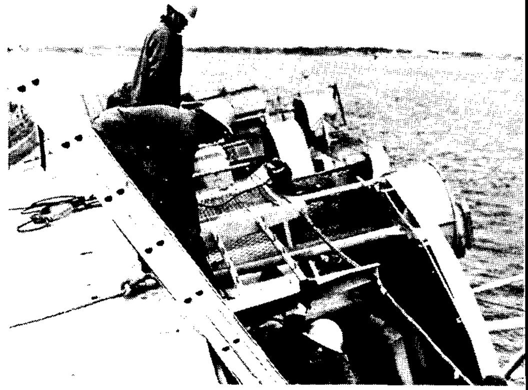


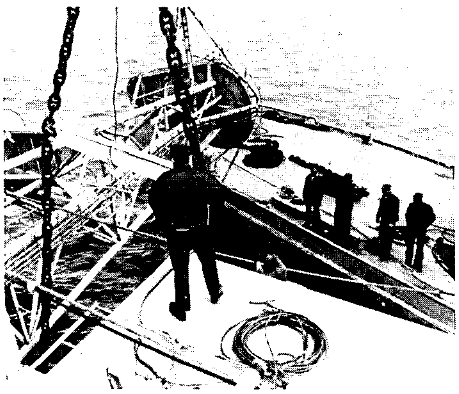


The deadmen backing YC 302 were put into burial sites located 120 feet inland. Note the chain and trench leading toward the water. Two mushroom anchors can be seen left of the big reel on the roadway.

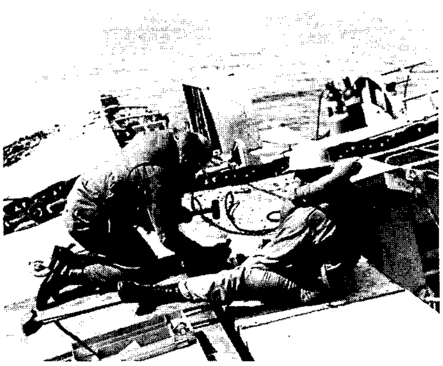
Similarly, holes were dug for the deadmen backing YC 1060. Deadmen for each YC consisted of a stockless anchor backed by two mushroom anchors. The deadmen for each YC were rigged 140 feet apart using 2¼-inch chain from the anchors to the shoreline and a 2-inch wire from the shoreline to each YC.

Chafing gear and 2¼-inch chain bridles, one each around the base of MT 51 and the pilothouse, were rigged for control by YC 302. The one around MT 51 was rigged with a standoff for better leverage. The other around the pilothouse was rigged for parbuckling forward.





Similarly rigged 2¼-inch bridles were placed around the base of MT 52 and the starboard 40mm twin mount aft for control by YC 1060. The one around MT 52 was rigged like MT 51. The other was rigged for parbuckling aft.



Other preparations included cutting final length of wires; installing inclinometers; rigging 3-inch or 6-inch diesel salvage pumps on swinging brackets for constant suction; cutting four 6-inch holes in port side above waterline to reduce free surface effect; rigging P-250's for additional pumping; and, rigging restraining bridles to the stub of the foremast and the base ring of the port 40mm.

The final preparations involved moving the two YC's into their pulling harnesses, the YSD-53 into its restraining harness and YRST-2 in line, stern-to-stern of the hulk.

* * * *

The period 8 April through 15 April saw the hulk raised to a 3^{o} starboard list, developing a maximum pull of 40 tons each leg during the lift. No major problems were experienced along the way.

Due to the shallow depths in this type of operation, only 14½ hours of bottom time were needed by divers to rig various bridles and to conduct routine bottom/hull surveys.

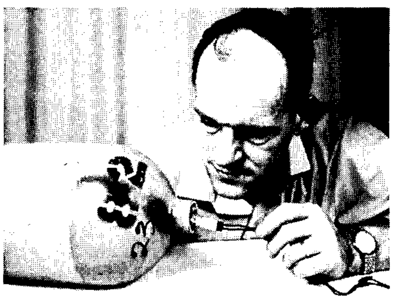
Stability tests were conducted from late on the 15th through the morning of the 16th, followed by deballasting to refloat the hulk. By 0934 on the 17th, the hulk was afloat and underway to Dahlgren pier.

The operation was completed almost two weeks earlier than originally anticipated. This could be attributed to the good weather, minimum structural damage to the hull, and the excellent planning and coordination by LT Woodall and his supporting salvage team members. By 2000 on 20 April, the clean-up had been completed and all craft had returned to home ports.

Visual Inspection of Aluminum Cylinders Encouraged

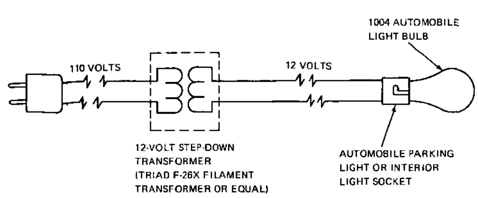
The 90-cubic-foot aluminum scuba cylinders, used extensively throughout the Navy diving community (usually assembled in pairs and referred to as "twin 90's"), were recently found to be prone to a pitting-type corrosion on their interior surface.

During an investigation of the causes of corrosion and possible problems resulting from this condition, it was found necessary to visually inspect the interior of approximately seventy cylinders which had been received from a number of Navy diving ships and shore facilities. The inspection technique found most effective utilized a small lightbulb which was inserted into the cylinder through the threaded valve hole following valve removal. This light provided adequate illumination of the cylinder interior permitting an overall visual survey of the interior wall surfaces.



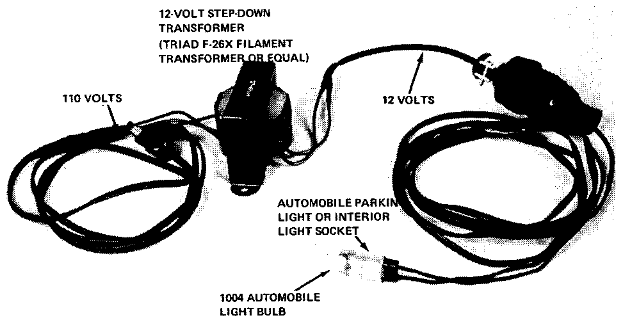
Insertion of lightbulb into cylinder.

The Office of the Supervisor of Diving conducted a recent inspection survey of 1,623 aluminum scuba cylinders and found that approximately 80 percent of the cylinders were corroded internally to at least a minor degree. Approximately 4 percent of the cylinders surveyed were considered "severely corroded". The type of corrosion occurring in these aluminum cylinders results in a number of individual pits scattered throughout the interior cylinder surfaces and produces a large quantity of light-gray gelatinous residue.



Schematic diagram of test light.

The test light is an accepted method for periodic visual inspection of the cylinders. Diving activities are encouraged to fabricate this simple device for making routine inspection procedures. If your inspection reveals that residue is present, it should be removed by filling the cylinder with a 5 percent solution of phosphoric acid and water, letting it stand for 30 minutes. This should be followed by a thorough rinsing and drying. The inspection light should then be reinserted into the cylinder permitting a survey of the number and depth of the pits present.

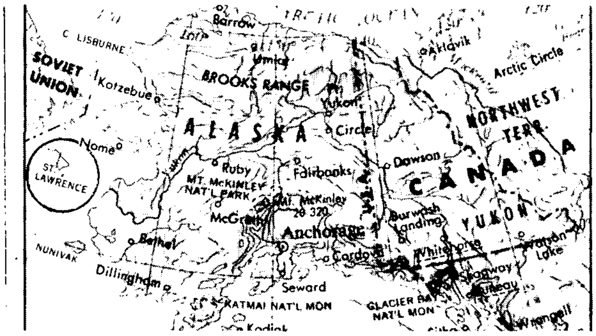


Material components of test light.

Large pits, 1/4-inch in diameter or larger, or a number of pits clustered together in one spot, may suggest that a 5,000 psi hydrostatic pressure test should be conducted to reinstate confidence in the immediate safety of the cylinder. Any widespread thinning of the wall is, of course, also cause for concern, indicating that a 5,000 psi hydrostatic pressure test should be conducted. It is suggested that those cylinders which have internal corrosion and are used frequently be inspected at 3-month intervals to permit detection of any problems which may be occurring.

The scuba cylinder study is continuing in an effort to eliminate the causes of and problems associated with cylinder corrosion. FACEPLATE will keep you informed on the progress of this study. – Ed.

ARCTIC DIVE



FACEPLATE recently read a group of notes written by LCDR James L. A. Majendie, Royal Navy, taken while on a diving expedition in the Arctic. LCDR Majendie, an exchange officer assigned to the Office of the Supervisor of Diving, was evaluating the effectiveness of the Mk 10 Mod 0 diving rig when used in very cold water and handled in a very cold environment. We feel that portions of his notes and some of the photographs taken comprise an interesting and informative account of a very non-routine diving job.

LCDR James L. A. Majendie

Early in 1970, it was decided that, to further evaluate the Mark 10 Mod 0 diving rig, dives in very cold water would have to be made. What we wanted to do was push the equipment to its limit and see first-hand just how it operated under these conditions. The Navy, therefore, joined forces with Dr. Carlton Roy of Johns Hopkins University, who was leading an expedition to Gambell, a small Eskimo fishing village on St. Lawrence Island, Alaska. The objective of this party, which included CBS television photographers and Alaska Department of Fish and Game representative, T. Burnes, was to study the behavior of pinnipeds (seals, walrus) both on and under the ice. The Mark 10, a fully closed-circuit mixed-gas breathing apparatus, is ideal for the study of underwater life, being silent and bubble free.

Our expedition arrived by chartered airplane on Friday the 1st of May. The airstrip was impossibly narrow and ridiculously short and was completely covered with snow. The pilot, however, seemed to think that conditions were quite good: he could see Gambell mountain a quarter of a mile away!

We spent Saturday settling in and finding our way around the village of about two hundred Eskimos, making our way through six to eight feet of snow. The spring thaw had not yet begun. Our "diving locker" was a completely snow-covered shack and, upon gaining entry, we found about six feet of snow inside as well. This we cleaned out, and the diving equipment was set up for the initial dives, which were to take place on Sunday. Later during the expedition, the ultimate in comfort was achieved by a consolidated effort of our Navy party and the General Electric representative Chuck Cantrell (an ex-Navy Master Diver, by the way). We managed to acquire a heater and raise the inside temperature of the "diving locker" to 4 degrees above freezing!

The initial dives on Sunday were successfully completed from the beach at Gambell. These dives checked the arctic wet suits in 29°F water and gave a final checkout to the civilian members of our expedition in the use of the Mark 10. We were now ready to start our work.

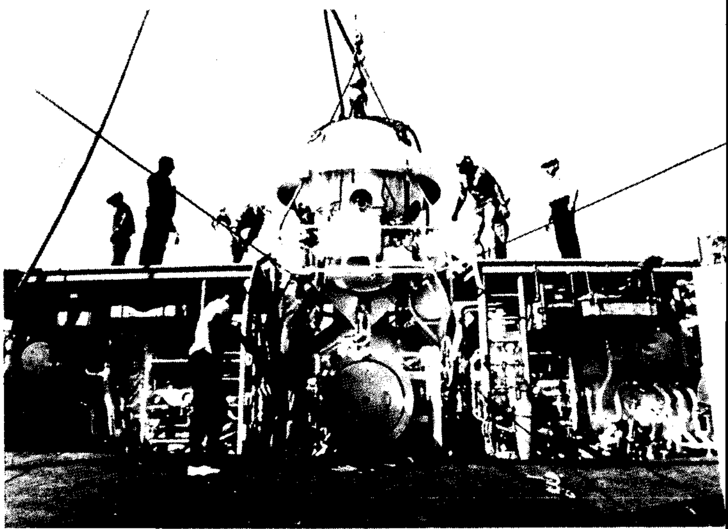
The best ice was to be found six miles across the island at Dovelawik Bay, and that became the diving location for the major portion of our evaluations. First, a hole was cut through three to four feet of ice — — the Eskimos were very good at this using ice chisels on the end of long poles. Now we could start diving.

The Mark 10 was successfully dived 39 times in the 29°F water with a total diving time of 1,150 minutes in, around, or under the ice. No dive was aborted because of equipment malfunction. We found very shortly that the limit of every dive was the diver himself. We got cold, *very* cold. Maximum time spent in the water was 54 minutes. However, this does not indicate the conditions to which we really subjected the equipment. The two Mark 10's were dived, then left on the ice and in the wind while we went to warm up in a nearby hunting lodge. The equipment was then dived again. After the diving was completed for the day the rigs were transported back across the six miles of very rough terrain using either dog sled or snow machine. Once back to the diving locker, the rigs were stripped down for the next day's dive.

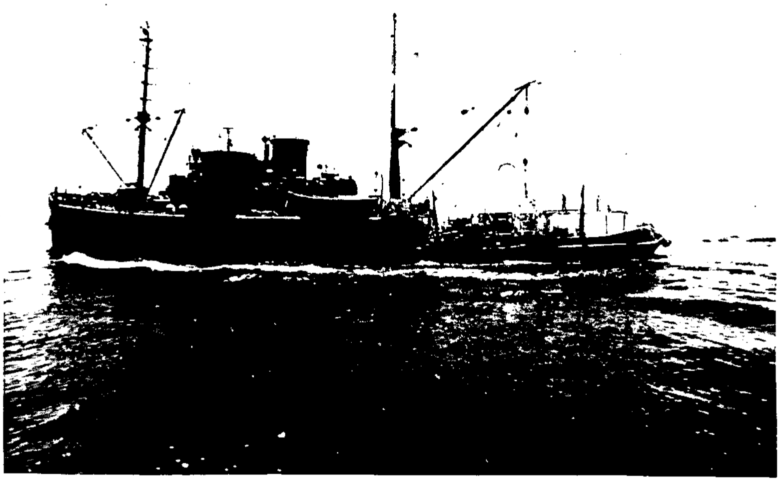
PH2 Billy Douthit of the Experimental Diving Unit and I returned to the "heat" of Washington D.C. on Saturday, the 23rd of May. The evaluation was a success, the equipment easily outlasting the divers. However, we were again dramatically shown that providing heat to a diver is a vital problem still to be solved.

Mark I Deep Dive Team Continues Successful Operation

The Navy's Mk I Deep Dive System (DDS) is a sophisticated combination of units, all functioning together to enable men to perform useful work safely in any of the world's oceans to depths of 850 feet. Who operates this multi-million dollar system? The men "behind this scene" are members of the Mk I Deep Dive Team. The Officer in Charge is Lieutenant Larry T. Bussey, USN; and, Assistant Officer in Charge is Warrant Officer R. D. McEntire, USN. The Master Diver of the team is Chief Electricians Mate J. J. Bates. The other team members are: T. K. Goacher (BMC), J. E. Mullen (BMC), R. K. Merriman (EMCS), L. L. Pulliam (SFC), F. J. Smelko (SFC), J. E. Langdon (DCC), C. I. McCoy (HMC), J. T. Brady (DC1), C. D. Wetzel (MM1) and E. A. Landstra (EN1). This team represents about 120 years of varied diving experience. All enlisted members have completed Saturation Diver (NEC 5311) qualifications. Because stability is so vital to team organization, the length of the tour for this type of duty has been established as three years.



The Officer in Charge directs mating of the Personnel Transfer Capsule to the Entrance Lock. The two divers inside the PTC will then be able to climb down a ladder into the Deck Chamber to complete decompression.



The USNS GEAR is the staging vessel presently being used for the Mk I DDS. The GEAR is under the supervision of the Supervisor of Salvage.

The team took over operations of the Mk I DDS about the second week of July 1969, after all acceptance trials had been completed. The staging area for all training operations with the system was established at Port Hueneme, located 60 miles north of Los Angeles, California. The USNS GEAR, an ex-Navy ARS under the supervision of the Navy's Supervisor of Salvage, was designated to act as the staging vessel for at-sea operations.

The key phase of the team training was first to establish a firm feel of the handling system alongside the pier and to establish the lines of communication so vital during a dive. Five, two-man teams were assigned for all training. Diving operations commenced late July 1969 at the 100-foot level with each team completing two dives. In August, diving operations resumed at the 180-foot level where the temperature was 53° F. For heating the diver, a modified Apollo "cool suit" with appropriate undergarments was worn under a modified English Dunlop Dry Suit, using a hot water supply from the surface. The Navy Mk IX semi-closed, mixed-gas breathing apparatus was the primary rig used to swim from the 100-foot umbilical, tended by the other team member inside the Personnel Transfer Capsule (PTC). The Kirby-Morgan Band Mask was used by the standby diver.

The team proficiency had advanced so well that by the time they reached the 300-foot level, it became a routine matter to complete two 300-foot dives each day without incident. A typical day for the team was as follows:

0800 – Set up equipment and complete check-off lists.

0930 – First set of divers enter PTC, lift off the deck and into the water. Complete 20-foot check-off, lower to bottom, pressure down and commence work.

1100 – PTC mated to Deck Decompression Chamber (DDC), divers transferred to DDC for decompression, which started during ascent of PTC. Logged one hour of bottom time. PTC set back on deck and checked out for second dive.

1300 – Second set of divers enter the PTC, lift off the deck and into the water. Same sequence as first dive.

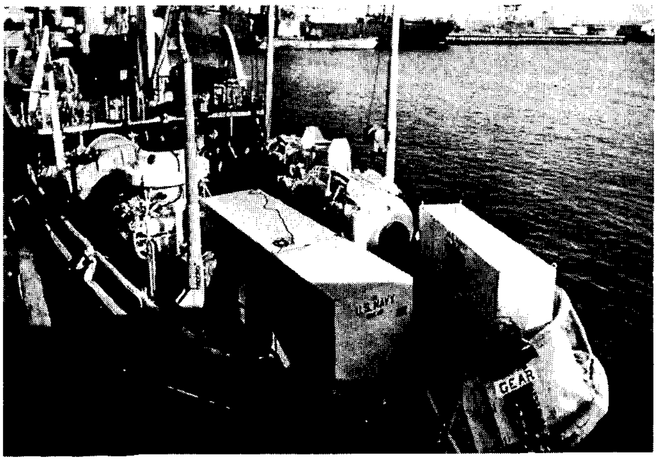
1430 – PTC mated to DDC, divers transferred to DDC for decompression. PTC set back on deck for post-dive check.

The next series of dives were staged off Santa Barbara at the 450-foot level. Upon completion of the final 450-foot dive, the sets of two-man teams were decompressed to 300 feet and then saturated at depth for 23 hours. All systems worked smoothly and decompression was effected without incident. On 20 October, team training was completed and the Mk I DDS became operational.

Since the System became operational, several projects have presented themselves. The team has continued to maintain its efficiency through numerous dives to the 300-foot level. In March 1970, the team provided the diving platform (PTC and DDC's) for evaluations of the Mk II semi-closed mixed-gas breathing apparatus. Its evaluation was the deepest, continuous, open sea diving operation ever conducted by the Navy. Four divers, one of whom was a member of the Mk I Deep Dive Team, spent over 400 hours under saturated conditions diving at varying depths of 200, 300 and 650 feet. Each dive conducted was over two hours duration. Dives of similar depth and duration, as well as other deeper dives with the System and the Team are planned.

Upon completion of West Coast operations, the System, with the men who really "make it go," will move to the Gulf Coast for installation on the YFNB-43, a 268-foot barge being specially converted. In early 1971, after shakedown and extensive diving operations in the Gulf Coast area, the Mk I Deep Dive System and its Team will come under the operational control of HCU-TWO in Norfolk, Virginia.

The Master Diver and log keeper maintain their watch in the Main Control Console, closely monitoring all movements of the divers via the Closed-Circuit Television System.



Mk I Deep Dive System installed on deck of USNS GEAR.

letters

Gentlemen:

I have completed reading the summer 1970 edition of *FACEPLATE* and find it a vast improvement over previous editions. The articles cover a large range of subjects and will appeal to anyone connected with the diving community.

My assignment is head of the Diving/Salvage Division at the Naval Safety Center, Norfolk. Being primarily interested in divers' safety, I was pleased to observe the "Old Masters" quote concerning approved equipment on page 15. However, one discordant note discovered on page 21 was the SCUBA diver with a single bottle rig. It may be possible that SRF Guam has authorization from NAVSHIPSYSCOM to use a single bottle rig.

In any event, *FACEPLATE* is now a magazine with real substance that will be read by all divers. Keep up the good work!

Sincerely,
H.H. SCRANTON
CDR, USN

Sharp eyes, Commander, you're absolutely right. The single bottle rig is not authorized for SRF or anyone else. – Ed.

Gentlemen:

I couldn't believe my eyes when I read *FACEPLATE* Volume 1 No. 2. You have made many great improvements.

I graduated from DSDS Aug. 1955 and have been active in diving since then. I am due to retire 17 Nov. 1970 at SEAL TEAM TWO, Little Creek, Va. after 22 years in the Navy.

The reason I am writing is that I lost my DSDS graduation Certificate in a move and want to know how to get a duplicate.

Keep up the good work and thanks a million.

HMC Erasmo Riojas
COMNAVFORV
N. S. W. G. Box 25
c/o FPO S. F. 96626

We have contacted DSDS and have been informed that a new Certificate is on its way.

Gentlemen:

The diving and salvage training program at *Service Squadron FIVE* in Pearl, under command of Captain Daniel C. Clements, USN, has recently had a face lifting. It all started with the raising of ex-*USS KODIAK (LSM 161)* from the bottom of Middle Loch in Pearl Harbor by a combined effort of *SERVRON FIVE* ships. Submarine salvage pontoons were utilized and much beneficial training was realized.

A training committee of *SERVRON FIVE* tugs and salvage ship Commanding Officers was formed (LCDR J.R. Nelson, USN, served as Chairman). From action by this committee the LSM has been patched and cleaned up and it has been planned for use in salvage refresher training. The conning tower has been removed and is presently being made over into a diving training tank for the training of *SERVRON FIVE* divers in underwater cutting and welding. Demolition and hand held sonar training for divers has also been arranged through EODGRUPAC Pearl.

LCDR J.R. Nelson, USN
Commanding Officer
USS CONSERVER (ARS 39)

Gentlemen:

We wish to express our congratulations to you for the initial issue of *FACEPLATE*—a job well done and a good reflection of the accomplishment in Navy diving technology. Also thanks for honoring us with copies; it is a valuable publication to us as well as the industry.

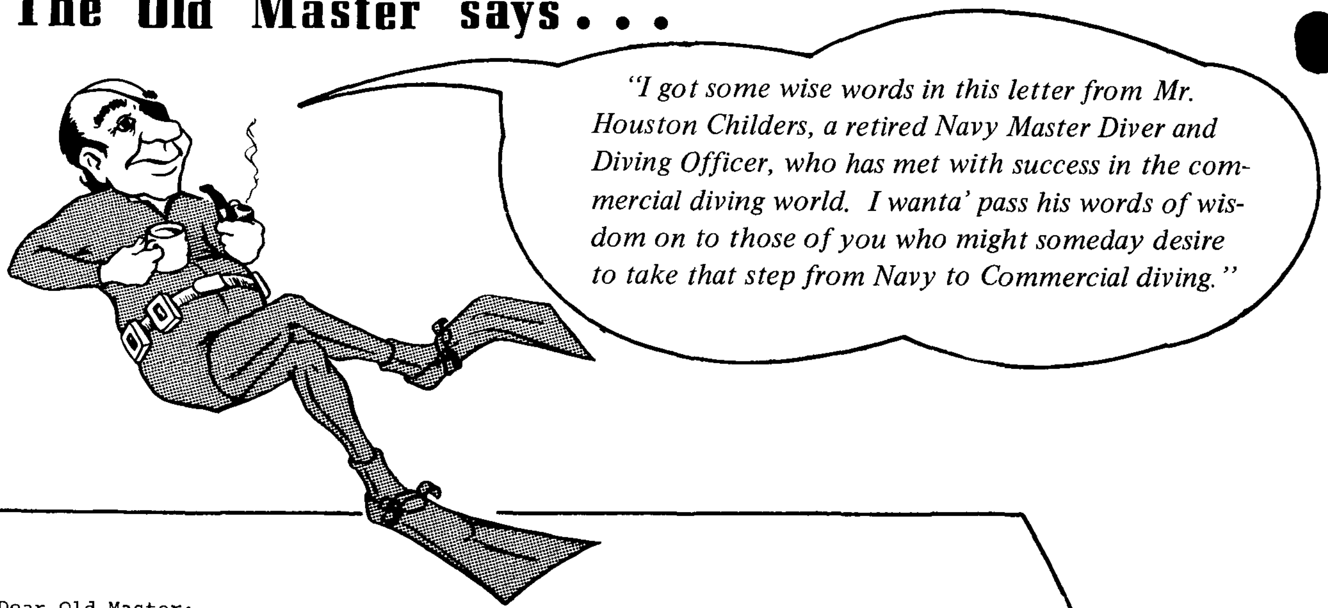
Since Westinghouse feels that we are and will be a valuable industrial asset to the support of Navy diving, it would be of mutual advantage to point out the need for a correction of a statement, Page 5, of the Spring 1970 issue. In reference to the Duke University hyperbaric unit chilled water in its "wet-pot", the article deemed it, "the only pressure complex in the country with that capability". The Westinghouse Life Support hyperbaric test facility at the Ocean Research and Engineering Center, Annapolis, Md. has a chilled "wet-pot" capability as was demonstrated during extensive factory acceptance tests on the Mark 11 Breathing Apparatus. Many hours of equipment endurance swims were conducted in water temperatures of 36°F.

We wish a long life to *FACEPLATE* and offer any assistance you need to increase its visability.

Yours very truly,
D.W. Perkins
Marketing Department
Westinghouse Electric Corp.

Thanks for your letter. We appreciate your comments and clarification. Our article on the Duke University dives should have indicated that at the time of the dives *the hyperbaric unit at Duke was the only pressure complex in the country with the chilled-water capability. Since that time, several units around the country with the capability have been put into operation, including the one at Westinghouse.*

The Old Master says . . .



Dear Old Master:

Since being on this side of the fence I have had the opportunity to observe the commercial diver, and now I feel I am qualified to comment that no diver is as well trained as the Navy diver. The average Navy diver has considerably more knowledge about diving than the average commercial diver due to formal detailed training.

So where would the argument lie when a Navy diver tries to make the transition to commercial diving? To answer that question, let's go back a ways in the Navy diver's career.

Six months after attending a diving school, with confidence in himself as a diver and orders in hand, he reported to his first billet as an assigned diver ready to treat any kind of diver's disease, dive to any depth and accomplish all kinds of impossible feats. Over-anxious as he was to dive, relief would come the first two months by going back to the diving locker a couple times a week to listen to, or tell sea stories.

The third to fifth month he was able to make requalification dives. He has not yet realized that 98% of diving is done in preparation topside. If he is not one of the fortunate few that receive assignments to full time in the diving locker, he most likely has not bothered to check out the diver's air system from compressor to diver's manifold, learned how he, in an emergency, could by-pass the air supply, nor what pressure the safety valves would pop-off, nor how long his stand-by air supply would last the divers on the bottom including a chamber treatment should the ship lose total power. If he is assigned to the class of vessel that carries portable air compressors, can he still tell how deep and how many divers a 105 CFM air compressor will support?

As he is not assigned to the diving locker and, through no fault of his own, all diving equipment is set up and ready to dive by the time he has finished his special sea detail assignment of getting the ship in a moor. He gets back to the diving station, checks the assignment list, glad that someone else set up the equipment, and all he has to do for the next hour is tend someone before his dive. His day dreams during this hour may tend towards comparison between his pay and knowledge and that of a commercial diver and capping the dream with a decision to leave the Navy and enter into the "Golden Dollars Field" where money is showered upon him.

This diver has many rude awakenings when he does leave the Navy. Unless he has had a tour similar to the Harbor Clearance Units, or assigned to a diving locker full time, he has forgotten how to select a compressor for a required depth, assemble the required diving equipment and tools to accomplish a particular job and how to manage the continued operation of the equipment. On the other hand, the divers that have been assigned to duties where they set up and maintain equipment continuously are totally trained working divers. These men usually are the ones you see wearing the most prestigious emblem in the Navy, the Master Diver emblem, respected by both the Navy and commercial diver.

So in the final analysis you may comment, "Then become a Master Diver before entering the commercial field". Darn good thinking, but the employer is also gambling on the Master Diver making the transition. For instance, the Navy diver and the commercial diver each speak a language that is foreign to the other. To clarify this, the Navy diver takes a handybilly to fight a fire; an elbow to turn the direction of your salvage pump discharge head; a riser is the fire plug located about the decks that the fire hose is attached to; and, a jacket is something you wear. But, if you said to a commercial diver, "handbilly," he would show you a jigger to lift or move weight; an elbow is an area of his arm; a riser is a pipe from sea bottom to the surface; a jacket is a leg of a drill platform.

Think about it! What type diver will you be? The type that holds the respect of both Navy and Industry, the Master Diver, or just a "bubble maker"?

You may think, "Well, my buddy, Bill Bulkhead, is out there doing pretty good for himself." But take the time to pause and think realistically - evaluate his qualifications to yours. Don't end up "just making bubbles."

Respectfully yours,

Houston Childers