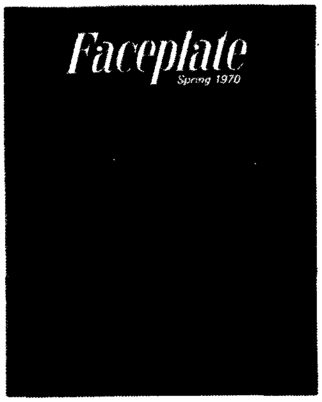
FACEPLATE

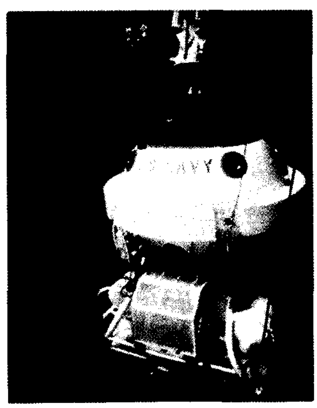
SPRING
1979

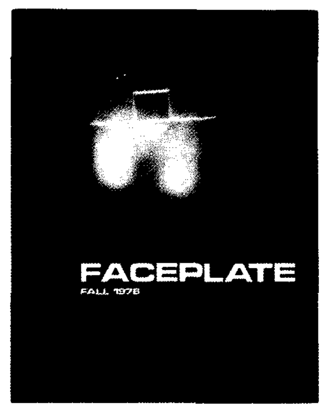
10TH ANNIVERSARY ISSUE

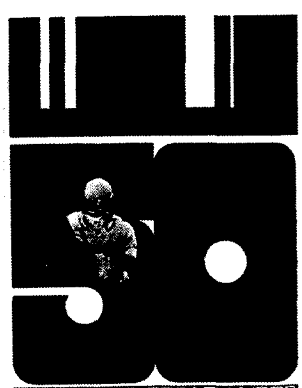


A DECADE OF NAVY DIVING

Significant events in Navy diving and salvage over the past ten years are reflected in this selection of covers from each year since 1970. From top left: the first issue (Spring '70); a salvage operation by HCU-2 (Summer '71); Special Warfare issue (Summer '72); the Navy-Duke 1,000-foot dive (Summer '73); Suez Canal clearance (Winter '74); Mk 1 Deep Dive System record dive (Summer '75); Navy's remote-controlled Deep Drone (Fall '76); a Mk V HeO_2 dive at HCU-1 (Summer '77); NSDS 50th Anniversary (Fall '78); and this issue's commemoration of *Faceplate's* tenth year.







FACEPLATE

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

VOLUME 10, NO.1

Page 12

Page 16

Page 20

Page 28

EDITOR-IN-CHIEF
CDR F. Duane Duff

ASSISTANT EDITORS-IN-CHIEF
CDR Frank M. Richards
LT Frank DiGeorge

MANAGING EDITOR
Stephen Person

DESIGN
Lisa Degenhardt

PRODUCTION
Sally Huff

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 Sea Systems Command, Washington, D.C. 20362. Telephone (Area Code 202) OX7-7606 or AUTOVON 227-7386.

COVER depicts several of the Navy's underwater breathing systems in commemoration of *Faceplate's* tenth year of publication by the Supervisor of Diving. Clockwise, from center: the traditional Mk V hard hat rig, the new Mk 12 SSDS, the Mk 1 Mask, the Mk 15 UBA, and the Mk 1 Mask with the Mk 2 DDS Personnel Transfer Capsule. Drawings by Bill Seals.

BACK COVER shows an NEDU diver on the pedal ergometer in training for the 1,000-foot TDCS dive (see page 12).

INTERNATIONAL DIVING SYMPOSIUM '79

Reflecting the worldwide growth in commercial diving activity, International Diving Symposium '79 convened in New Orleans, Louisiana, on February 5 with a record attendance of more than 2,000 persons and 150 exhibitors. The conference, sponsored by the Association of Diving Contractors, is the most extensive of its kind and offers divers and others involved in the offshore industry the opportunity to learn the latest developments and trends in undersea technology.

More than 20 technical papers were delivered at the conference. U.S. Navy-related presentations included "Tethered Diver Communication System" by Arlo Trieglaff of Hydro Products, Inc., "Underwater Nondestructive Testing Equipment and Techniques" by John Mittleman and Fred Barrett of NCSC, and "Navy Biomedical Assessment of 1-ATA Systems" by Arthur J. Bachrach of NMRI. Copies of the conference proceedings are available at $10 each from the Association of Diving Contractors, 1799 Stumpf Blvd., Gretna, Louisiana 70053.

Navy Experimental Diving Unit exhibited early diving equipment, records, and photographs at International Diving Symposium '79 in New Orleans, February 5-7.

At the opening session of the three-day conference, ADC president R.J. McGuire presented the second annual John Galletti Memorial Award to Commander S. A. "Jackie" Warner, Chief Inspector of Diving, Department of Energy, United Kingdom. The annual award is given to an ADC member who has made a significant contribution to the association. McGuire cited Commander Warner's outstanding 34-year career with the Royal Navy and his current efforts in promoting the health, safety and welfare of North Sea divers. Captain George F. Bond, USN (Ret), received the first Galletti award at last year's conference.

SUPDIVE STAFF RECOGNITION

During the month of January Captain R. B. Moss, Director of Ocean Engineering, presented awards to staff members at NAVSEA OOC. Lorenzo J. Milner received a Special Achievement Award for his efforts in managing the Mk 15 UBA development and acquisition program. Harry R. Rueter was presented a Special Achievement Award for his continuing excellent performance in support of the Navy's deep diving system programs. Congratulations are extended to these individuals for their efforts in support of Navy diving.

LCDR WHALL RELIEVES LCDR TAGESON

Lieutenant Commander David Whall has relieved Lieutenant Commander William Tageson as Supervisor of Salvage Representative West Coast at Treasure Island, California. LCDR Tageson will report to CNTECHTRA as Training Program Coordinator for Diving, Salvage, EOD and Special Operations Officer communities in Millington, Tennessee.

PRESERVER KEEPS ON HAULING

In the course of an overseas deployment, a naval vessel—especially a salvage ship—is called on to undertake any number of tasks, some scheduled and many unscheduled. A recent five-month deployment of USS Preserver (ARS 8) to the Mediterranean Sea was no holiday for the crew of the Navy's oldest active duty salvage ship. Preserver's divers made more than 170 working dives ranging in depth from four to 140 feet and provided diving demonstrations to more than 4,200 visitors. As for the unexpected, one short week during the deployment went like this: Early one morning just three weeks after arriving, Preserver found herself under way from Naples to mid-Mediterranean to perform an emergency tow of the submarine USS Tullibee (SSN 597). After an exhausting hook-up that lasted into the night, divers checked the submarine's shaft, then proceeded with the tow to Rota, Spain. As Preserver returned to Naples, an A-7E aircraft went down at Pachino Bay Target Range in Sicily. Preserver was directed to recover the aircraft's instrumentation and crypto gear. Afterwards, it was decided to replace the range's bombing target, which had seen better days after years of weathering, marine fouling, and direct hits. The new target's bulk and weight, however, exceeded the capacity of Preserver's cargo booms. Like any good salvage crew, Preserver's salvors improvised, rigging a beach gear purchase and lifting the buoy over the bow. Within 24 hours, the new target was in place, just in time for the start of National Week exercises.

WORKING DIVER 1980

Planning is well under way for The Working Diver symposium scheduled for March 1980 at Battelle Columbus Laboratories. Dates of March 11-12 have been selected, and it is planned to schedule a third day (March 13) for a Diving Officer/ Master Diver conference. Betty Alkire, the program coordinator at Battelle, is contacting potential speakers, and those individuals or commands contacted are urged to submit papers as early as possible to facilitate planning efforts. Make your plans for attendance early.

HEADS UP ON SOME ADMINISTRATIVE INFORMATION

- Change 2 to Volume 1 of the U.S. Navy Diving Manual has been issued. There are a few minor errors that are being processed for correction by errata sheet change; principal among these errors is that the printer failed to send page 8-4A/4B.
- An AIG 239 message has been sent to indicate which messages are still effective and which are now cancelled. (See CNO MSG 181956Z APR 79, AIG-239/79-9.)
- Change 2 to NAVSEA Instruction 9597:1 is being promulgated to update our approved equipment list. You will note that some equipment listed therein can no longer be purchased but is retained on the list to indicate authorization to those activities that already hold them.

Make sure that your copies of manuals, messages and instructions contain the most recent changes.

LCDR BRADY BECOMES USS FLORIKAN'S C.O.

Lieutenant Commander Timothy S. Brady relieved Commander Jack E. Hamilton as commanding officer, USS Florikan (ASR 9) in ceremonies held aboard Florikan at the Naval Station, San Diego, on February 16, 1979. LCDR Brady attended the University of Minnesota, earning a bachelor's degree in chemical engineering, and was commissioned through the Regular NROTC program. Prior to reporting to Florikan, he attended the Naval School, Diving and Salvage where he qualified as a helium/oxygen diving officer. CDR Hamilton graduated from the U.S. Naval Academy in 1962. Following graduation he attended Submarine School at New London, Connecticut. CDR Hamilton is now assigned to Staff, Commander Submarine Force, U.S. Pacific Fleet, for duties involving the Trident strategic weapons system.

NEDU Reports

Navy Experimental Diving Unit Report 15-78. *Development of Unlimited Duration Excursion Tables and Procedures for Helium-Oxygen Saturation Diving.* W.H. Spaur et al.

Abstract. Excursion ascents were performed during a series of experimental helium-oxygen saturation dives ranging between 150 and 1,000 fsw to study the limits of multiple and extended duration excursions both deeper and shallower than the saturation depth. The distance a diver can safely ascend without decompression following saturation was found to be a function of depth, increasing from 75 ft at a saturation depth of 225 fsw to 180 ft at 1,000 fsw. Initiation of saturation decompression immediately after an excursion was found to be safe. This information is incorporated into new U.S. Navy Unlimited Duration Excursion Tables and Procedures for Saturation Diving.

Navy Experimental Diving Unit Report 21-78. *Test and Evaluation of Mako High-Pressure Breathing Air Compressor KA-51-DF.* D. E. Dodds.

Abstract. A diesel-engine-driven, high-pressure breathing air compressor, Mako model KA-51-DF, was evaluated by the Navy Experimental Diving Unit to determine its suitability for Navy use. Results of the 100-hour endurance test showed that the portable compressor delivers breathing air at an average charge rate of 4.8 cfm, charging twin 71.2-cu.-ft. and twin 90-cu.-ft. scuba tanks in 25 and 31 minutes respectively. The unit is easily maintained, sturdily constructed, and economical in diesel fuel consumption. Modified to NEDU recommendations, the Mako high-pressure breathing air compressor is recommended for placement on the list of equipment approved for navy use.

These research reports have been issued by the Navy Experimental Diving Unit, Panama City, FL. Non-DOD facilities desiring copies of reports should address their request to National Technical Information Service, 5285 Port Royal Road, Springfield, VA 22151. DOD facilities can obtain copies from the Defense Documentation Center (DDC), Attn: DDC-TSR-i, Cameron Station, Alexandria, VA 22314.

Faceplate's First Decade

In 10 years, Faceplate *has grown from a mimeographed newsletter to an international magazine reaching divers throughout the U.S. and 38 foreign countries.*

With this issue, *Faceplate*, the official magazine for U.S. Navy divers, begins its tenth year under the sponsorship of the Supervisor of Diving. Some readers may remember *Faceplate* in the 1950s and 1960s when it was a brief, mimeographed newsletter published unofficially by the Deep Sea Divers School and the Navy Experimental Diving Unit at the Washington Navy Yard.

In those days, the newsletter was published intermittently and was distributed to just a few hundred subscribers. An item in the April 1962 issue read: "Distribution is made to all ships and stations having allowances for divers and, due to the limited run possible with the 'ditto' process, is usually one copy to all but the ASR's, ARS's and larger stations which get two apiece."

Today, *Faceplate* is an internationally distributed magazine. But, despite our growth, changes in appearance, and technical advances in production and distribution, the purpose of the magazine remains unchanged — to bring the latest and most informative news available to the Navy diving community.

When *Faceplate* made the transition from a newsletter to a magazine ten years ago, former U.S. Navy Director of Ocean Engineering, Captain E.B. Mitchell, wrote: "We welcome your letters and encourage the submission of material for articles you feel might be of interest to Navy divers. Your ideas, experiences, and comments will be a vital part of this publication. Let us hear from you soon!"

We reaffirm those sentiments as *Faceplate* magazine enters its second decade, and urge you to support your publication so that in the decades ahead it will remain the Navy's primary vehicle for the exchange of information between all who work beneath the surface of the sea.

S.P.

Navy Diving and Salvage Today . . .

Captain R.B. Moss, Director of Ocean Engineering/Supervisor of Salvage

This Tenth Anniversary issue of *Faceplate* provides an excellent opportunity to reflect on a decade of experience in Navy ocean engineering, diving, and salvage; to comment on our current course and speed; and to offer an opinion regarding future developments.

The past 10 years have witnessed significant changes, reflected in part by the recent establishment of a Navy Salvage Requirements Task Force, introduction of a Diver Consolidation Plan, great strides in diving certification, and initiation of waterborne hull cleaning as part of an overall Underwater Ship Husbandry Program. Tremendous technological advances have been made in the techniques and equipment employed in Navy diving and salvage, as well as oil pollution control. This new technology has been long awaited in most instances, and has been pressed immediately into service on demanding operational projects. After 12 years, impending introduction of the Mk 12 Surface-Supported Diving System is expected to open a new era for U.S. Navy underwater work.

With all that can be said for technology, people remain the paramount important element in any diving, salvage, or ocean engineering formula. Their numbers, their attitudes, their training, and their organization will determine success, readiness, or failure of the program. The number of diving-qualified people in the active force has declined significantly since the early Seventies but, as significantly during this period, the U.S. Navy has continued to benefit from the skills and expertise of those released from active duty. Highly successful and specialized Naval Reserve programs in Explosive Ordnance Disposal (EOD) and Inshore Undersea Warfare (IUW) have begun to identify diver billets. The Reserve Harbor Clearance Program (RHCU) has not only filled its diver billets (in excess of 250), but has available a unique training program that will enable untrained or novice divers to qualify as Second Class Navy divers. Our mobilization readiness is thereby enhanced, and through diligent exercise of the Total Force Concept, Naval Reservists have helped with accomplishment of many tasks levied on our peacetime Navy. Recognition of Panama City, Florida, as our center for Navy diving highlights and focuses on the importance of Navy diving people and their needs. With the Navy Experimental Diving Unit's relocation from the ancient facilities at the Washington Navy Yard to the modern Ocean Simulation Facility, added emphasis placed on the Naval Coastal Systems Center expertise in diving and salvage, and recent commencement of construction at the site of the U.S. Navy's new diving school, the business of training, testing, and development will be facilitated, less expensive, and more effective.

The centralization of both UDT/SEAL and EOD personnel into distinct operating groups has proven extremely beneficial in the preservation of fiscal resources and specialized skills. These groups have further improved their effectiveness, through introduction of improved swimmer delivery vehicles and the Mk 15

Swimmer Life Support System. Sheltered transportation systems and closed-circuit, non-magnetic breathing equipment, still in pre-delivery phases, will offer both groups a quantum enhancement of current capability.

A diver consolidation plan for grouping salvage and repair divers has recently been proposed, and is currently under review by both fleets. Better utilization of trained divers, better opportunity for diversified experience, higher morale among divers, and greater opportunity to preserve and manage dwindling resources are benefits expected to accrue from this plan. Increased impetus of the Underwater Ship Husbandry Program is another anticipated benefit.

Underwater ship husbandry, as an important element of Fleet material support, will encompass a variety of areas including design and use of: underwater non-destructive testing equipment, underwater repair techniques, underwater tools, improved underwater coatings, and underwater hull cleaning techniques and equipment. The intent of this effort is to extend the dry-docking interval from the present two years to a period between five and seven years. It is intended to routinely perform, waterborne, all those tasks (except major repair) that are now done in drydock. Future effectiveness of the underwater ship husbandry program, however, is vitally dependent upon acceptance in logistic planning of the fact that properly trained and equipped divers are capable of making extensive *permanent repairs* to waterborne hulls.

Many of you are aware of the problem posed by the fact that most of our current afloat salvage assets are of World War II vintage and are being retired without replacement. One of the prime objectives of the recently established Navy Salvage Requirements Task Force is to firmly identify the stature of a salvage capability necessary to support defense objectives during times of war, as well as supporting our national interests during peace. A subordinate objective is to determine the assets and organization necessary to sustain this capability.

(continued, next page)

. . . *and a Look at the Future*

Commander F. Duane Duff, U.S. Navy Supervisor of Diving

In the Fall '76 and Summer '77 issues, Commander Bartholomew and I discussed some of the programs under way which would improve the diving community's capability to do the job. As this is the Tenth Anniversary issue of *Faceplate*, I'd like to take a few minutes and look at some of the things that have been done in the past 10 years. We have come a long way.

We have continually updated and revised the Diving Manual, introduced the Mk 1 Mod 0 mask, have the Mk 12 SSDS at the schools, instituted the air sampling programs, revised the Underwater Cutting and Welding Manual, delivered the first Mk 15 UBAs, delivered open diving bells, have an operational Mk 2 Deep Dive System, made significant progress in the certification program, formulated a list of approved equipment, and developed a long-range plan for RDT&E. This list is certainly not all-inclusive, but is a sample of some of our achievements, many of which took a long time to come to fruition.

What can you look for in the future? Well, for sure, the Mk 12 SSDS; it's in production for the air mode, and has just completed a very successful mixed-gas technical evaluation. Also, we will be seeing the new Mk 15 UBA, Mk 16 UBA and Mk 14 CCSDS (push/pull). We can expect to see retirement of the Mk VI and Emerson rigs.

The Mk 12 will be in procurement through FY 82, so there will be a need to retain your Mk V's until the Mk 12 is delivered and your divers are qualified. Your attention is drawn to OPNAV Notice 10560 of 17 July 1978, which discusses the Fleet introduction of the Mk 12 and requires a one-time Mk V inventory report be submitted to my office. We will promulgate disposition instructions for the Mk V upon completion of the inventory. The very high sentimental value as well as material value of the Mk V require that the retirement from service be accomplished in the most proper and legal manner possible.

The BUPERS Manual is currently undergoing revision. The Diving Manual is always being updated and you should all have Change 2 to Volume 1 by now. We are working on Change 2 to Volume 2 and it should be out next winter. The Diving Log/Accident Report Form is under revision as is NAVSEAINST 9597.1 (approved equipment list). Diver training is being reviewed to ensure that we maintain quality as well as applicability. The Underwater Work Techniques Manual will be updated to include new procedures and equipment. Reorganization movements are under way in both fleets, which will improve diver utilization as well as lines of communication.

We are moving to ensure that the equipments found at one activity are much the same as those at another and that they are proven and adequate. This reduces system familiarization time and also ensures that equipments are supply system supported.

There is a high probability that in the near future the U.S. Navy will become the lead service in DOD for all diving equipment, RDT&E and procurement. If this standardization is realized, it may very well have the secondary benefit of facilitating joint diving operations in the field. The primary purpose of this standardization is to improve Department of Defense diving safety, eliminate duplicate research and attain cost effectiveness with consolidated service procurements.

All the foregoing is of little value, however, if the individual commands don't follow the established rules,

(continued, next page)

(Moss, from page 7)

The requirement to provide equipment and technical assistance to the Navy on-scene coordinator in the event of Navy salvage-related or offshore oil spills, has resulted in the establishment of Pollution Response Centers co-located with the Emergency Ship Salvage Material (ESSM) bases in Virginia and California. The overseas ESSM bases at Singapore and Livorno, Italy, have been targeted to receive pollution response equipment in the near future. A civilian firm has been contracted to provide support personnel to form the nucleus of the U.S. Navy open-ocean oil pollution response capability. The past several years have witnessed the acquisition of new equipment: open-ocean skimmers, booms with mooring systems, and lightering tenders to contain oil spills during salvage operations. Future acquisitions will include portable lightering pumps, oil/water separators, through-hull oil/gas/water detectors, small powerful tow boats, and large rubber storage bladders. Improvement of the Navy's offshore and salvage-related oil pollution abatement capability will continue as a high priority effort.

Only in the last part of this decade has the Navy's Diving System and Equipment Certification Program come of age. The nearly exponential rate of progress in this program can be illustrated with these statistics: In 1973, there were 12 certified diving systems in the Navy; in 1976, there were 22. Presently, well over 100 Navy diving systems have achieved system certification. This group includes all ATS's and ARS's; clearly, the material condition, operational and emergency procedures of the Fleet's diving systems have never been better. This remarkable achievement can be attributed directly to the fact that the Fleet has accepted "diving system certification" as a viable means for assuring that their diving system functions safely and as technically intended over its mission range. The old myth that diving system certification requires material traceable back to the mines has been put to rest. Today's Navy diver acknowledges that certifying his system entails a lot of hard work, but he also fully appreciates that the effort produces a system which is safe, reliable, and worthy of his confidence when he entrusts his life to its operation.

Advancing technology, driven by defense requirements and a demand for products of the sea, is rapidly changing the world oceans from hostile, inaccessible environments to those which man can safely approach with proper professional respect. In expansion of this subject, a more complete review of ocean engineering technology during the last decade will be addressed by a number of highly competent authors in the special Ocean Engineering issue of *NAVSEA Journal*, to be published this summer.

In conclusion, I would suggest that my view of the future is one of basic optimism. There will be continuing change necessary to match the Navy diving, salvage and ocean engineering capability to perceived defense needs, and an increasing requirement to manage these programs to make ever decreasing budget dollars cover the plans. You should expect positive, but deliberate progress in the direction of more capable and reliable equipment, deeper diving, better training, and a safer environment.

(Duff, from page 7)

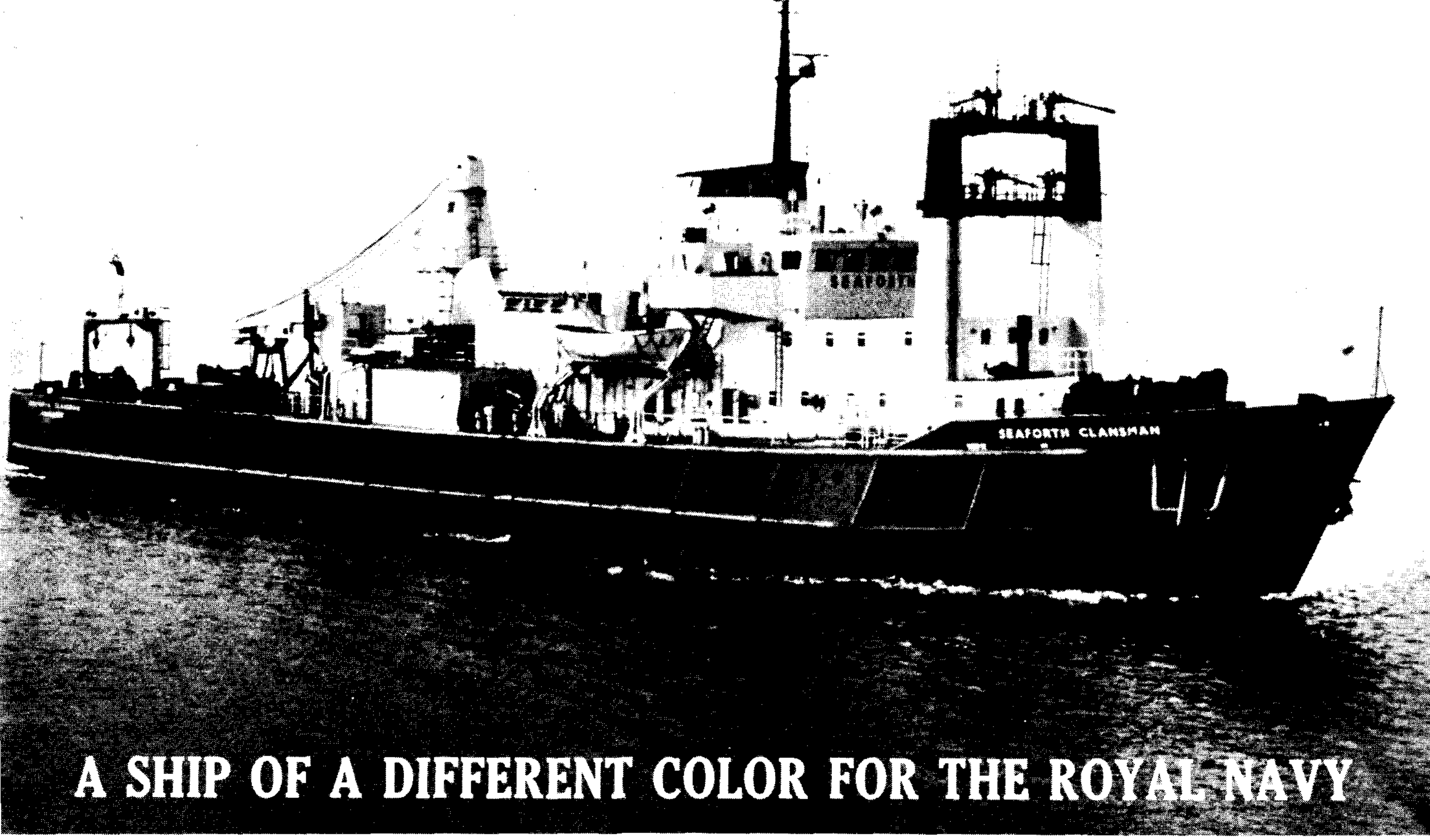
regulations and safety procedures. I get too many bad vibes about diving lockers not having the proper equipment or local command support to dive safely. Too many diving lockers still have not gotten into the certification program or do not conduct diving operations in accordance with the Diving Manual.

Divers must be constantly aware of safety and the need to follow established procedures using authorized equipment. Diving should be a safe business if the hard-learned rules are followed, and I cannot emphasize this issue strongly enough. There are a lot of non-divers who do not fully appreciate or recognize this fact, and it is up to all of us to ensure that they are properly educated. Part of cleaning up the act will be to ensure that *everyone* is in compliance with current directives. The Naval Safety Center has re-emphasized the assist visit program and this service should be taken advantage of. Being macho is dumb when it's not safe.

I can help tell you what you need to dive safely and how to get it; however, there is always a formal chain-of-command and it must be used. A phone call is great for discussing and assisting in the resolution of an immediate problem but pen must be put to paper if the ultimate solution is to be effected and other diving commands are to receive the benefit of your experience. In the same vein, I have kept a rough tabulation of who we get calls from. Over 80 percent are from master divers and below. It is almost an historic event to hear from a commanding officer, executive officer or diving officer. I don't know why this is, but if we are going to solve the overall safety problem, we must educate and involve our seniors. Your safety is as much their responsibility as yours. I again state my welcome and encouragement for phone calls and letters but we must also encourage formal communication up and down the line.

A final note. Improvements in techniques and equipments are not the exclusive prerogative of any individual or group. As I mentioned, I want to make the individual diver as safe and comfortable as possible, so the input from the diving station is a very valuable link in implementing programs. It takes the effort of writing and may not show up in the immediate future, but never feel that your opinion is not welcomed or valued. It is. The cards, letters and phone calls received concerning Change 2 to Volume 1 of the Diving Manual are extremely helpful and a strong indication of your concern. Keep them coming. *Good Diving.*

M/V SEAFORTH CLANSMAN:



A SHIP OF A DIFFERENT COLOR FOR THE ROYAL NAVY

In a single hull, Clansman gives Britain's Royal Navy a modern, wholly dedicated and fully equipped diving support and versatile salvage/recovery platform as well as a highly effective firefighting and oil pollution control vessel with which to enter the 1980s.

Lieutenant Commander Stan Cwiklinski, USN
On Exchange to the Royal Navy

With the acquisition of M/V Seaforth Clansman last July, the British Royal Navy more than doubled its sea-going, deep-diving capability. The multi-purpose diving vessel can conduct saturation diving to 1,000 feet of seawater (fsw) in conditions up to sea state seven.

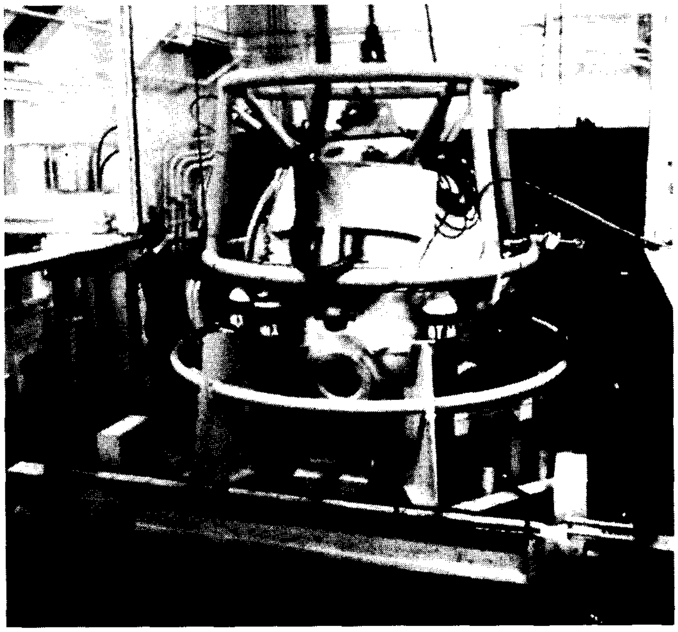
In a striking departure from her Fleet counterparts, Clansman is painted maroon and mimosa yellow with black trim, rather than the traditional navy gray. But, there's rhyme for reason since Clansman is uniquely on long-term charter to the RN. The vessel's colorful paint job conforms to the registered fleet colors of her commercial owner and manager, Seaforth Taywood, Ltd., and Seaforth Maritime, Ltd., respectfully.

Clansman was originally built on speculation to serve the commercial North Sea oil industry. When the Royal Navy became interested in the vessel as a replacement for the ancient and venerable HMS Reclaim in August 1977, she had had just one previous, short-term diving charter. Just eleven months later, the vessel achieved final Fleet acceptance, an enviable achievement considering the unique nature of the venture and the complexities involved in bringing ship and divers to RN ready status.

Under the sponsorship of Commander A.G. Worsley, RN Superintendent of Diving, a team of RN divers underwent intensive training to prepare for the follow-on diving trials program to officially qualify Clansman as an operational unit of the Fleet. A culminating six-man dive to 656 fsw proved eminently successful. Despite sea states building to five and six, eight hours of two-man, extra-bell excursions were conducted to 705 fsw. Also, a heavy-work, pipe and flange puzzle project was successfully completed at depth.

Fully operational, Clansman was delivered to Portsmouth, England, on schedule. She was officially accepted by the RN as a Fleet asset on July 11, 1978.

Below, Clansman's diving bell on traversing trolley in ready-for-launch position. At right, RN's Vice Admiral Burger reviews Clansman divers on occasion of Fleet Acceptance last July.



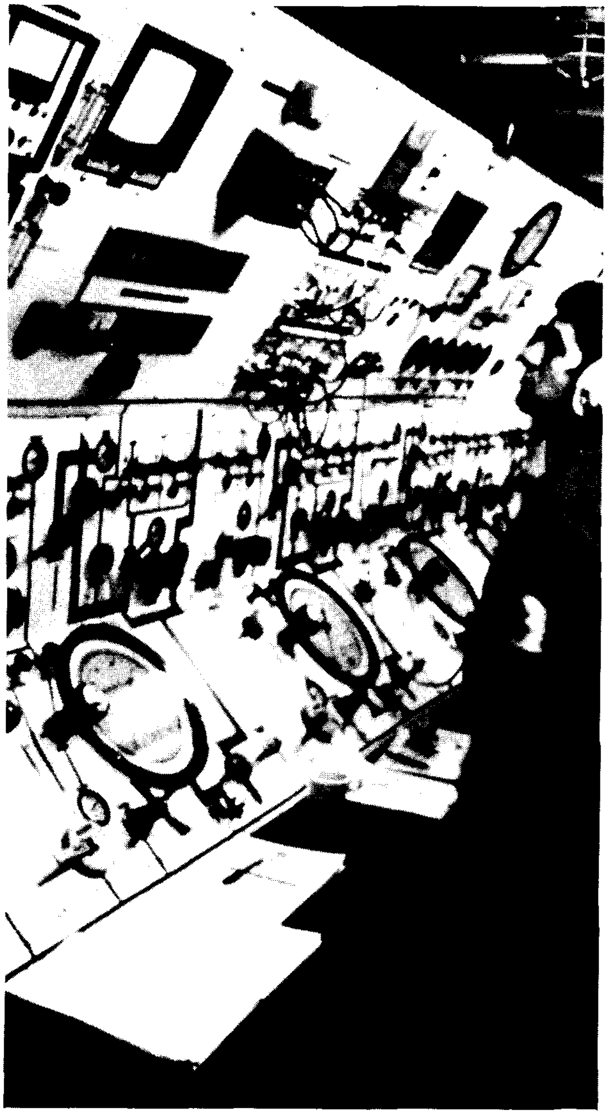
M/V Seaforth Clansman "diving gang." Front row (l-r): PO Olive, CPO Peacock, PO(D) Kerr, PO(D) Kidman, LS(D) Furlong, LS(D) Gunnel, AB(D) Barton. Middle row (l-r): LT Martin, CPO(D) Bauckham, LS(D) Matthews, LS(D) Scargill, LS(D) Spears, LS(D) Davies, PO Down, BMCM(MDV) Behling, CDR Worsley (RN Superintendent of Diving), LCDR Cwiklinski. Back row (l-r): PO(D) Brown, AB(D) Jones, LS(D) Mason, AB(D) Hammans, LS(D) Baker. Not pictured: CDR Greene, MC, USN; SURG LT Sykes, RN; and LS(D) Carrier.

Clansman's design is based on the lines of a modern stern trawler. She is 259 feet long with a molded beam of 50 feet, and displaces 3,300 tons. Two controllable pitch props, twin rudders, and a bow and stern thruster provide exceptional slow speed maneuverability and position keeping. Full speed from her four main engines is 13 knots. She can carry a crew of 46, including 27 divers.

The diving moonpool, opened at the bottom, is formed by a 14-foot-square casing passing vertically up through the hull. Clansman's state-of-the-art diving system is built into the ship on three deck levels which are totally out of the weather. The system consists of a three-chamber complex - two DDC's (one with an outer lock) individually bolt-flanged to a transfer lock. Each DDC can accommodate four divers. From the top of the transfer lock extends a transfer trunk onto which the diving bell mates. The bell is configured to carry two divers plus a bellman. The bell handling system can transfer the bell from fully mated to moonpool launch inside ten minutes. A moonpool aeration system greatly facilitates heavy weather operations by effectively mitigating the effects of sea surge up through the pool.

Along with the sat/bounce diving capability, Clansman is equipped to conduct surface-supported diving to 250 fsw. An open bell, handling davits and gas and hot water control manifolds for diving from either side are provided. A dedicated, deck-mounted, double-lock therapeutic recompression chamber is also installed.

The ship is fitted for but not with an acoustic,



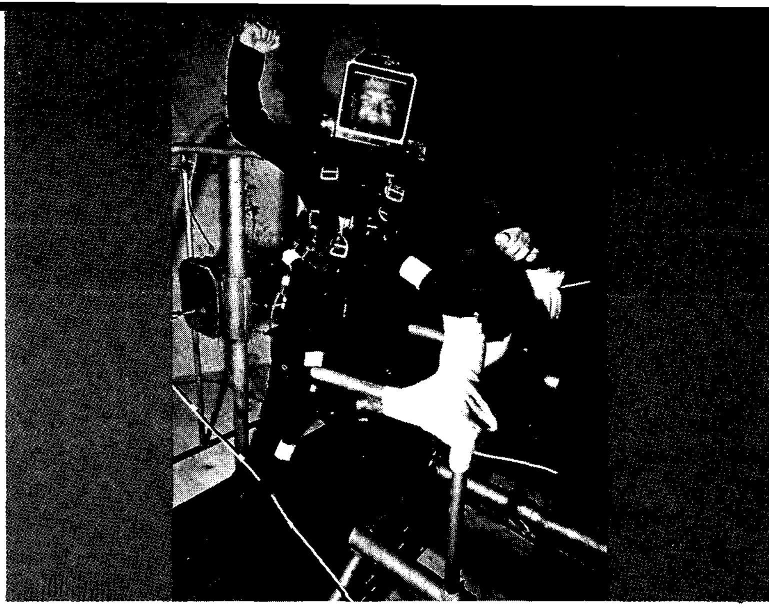
At left, a view of Dive Main Control. Above, Clansman's moonpool, through which diving bell passes, showing aeration system which reduces surge in heavy seas.

dynamic positioning system. Presently, a highly efficient, self-lay/self-recover, four-point mooring system is employed. Pollution abatement/control equipment is also fitted, consisting of a detergent mixing and spraying system and stowage for 50 tons of detergent concentrate.

Clanman's charter has been renewed for a second year with option for up to three additional years, which is the RN estimate for completion of its new Seabed Operations Vessel (SOV). The SOV, likewise, will carry a 1,000-fsw sat/bounce dive system, plus an unmanned tethered submersible for deep ocean search. Also, space and weight has been allocated for the future fit of a manned submersible.

As a retrofit consideration, Clansman's stern is specially strengthened to accept a hydraulically operated A—frame handling gantry for launch and recovery of a submersible. Also, the after deck has been structurally strengthened to accept trackways from the stern to a position where an additional transfer trunk to the dive complex has been targeted to permit diver transfer under pressure to and from a LI/LO submersible. This concept in greater diver versatility is presently practiced commercially.

With Clansman now a Fleet asset, the RN has formally entered the operational saturation/deep bounce diving business. It proudly possesses a small but professionally viable seagoing, deep diving organization. The Clansman charter affords the RN a cost-effective answer to further develop its deep diving expertise and to test and evaluate commercial and/or service-designed equipment for possible SOV application.



TDCS ONE THOUSAND

NEDU Tests the New Tethered Diver Communication System to 1,000 Feet and Probes the Origin of Some Bacterial Difficulties that Commonly Afflict Divers Under Saturation Conditions.

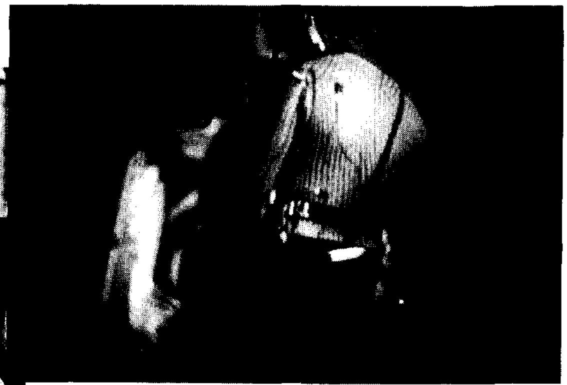
On February 15, 1979, six U.S. Navy divers emerged from the Ocean Simulation Facility at the Navy Experimental Diving Unit (NEDU) in Panama City, Florida, after a month-long, 1,000-foot experimental dive. This was the first NEDU dive dedicated to the evaluation of a communication system.

The Tethered Diver Communication System (TDCS) was developed for the Navy by Hydro Products, Inc., to improve communications with divers in the saturation diving environment. All four of the Navy's currently available umbilical-supplied diving systems were tested: the Mk 14 Closed-Circuit Saturation Diving System, the Mk 12 Surface-Supported Diving System, the Mk 11 Underwater Breathing Apparatus, and the Mk 1 Mod S diver's mask.

Speaking at the International Diving Symposium in New Orleans last February, while the dive was in progress, Arlo Trieglaff of Hydro Products said, "The helium-oxygen atmosphere required for life support at the high pressures in deep diving operations causes severe distortions of the human voice. The problem is further complicated by the poor acoustic surroundings, severe electrical interference conditions, and a high acoustical noise environment."

Because intelligibility is the ultimate index of the effectiveness of any communication system, the TDCS dive subjects were required to devote a good portion of the dive to the Modified Rhyme Test word lists. The test consists of 50 groups of words, with six words in each group. In a typical test, the reader reads one word from each group and the listener, who holds a response sheet with the same words, marks the word he hears from each group.

In addition to TDCS word list tests and technical tests, the dive plan was thoroughly booked with a wide

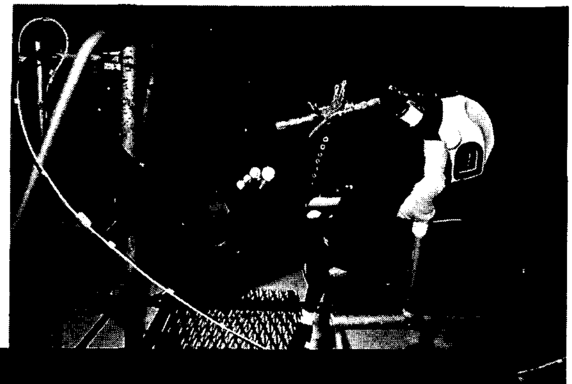


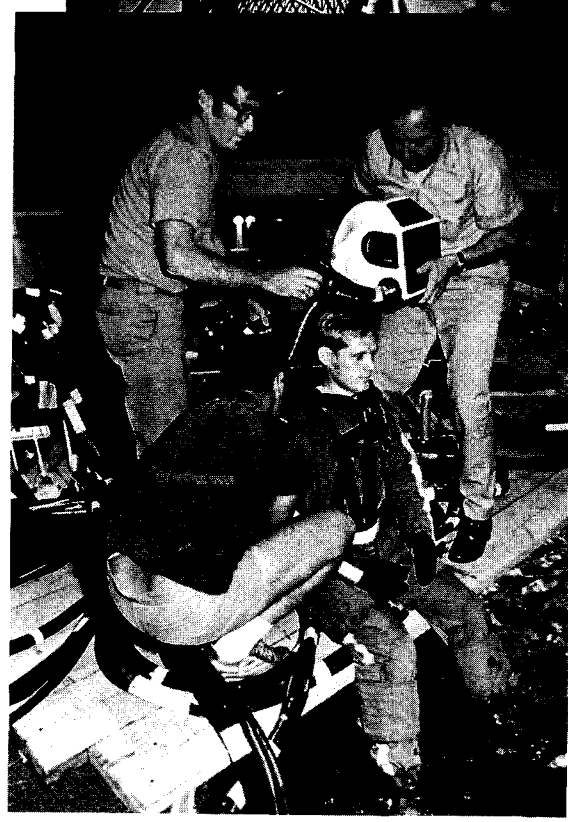
From the control room of the Ocean Simulation Facility, dive supervisor Lieutenant J. E. Halwachs communicates with a dive subject equipped with temperature probes inside one of the OSF's dry chambers.

range of medical and physiological tests, including blood studies, bacteriological sampling, thermal evaluations and graded exercise studies. Here is a brief summary of some of these tests:

- *Dry Thermal Study.* This study evaluated the effect of exercise on a diver's metabolic heat production and overall thermal balance in a helium-oxygen environment at 640 fsw. Dive subjects, wearing only swim trunks and shoes, were placed in one of the OSF dry chambers, which was cooled to 68°F. For a two-hour period, they rested and performed work on the bicycle ergometer as oxygen consumption and heat loss from skin, respiratory tract and body core were measured.

(continued on page 15)

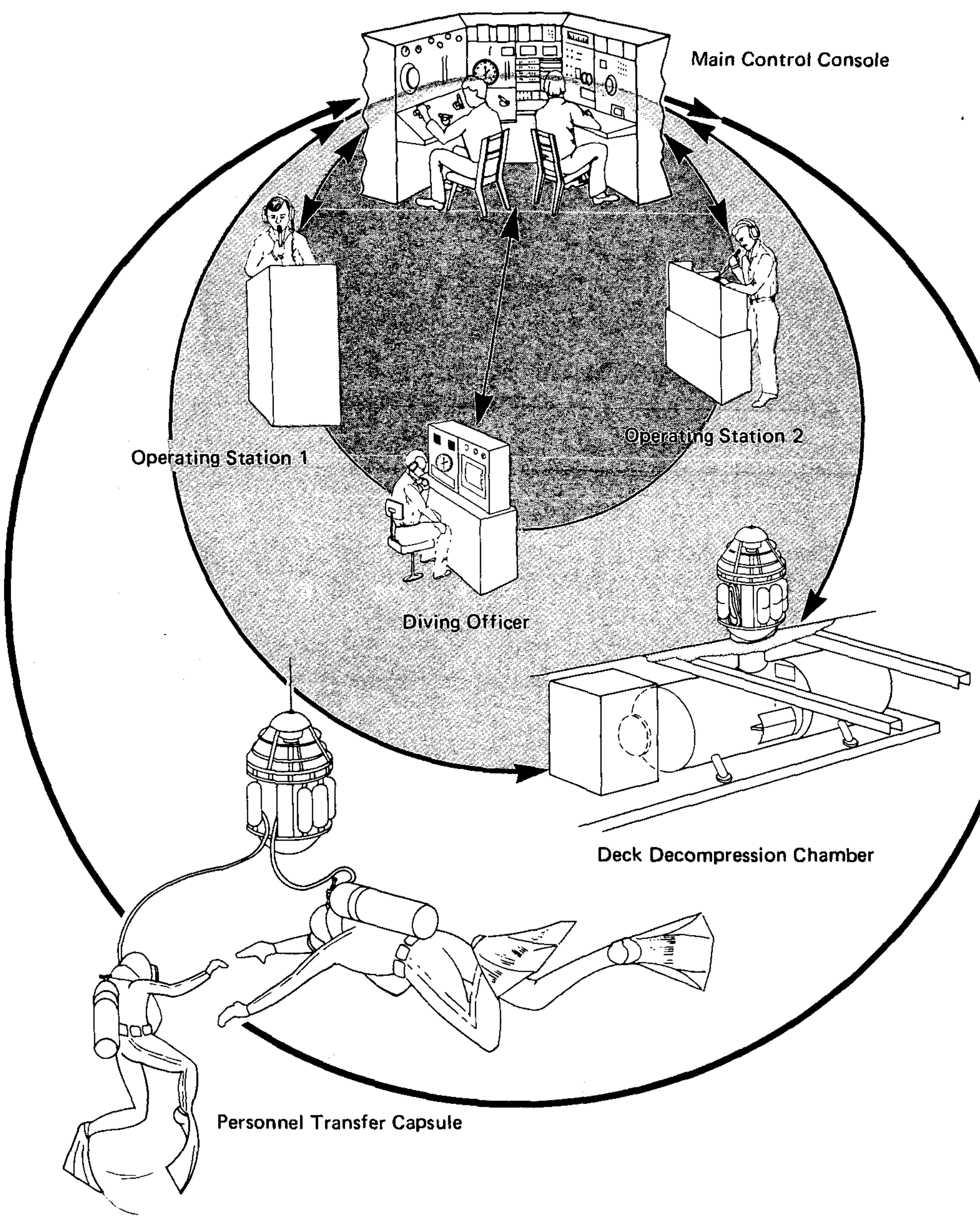


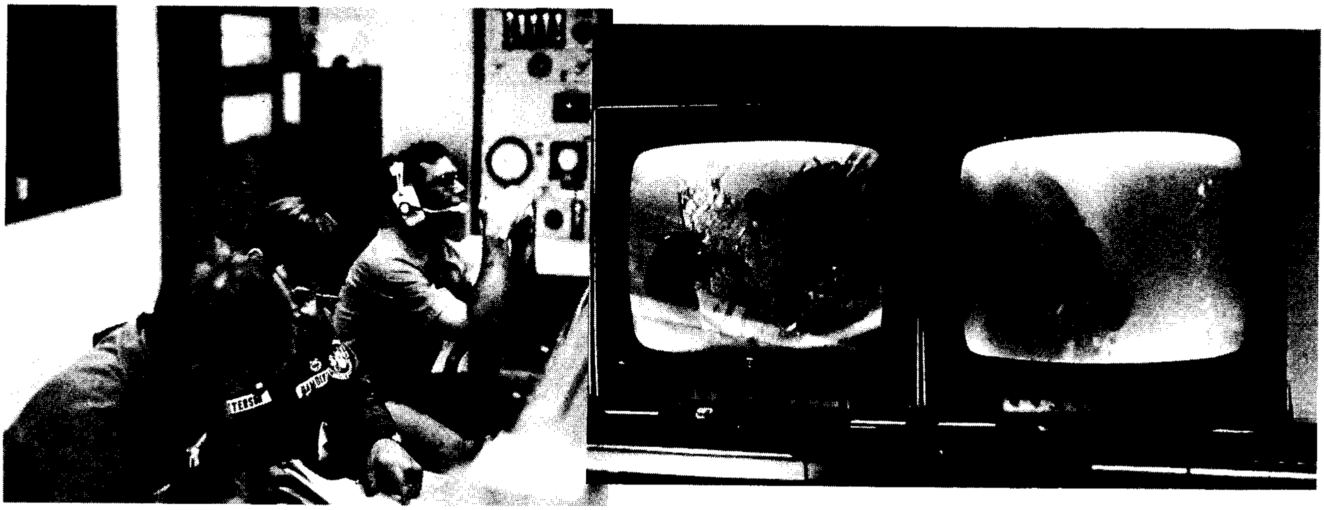


BM1(DV) Paul Castle is suited-up with the Mk 14 CCSDS during training in the OSF test pool. Workouts on the pedal ergometer (above and opposite page) permit physiological and breathing system evaluations.

A Closer Look at the Tethered Diver Communication System

The TDCS is a complete communication system for saturation diving applications. It enables divers to talk with topside personnel and to other divers in a personnel transfer capsule at saturation depths. The system has four communication loops (diver, intercom, surveillance, and command) located at eight different stations. Divers have hands-free communication; no controls or indicators are used. The TDCS's rugged simplicity is combined with several advancements in saturation diving communications: (1) diver and tender microphones are matched for noise cancelling characteristics to the acoustic properties of the masks and noise generated by the life support systems, (2) electromagnetic noise and interference are eliminated by converting the diver audio signals to FM signals which are multiplexed with other diver and tender channels, and (3) four helium speech unscramblers preprocess the helium voice, convert it to digital form, then store and process it for unscrambling, conversion to analog form, filtering and transmission. The result is an expanded communication capability with greatly enhanced voice intelligibility.





Operations Officer Lieutenant J. T. Harrison watches TV monitors while speaking to TDCS dive subjects inside the OSF wet pot. The new communication system vastly improves intelligibility of divers breathing helium-oxygen mixtures at deep depths.

Participants in the 1979 TDCS 1,000-foot dive in Panama City (l-r, standing): HTCS(MDV) Debolt, MMC(DV) Sullivan, EN1(DV) Cutchens, ET1(DV) Pappas, BM1(DV) Castle, and HTC(DV) Neal. In front, BMCS(DV) Mantell.

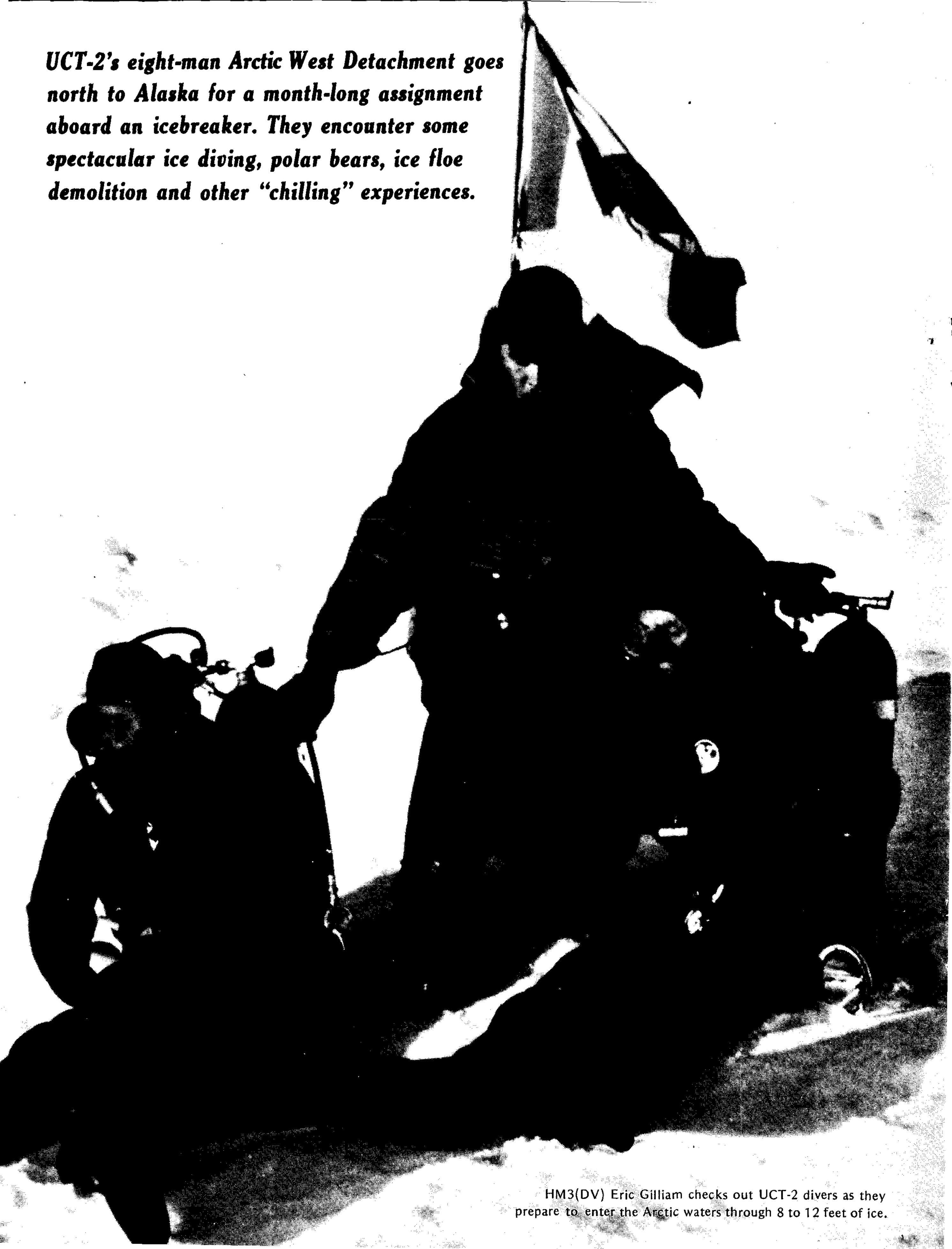
TDCS (continued from page 13)

- *Blood Study*. Investigators at the Naval Medical Research Institute and the Submarine Medical Research Laboratory prepared experimental protocols to determine the effect saturation diving has on the amounts of iron carrying protein found in the blood of divers (a fall in its level is associated with some diving difficulties), and to determine whether certain bacterial products are found more often in the blood stream as a result of compression or decompression stress. These studies were aimed at clarifying the origin of decompression sickness and learning why certain difficulties with bacterial infections in saturation divers occur.
- *Bacteriological Sampling.* During saturation diving, increases in the number and intensity of common skin and gastrointestinal disturbances occur. In an effort to determine the origin and spread of these difficulties under saturation situations, the dive subjects collected specimens from each other and from various areas of the chamber for later identification and analysis.

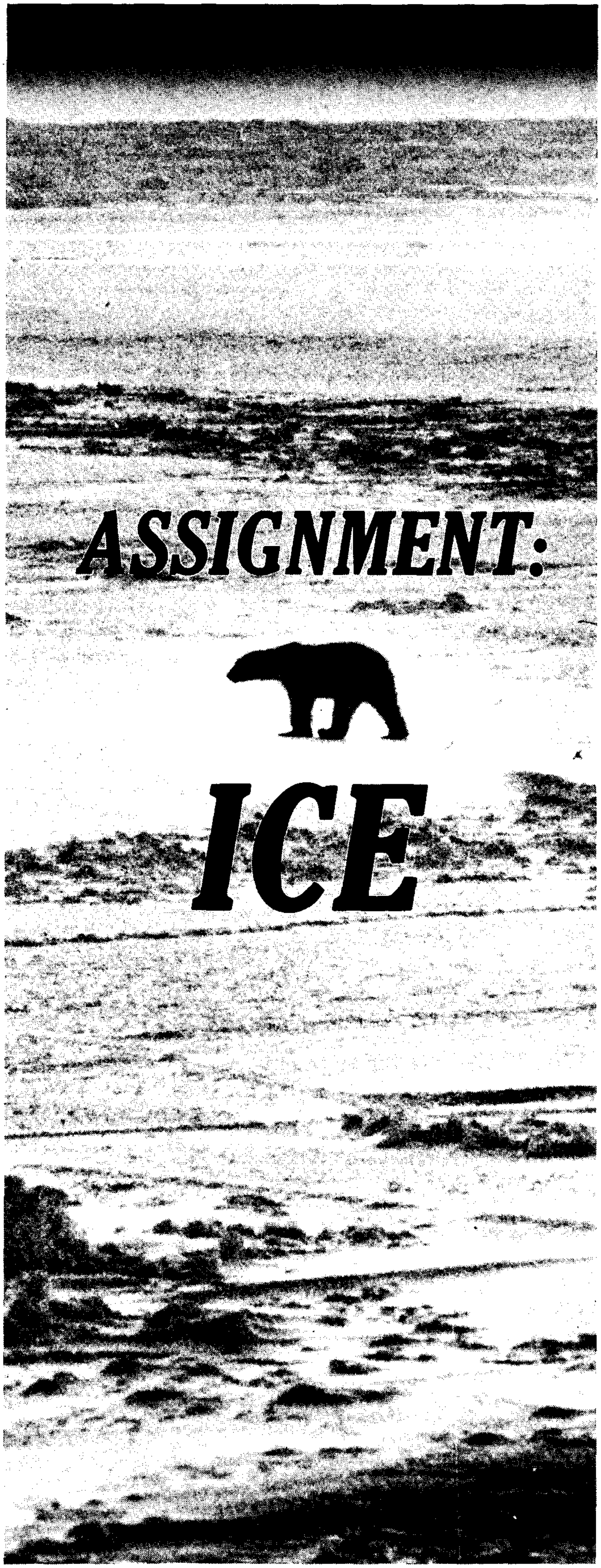
Operations Officer Lieutenant J.T. Harrison reported at the completion of the dive that all tests and mission requirements had been met.

Dive subjects for the 1979 Tethered Diver Communication System dive were HTCS (MDV) David E. Debolt, EN1 (DV) Jerry L. Cuchens, MMC (DV) George Sullivan, HTC (DV) Jack A. Neal, ET1 (DV) Troy C. Pappas, and BM1 (DV) Paul A. Castle, all of NEDU.

UCT-2's eight-man Arctic West Detachment goes north to Alaska for a month-long assignment aboard an icebreaker. They encounter some spectacular ice diving, polar bears, ice floe demolition and other "chilling" experiences.



HM3(DV) Eric Gilliam checks out UCT-2 divers as they prepare to enter the Arctic waters through 8 to 12 feet of ice.



ASSIGNMENT: ICE

Lieutenant J.M. Cherry, CEC, USN
UCT-2, Port Hueneme, California

Photos by PH1(DV) Harry Kulu, USN

Last fall, our Arctic West Detachment was flown to Nome, Alaska, to rendezvous with the 269-foot Coast Guard ice breaker Northwind for an assignment involving diving support for the Naval Arctic Submarine Laboratory.

A couple day's wait in Nome proved to be an enlightening experience. The renowned gold mining town (with gold dredges still in operation) appeared to have changed little from the late 1890s -- except for the cost of living. While several of us devoted spare time to relentlessly panning nearby icy streams, hoping for a few golden flakes, all were collectively shocked by prices such as $1.75 for a loaf of bread, or $.75 for a three-day-old newspaper. Needless to say, all hands were quite happy to sight the Northwind on the horizon.

Once aboard Northwind, the first task was to assemble and check out the various items of diving support equipment. Predeployment mission statements had dictated the need for the capability to dive under fourteen feet of ice to water depths of 90 feet. Accordingly, a prime prerequisite was the ready availability of a recompression chamber. Coinciding with the set-up of this equipment was the implementation of a training program to familiarize Northwind's Coast Guard divers with our equipment and procedures. In order to meet the requirements of reasonable comfort and maneuverability in the extremely cold waters beneath the ice pack, proper selection of diving gear was critical to the mission's success. Scuba equipment, used with a variable volume dry suit, was appropriately chosen.

"Bears had been sighted almost daily. . . A few hours after the divers returned to the ship a polar bear attacked the main shelter . . ."

The variable volume dry suit insulates the diver from the extreme cold by a cushion of air which literally inflates his dive suit. An inlet valve, connected to an external air source, and an exhaust valve permit the diver to regulate the volume of his insulating air. This suit offers a superior form of thermal protection against the frigid water of the Arctic. Certain limitations, however, do exist. Inlet and exhaust valves can malfunction. When the suit is exposed to ambient outside temperatures below 32° F, supercooling of the inlet and exhaust valves may occur. This can cause icing upon immersion in seawater, with the resultant effect of inoperable valves. Silicone spray applied to both valves will assist in counteracting this effect. When in the head-down or the horizontal position, air can accumulate in the foot area, resulting in a loss of buoyancy control and possible "blow-up." A rip in the suit or a parting zipper could cause an immediate loss of buoyancy along with thermal shock. All UCT-2 divers undergo annual refresher training in the operation of this suit. It is very important that a diver have experience using this suit prior to diving in the Arctic seas.

The single hose regulator with external thermal protection of the first stage was determined to be most compatible to the frigid environment. No overall advantage has been established for utilizing either the single or double hose regulator, but our detachment preferred the single hose version. Use of a single hose regulator in Arctic waters should include: (1) the external protection of an antifreeze solution surrounding the first stage adjusting spring and (2) a requirement to limit purging of the second stage to less than five second's duration. (See "A Guide to Polar Diving" by W.T. Jenkins, Naval Coastal Systems Laboratory, June 1976.)

Once the ice camps were established by the scientific party, the next priority was the underwater installation of a hydrophone array. Eight-inch diameter holes were to be drilled through the ice at specific intervals, and the sections of pipe would then be lowered beneath the ice for assembly by the dive team. Once the sections were hand-connected, the now-rigid array could be lowered to its operational depth.

"From the diver's perspective, the Arctic pack ice resembled a huge ice cave with blue-white stalactites suspended from the top and sides."

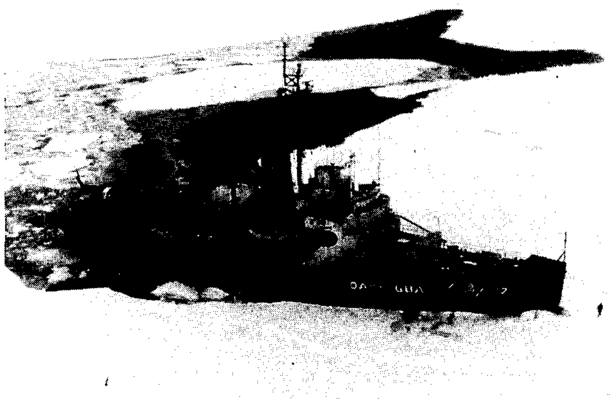
Ice demolition training included detonation of 40 pounds of composition C-4 explosive.

Once on site, the first dive team and standby diver donned their equipment, excluding tanks, inside a heated shelter near the ice entry hole. Due to limited space, the tanks were left outside. The team quickly learned its first lesson of this severe environment; the 4°F temperature froze the O-rings in the manifold in less than ten minutes, thus preventing a proper seal between the regulator and HP air manifold. Each diver's life support equipment was then placed inside the shelters, where the O-rings rapidly thawed.

Certainly not the least of the concerns of the diving supervisor was the possibility of a polar bear attack. Bears had been sighted almost daily in this area, and their size alone justified the posting of an armed lookout during the diving operation. Although no unwanted intrusion occurred during the afternoon's dives, a few hours after the divers returned to the ship a polar bear attacked the main shelter of the camp. Fortunately, the bear was scared away by the use of a flare gun, but not before considerable damage was done to both the tent and the confidence of the scientists.

The easiest water access for the divers was through a refrozen lead, which is a navigable channel through the surrounding ice pack. The ice was approximately two feet thick over the lead, whereas the surrounding pack ice varied in thickness from eight to 12 feet.

The first impression of the divers upon entering the water was a mild surprise at the excellent water clarity. In spite of hazy, late afternoon sunlight, in addition



USCGC Northwind (WAGB-282) was equipped with full diving support equipment for the month-long Arctic operation.

UCT-2 divers enter the Arctic Sea to install an underwater hydrophone array. Water temperature: 28.5°F. Visibility: about 75 ft.

to an ice and snow filter on the ocean surface, the divers had good visibility to about 75 feet. Surrounding the narrow lead on two sides was a large floe of Arctic pack ice. From the diver's perspective it resembled a huge ice cave with blue-white stalactites suspended from the top and sides. Recalling their briefings on the debilitating effects of very cold water on diver performance, comfort, and motivation the dive team quickly recovered from their reverie and began their specific task.

The first set of divers rapidly connected the lead-filled pipe, finding the task not significantly different from the practice assembly several months earlier in the harbor at Port Hueneme. However, two unions refused to be mated, requiring retrieval of the pipe to the ice surface. A damaged union was found at fault; it was replaced and the pipe was reconnected on the surface as a check. Noting the close proximity of the diver access hole to the desired array position, one of the divers suggested that the individual hydrophones and cables be threaded through their respective holes, then passed by divers back up through the dive access hole and connected at the required intervals along the pipe. Realizing the advantages of this approach, the scientists agreed to try it. The hydrophone cables were quickly connected to the pipe, then lowered through the access hole, and repositioned by the dive team. After each connection was rechecked by the divers, the fixed array was lowered to its operational depth. Subsequent utilization of the array in receiving sound projections from Northwind and helo-deployed underwater signal charge data revealed the system to be in good working order.

The deployment aboard Northwind offered the personnel of our detachment a unique opportunity to participate firsthand in shipboard evolutions. Team members were quick to learn the meaning of a "sea shower." The rigors of routinely standing a midnight to 0400 watch, in addition to putting in a full workday, were impressed upon us. The traditionally compact berthing spaces made their usual deployment quarters of a BEQ seem luxurious by comparison, and few of us ever adjusted to a bunk that would occasionally take 25-degree rolls. The Navy Seabees devoted their free time to assisting their shipmates in a variety of ways. Northwind's divers received detailed training on the operation of the detachment's recompression chamber and its supporting compressors and HP air banks. Lacking experience in ice demolition, the ship's Weapons Department requested and received demolition training on an ice floe.

In general, the men of UCT-2's Artic West Detachment made contact with their counterpart fleet ratings, and jointly benefitted from each other's experience. Thus, after one month at sea, the Seabees disembarked in Nome, and made haste for their homeport in warm, sunny Southern California.

J. M. Walsh, Ph.D.
Naval Medical Research Institute

The title of this article may sound somewhat ominous, so I'd like to define and clarify what I mean when I talk about "drugs." Drugs come in many forms: they can be ingested, injected, inhaled, and even absorbed through the skin—and we are concerned about all of them.

This discussion will not be restricted to street drugs or to prescribed medications, because we want divers to realize that many substances affecting body chemistry (e.g., aspirin, nasal sprays, alcohol, nicotine, caffeine) are not generally thought of as drugs—but probably should be.

If you follow the scuba literature, you probably have decided, as I have, that there are two schools of thought concerning the use of drugs while diving. The Navy provides no specific instructions concerning medication and fitness for duty; the diving supervisor makes his decision based on the recommendation of the diving medical officer (DMO), and that recommendation may vary considerably from one DMO to another. Some say there are a variety of drugs available that will counteract most minor problems and if you are unaffected by these drugs on the surface, you will be okay in the water. In direct contrast, many DMO's believe that under no circumstance should a diver *ever* take *any* kind of drug within the 24 hours before diving.

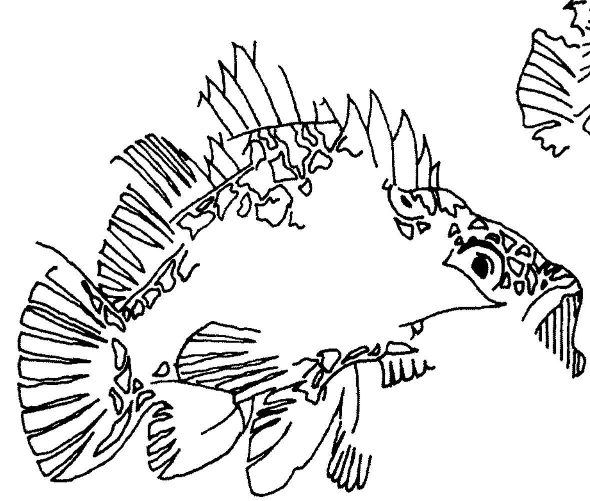
Now, it seems to me that there's room for discussion between these opposite opinions. So, I'd like to spend the next few paragraphs examining the facts and trying to evolve some logical recommendations and conclusions.

To begin with, there are many variables that alter the effects of drugs. In reality, there is no such thing as "a drug effect," because a drug never acts exactly the same in all individuals, or even in the same person on different occasions. The action of a drug depends, to a large extent, on the physiological and psychological makeup of the individual at the time the drug is administered and on the prevailing environmental conditions. A partial list of the kind of variables that can modify drug action is shown in Table 1.

Any drug can be toxic if you take enough of it, and people vary widely in sensitivity—so much so that an appropriate dose for one person can be an overdose for another. Let's consider what happens physiologically and biochemically when we dive. In the underwater environment we are subjected to: 1) increased hydrostatic pressure, 2) varying partial pressures of N_2 and O_2 in compressed air, and 3) the interaction of changing gas and pressure with all of the variables mentioned above.

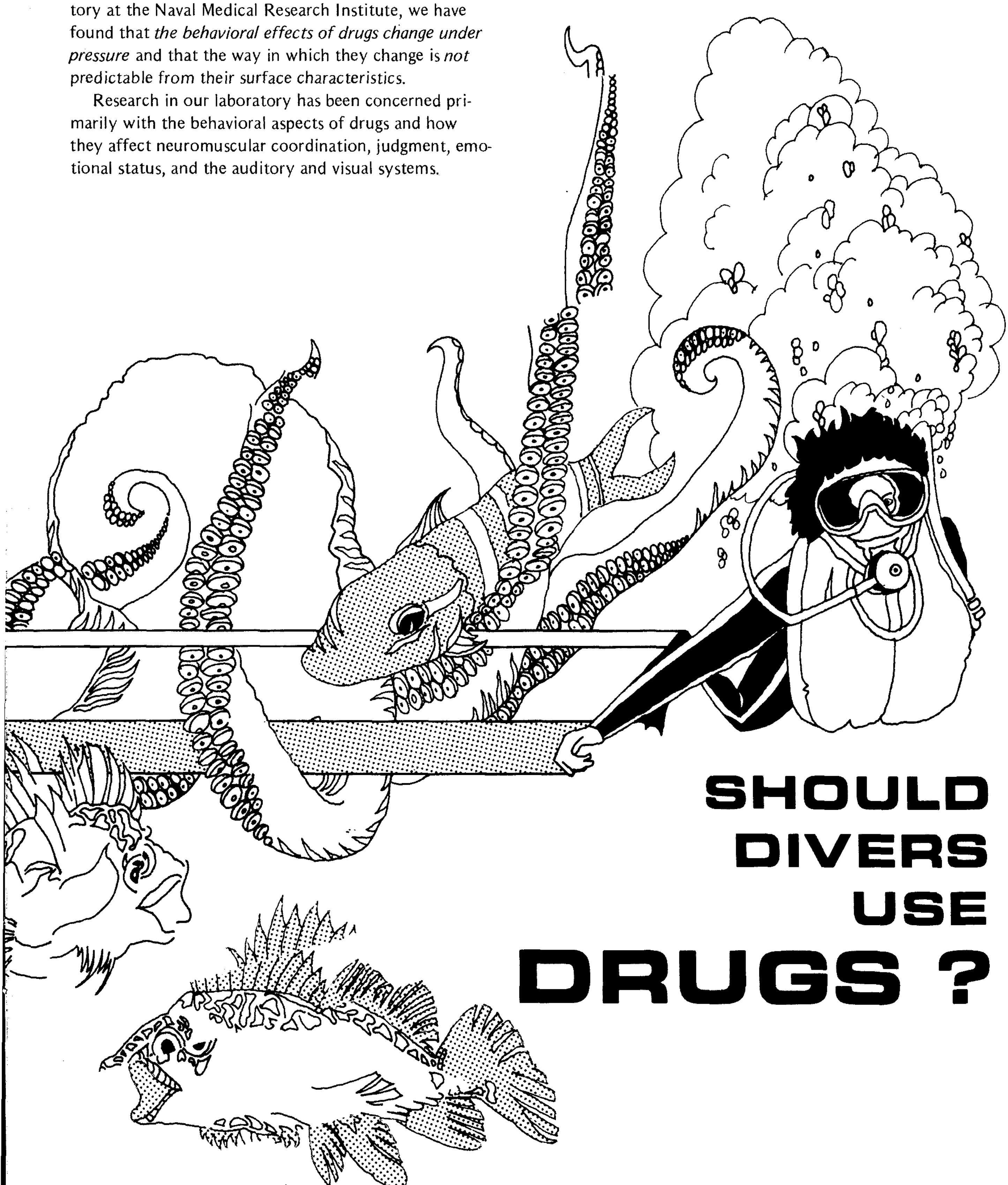
Pressure itself can exert numerous changes in our body chemistry. Many effects are obvious only at very high pressures, but even at the depths that divers are accustomed to, the increased workload of breathing under pressure can cause CO_2 buildup from reduced gas exchange and changes in blood constituents can occur. Cell membranes undergo pressure-induced changes, which may account for numerous hyperbaric phenomena, for example, nitrogen narcosis. Even oxygen, which is needed to sustain life, becomes toxic and can cause pulmonary damage and convulsions when the partial pressure is raised sufficiently. Research dives have shown that metabolic, hormonal, neurological, and cardiovascular changes occur at depths as shallow as 90 fsw.

When you plan to dive, you must remember: Changes in your body are going to occur during the dive, and this makes it tough to predict how a drug will act because so much depends on your physiological state and the environment, both of which are continuously changing. Even under carefully controlled conditions in our labora-



tory at the Naval Medical Research Institute, we have found that *the behavioral effects of drugs change under pressure* and that the way in which they change is *not* predictable from their surface characteristics.

Research in our laboratory has been concerned primarily with the behavioral aspects of drugs and how they affect neuromuscular coordination, judgment, emotional status, and the auditory and visual systems.



SHOULD DIVERS USE DRUGS ?

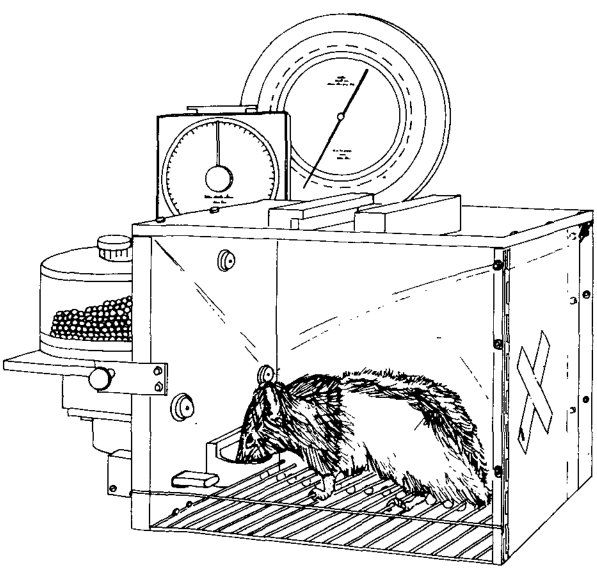
" . . . the behavioral effects of drugs change under pressure and the way in which they change is not predictable from their surface characteristics."

Our work has focused on three areas: 1) use of drugs to provide hyperbaric medical treatment for divers (e.g., in recompression therapy, and for emergency treatment requiring drugs that would work effectively and safely under relatively high pressures—i.e., up to 1,500 fsw); 2) use of drugs to maximize the number of men available for duty and to prevent the onset of hyperbaric disorders (e.g., a safe, effective drug for sinus problems, or something to prevent nitrogen narcosis); 3) unauthorized use of drugs (e.g., self-medication, drug abuse, or excessive consumption of substances that may be harmful, such as alcohol or caffeine).

The program is designed to comparatively evaluate drug compounds, beginning with studies involving small animals (usually rodents) and then thoroughly evaluating the substance in larger animals (monkeys or dogs) before testing it in human divers. The animals and humans are trained to perform similar complex tasks; then they are treated with the drug and exposed to normal and increased pressure conditions in a dry hyperbaric chamber. Because there are thousands of drugs available on the market, we have selected representative compounds from major drug classes for test and evaluation.

Results of these evaluations have demonstrated how widely the effects of drugs vary when introduced to the hyperbaric environment. Some specific observations follow (* indicates statements based on information where human evaluations have been conducted).

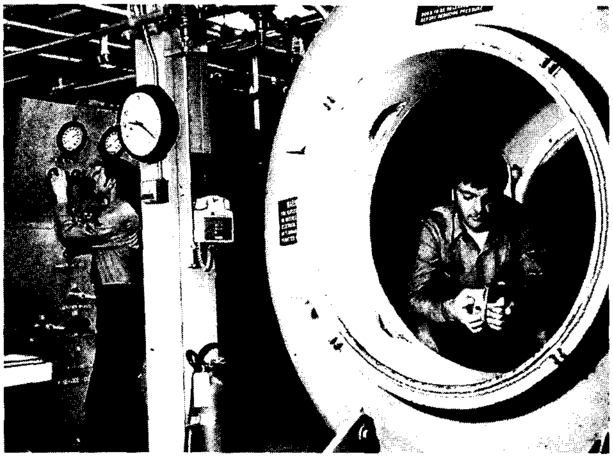
- *Analgesics.** Aspirin and Acetaminophen (Tylenol) have been tested at depths to 180 fsw, and even moderately high doses (3-4 tablets) have not produced behavioral or physiological problems.
- *Antihistamines.** (Benadryl) At prescribed doses we have consistently observed decreased performance, mental clouding, and reduced fine-motor coordination.
- *Decongestants.* (Sudafed) Behavioral effects of decongestants under pressure are not as toxic as those observed with the antihistamines, although we have seen some slowing of judgment and coordination. In addition, researchers and clinicians suggest that decongestants may predispose divers to cardiac arrhythmias.
- *Depressants.* Pentobarbital and alcohol have been evaluated, and the effects did not appear to get worse under pressure. However, alcohol intoxication, which can cause nausea or vomiting, would certainly be a problem for the diver.
- *Diuretics.* No behavioral effects have been observed at normal doses.
- *Hallucinogens.* Delta-9-tetrahydrocannabinol (THC), the active ingredient in marijuana, was evaluated in animals. The effects of marijuana, which interferes with cognitive processing and neuromuscular control, get worse under pressure, and these effects are magnified as the partial pressure of oxygen increases.
- *Motion Sickness Remedies.* Dramamine*, an antihistamine-type motion-sickness preparation, which is actually a combination of antihistamine and stimulant, does not appear to produce any significant behavioral problems at depths to 180 fsw.
- *Stimulants.* Dexedrine, Methedrine, and the antidepressant Monoamine-oxidase-inhibitors interact with pressure conditions to interfere with judgment and muscle coordination at depths as shallow as 50 fsw. These drugs also may have undesirable cardiovascular effects.
- *Tranquilizers.* Chlorpromazine, Librium, and Valium caused changes in the dose-response curves from animal subjects when these compounds were evaluated under pressure. The magnitude of the effect was dose- and pressure-dependent. In addition, although we have no data for humans, lack of alertness or overconfidence resulting from tranquilizers would certainly be troublesome at 100 fsw.



"The effects of marijuana . . . get worse under pressure, and these effects are magnified as the partial pressure of oxygen increases."

Now, these findings need qualification:

1. Although the studies were carried out under carefully controlled laboratory conditions, they were not done in the water, and the addition of that factor and its associated variables (e.g., cold, anxiety, fatigue) certainly could alter the effect of drugs.



Performance test subject MM1(DV) Chuck Bonner (right) and GMG2(DV) Don Sayre at console of NMRI's hyperbaric test facility.

"It would be wise to avoid all drugs while diving . . . Even the most benign compound may become behaviorally toxic under pressure."

2. As you've seen, we have not completed all of the evaluations with humans. Some of the conclusions are based on animal research, and, therefore, direct inferences about humans must be made with caution.

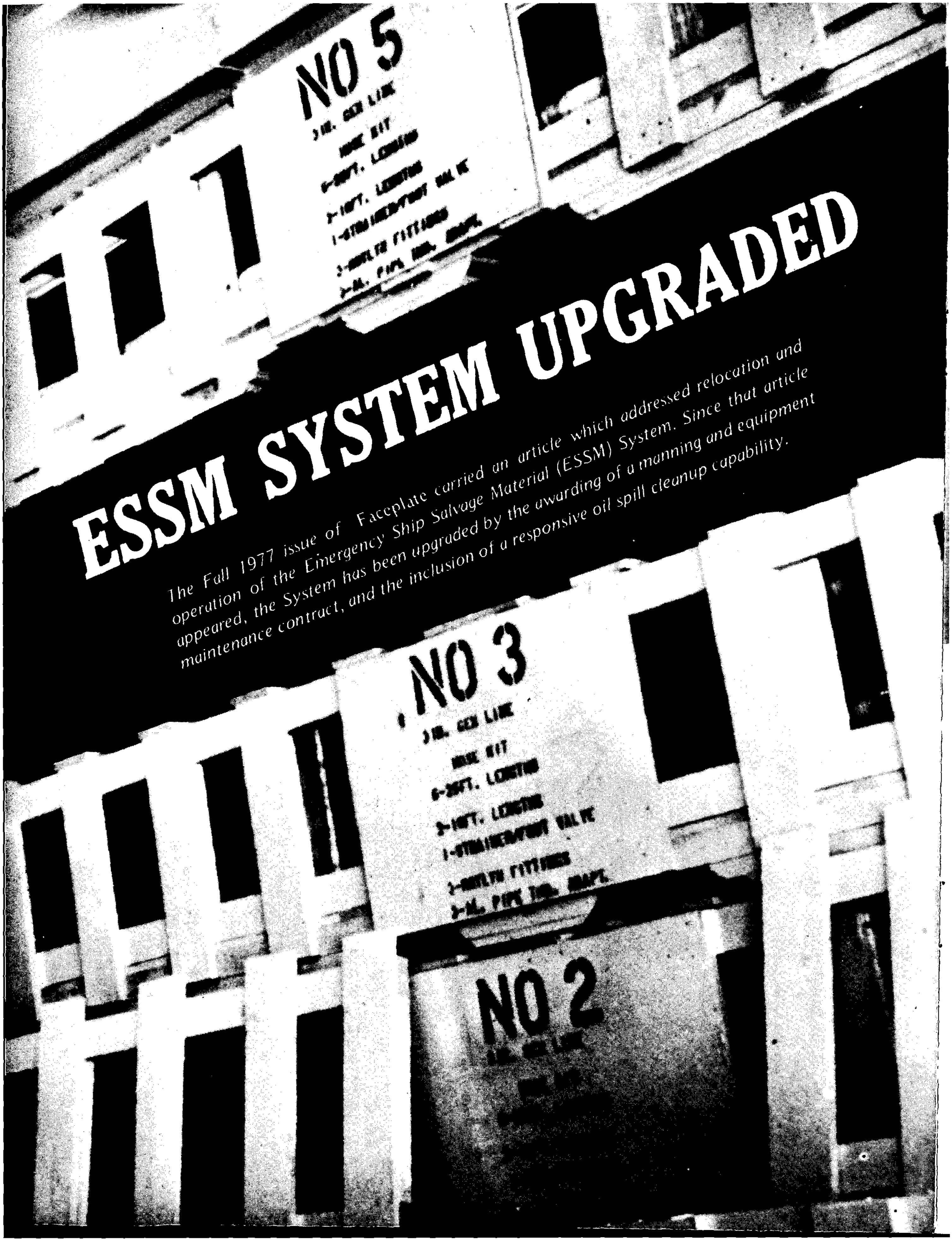
In summary, there are three important facts that you should remember when you plan a dive: 1) Changes in your body chemistry occur while diving; 2) many variables affecting drug action can come into play during a dive; and 3) the interaction of these facts (1 and 2) cause drugs to change unpredictably.

Recommendations

- It would be wise to avoid *all* drugs while diving.
- Remember that over-the-counter preparations can be as toxic as prescription or abused drugs.
- If you must dive under medication, be informed. Get full information from your diving medical officer, realize that even the most benign compound may become behaviorally toxic under pressure, and dive with extreme caution.

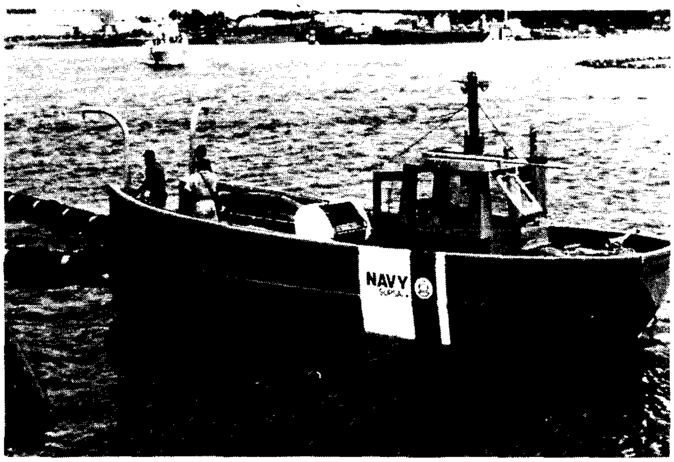
TABLE 1
PARTIAL LIST OF VARIABLES THAT CAN AFFECT DRUG DISPOSITON IN A DIVER

EXTERNAL	INTERNAL	PHARMACOLOGICAL
Breathing gas	Age	Acute vs. chronic
Current	Allergy	Administration route
Diet	Anxiety/panic	Bioavailability
Pressure (depth)	Cardiovascular function	Dose
Pressure x gas interaction:	Circadian rhythm	Excretion
Nitrogen narcosis	Disease state	Metabolism
Oxygen toxicity	GI function	Presence of other drugs
CO_2 intoxication	Infection/fever	Tolerance
Visibility	Pregnancy	Vehicle
Water temperature	Weight	

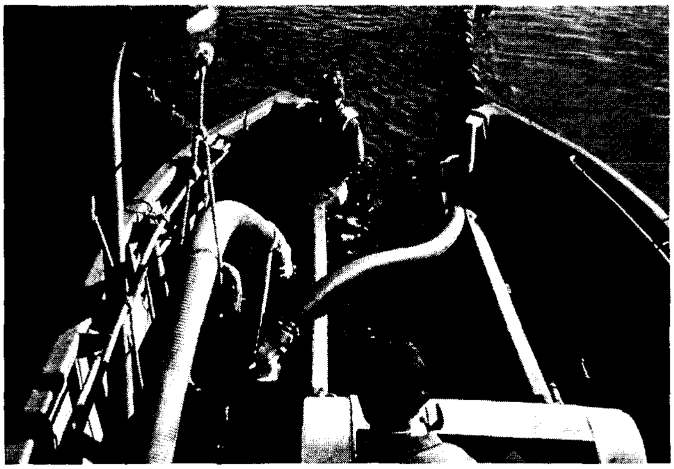


ESSM SYSTEM UPGRADED

The Fall 1977 issue of Faceplate carried an article which addressed relocation and operation of the Emergency Ship Salvage Material (ESSM) System. Since that article appeared, the System has been upgraded by the awarding of a manning and equipment maintenance contract, and the inclusion of a responsive oil spill cleanup capability.



ESSM inventory now includes self-propelled Marco oil skimmers, designed to operate in conditions to sea state 3.



Skimmer and oil containment booms recently underwent successful evaluation in Norfolk.

ESSM equipment is maintained in ready-for-issue condition at strategically located bases in California, Virginia, Italy, and Singapore.

Earl Baker
Office of the Supervisor of Salvage

The Emergency Ship Salvage Material System is a network of bases which store, maintain, control, and issue materials for emergency ship salvage operations both within and outside the continental United States. The materials are provided for ship salvage, ocean engineering, national emergency, specialized projects, and, most recently, marine oil pollution control.

In August 1978, a contract was awarded to Crowley Maritime Salvage, Inc., for the manning and maintenance of the ESSM System. To complement this contract, a basic ordering agreement was awarded through which Crowley can be tasked for the operation of oil pollution equipment and the clean-up of oil spills.

Under the contractor manning and maintenance concept, the ESSM System's capability has been tremendously upgraded. The two continental U.S. ESSM bases at Cheatham Annex, Virginia, and Stockton, California, each have a full-time basic staff consisting of a foreman, a senior mechanic, a mechanic/operator, and a warehouseman. With a full-time staff, many advantages will be realized which formerly were not possible, such as:

- Development and implementation of a realistic maintenance system with programmed periodic testing
- Improved response time
- Establishment and maintenance of a ready-for-issue pool of basic salvage equipment
- Improved warehousing practices
- Availability of highly trained personnel and equipment operators for deployment to oil spills on a 24-hour-a-day basis.

Under the terms of the contract, the contractor will visit the two overseas ESSM bases at Singapore and Livorno, Italy, twice annually to inspect, test and ensure the operational readiness of all equipment stored therein.

Oil pollution control equipment has been integrated into the ESSM System, including Goodyear oil containment boom, boom mooring legs, Marco oil skimmers, hot tap kits and hydraulic submersible pumps for offloading oil from stricken tankers.

The contract with Crowley Maritime Salvage, Inc., was awarded for a three-year period. With the assets and expertise available for maintenance and operation of the ESSM System, it is expected that the System will truly be ready, reliable and responsive.

THE NAVY'S MASTER DIVERS

The Navy master diver (MDV) is the recognized expert of his profession. To achieve this status, an individual must first meet the following qualifications: be a diver first-class for a minimum of two years, serve aboard an ARS or ASR, be an E-7 or above and be recommended by his commanding officer. MDV candidates enroll in the master diver course at the Naval School, Diving and Salvage, at the Washington Navy Yard. The course is given 10 times a year and has a maximum enrollment of four candidates per class. The candidates first undergo an intensive, three-week classroom evaluation, which includes a brushing-up in the medical and technical aspects of diving. This is followed by three weeks aboard a YDT where the candidates are evaluated for their ability to supervise air and gas dives. The final phase is "evaluation week" during which each candidate undergoes one drill per day before a board of his peers. He is evaluated for his leadership, knowledge, and responsiveness to emergencies. Selection to the ranks of the master diver is not easy – about half make it – but the personal and professional rewards are great. Currently, there's room at the top. Approximately 20 of the 98 MDV billets are now open. The Navy's active master divers and their duty stations are listed below:

HTCM(MDV) ERNEST ALEXANDER
USS Bryce Canyon (AD 36)
FPO San Francisco 96601

BMCS(MDV) DICK ARLINGTON
USS Holland (AS 32)
FPO New York 09501

BMCS(MDV) BILL AUSTIN
Naval Coastal Systems Center
Panama City, FL 32407

HTCM(MDV) EARL BENNETT
USS Vulcan (AR 5)
FPO New York 09501

MMC(MDV) DONALD F. BRADBURY
COMNAVSURFPAC, NAD Coronado
San Diego, CA 92155

HTCS(MDV) FRANK BUSKI
USS Florikan (ASR 9)
FPO San Francisco 96601

BMCS(MDV) ERNEST CALTENBACK
Naval Underwater Systems Center
Newport, RI 02840

BMC(MDV) EARL CLARK
USS Prairie (AD 15)
FPO San Francisco 96601

GMCS(MDV) PHIL COLVIN
BMCS(MDV) JUAN RAMOS
Naval Ocean Systems Center
San Diego, CA 92132

HTCS(MDV) JOHN CONNEEN
USS Edenton (ATS 1)
FPO New York 09501

TMCM(MDV) BILL GHOLSON
HTCM(MDV) GARY SPICKERMAN
Second Class Divers School
Service School Command Annex
Naval Station
San Diego, CA 92136

ENC(MDV) WESLEY J. GUMMEL
USS Preserver (ARS 8)
FPO New York 09501

BMC(MDV) WILLIAM GUTIRREZ
USS Beaufort (ATS 2)
FPO San Francisco 96601

BMCS(MDV) HERBERT HARPER
SUPSALVREP West Coast Office
Bldg 7, Rm 82
Naval Support Activity Treasure Is.
San Francisco, CA 94130

ENC(MDV) RAFAEL A. HERNANDEZ
USS Hunley (AS 31)
FPO New York 09501

MRCS(MDV) CHARLES A. HOLTON
USS Ortolan (ASR 22)
FPO New York 09501

HTCS(MDV) SAM HUSS
Solomons Facility Field Div.
Naval Surface Weapons Center
Solomons, MD 20688

HTCS(MDV) JERRY JENNINGS
USS Dixie (AD 14)
FPO San Francisco 96601

MMCS(MDV) BUD KILBURY
USS Ajax (AR 6)
FPO San Francisco 96601

HTCS(MDV) BILLY KITCHENS
USS Fulton (AS 11)
FPO New York 09501

BMCM(MDV) JOHN LANKFORD
Naval Torpedo Station
Code 012
Keyport, WA 98345

HTC(MDV) DONALD M. LAURIN
USS Orion (AS 18)
FPO New York 09501

HTCS(MDV) STEVE LECHNER
U.S. Naval Submarine School
Groton, CT 06340

HTC(MDV) JOSEPH M. LESZCZYSKI
USS Recovery (ARS 43)
FPO New York 09501

ENCM(MDV) BILL LOUDERMILK
MMCS(MDV) MIKE ANDERSON
Harbor Clearance Unit One
FPO San Francisco 96601

MMC(MDV) FERNANDO LUGO
USS Canopus (AS 34)
FPO New York 09501

HTC(MDV) WILLIAM L. MATHIS
USS Dixon (AS 37)
FPO San Francisco 96601

BMC(MDV) JOE R. MEDINA
ENC(MDV) CHARLES M. MOORE
USS Pigeon (ASR 21)
FPO San Francisco 96601

MMCS(MDV) BOB MOORE
Ship Repair Facility Subic Bay
U.S. Naval Station (Box 4)
FPO San Francisco 96651

BMC(MDV) ROY MOWEN
USS Sperry (AS 12)
San Diego, CA 92132

HTCS(MDV) JON MUNDY
Naval EOD Facility
Indian Head, MD 20640

HTCM(MDV) JOHN ORTIZ
BMCS(MDV) DON McKENZIE
Naval Submarine Trng. Ctr. Pacific
Pearl Harbor, HI 96860

MMC(MDV) COY W. PAYNE
USS Brunswick (ATS 3)
FPO San Francisco 96601

MMCS(MDV) TOM PETERSON
USS Yosemite (AD 19)
FPO San Francisco 96601

GMCM(MDV) GEORGE POWELL
ENCS(MDV) BOB CAVE
SWC(MDV) CHARLES COPE
Commander, SUBDEVGRU ONE
139 Sylvester Road
San Diego, CA 92106

BMC(MDV) RICHARD RADECKI
Naval Safety Center (Code 20)
Naval Air Station
Norfolk, VA 23511

EMC(MDV) MICHAEL D. REYNOLDS
NAVPERS Program Support Activity
Navy Dept.
Pers 5112 Navy Annex
Washington, DC 20370

ETCS(MDV) DUSTY RHODES
USS Howard W. Gilmore (AS 16)
FPO New York 09501

BMCM(MDV) DALE RIBBECK
USS Petrel (ASR 14)
FPO New York 09501

BMCS(MDV) LEE RINEHART
USS L.Y. Spear (AS 36)
FPO New York 09501

ENCS(MDV) BILL ROMAINE
USS Jason (AR 8)
FPO San Francisco 96601

MMCM(MDV) FRED SCHUNK
QMCS(MDV) GERALD DRAPER
BMCS(MDV) MIKE EIHNELLIG
HTCS(MDV) JOHN SCHLEGEL
BMC(MDV) HARRY CROTTS
BMC(MDV) ROBERT T. VAN DINE
Naval School Diving and Salvage
Washington, DC 20374

BMCS(MDV) ROBERT SMITH
Box 300 SSF Diving Locker
U.S. Submarine Base
Groton, CT 06340

BMCM(MDV) OKEY SOUTHERS
Commander Naval Surface Force
U.S. Atlantic Fleet
Norfolk, VA 23511

ENCS(MDV) JIM STARCHER
Commander Service Squadron 8
Naval Station
Norfolk, VA 23511

HTCS(MDV) RAY STEELE
Maintenance and Support
U.S. Naval Submarine Base
Pearl Harbor, HI 96860

BMCS(MDV) DAVE THOMPSON
Civil Engineering Laboratory
Naval Construction Battalion Center
Port Hueneme, CA 93043

HTCS(MDV) DICK THOMPSON
USS Simon Lake (AS 33)
FPO New York 09501

BMCM(MDV) JAMES TOLLEY
MMCM(MDV) A.J. PARFINSKY
BMCM(MDV) PAT BEHLING
HTCS(MDV) DAVID DEBOLT
BMCS(MDV) EDWARD WOODY
SMC(MDV) JACK DELAUTER
Navy Experimental Diving Unit
Panama City, FL 32407

MMC(MDV) CHARLES WETZEL
Naval School EOD
Indian Head, MD 20640

MMCS(MDV) ROBERT WILEY
EOD Training & Evaluation Unit
Barbers Point, HI 96862

MMC(MDV) DICK WIEBE
Shore Intermediate Maintenance
Activity, Mayport, FL 32228

QMC(MDV) JESSE WILLIAMS
USS Sierra (AD 18)
FPO New York 09501

ENCM(MDV) BILL WINTERS
BMCS(MDV) PETE PETRASEK
GMGCS(MDV) CHESTER C. STANLEY
BMC(MDV) EDWARD THOMAS
Naval Medical Research Institute
Naval Medical Center
Bethesda, MD 20014

MMCS(MDV) BILL YARLEY
USS Reclaimer (ARS 42)
FPO San Francisco 96601

At left, Lieutenant Curt Haverty inspects marine growth on a derelict hulk grounded on the reef near deep water channel into Eniwetok's lagoon. Below, Haverty inspects the reef below the stern of another wreck (shadow in background).

CLEAN-UP AT ENIWETOK

U. S. Navy divers and salvors from Harbor Clearance Unit One reserve detachments are saving Eniwetok, an atoll hard-hit over the years by battle, nuclear testing, and neglect.

LCDR R.H. Wells, USN, HCU-1 Det 110, Corpus Christi, Texas

The West Coast reserve harbor clearance units that support HCU-1 in Hawaii have all participated this year in the ongoing clean-up project on Eniwetok atoll, which is part of the United States Trust Territory in the Marshall Islands of the Pacific.

The units, Corpus Christi (Det 110), San Francisco (Det 220), Long Beach (Det 319), Seattle (Det 522), Honolulu (Det 614), and San Diego (Det 410) all took their ACDUTRA to assist an already overextended group of HCU-1 (and some HCU-2) personnel on this long-term project. With full support by HCU-1 the reserve units received indoctrination and demolition training in Hawaii before embarking to Eniwetok.

The clean-up is a joint-service project, but the only reservists who have been involved, or are likely to be involved, are those from reserve harbor clearance units.

In regards to their performance, Commander Art Erwin, commanding officer of HCU-1, said, "These sailors performed superbly, and provided us with the kind of help we needed. They're not reservists; just good, hard-working sailors and divers."

They report to the officer-in-charge of the diving/salvage detachment upon their arrival on Eniwetok and after a brief indoctrination are incorporated into the mainstream of salvage activity under way.

The clean-up project on the atoll is the result of an agreement between the United States Government and the native population. The material to be cleaned up and disposed of is the result of several factors: (1) The Japanese occupation prior to and during much of World War II; (2) a World War II battle between the U.S. and Japan in which the atoll was taken by the combined naval and Marine Corps force on February 23, 1944; and (3) the use of the atoll as a nuclear testing site. What has been left behind is debris from battles and nuclear tests, beached and sunken water craft of all manner, motorized vehicles dumped in the water or left on land, and numerous buildings to be razed. The Navy is responsible for, among other things, all material scheduled for removal that is located below the high-water mark.

The HCU reservists start out early each morning accompanied by diving detachment and EOD personnel, with a specific task set for their day. In this manner, they have managed to assist in most of the required Navy work on the islands of Medren, Japtan, Ikuren, Mut, Boken, and some of Eniwetok.

Typically, this work consists of search and survey, then demolition, followed by a clean-up using the detachment's D-8 Cat, various boats, a cherry-picker,

and a great deal of mulehauling by hand. All pieces of material spread out from an explosion must be deposited above the high water mark for later pick-up and disposal. In each case, demolition is set to spread debris out into the water to have minimal effect on the island's flora. This, of course, requires more work for the salvors.

Although accompanied each day by regularly assigned personnel, each HCU reserve team plans and executes the day's work. Individuals participate on each project from survey to clean-up, allowing the reservists to get maximum hands-on training. Those who have not had extensive training in demolition are paired with someone more experienced. Moreover, each step in the process is carefully monitored by qualified personnel before it is carried through.

Even though the idea for using the reservists for this project was the brainchild of Commander Erwin, much credit must be given to the entire staff of HCU-1 for making it possible; also, Lieutenant Commander Rob Hampe of CNAVRES and both the active and reserve sides of NAVSEA Diving and Salvage.

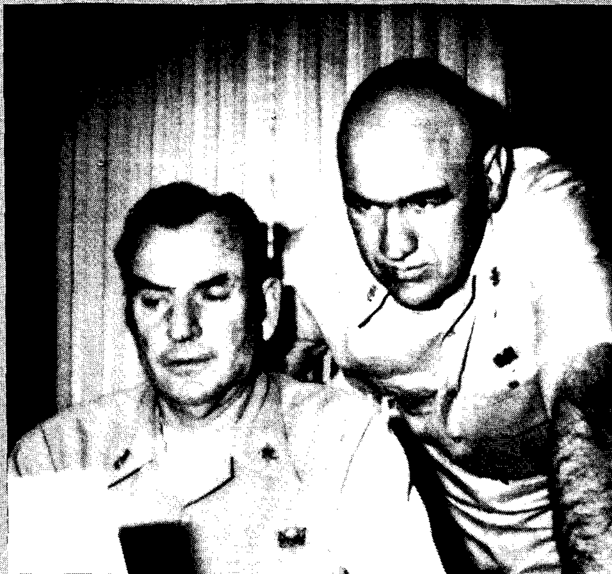
Above, HTC Jim Hayden instructs another reservist in the proper way of setting "det cord." At right, Hayden, LCDR Dick Wells and others set demolition charges around junked diesel engines and other debris left from a rotted hulk.

Commander Erwin said, "The readiness of these units has been obvious in their ability to immediately pitch in and go to work upon their arrival. It's not glamorous work, but it is the kind of work salvors are called on to perform."

It is an idea whose time has come. The success of the effort has been apparent to anyone involved with the project.

Charges are set so that negligible damage is done to the atoll and its life above and below water. After each detonation, all debris is disposed of by the Navy divers.

☆ Government Printing Office: 1979-720-375/1



Master Chief Tolley (left) will retire in June after 34 years of naval service, 27 of them in diving. MMCM Andrew J. Parfinsky (right) will write The Old Master column beginning next issue.

THE OLD MASTER

Changing the Watch

Looking back over the past 10 years, there have been some tremendous advances made in diving, both militarily and in the commercial field. More diving is going on now all over the world than ever before in history. We have seen our capabilities reach from the continental shelf to way past the depth limits that we ever dreamed of. The old Mk V hard hat will soon be a treasured "has been" as it will be replaced by a much lighter and improved piece of equipment, the Mk 12 SSDS. Did you ever dream of welding pipe in over a 1,000 feet of water? The commercial diving industry is doing it and having no problems. How about living at a 1,000 feet and deeper for over a month at a time? It's being done.

Thanks to one-atmosphere submersibles, we can recover objects from the ocean floor that were impossible to recover 10 to 15 years ago. Now they have diver lock-out submersibles. Can you imagine the capability this gives the diving industry?

Underwater television is a great asset. You can view the ocean floor thousands of feet deep now with underwater television cameras and topside monitors.

Thermal protection for the diver has improved considerably in the last 10 years with advancements in hot water suits and variable volume dry suits. There is a tremendous amount of work to be done in this area yet, but you can bet we'll get there.

With the specifications and certification process that we now have for new equipment and systems, we have a safer and more reliable inventory of diving systems than we've ever had.

The role of the diver himself has changed considerably in the last 10 to 15 years. It used to be that we wanted divers that could do the work in the water. If he was big and strong and could perform well in the water, he was a good diver. Now you have to be a technician, mathematician, and bookkeeper. We are required to know more about the medical aspect of diving than ever before. Now we are required to keep documentation on everything we do to a diving system. You should no longer have to go to a new diving locker and have to guess at what has been done to a piece of equipment or system.

The future looks very bright in diving. I believe that our depth capabilities will double in the next ten years. I think our decompression time will be much shorter. It's possible that the power to light, heat and cool your homes will come from the sea. Besides oil and gas, we'll be taking all types of minerals from the sea. More food will be coming from the sea. There is no end to what the oceans will do for us.

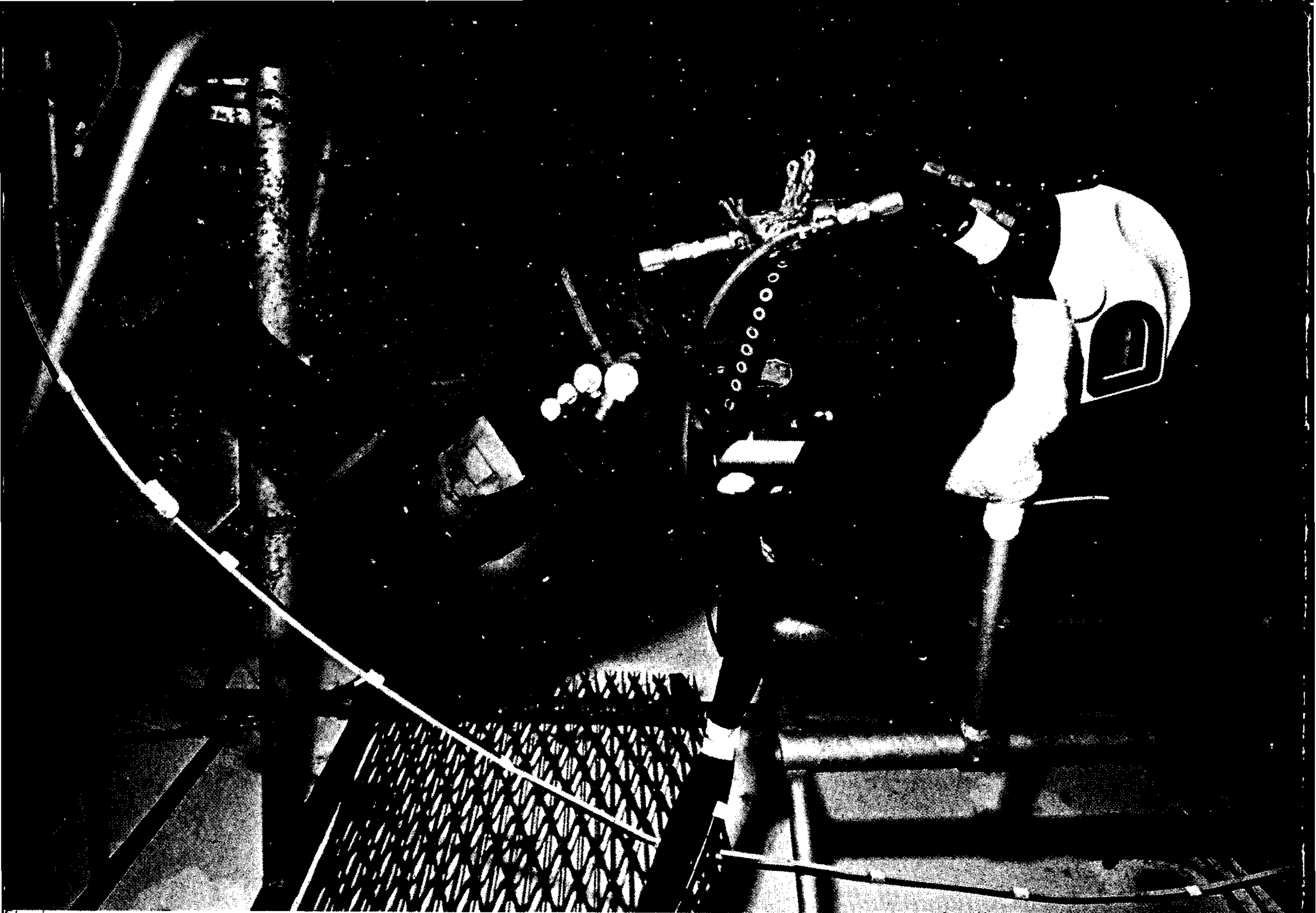
For you young people that are in diving now, you have a great future ahead of you. If you have just started your Navy career and would like to get into a challenging field that has a great future, request to go to diving school. You will never regret it!

I would like to mention that the Canadian Experimental Diving Unit is now operational. The system was designed and built for a depth capability of 5,000 feet. They can presently operate to a depth of 2,500 feet. And, the British Navy now has a ship operational with a saturation diving system that has a depth capability of 1,000 feet (see article, this issue).

Well, fellow divers, I'll be retiring in June with almost 34 years of naval service. Almost 27 years of that time has been in diving. As this will be my last article for *Faceplate*, I would like to say that I have enjoyed every day of diving duty. The best people the Navy has are in diving. I regret that I won't be a part of the Navy's progress in diving for the next twenty, but we all have to make way for the younger diver sometime. To you all, I say good luck and safe diving.

J. L. Tolley

BMCM(MDV) J. L. TOLLEY
Senior Master Diver, USN
Navy Experimental Diving Unit



DEPARTMENT OF THE NAVY
NAVAL SEA SYSTEMS COMMAND
WASHINGTON, D C 20362

OFFICIAL BUSINESS
PENALTY FOR PRIVATE USE, $300

THIRD-CLASS MAIL
POSTAGE & FEES PAID
USN
PERMIT No. G-9

POTCMAC RESEARCH, INC. 5-016-1287
1607-D LISENBY AVE
PANAMA CITY, FL 10
32405

MAY 16 RECD