THE BIO-MEDICAL RESEARCH DIVER

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Navy divers completing 85°F warm water dives once a week, then flying over 1,000 miles to take part in 41°F cold water dives the next week?

It does happen – particularly if the divers are participating in one of the biomedical diving research studies at the Naval Medical Research Institute. This past spring, research divers concluded human-performance evaluations of the one-atmosphere diving system (JIM) in warm water and one week later were at work in cold water investigating physiological and psychomotor performance. For the Navy diver who’s looking for unusual and unique experiences, biomedical research diving may be the answer.

The Naval Medical Research Institute (NMRRI) is located on the grounds of the National Naval Medical Center in Bethesda, Maryland. The Navy’s largest biomedical research facility, NMRRI houses approximately 200 military and 200 civilian personnel. Its mission, assigned by the Secretary of the Navy, is “To conduct basic and applied research and development concerned with the health, safety, and efficiency of naval personnel.” As part of NMRRI’s effort to carry out its mission, a biomedical diving research program has been active since the early 1940’s. Within NMRRI, diving support for medical investigations is primarily furnished by the Hyperbaric Support Department.

Navy divers serve a three-year tour at NMRRI; most of the billets are slotted for accommodation and day-to-day support of bio-medical research. On board at NMRRI in the spring of 1979 were 13 divers: 2 Saturation Master Divers, 5 Saturation Divers, 2 Divers First Class, 1 EOD Diver, 1 SEAL/UDT Diver, and 2 Diving Medical Technicians. When the new 1500-psi saturation system becomes operational later this year (Faceplate, Fall ’79), the number of divers personnel will be increased fourfold.

The present contingent of divers at NMRRI is called upon to perform a variety of tasks in support of bio-medical research, in addition to the usual duties associated with a diving facility. Divers at NMRRI often are asked to volunteer for diving medical experiments, experiences which may demand the utmost in diver stamina and fortitude. For example, during the past year NMRRI divers participated in studies evaluating commonly used drugs (Faceplate, Spring ’79), one-atmosphere diving performance, flying after diving, heat loss in water, blood gas exchange, and diver/operator performance in the one-atmosphere diving system. The tasks NMRRI divers perform in these studies are rarely pleasant; moreover, they may call for extensive physiological monitoring of diver performance via electrodes and probes under conditions of extreme environmental stress (eg. water temperature, fatigue). Successful biomedical research divers at NMRRI exhibit patience in the face of lengthy and involved experimental procedures and a dedication to accomplishing the tasks in an exemplary manner. Without the cooperation and professionalism of the NMRRI diver, applied biomedical diving research would falter.

Although no single investigation is typical of the experiments under way at NMRRI, a study can be chosen to illustrate the tasks NMRRI divers are called upon to perform. Recently, NRI(DV) Weaver participated in a study evaluating the effects of water temperature on physiological, cognitive, and motor performance by a wet-suited, scuba-equipped diver. During the experiment he completed 14 dives in water ranging from 77°F to 41°F. On each dive he performed tasks including top hatch transfer, tooler patch removal and installation, time estimation, learning and memory performance, on underwater response acquisition paddle, and torque wrench estimation. Before each dive EEG electrodes and temperature probes were applied; bottom times ranged from 30 to 50 minutes. The data gathered from this study will assist researchers in understanding the nature and extent of environmental stressors on diver performance. Once validated, this information will be passed on to the fleet with recommendations for appropriate action.

When not actively engaged in a research project, NMRRI divers can be found conducting pressure and O₂ tolerance tests for US Naval Academy midshipmen and divers, recompression treatments for military and civilian diving accidents. In addition, NMRRI divers have the opportunity for travel. Among the TAD locations visited by NMRRI research divers in the past year were Isle of Shoals, Maine; San Antonio, Texas; Panama City, Florida; and Columbus, Ohio.

What do the NMRRI researchers think of the support provided by the research divers? The comments of Dr JM Walsh are illustrative: “NMRRI divers do an excellent job for us. They are co-operative and highly motivated, despite numerous discomforts and indignities they must endure for reliable data to be gathered.” The NMRRI biomedical research diver fills a unique and important role in advancing our understanding of the effects of hyperbaria on the human body.

WE THANK THE SUPERVISOR OF DIVING, US NAVY, FOR PERMISSION TO USE THIS ARTICLE, WHICH WAS ORIGINALLY PRINTED IN FACEPLATE, SUMMER 1979.

OPINION CORNER: QUIS CUSTODIET CUSTODES?

Douglas Walker

Reading the article by Dr Michael Curley about his work using Biomedical Research Divers set me thinking about the responsibility of those running such investigations. Work involving risk of some sort to the subject is a necessary concomitant of seeking to advance physiological knowledge, and is unavoidable in the testing of new decompression procedures or the investigation of the course and the treatment of hypothermia, to mention two examples effecting diving medicine. Some seemingly enormous and important decision to write, namely re-reading an article concerning experiments using rats, the publication of a book on CIA experiments, and the paper by Drummond Rennie (Deputy Editor of the New England Journal of Medicine). The notation about the responsibility of all doctors to resist illegal and immoral acts on persons was perhaps the stimulus to precipitate into print.