

1990

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Recommended Citation

Hooper, Richard R. (1990) "Medical Support for the Fleet," *Naval War College Review*: Vol. 43 : No. 3 , Article 4.
Available at: <https://digital-commons.usnwc.edu/nwc-review/vol43/iss3/4>

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Medical Support for the Fleet

Captain Richard R. Hooper, MC, U.S. Navy

To the average professional officer, the military doctor is an unwillingly tolerated noncombatant who takes sick call, gives cathartic pills, makes transportation trouble, and causes the water to smell bad. Of course, he is useful after an action to remove the debris, but otherwise he is almost, if not quite, a positive nuisance.¹

Hans Zinsser

Medical services, though they are vital to an Army's welfare, affect it only through a small portion of its men, and therefore exert only a weak and indirect influence on the utilization of the rest.²

Carl von Clausewitz

The attitude reflected above, that medical support is primarily for the provision of care to the wounded after the battle is over, is still widely held by naval officers. A few years ago I interviewed a number of commanding officers regarding the medical support they were receiving. The general perception was that a medical officer's primary function was to take care of casualties resulting from accidents or battle. This perception is understandable because the prevailing public view of medicine in general is that the doctor's function is to treat illness or injury, and sailors as a group are generally healthy. Physicians have also contributed to this narrow perception. Many articles on medical support have focused on the care of the wounded and have not addressed the larger support role of medicine in the shipboard environment.³

However, the attitude that medical support is primarily battle casualty care is both mistaken and ill advised. It neglects the range and depth of support the medical community could provide, and it could ultimately jeopardize our ability to win a future war. In this article I examine the relationship between medical support and the Navy's mission. My thesis is that medical support needs to focus on this mission rather than on treatment of the injured after

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a battle is over. Furthermore, I believe that medical support is far more important than many officers realize, and its importance will become even greater in the future.

Medical Support and the Navy's Mission

The primary aim of medical support is to help a commander accomplish his mission, i.e., to "conduct prompt and sustained combat operations at sea."⁴ A carrier held in port because most of the crew has influenza, a submarine with an outbreak of food poisoning, or a SEAL team afflicted with dysentery are examples of situations where medical support may have been inadequate, thus leading to mission failure.⁵ Similarly, a medical evacuation (medevac) at an inopportune time can jeopardize a ship's mission, as any submarine commander will attest. Involvement of the medical officer in the planning process and in the regular provision of advice to the commander may sometimes make the difference between mission success and mission failure.

Medical support conserves manpower, which directly affects mission performance. In 1927 Lieutenant Commander William L. Mann described the purpose of the military medical service as "the promotion of physical efficiency for combat—by proper procurement and conservation of physical power."⁶ This medical support role was also reflected in the World War II adage of "keeping as many men at as many guns as many days as possible." Manpower conservation is accomplished by careful selection of personnel medically qualified for the job; preventive measures to keep them healthy; early intervention or treatment when injury or illness occurs in order to return them to their jobs as rapidly as possible; and removal of personnel from the environment by medevac, job transfer, or retirement when they become a burden to the system or a danger to themselves or others.

Medical support enhances crew morale. Although it is difficult to measure, we do know that reenlistment rates and the willingness of troops to fight are influenced by the availability of medical support. While some argue that morale is less important in a maritime environment because "in ships at sea the men go where the leaders go,"⁷ this statement is not so valid in this era of multiple worldwide commitments when we rely on experienced, trained, dedicated personnel to maintain a deterrent posture. Personnel are deployed to distant places for extended periods of time, and morale becomes of primary importance in maintaining good job performance. Furthermore, in the broader operational context, personnel will be needed for campaigns, not just single battles.

Lastly, medical support fulfills a moral obligation. Our national values emphasize the worth of the individual. Our willingness to take care of those in need is part of our heritage and a responsibility to which we must stay committed.

Thus, the purpose of medical support could be restated as helping the command to accomplish its *mission* by conserving *manpower*, promoting *morale*, and fulfilling a *moral obligation*. This perspective is far removed from the narrow view of medical services as having “a weak and indirect influence,” if not being “almost, if not quite, a positive nuisance.”

Medical Support in the Maritime Environment

To be effective at sea, medical support must adapt to the maritime environment. A number of characteristics make the practice of medicine at sea different from that on land. A ship can be thought of as a combination of an island, a factory, a moving vehicle, and a “home away from home,” all rolled into one. The “island” concept means isolation, with its concomitant lack of readily available medical consultation and equipment. The “factory” concept means a concentration of machinery exposing the crew to heat, noise and other hazards that can produce injury and disease. Most Navy ships are also weapon platforms where training is constant, and the risk of accidents is an ongoing concern. The ship as a “vehicle” means mobility and, consequently, exposure to a wide variety of environments where unusual diseases may be acquired. Motion contributes to accidents and sea sickness and poses difficulties in patient transfer. Also, the streamlined design of this vehicle means crowding and difficulties with storage of materials, including medical supplies. Finally, the “home away from home” means the ship is a residence for a big family where diseases can spread rapidly from person to person.

These characteristics of the maritime environment lead to higher disease rates and risks of injury than are found in the shore environment. Respiratory, intestinal, and skin disease rates are all higher in the shipboard setting than ashore. Psychological problems and traumatic injuries are also more frequent. Loneliness and prolonged absence from families causes psychological stress. In addition, there are conditions peculiar to the aviators that fly above the ships and the divers that swim below them.⁸

In the maritime environment, triage, or the establishment of priorities for the treatment of patients, takes on a distinctive character. At sea, the first priority is to save or “fight” the ship. Those members of the crew critical to maintaining the operational status of the ship must receive care first, provided they have treatable injuries. More seriously injured patients may therefore be assigned a lower priority of care. For example, when the U.S.S. *Stark* was hit by Iraqi missiles, the corpsman focused his efforts on treating the firefighters for their heat exhaustion and smoke inhalation so they could resume their firefighting efforts. The two serious burn patients received only basic first aid until a doctor arrived about 1½ hours later. The corpsman’s treatment priorities were exactly right in this situation. If a ship is lost, then the whole crew is at risk of being lost, in contrast to the triage situation on land, where other factors determine who will be the first to receive attention.

Medical Care, Square Rigger Style

At about this time I began to feel ill. At first I had a terrible headache and the sensation that all my teeth were being pressed out of my mouth. . . . I decided to live on bread and jam and fruit soup till my illness left me. As if by magic, fruit soup vanished from the menu and we had a week in which it seemed that the Cook had taken a vow to destroy us all by giving us scurvy. . . . In the middle of this week of horror, being in genuine agony, I applied through the proper channels to speak to the Captain, who was reputed to have a medicine chest. My interview took place in an informal manner at one o'clock on a very dark morning whilst I was at the wheel. Suddenly the Captain loomed out of the darkness and addressed me in what most Europeans still imagine to be American.

"So you can't take it. You're dying, are you?"

I told him that the meat made my mouth feel terrible. "Bloody meat is it?" This rather angrily, putting my thoughts into words.

Then reminiscently, "Ah, English boys, plenty of ice cream every day. Here we have man's food. Drink plenty lime juice. Soon you'll be better or you'll die. Don't worry—I won't."

This rough and ready treatment combined with the remainder of the jam effected a cure. In a week my gums hardened up and I felt well again. . . .

Eric Newby

The Last Grain Race

(New York, Penguin, 1956, pp. 96-98)

In a ship at sea, advanced first aid training of the crew and the dispersal of medical supplies is of great importance. During a battle, movement of casualties becomes difficult, partly because of the ship's compartmentalization. Therefore, initial care may need to be provided by crew members in the same compartment.

To complicate the situation, evacuation of casualties is likely to be delayed and will be determined by the tactical situation. In some cases, mildly injured patients will need to stay to help fight the ship. When the U.S.S. *Samuel B. Roberts* hit a mine, an electrician received an injury for which he would normally have been evacuated. However, his technical knowledge and supervisory skills were needed to run the emergency diesel generators and thereby keep the firepumps going. His evacuation was delayed until after the crisis was past.⁹

At sea we will never have enough medical assets to handle large numbers of casualties or to take care of every contingency. In this regard, Captain Wayne Hughes has observed that "the predominance of attrition over maneuver is a theme so basic that it runs throughout. Forces at sea are not broken by encirclement; they are broken by destruction. Over the years naval strategists have been careful about committing their forces to battle at sea because of its awesome destructiveness."¹⁰

Medical support during a battle at sea cannot be implemented effectively unless the scenario includes the following: casualties resulting from battle are injured or wounded rather than killed; a ship hit by a missile or torpedo stays afloat long enough for the wounded to be medically managed; medical personnel and equipment in the damaged ship remain functional; treatment is focused on those who are able to fight the ship; transfer to another unit is feasible despite the isolation of the ship, bad weather, or an ongoing battle; and the receiving unit has its own medical capabilities, a place to hold the wounded, and the ability either to treat the patient or to transfer him out of the battle force.

Clearly, it may be much more difficult to take care of battle casualties at sea than to do so ashore. It is also evident that a host of different events, many non-medical in nature, impact on the effectiveness of medical support. Moreover, the need to plan ahead, to make the best use of limited resources, and to take all the preventive and safety measures possible, is obvious. For example, money may be better spent on anti-flash clothing than on burn treatment.

Due to the characteristics of shipboard life, the variety of disease and injuries to which the sailor is exposed, and the difficulties in managing casualties, the most important functions performed by medical personnel are those that maintain the health of the crew. These functions include making sure that only the medically qualified go on deployment, the establishment of measures to prevent disease (e.g., immunization, education), and early treatment of the sick or injured. This is clearly more cost-effective and morale-enhancing than having to evacuate a patient whose condition has deteriorated. In the isolated shipboard environment, a commander can require the use of healthful, safe procedures, although this degree of control is not possible outside the ship's confines. However, these preventive measures might make the difference between mission accomplishment and mission failure.

The Present Status of Medical Support

Mission Support. Does the naval medical community currently focus on mission accomplishment? The medical support provided by the operational community of corpsmen, flight surgeons and submarine medical officers is certainly mission-oriented.

During World War II aviation commanders, concerned about the availability of pilots, discovered that flight surgeons enhanced their ability to keep pilots in the air. Later, flight surgeons were able to identify factors that could reduce accident rates and keep even more pilots on the job. Thus, the importance of the flight surgeon to a successful mission was realized.

There was a similar recognition of the mission importance of the submarine medical officer, although in 1972 it was determined that his services were not needed in submarines at sea. The closed environment and the small number of highly-select individuals resulted in low numbers of serious injuries and illnesses. Furthermore, the lack of diagnostic and treatment facilities aboard a submarine meant that a medical officer was often unable to do more than a corpsman could do. Only rarely did a situation occur where the assignment of a medical officer to a submarine made the difference between mission completion and mission failure, i.e., where the presence of a medical officer precluded a medical evacuation. Since the emphasis was on prevention of disease and injury, the job afloat could be done adequately by submarine corpsmen.

The mission orientation found in the flight surgeon, the corpsman, and the submarine medical officer is less often found in the hospital community¹¹ and in medical officers in surface ships.

The reduced mission orientation on the part of the hospital community is due to a divided responsibility during peacetime: support of active duty personnel and care of the dependent and retired populations. Another contributing factor is the focus of medical training on the care and treatment of the hospital patient rather than on prevention and early ambulatory treatment. Doctors tend to emphasize what they do best, and without adequate training and motivation, tend to make no distinction between the practice of medicine in the Navy and the civilian community.

The lack of mission-oriented medical support in the surface community is more difficult to explain. The previous assignment to ships of physicians untrained in shipboard medicine may have contributed to this lack of mission orientation. In the 1970s the ship squadrons' medical officer billets were deleted, and medical officers were assigned to surface ships directly from the civilian community. The general assumption was that the practice of medicine at sea is no different from that on land. The relative ease of medevacs and communications aboard surface ships as compared to submarines tended to support this view. Recently, steps have been undertaken to correct this lack of emphasis on mission support. A three-week orientation for medical officers going to surface ships has been implemented, and medical officers and senior independent duty corpsmen have been reassigned to surface ship squadrons. In addition, the role of independent duty corpsmen has been reviewed, financial incentives have been provided, and more attention has been paid to their training program. However, there is still difficulty in finding senior medical officers to fill the surface and numbered fleet medical slots. There is also a shortage of qualified medical officers to serve at the group level.

How much medical support does the fleet require? In a world of manpower constraints and logistic difficulties, the answer is, "At least enough to conduct prompt and sustained combat operations at sea." At the very least, medical

support needs to be sufficient to make the difference between mission execution and mission failure.

A few years ago a senior naval officer asked, "On a nuclear-powered vessel, can we provide sufficient medical support to sustain five to ten major burn patients and still allow the vessel to complete its mission?" The answer was, "No. Not only would we be short of supplies and trained care, but we also lack the equipment and the facilities to care for burn patients in such conditions." In other words, the only way that ship could complete the mission was by placing the lives of the burned sailors in jeopardy. While this answer was not the one the admiral wanted to hear, it does illustrate the need for prevention when medical support focuses on a ship's mission.

Prevention. Prevention in medical support equates to deterrence in national strategy. Are we presently providing the necessary level of preventive medical support? Our ability to keep people on the job and to prevent illness has made great strides since World War II. Most operational units and our overseas hospitals are adequately manned by medical staff. We get the job done. However, the demands placed on the system during peacetime are low, partly because of a healthy, high quality force. Medical support should concentrate on manpower conservation in order to support the fleet's ability to fight, upon which rests its contribution to deterrence.

Medical Readiness. As the fleet emphasizes readiness, so must the medical support system. How ready is our medical support? Let us try to answer this question by examining the medical readiness required in a crisis such as the escort operations in the Persian Gulf. The shortage of corpsmen in our smaller vessels, using peacetime manning standards, quickly became apparent following the U.S.S. *Stark* incident. The *Stark* had only one corpsman aboard. Subsequently, we made sure that the frigates assigned to the Persian Gulf had at least two corpsmen aboard. There was also difficulty in finding enough medical officers to meet the need, both in the management and patient care areas.

It follows then that medical support of the fleet would be difficult in wartime. Many more people will need to be screened medically for ship assignment, for flight duty, and for deployment. We will have outbreaks of disease and increased injury rates—just as we saw in Vietnam and in all prior wars. In the face of manpower shortages, prevention of disease and injury will become more important than ever to maintain a state of readiness.

Flexibility. Is the medical support system able to provide the flexibility required to support the fleet in wartime? There will be a shortage of rapidly available trained medical manpower for operational assignment. In recent years we have focused on recruitment of specialists that are in short supply

and hard to retain. We have deemphasized the need for generalists—internists, pediatricians, family practitioners and preventive medicine doctors. Yet these are the types of physicians who are most flexible and, with the proper training, would be most valuable in the maritime environment.

The physicians we assign to our surface ships receive only the three-week course mentioned above. Our solution to medical problems has been to rely on medical evacuation or to provide a ship with many specialists on board, such as an LHA or a hospital ship. This solution is not realistic for surface action or underway replenishment groups during wartime, especially those in forward locations. The carriers have surgeons, but elsewhere surgeons are in short supply. Present mobilization plans call for all combatant and most logistic ships to receive medical officers in wartime, but these manning plans place a reliance on reserve billets which are often unfilled. Even if filled, they will often provide medical personnel untrained for the maritime environment.

Technology. The influence of technological advancements on the medical support system in the maritime environment is considerable. Some advances have improved our flexibility, but others have created new problems.

Medical technology has become much more sophisticated in recent years, allowing great strides to be made in diagnosis and treatment. Design improvements in some types of equipment have led to smaller space requirements and increased durability. These advances are of considerable value in a shipboard setting. Also, the longer shelf life of medical supplies and improved methods of storing blood have led to greater treatment capabilities, allowing patients to remain in the ship or to be stabilized prior to medevac.

The advent of the portable computer has made the job of the medical department representative easier and more productive. The ability to store large quantities of medical information will continue to help him do his job in the future.

Promising future developments include a system to use the ship's water supply as a source for intravenous fluids, and a process to extract oxygen from the ambient air. These should result in fewer medical logistic requirements at sea.

On the other hand, the convenience of using disposable items has resulted in a requirement for more bulk storage space, a commodity in very short supply in ships. All the sophisticated equipment for shipboard use requires a large infrastructure to support it. Technicians are more specialized and, therefore, each becomes more critical to the ship's operation. Many recent graduates of medical school have been trained on equipment that cannot be used at sea. They become frustrated with the lack of access to precise diagnostic equipment and specialty consultation. Rapid technological

advances also mean a rapid outdateding of equipment, which increases the cost of medical support.

Recommendations and Conclusions

In order to support the fleet effectively, we must ensure that the necessary steps have been taken to prevent human casualties and to care for those we cannot prevent. Manpower conservation is becoming ever more important. This concept was understood during World War II: "Because seasoned and well-trained personnel are of inestimably more value than raw recruits and there is always limited manpower, it is imperative that the medical service not only strive to shorten healing, making possible early return to duty, but also institute hygienic and preventive measures to limit the incidence of disease."¹² Ships, and the weapon systems they contain, are becoming more complex, increasing the need for specialized, experienced personnel to operate them. Moreover, there are fewer people in modern ships than there were in old ones. Hence, each technician has become more important to the overall performance of the ship than formerly and, therefore, the maintenance of his health has gained in relative importance. The loss of a sonarman, for example, may have a critical impact on his ship's performance. Finally, the decline in the number of ships in the fleet puts an increased burden on each unit for the success of the mission. Mission failure for medical reasons is just as unacceptable as any other reason would be.

Medical support has a positive effect on the maintenance of morale. Today's educated, trained, specialized naval force has higher expectations for health care, despite the fact that this force is generally healthier than it has ever been.¹³

What changes should be made in the medical system that would improve support of the fleet? Here are some recommendations:

Measures of Effectiveness. We presently evaluate the effectiveness of some of our medical programs by counting the number of hospitalizations and the number of outpatient visits. These are poor measures of effectiveness. The more visits to sick bay, the more hindrance there may be to mission accomplishment and the more time may be wasted (both medical and non-medical). A physical examination performed in one visit is more supportive of the Navy's mission than one which requires two visits.

In order to assess the effectiveness of our medical support system, we need measures that focus on our ability to conserve manpower. Such measures include number of people screened for job placement and number removed from work because of ineffective screening; number of medevacs;¹⁴ number of man-days on the binnacle list; time spent in hospital; and number of individuals placed on the temporary disability retirement list or medically

retired. All of these indicators would help in the assessment of the effectiveness of the medical support system, specifically in terms of manpower conservation. In 1966 an economist performed an assessment of medical productivity by examining the reduction in man-days of work lost to the naval establishment and comparing that to the cost of medical support.¹⁵ He was able to demonstrate a rise in productivity of about seven percent per year between 1932 and 1962. To my knowledge, no followup studies were undertaken.

Wartime Medical Manpower Requirements. Medical support requirements for wartime operations need to be reassessed. What level of care is required aboard our ships in wartime? Are doctors needed on all our combatants? The British had doctors in all their combatants in the Falklands War. The United States has similarly included them in its mobilization plans. There are advantages to having a doctor on board. A doctor's skill in diagnosis makes him better able than a corpsman (or anyone else) to determine proper treatment and disposition of an ill or injured patient. This skill may also avert the need for medical evacuation and reduce the number of off-ship referrals. His presence may improve morale and occasionally may make the difference between mission success and failure. Underway replenishment groups, which might transport patients in difficult circumstances, and ships like an LHA, whose secondary mission includes the provision of medical support, obviously need medical officers. The bottom line is that the allocation of medical manpower to ships should be based on the following criteria: the nature and importance of the mission; the general health of the crew and their level of risk for disease or injury prior to and during the mission; and the degree of isolation and lack of other medical support they can expect during the mission.

Why should surface ships require medical officers if submarines don't? Surface ships generally have larger complements, and these personnel are not as thoroughly screened as their counterparts on submarines. They are also more likely to visit ports where exotic diseases are present. Finally, surface ships are more likely to be attacked than submarines and more likely after an attack to have survivors in need of medical care.

Medical Readiness. The present arrangement, in which we rely on unfilled reserve medical officer billets for some of our wartime manpower needs, is unsatisfactory. If war were anticipated, I would expect us to get our ships to sea and into forward positions early. At present, many ships taking part in such action would be without the medical assets they were supposed to have.

Training. Support of the fleet requires medical personnel familiar with the maritime environment and capable of handling a wide variety of situations.

The six-month course presently given to flight surgeons and submarine medical officers satisfies this requirement. The one-year course and the refresher training for the independent duty corpsman is also sufficient. In contrast, the three-week course for medical officers assigned to surface ships is inadequate. We need a substantial number of surface medical officers who know what to expect in a shipboard environment and who have wide-ranging skills and the ability to cope with isolated, restricted situations.

To sum up, medical support is of great importance to the success of the Navy's mission. Just as deterrence is preferable to war, so is prevention of disease and injury preferable to treatment. Planning for medical support should focus on dealing with the constraints of the maritime environment, mission-oriented training of medical department representatives, and conservation of manpower.

I have argued that medical support is important to mission accomplishment and will become increasingly so in future years. Moreover, this support requires mission-oriented medical officers familiar with the maritime environment and the peculiarities of providing medical support at sea. Such officers can only be obtained by selecting, training and retaining a group of active duty physicians to fill this role. We already have counterparts in the flight surgeon and the submarine medical officer. Medical officers going to the surface fleet do not have comparable training and have been difficult to retain beyond the initial tour. Former Secretary of the Navy John Lehman suggested that twelve officers per year be selected from the Annapolis graduating class to attend medical school.¹⁶ Perhaps the time has come to establish a field of operational or military medicine. Individuals in this field would have the corporate knowledge and the skills to ensure quality medical support for the fleet.

Notes

1. Hans Zinsser, *Rats, Lice and History*, (New York: Bantam Books, 1967), p. 113.

2. Carl von Clausewitz, *On War*, Michael Howard and Peter Paret, ed., (Princeton: Princeton University Press, 1976), p. 131.

3. See, for example, James D. Stewart, "Evacuating the Wounded: Why It Will Be So Difficult," *Military Logistics Forum*, Jan/Feb 1986, p. 38; Arthur M. Smith, "The Influence of Medicine on Strategy," *Naval War College Review*, Summer 1987, pp. 22-36; Joseph V. Henderson, Jr., "A Medical C3 Primer," U.S. Naval Institute *Proceedings*, November 1983, pp. 66-72; C. Vance Gordon and Jay C. Bisgard, "Medical Readiness Planning: Identifying Critical Elements and Aggregate Requirements," *Military Medicine*, February 1983, pp. 103-106; and Ben Eiseman, "The Next War: A Prescription," U.S. Naval Institute *Proceedings*, January 1975, pp. 33-40.

4. This basic mission statement is taken from the National Security Act of 1947, as amplified by DoD Directive 5100.1 of 31 December 1958.

5. Richard R. Hooper, "Disease Outbreaks in the Military Community," *Military Medicine*, December 1981, pp. 859-862.

6. William L. Mann, *Medical Tactics in Naval Warfare*, (Washington, D.C.: U.S. Govt. Print. Off., 1927), p. 3.

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7. Wayne P. Hughes, Jr., *Fleet Tactics: Theory and Practice* (Annapolis: Naval Institute Press, 1986), p. 26.

8. J. M. Erickson, L. M. Dean, E. K. E. Gunderson, "Morbidity as a Factor in the Operational Effectiveness of Combat Ships," *Military Medicine*, July 1977, pp. 624-628. While shipboard disease rates are high, most diseases are comparatively minor and easy to treat. Sailors are generally healthy and can be expected to live longer than their counterparts in the civilian population.

9. I addressed this subject in more detail in a paper entitled "Patient-Handling at Sea in Support of the Maritime Strategy," submitted to the faculty of the Naval War College, March 5, 1989.

10. Hughes, p. 27.

11. "Report Finds Pay Not a Major Factor," *U.S. Medicine*, Vol. 25, No. 5 and 6, March 1989, pp. 1, 32, 39.

12. Emmett D. Hightower, "Medical Service in the Seventh Amphibious Force," Chapter Seven of *History of the Medical Dept. of the U.S. Navy in World War II*, NAVMED P-5031, 1953, p. 183.

13. Arthur J. Barsky, "The Paradox of Health," *New England Journal of Medicine*, Vol. 318, February 18, 1988, pp. 414-418.

14. See D. Stephen Nice, "U.S. Navy Medical Communications and Evacuation at Sea," *Military Medicine*, September 1987, pp. 446-451.

15. Melvin E. Horton, *An Economic Analysis of Progress in the Medical Care of the United States Navy and Marine Corps Personnel*, (Ph.D. Thesis, University of Washington, 1966), p. 82.

16. John H. Lehman, Jr., *Command of the Seas*, (New York: Charles Scribner's Sons, 1988), p. 239.



It is of little avail to postpone the evil hour, if you must encounter it at last.

Naval Strategy

A. T. Mahan (1911)

Little, Brown (1918), p. 445

* * *

Sound military principle is as useful to military conduct as moral principle is to integrity of life. At the same time it must be conceded that the application of a principle to a particular case is often difficult, in war or in morals.

Naval Strategy

A. T. Mahan (1911)

Little, Brown (1918), p. 234