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Care Delayed Is Care Denied! Casualty Handling in Littoral Operations

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Casualty Handling in Littoral Operations

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The whole beach is filled with wounded of all kinds and all descriptions of wounds. It has quite unnerved me for a time. Some of the wounds are so ghastly, whole abdomens blown away and the men still living. They are in such numbers that it is difficult to get along, and there is only one hospital ship in the bay.

Col. John L. Beeston, Royal Australian Army Medical Corps,
Gallipoli, 1915[1]

WORLDWIDE POWER PROJECTION, a fundamental mission of U.S. forces, entails potential engagement at every locus within the spectrum of conflict, from small-scale contingencies to major theater warfare. Such varied missions may require deployment of forces to areas where no substantial basing or fixed logistical support structure exists. Furthermore, long-term, worldwide access to forward bases, including landing strips, ports, and logistics facilities, can no longer be assumed. Strictly unilateral considerations frequently determine whether such privileges are granted or denied by the nation's international "partners."

Since much of the world's population and most national capitals lie within reasonable proximity to the sea, the contingent deployment of combat forces to littorals has been an option historically exercised by maritime powers. Such capability is a powerful weapon for the United States, which enjoys great freedom of movement in seas around the world and already has effective control of all

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but coastal waters. This maritime supremacy could facilitate the establishment of an afloat support base during littoral operations of any intensity. Consequently, given the geopolitical realities of today's world, the sustainability of U.S. military projection forces—of which medical care for any accrued casualties is an integral component—may well entail sea-based logistical support.

Regardless of the location of medical support facilities in any littoral strategy, however, a historical imperative remains: the sick and injured are perishable cargo, and the ordinary rules of logistics cannot be applied to them. Their survival or death is fundamentally affected by the speed with which they are given medical care. In the current doctrinal context of Operational Maneuver from the Sea (OMFTS), an important question for the commander of a littoral operation is whether sea-based medical support mechanisms on hand will adequately support casualty retrieval and survival—or conversely, lead to premature deaths and protracted, complicated morbidity among those who survive their initial injuries.

The Tactical Setting

As envisioned today, ground-based maneuver warfare in littoral environments requires light, fast-moving, deep-striking bundles of combat potential—generally small, highly mobile teams capable of dispersal over a battlefield up to two hundred miles across as well as deep. Furthermore, since the time required to seize, defend, and develop beachheads and landing zones often nullifies the advantages of a rapid approach, the goal in OMFTS is to convey combined-arms penetration and exploitation operations directly to inland objectives. That is, in place of traditional ship-to-shore and shore-to-objective phases, OMFTS features ship-to-objective capabilities.

In order to accomplish modern littoral maneuver objectives, therefore, assault forces must be light and fast, and much of their command, control, communications, intelligence, fire, and combat service support (including health care assets) must be sea based, albeit in the face of an enemy who may recognize sustainment as the assault force's Achilles' heel.[2]

The availability to potential adversaries worldwide of inexpensive, advanced weapons and sensors has increased the risks associated with traditional methods of ship-to-shore movement and lodgment ashore. Ample deference must now be given to the 250-nautical-mile range of antiship cruise missiles, as well as to the shallow and deep-water capabilities of mines. In addition to weapons originally developed by Soviet technology and subsequently sold worldwide, threats include advanced Western designs. Furthermore, one would expect that an enemy's precision sensors and weapons, which utilize speed, stealth, maneuverability, background clutter, and surprise, will be subsequently directed at the big, slow ships of the afloat sustainment base. Such ships invariably have very little time to defend themselves against weapons employed at the short ranges likely in the littoral. In addition, the difficulty of preventing or rapidly detecting the laying of mines, or of clearing them in waters covered by a coastal defense system, will ultimately oblige task force ships to move to seaward.[3]

Whereas versatility at the forward edge of a ground-based maneuver envelope requires centralization of combat service support, retrograde evacuation of casualties to ships located over the horizon when hospital assets have not been established on shore is a delicate and precarious undertaking. Lengthy over-the-water evacuation is easily thrown into confusion, not only by enemy interference but by sea and weather conditions.

The Imperative of a Historical Perspective

Throughout the history of warfare, treatment outcomes for battle casualties have been influenced by the time elapsed between the moment of wounding and the delivery of medical treatment. The early delivery of first aid, the resuscitation of vital body functions degraded by injury, and the implementation of initial stabilizing surgery are particularly important.

During a ground operation delivered over the sea, whatever the location, the need for organized evacuation begins almost as soon as contact with the enemy is made. Delay in treatment due to evacuation lag is tantamount to the *denial of care* to some who could have survived had they received timely medical attention.

Therein lies the challenge. In future littoral warfare, air, sea, and ground-launched missiles, as well as mines and other familiar weapons, will create a tactical environment of unparalleled complexity insofar as land-sea-air interaction is concerned, delaying the seaward evacuation and care of combat casualties. Specific operational realities impeding the timely administration of care must be recognized and be given command-level analysis.

Ground Evacuation Problems. The system for casualty evacuation changes as an amphibious operation progresses. The integrated ground-sea continuum that supports casualty evacuation is contingent upon many critical and interdependent factors. These include time, distance, dispersion of ground units and personnel, casualty rates, methods available for immediate evacuation from the tactical setting, availability and priority of equipment, distribution of land and sea-based medical facilities, evacuation policies, availability of surface and air transportation to higher medical echelons, the allocation of reserves of medical and transportation resources, and of course, the ever-changing tactical and strategic situation. Realistically, however, it is possible to approach ideal medical planning and operational conditions only when the tactical situation stabilizes, as the theater of operations matures. In the interim, difficult choices must be made.

In the early phase of sea-land operations, primary emphasis is necessarily given to getting combat power ashore—troops, equipment, and supplies. Medical evacuation works in the opposite direction, but it relies upon the same surface and air vehicles, returning from the landing zone to the task force to pick up the next wave. To assign adequate transport to casualty evacuation may well slow down follow-on assault echelons. On the other hand, it must be recognized that accumulation of casualties within any combat unit inevitably restricts its movement, besides exerting a depressing effect upon morale. In fact, the relatively small and independent combat units called for by present doctrine—units called upon to traverse greater distances than before—can be immobilized by the lack of medical attention.

Unfortunately, the withdrawal of casualties against the grain of a constant forward flow of troops and supplies is never optimal. It is nearly impossible to transport wounded through such an evacuation chain without delays. The more dependent the evacuation of casualties is on the forward transport of combat personnel or material (rather than separate, dedicated casualty evacuation units, such as medevac helicopters or ground ambulances), the more difficult it is to deliver medical treatment in a reasonable time. Without early medical treatment (an extremely "time sensitive" reality) some unstable casualties will die, and the wounds of others will become seriously complicated disabilities. Furthermore, in an operational setting of fast-moving maneuver warfare, with its smaller, more mobile medical support, rendering effective initial on-site care will be a major challenge.

A characteristic of the attrition warfare of the past was heavy reliance upon extended, "nonselective" (that is, for all classes of injury) casualty evacuation chains out to an amphibious task force. Failure to select only the most needy casualties for evacuation imposed enormous burdens upon transportation assets and afloat casualty-reception facilities. Efficiency dictates a shore-based casualty sorting mechanism for both physiologic stabilization of the wounded and prioritization of casualties for further, over-the-water evacuation. (The filtering effect of evacuation selectivity obviously would be contingent upon the tempo of operations.) Without such evacuation triage, however, the massive nonselective evacuation conduit of attrition warfare might evolve yet again. Nonetheless, consistent with the modern mandate for compactness and simplicity of maneuver units, Marine Corps landing force medical assets have been reduced in size. Medical battalions have been "lightened" and downsized. The patient-holding capacities of operational medical units have been reduced, and multispecialty consultation has been virtually eliminated. These changes have been made under the assumption of a rapid evacuation of sick and wounded to amphibious assault vessels.

Problems with Air Evacuation. The distances involved in littoral maneuver, the lack of ground transport or facilities for casualty evacuation and treatment, and the vulnerability of small units justify dedicated, on-call medical evacuation aircraft, a concept well known in the U.S. Army but not heretofore in the Navy or Marine Corps. On the other hand, the modern battlefield may be too lethal for evacuation of the wounded exclusively by air. In the face of modern antiaircraft defenses, including increasingly ubiquitous and highly effective shoulder-fired missiles, the survivability of helicopters is certainly not assured. Further, of the finite number of helicopters on hand, many will be unavailable because of tactical missions, bad weather, or technical constraints.

The CH-46 helicopter remains the backbone of Marine Corps troop-lift and aeromedical capability, but its future role may be confined to peripheral zones. In Vietnam, in the absence of an air-to-air threat and despite a reduction in helicopter operations in high-risk areas, the U.S. Army lost an estimated 17,700 helicopters.[4] Following the 1975 *Mayaguez* rescue in the Gulf of Thailand, only one of the nine helicopters used in the initial mission was capable of a second, due to battle damage and losses. In Afghanistan, *mujahedin* antiaircraft ground defense reporredly led to the loss of 250 Soviet helicopters in the first eighteen months of the Soviet occupation. During the 1983 Grenada invasion, seven U.S. H-60 Blackhawk and two AH-1 Cobra helicopters were lost—over 10 percent of the eighty-eight combat helicopters used, a rate comparable to the prohibitive daylight bomber losses in World War II.[5] Consequently, assumptions that place heavy reliance upon evacuation of the wounded by helicopter or the MV-22 Osprey tilt-wing aircraft may well require reexamination.

Afloat Amphibious Facilities. The first-line Navy vessels equipped for casualty reception are designated "primary casualty receiving and treatment ships." They are the large-deck, multipurpose amphibious vessels of the LHA (*Tarawa*) and LHD (*Wasp*) types.[6] Most of the beds aboard these platforms are suited to light to moderate casualties, not requiring intensive nursing care. Significantly fewer beds are available for severely traumatized patients.

The LHD has six operating rooms, seventeen intensive-care beds, forty-seven ward beds, and a 536-bed overflow capacity, but it is not equivalent to a civilian trauma-care facility witb the same number of patient care units. Its capabilities and limitations are substantially different. Calculations that ignore the logistical and personnel constraints of afloat medical facilities relative to land-based trauma centers could adversely affect operational planning and execution.

Of paramount significance is the question of when and where amphibious assault ships, having both combat and medical missions, are to stand by to receive casualties. Because of their conflicting roles, the large amphibious ships cannot be expected to be optimally positioned for medical support. In point of fact, the combat responsibilities of these vessels preclude a full commitment to medical support. If judged to be in danger from mines, coastal defenses, or air and missile attack, they will operate a considerable distance from shore once an assault force has been landed. That tactical decision will significantly degrade patient evacuation.

Furthermore, the "backup" for these ships, in terms of where and how they will transfer casualties when they reach capacity, has not been fully defined or validated in operational exercises. Issues regarding fleet doctrine on medical and surgical supply and resupply for casualty treatment remain to be resolved. The medical equipment and supply inventories of LHAs and LHDs must specifically support the new and varied operational environment. Doctrine governing the use and characteristics of the helicopters, utility and air-cushion landing craft, and MV-22s supporting the medical mission of these ships needs to be factored into the support equation as well.

Hospital Ships. The hospital ship, with the specific mission of casualty support, today represents the highest echelon of medical capability afloat. Some historical precedents are instructive.

During the ill fated operation by Great Britain against Turkey at Gallipoli in 1915, the great number of Commonwealth casualties practically stopped operational activity on the beaches. At least twenty-two hospital ships, twenty troopships, and also transports and merchant ships had been set aside for the reception of sick and wounded, but fear of Turkish coastal artillery and German submarines prompted many of these vessels to lie off shore or in port some distance away. From the beaches, casualties were towed seaward in small craft, each carrying thirty patients, often in a frantic search for a ship that would accept them. As troopships landed their complements on the beaches or transports unloaded their cargoes, they were at once filled with casualties. These "carriers" then moved to the hospital ships or other vessels lying off shore and transferred the casualties at sea, under occasionally difficult, even dangerous, conditions. At a later stage, minesweepers partially fitted for medical purposes were brought into use for evacuating casualties, and the British Red Cross Society provided six motor launches specially equipped to tow barges from the Gallipoli beaches.

The large number of casualties at Gallipoli led to overcrowding, rendering some ships unsuitable as base hospitals. They became in essence casualty- clearing stations, receiving and providing interim, often only token, treatment of patients and transferring the more serious ones to distant shore bases.[7]

During the latter phases of World War II, the twenty-six U.S. Army and twelve Navy hospital ships changed from acting primarily as "ambulances" to providing advanced levels of definitive medical care. A similar policy was in effect during the Korean and Vietnam conflicts.

In more recent years, two U.S. Navy hospital ships have been commissioned, both converted from tankers. USS *Mercy* (T-AH 19) and USS *Comfort* (T-AH 20) each possesses a capacity of a thousand patients of varying degrees of criticality, in addition to twelve surgical suites. Their deployment theoretically inserts state-of-the-art surgical support and large numbers of beds into a theater within a relatively short time.

Because of their draft, however, these ships are limited to deep anchorages, and their size precludes access to pier-side berths in many ports; therefore, the ability of the current hospital ships to load and transfer casualties when moored is limited. At sea, they are accessible only by helicopter, on flight decks that can safely accommodate only one aircraft. Their single helicopter pads would be blocked in the event of a helicopter breakdown or crash. Waterborne access, whether by conventional landing craft, air-cushion landing craft (LCACs), or lighters, is not adequate. Movement of patients onto and off the ship by this means is slow, even under the best conditions. For all these reasons, the assumed patient "throughput" of a hundred major casualties per day has not been validated.

During the 1991 Gulf war, helicopter transport to the two U.S. hospital ships proved problematic: the helicopters' carrying capacities and flying-time capabilities were limited, and because of the missile threat the ships were kept far from the combat scene. Had there been a need to transport large numbers of casualties from the battle area, the realities of distance, helicopter shortages, and protracted travel time would have magnified the difficulties of access.

A Continuing Concern: Protected Neutrality

In 1917, the Central Powers of World War I declared, in disregard of international law, that hospital ships, no matter how prominently marked in compliance with Geneva and Hague Convention accords, were no longer protected as neutral vessels. Such ships were denied immunity from attack in the English Channel, parts of the North Sea, and the Mediterranean, even if the belligerents had been notified of their identities. In 1917 and 1918 alone, eight hospital ships were torpedoed. Overall, the British lost fifteen hospital ships, most from mines and torpedo attacks. Similarly, during World War II, Germany, and later Italy, showed complete disregard for the Hague Convention. By the middle of 1941, although all Allied hospital ships had been clearly marked, no fewer than thirteen were sunk.[8]

The modern naval warfare environment has grown even more dangerous and unpredictable, and unbridled offensive weaponry now threatens any noncombatant ship that strays within range. There is increased sophistication in mines used in littoral waters, but surface-to-surface or air-to-surface weapons fired on the basis of any sensor other than the human eye are blind to the white color of a hospital ship's paint, the brightness of its lights, or its presumed status of "protected" neutrality under the Geneva Convention.

The harsh and unpredictable nature of missile-based warfare is exemplified by the mistaken strike on an Iranian passenger jet by the Aegis cruiser USS *Vincennes* (CG 49). That tragedy brought into urgent question the safety, effectiveness, and survivability of any unarmed craft—aircraft or ship—dedicated exclusively to the care of the combat wounded. It occurred despite sophisticated electronic warfare systems. In reality, merely detecting a radar or transponder signal requires less technological sophistication than does interpreting it. Thus an adversary who is less technologically advanced but determined to win a conflict can use a raw signal from a craft to guide a missile, without ever appreciating, or caring about, the target's noncombatant role.

During military contingencies, therefore, hospital ships may no longer enjoy privileged immunity. For purposes of protection they may be forced to resort to their only other option, geographic separation—an option counterproductive to their principal mission of forward casualty support. Consequently, dedicated hospital ships should not be expected to be readily available to every task force entering dangerous littoral waters.

Solutions through Innovation

In World War II amphibious operations, and in subsequent landings at Inchon, tank landing ships (LST) were converted into an important component of the medical care system: the LST(H). Modified for surgical support in limited scope, these ships were primarily used by forward surgical teams to stabilize the wounded. Given the intensity of the warfare and the shortage of true hospital ships, LST(H)s became essential in providing quick, early, lifesaving treatment for the wounded in forward locations.

The battle of Leyte Gulf in 1944 demonstrated the benefit of beaching these surgical LSTs after unloading. Planners saw the value of holding one or two of them in reserve, to be committed to beaches overwhelmed with casualties or without medical facilities. During the operations at Lingayen Gulf in 1945, six LST(H)s with embarked surgical teams were beached to provide casualty care. At Normandy, all LSTs were equipped to handle returning casualties, and fifty-four were outfitted to perform surgery. Others were subsequently equipped to serve as casualty-control ships, regulating the retrograde flow of the wounded to rear facilities afloat and ashore. One was even made a floating blood bank. Such hospital LSTs, able to provide sophisticated surgical care in a relatively safe environment close to shore, performed effectively even under fire at Iwo Jima and Okinawa.[9]

In 1982, during the Falklands conflict, at Britain's suggestion but without any special agreement in writing the belligerents established a neutral zone on the high seas. This zone, located to the north of the islands and known as the "Red Cross Box," had dimensions of approximately twenty nautical miles on a side. Without hampering military operations, the zone enabled hospital ships to stay in one position and to exchange British and Argentine wounded. Inside the Red Cross Box the belligerents conducted helicopter transfers between hospital ships. The British hospital ship *Uganda* transferred patients to three converted "ambulance ships" for evacuation to Great Britain, by way of a neutral medical evacuation staging point in Montevideo, Uruguay, 420 miles away.[10]

The *Uganda* was one of two commercial vessels requisitioned and refitted for casualty care early that year, in anticipation of casualties in the British campaign to retake the Falklands. Operated as an educational-cruise liner, *Uganda* was converted to a hospital ship at Gibraltar within sixty hours. A helicopter pad was fitted, and a ramp was installed to allow rapid transfer of patients to the main hospital on the promenade deck. Other sections of the ship were converted to an operating room suite, an intensive care ward, and a skilled-nursing unit for "high dependency" patients (those requiring a high level of nursing support, short of intensive care, relative to the patient population on board). A separate burn unit was established in the ship's original hospital. Further space conversions produced low-dependency wards, an eye department, and also X-ray, laboratory, and dental facilities. Two evaporator plants were installed en route to the combat zone, to overcome freshwater limitations. Ultimately, 730 combat patients were admitted on board *Uganda*, and five hundred surgical procedures were performed.

In addition, three ocean-survey vessels converted to ambulance ships each evacuated between sixty and a hundred casualties on every run to the neutral staging point in Montevideo. They transported a total of 593 casualties, clearing room on board the hospital ship for new wounded.

A decade later, in the Persian Gulf during Operation DESERT SHIELD, Royal Navy casualty projections for the upcoming combat phase, DESERT STORM, indicated a need for a minimum of one hundred beds in an afloat hospital facility able to handle mass casualties of all types, initiate their management, and hold them for up to six days. RFA *Argus*, the air training ship of the Royal Navy, was designated to become that platform. Its flight deck, with five helicopter landing spots and two large aircraft elevators, was considered ideal for the movement of casualties. Studies analyzed the feasibility of building a "tactical hospital facility" within the ship, specifically considering whether the ship's services could cope with the vastly increased requirements that would be imposed. Ultimately, plans were drawn to convert the forward hangar of *Argus* into a two-deck, hundred-bed hospital in a "subcitadel" with airtight protection, leaving the other three hangars for maintaining and operating aircraft.

In three weeks the hospital was designed, built, equipped, and staffed. Using modular construction components of the commercial Portakabin Duplex

Building System, the British lifted the exoskeleton of the hospital onto the flight deck in sections, then fitted it together and lowered it into position. A forward decontamination "portakabin" was also added. *Argus* arrived in the Gulf with a hundred-bed hospital in a citadel independent of the superstructure of the ship, including a ten-bed intensive care unit; a fourteen-bed, high-dependency, skilled nursing care unit; a seventy-six-bed low-dependency unit; and four operating tables in two operating rooms with full support services. The hospital was staffed by a medical team of 136 men and women, including surgical, orthopedic, burn, dental, and ophthalmology specialists, as well as nurses and X-ray, laboratory, and other technical specialists. The hospital was also supported by the air department, with four designated casualty-evacuation Sea King helicopters, as well as Royal Navy support and liaison personnel. This afloat tactical medical-support concept significantly shortened casualty transit time from frontline, at-risk maritime units, because it employed a "grey hull" operating in forward areas with unrestricted communications.[11]

Possible Future Directions for the U.S. Navy

The landing craft (air-cushion) vehicle is the linchpin of a current effort to upgrade the U.S. surface amphibious assault capability.[12] LCACs are highly maneuverable, multipurpose hovercraft designed to conduct over-the-horizon ship-to-shore movements of assault vehicles, troops, and supplies. Their high speed and ability to transit easily the land-sea interface make them ideal for tactical surprise, swift introduction of forces, and night assaults from twenty to fifty nautical miles off shore. They may well replace much of the close-in surface support previously utilized. It has been stated that only 20 percent of the world's beaches are assailable by conventional, displacement-hull landing craft; the LCAC, however, is reported to be able to glide over 80 percent of them, without even the hydrographically surveyed boat lanes required for traditional landing craft. With the addition of an enclosed shelter on the main deck space, it can be converted to carry personnel from ship to shore and casualties back. LCACs can also be converted to beachfront surgical stabilization platforms.[13]

Where would medical personnel be obtained for such platforms if they were assigned medical roles? Planning and training are critical. In September 1990, during the prelude to the Gulf War, the Royal Navy placed a special surgical support team on board the Royal Fleet Auxiliary ammunition ship *Fort Grange* to perform forward, emergency stabilizing surgery for fleet personnel. Because *Fort Grange* itself, with its hazardous cargo, could not be sent where casualties were most likely to occur, it had to send medical assistance to the casualties. A forward-deployment team, similar to U.S. Army forward surgical teams, was organized to go forward via air drop, carrying its own gear, to resuscitate and stabilize casualties on board a damaged ship and then transfer them to *Fort*

Grange. Adapting this concept to the LCAC contingency medical platform, utilizing trained personnel of all services, would be a reasonable option.

The future U.S. armamentarium will need smaller hospital ships, capable of responding to the needs of littoral warfare as well as disaster relief and humanitarian assistance. Three to five ships of fairly shallow draft, each with about one hundred beds, should be developed, with emphasis upon primary care and basic surgical services. Design considerations should include operation in unimproved ports; physical dimensions allowing more use of piers than is possible now; ability to receive and transfer casualties by surface craft; and access by helicopter and MV-22. Whether such a hospital ship can claim Geneva Convention protection needs to be addressed; the fact that it would be served by "unprotected" combat-evacuation vehicles may violate its own neutral status.

Contingency shock and stabilization vessels are likewise needed, to complement the hospital ships and LHAs or LHDs. Beyond providing medical treatment, these smaller ships could be used as "ambulance vessels" to evacuate stable or minimally injured casualties from the primary medical platforms. Vessels suitable for these purposes include: the Combat Logistics Force; ships of the Military Sealift Command; cargo vessels that have delivered prepositioned military equipment; surge and sustainment cargo vessels, especially the large, medium-speed roll-on/roll-off ships (LMSRs) of the strategic sealift fleet; and ships of the Ready Reserve Force, including breakbulk, barge-carrying, and lighter-aboard-ship vessels. Chartered commercial craft, such as cruise ships, must also be considered; many of them already have the hotel, laundry, and other facilities required by a hospital. Conversion plans can be developed and kept "on the shelf." Once adapted for minimal, nonsurgical care and casualty evacuation, these ships would be able to offer stabilization and short-term management of patients, if appropriately staffed with medical personnel. (Consistent with U.S. military practice, contingency medical manpower requirements for such ships should be shared by all the uniformed services, not borne by the Navy alone.) Pods with medical equipment and supplies could be quickly loaded for the care of casualties being carried away from the combat scene.

Sudden, Massive Casualties

The Gallipoli campaign, from the first British landings on 25 April 1915 to the final evacuation on 10 January 1916, was a fiasco because of faulty doctrine, ineffective amphibious techniques, poor leadership, and an utter lack of coordination between attack and supporting elements. Uncoordinated medical support mirrored this confusion and failure to support expeditionary forces. Ideally, historical lessons will be incorporated into modern operational practices, since sudden, massive casualties remain a distinct possibility in any armed conflict. On each occasion, wounded personnel must receive initial care far forward (in the future, it may be at sea) if they are to survive the immediately destabilizing impact of injury and then endure a sometimes tortuous journey to a higher-echelon definitive-care facility.

Contemporary operational requirements in the littoral—particularly those based on ship-to-objective movement and maneuver—require that the details of medical support be "reengineered" to supply speed, flexibility, and above all, responsiveness. Many unforeseen obstacles will inevitably arise, often allowing little time for detailed, methodical planning. On-site leadership will be obliged to be adaptive and innovative, with fewer resources and greater threats. A template for medical support for conflict in the littorals can best be obtained from an appreciation of past experiences in this dimension, but the historical perspective must be enhanced by receptiveness to innovation and a willingness to ply uncharted waters.

Notes

1. Quoted in Michael Tyquin, *Gallipoli: The Medical War* (Sydney: Univ. of South Wales Press, 1993), p. 74.

2. Mark W. Beddoes [Lt., USN], "Logistical Implications of Operational Maneuver from the Sea," *Naval War College Review*, Autumn 1997, p. 31, citing U.S. Marine Corps, *Operational Maneuver from the Sea* (Quantico, Va.: Marine Corps Combat Development Command, 1996), pp. 5–6.

3. As a practical matter, the operational effects of standing farther off shore are mixed. On one hand, withdrawing the afloat sustainment base over the horizon offers commanders greater tactical latitude, with possibilities for surprise or "stealth" insertion of landing forces. On the other hand, sustainability, necessarily by air, is dramatically affected by increased distance, and thus flight time. Beddoes, esp. pp. 40–6.

4. James P. Etter [Maj., USMC], "New Aircraft Require New Thinking," U.S. Naval Institute *Proceedings*, November 1987, pp. 38–9.

5. Richard A. Gabriel, *Military Incompetence: Why the American Military Doesn't Win* (New York: Hill and Wang, 1985), pp. 180–1.

6. On casualty receiving and treatment ship assets, see Arthur M. Smith, "Gator Aid," U.S. Naval Institute *Proceedings*, October 1992, pp. 67–75, and "Until the First Bloodied Body Goes By . . . ," U.S. Naval Institute *Proceedings*, October 1993, pp. 64–9.

7. Tyquin, pp. 74–108.

8. For hospital losses generally, Jean S. Pictet, gen. ed., *Commentary*, vol. 2, *Geneva Conventions* (Geneva: International Committee of the Red Cross, 1960), esp. chap. 3; and G. I. A. D. Draper, *The Red Cross Conventions* (New York: Praeger, n.d.). For British hospital ships, John H. Plumridge, *Hospital Ships and Ambulance Trains* (London: Seeley, Service, 1975), esp. apps. C, E. See also the author's "Safeguarding the Hospital Ships," U.S. Naval Institute *Proceedings*, November 1988, pp. 56–65.

9. *The History of the Medical Department of the United States Navy in World War II*, NAVMED P-5031, vol. 1 (Washington, D.C.: 1953), pp. 171–201. See also Pietro Marghella [LCdr., USN], "Replace the Great White Elephants . . . with LSTs," U.S. Naval Institute *Proceedings*, December 1998, pp. 71–3, for an argument to convert surviving *Newport*-class LSTs to hospital ships.

10. The "box" seems not to have been defined in precise geometric terms; it has also been described as having a "diametre of 25 miles" (P. Eberlin, "The Identification of Medical Aircraft in periods of Armed Conflict," *International Review of the Red Cross*, July–August and November–December 1982). See also R. T. Jolly, "Ajax Bay," *Journal of the Royal Naval Medical Service*, vol. 63, 1983, pp. 35–9; Smith, "Safeguarding the Hospital Ships"; and Sylvie-Stoyanka Junod, *Protection of the Victims of Armed Conflict, Falkland-Malvinas Islands 1982: International Humanitarian Law and Humanitarian Action* (Geneva: International Committee of the Red Cross, 1984) sec. 3.1.3, p. 26.

11. E. P. Dewar, "Primary Casualty Reception Ship: The Hospital Within—Operation Granby," *Journal of the Royal Naval Medical Service*, Summer 1992, pp. 55–64.

12. U.S. Marine Corps Development and Education Command, "Employment of Landing Craft Air Cushion (LCAC) in Amphibious Operations," TACMEMO PZ005770-1-85, November 1985, cited in

Arthur M. Smith and Craig H. Llewelyn, "Tactical and Logistical Compromise in the Management of Combat Casualties: There Is No Free Lunch!" *Naval War College Review*, Winter 1990, p. 61.

13. Arthur M. Smith, Daniel P. Shaw, Dominic P. Zito, and Paul S. Jandreau, "Casualty Care in Over-the-Horizon Amphibious Operations Requires Contingency Options!" *Navy Medicine*, January–February 1995, pp. 14–20.

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Naval Historical Center Bicentennial Awards

The Director of Naval History, Dr. William S. Dudley of the Naval Historical Center in Washington, D.C., has selected Commander Tyrone Martin, USN (Ret.), author of *A Most Fortunate Ship: A Narrative History of Old Ironsides* (and co-author of an essay on the subject in the Summer 1997 issue of this journal), to receive the Naval Historical Center's Bicentennial Award of $2,500 for the best book relating to the history of the USS *Constitution* in any era, or to any aspect of the history of the federal navy during the period 1789 to 1801.

The Director of Naval History selected Dr. Elizabeth M. Nuxoll, author of "The Naval Movement of the Confederation Era," a paper to be published in a volume of proceedings from the 1996 annual meeting of the North American Society for Oceanic History, to receive the Naval Historical Center's $750 Bicentennial Award.

DTIC Public STINET Enhancements

The Defense Technical Information Center has announced enhancements to its Public STINET site—http://www.dtic.mil/stinet/. The service provides free access to unclassified, unlimited-distribution documents entered into DTIC's technical reports collection since 1985 and to other federal resources and databases. The service now has greater search capabilities, numerous new features, and improved communications.

As an element of the Defense Information Systems Agency, DTIC provides access to, and facilitates the exchange of, scientific and technical information, thereby contributing to the management and conduct of defense research, development, and acquisition.

For further information, contact Ms. June Doezema at (703) 767-8047 (DSN 427-8047) or Ms. Pat Tillery at (703) 767-8267 (DSN 427-8267), or by e-mail at stinet@dtic.mil or bcporder@dtic.mil.