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The United States' short minelaying campaign off the harbors of North Vietnam in 1972 was the occasion of two victories. The first of these was over the U.S. ignorance and fear as to what the Soviets and the Chinese might do if the mines were laid, and the second was over the North Vietnamese, whose military lifeline the mines strangled. Which victory was the greater of the two?

VICTORY OVER IGNORANCE AND FEAR: THE U.S. MINELAYING ATTACK ON NORTH VIETNAM

by

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The war in Vietnam may now be described as typical of a pattern that limited wars might follow in the future: an ill-defined beginning, an intense "hot" phase, and an inconclusive ending. The United States made no formal declaration of war; there was no all-out mobilization of the country's resources to support war, or no national political consensus to defeat the enemy decisively and force his surrender. The hot phase seems to have happened as a consequence of many individual decisions by at least three, and some will argue, four successive presidents of the United States.

The complexity of this war was increased by the pronounced effect of press attitudes, by the opposition of powerful individuals in the Congress, by college campus unrest and by disenchantment in Europe with U.S. preoccupation with the problems of Southeast Asia.

Within this setting, the American military had, eventually, to plan and execute actions needed to solve the problem of getting the country out of the war. The actions were limited by political considerations and the decisions flowing from them. In addition, the military was subjected to a degree of civilian command and control of strategy, operations, and tactics unique in American history. It may be remembered that on several occasions during the war President Johnson personally approved bombing targets for air operations the following day.

The U.S. Mining Campaign Before 1972. The Navy's mission was to reduce the flow of arms and military supplies to North Vietnam's armies. Throughout the course of the war this aim never changed. However, the means used to obtain the result did change substantially.

Most of those arms and supplies were foreign-made, the products of the U.S.S.R. and China. They entered North

Vietnam chiefly through Haiphong, with smaller amounts entering through Cam Pha and Hon Gai. There were also rail and road links (e.g., the "Ho Chi Minh Trail") between North Vietnam and China; however, these links carried only 15 percenr of the total.

Some 40 cargo ships called at these porrs monthly, and photo reconnaissance documented the nature of the cargoes. As early as 1966 military commanders appealed to Washington for permission to mine those harbors so as to halt or at least reduce the flow of supplies to the enemy. Invariably Washington's decision was negative on the grounds that mining would be seriously escalatory, perhaps damaging Soviet or Chinese merchant ships and thereby possibly involving those countries in the hostilities.[1]

However, after several years of combat in February 1967 the Services were successful in their argument to mine the rivers and inland waterways of North Vietnam. They believed that, after being landed at the major ports, about half of the enemy's cargo was carried at least part way to his combat forces via those rivers. By mid-April of that year aircraft had planted five river minefields.

The effect of the mining was watched carefully. Photos showed that few boars entered or left the mined rivers and in those rivers some boats were seen to have sunk. The North Vietnamese made no serious attempt to sweep rhe mines. Rather, they simply accepted the fact thar in these areas there were no longer practical avenues of transport.[2] They moved inland, used more trucks and drove mainly at night over unpaved roads and under the protection of the jungle. The supplies continued ro move southward.

From then until May 1972 strange contradictions generated by the mixture of political considerations and military necessity became evident in the American interdiction campaign in the North. While shipborne arms and supplies moved into North Vietnam's ports, the American military only tried to destroy them after they had been dispersed. It was still the overriding judgment in Washington that mining (or a naval blockade) of the major ports was simply too risky.[3]

The U.S. Mining Campaign in 1972. The fortunes of war took their toll politically as well as militarily. President Nixon succeeded a discouraged President Johnson in 1968 and installed a new set of civilian personalities in the military chain of command. The policy of "Vietnamization" reduced rhe American forces in South Vietnam from a peak of almost 600,000 men down to only 69,000 by spring of 1972. However, North Vietnam's major ports continued to be off the approved bombing target list and their access to the sea remained free. During this period the diplomatic position of the United States with regard to the Soviet Union and China also underwent substantial change. Intense diplomatic efforts resulted in rhe reestablishment of relations between the United States and China and relations between the United States and the U.S.S.R. also improved. These American diplomatic successes were perhaps the most importanr reason for the success of the subsequent mining operations.

Aided by the monsoon weather that reduced the effectiveness of U.S. close air support, in December 1971 the North Vietnamese launched a major offensive. The 69,000 U.S. combar troops and those in the status of advisors to the South Vietnamese forces were limited to fighting only in self-defense.

For the first time in the war, the United States employed B52 bombers in North Viernam as a countermeasure ro this offensive. These heavy bombers were able to operate in any weather and carried sophisticated electronic countermeasures equipment to reduce the effectiveness of enemy antiaircraft missiles.

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Still, an increase in the already intense domestic opposition to the war, combined with inadvertent bombing of civilians and humanitarian facilities, produced an adverse worldwide press reaction to the operation.

The acceptable military options were indeed becoming few in number.

On 8 May 1972 President Nixon announced the means he had chosen to counter the offensive: the U.S. Navy would mine Haiphong and other important North Vietnamese ports immediately. Speaking not only to the people of the United States, but also to the world and in particular the Soviet Union and China, he reviewed the long chain of events that had led to this major reversal in policy.[4]

The New Rules of Engagement. The President's speech was not only a declaration of action being taken and the reasons behind his decision, but also the basis for what emerged as "Rules of Engagement." He stated his overall objective very clearly: "I therefore conclude Hanoi must be denied the weapons and supplies it needs to continue the aggression." He then stated how he intended to accomplish it:

> All entrances to North Vietnamese ports will be mined to prevent access to these ports. United States forces have been directed to take appropriate measures within the internal and claimed territorial waters of North Vietnam to interdict the delivery of any supplies.

Lest the North Vietnamese should consider road or rail alternatives the President tried to foreclose them by saying: "Rail and all other communications will be cut off the maximum extent possible."

So, for the first time since the beginning of American involvement in the war, the American military had finally been authorized a rational and efficient means of cutting the major artery of war material into North Vietnam. Clearly, mines were the principal instrument to be used in closing the ports, but the statement to "take appropriate measures . . . to interdict the delivery of any supplies" must have left the North Vietnamese, Chinese, and Soviets guessing what these other measures might be.

The next day the Administration was quick to exploit newspapers and TV to elaborate on the President's statement the night before.[5] The following excerpts are taken from an interview of Deputy Secretary of Defense Kenneth Rush on the NBC-TV "Today Show."[6]

> NBC: We are getting to a possible stage with the mines, rhe interdiction campaign, and actually involving ourselves in a shooting situation with the Soviets. How likely is that?
>
> Sec. Rush: I would hope that the Soviets would see this as we see it; namely we are preventing a massive invasion of North Vietnam into South Vietnam. We are not stopping ships. We are saying that we are preventing the delivery of supplies to North Vietnam. We have laid mines and no ships need hit those mines.

The interviewer pressed for a statement of U.S. intentions of possibly using more active means.

> NBC: What about a Soviet ship that gets within the 12 mile limit . . . is such a ship subject to interdiction bombing?
>
> Sec. Rush: We have made no decision to bomb a ship. We have made a decision that the supplies from that ship will not reach shore.
>
> NBC: How else could you do this without bombing ships before they get into harbor?
>
> Sec. Rush: There are many ways. One of them, of course, is that the ship itself would be taking a very grave risk if it came within the 12 mile limit and should hit a mine. Another one is if the ship is

> unloaded and if you have lightering . . . we could subject the lightering to bombing. We could bomb once they reach shore. We have alternatives in that regard, but the measures we will take depend on the circumstances.

These statements notified the Soviets and other nations that their ships would not be harmed as long as they did not attempt to penetrate the minefields. However, the United States implied that it retained the option of supplementing the passive fields with active interdiction by air strikes against lighters if the North Vietnamese chose this means to land supplies.

The question of U.S. intentions toward minesweeping inevitably arose. The following day the Secretary of Defense, Melvin Laird, held a press conference during which this facet of the rules of engagement partially emerged.[7]

> Question: Mr. Secretary, what is the United States going to do if the Soviet Union attempts to remove any of the mines that the U.S. has laid?
>
> Sec. Laird: We will take all steps that are necessary in order to maintain an adequate mining operation . . . .

Although Secretary Laird did not give a direct answer to the very sensitive question of U.S. intentions toward Soviet minesweeping units, he clearly implied that minesweeping would be a fruitless effort; that is, the minefields could be replenished as fast as they were swept. Additionally, he did not rule out the use of force against sweeping, which must have been a very unsettling prospect to the Soviets if they were seriously considering such an operation.

The surprise reversal of the longstanding policy against mining the North Vietnamese harbors was dramatic, but in retrospect it could have been predicted if the basic assumption was made that the United States would not precipitously withdraw its remaining 69,000 troops leaving the South Vietnamese to their own devices to counter the latest offensive. The decision was predictable because there were few practical military alternatives left that had not already been tried and found lacking. Once the alternatives had narrowed, the civilian decisionmakers were faced with a smaller but nevertheless more difficult set of problems. The range of Soviet and Chinese reactions to mining had to be reassessed and placed on balance with the advantages foreseen by cutting the lines of supply.

The hazards of making a mistake in the critically important task of estimating Soviet and Chinese intentions were no doubt fully appreciated by President Nixon and his Defense Department advisors. Only two decades earlier the United States suffered heavily when the Chinese suddenly entered the Korean conflict and very nearly swept General MacArthur's forces off the Korean peninsula as the result of a mistaken U.S. estimate of Chinese intentions.

One paragraph of the President's speech gives some insight into how the Administration probably signaled the Soviets that a new American initiative was forthcoming:

> On April 20, I sent Dr. Kissinger to Moscow for four days of meetings with Secretary General Brezhnev and other Soviet leaders. I instructed him to emphasize our desire for a rapid solution to the war and our willingness to look at all possible approaches. At that time, the Soviet leaders showed an interest in bringing the war to an end on a basis just to both sides. They urged resumption of negotiations in Paris, and they indicated they would use their constructive influence.

The difficult and critical task of decoding their response obviously led to the conclusion that Soviet reactions

could be accommodated because only 18 days after Dr. Kissinger's arrival in Moscow the first mines were laid. It turned out that the U.S. assessment of Soviet reactions was correct. The Soviet leaders had, during Kissinger's visit to Moscow, shown more interest in discussing the summit between President Nixon and Chairman Brezhnev that had been planned to take place in the fall of 1972. The only Soviet public comment on the mining was a TASS article on 9 May summarizing the President's speech and, interestingly, calling attention to Nixon's assurance that the U.S. efforts were not directed against any other country. Rather plaintively, TASS asserted that the U.S. actions were not compatible with the professed desire to end the war.[8]

Nixon had already visited China that February. From talks with Chou En-lai the United States had learned that despite ideological differences, normal state-to-state relations could be established. Chou specifically abjured recourse to war to solve outstanding disputes, making explicit what the U.S. leaders had already learned privately. It was another, if implicit, assurance that the United States needed no longer fear Chinese military intervention in Indochina.[9]

The Chinese response to the mining was more subtle than the Soviets'. Although on 9 May they protested attacks on Chinese ships on 6, 7, and 8 May (before the President's speech), it was more important that the Chinese, through their Embassy in Paris, inquired matter-of-factly about technical arrangements for the trip to China of House leaders Hale Boggs and Gerald Ford. The United States knew well enough that nothing the Chinese do is accidental. Beijing was telling the United States that the trips were still on, and that the steady improvement of relations between the two countries was not affected by the President's action.[10]

Nevertheless, President Nixon certainly spoke directly to the Chinese, although they were not named in his 8 May speech, to suggest that he was not becoming more aggressive, that the mining was really a defensive measure:

> To the other nations, especially those which are allied with North Vietnam, the actions I have announced tonight are not directed against you. Their sole purpose is to protect the lives of 60,000 Americans . . . .

The U.N. and International Law. The United States immediately began to provide a legal basis for the mining operation. The U.S. Ambassador to the United Nations, George Bush, wrote a letter to the President of the Security Council of the U.N. on the same day as President Nixon's speech, stating that "these measures of collective self-defense" were being reported "as required by Article 51 of the U.N. Charter." He went on to say that the operation was "restricted in extent and purpose," emphasizing that the minefields had been confined to the internal waters and claimed territorial waters of North Vietnam.[11]

There are only two provisions in the U.N. charter that allow the use of arms in international conflicts. The first provision requires the U.N. or other competent international organizations to approve such use. This was the case in Korea in 1950 when the U.S.S.R. made the serious error of boycotting a U.N. Security Council session considering the aggression. This allowed the United States to obtain the right to fight under U.N. auspices. The second provision is the case of self-defense. By using the term "collective self-defense," the United States tied the action to this provision by referring to the 69,000 American troops still in the South.

There was no mention of the President's speech nor in any official statement of the terms *quarantine* or

blockade. However, these words were freely and indiscriminately used by the press and in the Soviet, Chinese, and North Vietnamese statements denouncing the U.S. action

There was inevitably a comparison between this operation and the 1962 Cuban quarantine, but there were great differences. The Cuban quarantine was not a unilateral action in self-defense, although that was certainly an important factor in the decision that led to it. The quarantine was sanctioned by the Organization of American States, as the international organization competent to give legal status to the action as per the U.N. Charter. More important, however, was the method chosen to mount the quarantine. U.S. combatant ships operating on the high seas had orders to stop selected cargoes from entering Cuban ports. The mine barriers in North Vietnam were not selective; all ships from whatever nation were stopped.

Experts in international law had a field day in discussing whether or not the Vietnam operation was a blockade and if so, arguing its legality, Professor Abram Chayes of the Harvard Law School took the position that it was not technically a blockade because the action did not take place on the high seas. He also said it would not have been permissible under the law as the means used were mines that would act against all shipping, rather than naval forces that could intercept and warn away neutral shipping.[12]

A Johns Hopkins University expert, Professor Steven Schwabel, argued that for a blockade to exist a declaration of war is necessary.[13]

Professor John Norton Moore of the University of Virginia disagreed, contending that "factual existence of a state of hostilities does not require a formal declaration of war." Because the existence of the blockade had been announced to nonbelligerent nations and was being applied impartially to shipping of all nations, he concluded the action was legal.[14]

There were "dove and hawk" overtones in these interpretations of international law but the thought common to all these discussions seems to be that the international law of blockade does provide a means of confining hostilities to the original belligerents, thus limiting the possibilities of confrontation with nonbelligerents.

Whether it was a blockade in the sense of international law or not, the United States carefully refrained from using the term "blockade" claiming instead the self-defense provision of the U.N. Charter. However, the United States just as carefully staged the operation as if it were a traditional blockade, announcing the timing of the action to the world, specifying the geographical limits, and allowing three daylight periods for nonbelligerent shipping already in port to depart before the mines became armed.

It seems curious that this, the least violent military measure taken during the war, could, after the fact, precipitate such interest in its legal aspects. No doubt before the fact it required a careful choice of terms to be used by the President and his advisors. The mining was a tactical decision designed to produce a broader series of results. By calling it an interdiction rather than a blockade the President did not open the door for a legal challenge to his authority to order the operation without a formal declaration of war. By confining the measures to internal and territorial waters he could not be accused of interfering with free navigation on the high seas. By complying with some of the rules of blockade, for example, notification of nonbelligerents and providing a period for neutral shipping to evacuate the ports, he took precautions to minimize the risk of direct confrontation with the U.S.S.R. and China.

Thus the decision to use a simple military measure to achieve a specific

objective was made. In a general war such an operation would have been staffed, decided upon, and executed at a level probably no higher than a fleet command. In limited war, because of the political implications, the operation required the attention of the highest civil and military authorities for an extended period, primarily to avoid intervention from other nations. The long delayed mining of North Vietnamese ports fully portrays the complexity of limited war and the constraints it places on those who guide it.

The U.S. Navy's Capabilities. The U.S. Navy was well prepared for and capable of executing the President's decision, and the result of the operarion was an unqualified success. This was no accident. The success sremmed from years of planning that led ro:

- The availability of a mix of mine types with the range of characteristics required to be effective against a wide variety of targets.
- A superb minelaying platform (the A-6 Inrruder) and sufficient carriers from which to launch them.
- Logistical readiness to support the operation.
- Excellent intelligence on the area and its environmental conditions.
- Proper appreciarion of the likely targers.

Early in the war the Navy had an inventory of sophisticated sea mines that had evolved from previous wars. However, they were designed primarily for use against large surface combatants and submarines. Their sophistication was at once advantageous and disadvantageous. Their choice of setrings allowed them to be very selective against specific rargets and highly resistant to countermeasures, but selectiviry and resistance ro countermeasures were contrary to the aim of targeting against a variety of vessels.

An essential part of the planning for the mining of Haiphong was to eliminate the possibility of offloading cargo from deep-draft vessels outside the limits of the minefields onto small craft for transshipment through the mined areas. Small craft would not set off the firing system in the mines at hand because their magnetic, acoustic, and pressure signatures were below the necessary threshold. So a new type of mine had to be developed. It had to be effective against junks and sampans and, most importantly, it had to work in shallow water.

These facts were recognized early in the war, and one result was the emergence of the Destructor series of mine designed by the Naval Ordnance Laborarory, White Oak, Maryland.[15] The Destructor is simply a 500- or 1,000-pound bomb fitted with a sensor that permits it to be used as a mine. Despite its small size, it has a number of advanrages:

- It is much less expensive than most mines.
- It is not a single-purpose weapon, for it is easily convertible from bomb to mine or vice versa by quickly trained personnel.
- It can be dropped from many kinds of aircraft.
- Ir is not limited to a minimum depth.

With the introduction of rhe Destructor, the U.S. Navy added a significanr chapter to the history of mine warfare. Nor only did it greatly simplify the enormous logistical problem associated with large-scale mining operations in previous wars, it also filled rhe gap in the increased sensitivity and wide-targer spectrum. The Destructor had been used successfully in the rivers and canals, but this time it was to prove itself in a major mining campaign.

The Haiphong mines were laid by carrier-based A-6 Intruders, aircraft capable of a navigarional accuracy in all weather conditions that could assure the mines were indeed going inro the planned areas. Before the introduction

of accurate airborne inertial navigation systems, navigational accuracy had always been a drawback to aircraft as a laying platform.

This operation should prove beyond any doubt that aircraft are capable of conducting large-scale mining exactly. During the war a total of 8,000 mines were laid by aircraft, and the relatively light Destructor was particularly valuable in this effort as the quantity carried per sortie justified the risk to the aircraft entailed in the mission.[16] Thus there was little difficulty for Task Force 77 to commence laying the minefields at the same time that the President began his speech in Washington. In fact, the Chairman of the Joint Chiefs of Staff, Admiral Thomas H. Moorer had requested the approval of the operation to be given not later than 1400 (U.S. Eastern time) the same day.[17]

The Mining of Haiphong. The main ship channel to Haiphong is 12 miles long and between 200 and 250 feet wide. It was mined in three places with 75 Mk 52 mines set to be actuated by large steel ships. These mines can be set to arm themselves at a very precise time, a particularly important characteristic as the President had stated publicly that three days would be allowed for ships in port to depart without harm. Outside the main shipping channel 700 Destructors with very sensitive settings were laid in three other fields. The Mk 52 mines were set to sterilize themselves in 100 days, the Destructors in 200.[18]

These settings were important from a naval as well as from a political standpoint. It was foreseen at the very beginning of the operation that if there were a political settlement of the war, the United States probably would have to sweep its own mines. Of course, no one knew how long it would take to agree on a settlement. The Mk 52 mines were sterilized by having them go inert at the predetermined time. The Destructors met the same aim by exploding themselves. The ability of mines to destroy themselves on a preset schedule was a new and highly convenient characteristic.

Because they were sophisticated, the Mk 52 mines could only have been swept by a time-consuming and expensive operation. This led to the decision to make their active lives short. Because the Destructors were all laid outside the main shipping channel, and as the clearance of the main shipping channel would be given first priority, their lives could comfortably be doubly that of the Mk 52s. Later, when additional Mk 52 mines were planted to replenish the original mines, a self-destroying mechanism was installed in them.

Formerly, after each war in which mines have been used, enormous commitments in ships, men, time, and money have been required to ensure navigational safety in waters which have been mined. Even today many ships travel specified (NEMEDRI) routes in the Baltic as these routes are the only ones guaranteed to be free of World War II mines. Not only does self-destruction largely eliminate this problem, but, it has a psychological advantage too. Those North Vietnamese close enough to the fields to observe or hear the explosions of self-destroying mines, had little doubt that the fields were still there. At night they could even be in doubt whether the sound they heard was that of a mine ending its life or ending that of a ship which had hit one.

It could be argued that the relatively long periods set for sterilization were inconsistent with the prospect for political success that mining seemed to offer. As we now know, this was no problem. It was estimated that North Vietnam had ammunition and supplies for about four months and the issue of drawing down these supplies was very important. If a political agreement had been reached in the interim, a sweeping operation could have been

mounted as a part of the political settlement.[19]

It would be misleading to state that the Destructor series can in all cases replace the ordinary sea mine. It cannot. A 1,000-pound Destructor has only half the weight of explosives found in a Mk 55 mine, so it is used only in shallow water depths and against small targets. Nevertheless, it can serve as the preponderant weapon in a mix of mines in most channels, ports, and along coastlines in anti-invasion minefields. There is a tendency to measure the effectiveness of a minefield in the numbers of ships sunk; however, modern thinking goes in the direction that overkill is not needed. Moderate damage, insuring that the target becomes nonoperational or at least will have to abandon its mission will be sufficient, and this is exactly what the Destructor can do.

The Success of the Minefields. The mining operations off Haiphong and other North Vietnamese ports were completely successful. Five weeks after the mines had been laid *Newsweek* published the following:

> Hanoi's failure to clear the mines laid in its harbors by U.S. planes comes as no surprise to the Pentagon. One top Defense official thinks even the Russian minesweeping task force now in the South China Sea, or the U.S. Navy itself, would have trouble sweeping those sophisticated weapons. Ir is likely any sweeping operation would have to wait until the timing devices in the mines had wound down and disarmed them.[20]

The Soviets made no attempt to sweep the fields, and the "blockade" remained effective until the United States, as a part of the Paris agreements, began Operation Endsweep. An interesting point with this operation was that although the U.S. Navy knew the exact settings of the mines, it was once again proved that mining is less expensive than mine countermeasures. It is estimated that the cost of planting the minefields off the North Vietnamese ports was $6.5 million while that of ensuring they were swept came to $14.5 million.

Five merchant ships left harbor during the three-day period before the mines activated but 27 more remained behind the blockade for the nine months that it was in effect.

The mining was both a political and a military success. The diplomatic initiatives established between the United States, the U.S.S.R., and China by Nixon and his administration were perhaps a key factor in the use of the mines. These initiatives clearly assisted in the accurate prediction of the reaction of the Chinese and the Soviets. It was a military success because shipping stopped. The flow of arms and supplies into Haiphong was ended. The U.S. Navy's recommendations through eight years were proved to be correct. The operation was executed with consummate skill, and it brought about the desired political response that seven years of bloody fighting had failed to achieve.

What Do We Make of It? What was it we learned from the U.S. mining experience in Vietnam? This is no idle question either for the United States, or for the other NATO countries. NATO's current strategy calls for a wide range of military options in crisis management and several aspects of naval mining are applicable in this regard:

• Although the deployment of mines brings weapons to bear on the adversary, it need not draw blood ro be effective. The Vietnam operation proved that beyond doubt. The minefields off the North Vietnamese ports were so effective that only some few boats tried to pass them. And the North Vietnamese made no serious attempt to sweep or otherwise counter them, for they estimated the risk to be too high.

• A minefield applies local force 24

hours a day for the extent of its programmed life without the necessity of massing naval forces near those of the potential antagonist. If a crisis is to be managed, the risk of an accidental outbreak of hostilities must be avoided. The best method of insuring that such will not occur is to maintain a prudent distance between forces without giving up the means of applying the necessary pressure required to produce the desired result. Of course, the lethal potential of the field must be maintained if it is to remain effective over a sustained period, but this too can be done without, for example, firing on mine countermeasure units. If it could be laid in the first place, the field presumably could be replenished, although the followup operation might be more difficult as surprise probably would not be possible.

• An important facet of the use of mines in crisis management is the close cooperation required between political and military planners. The decisions concerning which of the international conventions should be followed in providing a legal basis for the operation must be examined carefully, and so should the possibility of deviations from these conventions. The decisionmakers must have a realistic knowledge of the consequences involved and they should be prepared to address potential accusations at the international level. The method used by the United States to justify its "Rules of Engagement" serves as an example. Peacetime contingency planning should contain one or more sets of "Rules of Engagement" to fit the expected variation of possible scenarios in a time of tension.

• One must be prepared to address how the potential antagonist is to be informed of the mining. What should be said officially and what should be said to the press as followup information? The U.S. management of this issue was an excellent example of how one might proceed to develop the close cooperation required between political, military, and civilian agencies.

• A high degree of readiness must be assumed if a response is to be timely. The Destructor series particularly meets that requirement although the small amount of explosives each Destructor holds favor its use in channels, ports, and in anti-invasion minefields, rather than in deep water.

• NATO nations should be attentive to the relative inexpensiveness of the Destructor series in comparison to its evolutionary precursors. In an era when new weapon systems cost billions of dollars to develop and produce, this feature should appeal to the smaller nations whose military budgets are being severely strained by increasing personnel costs and by the expense of updating or replacing older weapons systems. Solid-state electronics with low power consumption provide a fertile field for the invention of new firing systems or the modification of old ones. At the same time it should be remembered that it is the presence in one mine, or in one minefield, of many different firing systems that makes the enemy's problem so complex.

• Some NATO countries plan to rely extensively on defensive mining. The self-destroying feature used in Vietnam is an attractive one, for there is little doubt about who will have the burden of mine clearance after the passage of a crisis or war. Furthermore, it is a very inexpensive feature to include on most existing mines.

A Final Thought. Mines might appear to be a universal weapon system capable of solving all problems. But, of course, this is not so. To be effective, mines must be backed with land, sea, and air forces, otherwise their use becomes merely a token gesture. As J.S. Cowie stated long ago, "Mine laying can never be an end in itself, but must always be an adjunct to the operations of other forces."[21]

The solution of a crisis would not necessarily require the use of other forces but such forces must be both obviously powerful and obviously available if a minelaying operation fails to achieve the desired solution. The important fact is that the use of mines might create the breathing space that could lead to quiet political negotiations rather than violent conflict.

The U.S. Navy's mining campaign in Vietnam was clearly one of the critical factors that led to serious negotiations in Paris and the subsequent voluntary withdrawal of U.S. military forces from Vietnam. It was an unqualified success and it revitalized dramatically the image of a form of warfare that had been in existence for nearly two centuries. In those austere periods between the wars it is important that this inexpensive, but effective conventional weapon system be improved upon.

The mining experience in Vietnam should constantly remind us that greater expense does not necessarily mean greater effectiveness in the complex arena of war. But, don't forget the political implications.

BIOGRAPHIC SUMMARY

Ulrik T. Luckow, a Danish Commander (s.g.), has through 16 years of his career served in minesweepers, minelayers, and the Danish Underwater Weapons Department, and as Senior Officer Minewarfare on the staff of Flag Officer Denmark. He served as division commander for the Danish 1 Minelayer division prior to his appointment as student at the Naval Command College of the Naval War College. He is now assigned to the staff of the Supreme Allied Command Atlantic, Norfolk, Virginia.

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