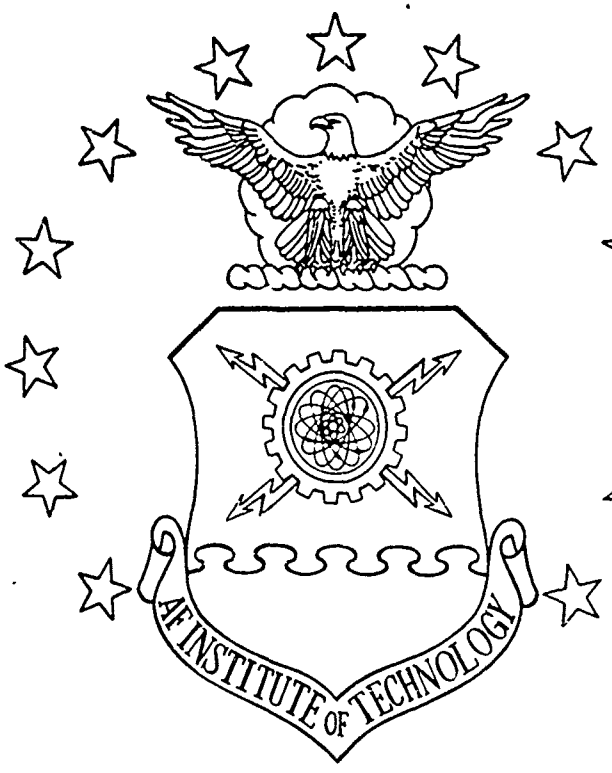

THE USE AND EFFECTIVENESS OF SABOTAGE AS A MEANS OF UNCONVENTIONAL WARFARE - AN HISTORICAL PERSPECTIVE FROM WORLD WAR I THROUGH VIET NAM

THESIS

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THESIS

Presented to the Faculty of the School of Systems and Logistics
of the Air Force Institute of Technology
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In Partial Fulfillment of the
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Master of Science in Logistics Management

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Acknowledgements

"I can do all things through Christ Who strengthens me." Phillipians 4:13

First and foremost, thanks to my Lord Who gave me the strength and ability to do what does not come naturally--reading.

"Who can find a virtuous woman? For her worth is far above rubies." Proverbs 31:10

No other person could compare to my bride, Ramona, in the love, devotion, strength and patience she displayed while enduring without a husband.

"Lo, children are a heritage from the Lord." Psalm 127:3

My three little boys had to compete with school for Daddy's time much more than he would have wished. It's now time to be a family again.

"My son, let them not depart from your eyes; keep sound wisdom and discretion." Proverbs 3:21

Many thanks to my thesis advisor, Lt Col Dennis Dragich. His knowledge of and devotion to the area of combat logistics directed me to him. His wisdom and patience allowed him to keep me on the right path to the end of this thesis.

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Abstract

The purpose of this research was to determine the effectiveness of sabotage as a means of unconventional warfare by historically analyzing previous conflicts to determine the role and impact sabotage played. In order to accomplish this research, answers to the following questions had to be found:

1) What is the definition of sabotage?

2) What is the definition of unconventional warfare?

3) What form has sabotage taken previously (e.g., bombings, tamperings)?

4) What were the targets in previous acts of sabotage (e.g., power stations, transportation, communications facilities)?

5) How much did forces rely on sabotage (i.e., was sabotage their main instrument of force, used seldomly, etc.)?

6) Is there a correlation between the type of force committing the sabotage, the manner in which sabotage was attempted, and the target picked?

7) How reliable were the acts of sabotage (e.g., the number of successful acts of sabotage compared to the total number attempted)?

8) How effective were any countermeasures encountered by saboteurs in preventing the sabotage?

What remained was to determine its effectiveness based on its usage in history. To be effective, sabotage had to accomplish what is expected of any offensive military operation--inflict damage on the enemy's ability to wage war. History supported the thesis that sabotage is an effective means of warfare. Sabotage was used against both strategic and tactical targets. It was proven capable of being used near the front line, in the rear areas, and even in support areas out of theater.

THE USE AND EFFECTIVENESS OF SABOTAGE AS A MEANS OF UNCONVENTIONAL WARFARE - AN HISTORICAL PERSPECTIVE FROM WORLD WAR I THROUGH VIET NAM

I. Introduction

Background

Lt. Col. Keith Grimes, author of Small Force - Big Impact, The Strategic Value of World War II Raiding Forces, stated:

> It is an old military concept to engage an enemy in his rear. As armies grew large they became more vulnerable along their rear, less able to live off the land and more dependent on bases for support (20:1).

Grimes acknowledged the use of raiders (i.e., saboteurs) to attack the rear of an enemy from the time of Quintus Fabius Maximus fighting against the Romans, through the time of the Vikings, the American Revolution and Civil War eras (20:2). Sabotage continued to be used during both World Wars, through the Korean and Viet Nam conflicts and even continues to the present day. Examples of sabotage include: German saboteurs caused the Black Tom and Kingsland fires and munitions blasts in the United States during World War I; the Russians used sabotage by fire against the Germans in World War II; four Viet Minh saboteurs set fire to the largest French petroleum, oil and lubricants (POL) depot in the Haiphong area in 1953; the Soviet Union used

sabotage to both capture the Prague airport in their invasion of Czechoslovakia and to aid in their invasion of Afghanistan (28:1, 21:36).

Weaver grouped potential saboteurs into the following eight categories:

1. The mentally disturbed individual
2. Terrorists or revolutionary groups
3. Enemy agents
4. Co-opted U.S. or allied personnel
5. Organized undergrounds
6. Guerrilla forces
7. Local sympathizers
8. Special military forces (38:3).

Weaver elaborated on the differences and characteristics of these possible sabotage agents. Mentally disturbed individuals include those who seek revenge, suffer from actual mental illness, or feel they have received a calling to carry out a particular mission. That mission might include sabotage (38:3-4).

Terrorists pose a possible sabotage threat during peacetime in support of an ideology. These acts of sabotage have normally been in support of the terrorists' goals and dissociated from the acts of a responsible government (38:4). However, terrorist groups could be used as surrogates, or extensions, for the foreign policy of other nations. Beitler noted that a KGB defector reported a sab-

otage school outside of Moscow used to train terrorists, including the Palestine Liberation Organization and others (7:40).

Enemy agents are enemy personnel in the targeted land either legally (e.g., diplomats) or illegally (e.g., infiltrators) or people recruited from the general populace of the targeted land. Enemy agents can be classified as either active agents or sleepers. Active agents perform other functions for the enemy during peacetime. Sleepers, in an effort to remain unknown to intelligence officials, do not start to operate for the enemy until after the outbreak of hostilities. Either one could be called upon to perform acts of sabotage on very short notice. In fact, a Czechoslovakian general who defected to the West told of the KGB's ability to organize "the sabotage of industries, bridges or port facilities in any part of Scandinavia within minutes after the outbreak of hostilities" (38:5-6).

Co-opted personnel are the US or allied military equivalent to the civilian enemy agent. They also may be categorized as active agents or sleepers and could be in positions ranging from enlisted to senior officers. Their job would be to hamper effective leadership and communications in the event of open hostilities as well as to commit acts of sabotage due to their close proximity to military targets (38:6-7).

Local sympathizers (i.e., partisans) have the potential to become organized forces. As such, they are possible resources for an organized underground. Both local sympathizers and organized underground movements could be used in sabotage acts and have the added advantage of living in the land, thereby knowing the best places to conceal weapons, munitions, etc. (38:7). Beitler stated:

> The main value of partisans to the Soviets in the Second World War was to provide tactical intelligence on weak links, other intelligence and conduct sabotage, disruption and diversionary operations (7:94).

Guerrilla forces are military and paramilitary personnel that conduct operations in enemy held or hostile territory. They usually consist of irregular, predominantly indigenous forces (26:117). Guerrilla forces regularly use sabotage and terror to accomplish their political and military goals. As such, they have practical "combat" experience in using sabotage against their enemies (38:8).

Special military forces potentially pose the greatest threat of sabotage in that they receive specialized training on committing acts of sabotage (38:8-9). For example, the Soviet Spetsnaz are trained in areas including foreign languages, parachuting, SCUBA, martial arts, terrorist operations, reconnaisance, sabotage demolitions, and partisan operations (7:26). Hansen reported Spetsnaz use accurate full-scale models of enemy installations and weapons, including mockups of PERSHING and LANCE ballistic missiles,

ground-launched cruise missiles (GLCM's), airfields, nuclear storage sites, air defense sites, and communications facilities (21:30).

A distinction can also be made as to the method used to commit sabotage. Saboteurs can employ any and all of the four basic types of weapons: conventional, chemical, biological, and nuclear (38:12).

Beside ordinary weaponry, conventional munitions include incendiary methods, contaminating fuel supplies, and using specialized devices, such as gallium metal anti-aircraft devices. Lewald noted that incendiarism particularly suits the needs of a saboteur because it requires very little specialized equipment and releases much more destructive energy for the small amount of fuel required to start a fire (28:2). Placing non-fuel additives cause decreased performance, if not inoperability in an engine. Klein discussed the feasibility of a clandestine anti-aircraft device utilizing gallium metal (27). Chemical weapons have also been used in warfare and have the potential for use in sabotage. The Soviet Spetsnaz receive training in the use of chemicals and poisons (38:13). Weaver pointed out:

> During an operation that resulted in the arrest of 105 Soviet agents in Britain in 1971, it was learned that plans existed for those agents to sabotage London's water supply system by poisoning (38:13).

The Soviets used this tactic of poisoning water supplies

on 13 and 20 September 1982 when they contaminated water supplies in two Afghan villages (5:61).

Biological weapons also present an easy means of sabotage due to the wide-spread effect, the relatively small amount of material needed to transport and the small chance of detection before use. One KGB defector told of the extensive training Spetsnaz personnel receive on the use of biological weapons and of plans that were already made to spread cholera, typhoid and other diseases in humans as well as infectious diseases in animals prior to open hostilities (38:13).

Some saboteurs are also trained on the use of tactical nuclear weapons (38:14). When quoting the Soviet defector, Aleksei Myagkov, Beitler noted:

> On the outbreak of war in Europe a GRU sabotage unit would use an atomic explosion to destroy the mountainous banks of the Rhine and dam it. As a result, Soviet military experts have calculated, some 300-500 kms of West Germany would be flooded, cutting roads, communications and destroying a number of important targets (7:53).

General Issue

Military planners must be aware of any type of action which might help their forces gain the advantage in a conflict as well as those actions which, if used by the enemy, could inflict damage on their ability to wage war. If the effectiveness of sabotage as a means of unconventional warfare could be shown in history, the lessons learned would help enable planners know how to best use sabotage against

an enemy as well as how to best defend against the enemy's use of sabotage. An historical research on the use and effectiveness of sabotage in past conflicts could, therefore, add to the body of knowledge that military planners use when determining military options and courses of action.

Specific Problem

In previous conflicts, sabotage was used by forces in an attempt to gain an advantage over their enemies. Sabotage could also be used by forces before a war or conflict is officially declared as a means of reducing a potential adversary's military options and abilities (and possibly adverting open hostilities). This research attempted to show the effectiveness of sabotage as a means of unconventional warfare by historically analyzing previous conflicts to determine the role and impact sabotage played.

Investigative Questions

In order to accomplish this research, the answers to the following questions had to be found:

1. What is the definition of sabotage?
2. What is the definition of unconventional warfare?
3. What form has sabotage taken previously (e.g., bombings, tamperings)?
4. What were the targets in previous acts of sabotage (e.g., power stations, transportation, communications facilities)?

5. How much did forces rely on sabotage (i.e., was sabotage their main instrument of force, used seldomly, etc.)?

6. Was there a correlation between the type of force committing the sabotage, the manner in which sabotage was attempted, and the target picked?

7. How reliable were the acts of sabotage (e.g., the number of successful acts of sabotage compared to the total number attempted)?

8. How effective were any countermeasures encountered by saboteurs in preventing the sabotage?

Limitations

For the purpose of this research the following limitations were made:

1. Although it is possible for saboteurs to have received training on the use of tactical nuclear weapons, the use of such was not discussed.

2. This research was restricted to a time frame of World War I up to the present time.

3. This research dealt with the historical use and effectiveness of sabotage as used by one aggressive group against another. As such, saboteurs discussed in this research did not include mentally disturbed individuals.

4. JCS Publication 1 defined sabotage as: an act or acts with intent to injure, interfere with, or obstruct the national defenses of a country by willfully injuring or

destroying, or attempting to injure or destroy, any national defense or war material, premises or utilities, to include human and natural resources (26:315). However, this definition did not take into account sabotage for the purpose of rendering equipment inoperative rather than its outright destruction. It also did not differentiate between acts committed in a covert, overt or clandestine manner. Therefore, for the purposes of this research, sabotage was defined as follows: a clandestine act(s) of a person(s) to destroy, or render inoperative, enemy combat equipment, support equipment, facilities, and/or utilities, to include human and natural resources, used to support aggression while not being actively used in an aggressive manner at the time of the act. The intent of the clandestine act is to conceal the method of destruction or rendering inoperable by avoiding detection by the aggressor, if possible. Excluded from this definition are surprise attacks in which valid targets are destroyed in an overt manner (e.g., helicopter attack using missiles to destroy a bridge).

II. Sabotage In Review

Methodology

An historical design for collecting, analyzing and synthesizing the data was used. In order to perform an analysis on the history of sabotage, a literature search was performed. All local libraries were contacted to examine relevant material. The researcher requested a literature search from the Defense Technical Information Center (DTIC) under the area of sabotage and expanded this search into several peripheral areas. These areas included raids, Spetsnaz, commandos, special operations or forces, clandestine attacks, covert operations, military history, unconventional warfare and terrorism. Additionally, searches through the DIALOGUE Information Services, Inc. were conducted using the same key words used in the DTIC search. The researcher also searched magazine articles under these areas in the Air University Index of Military Periodicals as well as the Reader's Guide to Periodical Literature. Finally, the researcher contacted numerous governmental agencies including the U.S. Army Center for Military History and the Air Force Office of Special Investigations via telephone in order to establish if there were any recognized experts or established data bases on the use and/or effectiveness of sabotage in history.

Based on the findings of this preliminary literature search, specific documents and recommended bibliographic information were ordered for review. Relevant material from the bibliographies was subsequently ordered through DTIC or inter-library loan and reviewed.

Review of the literature soon revealed that the area of sabotage had not been treated as a major subject. Rather, it had been treated as an ancillary subject, having been mentioned only as one of many tactics used by individuals or units in the accomplishment of their stated goals. As an example, the following is an excerpt from written communication from Mr. Terry Gough of the U.S. Army Military History Institute, dated 10 July 1987 in response to the query to the Center for Military History:

> On the history of sabotage, we have a few books...in which the subject is treated lightly. The history of sabotage seems to be intertwined with the histories of espionage, subversion, resistance movements and related subjects (17).

Also, based on the information received via similar conversations, it became apparent that there was no definitive work on the history of sabotage (8; 29; 35). Conversations on the subject for possible interviews yielded the additional bibliographical references already mentioned. It was necessary, therefore, for the researcher to sift through several tens of thousands of pages of literature in an attempt to glean the information pertaining to sabotage presented in this thesis. Time constraints did not permit

a review of all possible literature available. All sources used in this research were unclassified. Although some sources were in limited distribution for various reasons, the information cited from these sources was not subject to the restrictions established by those limited distributions.

This information, then, formed the data from which this study was based. The analysis of sabotage in this study seemed "uneven" in that World War II and the Viet Nam war were heavily emphasized while other conflicts and periods of time were not. Three possible explanations were posed for this observation. First, sabotage was used more in World War II and the Viet Nam war than in other conflicts. Second, sabotage was used as much (or more so) in other conflicts, but was not recorded in as much detail or volume. Third, sabotage was used as much (or more so) and would have been researched had time constraints not forced an end to the literature review. The fact, though, that sabotage was mentioned in these periods would indicate that it was indeed used to some extent.

Thus, by using this methodology, the researcher hoped to historically show the effectiveness of sabotage as a means of unconventional warfare. This chapter discusses the review of the literature. Chapter three discusses an analysis of the information found in the literature, the conclusions drawn from this analysis, and recommendations for possible follow-on studies.

Background

In this chapter, the literature reviewed for this research will be discussed. The chapter has been chronologically divided into major periods of time. Within these time periods, the countries referenced were placed in alphabetical order. Except in the case of Ireland and Great Britain, the incidents of sabotage listed within each country occurred in that country. Reference to the appropriate persons committing the sabotage, when known, was given. In the cases of Ireland and Great Britain, listing of sabotage incidents was based on the group committing the acts. This was done to provide continuity of these groups' histories and actions since they committed sabotage in multiple countries. In the case of Ireland, the group was the Irish Republican Army (IRA). In Great Britain's case, it was the British Commandos.

This research differentiated between the British Commandos and the agents of the British Special Operations Executive (SOE) due to the missions these two groups were assigned. The British Commandos were stationed in Great Britain. They were to travel to the target area, sabotage the intended targets, and return to Great Britain. As such, they were strictly saboteurs. On the other hand, SOE agents were normally assigned to organized groups of resistance within a country other than Great Britain as technical advisors and liaison personnel. They acted in this

capacity either on an on-going basis or joined the group for a specific mission and then returned to Great Britain. Although they sometimes helped commit sabotage, it was with the group to which they were assigned. As such, they were treated as part of the resistance group, not the British Commandos.

In the presentation of the literature the following clarification was made to reduce confusion. The phrase "line(s) of communication" was used to mean just that--communication. Examples of lines of communication would be telephone lines, microwave stations, repeaters, etc. Treated separately from lines of communication are lines of supply and lines of transportation. Where information was available, the specific types of lines were noted (e.g., canal vs. rail vs. road).

World War I

Arabia. After taking the port of Wajh, the British and Arab dissidents committed acts of sabotage against the Turkish-controlled Hijaz Railway. For example, on 12 February 1917, a sabotage party of 50 Bedouins left Wahj and crossed over to the railroad on camel. There they planted the charges and subsequently derailed a Turkish locomotive, leaving the rail cars standing between the two areas of track that blew up (11:14).

Throughout the summer the sabotage continued, now in conjunction with air strikes. These air strikes were tar-

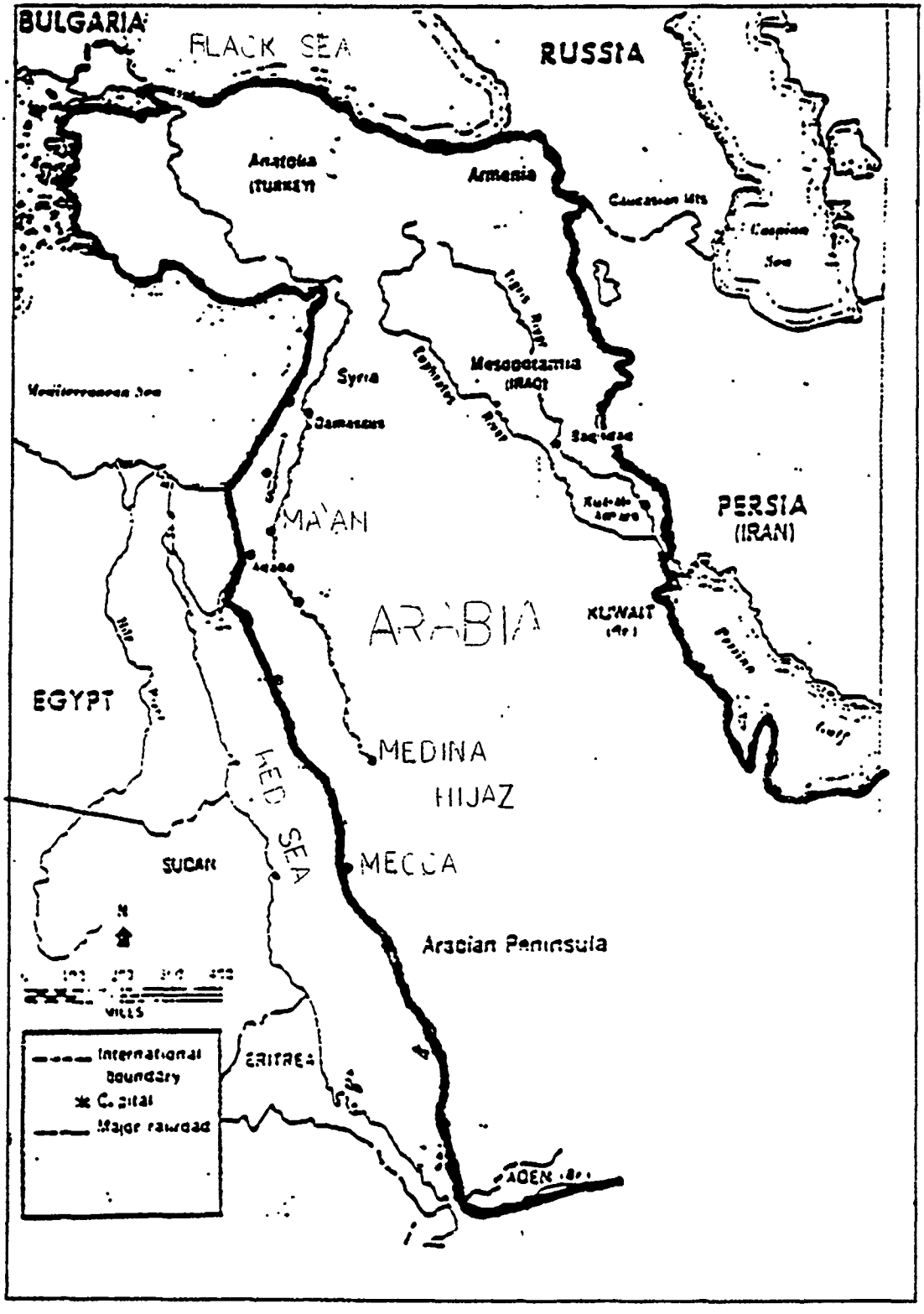

Figure 1. Arabia (11:2)

geted against both the Turkish posts and the repair teams sent out to reconstruct the demolished rail lines between Medina and Ma'an. During this time, Allied efforts in Arabia were proceeding as the British had planned. However, the faltering Allied line of battle in France in 1918 forced the British to transport troops from Arabia to France to strengthen their forces in that country. This drain of manpower virtually stifled the offensive efforts of the British. In spite of the inaction on the part of the British, the Arabs continued to use sabotage against the railroad for the next 200 miles up to Damascus. By the time spring of 1918 had ended, the rail line was so demolished the Turks couldn't use it (11:14). These actions against the Hijaz Railroad continued and took their toll on the Turks. Trains required security and repair teams on board and seldom travelled at night. Before the war, a stockpile of rail equipment had been amassed for linking Mecca to the other stations. However, the supply was cannibalized to effect repairs until nothing remained. A total of approximately 12,000 Turkish troops were eventually committed to the safeguarding of the railroad (11:21).

United States. On 30 July 1916 the Black Tom munitions storage terminal in New York Harbor was demolished due to sabotage. The explosions were so powerful that two of the blasts were heard as far away as Philadelphia. Buildings on neighboring Ellis Island were damaged. Soon

after World War I started, this terminal had become a focal point for the collection of American supplies, including munitions, to be shipped to the Allied nations. On this night the following munitions were present on railroad cars: 11 cars of high explosives, 17 cars of shells, 3 cars of nitrocellulose, 1 car of TNT, and two cars of fuses. The total weight of explosives for the train cars was approximately 2,132,000 pounds. Additionally, there were 10 barges at the northern pier loaded with explosives shipped from other terminals to Black Tom. One of these, the Johnson 17, had 100,000 pounds of TNT and 417 cases of fuses.

At 1:45 a.m. two fires started almost simultaneously, one on a munitions freight car and the other on one of the barges. A fire alarm was called in, but the fires burned uncontrollably until the explosions started at 2:08 a.m. After much litigation, in 1939 the Mixed Claims Commission ruled that the evidence pointed to German saboteurs who committed arson (40:30-38).

Pre-World War II

Ireland (1916-1921). After a long history of grievance against the British dating back to 1798, the Irish Republican Army (IRA) sucessfully rose up against the British on Easter of 1916. Until this time, much of the resistance had been passive. However, the IRA now went on a rampage of sabotage, knowing they could not fight head to head against

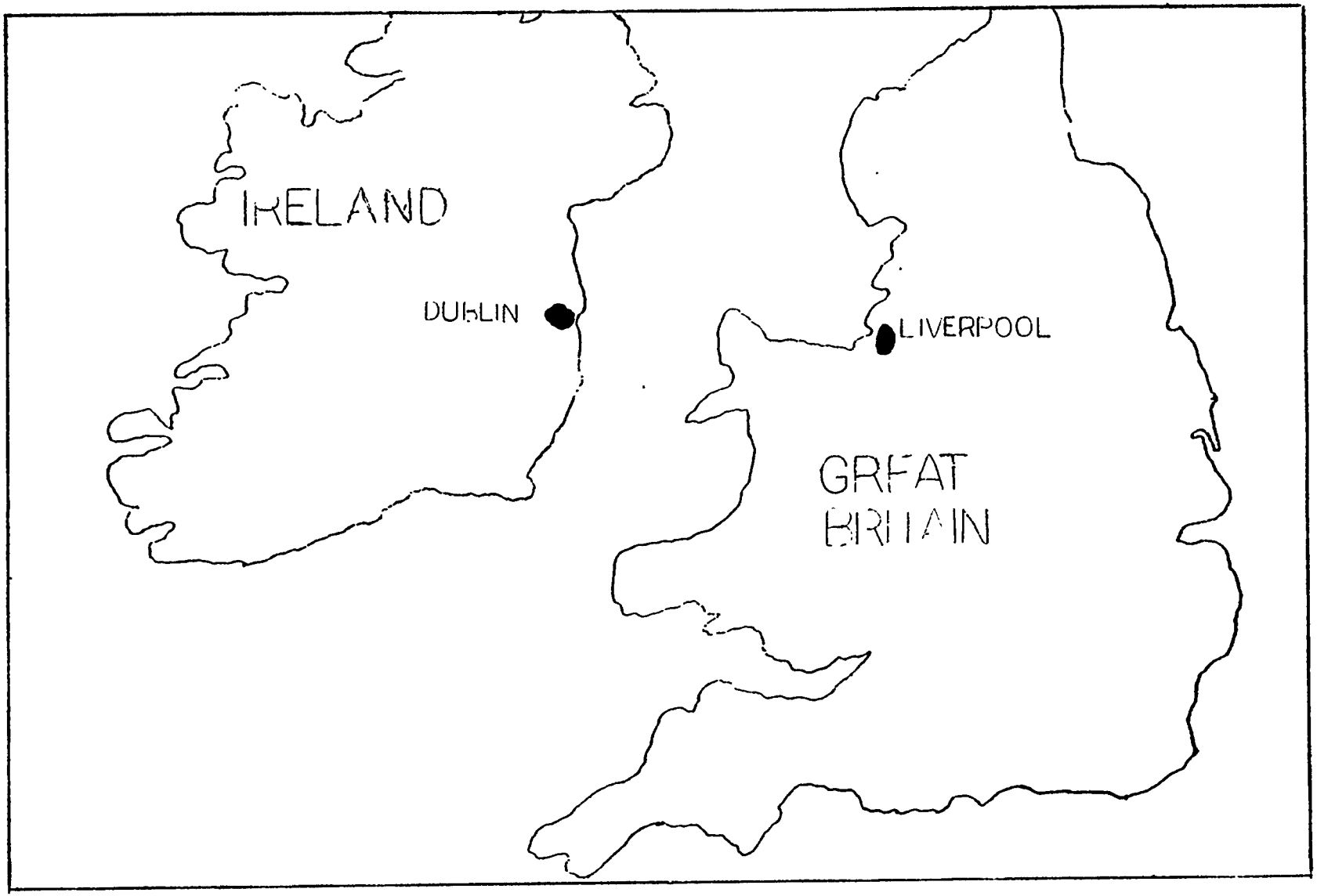

Figure 2. Ireland (1916-1921)

the British forces. Communication lines were destroyed as well as lines of transportation and fuel supplies (25:153). Passive sabotage included the refusal of dock and train workers to work on ships and rail cars used by the government (25:154).

In 1920, the IRA decided they would also commit sabotage in Britain itself. Here, just as in Ireland, the IRA struck openly. In Liverpool, for example, firefighters battled fifteen warehouse fires in one night that were the result of arson (11:43). In a later case of arson the IRA also removed the ability to extinguish their fires. On 25 May 1921, the IRA sabotaged the majority of the firetrucks while in the fire houses before they had set the fires. Thus, they ensured the fire they set to the Dublin Customs House and all of its records would continue to burn (11:43).

Palestine (1933). To show their resolve to keep the Jewish community from having a home in Palestine, Arabs committed sabotage and sniping against the British military, police, and Jews. Against the British, the Arabs targeted the oil pipeline from Iraq, transportation and communications systems, and police stations. Against the Jews, the Arabs targeted their means of living--fruit trees and livestock (11:68).

Spain (1936). During the Spanish Civil War, the Soviets organized guerrillas and operated two schools of sabotage to train about 200 each per class on techniques of com-

mitting sabotage. One of the schools was located in Madrid, the other near Valencia. All this was done in the rear area of the enemy fascists. The students learned well from their mentors--after only three months, "...forty percent of the bridges and power lines within sixty kilometers of the front were destroyed" (7:92-93).

World War II

The European Theater.

France. The French used both passive and active forms of sabotage in confronting the Germans. Some examples of passive sabotage included allowing poor quality material to pass factory inspections, losing German shipments, and hiding rotten food to spoil an entire shipment of food (11:118). For the active forms of sabotage, the French resistance received many sabotage orders of battle via message over the BBC radio or by aircraft (36:214-215). The profuseness of the active sabotage efforts was reflected in the annals kept by the Germans. According to the Germans' own records, 1,429 acts of sabotage were taken against them by the French resistance forces during the period of January 1942 until February 1943 (1:47).

As the French saw the effect their sabotage was having on the Germans, the rate of sabotage increased. From February 1943 to May 1944, there was a 600% increase in the number of acts of sabotage. Knowing the importance of supplying forces, the railroads remained a major objective for

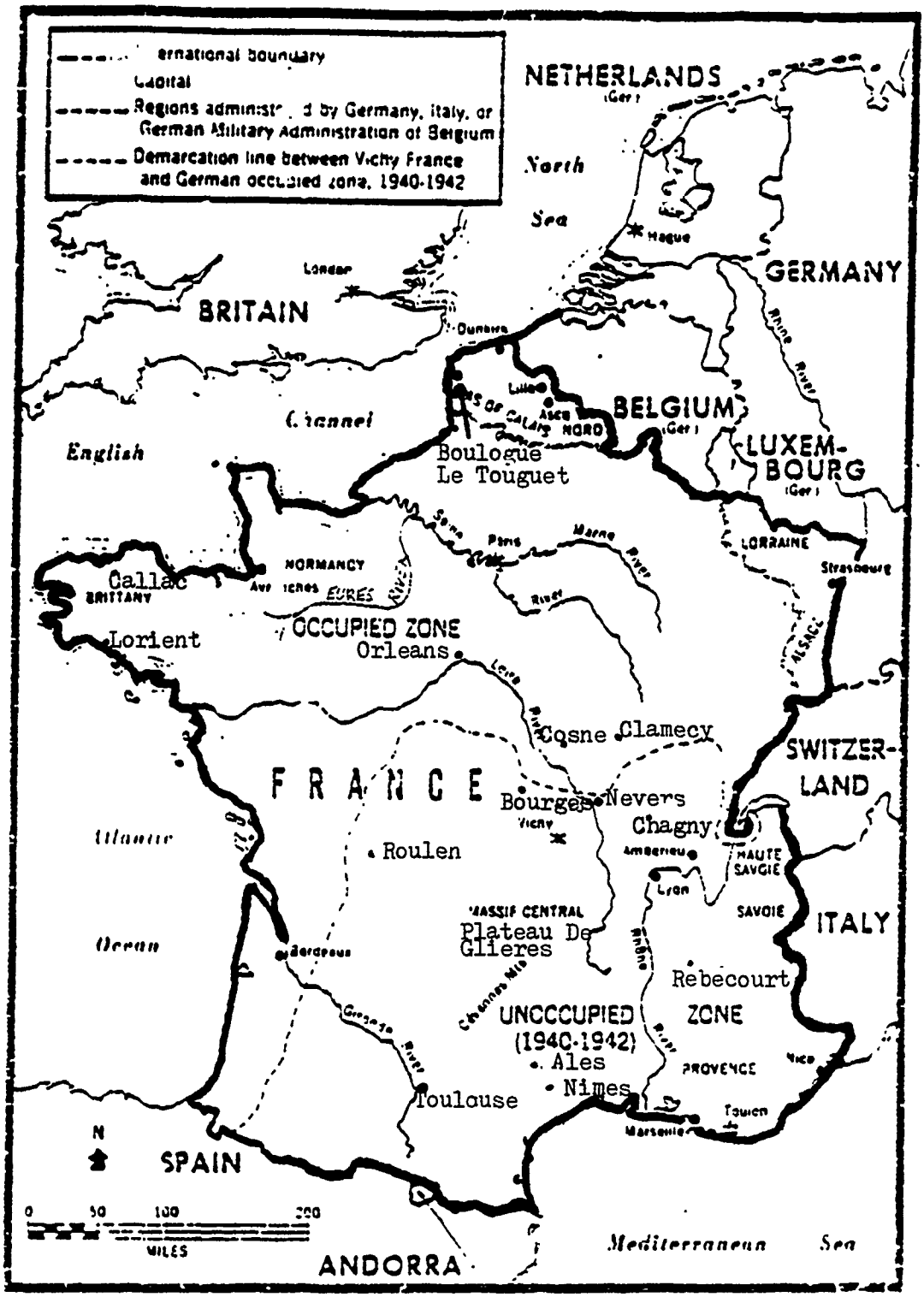

Figure 3. France (11:112)

the saboteurs (1:47). The Special Operations Research Office of The American University listed the following statistics about the French resistance:

> Between June 1943 and May 1944, the resistance destroyed 200 locomotives and 2,000 freight cars, and damaged 1,822 locomotives, 1,500 passenger cars, and 8,000 freight cars (1:47).

These figures indicate the effectiveness of sabotage when it is realized that from January through March 1944, sabotage accounted for nearly three times the number of locomotives damaged by Allied airpower (11:130).

The resistance sabotage efforts caused so much trouble in the German and Italian rear areas that the Axis forces had to divert great numbers of forces away from the front lines to engage in rooting out the partisans. The Axis forces quickly learned just how large a force these saboteurs milked from the front. For example, in February 1944, Italians tried to attack about 500 partisans in the Plateau des Glieres in France. When the Italians could not rid the area of them, the Germans marched in. A total of 12,000 German troops, supporting air power, armored cars and mountain artillery groups were tied up by these 500 partisans for a period of approximately two weeks (1:48-49).

As the invasion of Normandy approached, sabotage increased in importance. In preparation for the D-Day invasion, the Allies had developed four plans for the French resistance to execute starting at D-Day and con-

tinuing on in support of the beachhead at Normandy. Each of these plans focused on the use of sabotage. Plan VERT called for sabotage against the rail system for 15 days. This was considered to be the time that would be required to establish the beachhead at Normandy. Plan BLEU dealt with destroying electrical facilities. Plan TORTUE planned for the delaying of enemy troops that would naturally be coming to reinforce the Axis forces at Normandy. Finally, Plan VIOLET issued instructions for the cutting of underground cables (1:51).

The plans were executed as planned on D-Day. The following results were obtained:

> In the southeast, 52 locomotives were destroyed on 6 June and the railway line cut in more than 500 places. Normandy was isolated as of 7 June. The telephone network in the invasion area was put out of order and beginning June 20, the railway lines of France were rendered inoperational, except in the Rhone Valley where the line Marseilles-Lyon was kept open by the Germans despite heavy engagements with [partisans] units....Although the German local reserves were able to reach the front area despite resistance action '...marked delays were achieved against the movement of strategic reserves. The French claim to have delayed up to 12 divisions for from 8 to 15 days' (1:51-52).

In concert with the D-Day invasion, saboteurs cut railways 486 times that month. On the day after D-Day, 26 major rail lines were rendered unusable (11:137). As a direct result of the sabotage efforts against the rail system used by the Germans, French slowed the 2nd Panzer Division's movement from Toulouse to Normandy. It took the

Panzers 12 days to cross the 400 miles, nullifying their potential contribution at Normandy (11:138).

Sabotage continued to play an important role after the D-Day invasion. After the invasion of Normandy, the French resistance was responsible for preventing, or at least delaying, the flow of German men and supplies to the front. For example, fifteen days after the forces landed at Normandy, the British's Special Operations Executive (SOE) agents in France received a message from General Eisenhower. A Panzer Corps was on its way to join the fight at Normandy and its presence might have spelled defeat for the allies. The Panzers were going to cross the Eure River via the sole bridge not knocked out by RAF planes. Having witnessed yet another failed bomb run by the British Royal Air Force (RAF), saboteurs proceeded to demolish the bridge only three hours before the Panzers arrived (36:111). After D-Day, French resistance saboteurs concentrated their efforts against German fuel and munition storage areas, as well as transportation routes and communications lines used by the Germans (36:202). As the Allies gained the initiative a new role was added--protecting Allied assets as the Germans started their retreat from areas. Thus the saboteurs bore in mind the importance of not sabotaging material, communications or transportation routes that might aid in France's recovery after the war (36:215).

Capt Douglas Smith was an American who was a guerrilla warfare specialist. Acknowledged for his innovative thought on guerrilla warfare, he noted,

> And the guerrilla has one distinct advantage... Whatever the guerrilla does is a complete surprise. If the 'invisible' fighter is free at all, he is not suspected. Therefore when he aims a blow it almost always succeeds (32:44).

After being injured on a raid in North Africa, he returned to the United States and pressed for a unified guerrilla command. When trying to drum up the needed support, he shared information he had received from SOE agents in France on two weeks of partisan activity and the resulting damage. Admittedly, the fact that Smith was trying to gain support for a unified guerrilla command could lead to skepticism as to the information's validity. This information was not collaborated with other sources. However, the amount of damage reported by Smith appeared feasible, given the other substantiated reports of damage in the literature review. It was therefore included in Appendix B for the reader's review. Table 1 summarizes the highlights of this information.

Germany. Lt Col Otto Skorenzy was in charge of Germany's Special Troops (20:28). One of Skorenzy's sabotage efforts involved a bridges over the Waal River near Nijmegan in the summer of 1944. This bridge represented the only link into Germany after the Allied powers had started to advance toward Italy. They had been held by

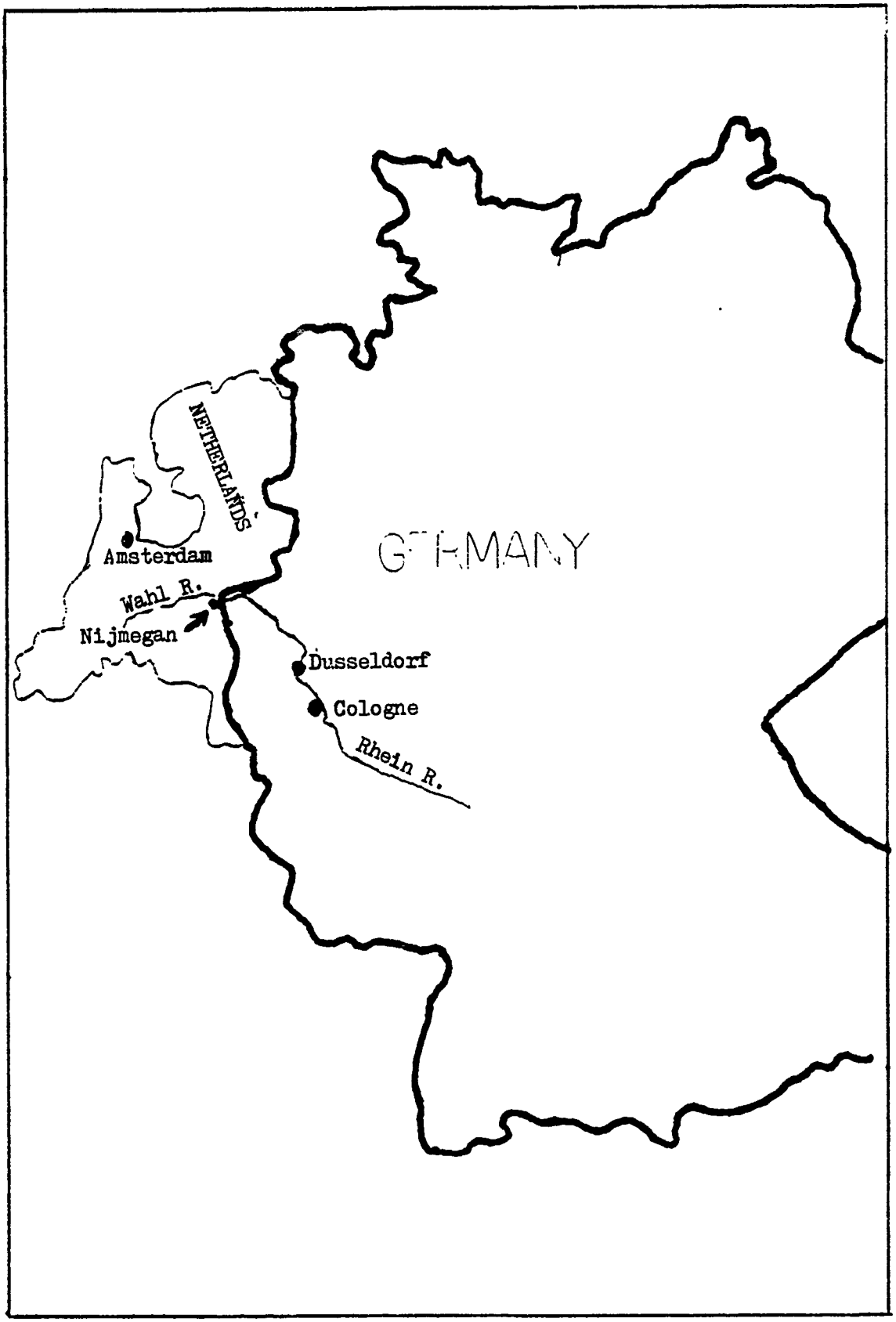

Figure 4. Germany

Table 1: Statistics on French Guerrilla Warfare for Two Weeks in the Summer of 1943 (32:298-300)

Trains destroyed/derailed:	7
Trains damaged:	1
Railyard turntables damaged:	1
German Army stores destroyed:	1
U-boat oxygen generating machines destroyed:	1
German soldiers killed:	82
German soldiers wounded: (approximate)	250

Allied troops despite 12 previous division-size attacks and 500 failed dive bomber sorties (20:29). Skorenzy sent 12 frogmen to sabotage the bridges from underwater with floating torpedoes. Moving at night the frogmen brought the torpedoes to the bridge. They were aided in their mission by the noise of British tanks rolling on the bridge above. They attached the charges and swam downstream. The attached explosives destroyed the bridge and the frogmen returned to the home base 6 miles downstream with only three injuries. The only route to the German homeland was closed (40:186-189).

Another of Skorenzy's exploits involved raising a force that would pose as an armored U.S. brigade. The Germans who were selected for the force were chosen mainly for their ability to speak English. The purpose of this brigade was to infiltrate the American units, sow discord,

issue false or contradictory orders and to hold six key bridges against Allied use. Skorenzy did this by using captured U.S. tanks, jeeps and uniforms. Operation GRIEF began on 16 December 1944 in the forests of the German and Belgian Ardennes. His troops then mingled among the other American units and held the key bridges. More of Skorenzy's troops in U.S. uniforms scouted ahead and demoralized the Allied troops by spreading false rumors of German force strength in the area. Once the idea that German troops were masquerading as Americans in the Allied occupied area, paranoia ran rampant. The Americans didn't know who was German and who wasn't. As a result, many false arrests were made, forcing the incarcerated American troops to spend time in the brig (40:189-197). Accomplishments of these units included: cutting communications, turning roadsigns, marking safe areas as if they were laden with landmines and spreading rumors of assassination plots against Generals Eisenhower and Bradley and Field Marshall Montgomery. Grimes stated these 28 soldiers slowed down the drive of a half million American soldiers toward Germany (20:31). The amount of time in which the sabotage was effective was not determinable. However, the ability of only 28 German soldiers to inflct a slowdown for such a proportionately higher number of enemy troops reflected great effectiveness.

Great Britain. When speaking of the early British Commando raids, Grimes noted they crossed into France

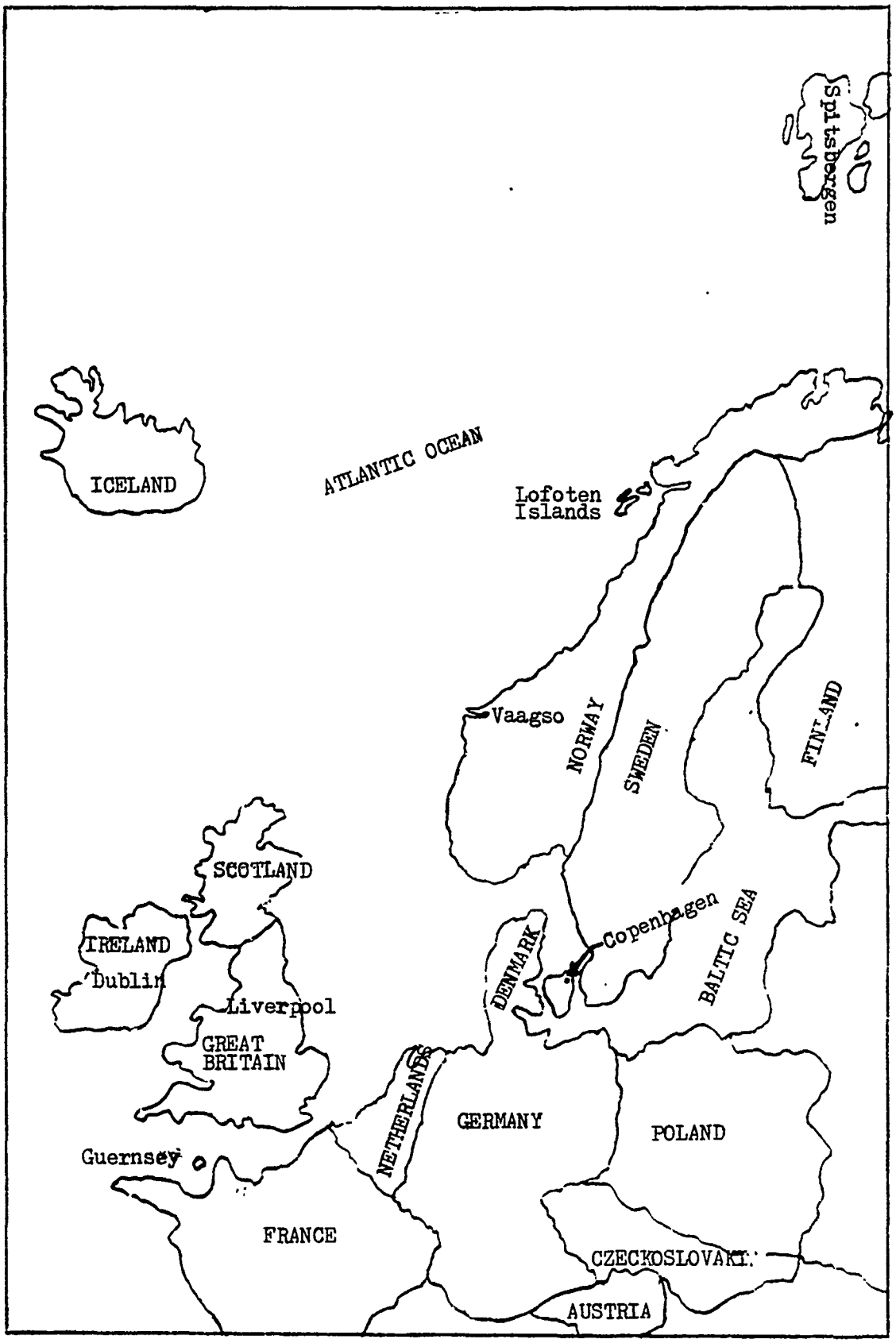

Figure 5. Great Britain

for a raid against Boulogne-LeTouguet in mid-1940. They were after any target presenting itself, but the raid came only three weeks after their formation and the commandos had received little training. Little of military value came about as a result of the raid. The Island of Guernsey was raided three weeks later with basically the same results (20:11).

The British Commandos' next raid occurred in March 1941 after the men had been adequately trained. Their objective was the German-occupied Lofoten Islands. The raid was a coordinated land and sea force that landed in an effort to destroy the explosives manufacturing capability on the islands. Collateral tasks were to sink as much of the German ships in the area, capture German prisoners and free Norwegian patriots. The results: 18 factories destroyed, 11 Germans ships sunk, 1 ship boarded and sailed back to Britain, 216 prisoners taken, 315 patriots returned to England, and nearly 800,000 gallons of fuel burned (20:13). A vital source of German munitions manufacturing capability was lost. The success of the raid provided a boost in morale that was desperately needed at that time (20:13).

After the Lofoten Islands, the next raid was specifically designed to aid Russia. By September 1941, Russia's morale was waning. Although Russia had not given up, her sea lanes near Norway were harrassed by Germany. The

British Commandos decided they would attack the German-operated coal mines at Spitsbergen, 350 miles north of Norway's northernmost point. This coal was essential to Germany's war effort. The Germans couldn't defend all of their vital areas equally well and Spitsbergen was one of the least guarded. The commandos enccuntered little opposition and the mines were destroyed. Almost one half million tons of coal was burned along with 275,000 gallons of petroleum (20:14).

Three months after the raid on Spitsbergen, and under the helm of Lord Mountbatten, the Commandos set their sights on a larger target--Vaagso, Norway (20:14-15). For Vaagso the immediate goals were the same as those at the Lofoten Islands; however, there were approximately 250 Germans, a tank and several gun batteries to protect their resources. There was also air protection from three German fighter bases within striking range. Due to the importance of this raid and the estimated amount of possible resistance, four destroyers escorted a headquarters ship up the fjord. The British provided many distractions in order to draw attention from the attack. R.A.F. bombers engaged both the Vaagso defenses as well as the nearest Luftwaffe base. On the previous day the Lofoten Islands were again struck by commandos to make the Germans believe that was the objective of the raid while a ground force almost 600 strong accomplished the sabotage actions

on Vaagso. Admittedly, German lookouts tried to report the assault force sailing up the fjord. This report was dismissed as absurd, further reducing the German's response. The result: in less than four and one-half hours, over 110 Germans killed, 8 ships sunk, 3 German ships run aground, many factories and warehouses destroyed and current German code books captured. These code books allowed the Allies to know the callsigns and challenges of all German ships operating in the Norwegian and French areas (20:16).

The British commandos' raids extended into the North African theater as well. On April 21 1941, Lt. Col. Laycock led his first Commando raid to Bardia, Libya. Consisting of 800 personnel, the raiding party produced indecisive results. It did, however, cause the Germans to pull an armored brigade from the front to protect Bardia (20:20).

The next British raid produced more tangible results. The location was Tobruk, Libya. Tobruk had been beseiged for the last three months by the Axis powers. 75 British Commandos went into the Axis rear area to commit sabotage, killing several dozen enemy and demclishing an ammunition dump. The cost to the saboteurs was one dead, 4 wounded (20:20-21).

After all these successes came a major failure. Lt Col Laycock was to lead a group to Rommel's headquarters

and kill him. There was no planning for this raid, no rehearsal, and no map of the compound. Due to this lack of preparation, they discovered that what they had raided was only a supply headquarters for Axis forces, not Rommel's Headquarters. Rommel wasn't there and, although many enemy soldiers were killed, only two of the 56 Commandos escaped (20:21-22).

Greece. The National Liberation Front was one of two major groups of the Greek resistance. They initiated and encouraged civil and armed resistance to the Axis powers, including sabotage (24:175). In October 1942, the attack on the Louros Gorge bridge initiated the pattern that sabotage would take as used by the Greek resistance against the Italian occupying force. The saboteurs had previously mined the bridge and the road on the opposite side from where the Italian supply convoy would come. They also placed large rocks in position so that they would fall and block the escape route when the road mines were detonated. All that was left to do was lay and wait for the supply convoy to show up. When it did, the saboteurs let the last escort tank on the bridge and then blew it up. At that time, the lead tank was in the mine field laid across the road. It detonated the charges, bringing down the rocks. The partisans then opened fire on the convoy with rifles and grenades. After the fighting was over, they hauled away trucks and necessary supplies to replenish

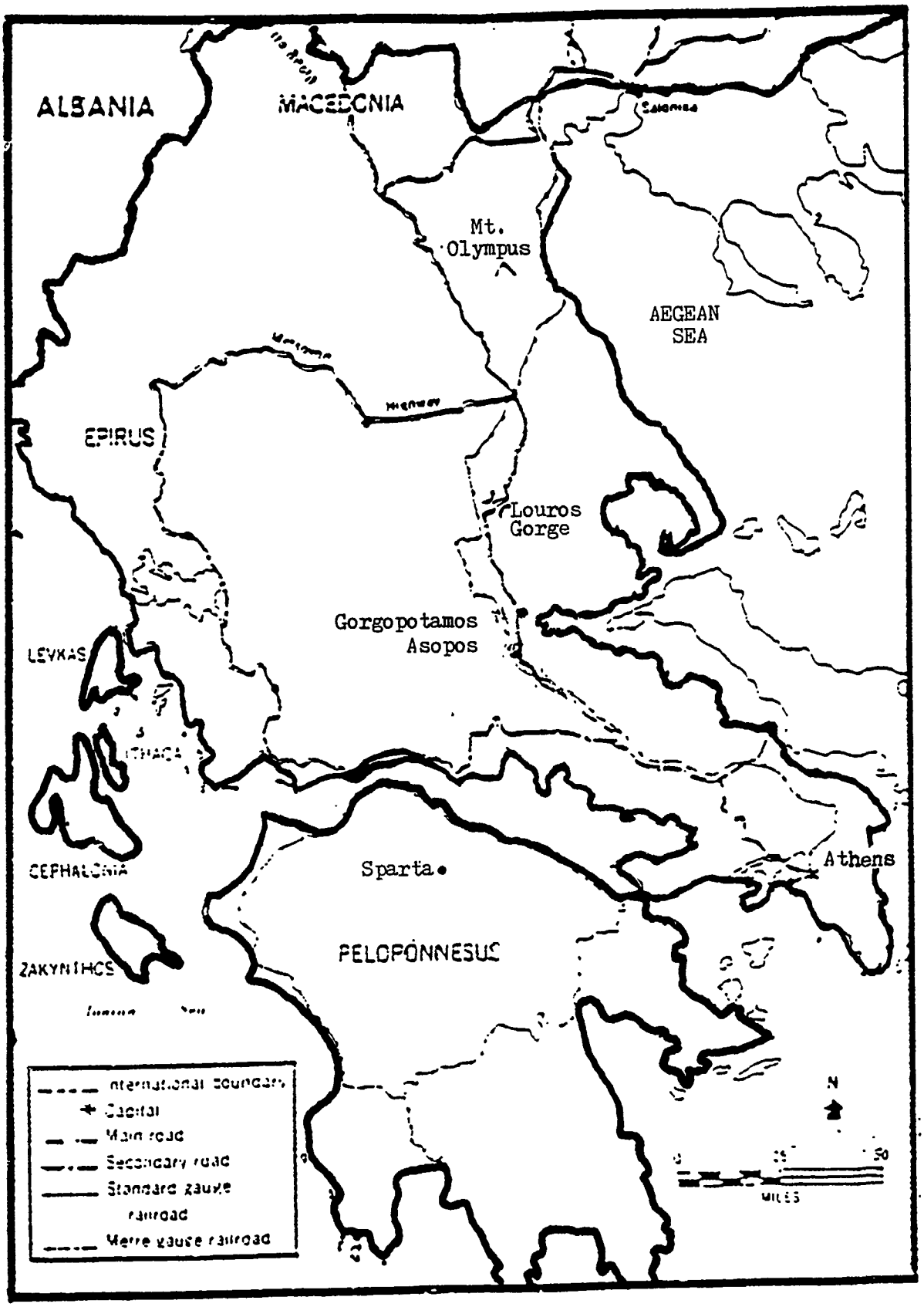

Figure 6. Greece (11:152)

their stock. What they could not take, they soaked with gasoline and burned to prevent the Italians from using it (1:10-11).

In the autumn of 1942, British liaison personnel parachuted into Greece, contacting the resistance members. The British felt it best to combat the Axis powers from a unified front. As a result, the two major groups of the resistance, the National Liberation Front and the communist group EDES, joined forces in destroying an vital Axis-controlled bridge over the Gorgopotamos River on 25 November 1942 (33:99). The destruction of this bridge caused the cessation of rail traffic for six weeks. This was particularly important as it was the only rail line for shipping supplies from Athens to Rommel's North Africa (1:12).

From November 1942 to June 1943, the Greek resistance continued to mount sabotage attacks against Italian railroads and roadways. Guard posts and blockhouses along road and rail bridges, as well as the bridges themselves, were attacked. The sabotage committed included exploding retaining walls along roads and bridges, mining the roads and bridges, dropping stand-up nails on large portions of the roads, loosening the lug nuts on wheels and slashing the tires of stationary vehicles as well as sniping at drivers. As a result of these acts of sabotage, the Metsovon Highway was closed for the better part of this time.

This was the single major road connecting the Aegean Sea to Greece and Albania (1:11-12).

Also during this period, the resistance members made daily attacks on telephone lines. Since this was a precious commodity for the resistance, they took what they could carry away, thus also making it more difficult, time consuming and costly for the Italians to effect repair. To further ensure prolonged downtime of communications for the Italians, the partisans mined the damaged areas and sniped at the repair crews (1:12).

To answer the high success rate of sabotage against rail and road bridges, the Italians greatly increased the security of these logistical choke points. Added guard shacks/towers were spaced at close intervals. Wire fencing closed the gaps between the towers. Machine gun nests were located so as to make the fenced areas a cross fire zone. Despite these added embellishments, the partisans kept the Asopos rail bridge shut down for a period of four months. It was demolished on 21 June 1943 when saboteurs sneaked down into the gorge which held the base of the piers. The Germans erroneously believed that no one could successfully enter the gorge. As a result they had never guarded that area (1:14).

As was already shown, the effective use of large-scale sabotage causes the enemy to divert troops from the front to protect the rear areas. Sometimes this can be a major

objective. For example, in June-July 1943, the Greek saboteurs initiated Operation ANIMALS. In this operation, they sabotaged transportation targets in an effort to convince the Germans that Greece was to be the landing site for an upcoming invasion instead of Sicily. As a result of their effective work, the saboteurs were engaged by one or two divisions that would probably have fought the Allies in the invasion (11:168).

Toward the end of World War II and continuing after when the Greeks fought against the Greek National Army, the partisans used mainly hit-and-run tactics. Usually using the cover of night, they positioned some of their number to guard against the enemy gaining reinforcements. The main party would then attack the enemy and commence blowing up different installations as well as replenishing used supplies with material obtained from the enemy's storehouses and depots. This main attacking force was usually complemented by the separate group of guerrillas which acted as "sabotage squads", going against such targets as communication lines (24:190). Once the area had been reclaimed by the Greek National Army, the saboteurs provided the guerrillas with additional support against the rear area of the Greek National Army by mining their roads and railways, sabotaging communications, destroying bridges, and "harrassing supply columns." (24:190). The insurgents so dominated Greece that only armed enemy convoys moved, and

then for only one or two days in a week. Sabotage was committed against water facilities, industries, and transportation systems (18:108).

Italy. The Italian resistance (anti-Fascists) directed sabotage efforts against communications lines, bridges and rail tracks and small garrisons of enemy troops (11:205). The saboteurs were very effective. In fact, when the Allies landed at Anzio, Mussolini felt the resistance to be as dangerous as the Allies (11:210).

Poland. Sabotage actions against the Germans were very successful. The Poles were able to get adequate supplies for committing sabotage. For example, the Home Army of Poland bought artificial fertilizer on the free market to obtain the saltpeter necessary for making explosives. Workers within industries and factories were sometimes able to "juggle the books" in order to steal materials. The Home Army personnel, again, were able to do so in two Warsaw pharmaceutical plants, stealing urotropine for explosives. The Polish Home Army also produced hand grenades using ordinary cans as the container. They converted fire extinguishers into flamethrowers. Collections from the populace included food and any supplies that were collected by the people from soldiers passing through the areas (36:67-69). From January 1941 to July 1944, approximately 4,326 vehicles, 28 aircraft, and 4,674 tons of fuel were destroyed by sabotage using explosives and arson (11:263).

Scandanavia. The phrase "Work slowly, work badly" described the passive sabotage the Norwegians conducted against the Germans. This was the predominant way the Norwegians fought the Germans, although they did accomplish some active sabotage as well (11:231).

When they did commit active sabotage, the saboteurs engaged in quite a bit of intelligence activity. Included in the desired information was the targets protection measures (so the saboteurs knew how difficult it would be to overcome and gain access to the target) and the construction of the target (in order to determine the best type and amount of explosives). If a road or railway was to be destroyed, knowing the timetable of vehicle arrivals/departures not only allowed the destruction of the intended system, the sabotage could be timed to also take out one or more of the carriers using the system. The Danish used a comprehensive network of saboteurs and messengers to gather such information. When an enemy train arrived in a town, the time was phoned to saboteurs in the next town, who then laid the mines just prior to the train's arrival. This "real time" notification prevented discovery of the mines by the railway security patrols (36:109).

With the resistance to the Axis powers being such a unified effort, the saboteurs attempted to make use of specialized talents. If possible, experts would be brought in to help in the technical aspects of sabotaging targets

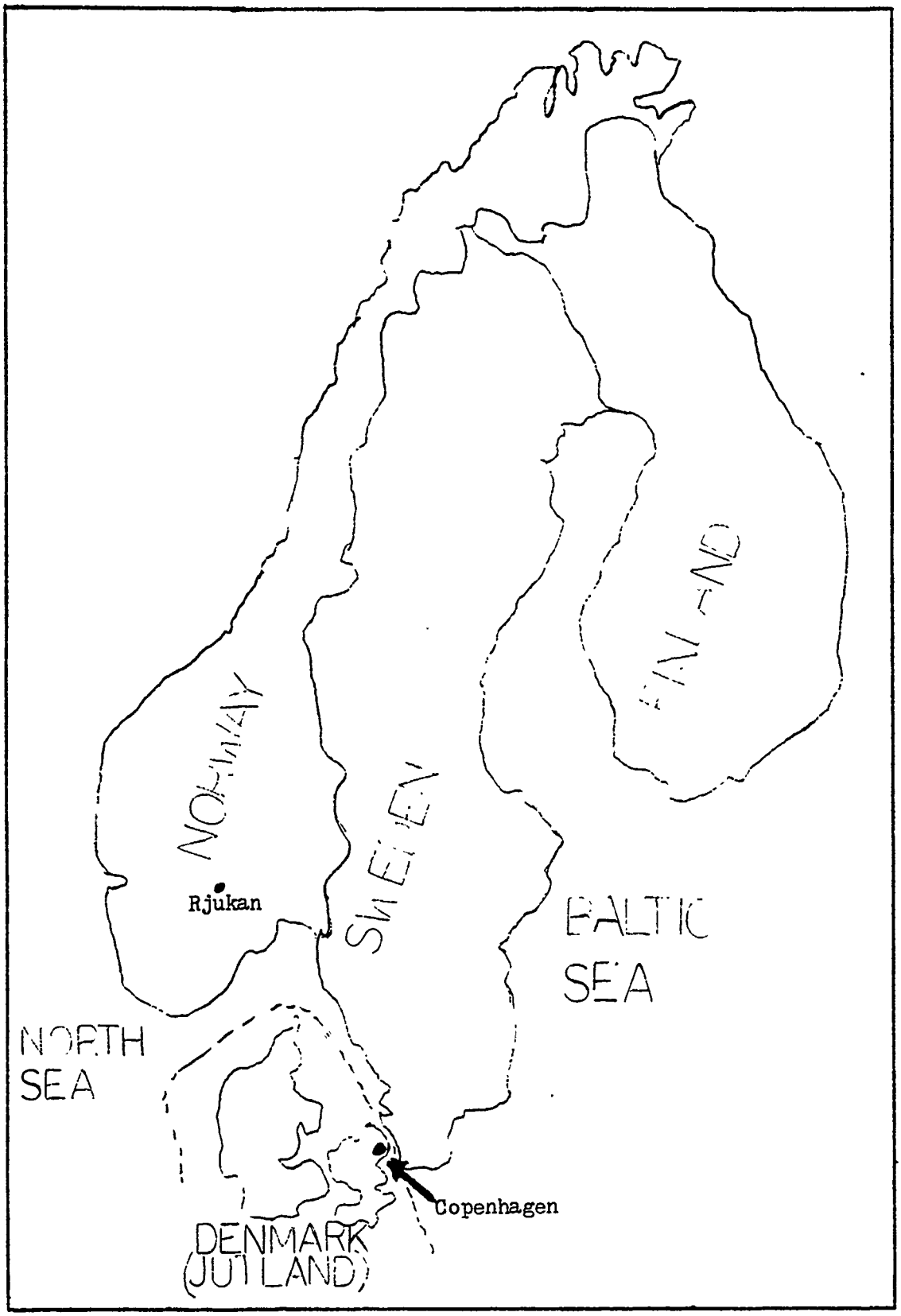

Figure 7. Scandanavia

of major interest. For example, in World War II the Germans controlled a heavy water plant in Rjukan, Norway. In order to sabotage the plant, a British special operations agent parachuted in to conduct the reconnaisance, a London-based Norwegian scientist provided the factory's technical details, and insiders provided other pertinent information (36:109).

In June 1944 a Danish resistance group, called BOPA, successfully sabotaged a radio factory near Copenhagen used to make V-2 rocket components. In preparation for the attack, BOPA acquired drawings of the buildings as well as guard positions. BOPA also planted a command detonated mine on the road between the plant and Copenhagen, should anyone pursue the saboteurs after their mission. 100 BOPA personnel penetrated the barbed wire and got past the guards. They then planted their mines, withdrew, and escaped safely to the buses waiting outside the plant to take them away. (36:113-114).

Immediately following the invasion of Normardy, the Germans attempted to move more than 12 divisions of troops from Scandanavia to France. Danish saboteurs continued sabotaging the Jutland railroad system throughout the winter of 1944-1945. The saboteurs were so successful that no German troop train left Scandanavia for two weeks. They were allegedly responsible for destroying the majority of the following:

> 92 wagons, 58 locomotives, 11 cranes, 14 water towers, 25 signal boxes, 8 bridges, 8 locomotive sheds, 9 turntables, and 31 level crossings...119 trains were derailed; and 7,512 attacks were made along the tracks (36:111-112).

In 1945, the number of sabotage acts increased, as Norwegians who were trained by the British agents came to render assistance. Their targets were "ships, railways, factories, and oil stores" (11:235).

Yugoslavia. The Yugoslavian resistance initially gained supplies used for sabotage against the Germans by manufacturing their own. However, they continually needed more of everything until the spring of 1943. At that time Italy fell and the resistance fighters swarmed into Italy to confiscate all Axis supplies located near the Adriatic Sea. That, supplemented with Allied airdrops, relieved the previous supply problem (36:230-231). Until that time, sabotage was accomplished with the materials they had on hand as well as passively.

When committing sabotage, one point the saboteurs kept in mind was the possibility of reprisals against the general populace. Charges were set with time delays to ensure vehicles (rail, water, and road) were far away from the location where the sabotage occurred in an effort to remove or diffuse the blame for the acts (36:239). The Yugoslav resistance also sabotaged stationary targets. For example, in the third week of July 1941, the first active form of sabotage occurred: an ammunition dump was demolished

(11:326). Also, in September 1943 a railway bridge of crucial importance was also sabotaged and destroyed by the Yugoslavian resistance (36:239).

Russia. Trying to fight a two-front war caused Hitler to induct more than one million World War I veterans. They were mainly used in security divisions to guard the rear areas against Soviet partisans. However, as the war dragged on, the Germans were forced to move these veterans up to the front to counter the attrition experienced there. It is estimated that approximately 1.5 million Germans were killed, wounded or missing in Russia (22:24).

Due to the manpower drain from the rear areas to the front, defense against rear area operations was limited. The Germans enlisted and accepted as volunteers anyone who had anti-Soviet feelings and who could fight. These individuals formed the nucleus of the German security divisions, whose responsibility was the security of rear area communications and transportation lines (22:25). As the German High Command had not anticipated a war in Russia lasting more than four months, training for these security divisions had concentrated on supply and transportation issues with little, if any, training on defense. This was in part due to the fact that the German High Command was not certain as to the type of fighting the rear area divisions would see. They really had not even considered the possibility that there would be many Russian troops aban-

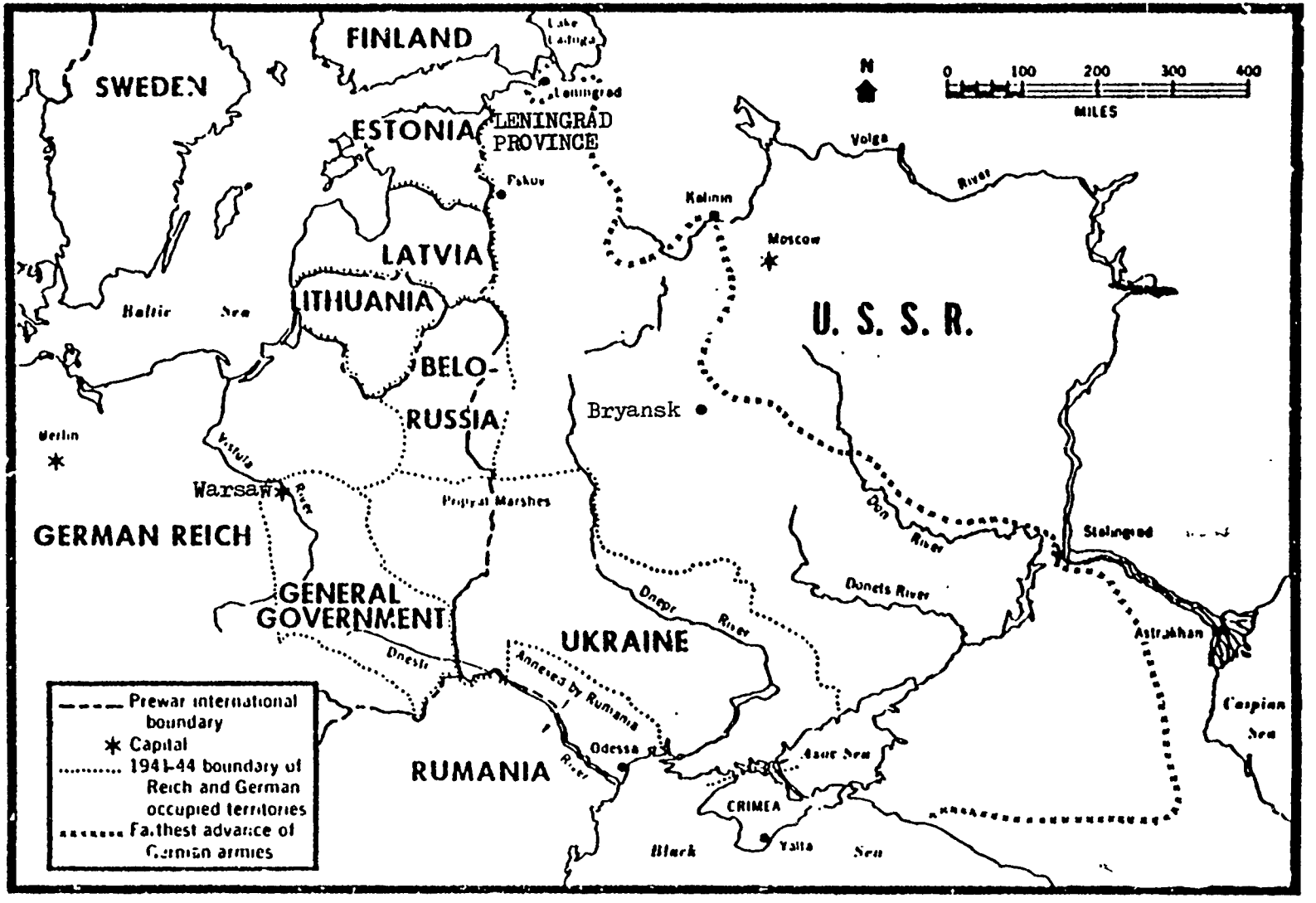

Figure 8. Russia (11:292)

doned in the rear. These troops formed the nucleus of the first partisan groups. The security divisions were no match for the nocturnal hit-and-run guerrilla tactics used by the partisans (22:25-26).

Being unfamiliar with these tactics the security divisions placed the majority of their men along the roads and trails in heavily-fortified bunkers at key intersections. They presented both easy targets for the partisans (should they wish to engage them) and easy obstacles to avoid (should they wish to go around them) (22:25-26).

German convoy operations were at mercy of the Soviet partisans throughout the war. The partisans' success was so overwhelming that the Germans had to devote an increasing number of troops to rear area defense. According to Harrigan:

> ...in 1941 nine security divisions were initially devoted to the rear area duty, by 1943, 25 field divisions, 30 regiments, 100 police battalions and an auxilliary of 500,000 personnel of Soviet origin were actively engaged in the rear area effort against the Soviet partisans (22:28).

Table 2 shows the damage wrought by partisan attacks in the German rear area during 1941 and 1942.

Anticipating a German occupation force in the Western areas of the Soviet Union, preparations began even before entering World War II to deliberately leave some "stay-behind" agents as well as some officials of the Communist Party of the Soviet Union. Their purpose in being left behind in the regions was to train and organize the part-

Table 2: Results of Soviet Partisan Attacks on German Rear Area During 1941 and 1942 (22:78)

Germans killed (including 30 generals):	300,000
Officers killed:	6,326
Attempts on trains:	3,000
Attempts on rail road bridges:	3,263
Tanks and armored cars destroyed:	1,191
Aircraft destroyed:	476
Artillery guns destroyed:	378
Lorries destroyed:	4,027
Depots and stores blown up or destroyed:	895

isans into cohesive fighting units (22:39).

Many of these agents were members of the NKVD (People's Commissariat for State Security), the forerunner of today's KGB. They served many various functions while remaining behind enemy lines once the Germans came into Russia. Their first task was to train and organize the partisans of their regions in partisan warfare (22:40). Their second major task was that of political watchdog. The Communist Party wanted to ensure that there would be no swaying of the Russian populace in light of any perceived liberation afforded by German occupation in the land. Any citizen of the Soviet Union caught or suspected of promoting criticism of the Communist government represented a threat to not only the government, but also to the partisan

bands being established. As such, any such individuals were detained for re-indoctrination or killed as enemies of the state. Thus the NKVD kept their partisan saboteurs virtually free of any spies (22:41).

Having been thus inserted into their regions of control before the German occupation of June 1941, the NKVD agents in effect became sleeper agents, taking on undercover roles within the community in order to escape detection by the Germans. They then taught the populace the same curriculum they had received: "espionage, sabotage and subversion" (22:41). More specifically, sabotage courses taught the partisan techniques on the types and uses of explosives; demolition of key targets, including aircraft and bridges; demolition of rail line bridges, navigation (e.g., map and compass reading); and operations behind enemy lines (e.g., stealth, eluding sentries, escape and evasion). Training was reinforced by giving each partisan a guide on partisan tactics. This guide contained instructions for the partisan on the sabotage of communications lines, aircraft, use of explosives, etc. (22:53). As implied, the NKVD agents also had the skills necessary to perform sabotage. Indeed, some of the agents came with pre-assigned orders to be carried out before linking up with the people they were to train and control (22:41-43).

Citing Ziemke, Harrigan noted that in July 1941, Stalin issued a General Directive detailing the activi-

ties required by the partisan groups. In it, the partisan movement was lauded as a key player in the defense of the homeland. They were to locate their groups near large enemy concentrations. Combat units were responsible for carrying out sabotage against such targets as supply areas, convoys, airfields, and railroad cars. In addition to the partisan combat units, diversionist groups were created in each area. The diversionist groups' targets differed only slightly from those of the combat units: telephone/telegraph lines, gasoline depots/ transports, railroad lines, and small vehicles. The partisans aided in intelligence gathering by turning in any enemy documents found. They also attempted to create unrest and fear through rumors designed to spread throughout the enemy camp (22:43-44).

During the first few months of the war in Russia, the German army advanced quickly and with great momentum. The Russian Red Army suffered heavily in both men and equipment. As the Red Army was forced to retreat, the partisans added those supplies they could not take with them to the list of targets to be sabotaged (22:46,50). In fact, Harrigan cited Howell's mention of a radio message delivered by Stalin:

> In case of the forced retreat of the Red Army units, all rolling stock must be evacuated; the enemy must not be left a single engine, a single railroad car, not a single pound of grain or a gallon of fuel. Collective farmers must drive off their cattle, and turn over their grain to the safekeeping of the state authorities for transportation to the rear. All grain and fuel

> that cannot be withdrawn, must be destroyed without fail.
>
> In areas occupied by the enemy, partisan units, mounted and on foot, must be formed. Sabotage groups must be organized to combat the enemy units, to ferment partisan warfare everywhere, blow up bridges and roads, damage telephone and telegraph lines, set fires to forests, stores, and transport. In occupied regions conditions must be made unbearable for the enemy and all his accomplices. They must be hounded and annihilated at every step, and all their measures frustrated (22:50).

Many times, sabotage was not an isolated act, but rather was used as a prelude to an attack or in concert with other tactics as part of a major assault. Thus, while the ultimate desire may have been the extermination of as many of the enemy as possible, sabotage of communications, supply and transportation capabilities greatly enhanced the furthering of that desire (22:56).

The German army's reliance on the railroad for troop movements, supply shipping, and medical evacuations became quite evident. The Soviet partisan struck railways very heavily. At first, this and other sabotage was limited to night operations including mining of roads, rail lines, etc. After 1941, the Soviet partisans would ambush the train by first stopping it through sabotage and then attack it with large parties of partisans. Thus, the Soviet partisans' relentless attack on the railways became a prime concern for the German army. The 707th Security Division was tasked with securing the railroad that covered approximately 90,000 square kilometers. It soon

became apparent, however, that they needed reinforcements (22:56-57).

Partisans were most effective when able to use the concealment of the forests to their advantage. This basically equated to "Leningrad province, Belorussia and the northern Ukraine" (25:165). The effects of this activity are summarized in Table 3.

Table 3: Soviet Partisan Activity in Belorussia During World War II (22:78)

Kilometers of rail blown up:	200,000
Trains wrecked or destroyed:	1,014
Locomotives wrecked or destroyed:	814
Railway bridges destroyed or damaged:	72

In an effort to thwart the partisans' effectiveness of sabotage against their railroads, the 707th Security Division established a point defense system. Bunkers surrounded by barbed wire and armed with machine guns were spaced approximately every 700 meters the entire length of the track. In order to remove areas for partisan concealment/ambush and act as a clear zone, vegetation was cut back 50 feet from the bunkers (22:57). Despite these increased security measures, by the German's own admission this did not stop the partisans from maintaining a very effective sabotage effort against the German rail system. In his monthly report to the German Army Group Centre

(GAGC), the GAGC Chief of Transportation ackrowledged a 25 percent increase in partisan activity during the month with a daily average of 45 demolitions, causing "a serious curtailment of all railroad traffic and a considerable loss of railroad material" (see Appendix C). During 1943 and 1944, Soviet partisan attacks on German railroads in western Russia were jointly conducted with Red Army offensives at the front. Coordination was achieved using radio communications, messages dropped from aircraft, and Red Army infiltrators acting as liaisons (22:59).

In helping the Red Army to counter the German's operation CITADEL, the Soviet partisans launched a major sabotage effort against the railways that ran to the town of Byransk in Russia during the Spring of 1943. In fact, the partisans layed over 8,600 explosives on the railways behind German lines. This action was so effective in sabotaging the railways that they should have been given at least partial credit for the Germans cancelling the operation (22:59-60).

In another joint effort in the summer of 1944, Russian partisans planted 9,000 explosives against the rail system two days before an impending attack by the Red Army against German Army Group Centre (22:60). On 19 June 1944, one night before the offensive, Soviet partisans attempted 15,000 sabotage acts against rail lines, 10,500 being successful. Their main target was the supply lines for the

Third Panzer Army (18:61). The results of this massive sabotage effort was the almost complete stoppage of rail traffic, thus preventing the German's retreat or reinforcement; a major contribution to the German Army Group Centre's defeat at the hands of the Red Army; and movement of the front from Belorussia to Warsaw (22:60).

Soviet partisans effected sabotage against German economic assets as well. Denying the German soldiers food and supplies, the partisans also focused on denying the German army's use of timber. This was treasured by the Germans because they used it for road/rail repair and construction as well as building such structures as the walls used to guard against the partisans along rail lines. In order to prevent the use of timber, the partisans would either destroy the lumber mills or control their output. The saboteurs' actions of decreasing lumber output only affected the Germans; eastern cities suffered no decrease (22:60-61). Table 4 shows the results of sabotage against timber targets for 1941 and 1942.

Table 4: Results of Partisan Attacks on Timber Production by Area During 1941 and 1942 (22:60-61)

Area Affected	% Drop in Lumber Production
Ukraine	80
Belorussia	45
Overall occupied region	35

The African Theater.

Egypt. The 10th MAS (Motorboats Against Submarines) Flotilla was a part of the Italian navy which carried out sabotage against surface and underwater targets. To get to the targets, the saboteurs travelled by submarines for the majority of their journey and then by Maiale. The Maliale was an electric, two-man submersible craft that towed the two saboteurs along side and had a 600 pound charge on its nose section.

On 18 December 1941, the submarine Scire left La Spezia, Italy enroute to Alexandria, Egypt. On the deck were three Maiale that later carried six saboteurs. The submarine stopped one mile from the mouth of the Alexandrian port and the saboteurs set off on the rest of the journey. They eluded a motorboat dropping depth charges and safely navigated into the harbor. The frogmen planted their charges on two battleships and one tanker. The six frogmen were captured after surfacing from the underwater demolition work, but the British interrogators could not determine the charges' whereabouts in time. Both battleships were damaged so badly they never returned to the war. The tanker was damaged as well, but was subsequently repaired. The loss of the two British battleships gave the Axis powers "...overwhelming naval supremacy, gun for gun, in the Mediterrarean..." (40:94) until the United States entered the European front (40:93-103). Thus, for the

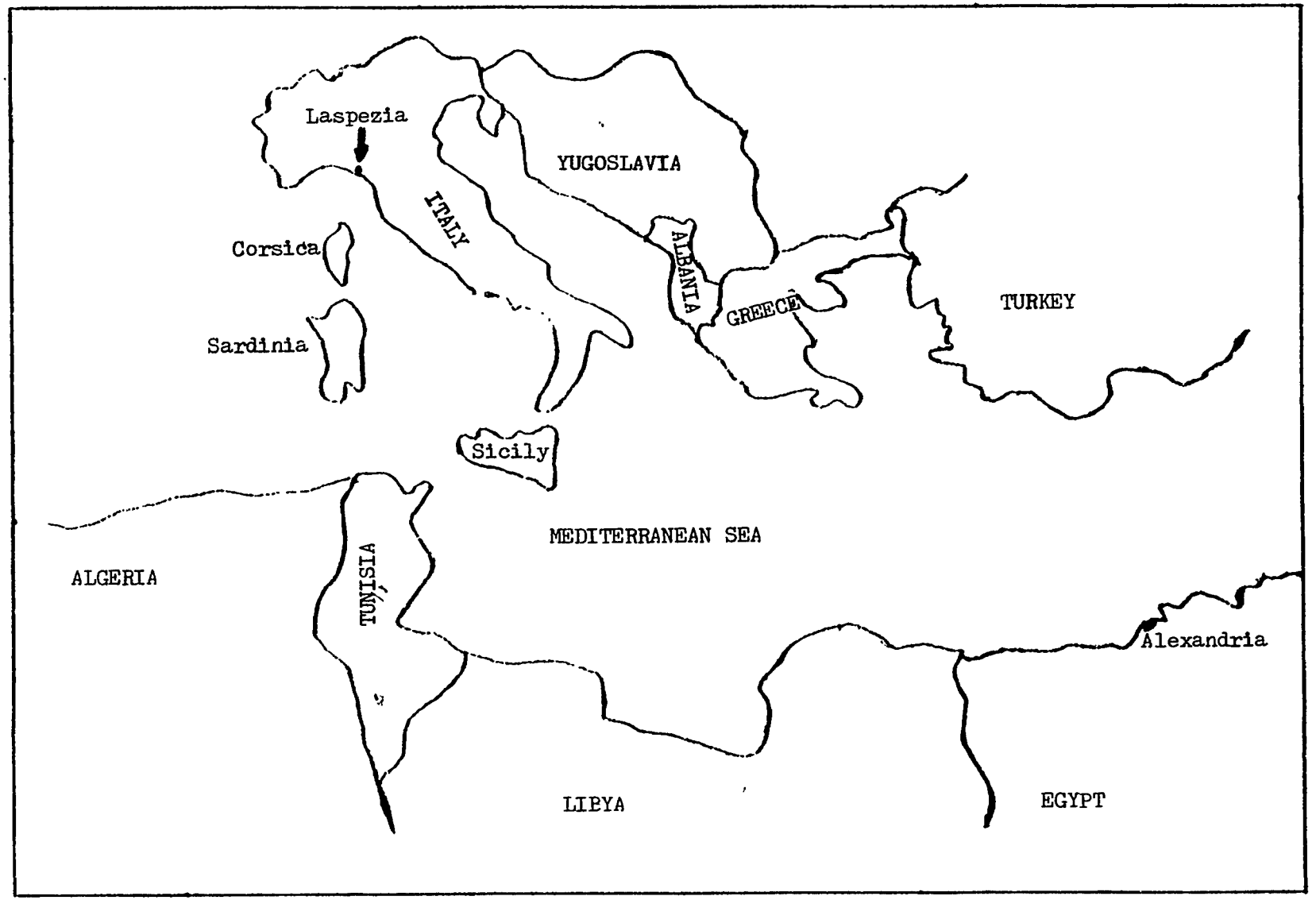

Figure 9. Egypt

price of six saboteurs being captured, Italy gained naval supremacy in the Mediterranean.

Ethiopia. The Ethiopian resistance fought the Italians throughout the time period of 1937 to 1941. The fighting was so heavy in the summer of 1938 that "the Italians were shipping home trains full of wounded officers and soldiers" (12:10-11). Also that year, the sabotage tactics the Ethiopians employed against the Italians were so effective that 12,000 Italian troops were forced to move from Harrar Province to protect five railroad stations in the Shoa Province (12:10-11). One of the ways the Ethiopians committed sabotage was to deny the enemy access to food. In an area where the Axis occupation forces were to "live off the land", the Ethiopians would sneak in, destroy the crops and steal the livestock (12:12).

North Africa. As previously mentioned, Capt Douglas Smith was a guerrilla warfare expert who was assigned to the "L" Detachment of the Special Air Service Brigade under the command of Lt Col David Stirling in the North African theater between 1941 and 1943. The situations described for North Africa came from his book, American Guerrilla.

Being a part of an organized military unit, these guerrillas used some of the more sophisticated materials for sabotage. The explosives used were soft, moldable plastic demolitions made of explosives and thermite. The

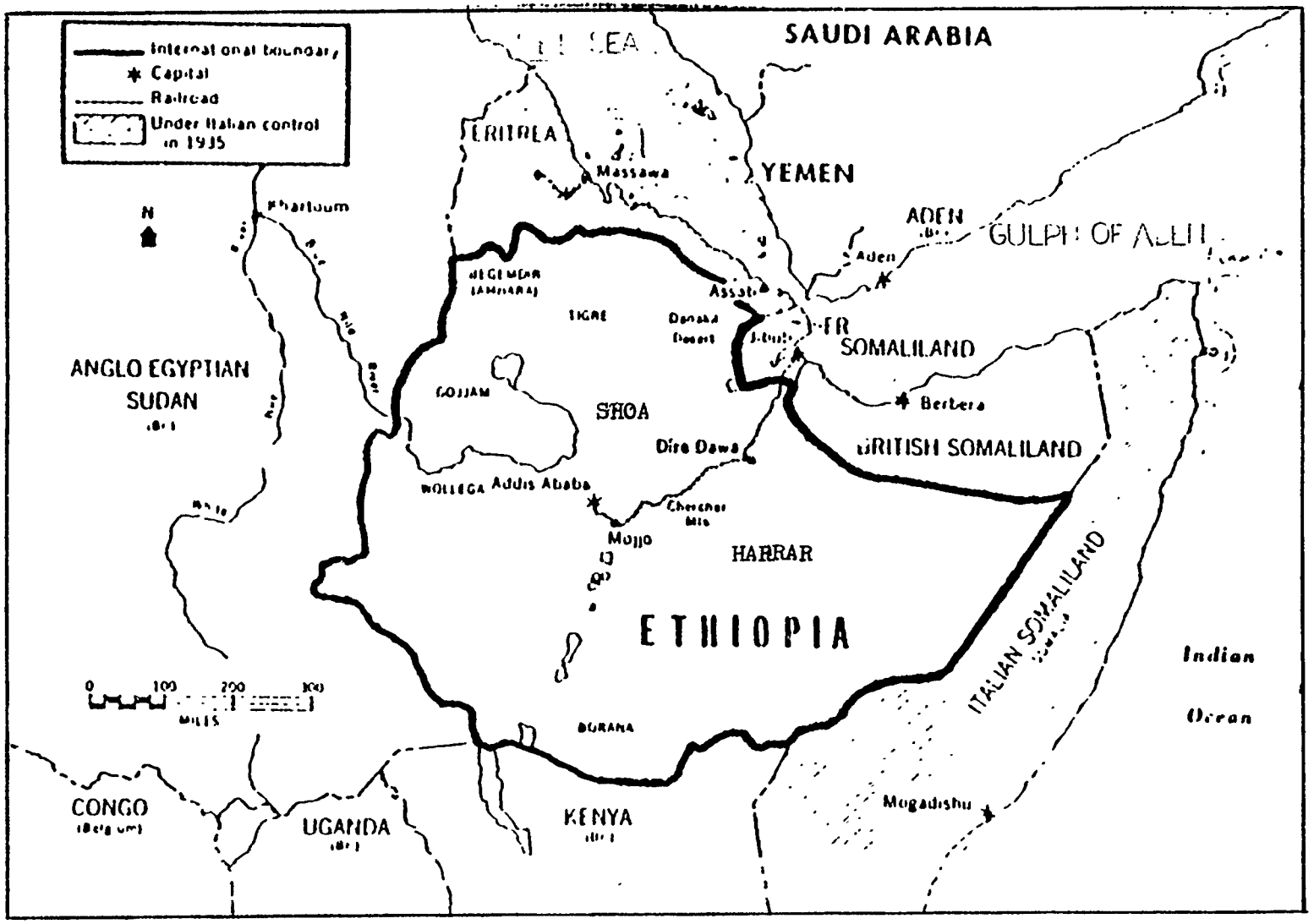

Figure 10. Ethiopia (12:2)

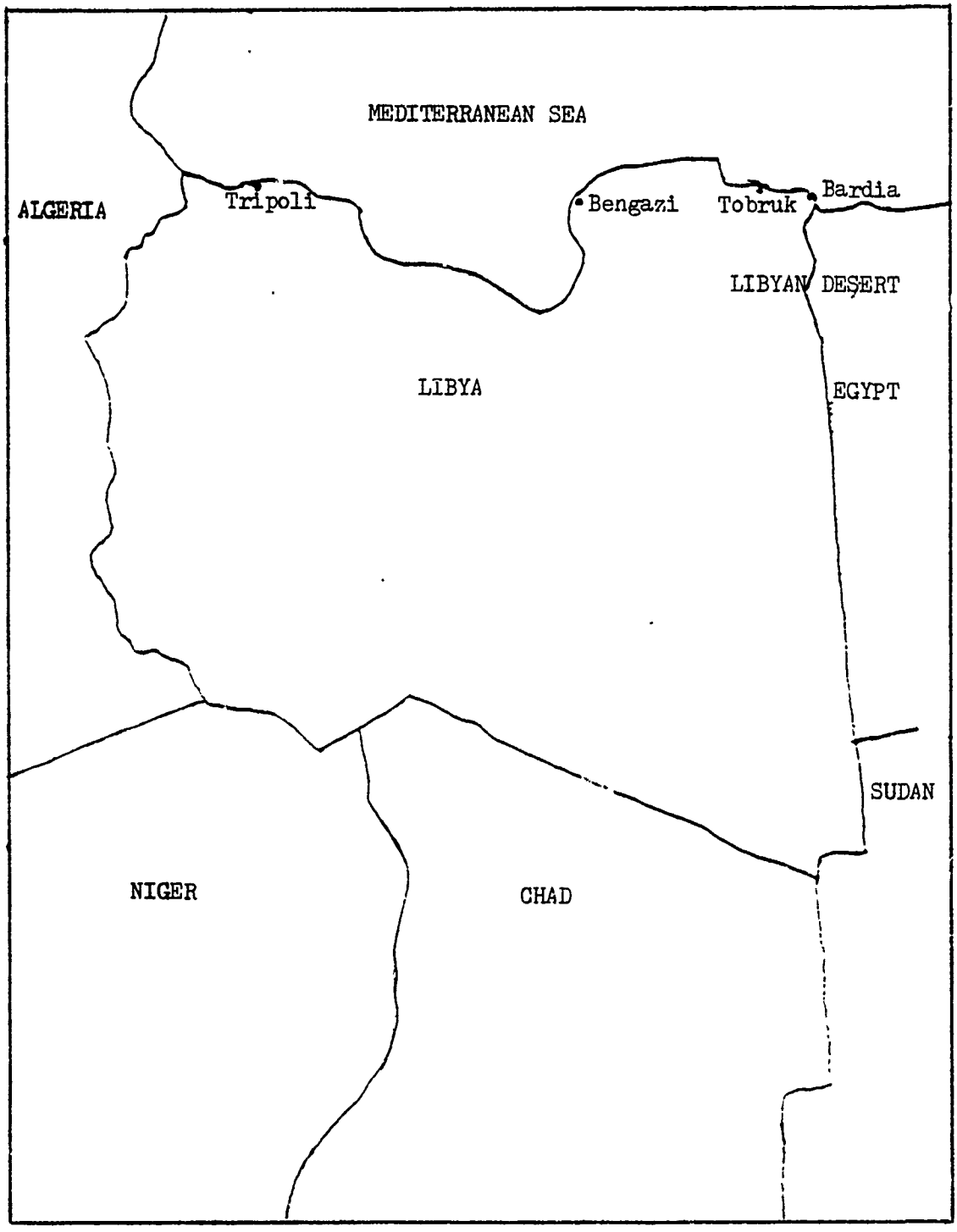

Figure 11. North Africa

explosive fragmented the objective while the thermite was mainly considered an incendiary material which set fire to the material it contacted after the explosion. These explosives could be stuck to any object. Magnetized material could be incorporated into the physical composition of the demolition, thereby allowing adherence to metallic objects (e.g., ship hulls) (32:142-143).

In the North African theater, the main targets for saboteurs were aircraft and supplies. On one occasion, guerrillas parachuted near an Italian camp almost 600 miles behind enemy lines in the Libyan desert. Having landed before dawn within easy distance of the camp, they reconnoitered until the following evening. The guerrillas then sneaked past the guards to the airfields and planted demolition with time delay fuses into the parked aircraft. Having hidden the bombs, they then made their way back out the camp to transportation prepositioned at a rendezvous point. The result was 37 parked planes destroyed with no friendly casualties (32:135).

A raid against a Nazi camp/airdrome 150 miles behind enemy lines yielded another 35 to 40 planes when guerrillas stole into the dispersal area, planted their bombs in the planes and safely retreated back into the desert (32:147).

Another raid was executed by two guerrillas, one acting as instructor/mentor and the other a new recruit. The instructor, Paddy Moyne, had personally sabotaged "...at

least sixty enemy planes himself, the highest individual score rolled up." (32:151). The two went to scout an Italian camp/airport before the raid. After a full day of reconnaisance, the two sneaked past the guards and headed for the airfield, each carrying six bombs. They split up and planted their bombs, having set the timers for 30 minutes to allow escape. Having one bomb left over, Moyne slipped over to where the camp commander was, set the timer for two minutes and placed it at the feet of the commander. Enemy losses for the night were twelve fighters and bombers destroyed, a repair facility heavily damaged and the death of the camp commander, an Italian colonel (32:152-166).

Ten guerrillas set out to find and sabotage a secret German camp/airfield near Tobruk. They knew that the Germans had been supplying Rommel by a coastal road leading out of Tobruk, but didn't know the location of the outpost. An agent had discovered a convoy departed from Tobruk for the outpost every Saturday. The guerrillas' plan was to wait for the convoy behind a knoll along a curve in the road. After the next-to-last truck went around the knoll, the guerrillas would join in before the last truck rounded the curve, thereby blending in as far as the last two trucks were concerned. The merging successfully occurred when the German convoy came after dark. Later, the guerrillas feigned mechanical difficulties, pulled off the road and disposed of the Germans in the last truck of the con-

voy. They then took the German truck and rejoined the convoy. Thus the correct number of trucks arrived at the outpost. Two guerrillas sat in the front of the truck; the others hid under the tarp. It was then they discovered the truck they were driving contained explosives and ammunition. They arrived at the outpost, parked their truck in the middle of the others, and set about their work of planting bombs and setting timers. One of the bombs was placed right under the truck they had driven. The saboteurs then started to depart the camp for their truck still hidden in the desert. They were discovered at this time and three were killed. The demolitions left in camp did their work--twenty planes; the trucks in the convoy with explosives, ammunition, and supplies; an ammunition dump one of the guerrillas had found; a tractor used to tow planes and equipment; a gasoline dump; a barracks; and other unknown destruction caused by the secondary explosions and subsequent fires. As a sidenote, the guerrillas decided to come back after giving the Germans time to rebuild their outpost. The saboteurs lost no lives that time, but still inflicted heavy losses. In addition, this time the guerrillas also had a machine gun mounted on the back of their truck. After they made their way back to the truck, they pulled up on a hill above the camp and sprayed the Germans with machine gun fire as they sought to stop the explosions and fires (32:169-198).

Not all the acts of sabotage involved aircraft as targets. Captain Smith made mention of their expert swimmer saboteur, Major Keeley. One case mentioned Major Keeley sabotaging two German freighters at Bardia, a major Axis port. Keeley lay camoflauged for three days a few miles west of Bardia looking for Axis ships. Two freighters heavily-laden with supplies arrived at the port the third afternoon. Keeley waited until dark and swam the distance to the port, towing a floboat holding eight magnetized demolitions. He eluded the sentries' search lights by swimming underwater, surfacing next to the first freighter. Planting four time-delayed charges, he accomplished the same at the other ship and made his way back out to sea, swimming back to his starting point. The freighters and their cargo went up in smoke (32:143-146).

In another instance at the port of Bardia, a guerrilla strolled onto the pier, dressed and acting like all the other line shoremen. He went into the freighter tied to the pier, opened the sea cocks, thus flooding the ship, and walked by to shore. He then waited to watch the ship fill with water and sink (32:200).

The saboteurs would also sometimes use passive sabotage. One incident involved a lone guerrilla on a motorcycle who posted detour signs in both German and Italian stating the road to Tobruk was damaged. He then waited to direct traffic along a road leading into the desert. After

misdirecting several hundred supply trucks, he sent word by carrier pigeon to headquarters as to the location and heading of the Axis convoys in order to direct bombers (32:168).

The China-Burma Theater.

Burma. British Col Wingate's Long Range Penetration (LRP) was a concept designed to position mobile forces behind the Japanese lines with the express purpose of destroying communications and supplies. These forces would be able to remain behind enemy lines due to air support which would drop supplies for the units at predetermined drop points (37:14). These forces were to have the ability to harrass the enemy in their rear area. As a result, one of the consequences of a successful LRP mission would be the demoralization and confusion sown behind enemy lines. This would in turn sap strength from the main operating forces fighting at the front (37:14).

Being behind the enemy's line meant the LRP units would be smaller in size than the enemy. Being smaller than the main operating forces of the Japanese army, LRP units relied on speed, concealment and mobility instead of going head to head against main operating forces. As such, one of the main requirements for using LRP units was that there be a major offensive in concert to their employment. Otherwise, Wingate figured, the LRP's action would cause the Japanese forces to determine their location and exterm-

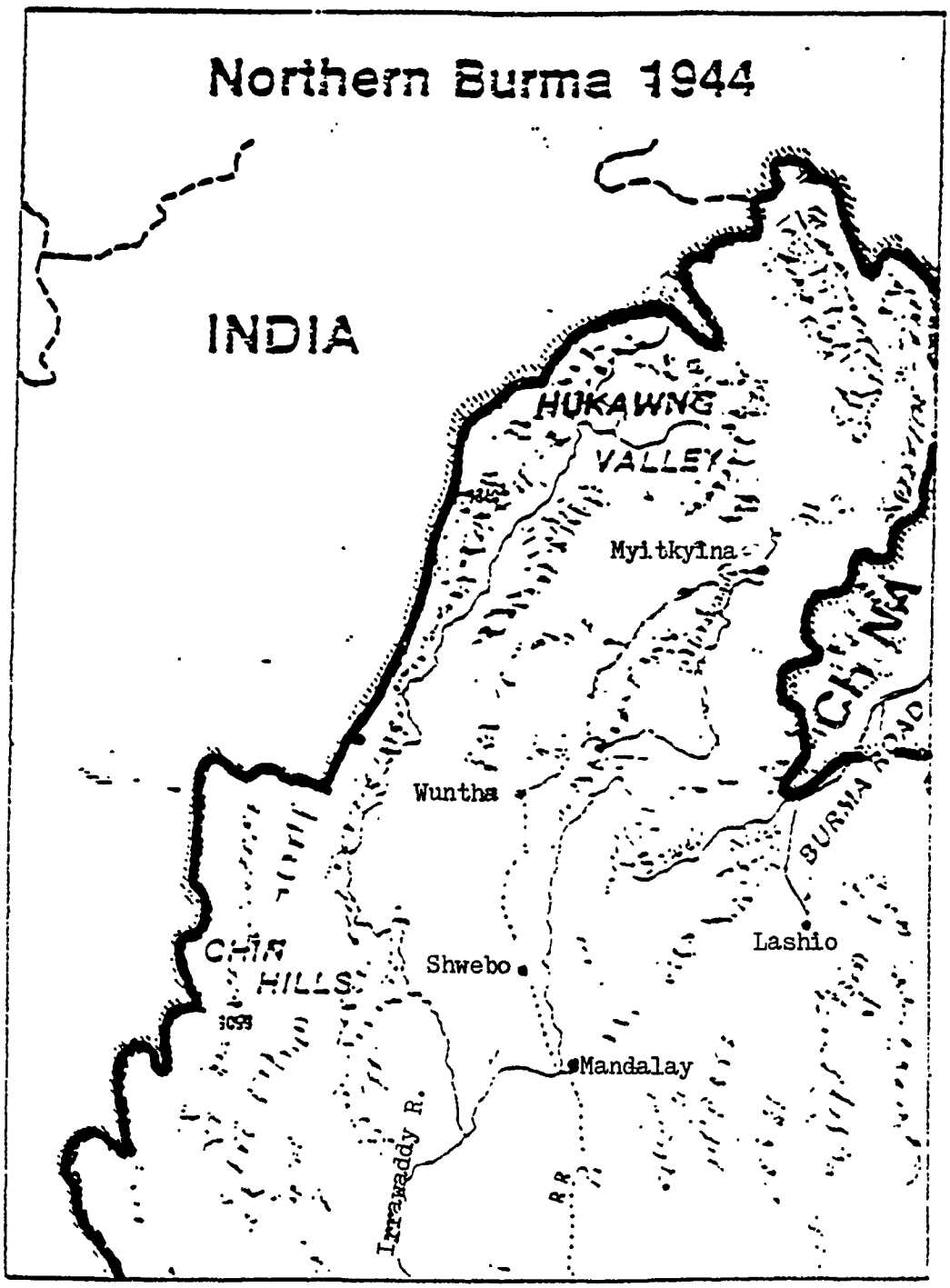

Figure 12. Burma (37:59)

inate them (37:14). They practiced typical guerrilla tactics of hitting the enemy in one location, retreating quickly before reinforcements arrived and popping up at another location. This kept the Japanese off guard to where the next attack would occur. Again, their sole aim was to destruction of communications lines and supplies (37:15).

Operation LONGCLOTH was to be a test for the LRP principle. Despite the fact that Gen Wingate knew that there was to be no major offensive tying up the Japanese front line, Wingate decided to go ahead with Operation LONGCLOTH. Around 8-10 February 1943 approximately 3,000 men started into Burma after crossing the Chindwin River. RAF liaison officers assigned to the LRP unit selected areas for scheduled air drops, the first series being successfully completed on 24-26 February (37:18). According to Van Wagner, the LRP unit had the following goals:

> (1) To cut the main railway line between Mandalay and Myitkyina,
> (2) To harass the Shwebo area , and
> (3) If possible, cross the Irrawaddy River and sever the railway between Mandalay and Lashio (37:18).

The unit lost their radio due to an ambush after the first series of supply drops. Unable to communicate with the outside world, hence not being able to direct supply drops, the units had to march back to India. Before their retreat, however, the unit managed to sabotage over 75 sections of the railroad between the areas of Shwebo and Wun-

tho before leaving Burma for India. Thus they fulfilled both of the first two objectives. The LRP unit also crossed the Irrawaddy River, but were forced at this point to turn back due to the aforementioned lack of supplies and the fact that the Japanese main forces were converging on them (37:18-20).

3,000 men marched into Burma; 2 182 marched out. Much of the loss was attributable to the lost resupply capability and to the violation of the main principle of LRP: there must be a major offensive. (37:20). Still, this statistic was remarkable when considering Gen Slim's Burma Corps had made the same trek in May 1942 when retreating from the enemy and lost 13,000 of the 25,000 they started with (37:10).

China. Guerrilla techniques, including sabotage, which emphasized deception, surprise, mobility and night movement were used. S. M. Chiu noted some of the techniques used to commit sabotage during the Chinese Civil War: planting nails and sickles on roads used by the enemy; placing sugar in fuel tanks, causing cylinders to stop functioning unexpectedly; and mixing explosives with the coal used in enemy industries, thus exploding the furnaces (24:151). Since the Japanese relied on mechanized transport, they were tied to bridges when crossing the canals in Central China. The Chinese destroyed the bridges and then would construct footpaths of stone located a few

feet under the water surface. These were indiscernable unless happened upon (10:154). The Chinese peasants manufactured and used landmines as a means of sabotage. They were taught by the Communists to mine the entrances to their village, should a Japanese attack occur. The mines were also laid around the Japanese forts. As the Japanese got used to the idea of landmines, they started taking villagers to lead the way through the minefields. The militia then developed mines with detonators about 20 yards ahead of the actual mine. The villager would activate the detonator and the Japanese would die (10:156-157).

The Pacific Theater.

Malaya. When the Japanese declared war, the British and Communist forces joined together. Several Communist members were trained in British schools for jungle warfare and sabotage (10:185). The Malayan People's Anti-Japanese Army (MPAJA) practiced sabotage against both communications and transportation lines (10:189).

Philippine Islands. The resistance movement needed the cooperation of the common people. However, because the Japanese official of the Mindanao area had treated the Filipino people respectfully, the people were effectively neutral toward the enemy. In order to sway the people toward the Filipino resistance movement, the movement used sabotage against the Japanese. The Japanese, in turn, responded by blaming, and attacking, the Filipino

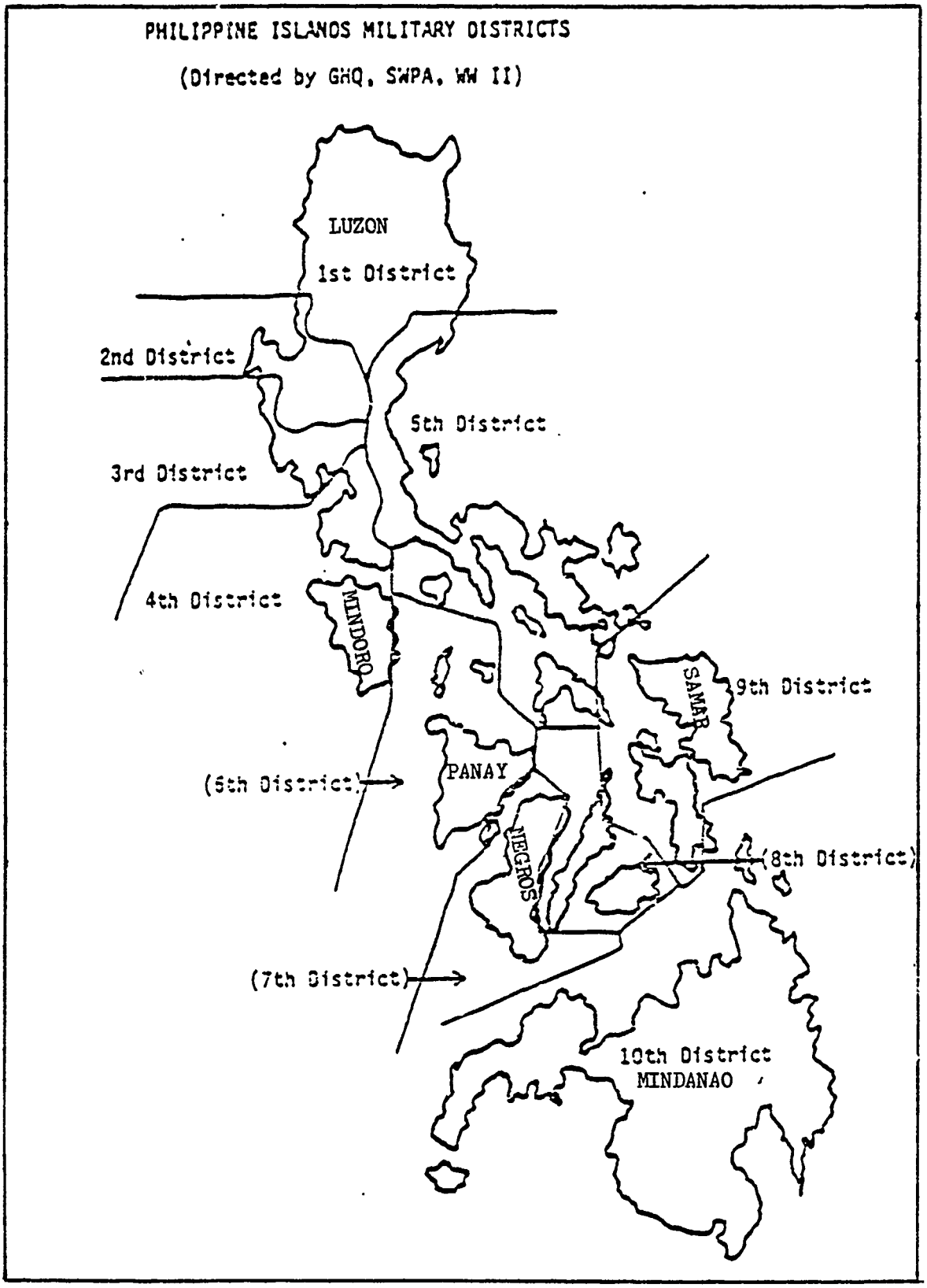

Figure 13. Philippines (31:xi,102)

villagers. Once the Filipinos saw the Japanese attacking innocent villagers in reprisal, they quickly turned their allegiance tc the resistance (31:42).

Weapons for the resistance's sabotage were manufactured, found, and stolen. The resistance members retained cartridge cases for reloading. Lead bullets were cast in home-made molds. Powder for the cartridges was made by either mixing amatol from Japanese mines with low-grade dynamite (found in the many local mines) or by reccvering pcwder from unexploded munitions. Grenades were made from either dynamite-filled coconuts or dyna-mite mixed with shrapnel in a can (31:208). One of the Filipino's sabotage weapons was the soyac trap. This was a series of sharpened bamboo sticks that were driven into the ground with about twelve inches remaining above ground. These were placed on both sides of a trail and were used to impale the enemy as they dcve for ccver in the bushes as a result of the Filipinos firing off a few rounds (31:203).

Using sabotage as a means of warfare had an added benefit in that the enemy seldom saw the perpetrators. By using the smaller groups for sabotage, the enemy often became confused as to the actual opposing strengtn (31:204-205). For example, the 10th Military District had approximately 36,000 Filipino personnel under the command of Col Wendell Fertig. At no time from 1943 to the end of the war did Japanese intelligence count more than 6,000 (31:205).

In American Involvement in the Filipino Resistance Movement on Mindanao During the Japanese Occupation, 1942-1945, Schmidt noted that Col Wendell Fertig sent the following radio message to General MacArthur:

> ...Large number of enemy motor vehicles and bridges have been destroyed. Many telephone poles have been torn down, food dumps burned, and considerable enemy arms and ammunition captured.... (31:101).

The guerrillas' sabotage actions were cause for great consternation on the part of Japanese military officials (31:231-232). In fact, Schmidt quoted two other sources as having stated that the guerrillas "added greatly to the woes of Morozumi and Harada" (31:231).

Thailand. Of the four goals established for the Thai resistance, one of them included the use of sabotage against the Japanese (23:26). Although a coordinated effort for conducting sabotage did not occur at first, individuals and small groups worked throughout the course of the war to commit sabotage against the Japanese. This included acts such as contaminating fuel and food/water, as well as beating/killing soldiers (23:55).

Post World War II

World War II was the last war in which major powers of the world fought against each other outright. Starting in the Post World War II period, the wars and conflicts mainly revolved around the spread of communism or relief from oppressive governments.

Algeria (1954-1962). Sabotage was one of the methods with which the Algerians sought to intimidate and destroy the economy of the French in Algeria and eliminate the will to resist their movement. As such, they focused their sabotage efforts on official French targets (e.g., military, civil, and police) (12:184)

Cyprus (1954-58). Insurgents used sabotage more as a means of swaying the political climate to their favor (11:360). By the end of the insurgency it was estimated that 4,758 homemade bombs had been used. Of these, 927 caused significant damage to the British assets on Cyprus. An additional 855 caused minor damage. The remaining 2,976 either failed to explode or were discovered in time to prevent damage from occurring. Cost of the damage to the British as a result of these bombs was estimated at 10 million pounds, while only costing about 50,000 pounds to produce.

Hungary (October-November 1956). Sabotage for the Hungarian insurgents mainly consisted of the destruction of tanks. Homemade fire bombs were hurled onto the engine grates or on the exhaust pipes. The tanks were slowed down in the streets by many methods. Gasoline was poured in street depressions and ignited when the tank passed over it. Oil was poured on sloped streets to lessen traction. Sabotage by deception was a tactic also employed. This involved fooling the enemy by committing what appeared to

be acts of sabotage with harmless materials in an effort to produce the same effects. Sabotage by deception occurred when the insurgents simulated mines in the streets with frying pans/dishes or when they lured tanks into narrow streets by placing broomsticks through windows, simulating rifles. Once in the tight streets, the tanks were attacked (11:541).

Kenya (1952-1960). No real reason is given for the lack of sabotage in the Mau Mau's territory of Kenya. The one incident of such against the railway could only be deemed successful: several trains derailed when they hit a pile of rocks heaped up on the tracks. The only times telephone lines were usually cut were as a prelude to an attack upon single homes. Nairobi's water supply came from two dams; however, the dams or water lines were never cut and water never poisoned (12:288).

Madagascar (1947-48). On the night of 29 March 1947, a violent outburst throughout the entire island occurred. Insurgents isolated the provincial capitol, Fianarantsoa, by cutting both power and communications lines. At the French military post, Moramanga, the insurgents not only sabotaged the communications lines, they attacked the soldiers, killing many while they slept by setting fire to the barracks. Eleven were cut down as they attempted to flee the building. Those French officers in the neighboring town were then ferreted out and assassinated. In all, only one officer survived the night (12:324).

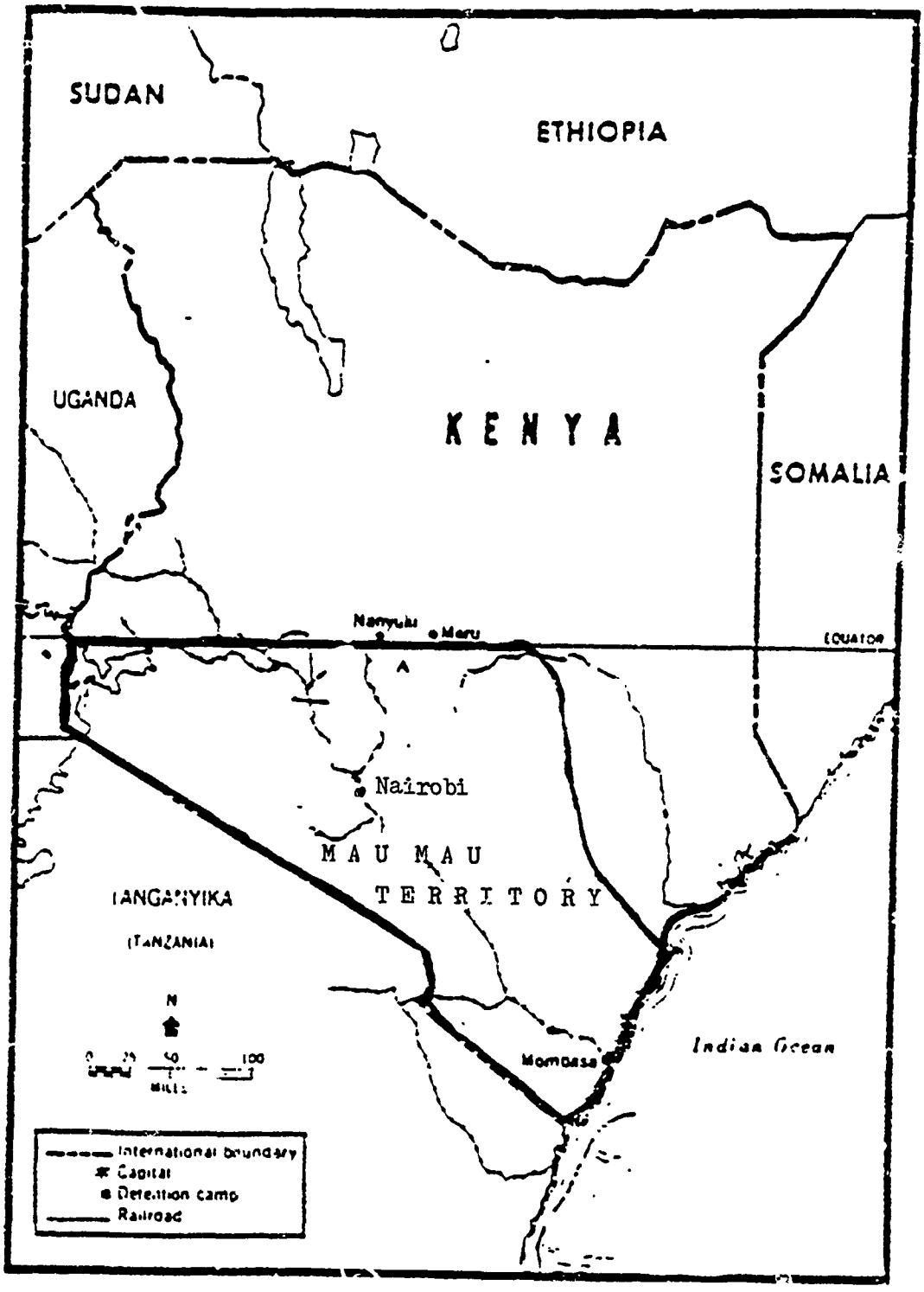

Figure 14. Kenya (1952-1960) (12:270)

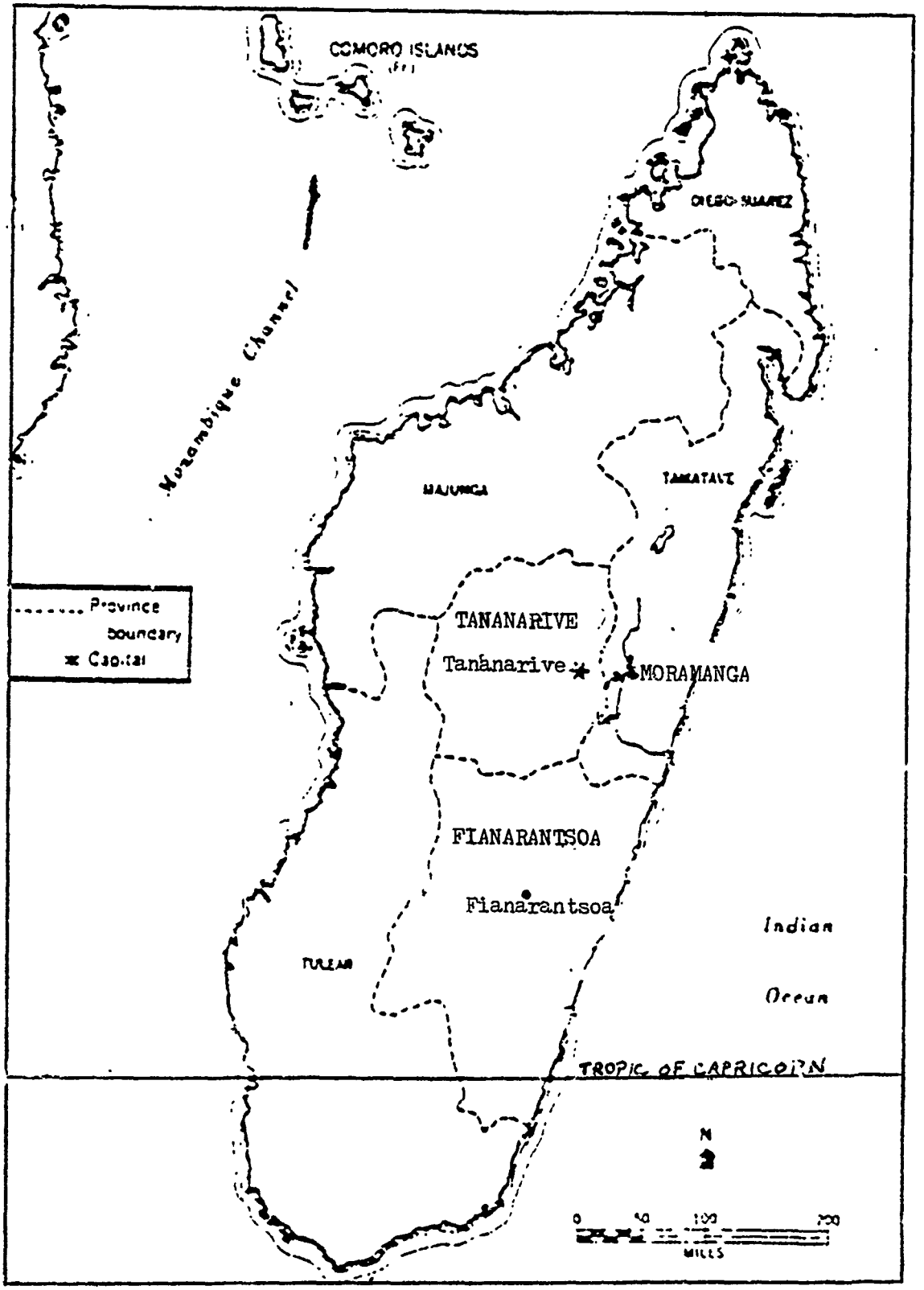

Figure 15. Madagascar (1947-1948) (12:314)

Land-based supply routes were also at the mercy of the saboteurs. For the first six months of 1947, both of the main rail lines were cut by saboteurs. The major road between the provincial capitols of Fianarantsoa and Tananarive was blocked for periods of time. When attacking convoys, a typical tactic was to dig ditches across and attack the convoy when they were forced to stop (12:325-326).

Malaya (1948-1960). The Malayan Communists' plan of attack in an area was to first destroy smaller targets like railway bridges. After they removed these targets and had increased their number of personnel from recruitment in the local area, they then expanded their horizon to objectives such as military camps (24:222). Sabotage accounted for approximately 10% of the incidents performed by the Communist insurgents. Primarily, this sabotage was conducted against railway systems and structures. Acts of sabotage were also committed against communications lines, and local water supplies (10:449-450).

The insurgents also used sabotage as a means to cripple, if not kill Malaya's economy. They sabotaged trains, destroyed the rubber trees on plantations and blew up such civil necessities as water pipes and electric lines. The insurgents quickly stopped the destruction of rubber trees, though. In fact, on October 1, 1951 a communique from the Malayan Communist Party prohibited the use of terror and sabotage of public utilities (24:228). Although it is not

exactly known why the practice was stopped, Sunderland postulated that it caused loss of popular support with the people. By this reasoning, it could be inferred that the sabotage efforts were very successful, possibly too successful (24:228; 33:258).

Palestine (1945-48). After the end of World War II, the Jewish people of the world rallied in an effort to establish a new state of Israel. Jews from around the world started migrating back to their traditional homeland. The British still maintained control over the land to be Israel until the Balfour Declaration in 1948. The widespread persecution of Nazi criminals by Jews, the constant presence of Arabs in Palestine, and the desire to have a Jewish state all joined together to form an explosive situation (36:333-336). The Haganah, unlike other Jewish groups opposing the British, did not resort to sabotage against non-military targets. They sabotaged radar installations that could be used to detect illegal immigrant ships and attacked camps used by the British to hold refugees. However, the other two groups opposing the British, the Stern Gang and the Irgun, actively engaged in terrorism and sabotage against the British government and railroads, airfields, etc. (11:420,421). The Haganah only cooperated with the Irgun once to sabotage a railway line in 1945 (36:344). In November 1946, the Irgun and Stern Gang joined to attack a railroad 21 times in as many days. The

railroad workers were so jittery after these attacks that the Arab railroad workers called a strike. The 6th Airborne Division had to protect the railroad for two weeks to resume operation (11:423).

Portugese Guinea (1959-1965). Land and river transportation were preferred sabotage targets, along with Portugese soldiers' locations. Economic targets, such as the large Portugese trading companies also fell victim to sabotage attacks (12:358).

South Africa (1961-1964). On 16 December 1961, blacks began a long period of sabotage against the repressive white government. This period lasted until May 1963. At first the sabotage was directed toward government facilities as well as power transportation and communications lines. As time progressed, however, the emphasis switched to terrorism with sabotage against whites. Eventually, the government began to regain control and sabotage became less frequent (12:389,391).

Korea. Forero noted five goals the North Koreans attempted to fulfill when working behind U.N. lines:

> (1) draw manpower from front lines
> (2) interdict U.N. lines of communications and supply centers
> (3) destroy rear area installations
> (4) furnish the North Koreans with military intelligence and
> (5) terrorize the local population into cooperation (19:20)

Unfortunately for the communist saboteurs, their logistics pipeline never supplied them adequately. As a result, the

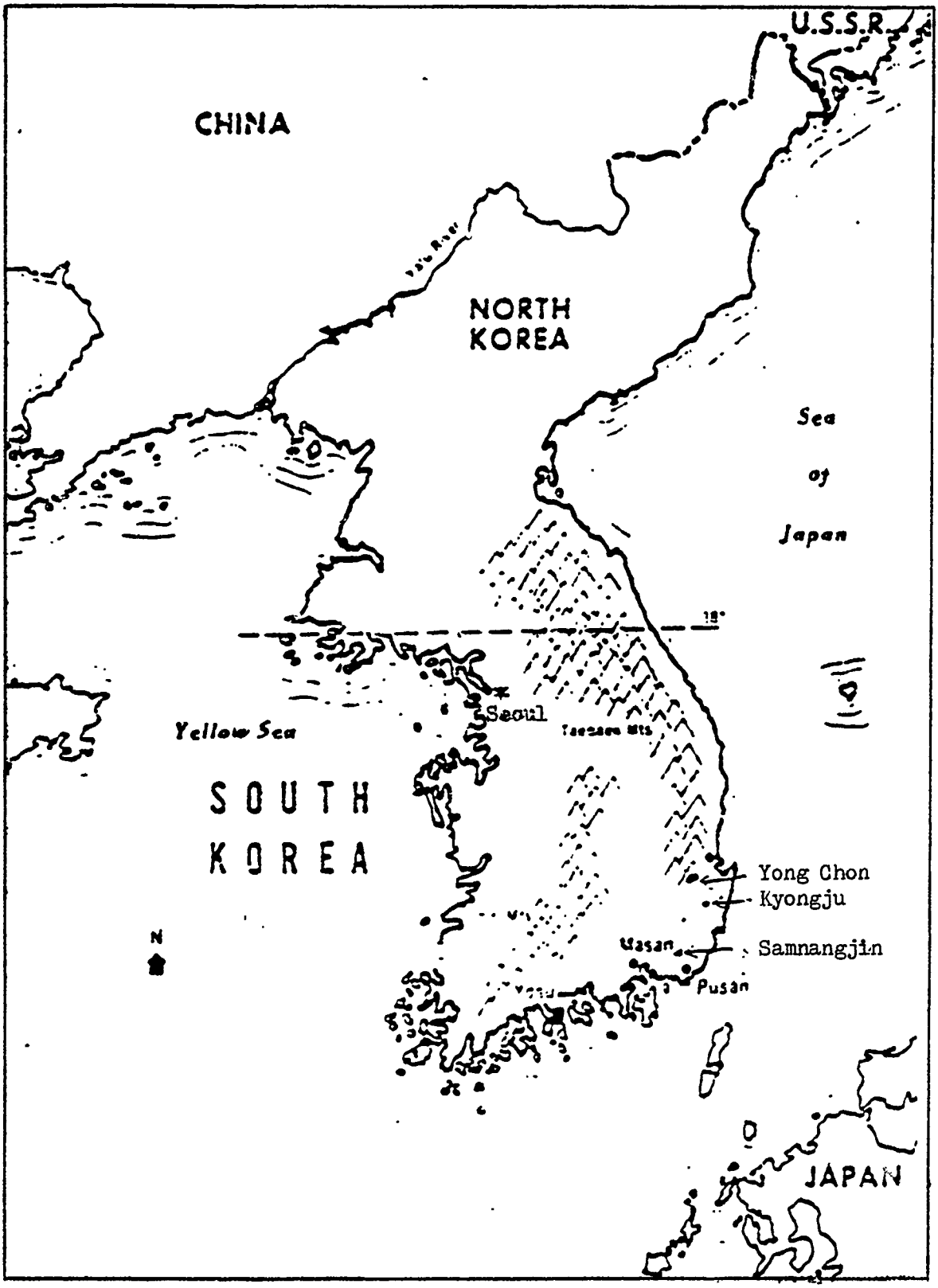

Figure 16. Korea (12:510)

saboteurs had to rely mainly on the local supplies or what they could steal. The guerrillas never had the supplies to effectively carry out an comprehensive sabotage effort. So poorly hobbled were they, little more than half of the guerrillas were armed, and then only with small arms, grenades, and a "very small quantity of explosives, mortars and heavy artillery pieces." (1:117,118). Arson, however, was very effective, as exemplified by the Pusan fires of 1953. These fires were started to destroy the military supply bases there. They succeeded (18:126).

For reasons unknown, very little sabotage occurred against the railways. Even remote bridges were usually left alone. In fact, there were only ten cases of sabotage against rail assets. Of these ten cases, eight involved destruction/damage to locomotives or railroad cars rather than to the rights of way (24:256). Those occasional attacks on trains were in the rear areas of the Pusan perimeter, in the Yongchon-Kyongju region, or in the Samnangjin area. These usually resulted in only slight disruptions of schedules.

After sabotaging railroad equipment, cutting telephone lines and demolishing police vehicles were the most frequent types of sabotage (1:128-129). As a result, sabotage during this period rarely represented more than a fly-in-the-ointment situation. One of the exceptions occurred in late August 1950. A radio relay station located 8 miles

south of Taegu was sabotaged. About 100 guerrillas overcame the 70 guards and then set the building on fire. The guerrillas waited until the building was destroyed before leaving the area. Another sabotage incident involved a radio relay station the next month. This station was located at Changwon, 4 miles northeast of Masan. It too was destroyed and the guards shot. Despite these few instances, though, no serious threat occurred to either supply or communications lines (1:118).

Indochina. Paddy fields and limited roads and railways in Indochina confined French armor, making sabotage very easy to enemy forces and very damaging to the French (24:69-70). On 19 July 1949 a raid against the Viet Minh's largest railway equipment depot near Tamquan accounted for the loss of "6 locomotives, 240 railroad cars, and 1 repair shop" (4:169). During September and October 1949, the Viet Minh so hobbled the French's transportation lines and convoys that French soldiers had to use the Air Force to ensure that monthly supplies would make it to their destination (4:18).

An analysis was conducted from January to July of 1954 on the four main transportation routes in the Tonkin area. The results were that instead of the normal density of 4 to 5 troops per kilometer, 10 were needed for the daily opening of the route due to the actions of sabotage. Working against this density, however, was a daily loss rate of

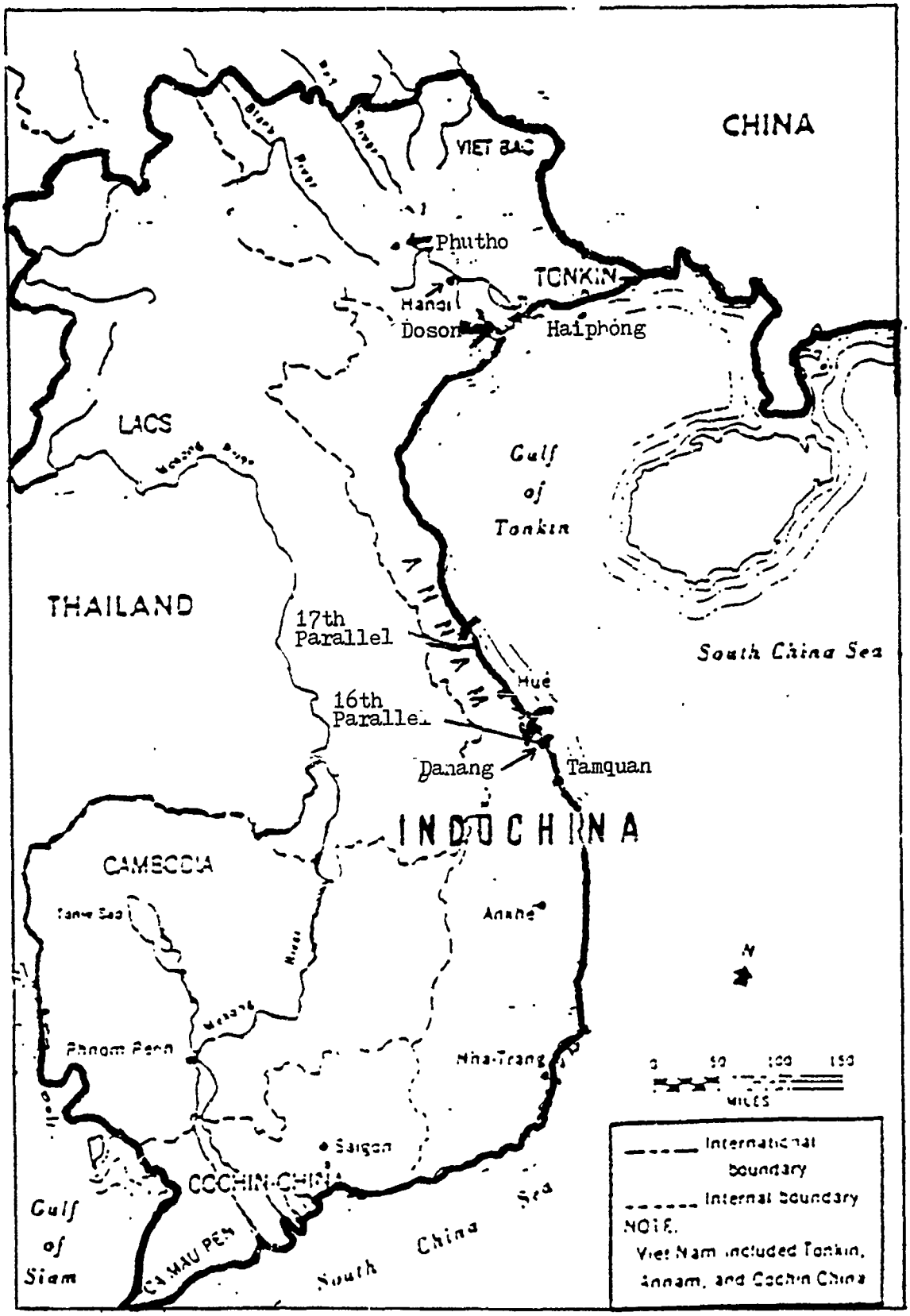

Figure 17. Indochina (12:238)

soldiers of 3 to 10 men per 100 kilometers due to enemy action. Of these, sabotage by mining accounted for between 25% and 50% of the tally. The French estimated they only had control of the roads for eight to ten hours of a day (4:80).

Land routes were not the only transportation systems harrassed by the Viet Minh. French river and coast patrols were constantly harrassed by the sabotage of the waterways. This sabotage took the form of obstacles to block free navigation, water mines, or the combination of both (4:173).

Even before the Viet Minh had the capability of using explosives they would use what they had to effect sabotage on transportation routes. Water buffalo were used to pull out bridge foundations. Bridges were burned. Concrete was set upon with picks and drills. Roads running through the rice fields were systematically destroyed by removing hundreds of yards of the road bed and allowing erosion to finish the task (4:314). Once again, saboteurs proved that

> ...with only the most rudimentary of means...one can obtain significant results as long as one is prepared to act with tenacity, courage, and ingenuity, and carry on the struggle over the whole land (4:271).

Heavy reliance was placed on sabotage by the Viet Minh. In fact, 85 percent of the total number of armored vehicle losses were the result of mines. Another eight percent of the losses were attributed to the combined use of portable antitank weapons and explosives. The antitank

weapons stopped the vehicle and explosives planted on/in the vehicle finished the job so the vehicle was destroyed and not simply returned for repair. Obstacles placed in strategic choke points also accounted for some loss of French vehicles as well. Ditches too deep or walls too thick and high to scale effectively stopped the vehicles. Many times these obstacle courses were also combined with anti-vehicle and anti-personnel mines (4:271-272). Thus as a stand alone method, or in combination with other tactics, sabotage contributed to virtually all the French tanks destroyed.

Tanks were not the only target considered important, though. The Viet Minh also recognized the value of, and sabotaged, the enemy's fuel supplies. Of the nine fuel depots the French used, saboteurs attempted to damage or destroy seven. Of these, only the Vinh Long depot escaped damage due to a watch dog sensing the saboteurs. The others were damaged to varying degrees or destroyed. The Danang depot was sabotaged and completely destroyed by "in-siders" in 1952. In 1953 the Do Son depot lost only one 1600 cubic meter storage tank to plastic explosives, the other two tanks having been protected by a reinforced wall. Two depots at Thuong Ly, one civilian and one military, were heavily damaged in 1953. The Phutho and Nha Trang depots were totally destroyed in 1952 and 1954, respectively. Though eliminating the

potential use of the destroyed fuel, these attacks did not have a grave impact on operations. This was probably due to the heavy daily rate of fuel resupply via trucks (4:392).

Viet Nam. The Viet Nam War was a war fought against saboteurs on both land and water. Information pertaining to land sabotage is presented, followed by that on sabotage in the water. Incidents for land sabotage are listed in Appendix D, while incidents of sabotage aginst aquatic targets are presented in Appendix E. Tables 5 and 6, respectively, show a summary of the two appendices.

Table 5: Sabotage to U.S. Naval and Vietnamese Naval Land Targets in South Vietnam for the Months of March and August 1967, May 1969, and June 1971 (see Appendix D)

# Raids	Destroyed	Damaged	Wounded
3	1 ammo dump	11 ammo pads 2 5-ton trucks 1 3-wheeled vehicle dependent housing	3 friendly

Sabotage on land. Although the Viet Cong (VC) first attempted major attacks as their primary method of warfare, late in 1969 they replaced major attacks with sabotage and small raids and harrassments. This included a

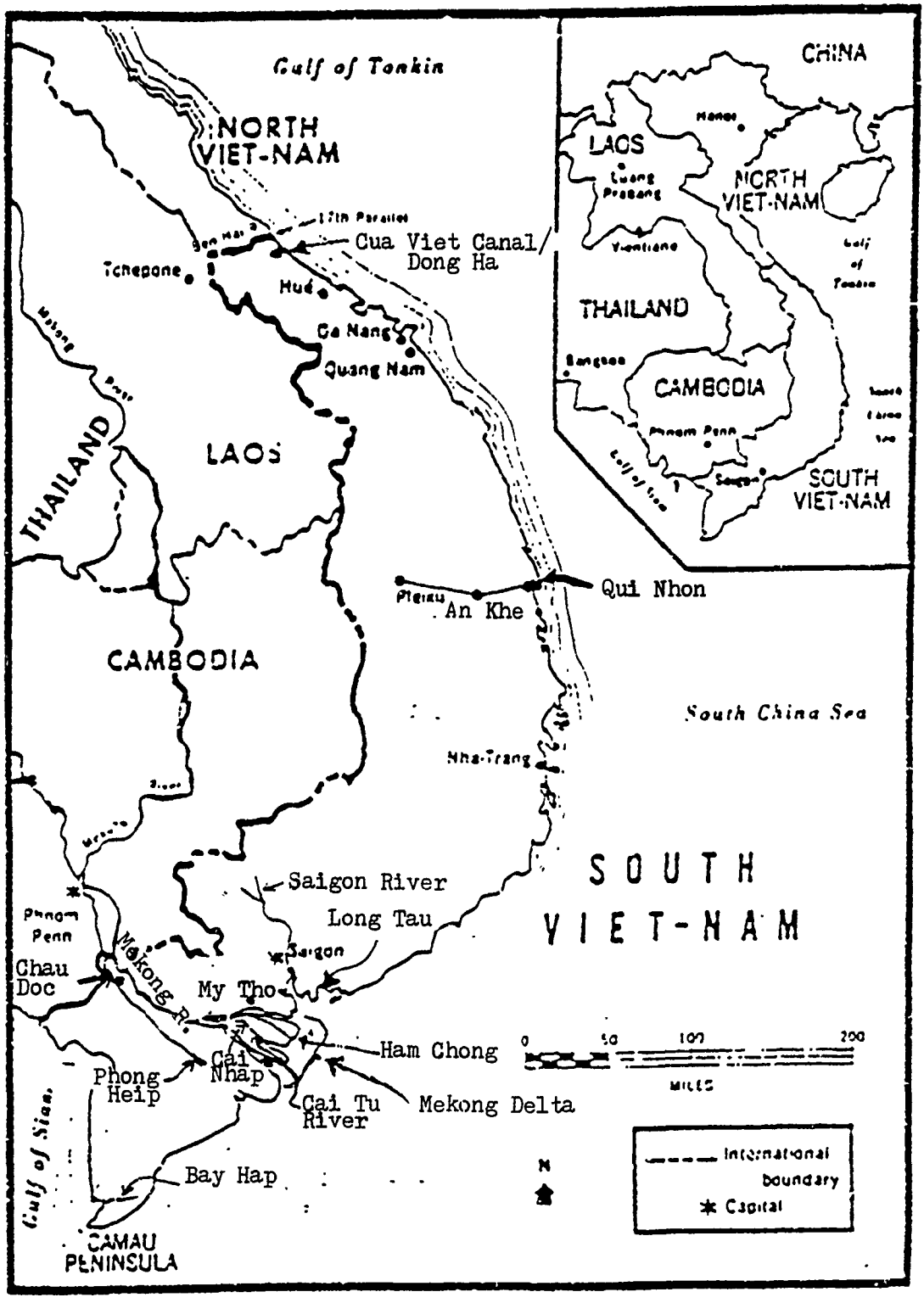

Figure 18. Viet Nam (12:332)

Table 6: Sabotage to Aquatic Targets in South Vietnam for the Months of March and August 1967, May 1969, and June 1971 (see Appendix E)

Mines found before detonation:	5	
Mines detonated, causing no damage:	6	
Mines causing damage/destruction:	6	
Obstacles removed by friendly forces:	4	
Damaged vessels:	10	
Destroyed vessels:	11	
Number wounded:	5	friendly
VC swimmers killed:	10	
VC swimmers captured:	2	
Material seized by friendly forces:	140	lb. explosives
	5	60 mm mortars
	5	rifle grenades
	18	B-40 rockets

greater incidence of mines and booby traps. One Army of the Republic of Viet Nam (ARVN) colonel noted that it was these weapons of sabotage that caused the greatest damage to Republic of Vietnam Navy (VNN) personnel and machines (2:4-17 - 4-18). In fact, roughly 70 percent of the vehicles lost and 11 percent of U.S. Army combat deaths were caused by VC mines and booby traps (3:16-25). Table 7 shows simple VC mines and booby traps encountered during the Viet Nam War while Table 8 shows the percentage of US/RVNAF KIA by mining/explosion.

Table 7: Viet Cong Booby Trap Devices
(3:16-26)

TIN CAN GRENADES:

Grenades placed in cans with pins removed, a pull on a trip-wire would extract the grenade and explode it

PUNJI STAKES:

Sharpened spikes made of steel or bamboo embedded in the floor of a shallow pit covered by twigs and foliage

SPIKED BALL:

Heavy mud ball with spiked punji stakes attached to a tree and when released by a trip-wire would swing hard across the path

STREAM GRENADES:

Grenades placed in streams, minor rivers and swamps

BOW AND ARROW:

Bow embedded in sides of concealed pits, arrow held under tension in the bow and released by actuating a trip-wire running across the track

Table 8: US/RVNAF KIA By Type of Enemy Action
(Monthly Average) (30:59)

Type of Enemy Action	1967	1968	1969	Jan 1970
Assaults	327	371	298	96
Indirect Fire	163	236	230	500
Mining/Explosion	68	89	104	67
Other	13	6	9	10
TOTAL	571	702	631	673

Note: Included in the mining/explosion were mines, booby traps, and other explosives.

The marshy paddy fields that confined French traffic to a limited number of roads, rail systems and canals did not disappear. As such these were again favorite targets for the VC. Table 9 shows the yearly totals of VC sabotage incidents against transportation structural systems (ie, road, rail, canals, and bridges) in South Viet Nam.

Table 9: VC Incidents Against Transportation Structures (Annually) (30:95)

YEAR	NUMBER OF INCIDENTS
1963	686
1964	3506
1965	5353
1966	4753
1967(JAN-APR)	1592
TOTAL	15,890

Thus, for the 52 month period indicated, there was a overall monthly average of approximately 306 sabotage incidents involving the transportation structures alone. The guerrilla's persistence and intensity caused truck units to divert upwards of 15 percent of their assigned driver personnel away from their primary duties to beef up security. This came in the form of additional duties like installation and convoy security. As a result there was usually shortage of drivers for long periods of time in motor transport units. Table 10 shows the results of a

48th Group (MT) study which lasted from July 1968 to May 1969.

Table 10: Average Percentage of Time Drivers Spent (by Task) (34:L-6)

Driver Available	56.8%
Transits (in and out)	4.5
Ineffectiveness	8.5
Guard, Installation	11.7
Other (dispatchers, administrative drivers, trailer transfer points, tire repair, convoy guards)	18.5
TOTAL	100.0%

It was obvious that, aside from the ineffectiveness category (e.g., those pending courts-martial, sickness, article 15, etc.), convoy and installation security requirements took a large toll on the availability of drivers. Not only did the convoy security place added strain on personnel time, but it also required the use of an additional vehicles. Convoy supervisors, platoon leaders, etc. found it necessary to have an additional 1/4-ton truck per convoy. This truck was used by supervisors to provide the additional command control element deemed necessary to safeguard against the guerrillas (34:L-15). Additional fire power was also requested. As a result, motor transport had to supply more gun jeeps and gun trucks. In the Northern II region, 5-ton trucks were

fitted with four .50 cal machine guns or a single M-60 machine gun to help alleviate the need for security. This was an extensive change, though, foregoing the cargo-carrying capability of the 5-ton truck and thus represented a loss of transportation assets (34:L-22).

Roads and road vehicles were not the only land vehicles susceptible to sabotage. Railroads were also hit. Four Military Railway Security (MRS) Battalions, totalling nearly 2,000 men were assigned to guard the railroads. As an example of the futility of this effort, the 2d Battalion in Qui Nhon was responsible for securing 175 km of track, including 151 bridges, with the 400 men assigned. The 2d Battalion was augmented by 10 Regional Force Popular Force companies for maintaining bridge security (34:L-22).

The Military Railway Security Battalions attempted to maintain railway security with the use of armored trains, foot and night troop train patrols, and sentries posted at bridges. However, with such a great expanse adequate security could not be maintained with the few numbers of personnel and equipment assigned. As a result, railways were sabotaged with minimal concern of capture or failure throughout the entire remote countryside. Despite the best intentions of the MRS Battalions, this lack of security caused both passengers and shippers to avoid using rail for transportation and thus caused it to almost cease entirely by 1965 (34:L-22).

Supply lines were also a favorite target for North Vietnamese saboteurs. The Qui Nhon-An Khe-Pleiku petroleum-oil-lubricants (POL) pipeline was a pipeline running above-ground between the three named towns. VC were so able to sabotage it that monthly losses ran up to 2.5 million gallons. Due to the severe fuel loss, it was shutdown in 1969 (3:10-51).

Sabotage on water. The Viet Nam War was where the swimmer saboteur seemed to have come to light as a force. In fiscal year 1970 alone, Viet Cong swimmer saboteurs attempted 58 incidents. Thirty (51.7%) were successful, with 28 assets either sunk, destroyed or damaged. In fiscal year 1969, 66 incidents were reported with 33 (50%) being successful and 49 friendly assets either sunk, destroyed or damaged (6:2). Babyak characterized North Vietnamese swimmers as patient, ingenius, highly trained and highly motivated, despite being poorly equipped (6:9). He further acknowledged covert swimmers to be excellent weapons for "have not" nations. The only cost to the country for this type of mission is that for an underwater explosive and a swimmer. Like all sabotage situations, the cost and possible loss to the country for failure compared to the possible gains from a successful mission should make swimmer sabotage an obvious favorite (6:2).

Due to the heavy growth of vegetation along the river banks, saboteurs were able to enter and exit the target

area easily. Once in the water, the swimmer would often use the debris which floated freely in the river to conceal himself and float from an upstream position to the ship. As in most sabotage situations, Babyak noted that the swimmer made use of the added concealment of darkness (6:9).

Along the coastlines of Viet Nam, the swimmer used scuba gear more frequently. Where scuba was not used, swimmers traversed the increased distance to offshore ships by making use of the large numbers of junks and sampans in the area. The swimmer could ride to the target area in a boat or hold on to the side and float out to escape detection. Once in the area, the swimmer could then manuever the boat to conceal his work or possibly attach the charge to the junk itself and anchor it close to the target ship (6:9-10).

As on land, saboteurs' attempts to mine ships and penetrate perimeters accomplished the goal of reducing unit combat capability by forcing it to commit increasing numbers of personnel to round-the-clock perimeter and resource security. This also included harbor and waterway security. Infiltration of Viet Cong forced the need for increased cargo security as well to prevent cargo loss through theft or damage (34:M-19,M-24).

III. Analysis, Conclusions, and Recommendations

Analysis

Following the literature review, an analysis of the information was made based on the eight investigative questions posed in chapter one. The results, along with the conclusions and recommendations for further study, are found in this chapter.

Sabotage and Unconventional Warfare Defined. The first two questions required definitions for sabotage and unconventional warfare. These provided the guidelines on whether or not to include the cases in the literature review. As was previously explained in chapter 1, the definition for sabotage was limited in scope from that found in JCS Publication 1. Sabotage was defined in the limitations section of chapter 1 as a clandestine act(s) of a person(s) to destroy, or render inoperative, enemy combat equipment, support equipment, facilities, and/or utilities, to include human and natural resources, used to support aggression while not being actively used in an aggressive manner at the time of the act. The intent of the clandestine act is to conceal the method of destruction/rendering inoperable by avoiding detection, by the aggressor, if possible. Excluded from this definition are surprise attacks in which valid targets are destroyed

in an overt manner (e.g., helicopter attack using missiles to destroy a bridge). Unconventional warfare was defined in JCS Publication 1 as a broad spectrum of military and para-military operations conducted in enemy-held, enemy-controlled or politically sensitive territory. Unconventional warfare includes, but is not limited to, the interrelated fields of guerrilla warfare, evasion and escape, subversion, sabotage, and other operations of a low visibility, covert or clandestine nature. These interrelated aspects of unconventional warfare may be prosecuted singly or collectively by predominantly indigenous personnel, usually supported and directed in varying degrees by (an) external source(s) during all conditions of war or peace (25:379). Those definitions, and others, are found in Appendix A.

Forms of Sabotage. Question 3 asked: What form has sabotage taken previously? Sabotage was divided into passive and active forms. Active forms of sabotage were further grouped into forms of sabotage used on land and forms of sabotage used against aquatic targets. Passive forms of sabotage and the active forms of sabotage used against aquatic targets and land targets are shown in tables 11, 12, and 13, respectively. The forms are presented in order from that used most often to least often.

Table 11: Forms of Passive Sabotage

Intentional loss/theft of material

Deliberate work slowdowns/inefficiencies

Deliberate poor quality control of materials made

Spoiling perishables

Giving false directions/false roadblocks.

Turning/removing road signs

Table 12: Forms of Sabotage Used Against Land-Based Targets

Use of explosives

Cutting power/communications lines

Mining of roads

Arson (used alone and in conjunction with attempts to sabotage fire fighting capability)

Use of natural resources for obstacles (eg, rocks on roads, land slides)

Destruction or theft of livestock/crops

Sniping

Damaging tires (eg, using stand up nails, slashing tires, loosening lug nuts)

Mining areas to prevent repair

Fuel contamination

Overt food/water contamination

Covert mixing of explosives with standard fuels

Sabotage by deception (eg, laying fake mines) with possible association of other methods of destruction

Reduction of vehicle traction.

Table 13: Forms of Sabotage Used Against Aquatic Targets

Water mining

Use of underwater demolitions (swimmer saboteur)

Sinking of obstacles in narrow passages of water (sometimes used in conjunction with mining)

Running ships aground

Arson

Tampering (eg, opening a ship's seacocks to flood it).

Types of Targets. Question 4 asked: What were the targets in previous acts of sabotage? Beside the category of enemy personnel, the target types were classified as follows: munitions, fuels, supplies and repair facilities; aquatic targets; land routes/vehicles and weapons; industrial/economic; utilities; and barracks and civic buildings. Tables 14 through 19 reflect the targets found within each category. Once again, the target types are listed from those found to be sabotaged most often to those sabotaged least often.

Table 14: Munitions, Fuels, Supplies, and Repair Facilities as Targets of Sabotage

Munitions and fuel (both depots and manufacturing facilities)

Supply depots/warehouses

Repair facilities

Oil pipelines

Table 15: Aquatic Targets of Sabotage

Ships (combatant and supply/transport)

Water routes (canals, river, etc.)

Harbors/piers/docks (both from water and land routes)

Table 16: Land Routes/Vehicles and Weapons as Targets of Sabotage

Railways (track, switching units, etc.) and rail bridges/tunnels

Trains (locomotives, freight and passenger cars)

Roads and road bridges/tunnels

Vehicles (trucks/armored vehicles/tanks), both stationary and moving

Aircraft on the ground

Artillery

Table 17: Industrial/Economic Targets of Sabotage

Industries (both from "insiders" and external sabotage)

Machinery (only, as opposed to an entire factory)

Economic crops (eg, rubber tree plantations)

Coal mines

Table 18: Utilities as Targets of Sabotage

Communications (lines above and below ground, radar installations, radio facilities)

Electrical facilities

Water facilities

Table 19: Barracks and Civic Buildings as Targets of Sabotage

Administrative and police buildings

Troop barracks

Reliance upon Sabotage. Question 5 asked: How much did forces rely on sabotage? This varied according to several factors. First, the degree of organization within the force affected the use of sabotage. Those forces with a high degree of organization were able to prepare well thought-out plans on where sabotage should occur. The four sabotage plans drawn up by the Allies and executed by the French resistance in preparation for the invasion of Normandy illustrate a complex, coordinated example. The ability to draw upon expert knowledge in different areas provided an extra measure of assurance that an unorganized group could not achieve. Being able to tap resources like the London-based Norwegian scientist's technical knowledge of the German's heavy water plant in Norway can be a great asset. Highly organized groups were also more visible to the armies and governments which fought the common foe. This usually brought about an increase in arms and supplies from sympathetic official sources. The British Special Service Forces, for example, took note of active sabotage efforts of partisans like the Greek resistance and provided technical assistance, training and supplies.

The type of forces involved also determined the reliance placed upon using sabotage. Professional military units (eg, the British Special Service Forces) usually had a high degree of training and modern equipment for sabotage. Because the professionals were trained not only in sabotage but in all aspects of guerrilla warfare, they also used sabotage in conjunction with other tactics. The D-Day invasion displayed the coordination that could be obtained when properly mixing sabotage with other military tactics. Many times, when using other guerrilla tactics the professionals used sabotage against targets of opportunity. Paddy Moyne's ability to eliminate a German colonel with one left-over bomb illustrates this well.

Partisans and insurgents who had the backing of official governments used sabotage extensively. One reason for the great use of sabotage was the knowledge of possible reprisal against innocent civilians. Open conventional warfare against the enemy left no doubt as to who was doing the fighting. Since many times the saboteurs melted into the general populace, the enemy could only speculate as to who they were. To be sure, reprisals still came in situations such as this; however, the popular support that existed for the partisans only solidified further when innocents were attacked in reprisal. To help alleviate the possibility of reprisal, the saboteurs ensured the act of sabotage occurred away from civilian concentrations. This

was done by either going to remote areas to commit the sabotage or by using time delays on their explosive/incendiary devices, thus allowing the target to travel away from the civilian concentrations before being destroyed.

Another reason for the partisans' and insurgents' use of sabotage was their familiarity of the area in which they worked and their knowledge of the enemy's daily routines. They developed intelligence networks laying out not only the strengths and weaknesses of the enemy, but also the movements of men and material. As such they could plan their sabotage effectively. The Danes' knowledge of the German rail traffic timetable allowed them to sabotage the structure and one or more of the carriers using the system. Their comprehensive network of saboteurs and messengers used to gather "real time" information prevented discovery of the mines by the railway security patrols.

In many ways, the guerrilla forces exhibited these same characteristics. They too often received help from outside governments in the form of trained advisors, instruction and supplies. Having lived in the area of operation all their lives they were intimately familiar with the surroundings, giving them an in-depth knowledge of the best places to commit sabotage. Having a support base among the populace, they could escape detection with relative ease. Due to their usual inability to go head to head conventionally against the enemy, they used sabotage exten-

sively as a main tactic. Readers need only look at North Viet Nam to see these guerrilla forces in action.

Enemy agents were trained in sabotage and committed sabotage as well. However, they seemed to be mainly used for the establishment, training, and governing of organized underground or guerrilla network. These forces were the ones who in turn committed the actual acts of sabotage. NKVD agents in World War II built up an extremely extensive network of Soviet partisan forces whose sabotage wreaked havoc with the Germans.

The ability to acquire material for sabotage also had an impact on a force's reliance on using sabotage. Procuring supplies, including those for sabotage, was done in the following ways: purchase, theft, manufacturing, collections from the populace, parachute drops and previous wartime equipment. People went to the legal market to obtain material from which sabotage material could be derived. Obviously, raids on factories, warehouses, convoys, or depots yielded a vast amount of material. One of the most common means of obtaining sabotage equipment was that of manufacturing it yourself. Grenades, incendiaries, explosives, and mines were but a few of the types of equipment produced by saboteurs or their supporters. The Poles' ingenuity in using basic resources to make sabotage weaponry illustrated the ease of making sabotage instruments. Parachute drops were often used to supply saboteurs in

World War II, such as in Yugoslavia. A final source of material for sabotage was wartime equipment stored from previous conflicts. Again, the Yugoslavians provided an example of this when they took the arsenal left by the Italians after Italy fell.

Correlations. Question 6 asked if there was any correlation between the types of forces commiting the sabotage, the manner in which the sabotage was committed, and the type of target chosen. The possible two way combinations for this comparison were: type of force with form of sabotage, type of force with targets struck by sabotage and form of sabotage used with types of targets.

Comparing types of forces to the forms of sabotage used showed that partisan/insurgent and guerrilla forces alike used most forms of sabotage against land targets. No reference was made to aquatic sabotage except by professional and guerrilla forces. Planting explosives in order to cause rock and land slides, damaging individual pieces of equipment on trucks (eg, tires), mixing explosives with standard fuel, and reducing vehicle traction were not employed by the professional soldier. Professional soldiers were able to use infiltrators among enemy units in much the same way insiders were used in factories--the same effects, just different forces targeting a different group of people. Deliberate work slowdowns or inefficiencies, poor quality workmanship, loss of material, and spoiling

perishables were forms of sabotage used only by partisans. This was attributed to the fact that the enemy was dependent upon the partisans to continue in the work places in order to feed the war effort. The other types of forces were obviously not in a position to commit such acts of sabotage.

Comparing types of forces to the targets struck by sabotage showed some differences as well. All forces used sabotage against transportation routes and the vehicles employing the routes. Munitions, fuel and supply areas were likewise subject to sabotage from all types of forces. The only instance noted of coal mines being sabotaged occurred at the hands of professional forces. As was noted in the literature review, Spitsbergen's coal was vital to Germany's war efforts. Distance prevented all but professionals from reaching the target area. Insiders were only used by the partisans, since they were the only group forced to work for the enemy. Hence, they were the only group to sabotage machines within the factories. External sabotage against industries was committed by all groups. Repair facilities were sabotaged by all groups, as were communications lines and facilities. No circumstances in the literature review revealed sabotage by professional forces against civic buildings or economic crops. Based on the types of targets predominantly struck by professional military units, it would appear that they sabotage

targets having the greatest and most immediate impact on the enemy's ability to wage a logistically-feasible war. Enemy troops were targets for sabotage by all groups as well as their abodes. Finally, all types of forces sabotage electrical and water facilities and targets of opportunity.

The last combination to be considered was that of forms of sabotage and the targets affected. Arson was used against ships and land vehicles; communications facilities; munitions, fuel and supply concentrations; machinery; and buildings. Explosives were used against all these targets and all forms of transportation routes. Explosives were also used to sabotage fuel used in industry, oil pipelines, repair facilities, electrical and water facilities, and other targets of opportunity. Fire or spoilage were used to destroy food and economic crops. Fire, food/water contamination, turning/removing road signs, giving false directions/false road blocks, explosive (mining/bocby traps) and sniping were used against troops. Mining, damaging vehicle tires, fuel contamination, reduction of traction, and sabotage by deception were all used against land vehicles. Deliberate work slowdowns and inefficiencies, deliberate poor quality control of materials made, intentional loss/theft of material, and spoilage of perishables were all aimed at industry. Tables 20 through 26 summarize this data.

Table 20: Forms of Sabotage Used Against Aquatic Targets

Explosives

Use of underwater demolition (swimmer saboteur)

Arson

Running ships aground

Tampering

Table 21: Forms of Sabotage Used Against Land Routes/Vehicles and Weapons

Mining

Explosions

Arson

Damaging vehicle tires

Fuel contamination

Reduction of traction

Sabotage by deception were all used against land vehicles.

Table 22: Forms of Sabotage Used Against Munitions, Fuels, Supplies, and Repair Facilities

Explosives

Arson

Fuel contamination

Table 23: Forms of Sabotage Used Against Barracks and Civic Buildings

Use of explosives

Arson (used alone and in conjunction with attempts to sabotage fire fighting capability)

Table 24: Forms of Sabotage Used Against Utilities

Use of explosives

Cutting power/communications lines

Arson (used alone and in conjunction with attempts to sabotage fire fighting capability)

Mining areas to prevent repair

Table 25: Forms of Sabotage Used Against Industrial/Economic Targets

Use of explosives

Cutting power/communications lines

Arson (used alone and in conjunction with attempts to sabotage fire fighting capability)

Destruction or theft of livestock/crops

Fuel contamination

Covert mixing of explosives with standard fuels

Intentional loss/theft of material

Deliberate work slowdowns/inefficiencies

Deliberate poor quality control of materials made

Spoiling perishables

Table 26: Forms of Sabotage Used Against Enemy Personnel

Use of explosives (mines and booby traps)

Sniping

Overt food/water contamination

Giving false directions/false roadblocks.

Turning/removing road signs

Reliability of sabotage. Question 7 asked: How reliable were the acts of sabotage? To be reliable, the saboteurs had to travel to the target, avoiding or subduing enemies. Next, they had to use whatever form of sabotage they had planned (eg, explosives, incendiary device) and accomplish the sabotage act so that the form could act in such a way as to have the desired effect (eg, securing a mine to an anchor to ensure it doesn't float away from the target). Implicit in this definition is the assumption that the sabotage form is reliable (eg, the explosive will in fact explode). To quantitatively measure the reliability would have required raw data on the actual number of sabotage attempts vs. the number of successful acts. Some raw data of this nature was found. However, due to time limitations constraining the literature review, the researcher could not be reasonably assured of the data being a representative sample. Qualitatively, it could be presumed that the sabotage was reliable based on its use in history. This was especially born out in those countries and time periods where the literature noted the dramatically increased used of sabotage by forces. It could therefore be inferred that sabotage was at least as effective, if not more so, than the other tactics employed by those various forces.

Effectiveness of countermeasures. Question 8 asked: How effective were any countermeasures encountered by sabo-

teurs in preventing the sabotage? The only countermeasure that stopped sabotage was the manpower-prohibitive act of exterminating the saboteurs. Committing the number of forces necessary for effective counter-sabotage also produced too much of a drain on the front line. Indeed, as this fact became known, sabotage efforts increased in a deliberate move to force the enemy to guard against sabotage in the rear area. Thus, this research indicated there were no effective countermeasures to sabotage.

Conclusions

The purpose of this research was to determine the effectiveness of sabotage as a means of unconventional warfare by historically analyzing previous conflicts to determine the role and impact sabotage played. A basic premise to this research was that sabotage indeed was a means of unconventional warfare as defined in JCS Publication 1. What remained was to determine its effectiveness based on its usage in history.

To be effective, sabotage had to accomplish what is expected of any offensive military operation--inflict damage on the enemy's ability to wage war. Again, history supported the thesis that sabotage is an effective means of warfare. Sabotage was used against both strategic and tactical targets. It was proven capable of being used near the front line, in the rear areas, and even in support areas out of the theater.

To be sure, sabotage had to be performed properly to obtain the desired results. However, that is true of any operation. Also, as with any type of operation there were failures to go along with the successes. The failures seen, however, seemed to be due more to faulty planning, inadequate time for planning, inadequate or improper equipment, and not following the plan of operation rather than a failure due to the actual act of sabotage. Again, these problems could spell failure to any operation. The multiple target types that could be hit in the multiple depths of operation, the ability of sabotage to accomplish what conventional operations many times could not, the flexibility of not necessarily needing sophisticated equipment, and the seeming lack of effective countermeasures shown all bear out the logical conclusion that sabotage was deemed effective in history. Military leaders who employed sabotage saw its effect on the enemy and increased its use. Enemy leaders wrote about the ill effects it had on their side. In all these ways, sabotage proved itself effective in history.

Lessons learned. There are several lessons to be learned from this research effort:

1. Sabotage can be accomplished after the person(s) has infiltrated an organization, industry or factory. This sabotage could take on the form of physical destruction of material, facilities or personnel. It could also take on

the form of subversion in an effort to reduce or stop production.

2. Underground/resistance movements make use of printed material to spread instructions on how to commit sabotage.

3. Timing of the sabotage could mean the difference between knocking out an asset that could be used by both sides or only hindering the enemy. For example, blowing up a bridge prematurely to prevent enemy use may impede a possible advance should the momentum of a battle turn. Timing can also spell the difference between knocking out one asset or several assets at once (eg, just blowing up a section of train track or waiting to also demolish a supply train as well).

4. Sabotage may sometimes succeed when conventional forces cannot. Skorenzy's ability to blow up a bridge that stood the test of 500 failed dive bomber runs illustrated this well.

5. History does not point to an effective counter-measure to sabotage.

6. Sabotage can be used to draw troop strength from vital battle zones.

7. Selective sabotage is used to destroy or render inoperable assets not easily be replaced or repaired in time to meet the enemy's crucial needs. The required down time of the target depends on the target itself. For exam-

ple, a crucial route might only need be impassable for several days near the front, whereas an oil refinery might need to be down for months to show the effects of its loss on a war.

8. Sabotage can be used against both tactical and strategic targets.

9. Any nation, rich or poor, large or small can effect sabotage against an aggressor.

10. Sabotage is an economical form of warfare, requiring only a mode of transportation (possibly walking), a properly trained individual, and an applicable sabotage device.

Recommendations For Follow-on Study

As mentioned in the first chapter of this thesis, military planners must be aware of any type of action which might help their forces gain the advantage in a conflict as well as those actions which, if used by the enemy, could inflict damage on their ability to wage war. This thesis showed the effectiveness of sabotage. However time constraints imposed a limitation as to the depth and breadth of study. Many avenues exist for continuation of this research.

1. As the United States military continues to evolve, added emphasis is being placed on the capabilities of the Soviet Union/Warsaw Pact countries to launch an attack against NATO forces. History is replete with exam-

ples of how the Soviets used, instructed, and encouraged sabotage. Spetsnaz forces, in particular seem well suited for this type of operation. Additional study could be made of any changes to the Soviet's philosophy in the area of sabotage, particularly in light of the Afghanistan invasion of 1979.

2. This research covered an overview of sabotage through the indicated time period. It was not theater-exclusive. An analysis of the use of sabotage over time in theaters projected to be potential areas of conflict (eg, the Persian Gulf, the Middle East in general) to determine any trends on how sabotage has been and may be employed could be accomplished.

3. As the computer becomes more necessary for the proper operation of the military, it becomes a more important target to sabotage. Already computer "virus" programs exist which can effectively sabotage a central processing unit, rendering it useless. Analyzing the ease of sabotaging computer equipment (hardware and software) both in the field and on a support base might help identify possible solutions to this problem.

Appendix A: Definitions

In this research, an attempt was made to use standard military definitions of the terms listed below. As a result, JCS Pub 1 was used almost exclusively. JCS Pub. 1 delineated between definitions accepted by the Department of Defense (DOD) and other organizations. All definitions extracted from JCS Pub. 1 for this thesis were those listed as being accepted by the DOD.

clandestine operation - an activity to accomplish intelligence, counterintelligence, and other similar activities sponsored or conducted by governmental departments or agencies, in such a way as to assure secrecy or concealment (26:69).

covert operations - operations which are so planned and executed as to conceal the identity of or permit plausible denial by the sponsor. They differ from clandestine operations in that emphasis is placed on concealment of identity of sponsor rather than on concealment of the operation (26:96).

enemy - for the purpose of this research, a country or countries which would use unconventional warfare against their opponent(s) before, during and after any declarations of open hostilities.

Glavnoe Razvedyvatelnoe Upravlenie Sovetskoi Armii (GRU) - the Main Intelligence Directorate of the Soviet Army (7:36).

incendiarism - the act or practice of setting on fire maliciously or of stirring up strife (39:204).

Komitet Gosudarstvennoy Bezopasnosti (KGB) - the Committee for State Security of the Soviet Union (7:60).

raid - an operation, usually small scale, involving a swift penetration of hostile territory to secure information, confuse the enemy, or to destroy his installations. It ends with a planned withdrawal upon completion of the assigned mission (26:297).

sabotage - an act or acts with intent to injure, interfere with, or obstruct the national defense of a country by willfully injuring or destroying, or attempting to injure or destroy, any national defense or war material, premises or utilities, to include human and natural resources (26:315). For the purposes of this research, sabotage was defined as a clandestine act(s) of a person(s) to destroy, or render inoperative, enemy combat equipment, support equipment, facilities, and/or utilities, to include human and natural resources, used to support aggression while not being actively used in an aggressive manner at the time of the act. The intent of the clandestine act is to conceal the method of destruction/rendering inoperable by avoiding detection by the aggressor, if possible. Excluded from this definition are surprise attacks in which valid targets are destroyed in an overt manner (e.g., helicopter attack using missiles to destroy a bridge).

special operations - operations conducted by specially trained, equipped and organized DOD forces against strategic or tactical targets in pursuit of national military, political, economic, or psychological objectives. These operations may be conducted during periods of peace or hostilities. They may support conventional operations, or they may be prosecuted independently when the use of conventional forces is either inappropriate or infeasible (26:335).

Spetsnaz - Soviet Special Operations Forces. The term is taken from the Russian "spetsialnove nazvanie" meaning forces of special designation. Spetsnaz forces work under the control of the Soviet General Staff's Main Intelligence Directorate (GRU) (9:4).

unconventional warfare - a broad spectrum of military and paramilitary operations conducted in enemy-held, enemy-controlled or politically sensitive territory. Unconventional warfare includes, but is not limited to, the interrelated fields of guerrilla warfare, evasion and escape, subversion, sabotage, and other operations of a low visibility, covert or clandestine nature. These interrelated aspects of unconventional warfare may be prosecuted singly or collectively by predominantly indigenous personnel, usually supported and directed in varying degrees by (an) external source(s) during all conditions of war or peace (26:379).

Appendix B: Statistics on French Guerrilla Warfare for Two Weeks in the Summer of 1943

Between Nevers and Chagny, a German train was derailed, killing 52 soldiers and wounding 150 others, stopping traffic for 36 hours.

Between Cosne and Clamecy, another train was derailed. This one was loaded with war materiel enroute to Russia.

At Rebecourt, an explosion knocked a train off the track, killing 30 German soldiers, injuring about 100 others and stopped traffic on the line for three days.

Dropping boulders on train tracks stopped traffic for an untold time between Nimes and Ales.

Between Nevers and Clamecy, a train full of material destined for steel and chemical plants was destroyed.

The turntable in the railyard at Bourges was sabotaged, stopping traffic for 20 hours.

At Orleans, saboteurs cut electric cables above numerous freight cars carrying flammable materials and three locomotives, thus setting them on fire.

A train's brake system was rendered inoperable when 30 brake transmission tubes were cut. The confusion caused by this episode allowed time for another person to cut all the telephone cables.

At Callac, fire caused by an incendiary device destroyed the German Army stores.

A group known as Combat took advantage of the con-

fusion caused by RAF bombing at Lorient and sabotaged the oxygen generating machine used for U-boat crews.

At the Roulen railyard, underground members sabotaged locomotives (32:298-300).

Appendix C: Excerpt from the August 1943 Report from the Chief of Tranportation, German Army Group Center

Despite the employment of special alert units for the protection of the railroad lines, partisan activity increased by 25 percent during August 1943 and reached a record of 1,392 incidents, as compared to 1,114 in July. The daily average amounted to 45 demolitions. In 364 cases, the rails were cut simultaneously in more than 10 places. Individual demolition points amounted to 20,505, while 4,528 mines were detected and removed. During the night from 2 to 3 August, the partisans began to put into effect a program of large-scale destruction. Numerous demolitions were carried cut which caused a serious curtailment of all railroad traffic and a considerable loss of railroad material. Within 2 nights, the six to seven thousand miles of track in the area were cut 8,422 places, while another 2,478 mines were detected and removed prior to exploding.

(18:61)

Appendix D: Incidents Involving Land Sabotage by the Viet Cong

Sabotage ccmmitted by enemy forces:

In June 1971 ARVN lost an ammunition dump due tc sabotage at Qui Nhon (14:80-81).

In June an "unidentified explosive device" exploded at a POL farm caused only damage to a wall with no damage to the tanks (14:81).

Sabotage on 30 June, possibly satchel charges, caused damage to 11 ammunition pads and dependent housing units (14:82).

On 13 June, while traveling Route 341, a five ton truck was severely damaged and a passenger critically injured when the truck ran over a mine. 3,000 feet later, a three wheeled vehicle struck a mine and was completely destroyed. The mine demolished the vehicle and killed three RVN. On the same road, a second five ton truck detonated a mine, crippling the truck and wounding two Seabees (14:119).

Appendix E: Incidents Involving Sabotage Against Aquatic Targets

Two unsuccessful sabotage attempts occurred on 9 and 24 March 1967 when Viet Cong (VC) exploded claymore mines at two separate mine sweepers in the Long Tau Canal. The minesweepers were hit with shrapnel, but no damage was incurred (15:3).

Another unsuccessful attempt occurred on 15 March 1967 in the same vicinity. On this occasion, a mine was detonated between two River Patrol Boats (PBRs) as they were accomplishing a reconnaisance mission. The mine was powerful enough to throw water and mud 150 feet in the air. Again, no damage (15:3).

On 6 August 1967, a Utility Landing Craft (LCU) was sabotaged when three mines attached to it exploded. The three mines caused heavy damage, with two 6 x 8 foot holes and one 4 x 10 foot hole. The LCU forward section flooded with water, but it did not sink. It was subsequently towed away for repair (13:47).

On 18 August 1967 a VC swimmer was killed by base defense members of Coastal Group 13 (25 miles northwest of Danang) and 80 pounds of explosives seized (13:80).

On 27 August 1967, an informer tipped off an attempted VC mining operation in the Cho Gao Canal of the My Tho. The attempt was thwarted (13:64).

On 3 May 1969, a Vietnamese Marine Corps (VNMC) Engineering team and a U.S. Navy EOD team destroyed two underwater log barricades which blocked the entire width of the canal. These were discovered nine miles from the canal entrance along the Kinh Can Gao. Two other barricades were subsequently removed (16:enclosure 1:24).

On 10 May 1969, the lead craft of five Fast Patrol Craft (PCF) struck an underwater obstruction near the mouth of the Bay Hap river. As the other PCFs swung around the obstruction, a water mine exploded near the vicinity of the obstruction. No damage occurred. At was believed that te obstruction was a command detonated underwater mine (16:enclosure 1:21).

On 11 May 1969 a water mine exploded under a Landing Craft on the Cai Tu River, resulting in the complete destruction of the craft and 4 sailors wounded (16:enclosure 7, p.6).

On 19 May 1969, two swimmers and two additional VC were fired upon and listed as probable kills by SEALs seven miles southwest of Chau Doc. There were no U.S. casualties. Additionally, Vietnamese Navy (VNN) reaction troops found and detonated an eight kilograms watermine positioned in five feet of water during a routine sweep five and one half miles from Chau Doc (16:14).

On 20 May VNN troops noticed and engaged ten VC six miles south of Chau Doc. They later swept the area and

found a seven and one half pound watermine and four blasting caps (16:enclosure 1:14-15).

On 22 May, twelve VNN troops found a sampan which the VC had sunk earlier with a mine. A second mine had also been placed so that boats swinging clear of avoiding sampan would pass over it. Another routine patrol noticed wires going into the river on 23 May. A battery was connected to the wires and the underwater charge in the middle of the river was harmlessly detonated (16:14).

While on patrol near Chau Doc on 27 May 1969, a VC saboteur was killed as he attempted to sabotage a River Patrol Boat after a sailor heard sounds coming from under the boat. A fragmentation grenade was found attached to the port sea suction intake and removed. Further inspection later revealed the would-be saboteur had prepared to secured another mine on the starboard side as well (16:enclosure 3:5).

Four unsuccessful sabotage attempts reinforced the need for security measures. On 11 May 1969 a camoflauged sampan was noticed just as it was entering the Saigon River. Friendly forces fired on the sampan, killing two VC. One of the bodies recovered was nude (ie, readying to swim) and had explosives and fuses with him. Between 0026 and 0033 on 12 May tapping sounds came from under the hull of the USS Benewah, which was anchored in the My Tho River. Concussion grenades apparently chased the would-be saboteur

away. A hull inspection showed no devices. At 0125 that night, a enemy swimmer was spotted 10 yards off the bow of the Whitfield County. Concussion grenades were dropped against the swimmer, who disappeared. Once again the hull inspection found nothing unusual. At 0035 on 19 May a swimmer using scuba gear was spotted off the Benewah's stern, this time in the Ham Luong River. A sentry shot at the swimmer three times. The swimmer fled, dropping two 18 inch long objects. Neither the swimmer nor the objects were recovered. Also on 19 May, just past midnight, movement in the water near two anchored junks alerted a VNN sailor. Concussion grenades brought two bodies to the surface. A mine was dicovered on the anchor chain of one junk. The sailors cut the line and withdrew from the area with the junks. The mine subsequently exploded about five minutes later with no friendly casualties or damage (16:enclosure 5:7 and enclosure 7:5-6).

In June 1971, another explosion among four barges caused only minor damage to one of them.

Sabotage accounted for the sinking of an Assault Support Patrol Boat (ASPB) on the Cai Nhap Canal (14:10).

On the afternoon of 7 June SEALs were inserted against a previously-sunken sampan. They found and removed five 60mm mortars, five rifle grenades, and 18 B-40 rocket boosters. Being forced out of the area by darkness, they had to leave a large remainder of weaponry (14:5).

Enemy swimmers sank a barge in the Cua Viet channel on 18 June. This caused a short cessation of traffic. They also damaged a Personnel Landing Craft. A sailor was wounded as the result of sniper fire (14:72, 75).

For the first six months of 1971, seven ships were sunk and six damaged in the Cua Viet-Dong Ha area as the result of 71 reported mining incidents. This yielded an average of 18% of the reorted mines damaging or sinking craft. In the Delta the average reached 75% (14:73).

On 18 June a mine was disarmed by EOD after getting caught in a fishing net. On 18 June 60 pounds of VC satchel charges were recovered (14:74).

On 2 June a Mechanized Landing Craft struck a mine one kilometer fron Cua Viet, causing heavy damage to the engine area (14:74-75).

Two would-be VC swimmer saboteurs were captured on 25 June. Not only did they reveal the location of the mine they had laid, but also location of a munitions bunker. Later on 25 June two other swimmers were spotted in the area and killed with concussion grenades (14:77).

No damage resulted from a Mechanized Landing Craft striking a mine on the Phung Hiep Canal (14:119).

In June the SS American Hawk sank due to successful mining at Qui Nhon (14:80-81).

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The purpose of this research was to determine the effectiveness of sabotage as a means of unconventional warfare by historically analyzing previous conflicts to determine the role and impact sabotage played. In order to accomplish this research, answers to the following questions had to be found:

1. What is the definition of sabotage?
2. What is the definition of unconventional warfare?
3. What form has sabotage taken previously (e.g., bombings, tamperings)?
4. What were the targets in previous acts of sabotage (e.g., power stations, transportation, communications facilities)?
5. How much did forces rely on sabotage (i.e., was sabotage their main instrument of force, used seldomly, etc.)?
6. Is their a correlation between the type of force committing the sabotage, the manner in which sabotage was attempted, and the target picked?
7. How reliable were the acts of sabotage (e.g., the number of successful acts of sabotage compared to the total number attempted)?
8. How effective were any countermeasures encountered by saboteurs in preventing the sabotage?

What remained was to determine its effectiveness based on its usage in history. To be effective, sabotage had to accomplish what is expected of any offensive military operation--inflict damage on the enemy's ability to wage war. History supported the thesis that sabotage is an effective means of warfare. Sabotage was used against both strategic and tactical targets. It was proven capable of being used near the front line, in the rear areas, and even in support areas out of theater.