

CHOKER HOLD:
THE ATTACK ON JAPANESE OIL IN WORLD WAR II

BY
STEPHEN L. WOLBORSKY

A THESIS PRESENTED TO THE FACULTY OF
THE SCHOOL OF ADVANCED AIRPOWER STUDIES
FOR COMPLETION OF GRADUATION REQUIREMENTS

SCHOOL OF ADVANCED AIRPOWER STUDIES

AIR UNIVERSITY

MAXWELL AIR FORCE BASE, ALABAMA

JUNE 1994

Distribution A: Approved for Public Release; Distribution is Unlimited.

Report Documentation Page

Form Approved
OMB No. 0704-0188

Public reporting burden for the collection of information is estimated to average 1 hour per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. Send comments regarding this burden estimate or any other aspect of this collection of information, including suggestions for reducing this burden, to Washington Headquarters Services, Directorate for Information Operations and Reports, 1215 Jefferson Davis Highway, Suite 1204, Arlington VA 22202-4302. Respondents should be aware that notwithstanding any other provision of law, no person shall be subject to a penalty for failing to comply with a collection of information if it does not display a currently valid OMB control number.

1. REPORT DATE JUN 1994		2. REPORT TYPE N/A		3. DATES COVERED -	
4. TITLE AND SUBTITLE Choke Hold: The Attack on Japanese Oil In World War II				5a. CONTRACT NUMBER	
				5b. GRANT NUMBER	
				5c. PROGRAM ELEMENT NUMBER	
6. AUTHOR(S)				5d. PROJECT NUMBER	
				5e. TASK NUMBER	
				5f. WORK UNIT NUMBER	
7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES) Air University Press Maxwell AFB, AL 36112-6615				8. PERFORMING ORGANIZATION REPORT NUMBER	
9. SPONSORING/MONITORING AGENCY NAME(S) AND ADDRESS(ES)				10. SPONSOR/MONITOR'S ACRONYM(S)	
				11. SPONSOR/MONITOR'S REPORT NUMBER(S)	
12. DISTRIBUTION/AVAILABILITY STATEMENT Approved for public release, distribution unlimited					
13. SUPPLEMENTARY NOTES					
14. ABSTRACT					
15. SUBJECT TERMS					
16. SECURITY CLASSIFICATION OF:			17. LIMITATION OF ABSTRACT UU	18. NUMBER OF PAGES 106	19a. NAME OF RESPONSIBLE PERSON
a. REPORT unclassified	b. ABSTRACT unclassified	c. THIS PAGE unclassified			

DISCLAIMER

The views in this paper are entirely those of the author expressed under Air University principles of academic freedom and do not reflect official views of the School of Advanced Airpower Studies, Air University, the US Air Force, or the Department of Defense. In accordance with Air Force Regulation 110-8, it is not copyrighted, but is the property of the United States Government.

TABLE OF CONTENTS

	<u>Page</u>
Disclaimer	ii
Abstract	iv
Biography	viii
Acronyms/Abbreviations	ix
Chapter 1: Introduction	1
Chapter 2: The Campaign Against Japanese Oil	11
Chapter 3: Preferences, Parochialism, and the B-29	51
Chapter 4: Conclusions, Implications, and Recommendation	76
Bibliography	93

ILLUSTRATIONS

Figure

1	Main Netherlands East Indies (NEI) Oil Complexes	18
2	Major Japanese Oil LOCs and Key Ports	25
3	Relationship Between B-29 Bases, Combat Radius and Target Areas	41
4	Strategies-to-Tasks Model	85

ABSTRACT

After WW I, Army airmen like Billy Mitchell, in a bid for service independence, touted land-based air power's dominance over ships. Later, airmen at the Air Corps Tactical School developed a theory of independent air power application based on strategic bombing. These airmen persuaded Congress to purchase the tools to implement strategic bombing--fleets of heavy bombers--by citing these aircraft as optimum for defending the US coasts against enemy ships.

However, when the opportunity to test the efficacy of bombers against ships presented itself in WW II's Pacific Theater, Army Air Force (AAF) leaders proved reluctant to throw their full support behind such an effort. A key aspect of the US Navy's Pacific strategy was an intense campaign against Japanese commercial shipping. This blockade, primarily targeting oil after late 1943, was spearheaded by US Navy submarines. A blockade proved the most effective means of attacking Japan's oil, although AAF leaders preferred strategic bombing of the Japanese home islands, including oil facilities, over blockade support. This preference was particularly true for the B-29. This thesis analyzes the campaign against Japanese oil to explore why an oil blockade was effective against Japan and, more important, to examine how service parochialism distorted the development of a rational military strategy in the Pacific Theater.

Japan's late-19th century modernization and subsequent expansionism in East Asia and the Western Pacific brought them into conflict with the US. Lacking indigenous resources, Japan depended on oil imports--mostly from the US--to fuel its powerful military, especially its naval and air forces. Ultimately, in response to continued Japanese moves in China and Indochina, the US cut off all oil to Japan in 1941. This placed key factions in the Japanese government in an untenable position, and they decided to seize the oil-rich Netherlands East Indies (NEI), securing this source of

oil by attacking the US Fleet at Pearl Harbor, establishing a perimeter of Pacific island bastions, and hoping the US would decide against fighting their way across the Pacific.

However, from the war's first day, US submarines took the war to Japanese shipping. While the submarine campaign was unsystematic at first, the Navy overcame its own parochial constraints to make oil tankers the top submarine target in 1943. As US forces constricted Japan's island empire, AAF units began supporting the blockade with armed reconnaissance, aerial mining, and attacks on NEI oil installations. These latter attacks served as a blockade "force multiplier," stretching Japan's already inelastic tanker fleet. Although accounting for 16 percent of Japanese commercial ship sinkings, the AAF only invested about 2 percent of its total effort in the Pacific toward the blockade. In any case, the blockade reduced Japanese oil movements to a trickle by the end of 1944, stopping them completely by April 1945. In May 1945, AAF B-29s began bombing Japanese home island oil refineries, synthetic fuel plants, and storage facilities. While extensively damaging refineries, these attacks had little effect on either Japanese military capability or civilian will--due to the blockade, the bombs fell on mostly idle facilities.

Japan's naval and air forces, who had to defend vast expanses of the Pacific against the US onslaught, felt the blockade's effects most heavily. The result was denial of Japan's naval and air strategies by the end of 1944, although the complex nature of the Japanese government prevented this from causing capitulation by itself. In sum, the blockade was effective because, first, Japan's military strategy created a high demand for oil. Accompanying this high demand, Japan had serious supply problems. It had to import oil over long and contested sea LOCs because it lacked the indigenous or synthetic resources to satisfy the demand for oil. Further, Japan's tanker fleet proved inadequate, and poor blockade countermeasures only exacerbated this inadequacy. Geographic isolation completed Japan's dilemma, prohibiting oil storage in neighboring sanctuaries. This thesis argues that the AAF, instead of sending its first B-29s to the CBI

Theater, should have sent these aircraft to the Southwest Pacific to attack NEI oil facilities. Coupled with other increases in AAF blockade support, this might have caused Japan to capitulate 3-6 months before it did, with little effect on the AAF's own bureaucratic agenda.

This bureaucratic agenda colored almost all decisions by AAF leaders concerning the war against Japan, especially regarding the B-29. Believing strategic bombing to be decisive in modern warfare, but only if strategic bombers remained under the centralized control of airmen, AAF leaders fought to apply this approach against Japan's home islands. The AAF's long-term political objective, achievable if strategic bombing proved decisive, was post-war service independence. Thus, B-29 strategic bombing promised independent air power application, centralized control by the AAF, and visible demonstrations of effect against the Japanese homeland. Conversely, increased blockade support seemed only to offer a role secondary to the Navy, possible subservience to non-AAF theater commanders, and the often ephemeral and slow effects of maritime missions, all conducted on the periphery of the Japanese empire.

Along with political factors, doctrinal and operational forces influenced the AAF's decision to bomb home island oil targets, as well as the AAF's ambivalence toward B-29 aerial mining. AAF doctrine identified refineries and storage as the best targets in an enemy's oil system. The US Strategic Bombing Survey's preliminary report on the European bombing campaign seemed to justify this belief, despite its inapplicability toward Japan. Doctrine also downplayed the potential effectiveness of missions like aerial mining. Operationally, the AAF saw Japan's home island oil industry as an ideal target to validate precision radar bombing, important to air power's claims as an independent war winner. Finally, strategic intelligence shortfalls increased planners' uncertainty as to the true state of Japan's home island oil, as well as the nature or intentions of Japan's government. Hence, since they had abundant resources, AAF

leaders saw little reason not to bomb home island oil facilities and possibly shorten the war.

The US will not likely enjoy such luxury again. Hence, this study's implications and recommendation concern the future of the Air Force's maritime role. After WW II, the new USAF let their maritime capability atrophy. The USAF and US Navy, fearing an emergent Soviet naval threat, revitalized USAF maritime capabilities in the 1970s and 80s. However, with the Cold War's end, the emergence of "hyperwar" air power theory, and slashed defense budgets, the USAF now finds itself with little maritime capability once more. While this may be an appropriate course for today, tomorrow's strategic environment may require the USAF to maintain a robust, fast response maritime capability. Therefore, this thesis recommends a detailed and unbiased analysis--preferably self-initiated by the Air Force--to determine whether the future will require an increased USAF emphasis on maritime operations.

BIOGRAPHY

Major Stephen L. Wolborsky (BS, Tulane University; MS, University of Arkansas) is a B-1B pilot. Following graduation from the School of Advanced Airpower Studies, he was assigned to the Strategy Division of JCS/J-5, Pentagon. Also a graduate of Air Command and Staff College, he previously served as a B-1B instructor pilot and chief of wing scheduling at Grand Forks AFB, North Dakota. His other assignments included a tour as an ASTRA officer at HQ USAF/DP, and duty as a KC-135 instructor pilot and assistant operations officer at Blytheville AFB, Arkansas.

ACRONYMS AND ABBREVIATIONS

<u>TERM</u>	<u>EXPLANATION</u>
AAF	(US) Army Air Forces [also USAAF]
AC/AS	Assistant Chief of Air Staff
ACC	Air Combat Command
ACTS	Air Corps Tactical School
AFB	Air Force Base
AFHRA	Air Force Historical Research Agency
AFM	Air Force Manual
AFMC	Air Force Materiel Command
AWPD	Air War Planning Document [or Air War Plans Division]
BC	Bomber Command
CBI	China-Burma-India [Theater]
CCS	[Allied] Combined Chiefs of Staff
CG	Commanding General
CINC	Commander-in-Chief
CJCS	Chairman, Joint Chiefs of Staff
CNO	Chief of Naval Operations
COA	Committee of Operations Analysts
DOD	Department of Defense
ETO	[World War II] European Theater of Operations
FY	Fiscal year
G-2	[Army] General Staff, Intelligence Division
GHQ	General Headquarters
GPO	Government Printing Office
GWAPS	Gulf War Air Power Survey
HQ	Headquarters
IJN	Imperial Japanese Navy
IJNAF	Imperial Japanese Naval Air Forces
JCS	Joint Chiefs of Staff
JIC	Joint Intelligence Committee
JPS	Joint Planning Staff
JTG	Joint Target Group
LAB(s)	Low altitude bomber(s) [B-24 "Snooper"]
LOC(s)	Line(s) of communication
MAJCOM	[USAF] Major command, e.g., ACC
NEI	Netherlands East Indies [modern-day Indonesia]
UN	United Nations
USAF	United States Air Force
USASTAF	United States Army Strategic Air Forces
USN	United States Navy
USSBS	United States Strategic Bombing Survey
VHB	Very Heavy Bomber, e.g., B-29 [alternatively VLR]
VLR	Very Long Range [Bomber], e.g., B-29

Chapter 1

Introduction

The contribution to the Japanese defeat of the bombing offensive against oil was negligible because the war had already been won by the blockade.-

-
United States Strategic Bombing Survey (USSBS), *Oil in Japan's War*, 7.

In late 1941, the need for oil weighed heavily on the minds of Japanese leaders. Earlier, in July of the same year, US concern over Japanese expansionism in Indochina had led the Roosevelt Administration to embargo all oil exports to Japan. This move threw Japan into an immediate crisis due to their shortage of indigenous oil resources and dependence on imports of US petroleum. At existing consumption rates, Japan's modern military--especially the navy--would exhaust strategic reserves within months. When asked why Japan went to war with the US, Vice Admiral Hoshina, Chief of the Naval Affairs Bureau, said, "The stoppage of oil imports. Without them Japan could not survive."¹ Thus, one of the pillars of Japanese strategy was seizure of a reliable source of oil. They accomplished this with their conquest of the oil-rich Netherlands East Indies (NEI) in early 1942. However, vast ocean distances between these oil resources, the home islands, and military outposts made the Japanese vulnerable to a blockade.

Long before island-hopping, epic carrier battles, and the "death by fire" of Japanese cities, American submarines took the war to Japan, beginning an anti-shipping campaign on the first day of the war. In its early stages, this campaign was unfocused, seeking to maximize tonnage sunk regardless of ship type. However, in late 1943, the Navy made tankers the top priority target for submarines. As a result, Japan's oil supply rapidly dwindled, with reserves dropping to emergency levels by the end of 1944. By April 1945, oil imports dried up completely.

As the Allies advanced toward Japan, other forces joined the blockade. While carrier aircraft played a large role in the anti-shipping effort, land-based Army Air Forces

(AAF) aircraft also participated in a variety of blockade support missions. Operating from an ever-tightening ring of bases, these aircraft either attacked ships themselves, laid mines, or passed intelligence to Naval forces. Fearing such aircraft, Japanese tankers often avoided coastal areas and cruised in deeper water, where they became prime targets for US submarines.² Bomber attacks on NEI oil refineries also aided the blockade by eliminating Japan's capability to supply military refueling stations with refined product directly from the NEI. By forcing the Japanese to ship crude oil from the NEI to home island refineries first--before it could be delivered to consumers--these attacks increased Japan's tanker requirements, with a resultant rise in sinkings.³ Yet, despite these successes, AAF leaders committed less than 2 percent of their sorties toward maritime missions, and AAF commander Gen H. H. "Hap" Arnold was particularly adamant in withholding the B-29 from what he considered "diversions."

Arnold's position was unfortunate because the oil blockade significantly affected Japan's war effort. Japanese countermeasures to the tanker sinkings proved inadequate, as did attempts to develop substitutes for oil imports. Since Japanese civilians were not major oil consumers, the blockade's main effect was denial of Japan's military strategy through reduced air force and naval effectiveness. The most telling blow came at The Battle of the Philippine Sea, where oil shortages played a great role in the demise of Japan's carrier air power. Japan's loss in this battle had a political effect, boosting the stock of peace advocates within the Japanese government. While the blockade irreparably weakened the Japanese military before the end of 1944, increased support by the AAF--especially with B-29s--for the blockade might have helped end the war 3-6 months earlier than the August 1945 Japanese surrender.

Strategic bombing of the Japanese homeland began in earnest in November 1944. AAF leaders, and the Air Staff especially, had long advocated such an approach, fighting a vigorous bureaucratic campaign to guarantee their opportunity to execute it. In their crusade, political, doctrinal, and operational influences fueled these airmen. Thus, long

after Japan had seen its last oil imports, Marianas-based B-29s began a campaign against Inner Zone oil facilities in May 1945.⁴ In a series of missions running until the war's end, the AAF destroyed 85 percent of Japan's refining and synthetic oil capacity. However, these attacks proved superfluous because the residual Inner Zone refining capacity, when the strategic campaign ended, still exceeded the available crude oil by 1500 percent. In all, these attacks had negligible operational or strategic effect beyond that of the blockade.

On the surface, AAF decisions seem counterintuitive. AAF leaders certainly believed oil was important to the Japanese military strategy. They also knew of Japan's pre-war dependence on imported oil and reasons for seizing the NEI oil facilities. Given Japan's insular geography and consequent need for shipping to transport oil over vast ocean distances, the most logical way to deny Japan access to NEI oil (and hopefully defeat its military strategy) would seem to be through a blockade, not strategic bombing.

Oil Blockade: An Idea with Contemporary Relevance?

The AAF's Pacific campaign had both unique and enduring aspects. It featured the only large scale maritime effort in AAF/US Air Force (USAF) history, foreshadowing today's DOD emphasis on "jointness." Further, the AAF's preference for strategic bombing in the assault on Japan is consistent with the USAF's approach to later conflicts, including DESERT STORM, where a leading air planner claimed the world had "seen a demonstration of the validity of strategic attack theory."⁵

Oil has traditionally occupied a prominent place within this theory.⁶ Oil targets have fascinated US air planners since before World War II. In that conflict, it was the AAF's favored target in Europe and a subject of both bombing and blockade in the Pacific. The World War II experience reinforced airmen's belief in oil's universal suitability as a target. Thus, in Korea and Vietnam, oil's questionable importance to either enemy civilians or military forces did not deter US air planners from eagerly advocating strategic attacks against it. In Vietnam, oil proved relevant as a target set

only during 1972's Linebacker I campaign when the enemy chose to fight an oil-dependent conventional, versus guerrilla, war. However, the key factor affecting oil supply in Linebacker I was the successful mining of Haiphong Harbor, North Vietnam's main oil port, by the US Navy. Without the blockade of Haiphong, bombing of the North's oil storage might have proved as irrelevant as it did during the earlier Rolling Thunder campaign.⁷

More recently, Middle Eastern states have used oil as a geopolitical lever to manipulate the US, eliciting often forceful reactions from the American government. Instances include the Arab oil embargo of 1973-74, enunciation of the so-called Carter Doctrine pledging the US to defend the free flow of Persian Gulf oil, and US reflagging of Kuwaiti tankers under Operation EARNEST WILL.⁸ Oil also figured prominently in DESERT SHIELD and DESERT STORM. Protection of its own oil sources partly motivated the US to initiate DESERT SHIELD. Further, the US targeted Iraqi oil during DESERT STORM's air war. To USAF planners, Iraq's mechanized military did not look very different from Germany's *Wehrmacht*. Hence, most oil attacks met traditional USAF visions of air warfare--targeting refineries and associated storage to reduce the flow of refined products to Iraq's military. The only new wrinkle was a desire to avoid lasting damage to the Iraqi oil industry. Because the war was so short, the oil attacks had insufficient time to show much effect. The war's fast pace spurred Col John Warden, a key architect of the air campaign, to write, "The world has just witnessed a new kind of warfare--hyperwar. It has seen air power become dominant."⁹ Hyperwar is heavily reliant on stealth technology, precision, information dominance, and parallel attack to concentrate fires on enemy targets within a compressed period.

This vision of hyperwar may change the way planners target oil. Looking at the future, some air theorists question the USAF's traditional emphasis on attacking refineries and strategic level fuel storage. Instead, they advocate the enemy's operational and tactical level fuel supplies as the top priority oil targets in a hyperwar. They believe

planners can achieve the most immediate effect from such attacks because the enemy will be unable to recover from these fuel losses within the conflict's short time span. To these theorists, planners should only strike other oil targets, e.g., refineries, in the event a war becomes prolonged.¹⁰

Current US air planners also maintain a keen interest in oil. The Air Staff's "Checkmate" Division (HQ USAF/XOOC) considers oil useful in attacking a prospective enemy's capability and will to fight. Their interest in targeting oil makes sense, given the US military's current regional focus. Developing nations, forming the most likely regional "hot spots," are also the world's fastest growing oil consumers. For example, between 1982 and 1991, average annual growth in oil consumption was highest in the Middle East (4.6 percent) and the Far East/Oceania (3.6 percent), while North America (1.0 percent) and Western Europe (0.7 percent) had far lower growth rates. These trends will likely continue well into the next century. Further, many of these nations are modernizing their military forces with oil-consumptive equipment.¹¹

While such evidence establishes oil's continuing relevance to US strategists, the types of attacks described above do not constitute an inviolable approach for a variety of reasons. First, not all future wars will be hyperwars, and, besides, it is nearly impossible to predict the course of any conflict. Hence, a "planned" hyperwar can degenerate into attrition warfare despite planners' best intentions.¹² Second, these studies ignore the use of oil as a coercive tool in hostilities short of war or low intensity conflict.

Thus, alternative strategies are possible. As this paper will show, under certain conditions a sea blockade may be an excellent means of attacking a target state's oil supply.¹³ In Japan's case, a sea blockade was effective because the Japanese depended on seaborne imports for a substantial portion of their oil. They also had an inelastic oil system, lacking adequate substitution or sanctuaries to compensate for oil losses due to the blockade. Generally, given these conditions, exactly how much oil a blockade needs to cut off to be effective will depend on the target state's civil and military vulnerability

to an oil reduction, the objectives of the parties to the dispute (balance of interests), and the nature of the conflict. For example, an agrarian state engaged in a guerrilla war of independence would probably care less about the loss of a given quantity of oil than an industrialized state fighting a conventional war of movement for a limited objective.

There are also instances where a blockade is clearly the best, or only, approach to attacking oil. In attrition warfare with an enemy who depends on oil imports, a blockade may form the primary means of exhausting the enemy's military capability. In limited wars, political considerations may constrain direct aerial attacks against enemy territory, leaving blockade as the most viable option for attacking oil.¹⁴ This is even more valid for peacetime political coercion.

Recent examples highlight the UN's interest in blockading oil supplies for such coercion. Actions against Yugoslavia (Serbia and Montenegro) and Haiti demonstrate this, although the latter is more specific than the former regarding both oil and its targeting by blockade. In May 1992, UN Security Council Resolution 757 directed states to boycott Yugoslavian products, freeze assets, and embargo all but food and medical supplies to Yugoslavia. The UN's aim, in brief, was to make Yugoslavia quit interfering in Bosnia and Hercegovina. As for oil, the embargo affected Yugoslavia--a net oil importer--and states such as Russia and China who export oil to them.¹⁵ By directing an embargo, the UN left the option open to increase pressure by a later blockade. On the other hand, UN sanctions against Haiti were more specific. Here, the UN wanted to convince Haitian military leaders to reinstate the legitimate government of President Jean-Bertrand Aristide. Hence, in June 1993 the Security Council decided "to prohibit any traffic from entering the territory or territorial sea of Haiti carrying petroleum or petroleum products."¹⁶

If one believes oil will remain important in the future--at least for some conflicts--then how best to attack it will remain equally important. This is especially true because resource-constrained defense environments will likely continue indefinitely. Unlike the

end of World War II, when the US fought Japan from a position of abundance, we may not be able to afford redundant attacks on target sets like oil. In the words of one analyst, “A future conflict, especially in its early stages, could be a war of scarcity in which wasteful practices might prove disastrous.”¹⁷ Given the potential “one-shot” nature of such decisions, planners cannot afford to select courses of action based solely on service parochialism and preferred solutions.

In World War II, a blockade proved to be the most effective means of attacking Japan’s oil, although AAF leaders preferred strategic bombing of the Japanese home islands, including Inner Zone oil facilities, over blockade support. This preference was particularly true for B-29 employment. This thesis will analyze the campaign against Japanese oil for two purposes. First, it will derive conclusions as to why an oil blockade was effective against Japan. Second, and more important, it examines how service parochialism distorted the development of a rational military strategy in World War II's Pacific Theater. Following this introduction, Chapter 2 will examine the campaign against Japanese oil, detailing why oil was important to the Japanese and analyzing both the blockade and strategic bombing of this oil. Chapter 3 explores the AAF's preference in B-29 employment by examining the political, doctrinal, and operational forces influencing key AAF leaders. Finally, Chapter 4 discusses this case's conclusions and implications, recommending a detailed analysis to determine whether the USAF should pursue maritime capability in the future.

Any study using a single example has limitations, but there is a compelling reason to focus on this particular case. Service parochialism, driving preferred military options, played a tremendous role in shaping US strategy in the Pacific. This paper now turns to a piece of that strategy, a microcosm of much of the US's approach to the Pacific war, the campaign against Japanese oil.

¹ USSBS, Oil and Chemical Division, *Oil in Japan's War (Pacific War No. 51)* (Washington, DC: GPO, Feb 1946), 29.

² US submarines also preferred to avoid coastal regions for fear of (Japanese) land-based air power.

³ Furthermore, it takes about three parts crude on average to produce one part of refined product (depending on the purity of the crude), so this also increased tanker requirements. To illustrate, where previously one tanker could carry refined fuel oil directly from the NEI to the naval refueling base at Singapore, after the NEI refinery attacks three tankers had to carry the crude to Japan first, followed by another tanker to take the refined fuel oil from the Japanese refinery to Singapore. Wartime analysts forecast this phenomenon. For example, see Report of Committee of Operations Analysts, Subcommittee on Far Eastern Petroleum Including Aviation Gasoline Supplement, "Revision of [11 Nov 1943] Report to Committee of Operations Analysts," Washington, DC, 1 May 1944, iii. AFHRA File No. 118.04D; Report of Committee of Operations Analysts, "Revised Report on Economic Targets in the Far East," Washington, DC, 10 Oct 1944, 40-2. AFHRA File No. 118.04D-1.

⁴ Planners and strategists during WW II commonly used the term "Inner Zone" to refer to the areas primarily involved in raw materials processing, including Japan, Manchuria, and North China. The "Outer Zone" contained the source of raw materials and the Japanese defense perimeter, consisting of South China, French Indochina, Thailand, Malaya, Burma, the Indies, the Philippines, and outpost islands. The author uses this convention. See Memorandum, Committee of Operations Analysts, to Gen Arnold, Subject: Economic Objectives in the Far East, 11 Nov 1943, AFHRA File No. 118.04D.

⁵ Col John A. Warden III, USAF, "Employing Air Power in the Twenty-first Century," in *The Future of Air Power in the Aftermath of the Gulf War*, ed. Richard H. Schultz and Robert L. Pfaltzgraff, Jr. (Maxwell AFB, AL: Air Univ. Press, 1992), 81.

⁶ For this paper, "oil" refers to crude oil as well as its refined products, unless otherwise noted.

⁷ Robert F. Futrell, *The United States Air Force in Korea 1950-1953*, rev. ed. (Washington, DC: Office of Air Force History, 1983), 174-5, 185-7; Mark Clodfelter, *The Limits of Air Power: The American Bombing of North Vietnam* (New York: The Free Press, 1989), 95-7, 134-7, 167.

⁸ Mark Graper, Andrew Weaver, and Stephen L. Wolborsky, "Petroleum as a Center of Gravity" (Unpublished Air Campaign Planning Course Paper, Air Command and Staff College, Maxwell AFB, AL, Jun 1993), 17-18.

⁹ Gulf War Air Power Survey (GWAPS), vol. 1, *Planning and Command and Control* (Washington, DC: GPO, 1993), part 1 (*Planning*), 116-7; Gulf War Air Power Survey (GWAPS), vol. 2, *Operations and Effects and Effectiveness* (Washington, DC: GPO, 1993), part 2 (*Effects and Effectiveness*), 290-301, 309-12; Warden, 81 (quote). Warden and his planning team initially targeted three refineries and three military fuel depots. Subsequent planners added more than a dozen oil targets to the list. Warden's consideration of the war's end state reflected Pres. Bush's desire to avoid long term damage to Iraq's infrastructure. However, not all planners understood this guidance, and officers preparing the ATO or planning missions at wing level targeted several items (e.g., distillation towers at "non-military" refineries) that perhaps exceeded the guidance.

¹⁰ While the distinctions are not always clean, strategic level fuel storage generally refers to fuel in fixed facilities (such as tank farms) that is not earmarked for specific military unit use, while operational/tactical level fuel is so earmarked, and is usually stored in proximity to prospective consumers. For discussions of

oil targeting scenarios in hyperwars, see Scott E. Wuesthoff, "Utility of Targeting the Petroleum-Based Sector of a Nation's Economic Infrastructure" (Unpublished thesis, School of Advanced Airpower Studies, Maxwell AFB, AL, May 1993), 44-6, 64; Maj Edward J. Felker, USAF, "Does the Air Force Practice Its Doctrine? A Limited and Focused Air Campaign Concept" (unpublished Master's thesis, Army Command and General Staff College, Fort Leavenworth, KS, 1991), 79-81, 100-12, 122.

¹¹ Report of HQ USAF/XOOC (Checkmate), "The Checkmate Air Campaign Concept Development Process," Washington, DC, 9 Jul 1993, 6-8; Energy Information Administration, *International Energy Annual: 1991*, (Washington DC: Government Printing Office, 1992), 21; Wuesthoff, 38; M. A. Adelman, "Oil Fallacies," *Foreign Policy* (Spring 1991), 4; Graper, Weaver, and Wolborsky, 17.

¹² It was just such uncertainty as to the possible length of the war that motivated DESERT STORM's air planners to attack refineries and strategic level oil storage. Entering the war, Iraq looked like a much more formidable opponent than they turned out to be. It would have been virtually impossible to predict that the Iraqi AF would not fight or the ground forces would fall so rapidly. A further problem with hyperwar oil targeting is the tremendous number of aimpoints such an approach would generate. Imagine trying to target every brigade or division level fuel dump, every airfield's fuel storage, and operational level fuel depots. This would be a daunting task, particularly given the prospective size of future US air forces. Against Iraq, "the number of storage tanks and individual aimpoints that would have to be hit in order to eliminate [Iraqi military] refined products was quite large," and a deterrent to such an approach. See Gulf War Air Power Survey (GWAPS), vol. 2, *Operations and Effects and Effectiveness* (Washington, DC: GPO, 1993), part 2 (*Effects and Effectiveness*), 310-12.

¹³ However, the term "blockade" falls into a definitional vacuum in joint and USAF publications. Surprisingly, the term does not appear in Joint Pub 1-02, *Department of Defense Dictionary of Military and Associated Terms*, 1 Dec 1989. Nor does it appear as either a wartime operation or a "military operation other than war" (Chap. V) in Joint Pub 3-0, *Doctrine for Joint Operations*, 9 Sep 1993. Specific maritime doctrine in Joint Pub 3-04, *Doctrine for Joint Maritime Operations (Air)*, 31 Jul 1991 and Joint Pub 3-15, *Joint Doctrine for Barriers, Obstacles, and Mine Warfare*, 30 Jun 1993 also does not mention the term "blockade." Likewise, it is not in either volume of AFM 1-1, *Basic Aerospace Doctrine of the United States Air Force*, March 1992. Something these manuals do discuss, though, is *interdiction*, and blockade logically falls into that broader category.

The only mention of "blockade" the author could find in joint publications was in the rescinded JCS Publication 3-00.1, *Joint Doctrine for Contingency Operations*. This document described blockades as "belligerent operations to prevent vessels, land transport, and/or aircraft of all nations, neutral as well as enemy, from entering or exiting specified ports, airfields, or coastal/border areas belonging to, occupied by, or under the control of an enemy nation." It also defined lesser included activities, "quarantines," as "limited coercive measures to interdict the movement of certain types of designated items into or out of a nation." US authorities contrived the term "quarantine" during the Cuban Missile Crisis to avoid establishing a *de facto* state of war with the USSR. As a "belligerent operation" (act of war), a blockade permits less discriminate actions against enemy vessels than a quarantine, whereas the latter normally requires stopping and searching of enemy vessels before taking further action.

In this case, the law of the sea provides perhaps the best guidance. C. John Colombos, in *The International Law of the Sea*, defines a blockade as "the interception by sea of the approaches to the coasts or ports of an enemy with the purpose of cutting off all his overseas communications." (714) As a result of this century's two world wars, this definition has grown to include blockade-related actions by aircraft and submarines, weapons that have made blockades more effective. Colombos describes the blockade as both a seaborne extension of the classic siege and a well-established naval activity in time of war. He distinguishes it from actions against "contraband" that limit a blockade to specific items, much like quarantine described above. Finally, a blockade is normally either "strategic" (part of a military operation) or "commercial"

(independent of other military operations). See C. John Colombos, *The International Law of the Sea*, 6th ed. rev. (London: Longmans, 1967), 714-52.

For simplicity, this paper will refer to all the above listed activities (blockade, sea interdiction of shipping, quarantine, and contraband) as a "blockade," whether conducted during wartime or not. Lastly--and this is the longest note in this thesis--one should not confuse "blockade" with "embargo" which *Webster's New Collegiate Dictionary* describes as "a legal prohibition on commerce." See *Webster's New Collegiate Dictionary* (Springfield, MA: G. & C. Merriam Co., 1977), 370. If all states accede to an embargo on an item or items, then the effect is the same as if a blockade was in place. A good way to distinguish between the terms is to view a blockade as a means of enforcing an embargo.

¹⁴ Frederick M. Sallagar, *Lessons From an Aerial Mining Campaign (Operation 'Starvation')*, Rand Report R-1322-PR (Santa Monica, CA: Rand Corp., Apr 1974), 72-3. AFHRA File No. K.146.003-112 (74/04/00).

¹⁵ In 1990, for example, Yugoslavia depended on imports for 77 percent of its daily oil consumption. See Energy Information Administration, 40.

¹⁶ The sanctions against Haiti also prohibited arms shipments of all types. The harsher action toward Haiti had to do with Haiti's lack of world political support, as well as their insular geography (although they have received some oil from the neighboring Dominican Republic, with whom they share the island of Hispaniola). The US voted for both Security Council resolutions. See UN Security Council Resolution 757, "Sanctions Against the Former Yugoslavia," 30 May 1992, and Statement by Ambassador Perkins, US Permanent Representative to the UN before the UN Security Council, "Aggression by the Serbian Regime," 30 May 1992, in *US Department of State Dispatch* 3, no. 23 (8 Jun 1992): 448-451; "UN Security Council Votes for Yugoslavia Sanctions," *Editorials on File* 23, no. 11 (1-15 Jun 1992): 664; "Wide-ranging Sanctions Imposed Against Yugoslavia," *UN Chronicle* 29, no. 3 (Sep 1992): 5-12; UN Security Council Resolution 841, "Crisis in Haiti," 16 Jun 1993, in *US Department of State Dispatch* 4, no. 26 (28 Jun 1993): 469-70 (quote p. 470).

¹⁷ Graper, Weaver, and Wolborsky, 39-43; Sallagar, 71 (quote). Although twenty years old, Sallagar's advice applies today.

Chapter 2

The Campaign Against Japanese Oil

The story of the fight to deny oil to the Japanese begins with an ending--Japan's exit from isolation. Japan's subsequent growth as a military power and expansionist moves brought them into conflict with the US. Dreams of a "Greater East Asia Co-Prosperity Sphere" drove Japan to secure oil sources in the NEI to feed their powerful navy and air forces. This chapter explores why these moves left them highly vulnerable to a blockade. It also documents the US's response to this vulnerability with air and submarine attacks on Japanese oil. While the AAF gave some effective support to the blockade, this effort was not as robust as it might have been. Instead, AAF leaders made strategic choices reflecting their preferences in war fighting, particularly when it came to the B-29 bomber. This chapter will contrast the relative effectiveness of both the blockade and bombing of oil, exploring any relationships between the two. In particular, it focuses on each effort's effect on Japan's strategy. Finally, it examines two questions; could the AAF have increased their support for the blockade without significantly jeopardizing their own preferred strategy, and would this have made a difference in the overall war effort?

Dawn: Japan's Development as an Oil Nation

In an ironic twist, the US was the catalyst for Japanese modernization. Japan entered the modern world with Commodore Matthew Perry's visit to the port of Yedo in 1853. Shocked at the superior naval power embodied in Perry's flotilla, the emperor's powerful advisors vowed to resist Western exploitation. With the "restoration" of Emperor Meiji in 1868, Japan reasserted the emperor's primacy over the feudal warlords and, at Meiji's instigation, began concerted modernization efforts. To effect such a modernization, Meiji had to forge an accommodation between rival political factions. Thus, industrialists gained a free hand in modernizing the economy while control of the

military and foreign policy went to the rural gentry. This effectively “transformed national policy into a process of permanent bargaining between the old [rural/traditional] and the new [industrial] controlling interests.”¹

Both factions enthusiastically supported the idea of Japanese expansionism in Asia, albeit for vastly different reasons. To the industrialists, expansion meant economic vitality, new markets, and secure sources of essential raw materials. To the traditionalists, expansion would require a robust military, entrenching their power and moving the military onto political center stage. However, Japan's military was far from unified. While Japan's insular geography dictated the need for a strong navy to execute expansionist aims, the ultimate success of any territorial moves would be in the hands of the Imperial Army. Over time, a strong rivalry developed between the two services.²

However, the geographic imperative outweighed other factors, so Japan's priority in military modernization was to assemble a world-class navy. Here, they were far from self-sufficient in the late 19th century, relying on foreign equipment and expertise. The investment paid off handsomely. In 1894, the Japanese fleet devastated a weak Chinese force in the Sino-Japanese War, gaining control over Formosa and Korea. Their next major conflict, the Russo-Japanese War, vaulted Japan into the first rank of world military powers. Capped by Admiral Togo's crushing defeat of a large Russian fleet at Tsushima on 27 May 1905, their victory in this war earned Japan a foothold in Manchuria. Besides reinforcing the validity of expansionist policies, this experience convinced the Japanese of their equality with most Western powers.³

The next three decades featured tremendous growth of the Japanese navy. In WW I, Japan sided with the Allies, taking advantage of a chance to seize German islands in Micronesia. This Mandate was formally ceded to the Japanese at Versailles, and would prove important to their later strategy. Further, while many militarists considered the Washington Naval Treaty of 1921 an affront (the victors of Tsushima were held at 60 percent of British and American levels in capital ships), the Japanese used the interwar

years to develop their shipbuilding and aircraft industries. Thus, by the mid-1930s, they had carefully crafted one of the world's most capable navies, equipped largely with modern oil (versus coal) burning ships.⁴

Japan particularly emphasized aircraft carriers, commissioning *Hosho*--the world's first true carrier from the keel up--in 1922. They followed this with two additional carriers in the 1920s, a fourth in 1933, and two more in 1936-7. By this point the Imperial Japanese Naval Air Force (IJNAF) had begun devoting significant attention to carrier aircraft design and pilot training. Their "Kate" torpedo plane and "Val" dive bomber were equal to or better than American types. The most beloved carrier plane, however, was the redoubtable A6M Zero ("Zeke") fighter, fielded in the late 1930s. To fly this excellent equipment, the Japanese developed a cadre of highly trained, elite naval aviators.⁵

The catalyst for the cause of naval aviation was Admiral Isoroku Yamamoto. Harvard-educated and highly familiar with American military-industrial potential, this former naval *attache* to the US pushed the development of carrier air doctrine in the 1930s. Serving in a variety of key IJNAF posts, Yamamoto knew the only possibility of defeating the US lay in quick, decisive destruction of the Pacific Fleet. Under Yamamoto's expert tutelage, the Japanese developed a form of naval *blitzkrieg*, with the carriers and their "air fleets" used as a shock force to batter the opposing fleet.⁶ Such a force, while possessing awesome potential, was also enormously fuel-dependent due to their offensive doctrine and the vast distances they needed to cover in the Pacific Theater.

While this naval development occurred, Japan continued its expansionist policy. Although the Great Depression gave expansion some impetus--as an effort to overcome economic stagnation--the main boost came from a tremendous wave of army-incited nationalism. Imbued with *bushido* (warrior ethic), army officers engineered the conquest of Manchuria in 1931, eliminated their domestic political opposition, and sponsored the invasion of northern China in 1937. This latter "China Incident" bogged down when

Chiang Kai-shek refused to capitulate in the face of Japanese military superiority. Still, these military moves helped achieve the army's long-time goal of primacy in the Japanese political system, especially in the area of foreign policy.⁷

Japan depended on imports for their oil, and realized their aggressive moves might run them afoul of their suppliers. Thus, in the 1930s the Japanese government accelerated plans to increase their oil self-sufficiency. As their Planning Board Director, Teichi Suzuki, said in September 1941, "we anticipated that eventually the present difficult circumstances would arise."⁸ Since the 1890s, the Japanese had tried to develop an indigenous oil industry, using substantial amounts of American technology and expertise. Although oil extraction efforts proved insufficient, by 1941 Japan had 21 operational refineries in the home islands, with an annual capacity approaching one year's normal consumption. Starting in 1934, the Japanese government had virtually nationalized their oil industry, consolidating government control over import purchasing, production, and refining. In the wake of the China Incident, Japan launched an ambitious expansion of the synthetic oil industry, enacting a Seven-Year Plan in 1937. By 1943, this plan called for completion of 66 carbonization plants (using coal feedstocks), 10 hydrogenation plants (using coal tar and shale oil distillates), and 11 plants using the German Fischer-Troph hydrocarbon synthesis process. Hopefully, these facilities would annually produce 6.4 million barrels of gasoline and 7.7 million barrels of heavy oil, products of military value.⁹

High Noon: Japan Goes to War

The late 1930s were very turbulent times for Japan. While the country still relied heavily on foreign fuel, their forces in China were consuming considerably more oil than planned against a resistant enemy. Worse for Japan, their often brutal actions in China, e.g., "the rape of Nanking," stirred revulsion around the world, especially in the US and Britain. As a result, the US restricted Japanese purchases of American strategic chemicals, minerals, aircraft parts, and high (greater than 87) octane aviation fuel. This

attempt at coercion failed, mostly because the Imperial Japanese Army felt any retreat from China, or forced settlement, would mean an immediate loss of “face” and ultimate loss of domestic political power. Thus, they felt their only strategic option was to continue forward, and if oil became tight, to seize a fuel source.¹⁰

Meanwhile, the Imperial Japanese Navy, politically weaker than the army, was eager to boost its status with a military success. With France's defeat at the hands of Japan's German ally in June 1940, the navy saw its chance. Thus, Japan coerced the Vichy government into granting them “rights” in northern Indochina in September 1940. The navy saw bases in Indochina as a potential springboard to secure NEI oil facilities. Like their army counterparts, naval expansionists recognized secure oil sources as essential to Japan's power base. Therefore, the Japanese forced the French to cede further "rights" in southern Indochina in July 1941.¹¹

This stimulated the sternest US response to date. On 26 July 1941, President Roosevelt froze Japanese assets in the US, effectively stopping the export of all commodities to Japan.¹² The US action took away 80 percent of Japan's oil imports with the stroke of a pen. This threatened the army's China campaign and put the navy--owner of 88 percent of Japan's refined fuel stocks and number one fuel consumer--on borrowed time at a rate of one million barrels of oil a month.

The oil embargo also gave US-Japanese diplomacy a greater sense of urgency. Japan's military was now depleting the 43 million barrel oil reserve the government had carefully accumulated over the last decade. At existing consumption, fuel would run out in less than two years. US diplomatic demands included Japanese withdrawal from China and Indochina, the former promising an irreparable loss of face to the army, the latter a similar fate for the navy. “The Japanese believed they had few options: they could do nothing and let their war-making capacity drain away; they could give up their hard won gains on the mainland to gain [a] respite from Anglo-American sanctions; or they could make a final desperate lunge for autonomy.”¹³

The Japanese chose the latter path, but their journey would prove tortuous. By 1941, the Japanese had a well-established process for achieving consensus in policy, using Liaison Conferences between government representatives and the military high command to make decisions. Conferees then brought these decisions before the Emperor for some largely ritualistic questioning by the Imperial Court, followed by the Emperor's official sanction of the move. Emperor Hirohito rarely participated actively in this process. However, once he blessed a decision--tacitly or not--it became binding on all concerned, and thus very difficult to reverse.¹⁴

Official records of these Liaison and Imperial Conferences show oil to have been a critical factor in Japan's decision for war with the US. The American oil embargo provoked Japanese leaders into issuing a diplomatic ultimatum to the US and accelerating war preparations. In a 6 September 1941 Imperial Conference, officials obtained the Emperor's approval for war if the US rejected Japanese demands. These demands included US non-interference in any future Japanese moves in the NEI, as well as immediate restoration of full commercial relations between the two countries, i.e., an end to the oil embargo. Military leaders argued for an early deadline. They felt that if Japan maintained the *status quo*, the US would only get stronger while their own liquid fuel stockpiles would severely diminish by mid-1942, even if they eliminated civilian fuel consumption entirely.¹⁵

Japan found the US intransigent, so the crisis accelerated. Unwilling to lead the nation into war, moderate Prime Minister Prince Konoye resigned in October 1941 and was replaced by the more hawkish War Minister Hideki Tojo. Meanwhile, oil continued to drive a perceived need for immediate action. Planning Board Director Suzuki and the navy leaders deemed the synthetic fuel industry inadequate for any near-term war effort. This led Tojo and the army leaders to present final plans for seizure and administration of NEI oil resources. Without such actions, they estimated Japan could fight the US for two years at best.¹⁶

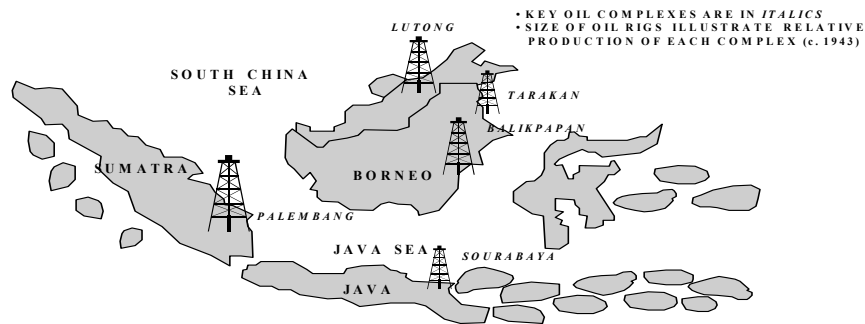
Diplomacy then entered its "end game." Foreign Minister Shigenori Togo presented Japan's final diplomatic position on 1 November 1941, with the oil embargo's removal a non-negotiable term. The US categorically rejected this, issuing a counter-ultimatum on 26 November. The US demanded complete withdrawal of Japanese troops from Indochina and China before any concessions. With this, the Japanese leadership decided for war with the US, a decision Hirohito approved on 1 December.¹⁷

Looking at the world, these leaders, though concerned about US potential, had confidence in their own military might. Their modern forces included 7500 aircraft of all types, 81,000 military motor vehicles, and 1180 tanks. Perhaps most impressive was their navy, an oil-driven Goliath of 10 aircraft carriers, 10 battleships, 33 cruisers, 111 destroyers, 64 submarines, and 500 carrier based aircraft manned by some of the world's best trained pilots. This force far outmatched the US's Pacific presence.¹⁸

Therefore, in late 1941, the Japanese had reason to believe their strategy might succeed. Their objective was limited--secure a supply of natural resources and consolidate their "Greater East Asia Co-Prosperity Sphere." To do so, they would seize the NEI and establish a Pacific island defense perimeter. Threats to this plan included the British bastion at Singapore, US air power in the Philippines, and, most importantly, the US Pacific Fleet in Hawaii. The Japanese knew they lacked the wherewithal for attrition warfare, and their strategy depended on surprise and overwhelming local superiority.¹⁹

A short war seemed distinctly possible at the time. France had fallen, the Dutch were no threat to defend their possessions, and the British were preoccupied in Europe. With Germany knocking at the gates of Moscow, it looked as if Russia would soon be out of the war, with England likely to follow. The US appeared tied to its British ally, and US domestic politics pointed to the continuing strength of isolationism. If the Japanese could knock out the US Fleet--harkening back to Tsushima--and hold on to their island perimeter, the US might very well find "the game not worth the candle," and, within a matter of months, seek terms providing Japan hegemony in East Asia.²⁰

Thus, the Japanese went to war. Japan began its conquest of the NEI on 5 January 1942, capturing all oil fields, storage, and refineries on Borneo, Java, and Sumatra (see Figure 1) within two months. Coupled with earlier attacks on the Philippines and Pearl Harbor, and the ongoing campaign in Malaya, this gave Japan the secure oil source they had long desired. In the NEI campaign, oil technicians accompanied invading troops to repair damage intentionally inflicted by the previous operators. Such Japanese preparation paid off, as they restored crude oil production to 76 percent of its 1940 level by the end of 1943. Even more important, they restored refined products to 45 percent of 1940 levels, reducing the load on tankers and home island refining.²¹



Source: USSBS, Oil and Chemical Division, *Oil in Japan's War (Pacific War No. 51)*, (Washington, DC: GPO, Feb 1946), Figure 19.

Figure 1. Main Netherlands East Indies (NEI) Oil Complexes

By mid-1942, Japan dominated the Western Pacific and East Asia. In less than a hundred years, they had gone from total isolation to extreme interventionism, building a powerful military to execute their hegemonic policy. But they had problems. With forces dispersed throughout the Pacific and depending on long sea lines of communication (LOCs) for oil, Japan's geographic position was clearly a liability. Hoping for a short war, over before American economic power could be brought to bear, Japan would be sorely disappointed. Their insularity and dependence on offshore oil drove an immense shipping requirement, leaving them "desperately vulnerable to blockade operations."²²

Twilight: the Blockade of Japanese Oil

The blockade of Japan was an active fighting campaign. While American soldiers and Marines--supported by tactical air power--tightened their choke hold on Japan, submarines, aircraft carriers, and land based aircraft increasingly devastated Japanese shipping.²³ The idea of using a blockade against Japan was not new, and had been an integral part of Navy plans for the Pacific since 1906. These so-called "Orange" plans envisioned a blockade as part of the final phase of an epic naval war against Japan. To Edward Miller, author of *War Plan Orange*, the Navy "had established the undeniable gospel that Japan and its outposts would be exceedingly vulnerable to an un-Mahanian *guerre de course* [commerce raiding]." With the war's start, only the blockade's weapons changed. Whereas Orange plans called for surface ships to prosecute the blockade, wartime exigencies forced the Navy to use submarines and aircraft for this purpose.²⁴

Early in the war, submarines were the only US forces able to penetrate defenses and strike Japanese shipping. A few hours after Pearl Harbor, President Roosevelt approved a message from Chief of Naval Operations (CNO) Adm Harold Stark to Pacific commanders, authorizing them to "Execute Unrestricted Air and Submarine Warfare Against Japan." Although limited in numbers initially, US submarines began interdicting Japanese shipping lanes in the conquered zones and off Japan itself.²⁵ In the war's first year, submarines inflicted 72 percent of Japan's shipping losses. Stark's successor, Adm Ernest King exuberantly praised them for not letting the enemy "pile up in Japan an adequate reserve of fuel oil, rubber, and other loot from his newly conquered territory."²⁶

However, this was not quite the case. Instead, initial results were rather poor due to an unfocused strategy. Early in the war, the Navy made combat vessels the priority target for submarines, followed by commercial shipping. Among commercial ships, tankers ranked higher than dry cargo. In practice, submarines sought to maximize cumulative tonnage sunk regardless of ship type. This lack of focus led them to sink just 9000 tons worth of tankers (1.3 percent of total sinkings) in the first year, with only brief

flurries of anti-tanker activity through most of 1943. As a result, the Japanese began increasing both their tanker tonnage afloat and their imports of NEI oil.²⁷

In the fall of 1943, the Navy changed their priorities for Pacific submarines, making tankers the top target. Neither the USSBS nor the Navy's official history details the reasons for this change nor the process involved, noting only that a change occurred. As Clay Blair, Jr., a leading historian of the submarine war in the Pacific, says, "Why this order was not put out months earlier remains a mystery."²⁸ Several individual submarine commanders, on their own initiative, had already been emphasizing tanker attacks with some success. Thus, in late 1943, submarines at Fremantle, Australia--the base closest to Japan's oil LOCs--received orders to concentrate on tankers carrying oil from the NEI to the Japanese fleet base at Truk. A February 1944 attack by US carrier planes on Truk destroyed several large tankers, and the dramatic effects of this attack on regional Japanese fuel supplies reinforced the decision to change submarine target priorities. Also, at this time, the Navy decided to deploy submarines in the straits of Luzon (between the Philippines and Taiwan) astride the main Japanese oil lifeline.²⁹

The combined effects of these moves was dramatic and immediate. To help the submarines, Navy code breakers discerned Japanese convoy information, e.g., schedules and routing, minimizing search requirements. Submariners also refined their tactics, using "wolf-pack" strikes and night attacks. By this time, the US Pacific and Asiatic Fleets were mostly using the new 1500 ton *Tambor* class submarines they had been acquiring at the war's start, except now they had them in greater quantities (100 total by January 1944). They also had improved torpedoes, and an elite corps of battle-hardened veterans manned these fast, long range, and well-armed boats. Further, as the joint US campaigns in the Central and Southwest Pacific began constricting Japan's island empire, carrier and land based air more effectively participated in the blockade. By the end of 1944, US forces had sunk two-thirds of the Japanese tanker fleet and cut oil movements to a trickle.³⁰

Although the exact reasons for the Navy's change in submarine targeting priorities are unclear, there are some plausible reasons why it might have taken them so long to reach what should have been an obvious conclusion. First, it was politically crucial for the US to oppose the Japanese military wherever possible at the start of the war. US credibility among its allies and in the eyes of the enemy depended on it.³¹ Visible demonstrations of effectiveness against Japanese forces would also bolster domestic morale. Second, Navy doctrine drove employment decisions. In World War II, the Navy remained devoted to the ideal of the decisive Mahanian sea battle, and pre-war doctrine saw submarines as an auxiliary of the main battle fleet, used for scouting and harassment of the enemy surface fleet. The USSBS criticized this Navy adherence to an outmoded method of warfare, especially its pull on resources such as submarines and carrier air that they might have more effectively used against Japanese tankers.³²

However, even had political and doctrinal conditions allowed an early concentration on tankers, operational problems would have hampered such an effort. At the war's start, the Navy had just 55 submarines throughout the Pacific and 26 in the Western areas, too few to mount a concerted campaign against both Japanese naval forces *and* commercial shipping. They also had only two bases after the Philippines fell--Australia and Hawaii--making it tough to sustain operations against distant LOCs. Many submarines were obsolete and American torpedoes were notorious failures. Further, they suffered from overly conservative tactical doctrine, inadequate peacetime training, and more than a few incompetent submarine skippers, who had to be relieved. Finally, inflated crew claims delayed Navy awareness of the poor performance of the submarines.³³

While the submarines ultimately focused their efforts on oil, one can most charitably characterize the AAF's overall contribution to the blockade as mixed.³⁴ When they concentrated their attacks systematically, the effects were often spectacular, particularly when they coordinated their actions with submarines. However, on a

strategic level against Japanese resources, maritime missions were generally not a priority for the AAF. All the same, various AAF units in the vast Pacific Theater approached this mission with quite different enthusiasm levels.³⁵

In evaluating the performance of land based air, it is very difficult to divorce specific support for the oil blockade from general anti-shipping strikes because the US rarely broke out statistics along such lines. In any case, by mid-1943 AAF aircraft began scoring some successes with long range armed reconnaissance against Japanese shipping. As US forces contracted the Japanese island perimeter and gained new air bases, these aircraft became increasingly effective in reducing the flow of raw materials such as oil. Besides armed reconnaissance, the AAF increased their aerial mining efforts and began attacking NEI oil facilities in 1943. The latter attacks aided the blockade by stressing Japan's already inelastic tanker fleet. Any loss of NEI refining capacity forced the Japanese to increase shipments of crude back to the Inner Zone for refining. Once refined, much of this product again had to be shipped to dispersed military consumers around the empire. Conversely, with NEI refineries at full strength, the Japanese could ship finished products directly to consumers, over much shorter LOCs.³⁶

AAF aircraft used a variety of methods in support of the blockade: high altitude bombing and low altitude minelaying by heavy bombers; skip bombing and night radar rocket attacks by low altitude medium bombers (LABs); and strafing, bombing, and dropping of gasoline tanks by fighters. All AAF numbered air forces in the Pacific conducted maritime missions. In the Central Pacific, the 7th Air Force supported Naval anti-shipping efforts and the 20th Air Force's XXI Bomber Command did aerial mining. In the South and Southwest Pacific, the 5th and 13th Air Forces "scoured the waters of the eastern Netherlands Indies." From Burma, the 10th Air Force mined harbors and attacked ports. From China and India, the 20th Air Force's XX Bomber Command conducted occasional aerial mining. Finally, Gen Claire Chennault's China-based 14th

Air Force used their proximity to Japan's major shipping lanes to bomb harbors, lay mines, and harass shipping from the Gulf of Tonkin to the Formosa Straits.³⁷

Armed reconnaissance was the AAF's first major blockade support mission. Allied air forces in the Southwest Pacific pioneered techniques using long range bombers for this purpose. These bombers would search ocean areas within 800-1000 miles of their bases, either attacking any ships discovered or relaying vital information to Naval forces. By the fall of 1944, AAF bomber bases were within range of many key sea lanes around the NEI. Now, they would either attack ships or, failing that, drop their bombs on NEI oil facilities. Theater commander Gen Douglas MacArthur's use of a joint staff at his headquarters helped the overall armed reconnaissance process, although significant cooperation with submarines did not occur until early 1945.³⁸

Chennault's 14th Air Force, formerly the American Volunteer Group or "Flying Tigers," was particularly aggressive in its maritime operations. Flying from Chinese bases, Chennault's B-24s, B-25s, and P-40s began anti-shipping attacks in the summer of 1942. During the fall of 1943, they initiated the first sustained air interdiction campaign against Japan's oil lifelines between the NEI, Singapore (the main Japanese fleet refueling base), island outposts, and the home islands. At first using daylight skip bombing tactics against ships, by May 1944 the 14th Air Force had acquired special radar-equipped B-24s (called LABs or "Snoopers"). These bombers proved very effective in low altitude, night, and weather attacks on enemy shipping. Chennault's aircraft also mined harbors at Haiphong, Canton, Hong Kong, and Shanghai. When not destroying or delaying Japanese ships themselves, these mines forced such ships to cruise farther out to sea, where they were prey to US submarines and armed reconnaissance aircraft. The result, in effect, was a blockade of the Formosa Straits. This, in turn, helped stagnate the Japanese campaign in China and, more important, reduce resources for the overall war effort.³⁹

Although the 14th Air Force played a crucial role in the blockade, they operated “on a shoestring” during the war. Unit operational reports document the effectiveness of their attacks on oil shipments, showing a number of sinkings of large (over 300 foot long) tankers. These reports cannot document the number of tankers sunk by submarines and long range aircraft when fear of the 14th Air Force pushed these tankers into open water. Yet, AAF leaders did not raise the 14th's priority for logistics, something Gen Chennault strenuously pursued. Futilely pressing Gen Arnold for greater support, Chennault wanted to increase B-25 sea sweeps, as well as LAB reconnaissance and anti-ship attacks.⁴⁰

The 14th Air Force was not the only unit engaged in aerial minelaying. Around the Pacific, aircraft--due to their speed, range, and payload--proved highly effective in this mission. While mines sank many vessels, this was incidental to the primary purposes of mining--disruption, delay, or diversion of enemy shipping. Since mines were normally sown in coastal areas, ships would move out to sea to avoid them, again increasing their vulnerability to submarine attack. An additional effect was the diversion of enemy resources toward the painstaking task of minesweeping. However, mining's shortage of immediately visible results made it an inherently less palatable mission to AAF leaders, who preferred to measure success in terms of bombs dropped or ship tonnage sunk.⁴¹

Since US mines did not discriminate among ships, it is difficult to determine their specific effect on oil tankers. However, along with the 14th Air Force, other units mined sea lanes and ports along Japan's oil LOCs (see Figure 2). The 10th Air Force mined Burmese ports, and B-29s of the XX Bomber Command flew long distances from Chinese and Indian bases to sow mines at Singapore, Saigon, Cam Ranh Bay, and Palembang (a key NEI oil facility) in late 1944 and early 1945. Although they represented only a small part of the total XX Bomber Command effort, these B-29 missions were quite effective. Before these attacks, Singapore and Saigon were two of the safest ports for Japanese ships due to their distance from Allied land based air. Afterwards, as Japan's oil situation worsened, tankers attempted to run these minefields,

with serious results. Losses at Singapore were heavy, and the Japanese finally abandoned the Singapore-Japan route in early 1945.⁴²

The mining campaign provided perhaps the best example of cooperation between the Navy and AAF in the Pacific. Naval mine warfare officers helped plan or direct all mining operations, with the Navy attaching personnel to most AAF headquarters for this purpose. The China-Burma-India (CBI) Theater featured particularly smooth coordination. Here, AAF commanders eagerly supported the mission, and the Navy supplied and assembled mines for the AAF.⁴³

The greatest AAF mining effort of all, the XXI Bomber Command's "Operation Starvation," began in March 1945. However, as the name indicates, the primary target of this campaign was Japanese food supplies, not oil. This is because, by March 1945, the blockade had completely severed Japan's oil lifelines. While "Starvation" used only 6 percent of the command's B-29 sorties, it had a disproportionately great effect, cutting all remaining Japanese imports to near zero.⁴⁴

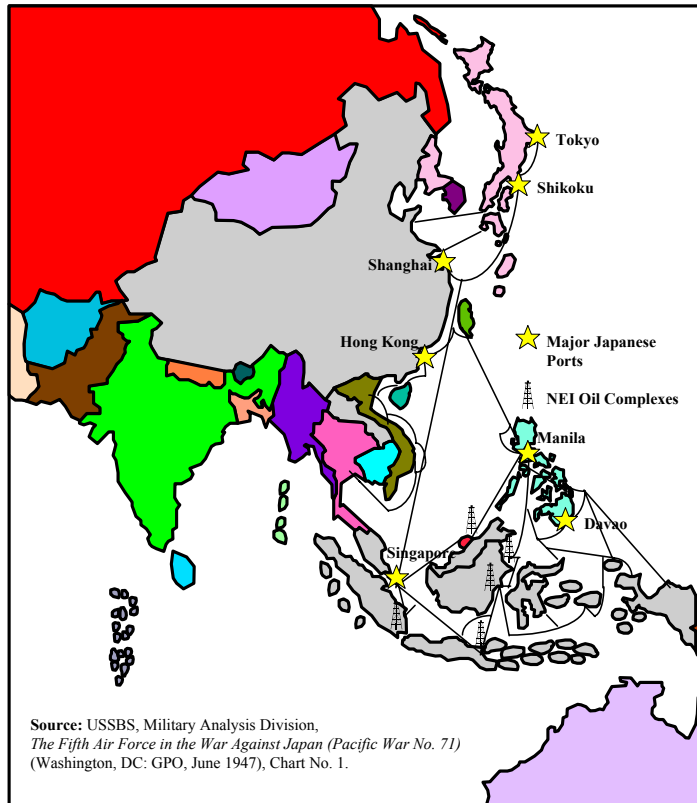


Figure 2. Major Japanese Oil LOCs and Key Ports

Aerial mining also played a part in attacks on NEI oil facilities, the final element of AAF support for the blockade. In August 1944, XX Bomber Command B-29s flew from Ceylon (Sri Lanka) to strike targets in Sumatra’s Palembang oil complex. Six of the bombers performed high altitude precision bombing, which proved ineffective. However, eight other aircraft dropped a total of 16 1000-lb. mines, sinking or damaging seven Japanese ships over the next few days. This stopped oil shipments along the critical Moesi River link to Palembang for a month. With this success, “it appeared that B-29s might carve for themselves an important niche in maritime operations.”⁴⁵ However, as the next chapter will reveal, the AAF leadership in Washington resisted wide scale B-29 aerial mining until late in the war.

One AAF officer who eagerly sought B-29s for attacks on NEI oil facilities was Gen George C. Kenney, MacArthur's ranking airman. Kenney’s enthusiasm for such a

strategy had its genesis in his own experience in the Southwest Pacific. In the fall of 1943, Kenney had attacked the only NEI facilities he could hit with his performance-limited B-24s, the refineries at Balikpapan and Sourabaya in Borneo. Even though his B-24s could only carry 3000 lbs. (versus 10,000 lbs. for B-29s) of bombs to such distant targets, Kenney's post-strike intelligence revealed these missions had significantly affected Japanese aviation fuel supplies in the region. The AAF, however, turned down Kenney's repeated requests for B-29s. Thus, Kenney had to wait to launch a sustained effort against NEI targets until Allied ground forces secured bases within B-24 range. At last, he began this with a series of five raids from 30 September-18 October 1944, striking various targets in Borneo's Balikpapan and Lutong complexes.⁴⁶

NEI attacks had a variety of important effects. Strikes on Balikpapan reduced Japan's supplies of high octane aviation fuel and important lubricants. Ultimately, the cumulative effect of aerial mines, submarines, and land based air attacks on facilities and shipping led the Japanese to abandon Balikpapan (in southeast Borneo) and the shipping route from Balikpapan to Singapore by December 1944. With Balikpapan gone, the Japanese hastily shifted their emphasis to maximizing refined output from the Lutong complex in northeast Borneo. Keeping the pressure on, 13th Air Force B-24s conducted a series of raids in December 1944 to seal off Lutong. These attacks were so effective they virtually eliminated Borneo as a source of Japanese oil for the rest of the war.⁴⁷

These NEI attacks had a devastating effect on Japanese tankers. According to the USSBS, "There is no indication that these air activities had any strategic effect because more oil was always available in the Southern Zone than could be shipped out."⁴⁸ However, this completely misses the point--the Japanese *tried* to ship the oil out. By destroying NEI refining capacity, these attacks overstressed the remaining Japanese tankers and served as a force multiplier for Allied anti-shipping efforts. The statistics tell the story: more tankers dedicated to NEI shipments than ever before; tanker losses up from 194,741 tons in 1944's last quarter to 308,751 tons in 1945's first quarter, a 59

percent jump; and oil reaching the home islands down 33 percent from the previous year.⁴⁹

By the end of the war, air power (carrier and land based) dominated the blockade, achieving 62 percent of all sinkings in the last year. According to Fleet Admiral Nagano, Chief of the Japanese Naval General Staff, while submarines were more effective against oil movements early in the war, “afterwards it was your air force; and I believe that the air force, once it got operating, was more effective than the submarines in checking the shipments of oil.”⁵⁰ However, the US barely tapped the potential of land based air in the oil blockade. Until the end of the war, the AAF did not emphasize attacks on large ships or strategic routes. Instead, they applied the brunt of their anti-shipping efforts toward tactical interdiction of resupply for remote island outposts, or incidental to the island-hopping campaigns. Yet, when they pursued strategic interdiction, they did very well. Although anti-shipping sorties represented only 1.7 percent of the total AAF effort in the Pacific, these sorties tallied 16 percent of all merchant ships sunk during the war. Moreover, this does not include their work as force multipliers for the Navy.⁵¹

Once oil became a US priority in the blockade, Japanese shipbuilders proved unable to keep pace with tanker sinkings. Japan entered the war with a 575,000 ton tanker fleet. By giving shipbuilding their highest industrial priority, they increased this to a wartime peak of 834,000 tons by November 1943. The early US failure to make tankers a top priority helped Japan achieve this goal. Further, by centrally controlling their tankers, the Japanese were able to maximize their exploitation of the NEI, devoting up to 90 percent of their tankers to this task. Thus, oil imports to the home islands peaked at 1.75 million barrels in August 1943. Once US forces began focusing on oil at the end of that year, monthly tanker sinkings tripled. By October 1944, oil imports had dropped to 300,000 barrels a month. After a last desperate spasm of imports early in 1945, the oil flow stopped permanently by April.⁵²

Japanese countermeasures to the blockade, while costly in resources, were largely ineffective. As their tanker losses accelerated, the Japanese diverted older destroyers from their main fleet to form a Grand Escort Fleet. This not only depleted Japan's front-line naval power, but the restrictive practices these escorts instituted for protection lengthened oil movements, exacerbating Japan's problems. This still might have worked for Japan, except, as discussed earlier, US knowledge of convoy information undercut the escorts' efforts. Also, Japanese antisubmarine warfare equipment and training were poor. Measures like moving convoys closer to their own land based air and traveling at night failed in the face of US sea and air superiority. As one convoy commander bemoaned, "when we requested air cover only American planes showed up."⁵³ In desperation, the Japanese loaded oil drums on all cargo vessels, shipped only refined products when possible, converted ships from oil to coal fuel, put oil in rubber bladders for towing behind ships, and even used submarines to move oil.⁵⁴ In the end, these expedients all failed.

The blockade affected fuel stocks at various points in the Japanese empire differently. In the NEI, refineries could neither export many products nor import materials essential to continued operation. As a result, they curtailed operations, even burning or pumping back into the ground non-aviation fuel products. Conversely, in the home islands, after mid-1942 consumption began depleting fuel reserves despite emergency conservation measures.⁵⁵ The Japanese also lacked substitutes to compensate for losses.

This lack of substitutes would prove to be Japan's Achilles Heel. Indigenous oil production peaked at 2.5 million barrels in 1937--less than 10 percent of peacetime consumption--going progressively lower thereafter. Once the Japanese seized NEI facilities, home oil production received a lower priority for scarce workers and equipment. As for synthetic fuel, the Seven Year Plan was a complete bust. Due to a host of technical problems, only 8 of the 66 planned plants produced fuel during the war,

and production planned for 14 million barrels in 1943 reached an all-time high of 1.5 million barrels in 1942. Worse, where Japan had counted on synthetic processes to supply much of their aviation fuel, they supplied almost none. Cumulatively, indigenous and synthetic oil production never topped 12 percent of Japanese requirements. While oil refining did achieve its rated capacity during the war, at least while oil was still flowing north, it had similar problems to other Inner Zone oil industries. Among these problems were inadequate equipment for refining high octane aviation fuel (due mostly to prewar reliance on US designs), blockade-induced shortages of construction materials, and, ironically, an overall technologically incompetent society.⁵⁶

As with their movement of oil, by 1945 the Japanese were resorting to desperate expedients in fuel manufacturing. They processed oil from beans, peanuts, and coconuts. One of their most vigorous programs involved the distillation of crude oil from pine roots, an effort involving a large portion of the Japanese civilian population. By denuding Japanese forests, these civilians were able to operate 37,000 stills, each producing 3-4 gallons of crude oil daily. However, the refined end product of this oil was awful. For example, aviation gas made from pine oil, though high in octane, would ruin an aircraft engine after several days of use. The Japanese also made alcohol from vegetables, sugar, and rice for use as a gasoline substitute, but the government had to relent on this program after food expropriations threatened wide scale famine.⁵⁷

The end of the war was one of the few times when oil shortages truly hurt Japan's civilian population. Besides the use of indigenous foodstuffs for oil substitutes, a lack of oil for ships affected Japan's ability to import essential foods from the conquered regions. Coupled with "Operation Starvation's" aerial mining, this caused the daily civilian caloric intake to drop below the subsistence level. However, for most of the war, civilians were not particularly vulnerable to an oil blockade. The Japanese government had begun rationing gasoline in 1938, and once war with the US appeared imminent, the Army-Navy Oil Committee eliminated almost all civilian gasoline, as well as oil for non-war

related industries. The Japanese people had adjusted to these conditions, learning to do without most civilian vehicles, and converting those they could not do without, e.g., ambulances, to wood or charcoal fuel. Furthermore, oil was less important than commodities like steel to most Japanese industries, and by 1941 few industries used oil.⁵⁸

Although it was not critical to Japanese industry, “in every phase of the war, oil determined Japan’s strategy and governed the tactical operations of its Navy and Air Force.”⁵⁹ As a reminder, the keystones of that strategy were: 1) establishing a sea bridge between the NEI, home islands, and oil consumers; 2) defending this nexus by preemptive strikes on any threats and establishment of perimeter island bastions; and 3) hoping the US would agree to a negotiated settlement in Japan’s favor rather than fight through this imposing array. Although these represent limited objectives, to execute such a strategy within the Pacific geography would require a robust military, especially naval and air forces. This military would need great quantities of oil. If a blockade could deny Japan that oil, the US could defeat the Japanese strategy.

The oil blockade had wide ranging effect on the Japanese military.⁶⁰ It affected ground forces least, because these were normally either garrisoned on confined islands or deployed in resource rich areas like Manchuria. However, the blockade affected air forces to a much greater extent. Fuel shortages led the Japanese to cut initial pilot training hours from 100 to 40 after 1943. They also cut advanced training to 30 hours, and, in 1945, eliminated navigational training for pilots. These neophytes were expected to follow their leaders to the target, and if the leader was shot down or lost, they were unlikely to return. The effect of such moves was a vicious cycle where a lack of training led to low proficiency, in turn causing higher losses and replacement by even worse trained pilots. The Japanese cut test flights for new planes, and existing planes fell into disrepair as low quality fuel wrecked engines. They also prohibited maintenance engine runs. Tactically, Japan curtailed reconnaissance and anti-submarine missions--even

prohibiting fighters from intercepting B-29 strikes--due to fuel shortages. Ultimately, the Japanese left themselves with one viable air power option, *kamikazes*.⁶¹

The Japanese navy felt the oil squeeze above all others. As early as May 1942's Battle of Midway, Japanese admirals began fretting over excessive naval fuel consumption. As the blockade started taking a toll on tankers, things got much worse for the navy. The Battle of the Philippine Sea perhaps best exemplifies how costly the blockade had become. Oil concerns figured prominently in every facet of this battle in mid-June 1944. Because of the blockade's effect on tankers, Adm Toyoda, Chief of the Japanese Naval General Staff, had deployed his main combat fleet to the waters off Borneo before the battle, to ensure these forces would have ready access to fuel if needed. This deployment scheme, however, increased Japanese forces' vulnerability to submarine attacks, so the fleet stayed in port. Carrier pilots, who were already only marginally trained due to fuel concerns, could not fly while the carriers were in port, and no other airfields were available. Further, when Toyoda urgently ordered the fleet to engage US forces invading the Marianas island of Saipan, fleet oilers loaded up on usable, but highly volatile, Borneo crude rather than waiting for refined fuel oil.⁶²

In the ensuing battle, oil played a role at many levels. Tactically, the poorly trained Japanese pilots were no match for the Americans, who destroyed all but 35 of the 430 Japanese aircraft in what came to be called "The Great Marianas Turkey Shoot." Fuel shortages also compelled the Japanese to withhold a portion of their on-hand naval forces from the battle. In a final disaster, when US torpedoes struck two of the Japanese carriers, the Borneo crude they were burning exploded, causing both ships to sink. The Japanese then retreated. At the operational level, the battle marked the last gasp of Japanese carrier power as well as a US victory in retaking the southern Marianas. These islands had immense strategic value to the Navy as logistics and submarine bases and, to the AAF, they promised B-29 bases for strategic bombing of the Japanese homeland. On

the strategic level, the loss of Saipan was instrumental in the fall of the Tojo government and an increase in activity by Japanese peace advocates.⁶³

After the fall of Saipan, oil woes continued to plague the Japanese navy. During the Battle of Leyte Gulf, a blunder by US Adm “Bull” Halsey left MacArthur’s landing forces exposed to attack by Japanese ships. Inexplicably, the Japanese turned away from the Americans. According to Adm Takata of Japan’s Naval General Staff, the fleet did so simply “because of a shortage of fuel.”⁶⁴ This also kept Japan’s battleships away from Iwo Jima, and left only one battleship to oppose US forces off Okinawa. In the war’s last stage, lack of fuel drove the Japanese to station their once proud fleet in home island ports for use as static anti-aircraft artillery platforms and coastal defense batteries.⁶⁵

How effective was the blockade in defeating the Japanese strategy? The USSBS summarizes it neatly:

The blockade shattered Japan’s entire war strategy. Instead of the 28,500,000 barrels of oil its leaders expected to import from the Southern Zone in 1944, it imported only 4,975,000 barrels. In 1945 its imports were confined to the few thousand barrels brought in during January and February by single tankers that succeeded in running the blockade. Yet the war, which Japan had planned to finish in two years, had not reached its climax. After the battles of early 1945, when Japan lost the Philippines and Okinawa, United States forces sat astride its vital oil life line. Strategically the war was won.⁶⁶

Midnight: Strategic Bombing of Inner Zone Oil Targets

Thus, as 1945 began, Japan’s fleet had sighed its last gasp in the Philippines, their air forces--land and carrier based--were through (except for desperate measures), and their merchant shipping was decimated. The oil blockade had been instrumental in all these outcomes. With their naval strategy denied, Japan’s remaining military option appeared to be to make a US victory as costly as possible. Politically, very delicate peace maneuvers within the Japanese oligarchy had been occurring, but would not yield fruit until unprecedented devastation had rained down upon the “paper cities” of Japan.⁶⁷ While AAF B-29s based in the CBI Theater had been flying strategic bombing missions

against Japanese targets since June 1944, these aircraft could not reach the main Japanese island of Honshu, and had experienced serious operational difficulties. The first sustained assault on the Japanese homeland began when XXI Bomber Command B-29s started flying missions from Marianas bases in November 1944.⁶⁸

The majority of B-29 strikes against Japan occurred in the second phase of XXI Bomber Command operations, from 9 March-15 August 1945. Although this period is noted for the incendiary and nuclear bombing of Japan's cities, 22 percent of the command's missions during this phase went toward high explosive bombing of industrial targets. High on the list of such targets was Japan's Inner Zone oil industry.⁶⁹

The B-29 assault on Inner Zone oil began on 10 May 1945. The AAF classified the first three oil attacks (in May) as "tactical" strikes in support of the Okinawa invasion, with the remaining "strategic" attacks running from 26 June 1945 until the war's end. In 23 missions, B-29s dropped 10,613 tons of bombs on 18 oil refining, storage, and synthetic production facilities. This tonnage represents 7 percent of the total dropped on Japan's Inner Zone during the strategic bombing campaign. B-29 losses on oil strikes were light, with only four aircraft lost and 108 damaged out of 1420 sorties. As for physical damage, the bombers destroyed 85 percent of Japan's refining and synthetic production capacity, plus 12 percent of their stored fuel.⁷⁰

Yet, despite these impressive statistics, the oil attacks were largely superfluous. This is because "any discussion of the effectiveness of the bombing of the Japanese oil industry is somewhat academic because the industry was already defunct when attacked. Bombing did not stop production because nearly all production had ceased because of a lack of crude oil."⁷¹ By April 1945, before the oil bombing started, the blockade had completely stopped the flow of oil imports to the Inner Zone. Hence, US bombs fell on mostly dormant facilities. Even after the attacks, the remaining refining capacity exceeded the amount needed to satisfy all Japanese oil requirements by 1500 percent. Attacks on oil storage, though perhaps a more logical target than refineries, were also

disappointing. The amount destroyed, 12 percent, was not much, and the attacks had little effect on any specific fuel categories. The bombing did not even affect the supply of *kamikaze* fuel, which the Japanese had dispersed before the oil attacks began.⁷²

In retrospect, the strategic bombing of Inner Zone oil targets appears to have had a negligible strategic effect. By the time the AAF started this effort, the blockade of oil had already been decisive in the defeat of Japan's air forces and navy. The army, for its part, had been the smallest military oil consumer, and its soldiers were either isolated on remote islands or stationed where indigenous resources satisfied their fuel requirements. To accomplish any "last-ditch" defense of the homeland, the Japanese planned to rely on manpower and *kamikazes*, having dispersed whatever fuel they might need for suicide attacks. In any case, the B-29s had demonstrated an inability to affect fuel storage significantly. Thus, attacks on Inner Zone oil minimally affected Japanese capability to resist, one of the strategic bombing campaign's key objectives. Oil attacks affected Japanese will to resist, the other campaign objective, even less. Oil was not critical to most Japanese industries. Likewise, the government had progressively curtailed personal civilian use of oil since 1938, reducing it to almost zero by 1945.⁷³ Finally, any punishment effect from oil attacks would likely have been lost in the holocaust of incendiary and nuclear attacks.

Eclipse: A Tale of Two Campaigns

To summarize the argument thus far--multiple factors drove the Japanese to develop modern, oil-dependent military forces. A wave of nationalism then pushed them toward expansion in Asia, putting them into conflict with the US. The subsequent loss of US oil imports led the Japanese to seize oil sources in the NEI, a move also compelling them to attack US forces they deemed a threat. Lacking oil substitutes, and forced to move their NEI oil over the ocean with a thinly stretched tanker fleet, the Japanese found themselves highly vulnerable to a US blockade. The US responded accordingly, with a sea blockade initially spearheaded by submarines, but increasingly dominated by land

and carrier based air power. The blockade, once it emphasized tankers, rapidly affected Japan's naval and air forces. This led to denial of Japan's military strategy and a reduction of oil imports to a trickle by the end of 1944. After the blockade had cut the oil flow completely, US B-29s launched their assault on Japanese Inner Zone oil. Dropping their bombs on mostly idle facilities, these missions achieved little operational or strategic effect beyond that of the blockade. To Adm Toyoda, Japan's last Naval General Staff chief, "as regards the effects on our war strength on the whole, I think the greatest effect was felt after all by the lack of ships and consequent inability to bring materials from the south."⁷⁴

A superficial comparison between the blockade and bombing of oil might lead one to conclude that the blockade was much more effective, and perhaps question why the AAF bombed oil facilities at all. However, as the next chapter will show, the AAF had several reasons--some rational, some not--for bombing these targets. Further, the AAF did support both efforts, which were sequential in time. As discussed above, strategic bombing of Inner Zone oil occurred after the blockade had already stopped the oil flow. Conversely, until November 1944 (when suitable B-29 bases became available) blockade support was the AAF's *only* option against oil. As a result, they never really had to choose between blockade or bombing of Japanese oil. Thus, perhaps, the real issue is whether the AAF applied as much support for the blockade as they could have.

Are there some alternatives the AAF could reasonably have pursued, with a potential increase in overall effectiveness of the Pacific war effort? It appears so, and a list of possible alternatives follows.

First, *the AAF could have deployed its first B-29 units to Australia for attacks on NEI oil and Japanese shipping, instead of sending these aircraft to the CBI Theater.* Boeing delivered its first production model B-29 to the AAF in July 1943, and the AAF's first B-29 unit, the 58th Wing, began training at Salina, Kansas in September 1943. The B-29 was an ideal very long range (VLR) aircraft to cover the immense distances

required to strike Japan from existing or foreseeable US bases. Hence, there were many parties in the Pacific clamoring for these aircraft. Meanwhile, AAF leaders in Washington zealously fought any moves threatening their hold on this potential war-winning weapon.⁷⁵

Ultimately, Gen Arnold won the bureaucratic battle over B-29 deployment, and the first B-29s went to the CBI Theater. At the time, many airmen favored this theater because "General Arnold and his Air Staff were determined to employ B-29s against the Japanese homeland," and forward bases in China provided the only opportunity to do so. While the belief that such strikes could have a greater strategic effect than any other action pervaded the AAF, an equally strong current held that "not only military careers, but the future of an independent air force turned on the demonstrated efficacy of strategic aerial bombardment."⁷⁶ External political pressures also influenced the AAF decision. President Roosevelt, angry at Arnold's failure to deliver on promises of early B-29 deployment to the CBI, complained to Army Chief of Staff Gen George Marshall in October 1943, spurring Arnold to speed up AAF preparations. Finally, in the policy area, sending B-29s to China would fulfill long-standing US promises to help Chiang Kai-Shek fight Japan. By bolstering Chiang's morale, the US could keep him in the war and reduce the pressure on Americans elsewhere in the Pacific.⁷⁷

The AAF began deploying to the CBI Theater in March 1944, beginning their strategic bombing campaign, "Operation Matterhorn," in June 1944. During this campaign, running through January 1945, the XX Bomber Command flew most of their missions from Chengtu, China, encountering several insurmountable obstacles. First, targets in the heart of Japan (on the main island of Honshu) exceeded B-29 range, even from the forward Chinese base. The B-29s thus concentrated on reachable targets like Manchurian coke ovens and aircraft factories on the southern Japanese island of Kyushu. Second, logistic nightmares stymied bomber leaders. For example, fuel and bombs had to be flown from main operating bases in India "over the Hump" (Himalayas) in horrible

weather. Maintenance facilities in China were also inadequate. Third, crews were still developing B-29 tactics, and severe weather played havoc with bombing accuracy. As a result, the impatient Arnold quickly went through two commanders before settling on Maj Gen Curtis E. LeMay. Finally, as B-29 production was just hitting its stride, US forces seized the Marianas, territory promising better bomber bases. Hence, the force available for CBI operations remained limited.⁷⁸

These problems limited the effectiveness of the B-29 campaign. To the USSBS, it appeared Matterhorn's results "did not warrant the diversion of effort entailed and that the aviation gasoline and supplies used by the B-29s might have been more profitably allocated to an expansion of the tactical and antishipping [sic] operations of the Fourteenth Air Force in China."⁷⁹ Instead, throughout 1944, the 14th Air Force had to divert its own resources away from the blockade to support these B-29s. Indeed, before the Marianas occupation, the B-29s themselves "could have been more effectively used in coordination with submarines for search, low-level attacks and mining in accelerating the destruction of Japanese shipping, or in destroying *oil* and metal *plants in the southern areas*, than in striking the Japanese 'Inner Zone' from China bases [emphasis added]." To gain training and combat experience with the B-29, the USSBS considered such Outer Zone targets the equal of any Inner Zone targets reachable from China. In addition, bombers could fly strikes on the former from far more easily supplied bases, such as those in Australia.⁸⁰

The idea of deploying B-29s to Australia, or using them against NEI oil and shipping, was not new and had been advocated vigorously by parties in the Pacific and Washington. One of the most forceful advocates for such a move was Gen Kenney. In a 29 October 1943 letter to Gen Arnold, Kenney made a concerted plea to get the AAF to deploy its first B-29s to the Southwest Pacific. Citing the availability of at least eight suitable airfields in Australia and New Guinea, Kenney's top priority for the B-29 was to strike "the finest and most decisive set of targets for bombing anywhere in the world,"

the entire range of NEI oil facilities. The objectives of these attacks would be “to deprive Japan of the one essential commodity which she must have to carry on the war--oil.”⁸¹ Kenney predicted the loss of NEI oil would rapidly affect Japan’s navy and merchant marine. This would force Japan to abandon their island bastions due to an inability to supply and protect these bases. NEI attacks might also make the planned US campaign toward the Philippines easier by knocking Japan’s air forces and army vehicles out of action. On the strategic level, these effects, i.e., denying Japan’s strategy, might force Japan to sue for peace by the end of 1944, or early 1945 at the latest.⁸²

As a second priority after NEI oil attacks, Kenney proposed using B-29s against enemy shipping traversing sea LOCs along the East Asia coast. As Kenney was not an aerial mining devotee, such a campaign would almost certainly have hinged on tactics involving direct attacks on ships, an area in which he was an expert. Finally, Kenney cited his theater’s advantages over China. For one, B-29s flying from his bases could reach all NEI targets, whereas those flying from China could not. He also felt his facilities were safer from Japanese attack, and his logistic situation would be much easier than China’s, with sea LOCs to Australia fairly secure by this point.⁸³

The AAF leadership turned Kenney down--not for the last time--with little explanation. The next chapter will explore possible AAF rationales for this decision.⁸⁴

A second alternative for the AAF could have been *to begin Marianas-based B-29 aerial mining much sooner than they did*. Many AAF leaders perceived B-29 mining as a diversion from the “true path” of strategic bombing. While “Operation Starvation” was highly successful, it began in March 1945, too late to affect oil. The USSBS maintains the AAF should have begun intensive night mining against Japanese ports and LOCs as soon as Marianas bases became available (in October 1944). This might have accelerated Japan’s crisis by severing sea LOCs before the projected Philippine invasion.⁸⁵

As a third alternative, *the AAF could have better supported anti-shipping missions in general*. Again, the overall effect sought would be earlier denial of Japan’s military

strategy. For less than 2 percent of their total Pacific effort, the AAF achieved disproportionate results against shipping, accounting for almost 20 percent of the total tonnage sunk. To the USSBS, AAF units trained and specially equipped for anti-shiping attacks as a primary mission performed best in the maritime role. Again, had the AAF “more fully coordinated long-range air search and attack missions with submarine operations, the ship sinking program might have been even more effective.”⁸⁶

These alternatives may appear to be more rational than the actions pursued by the AAF. However, whether they would have shortened the war appreciably is a matter of pure conjecture. If adopted by the AAF, what might have been some plausible results? With Australian-based B-29s, the AAF might have begun concerted attacks on NEI facilities in the summer instead of the fall of 1944, and B-29s would have delivered a more concentrated attack than B-24s against these targets. Joined with the other recommendations--increased submarine emphasis on tankers, greater anti-shiping efforts by all AAF units, and accelerated aerial mining by Marianas-based B-29s--this may have induced the wholesale destruction of Japanese tankers 3-6 months earlier than occurred (fall 1944 versus winter/spring 1945). The NEI bombing also would have tested B-29 capabilities and tactics without diverting as many resources as the CBI campaign, and with arguably greater effect. A more robust blockade may have bolstered the status of peace advocates in Japan's government, hastening a settlement. Wholesale fire bombing or nuclear attack of Japanese cities may have proven unnecessary. Amphibious assaults on Luzon, Iwo Jima, and Okinawa might have been moved up, avoided totally, or made less costly. However, as one must remember, all these bloody attacks occurred after Japan's naval and air forces were in defeat, and yet the Japanese still stubbornly resisted.⁸⁷ Also, without US support the Chinese may have folded, freeing up Japanese forces to fight elsewhere. Thus, adoption of more rational actions by the AAF may have accelerated the Japanese capitulation, but were not clear war-winners by themselves.

Why Japan did not surrender when its naval and air strategies had been denied, and its resources cut off, is problematic. It is even more inexplicable when one recalls they still did not quit after US B-29s began burning their cities to the ground. The question intrigues historians and political scientists to this day. Some believe the effect of cumulative civilian punishment--capped by the A-bomb--was ultimately decisive. Others maintain the Allies had not denied Japan's strategy, and wholly convinced the army of the military's vulnerability, until the Russians rolled through Manchuria. Still others cite US intransigence, fear of losing the emperor, or some combination of these factors. In any event, the loss of oil, if not causing Japan's defeat, helped make it inevitable.⁸⁸

Furthermore, even if the AAF had pursued all these alternatives, they probably would have conducted Marianas-based strategic bombing of the Japanese homeland anyway, thus making their case for post-war independence. Several reasons lead to this conclusion. First, the Navy would likely have sought capture of the Marianas regardless of the AAF's strategy. For 35 years, an on-again, off-again feature of various "Orange" plans (the Navy's plan for the Pacific) was seizure of the Marianas as an intermediate objective. Since the powerful CNO, Adm King, strongly endorsed this idea, it was on-again for the war. On the Joint Chiefs of Staff, the Navy found a surprising ally in Gen Arnold, who wanted the Marianas for B-29 bases.⁸⁹ The reason Arnold sought the Marianas was that B-29s based there could strike the full range of Japanese home island targets, whereas CBI-based B-29s could only reach as far as the southern island of Kyushu, and Australia-based B-29s could not reach any home island targets (Figure 3).

By mid-1944 (the time frame for most of these alternative actions), strategic bombing of the Japanese homeland was an entrenched element of Allied Pacific strategy. To the Combined Chiefs of Staff (CCS), the overall war aim was "to obtain objectives from which we can conduct intensive air bombardment and establish a sea and air blockade against Japan, and from which to invade Japan proper if this should prove to be

necessary."⁹⁰ Until forces moved close enough to prosecute such an invasion, strategic bombing from the Marianas offered the best means for directly attacking Japan proper.

Invasion planning also worked in favor of Marianas-based strategic bombing. Based on their experiences in Europe and the Pacific, the Army would likely want a thorough softening up of Japan proper before hitting the beaches of Kyushu and Honshu. Again, the Marianas offered the only immediate option for satisfying this desire.⁹¹

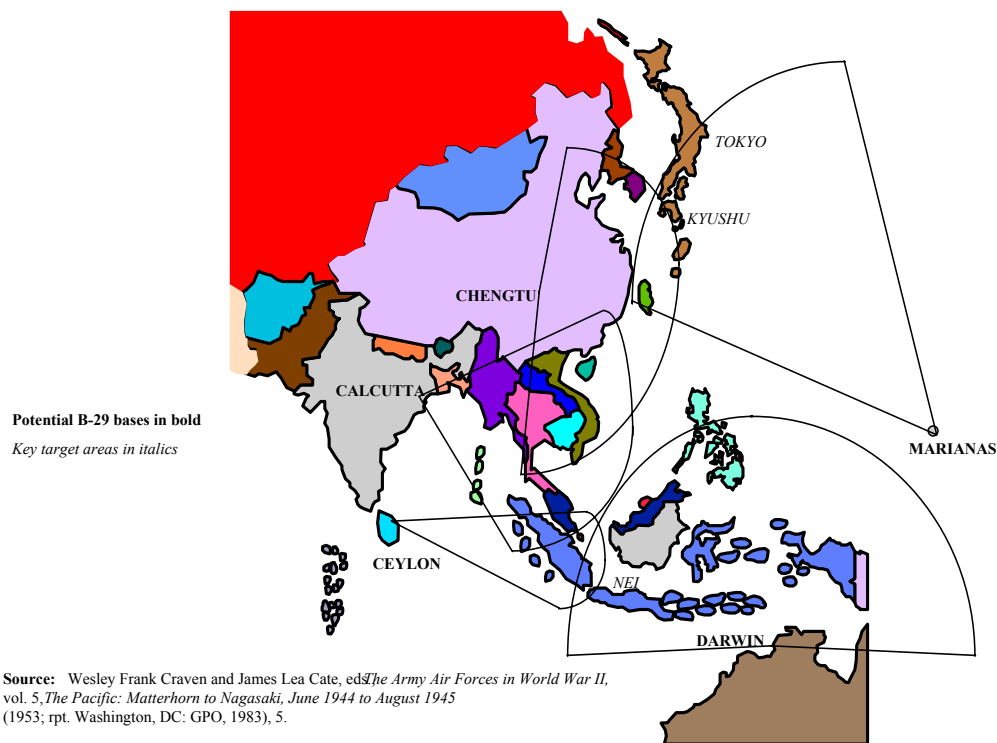


Figure 3. Relationship Between B-29 Bases, Combat Radius and Target Areas

Thus, the B-29 bombing campaign from the Marianas seemed secure regardless of other AAF actions. Why, then, did they not support the blockade to a greater degree? Possible answers revolve around the B-29 and the AAF's desire for post-war independence, their doctrine, and operational factors in the war against Japan.

Notes

¹ USSBS, Overall Economic Effects Division, *The Effects of Strategic Bombing on Japan's War Economy (Pacific War No. 53)* (Washington, DC: GPO, Dec 1946), 5; John Keegan, *The Price of Admiralty: The Evolution of Naval Warfare* (New York: Penguin Books, 1988), 190-1. The Japanese landed classes formed a feudal gentry akin to the Junkers in Prussia.

² This rivalry extended into all areas of military production and development, as well as resource allocation. See USSBS, *Effects of Strategic Bombing*, 6; R. J. Overy, *The Air War 1939-1945* (1980; rpt. Chelsea, MI: Scarborough House, 1991), 133, 178-9, 188.

³ From the start of their military modernization, the Japanese bought only the best, purchasing hulls from England, naval artillery from Krupp, and using British naval officers to start the naval academy at Etajima. In the Russo-Japanese War, the Japanese Army earned their share of glory with bloody, but convincing victories at Mukden and Port Arthur. For a discussion of early Japanese military development, see Keegan, 191-4; USSBS, *Effects of Strategic Bombing*, 6; Headquarters, US Army Air Forces, AC/AS, Intelligence, *Mission Accomplished* (Washington, DC: GPO, 1946), 2.

⁴ To acquire the Mandates, the Japanese promised not to fortify these islands, a promise they failed to keep. Hence, the US bought back these islands with their own and Japanese blood.

The Washington Conference on Naval Disarmament met from late 1921 to early 1922. Delegations from five maritime nations--the US, Great Britain, Japan, Italy, and France--participated in the conference. The resultant Washington Naval Treaty placed a 10-year (later extended to 15 years) moratorium on battleship construction, and limited total battleship tonnage to 525,000 for the US and Britain (each), 315,000 for Japan, and 175,000 for Italy and France (each). This was the famous ratio of 5:5:3:1:1; hence, the Japanese sat at 60 percent of US or British allowances. In addition, new battleships would be capped at 35,000 tons each, and the biggest allowable guns were 16 inches. Aircraft carrier tonnage was 135,000 for the US and Britain, 81,000 tons for Japan, and 60,000 tons for Italy and France. Further, the US agreed to a 10-year halt on fortification of bases west of the International Dateline (e.g., Guam and the Philippines), while Japan agreed to freeze the military development of outlying islands such as the Bonins (e.g., Iwo Jima) and Ryukyus (e.g., Okinawa).

The Washington Treaty backfired on the West to a degree because the portions objectionable to the Japanese tended to increase the militarist spirit in Japan, making long-term peace less likely. In any event, the Japanese got the Treaty restrictions lifted in 1936, long after their buildup was underway. For information on the Mandates, Washington Treaty, and Japanese interwar naval development, see Edward S. Miller, *War Plan Orange* (Annapolis, MD: Naval Institute Press, 1991), 75, 105-12; Keegan, 186, 194; E. B. Potter, ed., *Sea Power: A Naval History*, 2d ed. (Annapolis, MD: Naval Institute Press, 1981), 233-4.

⁵ Keegan, 188, 225-8; Alvin D. Coox, "The Rise and Fall of the Imperial Japanese Air Forces," in *Air Power and Warfare: The Proceedings of the 8th Military History Symposium, US Air Force Academy, 18-20 Oct 1978*, ed. Alfred F. Hurley and Robert C. Ehrhart (Washington, DC: GPO, 1979), 88-90. At the start of World War II, the Zero was among the world's best fighters in level flight speed, climb capability, and maneuverability.

⁶ Keegan, 194-7; Ronald H. Spector, *Eagle Against the Sun: The American War with Japan* (New York: Vintage Books, 1985), 43-8.

⁷ A position they frequently enforced by assassination of dissenters or replacement of the government. The army exploited their conquests in mainland China, using resources gained for their own purposes and developing a complex patronage system to govern these territories. This was particularly true for the

Kwangtung Army in Manchuria. See USSBS, *Effects of Strategic Bombing*, 7-9; Keegan, 195; HQ USAAF, *Mission Accomplished*, 2.

⁸ Nobutaka Ike, ed. and trans., *Japan's Decision for War: Records of the 1941 Policy Conferences* (Stanford, CA: Stanford Univ. Press, 1967), 147.

⁹ In particular, they hoped hydrogenation plants would supply a large portion of their aviation fuel. See USSBS, *Oil in Japan's War*, 18-24, 33-7, 41-2.

¹⁰ USSBS, *Oil in Japan's War*, 29-31; USSBS, *Effects of Strategic Bombing*, 8-9; Irvine H. Anderson, Jr., "The 1941 De Facto Embargo on Oil to Japan: A Bureaucratic Reflex," *Pacific History Review* 44 (1975): 206-8.

¹¹ These "rights" included Japanese garrisons in this region. See USSBS, *Effects of Strategic Bombing*, 9.

¹² Ike, 109; Anderson, 218-31. Interestingly, FDR originally wanted to avoid a full embargo, seeing oil as having potential for further diplomatic leverage with Japan. However, his instructions were either misunderstood or deliberately disobeyed (depending on what account one reads) by various factions within the State and War Departments who preferred a harder line against Japan. Once FDR recognized the oversight in mid-September 1941, he felt it was too late to rescind the embargo order without an unacceptable loss of face for the US.

¹³ Anderson, 231 (quote). Also see USSBS, *Oil in Japan's War*, 11-16; USSBS, *Effects of Strategic Bombing*, 9-10, 46; Keegan, 204.

¹⁴ Ike, xv-xix.

¹⁵ Stressing the situation's urgency, Naval Chief of Staff Nagano argued how "a number of vital military supplies, including oil, are dwindling day by day. This will cause a gradual weakening of our national defense, and lead to a situation in which if we maintain the status quo, the capacity of our Empire to act will be reduced in the days to come." See Ike, 133-51 (quote p. 139).

¹⁶ *Ibid.*, 184-5, 195-6, 218-22, 238.

¹⁷ *Ibid.*, 199-210, 231, 255, 257-83.

¹⁸ For example, at the start of the war, the US had only three carriers assigned to the Pacific Fleet. See USSBS, *Effects of Strategic Bombing*, 13; Keegan, 188, 202.

¹⁹ USSBS, *Effects of Strategic Bombing*, 11; Ike, 139-40; Wesley Frank Craven and James Lea Cate, eds., *The Army Air Forces in World War II*, vol. 5, *The Pacific: Matterhorn to Nagasaki, June 1944 to August 1945* (1953, rpt. Washington, DC: GPO, 1983), 659.

²⁰ USSBS, *Effects of Strategic Bombing*, 10-11; Ike, xv.

²¹ In their initial NEI production, the Japanese emphasized aviation fuel production and gave this commodity shipping priority over all others. Japanese interservice relations played a role in wartime oil allocation. As the strongest element in the Japanese political system, the army awarded themselves control of 85 percent of the NEI oil resources. However, the navy was by far the largest oil consumer. They also controlled most of the tankers and all the tanker escorts. Hence, the services found it best to work together

in the exploitation and shipment of NEI oil, although they each still operated many of their own oil facilities. They also cooperated on the Army-Navy Oil Committee, ensuring the military got first priority for oil. Conversely, civilians received whatever fuel remained. This was often not much and, besides, the "civilian" Fuel Bureau was headed by an admiral. See USSBS, *Oil in Japan's War*, 33-8, 45-50.

²² USSBS, *Effects of Strategic Bombing*, 12-14; USSBS, *Air Campaigns of the Pacific War (Pacific War No. 71a)* (Washington, DC: GPO, Jul 1947), 7 (quote).

²³ Due to an initial shortage of resources in the Pacific, coupled with an inopportune starting position, US forces prosecuted a "commerce raiding" campaign--using unrestricted submarine warfare--as opposed to a full blockade. Ironically, Germany's use of just such methods had caused the US to enter WW I. See USSBS, *Effects of Strategic Bombing*, 43-4; USSBS, Transportation Division, *The War Against Japanese Transportation 1941-1945 (Pacific War No. 54)* (Washington, DC: GPO, May 1947), 6; Spector, 478-9.

²⁴ The blockade was in the first War Plan Orange, and remained thereafter. See Miller, 4, 28, 33, 150-66, 352 (quote), 364-5.

²⁵ USSBS, *War Against Japanese Transportation*, 34; Spector, 478-80.

²⁶ USSBS, *Effects of Strategic Bombing*, 42-3; Adm Ernest J. King, *US Navy at War 1941-1945: Official Reports to the Secretary of the Navy* (Washington, DC: GPO, 1946), 201 (quote).

²⁷ Drew Middleton, *Submarine: The Ultimate Naval Weapon--Its Past, Present, and Future* (Chicago: Playboy Press, 1976), 103; USSBS, *War Against Japanese Transportation*, 7, 102-3, 114; Spector, 483; Kenneth J. Hagan, *This People's Navy: The Making of American Sea Power* (New York: The Free Press, 1991), 328-31.

²⁸ USSBS, *War Against Japanese Transportation*, 7; USSBS, Naval Analysis Division, *The Campaigns of the Pacific War (Pacific War No. 73)* (Washington, DC: GPO, 1946), 378-86; Samuel Eliot Morrison, *History of United States Naval Operations in World War II*, vol. 8, *New Guinea and the Marianas, March 1944-August 1944* (Boston: Little, Brown, and Co., 1953), 12-27; Clay Blair, Jr., *Silent Victory: The U.S. Submarine War Against Japan* (Philadelphia: J. B. Lippincott Co., 1975), 486 (quote).

²⁹ Middleton, 104-5; Blair, 486; USSBS, *War Against Japanese Transportation*, 6, 7, 38.

³⁰ USSBS, *War Against Japanese Transportation*, 7; Spector, 480-1, 485; Morrison, 15-6; USSBS, *Oil in Japan's War*, 52-57.

Once the Navy switched to tankers as a priority, Middleton says submarine "purists" lamented any diversions of submarines away from attacks on tankers and strategic LOCs to support tactical campaigns such as "island hopping." This is remarkably similar to the complaints of AAF bomber advocates who fought diversions from strategic bombing to support surface forces. See Middleton, 104-8.

³¹ This must also be tempered with the US's "Europe first" context.

³² Analysis of service decisions by political, doctrinal, and operational factors is the model used in the next chapter on the AAF. For discussion of political influences on submarine strategy, see Middleton, 93-4, 97. As for the Navy's doctrine, or dogma, Edward Miller says, "American reverence of the battleship as the arbiter of victory was clearly wrong." See Miller, 352-3; also see USSBS, *War Against Japanese Transportation*, 7; USSBS, *Air Campaigns of Pacific*, 1-7.

³³ Crews inflated their claims by approximately 50 percent before the Navy discovered the discrepancy. Middleton, 92-6, 98, 101, 104; Spector 482-5.

³⁴ The idea of using land based air power against ships was not new. For the US, it was at least as old as Billy Mitchell's demonstrations against captured German ships in the 1920s. Also, both the Allies and Germans were using such forces in the ongoing Battle of the Atlantic, with one side trying to enforce a blockade and the other trying to break it. Despite the Army Air Corps' use of maritime missions to justify greater autonomy, actual training in these missions, especially practice with the Navy, severely lagged rhetoric during the interwar years. This continued well into the war, but the AAF was not the only one guilty of shortchanging maritime missions. An USSBS evaluation of carrier-borne air attacks matches their critique of land based air. While praising carrier air attacks for their devastating effect against Japanese merchant ships, the USSBS also criticized the unsystematic nature of such strikes, and merchant shipping's generally low priority for carrier forces. See William Mitchell, *Winged Defense: The Development and Possibilities of Modern Air Power--Economic and Military* (1925; rpt. New York: Dover Publications, 1988), 56-76; Overy, 8, 31, 36, 39-42; USSBS, *War Against Japanese Transportation*, 7.

³⁵ This was due mostly to the nature of the theater. The Pacific was so large that its various sub-areas were all theaters in their own right. In addition, these areas were quite diverse, consisting of barren atolls, jungles, mountains, open ocean, etc. In this immense theater, the only AAF forces under direct command and control of AAF headquarters were the 20th Air Force B-29s. The remainder fell under their specific sub-theater commanders-in-chief. During the war, the AAF deployed 20th Air Force B-29s under two subordinate commands, the XX Bomber Command in China and the XXI Bomber Command in the Marianas.

³⁶ USSBS, *War Against Japanese Transportation*, 7-8, 37; USSBS, *Effects of Strategic Bombing*, 36.

³⁷ USSBS, *War Against Japanese Transportation*, 34-5; USSBS, *The Seventh and Eleventh Air Forces in the War Against Japan (Pacific War No. 70)* (Washington, DC: GPO, May 1947), 18, 25-7.

³⁸ MacArthur's original air arm, the 5th AF, was commanded by Gen George Kenney, a noted advocate of using bombers in direct attacks against ships (although he did not care for aerial mining). When the 13th AF moved from the South to Southwest Pacific Theater, it too came under Kenney's command, now renamed the Far East Air Forces. See USSBS, *The Fifth Air Force in the War Against Japan (Pacific War No. 71)* (Washington, DC: GPO, Jun 1947), 3-7, 78-84; USSBS, *The Thirteenth Air Force in the War Against Japan (Pacific War No. 69)* (Washington, DC: GPO, 30 Sep 1946), 13-14.

³⁹ The specific oil interdiction cut the flow of: crude from the NEI to the home islands; refined products from the NEI to the home islands, fleet bases, and island outposts; and refined products from home island refineries to bases/outposts. Also, a key reason submarines preferred deeper water was their own fear of detection and attack by Japanese land based aircraft. See USSBS, *Air Operations in China, Burma, India World War II (Pacific War No. 67)* (Washington, DC: GPO, Mar 1947), 70-1; USSBS, *War Against Japanese Transportation*, 37, 39; USSBS, *Effects of Strategic Bombing*, 42-3; Reports of HQ Tenth Air Force and HQ Fourteenth Air Force, "Japanese Sea Lanes," 1943-45. AFHRA File No. 142.041-8.

⁴⁰ It is uncertain whether the AAF turned him down due to higher priorities or the increasingly untenable position of Chennault's forces in the wake of Japanese attacks. See Reports of HQ Tenth Air Force and HQ Fourteenth Air Force, "Japanese Sea Lanes," 1943-45. AFHRA File No. 142.041-8; Maj Gen C. L. Chennault, CG, Fourteenth Air Force, to Gen H. H. Arnold, CG, AAF, letter, subject: Operations in China, 14 Sep 1944, 4-5. AFHRA File No. 142.041-34; Craven and Cate, xiii.

⁴¹ USSBS, *The Offensive Minelaying Campaign Against Japan (Pacific War No. 78)* (Washington, DC: GPO, 1 Nov 1946), 1-3, 20; Frederick M. Sallagar, *Lessons From an Aerial Mining Campaign (Operation 'Starvation')*, RAND Report R-1322-PR (Santa Monica, CA: RAND Corp., Apr 1974), 53-7. AFHRA File No. K.146.003-112 (74/04/00); Maj John S. Chilstrom, USAF, *Mines Away!: The Significance of US Army Air Forces Minelaying in World War II*, thesis, School of Advanced Airpower Studies (Maxwell AFB, AL: Air University Press, Oct 1993), 13; Craven and Cate, 662-6. According to Sallagar, the AAF much preferred tangible results like ships sunk to the more ephemeral effect of, say, delaying shipping. This was particularly true for the politically charged B-29 campaign (see Chap. 3), whose statistics were overseen by a bright young officer on the 20th AF staff, Lt Col Robert S. McNamara.

⁴² USSBS, *War Against Japanese Transportation*, 39; USSBS, *Offensive Minelaying Campaign*, 108-9; USSBS, *Oil in Japan's War*, 55.

⁴³ Several key AAF staff officers in the theater were also graduates of the Navy's Mine Warfare School. USSBS, *Offensive Minelaying Campaign*, 9, 109-10; Chilstrom, 11.

⁴⁴ Starvation's biggest effect was on imports from Korea, Manchuria, and elsewhere on the Asian mainland. See USSBS, *The Strategic Air Operations of Very Heavy Bombardment in the War Against Japan (Twentieth Air Force)* (Pacific War No. 66) (Washington, DC: GPO, 1 Sep 1946), 17-8; HQ USAAF, *Mission Accomplished*, 61-4.

⁴⁵ At the time, this was the longest non-stop bomber mission ever. See Alvin D. Coox, "Strategic Bombing in the Pacific: The American Air Assault on Japan, 1942-1945," in *Case Studies in Strategic Bombardment* (Draft) (Washington, DC: Center for Air Force History, scheduled for 1994 release), 456 (quote); USSBS, *Offensive Minelaying Campaign*, 108-9; Chilstrom, 14.

⁴⁶ Balikpapan was second only to Sumatra's Palembang oil complex among NEI facilities in production. George C. Kenney, *General Kenney Reports* (1949; rpt. Washington, DC: GPO, 1987), 378, 426, 432-9; Lt Gen George C. Kenney, CG, USAAF, Southwest Pacific Area, to Gen H. H. Arnold, CG, AAF, letter, subject: Request for B-29 Deployment to Theater, 29 Oct 43, 1, in *Army Air Force Operational Letters*, 1943-5, vol. 2, AFHRA File No. 168.491; USSBS, *Air Operations in China*, 12; Craven and Cate, 316-22.

⁴⁷ USSBS, *Fifth Air Force*, 34; USSBS, *Offensive Minelaying Campaign*, 52; USSBS, *Thirteenth Air Force*, 14; Craven and Cate, 322. Seizure of the Philippine Islands also had a great effect in severing Japanese LOCs.

⁴⁸ USSBS, *Oil in Japan's War*, 65.

⁴⁹ USSBS, *Oil in Japan's War*, 57; USSBS, *Effects of Strategic Bombing*, 46.

⁵⁰ HQ USAAF, *Mission Accomplished*, 38 (quote); USSBS, *Effects of Strategic Bombing*, 42-3. Over the course of the war, submarines and carrier air accounted for approximately 90 percent of all tanker sinkings. One could argue that the AAF might have contributed more to this effort had they been less reluctant to participate in maritime operations. See USSBS, *Campaigns of the Pacific*, 386.

⁵¹ USSBS, *War Against Japanese Transportation*, 7-8, 34; Overy, 95-6; USSBS, *Air Campaigns of Pacific*, 53.

⁵² USSBS, *Oil in Japan's War*, 50-7; USSBS, *War Against Japanese Transportation*, 102-5; Craven and Cate, 659.

⁵³ USSBS, *Oil in Japan's War*, 55 (quote); USSBS, *War Against Japanese Transportation*, 7; Spector, 486; Morrison, 15; USSBS, *Campaigns of the Pacific*, 378-9.

⁵⁴ USSBS, *Oil in Japan's War*, 52-7.

⁵⁵ USSBS, *Oil in Japan's War*, 49-50; USSBS, *Effects of Strategic Bombing*, 46.

⁵⁶ Although hard to believe today, Japan's society during WW II was still largely agrarian, and trained technicians and engineers were in constant short supply. Also, while refining was based on US equipment or Japanese copies thereof, the Japanese depended on their German "allies" for help with synthetic fuel. Here, the Germans "slow rolled" Japanese attempts to obtain licenses for the Bergius hydrogenation process, and never supplied technicians to start up these plants. The other German-supplied design, Fischer-Troph, was plagued by technical failures. See USSBS, *Oil in Japan's War*, 11, 16-20, 23-7, 40-2, 59, 68; USSBS, *Air Campaigns of Pacific*, 7.

⁵⁷ USSBS, *Oil in Japan's War*, 61-2.

⁵⁸ Sallagar, 68-9; USSBS, *War Against Japanese Transportation*, 105, 114; USSBS, *Oil in Japan's War*, 40, 67, 71-2; USSBS, *Effects of Strategic Bombing*, 46. An example of Japan's dilemma at the end of the war: when the Japanese switched to smaller wooden-hulled ships to reduce their vulnerability to mines, they also raised their requirement for fuel oil distillates (a commodity severely affected by the blockade), for which the military received first priority.

⁵⁹ USSBS, *Oil in Japan's War*, 6.

⁶⁰ While US constriction of the Japanese empire reduced Japan's military fuel requirements somewhat, there were many instances of oil's effect on operations.

⁶¹ USSBS, *Oil in Japan's War*, 50, 85-7; USSBS, Military Analysis Division, *The Effect of Air Action on Japanese Ground Logistics (Pacific War No. 64)* (Washington, DC: GPO, Apr 1947), 9; USSBS, *Effects of Strategic Bombing*, 46; HQ USAAF, *Mission Accomplished*, 34; Craven and Cate, xx. In their decision to cut training first, the Japanese emulated the German approach, with equal (lack of) success.

⁶² Some crudes found in Borneo are pure enough to use as emergency fuels without refining, but at a risk, because some of the impurities that are removed by refining are highly volatile. See USSBS, *Oil in Japan's War*, 83; Potter, 326-7.

⁶³ Ironically, most of these advocates were naval officers who operated without the army's knowledge and at a danger to their lives. Various naval studies, especially that of Rear Adm Takagi in late 1943-early 1944, had spoken to the futility of continuing the war due to shipping losses and the resultant inability to move essential raw materials. It would be two more governments and a year later before Japan finally surrendered. See Potter, 327-30; HQ USAAF, *Mission Accomplished*, 18-9; Paul Kecskemeti, *Strategic Surrender: The Politics of Victory and Defeat* (Stanford, CA: Stanford Univ. Press, 1958), 155-6, 169, 172-3; Bernard Brodie, *Strategy in the Missile Age* (Princeton, NJ: Princeton Univ. Press, 1965), 128, 139; Craven and Cate, xxii.

⁶⁴ Lacking fuel, they would have been in serious trouble if the US Fleet returned. See USSBS, *Oil in Japan's War*, 84.

⁶⁵ USSBS, *Oil in Japan's War*, 84-5; USSBS, *Effects of Strategic Bombing*, 46.

⁶⁶ USSBS, *Oil in Japan's War*, 57.

⁶⁷ Brodie, 128-30, 139.

⁶⁸ The CBI-based campaign is discussed in greater depth later in this chapter. See Coox, "Strategic Bombing," 361-80.

⁶⁹ USSBS, *Strategic Air Operations (Twentieth Air Force)*, 16-7.

⁷⁰ The AAF's tactical/strategic distinction for B-29 oil attacks is a bit artificial as they struck the same types of targets in both cases. To the AAF, the first missions were "tactical" because they were flown in support of the ground force objective of capturing Okinawa, while the latter "strategic" missions supported an independent air objective of compelling Japanese capitulation. See USSBS, *Oil in Japan's War*, 64, 115, 123, 128-33; USSBS, *Air Campaigns of Pacific*, 52; Craven and Cate, 658-62.

⁷¹ USSBS, *Oil in Japan's War*, 115.

⁷² USSBS, *Oil in Japan's War*, 65; USSBS, *Effects of Strategic Bombing*, 47; Craven and Cate, xxi, 661-2.

⁷³ Spector, 543-4; USSBS, *Effects of Strategic Bombing*, 46; Haywood S. Hansell, Jr., *The Strategic Air War Against Germany and Japan* (Washington, DC: GPO, 1986), 178; USSBS, *Oil in Japan's War*, 57-8.

⁷⁴ HQ USAAF, *Mission Accomplished*, 21.

⁷⁵ Coox, "Strategic Bombing," 354-361; Craven and Cate, 7, 20, 52-7. The ensuing section and Chapter 3 will show that Army, Navy, and AAF commanders in the Pacific all sought control of the B-29s.

⁷⁶ Hansell, *Strategic Air War*, 141 (first quote); Coox, "Strategic Bombing," 359-60 (second quote). This issue will be covered in depth in Chapter 3.

The AAF's official history concurs with the idea that bombing the Japanese homeland was the AAF leadership's vision for the B-29, stating, "Powerful also was the desire of AAF headquarters to use the B-29 for its intended purpose, very long-range attacks against the Japanese home islands." See Craven and Cate, xvi. Page 30 of the same volume expresses a similar sentiment.

⁷⁷ Coox, "Strategic Bombing," 356-9; Spector, 489; Craven and Cate, xiv, 13-26.

⁷⁸ USSBS, *Strategic Air Operations (Twentieth Air Force)*, 6-9; Coox, "Strategic Bombing," 361-80; Craven and Cate, xii-xv, 4, 41-52, 131-78. One area where CBI B-29s showed potential was aerial mining (discussed earlier), but these missions were really no more than an experiment for the XX Bomber Command.

⁷⁹ USSBS, Office of the Chairman, *Summary Report (Pacific War)* (1 Jul 1946; rpt. Maxwell AFB, AL: Air Univ. Press, 1987), 67.

⁸⁰ USSBS, *Effects of Strategic Bombing*, 36; USSBS, *Summary (Pacific)*, 67, 112 [quote]; Craven and Cate, xv, xvi.

⁸¹ Letter, Kenney to Arnold, 29 Oct 43, 1-2. Kenney based his assessment on Japan's seizure of the NEI right after the war's start, his (fairly accurate) estimate that Japan was getting 90 percent of their oil from the NEI, and his dismissal of Japan's synthetic fuel capability.

Kenney felt some degree of ownership for the B-29, since he "had helped develop the B-29 while serving with the Materiel Division at Wright Field (1939-42), and he seems to have entertained some belief that he enjoyed a personal priority in plans for its use. See Craven and Cate, 12.

⁸² Letter, Kenney to Arnold, 29 Oct 43, 1-5; Spector, 489.

⁸³ According to Kenney, if B-29 attacks could make the road to Mindanao easier, then the US would more quickly sever Japan's oil life lines completely. This might in turn obviate the need for a Central Pacific island-hopping campaign, the favored strategy of Navy leaders. See Letter, Kenney to Arnold, 29 Oct 43, 1-6; Chilstrom, 13.

⁸⁴ Maj Gen Barney M. Giles, Chief of Staff, HQ USAAF, to Lt Gen George C. Kenney, CG, USAAF, Southwest Pacific Area, letter, subject: Declining B-29 Deployment to Theater, 16 Nov 1943, in Army Air Force Operational Letters, 1943-5, vol. 2, AFHRA File No. 168.491.

⁸⁵ Such a campaign could have been in concert, not competition, with Australia-based bombing of NEI oil by B-29s. The USSBS also criticizes US submarines for not emphasizing tankers from the start of their campaign, claiming such a move may have denied Japan's naval and air strategies earlier, with fuel possibly becoming critical by the end of 1943. See USSBS, *Air Campaigns of Pacific*, 5; USSBS, *War Against Japanese Transportation*, 7-8; Robert A. Pape, "Why Japan Surrendered," *International Security* 18 (Fall 1993): 200; Craven and Cate, xvii.

⁸⁶ USSBS, *Summary (Pacific)*, 73, 75.

⁸⁷ Some authors, such as Dr. Pape, are a little more sanguine than this author about the potential effects of increased blockade support. It is also important to understand how the US saw the war in the Pacific--as total war against a seemingly fanatical enemy willing to die for the emperor. See Pape, 199-200.

⁸⁸ However, one thing is fairly certain--the army was still the most powerful faction in Japan, and surrender was unlikely without their acquiescence. There may be an oil-related reason why the army was not compelled to quit earlier. Overall, it was the smallest military oil consumer, and its own most powerful faction, the Kwangtung Army in Manchuria, was able to suffice with local resources. For varying views on the surrender, see Kecskemeti, 155-211; Pape, 154-201; Louis Morton, "The Decision to Use the Atomic Bomb," *Foreign Affairs* 35 (Jan 1957): 334-53; USSBS, *Summary (Pacific)*, 103-7; USSBS, *Effects of Strategic Bombing*, 13.

⁸⁹ In any case, since 1928 the Navy had incorporated the idea of strategic bombing into the climactic third stage of their plan, the blockade and siege of Japan. Army Air Corps (later AAF) leaders heartily endorsed this move. See Miller, 4, 33, 150-66, 207-10, 343-4, 349-50, 364-6; Craven and Cate, 19.

⁹⁰ Also, once such complex plans are set in motion, particularly at the grand strategic level, the bureaucratic momentum can prove very difficult to reverse. See Combined Chiefs of Staff, "Over-All Plan for the Defeat of Japan (CCS 417/2)," Washington, DC, 23 Dec 1943, in *Records of the Joint Chiefs of Staff, Part I: 1942-1945, The Pacific Theater*, ed. Paul Kesarsis (Frederick, MD: University Publications of America, Inc., 1981), microfilm, reel 4, frames 0315-0330, 2.

⁹¹ Other possible rationales for strategic bombing include a strong belief by some planners and agencies that urban incendiary bombing was the key to defeating Japanese will and capability. Also, Arnold's knowledge of A-bomb development may have led him to push for strategic bombing from the Marianas. While both incendiary and A-bomb attacks could have been launched from other bases, the Marianas gave the AAF maximum flexibility in target selection. See Memorandum for information No. 31, Joint War Plans Committee, subject: References--Pacific Campaign, 10 Jul 1944, in *Records of the Joint Chiefs of Staff, Part I: 1942-1945, The Pacific Theater*, ed. Paul Kesarsis (Frederick, MD: University Publications of America, Inc., 1981), microfilm, reel 9, frames 0277-0282, 2; Sallagar, 15-23; AC/AS Intelligence, Analysis Division, Estimation of Force Required to Neutralize a Selected List of Japanese Targets, staff study, Washington, DC, 15 May 1944. AFHRA File No. 118.04D-7.

Chapter 3

Preferences, Parochialism, and the B-29

In the fight against Japan, AAF leaders tried to act in the best interests of both the United States and their own service. However, these two interests were not always congruous. B-29 deployment and employment issues proved particularly contentious. In this bureaucratic fight, the AAF's interwar pursuit of greater service autonomy, and the independent air power doctrine this fostered, influenced their actions. Thus, believing strategic bombing to be decisive in modern warfare, AAF leaders fought for this approach in the war against Japan. Oil figured prominently in this bureaucratic battle, both as "the road not taken"--increased blockade support--and as a target of the eventual bombing campaign. Throughout, the political drive for post-war independence, service doctrine, and operational factors colored AAF decision making.

Foundations: Genetic Coding of the AAF

Since the end of World War I, Army airmen had sought increased autonomy with an eye toward independence. Advocates like Billy Mitchell and Alexander de Seversky touted the potential decisiveness of independent air power, bringing the issue to national attention. In the process, they took on both the Army and Navy. Since these services had strong political constituencies of their own, such tactics could prove detrimental to one's career, as Mitchell learned. Still, airmen made progress with the establishment of: the Army Air Corps in 1926; the GHQ Air Force, a quasi-independent striking arm, in 1935; and in 1941, the fully autonomous Army Air Forces. Along the way, they developed a theory of independent air power application based on strategic bombing. Ironically, given last chapter's discussion, airmen sold Congress on heavy bombers by citing these aircraft as optimum for defending the US coasts against attack by enemy ships.¹

However, the arguments airmen used to persuade Congress were not important. Rather, what mattered was how these airmen really felt about the best way to use heavy

bombers. Work in this area was mostly accomplished at Maxwell Field, Alabama's, Air Corps Tactical School (ACTS). In a now-familiar catechism, ACTS instructors posited a theory of daylight, high altitude, precision bombing of carefully selected elements of an enemy nation's "industrial web." Such attacks, if carried out in sufficient concentration, could destroy both the enemy's capability to wage war and the population's will to resist. In attacks on either capability or will, oil was essential to any modern state's survival.²

A 1939 ACTS lecture by Maj Muir S. Fairchild laid out the essentials of industrial web theory, and oil's value as a target set within it. In his discussion, Fairchild did not mention a blockade as a means of attacking a nation's oil supply. Instead, his answer was to bomb "vulnerable" refineries, and in the case of small oil producers, those who have "*concentrated* rather than dispersed" storage facilities [emphasis in original].³

ACTS strongly influenced AAF planning in World War II. For example, AWPD-42, a September 1942 plan for "complete air ascendancy over the enemy," identified 15 Japanese oil targets for possible B-29 attack. Of these, all were refineries, and only one--Pladjoe--was in the NEI. The rest were Inner Zone targets selected because they were "vulnerable to air attack, being easy to identify from the air, very susceptible to damage, and requiring considerable time to repair."⁴ The plan did not mention blockade at all, although it deemed oil storage tanks located near refineries to be excellent targets.

ACTS influence permeated more than plans, however, by extending to the planners themselves. For example, the AAF representative on the Joint Strategic Survey Committee, the second highest JCS deliberative body after the chiefs themselves, was none other than (now) Maj Gen Muir S. Fairchild. On this committee, Fairchild evaluated various war plans and advocated strategic bombing. Finding AAF target selection lacking, Fairchild pushed for the creation of a Committee of Operations Analysts (COA) to provide Gen Arnold the best possible civilian and military advice on economic targeting. Besides Fairchild, former ACTS instructors with key wartime roles included Brig Gen Haywood S. Hansell, 20th Air Force Chief of Staff and, later, first

commander of the XXI Bomber Command, and Maj Gen Laurence Kuter, Air Staff and 20th Air Force Chief of Plans. Throughout the war, these officers kept the idea of precision bombing of the Japanese industrial web alive.⁵

Politics: Fighting the War for Independence

From Gen Arnold's perspective, the B-29 was to be the standard bearer for post-war service independence, and visible demonstrations of effect were vital to that cause. In a December 1944 letter to LeMay, then commanding the XX Bomber Command, Arnold wrote, "As I told you before you went out to India, the B-29 project is important to me because I am convinced that it is vital to the future of the Army Air Forces."⁶ Not only did the B-29 represent an over \$3 billion investment--fruit of a hard won victory over the Army and Navy for wartime resources--but as Arnold wrote Kenney in late 1944, it was "THE weapon that can best destroy the industrial heart of Japan and start doing it now."⁷

The external pressure on Arnold and the AAF to produce results, and *fast*, in the Pacific was also intense. Now the promises of Mitchell and ACTS rebounded on the AAF. The AAF had failed to prove strategic bombing's merit as an independent war-winner in Europe. Further, the JCS had invested tremendous political capital in the strategic bombing idea. Time seemed to be closing in on the AAF's chances of demonstrating strategic bombing's efficacy. The failure of the CBI-based bombing of Japan only increased the pressure on the AAF. Feeling this pressure, Arnold began to push for more visible and quantifiable results. Such results could best be gained by destroying fixed targets in the Japanese homeland instead of the often more ephemeral effects of blockade support, e.g., aerial mining. As Hansell relates, a poor showing by the B-29s could have delayed AAF independence by years. More immediately, "one major slip and the critics would have their way--the Twentieth [Air Force] would have been dismembered and parceled out to various theaters."⁸

This fear of losing centralized control of the B-29 was a recurrent theme in AAF decisions during the war. The AAF leadership's first priority was to avoid diversions of the B-29 from concentrated bombing of the Japanese homeland. Any such diversions ran the risk of losing control of the bombers to regional surface commanders. Recent events in both Europe and the Pacific motivated the AAF's concern on this issue. In Europe, Allied leaders had diverted 8th Air Force heavy bombers from attacking Germany to support ground campaigns in Northwest Africa and the Mediterranean. Even when striking Germany, AAF leaders did not always get their way. For example, B-17s bombed targets such as submarine pens and V-1 rocket sites over the protests of these airmen. In the most divisive controversy of all, Gen Eisenhower had threatened to quit as Supreme Allied Commander if he did not get full control over all bombers for three months before and after D-Day.⁹

The AAF's fight to retain control of their bombers was, if anything, more difficult in the Pacific. From the start of the war, the Navy had sought heavy bombers for a variety of missions. Arnold denied such a request from King as early as February 1942, citing the need to maintain unity of command as a rationale. B-29 deployment plans exacerbated problems in the Pacific, as both Adm Nimitz and his senior AAF officer, Maj Gen Willis Hale, thought they should control Marianas-based B-29s. Likewise, Generals Stillwell, Chennault, and Stratemeyer (among others) in the CBI Theater all thought XX Bomber Command B-29s should be theirs. Of course, Gen Kenney (and by extension Gen MacArthur) had long wanted these prized assets.¹⁰

Although Hale, Chennault, Stratemeyer, and Kenney were AAF officers, they all also worked for either Navy or Army commanders. Giving B-29s to any of these airmen made AAF leaders "extremely apprehensive lest they be apportioned to theater commanders for local operations," as opposed to strategic bombing of the Japanese homeland. Conversely, as the discussion will reveal shortly, the 20th Air Force was under the centralized control of AAF headquarters. Reflecting their fear of losing

centralized control, AAF headquarters advised LeMay to maintain geographic separation from MacArthur and Nimitz when establishing a new headquarters for all B-29s in the Pacific.¹¹

RAND analyst Carl Builder, who has studied the military culture extensively, has reduced his conception of airmen's core beliefs--*the* air strategy--to three linked premises:

1. Air power can be the decisive instrument of war.
2. The decisive use of that instrument requires air superiority.
3. Achieving air superiority requires central control of air power.¹²

In World War II, "the centerpiece of the air strategy and the bid for an independent Air Force was strategic bombing." To realize this quest, "the central control of air power in a separate, independent, autonomous Air Force became the implicit objective of almost all AAF actions."¹³ While such notions are doctrinal in nature, in World War II they served the AAF's political end of post-war independence.

How did the AAF's leaders translate their belief in centralized control into political action? First, they secured strategic bombing's place in the overall Pacific strategy. Next, they ensured the joint US Pacific campaign would acquire suitable B-29 bases. After that, they engineered a JCS decision to retain centralized control of the B-29s. Finally, the AAF killed the main plan competing with their own notions of proper B-29 employment. In early 1943, many Army and Navy leaders still viewed the AAF as an upstart and strategic bombing as a peripheral strategy in the Pacific. During August's Quadrant Conference of Allied leaders, the subject of a bomber offensive in the Pacific never arose. To rectify this, Brig Gen Hansell, the AAF's key joint (and combined) staff planner, persuaded his sister service counterparts to endorse the AAF's position on strategic bombing. Securing the cooperation of his Army counterpart on the three-man Joint Planning Staff, Hansell successfully advocated: 1) centralized control of strategic air forces in both Europe and the Pacific; 2) recognition of strategic bombing "as a principal, war-winning strategy" against Japan; and 3) obtaining air bases for such a

campaign.¹⁴ At Cairo's Sextant Conference in early December, Allied leaders approved a new Pacific strategy incorporating most of these ideas. While they did not commit themselves on the issue of centralized control of the B-29s, the CCS gave strategic bombing a place in official plans with priority in any surface campaigns going to seizing suitable B-29 bases.¹⁵

Securing such bases became the AAF's second goal in retaining control of the B-29s. At Sextant, Allied leaders had settled on the idea of dual campaigns in the Pacific, with Nimitz commanding the central, Navy-dominated thrust and MacArthur commanding in the Southwest Pacific. As last chapter revealed, Adm King favored the idea of a Central Pacific campaign, especially seizure of the Marianas. While the Navy wanted the Marianas for logistics and operational reasons, Gen Arnold coveted them as potential B-29 bases. However, Nimitz and MacArthur were not too enthusiastic about the idea of dual campaigns and proposed dropping the central thrust in January 1944. Moving quickly, King rebuked Nimitz for his heresy--getting his fellow admiral back on board--and enlisted Arnold's support within the JCS to defeat MacArthur's moves to change Pacific strategy. Therefore, early in 1944 the JCS set a target date of 15 June 1944 for taking the Marianas.¹⁶

With plans to deploy B-29s to widely separated bases in China and the Marianas, Arnold had the opening he needed to pursue the most crucial step in consolidation, persuading the JCS to retain centralized control of the B-29s. Because he believed B-29s would routinely overlap theaters during their missions, Arnold claimed, "I could do nothing but retain command of the B-29s myself--something I did not want to do."¹⁷

To sell King on centralized control, Hansell compared the "independent" B-29 force to a wide-ranging battle fleet. Hansell argued that the B-29s were like US Naval forces in the Pacific; no matter where they were based, they needed to be able to concentrate against an objective. For the Navy, the most important such objective was the enemy fleet. For the B-29s, it was the Japanese homeland. Therefore, since the

commander of the US Fleet (Adm King) had the flexibility to employ his forces in unified action regardless of where they were deployed, so should Gen Arnold enjoy the same degree of flexibility. This argument persuaded King, and a 1 April 1944 JCS directive established the 20th Air Force, a move Hansell described as "one of the most important events in United States Air Force history."¹⁸ This organization, with Arnold in command, would remain under JCS control and direct all Pacific B-29s. It would consist initially of two commands, the XX Bomber Command in the CBI Theater and the XXI Bomber Command in the Marianas (once bases became available). The Air Staff would double as the 20th Air Force's staff, and the COA as their targeting advisors.¹⁹

Even this organizational move did not eliminate all conflicts over control of the B-29s. The organizing directive itself--perhaps a mistake--made the theater commanders responsible for logistic and administrative support for these bombers, forces over which they normally did not have operational control. This carried the danger of B-29 requirements receiving a lower priority than other theater needs, giving theater commanders a degree of *de facto* control over bomber operations. Further, the directive had a clause allowing theater commanders "at their discretion, [to] utilize the VLR bomber forces which are based within their respective areas for purposes other than their primary mission" in case of an undefined "strategical or tactical emergency."²⁰ A B-29 commander like Hansell thus had to walk a tightrope between very powerful commanders seeking to usurp his forces. This dilemma led bomber leaders to emphasize their independence from other forces, lest a perceived reliance undermine centralized control and "almost certainly destroy the strategic air war against Japan as a war-winning grand strategy--one in which I [Hansell] and my fellow airmen fervently believed."²¹

With strategic bombing recognized as a key element of Pacific strategy, suitable bases either immediately or imminently available, and an organizational structure in place, AAF leaders stood poised by mid-April 1944 to realize their goal of centralized

control of Pacific B-29 operations. Only one task remained, defeating or delaying employment schemes competing with the strategic bombing of the Japanese homeland.

The main competing strategy was B-29 support for the oil blockade, including attacks on the NEI facilities. This was precisely the type of employment Gen Kenney had repeatedly urged. Throughout the planning for the war against Japan, some influential advisory bodies also had persistently advocated such actions. For instance, as early as April 1943, the JCS's Joint Intelligence Committee (JIC) identified tankers as the main vulnerability in Japan's oil situation, with refined products and the nearly pure Borneo crude the most valuable shipments. Along with air and submarine attacks on tankers, they recommended sustained bombing of NEI refineries and gathering stations to

make it necessary to move additional quantities of crude oil to Japan proper and adjacent areas for refining, instead of moving smaller quantities of finished products directly from the East Indies to the points of consumption. This would impose an additional burden on the already overburdened Japanese tanker fleet.²²

Such actions would target Japanese military capability, primarily affecting the navy and merchant marine. Subsequent JIC reports in the winter and spring of 1944 echoed these themes, recommending the use of B-29s from Australia for this effort and citing the advantages of such a campaign over attacks on Japanese industry. The JIC claimed their strategy would require less effort and yield greater results than strategic bombing.²³

Perhaps even more disturbing to the AAF leadership, their own COA advisers had arrived at similar conclusions to the JIC in several reports since November 1943. To the COA, as long as Japan still held the NEI, the most vulnerable point in their petroleum position was fuel oil (the navy's main fuel), the chief bottleneck was transport, and the best targets were tankers. The only refinery worth targeting, due to its large output, was Pladjoe on Sumatra. The COA's position was not unanimous, however. While several of the AAF members of the COA advocated attacks on Inner Zone synthetic fuel targets, their civilian counterparts supported this only if, or when, Japan lost the NEI. AAF

members also thought shipping was a poor target for the B-29, an aircraft designed for high altitude bombing, not dive or "skip" bombing.²⁴

The JCS supported the findings of the JIC and COA, but also had to account for significant political considerations like bolstering Chiang Kai-Shek. Thus, a 6 April 1944 JCS report on "VLR Bombers in the War Against Japan" identified the China-based "Operation Matterhorn" as the top priority even though "the implementation of Matterhorn first is not in consonance with conclusions reached from the detailed [JIC and COA] studies."²⁵ In a hedged conclusion, the JCS also considered deploying B-29s to Australia and the Marianas. Marianas bases would not be available until at least 30 September 1944, while bases in New Guinea were already available and a base at Darwin, Australia would be ready by 1 May 1944. Ultimately, Southwest Pacific B-29s would be able to attack "practically all the oil installations of the 'Outer Zone' [NEI]," as well as Japanese shipping.²⁶ As the JCS released this report, B-29s had already begun deploying to the CBI Theater. Conversely, while possible at any time, B-29 deployments to the Southwest Pacific had not yet started.

Therefore, AAF leaders had to act quickly to avoid the diversion of B-29s to MacArthur's theater for blockade support. Gen Arnold occupied an extremely influential position as commander of both the AAF and 20th Air Force. Few B-29 strategies were likely to be implemented without his support, and his influence on "worker bees" ultimately killed plans to deploy B-29s to the Southwest Pacific. A key event occurred when Adm Bieri, head of the JCS's planning staff, suggested sending B-29s to Australia in a 19 Apr 1944 meeting. Although Bieri carefully stated such missions would not take precedence over future Marianas operations, the AAF member, Col Lindsay, responded emphatically against the idea. His main argument was the difficulty in supplying parts and equipment to Australia, a ridiculous assertion considering the far more difficult circumstances--well known--in operating B-29s from China. Bieri dropped the issue, conceding to the AAF.²⁷

As a result of this meeting, the next day the JCS directed that "no B-29s be diverted to Australia." Claiming Ceylon-based B-29s could destroy the most critical NEI refineries, the JCS threw their weight behind Marianas-based bombing of the Japanese homeland. Attacks from the Marianas could do "immediate and direct damage to Japan's war making capacity but may also produce a far-reaching effect upon the Japanese public." This outcome adds insight into Arnold's refusal a month earlier to send B-29s to Kenney.²⁸

AAF headquarters' actions through April 1944 ensured they would achieve their first priority for the B-29, retention of centralized control. These actions also virtually guaranteed the B-29 would not be diverted to uses the AAF deemed undesirable. However, what was not entirely clear was what the AAF planned to do with the B-29s once they had achieved their bureaucratic agenda. Thus, the AAF's next priority would be to devise their own targeting scheme to attack Japanese capability and will.²⁹ Although a comprehensive study of the strategic bombing of Japan exceeds the scope of this thesis, the rest of this section details oil's role in the planning of the strategic bombing campaign.

Strategic bombing meshed well with other Pacific strategies. However, specific target selection depended heavily on whether there was to be an invasion of the Japanese homeland. From July's Honolulu Conference through October's Octagon Conference, Allied leaders made no decision, leaving grand strategy adrift. The Army, fresh from the successful invasion of the European continent, began to focus on the Pacific. To them, and most notably Gen Marshall, invasion was the only way to finish off the Japanese, especially given the fierce resistance Americans had met with on Guadalcanal, Tarawa, Saipan, etc. Among the joint chiefs, Marshall was a towering figure, and the dominant voice in strategy formulation. Therefore, as the summer progressed, Marshall pressed his invasion preference on the other chiefs.³⁰

In this instance, the AAF had little choice but to support Marshall. For one, they owed their existence as an autonomous force to him, and Marshall had long supported AAF bids for increased autonomy and an independent mission. Arnold had only been made a member of the JCS (and CCS) at Marshall's insistence, and over King's objections. Finally, maintaining Marshall's favor would be crucial in the impending post-war battle for service independence. With both Marshall and Arnold supporting invasion, the Navy ultimately acquiesced in its inclusion as a definitive element of US strategy.³¹

An invasion of Japan would likely be bloody. To soften Japanese military capability and will to resist before any amphibious assault, the Army would almost certainly want a preparatory bombing campaign, with emphasis on those targets having the greatest immediate tactical effect. Many planners fit Inner Zone synthetic oil production, refineries, and fuel storage into this category, giving these targets renewed prominence.³²

However, despite their political "bills to pay," there is little doubt AAF leaders still hoped strategic air attacks--with perhaps some help from the sea blockade--could win the war before any invasion. For example, in a 14 April 1945 "Eyes Only" letter to one of the AAF's Pacific commanders, Arnold wrote, "In my opinion, we can bring Japan to her knees by B-29 bombing before the ground troops or the Navy ever land on the shores of the main island of Japan."³³ However, AAF leaders could only express such opinions privately. When LeMay, for example, went public on the issue, he earned a reprimand.³⁴

This mix of sentiments led AAF leaders and planners to hedge their bets. For example, in a September 1944 tasker to the COA, Kuter requested a report based on two alternative scenarios against Japan: (1) blockade and strategic bombing only; and (2) blockade, bombing, and invasion of the home islands. While target sets for the two scenarios did not differ greatly, the ensuing report leaned toward invasion (scenario two).

It rated the aircraft industry as scenario two's top priority versus scenario one's top choice of shipping. Consistent with their previous work, the COA placed heavy emphasis on B-29 mining, severing sea LOCs, and attacking NEI oil facilities, while Inner Zone oil received even lower priority than before. Conversely, Air Staff planning efforts throughout the summer of 1944 emphasized Inner Zone oil targets approximately equally with NEI facilities, with merchant shipping viewed only as a target of opportunity.³⁵

However, once the XXI Bomber Command began bombing Japan in November 1944, oil virtually disappeared as a priority target set. Hansell, the unit's commander, pursued his own preference for precision bombing of the Japanese aircraft industry. Meanwhile, his AAF superiors in Washington were beginning to focus on incendiary attacks of Japanese cities, a prospect Hansell found unappealing. The COA's successor, the Joint Target Group (JTG) offered yet another input. The JCS had formed this organization to serve an analogous function for "their" 20th Air force as the COA had served for the AAF. The JTG tended to synthesize the views of all parties, stressing a mix of incendiary, industrial, and tactical targets. In their early efforts, Inner Zone oil storage--but not refining--appeared on several of their bi-monthly target lists. After receiving unequivocal JCS direction to prepare for invasion, though, the JTG categorically rejected oil as a target in May 1945. They felt oil targets would require too much effort to gain any effect. Further, with an eye to the war's termination, they believed attacks on oil would "delay Japan's national economic recovery after the war for many years."³⁶

A final idea for B-29 employment came from outside the AAF. Since mid-1944, Adm Nimitz' Naval Mine Warfare Section had persistently advocated a massive and systematic aerial mining campaign. Deployment of B-29s to the Marianas, conveniently located in the heart of Nimitz' theater, offered a perfect opportunity for just such an effort. Twentieth Air Force and XXI Bomber Command leaders actively resisted this

potential diversion of B-29s, at least through the opening months of the Marianas-based bombing campaign. Thus, the AAF missed another chance to target Japanese oil.³⁷

In little more than a year, the AAF had made great strides toward their goal of post-war independence. They had fended off attempts to disperse their most cherished weapon, the B-29, a weapon offering realization of the dreams of air power advocates for three decades. These dreams might come to fruition if a strategic bombing campaign against the Japanese homeland could force Japan's capitulation before an invasion. Thus far, oil's main role was as a "road not taken" for the AAF, a road leading to the NEI and increased blockade support.³⁸ Nevertheless, doctrine, a factor inhibiting attacks on oil through aerial mining, would help bring oil targets back into prominence for the B-29.

Doctrine: An Undergird for Action

In their political fight for independence, the AAF enlisted doctrinal tenets to buttress their arguments. However, doctrine in and of itself exerted a profound influence on AAF leaders, especially their actions regarding B-29 employment. The last chapter described the B-29 mining campaign, "Operation Starvation," as well as the assault on Inner Zone oil facilities. Yet, as the XXI Bomber Command began its operations, neither of these actions rated very high on the command's agenda. Why was this, and what worked to change the minds of key AAF leaders? For mining, doctrinal forces played a large part in these leaders' resistance, while political and organizational concerns help explain their change of heart. Conversely, for the attack on Inner Zone oil, a mix of influences motivated resistance (see previous section), while doctrine strongly influenced the reversal of their position. Doctrine, this section's subject, is the common denominator.

"Starvation" was highly effective, particularly considering the campaign used less than 6 percent of the XXI Bomber Command's total sorties. This begs the question--why did AAF leaders wait so long to start, given the apparently successful mining efforts in the CBI Theater and the many studies recommending B-29 mining? An earlier mining

campaign might have had a greater effect on Japanese oil shipments than "Starvation." In a post-war critique, the USSBS found most AAF leaders skeptical of aerial mining, except for CBI airmen who welcomed more resources and responsibilities.³⁹

Perhaps the biggest skeptics of all were the former ACTS instructors involved in the B-29 campaign. Kuter, the Air Staff and 20th Air Force chief planner, was perhaps the most vigorous opponent of B-29 mining. After Kuter refused their requests for B-29s, Navy mine advocates bypassed Kuter, asking Adm King to appeal to Undersecretary of War Robert Patterson and Gen Arnold. Patterson demanded a reason for the refusal. Kuter's response emphasized his priority of B-29 industrial bombing over shipping attacks, alluding to the former as the primary mission and the latter as a diversion. Hansell, the on-scene commander, agreed with this rationale, also expressing fear of sister service encroachment on his forces. He based this on the 8th Air Force's experience in Europe. Hansell further revealed his parochialism when he wrote, "It is quite clear I could have endorsed mining as an aspect of *strategic bombing* against the Japanese transportation system rather than as an auxiliary aspect of the sea blockade [emphasis added]."⁴⁰

Arnold also resisted mining for a while, but finally relented under pressure from King and Nimitz in December 1944. Arnold's approach was pragmatic, agreeing to mining on a non-interference basis with the strategic bombing campaign. His change of heart stemmed from organizational and political concerns. First, he believed mining could enhance the AAF's political position by carving a new niche for the B-29. Similarly, he feared the Navy might develop their own fleet of long range aircraft for aerial mining if he did not relent. Still, the AAF delayed three more months before Gen LeMay finally started mining operations in March. Although he considered mining a doctrinal violation, LeMay was less dogmatic than his predecessor, Hansell. Applying himself with characteristic verve, LeMay dedicated an entire B-29 wing to "Starvation." Gen Norstad aptly summed up AAF ambivalence toward this mission when he wrote, "I

must admit some slight revulsion at the thought of dropping mines rather than dropping bombs, but...I am forced to agree that there are times and places where this type of operation is most effective."⁴¹

Although it impeded AAF mining efforts against oil, doctrine was instrumental in reviving strategic bombing of Japanese oil targets, with impetus from the recently concluded European bombing campaign. Some analysts have accused American air strategists of mirror imaging in their ardent pursuit of oil bombing in Europe. In May 1945, that approach certainly appeared to have been the right choice, and AAF leaders longed to apply their European "lessons learned" on Japan.⁴²

European results were available due to the ongoing work of the United States Strategic Bombing Survey (USSBS). Entering Europe on the heels of the Normandy invasion, USSBS committees had immediately begun evaluating the Allied bombing campaign. Since January 1945, the JTG and others in Washington had been pressuring the USSBS leadership for useful targeting inputs against Japan. The USSBS hesitated to offer suggestions based on their as yet unfinished work, believing Japan's economic and military situation to be vastly different from Germany's. However, their warnings on this point failed to register with impatient planners seeking a way to break Japan. Briefing the JTG and other senior defense leaders in mid-June 1945--after the JTG had recommended oil's removal as a target--USSBS members denounced urban incendiary attacks on Japan. Instead, they advocated concerted bombing of other targets to influence Japanese political behavior and civilian morale. Transportation topped their list, but Inner Zone oil plants also rated highly due to their effect on remaining Japanese ability to move troops within and among the home islands. Again, the USSBS based this recommendation on their European findings, not on a detailed study of Japan. In reality, by the time the USSBS gave their advice, Japan had long seen the last of its oil imports.⁴³ Whether the AAF might have done a better job of discerning the true state of Japan's oil situation is a subject of the next section.

The USSBS findings had immediate influence. Although the JTG was not persuaded, other more influential leaders were. Arnold received the preliminary USSBS report on European bombing while he was on a trip to the Pacific. The report's account of attacks on German oil and transportation convinced him that a similar, or even lesser, effort "would have a worse effect on Japan."⁴⁴ Adding weight to the USSBS recommendation, an urgent appeal for attacking Inner Zone oil came from the organization that would carry out the assault. On 22 June 1945, the XXI Bomber Command wrote Kuter to dispute the JTG's position on oil targeting. Their argument cited intelligence reports showing oil supplies as critically low in Japan, although they did not specify the effect they wanted to achieve by attacking remaining oil.⁴⁵ Their advocacy points to Inner Zone oil's intrinsic value as a target to AAF bomber leaders.

This visceral belief in the appropriateness of certain target sets sprang from AAF doctrine. Doctrine may not be wholly rational precisely because it is steeped in an organization's core values and belief systems, not necessarily objective criteria. As a pair of leading writers in the field define it, "Doctrine is what we believe about the best way to do things."⁴⁶ Thus, because of its ingrained nature, it is possible for doctrine to blind a service to better ways of "doing things." In the AAF's case, doctrine influenced the negative perception of aerial mining among key officers such as Hansell and Kuter, as well as their favorable view of Inner Zone oil targets. The architects of strategic air doctrine at ACTS never considered maritime operations in their discussion of imploding an enemy's industrial web. However, they did discuss oil targets, specifically refineries and strategic level storage. To the USSBS, such targets seemed decisive against German military capability, and many in the AAF, including Gen Arnold, thought it would work as well against the Japanese homeland. The AAF overrode skeptics in the JTG, and the XXI Bomber Command clinched the argument with their call for immediate attacks on Inner Zone oil supplies. In this request, the XXI Bomber Command bemoaned their lack

of success with precision radar bombing.⁴⁷ As it turned out, they found a way to link a solution to the radar bombing problem to their advocacy for oil attacks.

Operations: How the Real World Works

The B-29 assault on Inner Zone oil began just four days after the XXI Bomber Command wrote their memorandum to Kuter. Up to that time, problems with radar bombing had presented an operational obstacle to the success of the strategic bombing. If the AAF could not solve these problems, it would limit their flexibility for the remainder of the war, as well as in the post-war environment. Without accurate radar bombing, the notion of "all-weather" capability was a myth. In the extreme, this lack of capability could undercut the case for service independence by making air power appear excessively limited in its application.⁴⁸ Thus, AAF leaders felt it important to validate precision radar bombing. Along with radar bombing accuracy, another vexing operational problem was a persistent intelligence shortfall regarding Japanese oil. Before the war, the US had almost no strategic intelligence on Japan's economy or industry. During the war, air planners tended to overestimate Japan's substitution capability, especially in synthetic fuel. They also failed to link the reduced combat effectiveness of Japanese forces to the oil blockade.

The Japanese oil industry presented an ideal target set for radar bombing. Individual targets, built above ground and constructed mostly of metal, were highly radar reflective. Equally important, most of these targets were near the coast, providing excellent radar contrast between the facilities and the water. Thus, oil facilities should have been locatable on radar. The problem for the XXI Bomber Command was the APQ-13 radar in the B-29 had proved deficient in resolution.⁴⁹ Moreover, most B-29 crews were not particularly well trained in radar interpretation or bombing techniques. There was one exception, though. For months, crews from the 315th Wing had been practicing night radar bombing in the CBI. Further, their B-29s had a new radar, the APQ-7 "Eagle," possessing ten times greater resolution than the APQ-13.⁵⁰

Thus, the XXI Bomber Command selected the 315th Wing to conduct the majority of the oil attacks. To Hansell, this "afforded the opportunity to test again the feasibility of all-weather attack on selected targets by radar bombing, and at the same time to contribute substantially to the conduct of the war."⁵¹ With Japanese air defenses virtually non-existent and an emergency base at Iwo Jima available in case of problems, the oil industry offered an operational testing opportunity no US training range could match. LeMay's message to the 315th after a successful attack bears this out, "The operations of the 315th Wing showed conclusively that it was feasible to destroy selected targets by radar bombing when the target location was well known and the radar returns of the target itself were clear or its location relative to a prominent radar feature was well known."⁵²

The conditional nature of LeMay's message unveils the second major operational issue for the AAF, a lack of accurate intelligence on the Japanese oil industry. Before the war, the US had little strategic intelligence on Japan's economy, being especially short in aerial photos. As for open sources, Japan had progressively closed itself off to the outside world since 1931, nearly completing its isolation by enacting strict censorship laws in 1937. The AAF also had bureaucratic problems. In 1940, Army G-2 had refused to include Arnold on its distribution list for intelligence products, and then had the audacity to protest when Arnold formed his own air intelligence apparatus. In this case, Arnold's direct appeal to Gen Marshall solved the problem, but the in-fighting had delayed AAF intelligence gathering efforts immeasurably.⁵³

Once the war started, intelligence did not improve appreciably. For example, after Arnold tasked the COA to make continuing studies of Japanese targets, the COA had to scour private concerns around the world for information on Japanese industry. This effort took about six months, yielding mixed results. As US forces moved closer to Japan proper and began winning air superiority, photo reconnaissance improved planners' knowledge of the location and configuration of Inner Zone oil facilities. However, this

did not improve their estimates of production. Here, a shortage in human intelligence left air planners in the dark as to how Japan's oil industry was performing.⁵⁴

Lack of knowledge regarding Japan's oil industry led planners to consistently overestimate Japanese capability, particularly in synthetic fuel production. Recalling Japanese efforts in this area, of 66 planned synthetic fuel plants, the Japanese were only able to put 8 into action during the war. Synthetic fuel production of all types peaked at 1.5 million barrels--versus a planned 14 million--in 1942. Yet, study after study by US air planners forecast much higher production. A 1942 Board of Economic Warfare study claimed development of Inner Zone facilities to be a higher priority for Japan than exploitation of NEI oil. The COA estimated Japanese synthetic production at 6-7 million barrels a year in a September 1943 study. The same study estimated 7 to 14 plants in Manchuria were producing synthetic fuel (the actual number during the war was one). A later COA study in October 1944, while cutting estimates of Japanese synthetic production in half, still overstated the case. Perhaps most optimistic, though, was a June 1944 State Department report predicting near-term Japanese synthetic production at 8.4-12.6 million barrels of fuel.⁵⁵

These overestimates are understandable given the lack of hard intelligence on Inner Zone oil production, although one wonders whether the AAF might have been able to do a slightly better job with photo reconnaissance.⁵⁶ Less forgivable is the AAF's misreading of the blockade's effects. Certainly, they knew Japanese air and sea resistance was severely diminished by the end of 1944. They also could have discerned the blockade's destructive effect on tankers, if not by cooperating with Naval intelligence, then from their own units' operational reports, such as those of the 14th and 10th Air Forces cited in Chapter 2.

Even had they done all this, though, the AAF might not have acted any differently regarding Inner Zone oil. Why? First, as the doctrine discussion revealed, most AAF leaders genuinely felt strategic bombing was the way to win the war in the shortest time

with the fewest American casualties. Within strategic bombing theory, oil seemed to be fundamentally important to any industrialized state with a modern military. Second, the Japanese were an enigma to US strategists. The US had little insight into the Byzantine machinations of the Japanese political system, except that devotion to the emperor appeared all-consuming. Suicidal Japanese resistance on Pacific atolls and *kamikaze* attacks validated this perception. While one could accuse the US of intransigence for demanding unconditional surrender, this was the responsibility of political, not military, leaders. Several recent authors, influenced by the US's Vietnam experience, have portrayed AAF leaders as racist, bloodthirsty, callous, or dogmatic in their actions toward the Japanese.⁵⁷ Of these, only the last critique seems valid to this author.

The politics of post-war independence did taint AAF motives, and "the real and demonstrable effect of the air strategy was institutional independence; all the rest remains disputed theory even today."⁵⁸ However, in fairness to AAF leaders, the fact remains that the US was fighting a total war. Since the AAF--and the US as a whole--eventually had overwhelming resources in the Pacific, they did not have to make too many hard choices in target selection or B-29 employment, once they achieved their bureaucratic agenda. Therefore, if bombing Inner Zone oil, along with nearly everything else in Japan, might have helped shorten the war, the AAF saw little reason not to attack it.

NOTES

¹ Although this rationale was mostly a response to the isolationist sentiment of the era, it marked another salvo in a roles and missions battle started by Mitchell and continuing today. The Navy had traditionally performed coastal defense with help from Army artillery. Mitchell's earlier ship attacks demonstrated the potential effectiveness of land-based air against ships. In their writings, Mitchell and de Seversky were particularly harsh on the surface Navy (including carriers), seeing it as obsolete against modern air power. See Robert F. Futrell, *Ideas, Concepts, Doctrine: Basic Thinking in the United States Air Force*, vol. 1, 1907-1960 (Maxwell AFB, AL: Air University Press, 1989), 61-114; Thomas H. Greer, *The Development of Air Doctrine in the Army Air Arm 1917-1941* (1955; rpt. Washington, DC: GPO, 1985), 1-129; Carl H. Builder, *The Masks of War: American Military Styles in Strategy and Analysis* (Baltimore, MD: Johns Hopkins Univ. Press, 1989), 68.

² Maj Muir S. Fairchild, "National Economic Structure," Lecture Number AF-9-C/10-C, Air Corps Tactical School, Maxwell Field, AL, 5 Apr 1939, 1-10. AFHRA File No. 248.2020A-9; Haywood S. Hansell, Jr., *The Air Plan that Defeated Hitler* (Atlanta: Higgins-McArthur, Longino & Porter, 1972), 6-48.

³ Fairchild, 4-6, 8-10, 13, 20-2. Fairchild cites potential effects on both enemy capability and will in his discussion of targeting petroleum, listing the effect on capability (denial) first. In this lecture, Fairchild also specifically cited Japan's inherent limitations as an insular nation with few natural resources.

However, even in this specific discussion, Fairchild did not bring up blockade as an option.

⁴ Report of Air War Plans Division, "A.W.P.D.-42: Requirements for Air Ascendancy," Washington, DC, 9 Sep 1942, Tab B-4-b, Appendix J, VI. AFHRA File No. 145.82-42.

⁵ Hansell also served on the Joint Planning Staff, a "worker bee" committee one level below Fairchild's. Pursuit of precision bombing would run these officers afoul of other AAF leaders, especially Arnold, at times. Such a conflict in early 1945 led Arnold to remove Hansell as commander of the XXI Bomber Command (BC), replacing him with LeMay. Still, the selective targeting idea remained alive, even amid incendiary and atomic attacks (see Chap. 2). See Hansell, *Strategic Air War*, 232.

The highly influential COA consisted of a mix of "pure civilian" business leaders and academics, "uniformed civilian" experts, and AAF officers. Later, the COA expanded to include Navy members. See Guido R. Perera, History of the Organization and Operations of the Committee of Operations Analysts, 16 Nov 1942-10 Oct 1944, vol. 1, 1-23, 42-4.

As a reminder to the reader, the 20th Air Force was the command for all Pacific B-29s. Its unique development is discussed later in this chapter.

⁶ Arnold repeated this in numerous other letters to Pacific commanders, a sentiment parroted by his 20th AF Chief of Staff, Brig Gen Lauris Norstad, who replaced Hansell in that position after the latter took over the XXI BC. See Gen H. H. Arnold, CG, AAF, to Maj Gen Curtis E. LeMay, CG, XX Bomber Command, letter, subject: B-29 Operations, 17 Dec 1944, in *Army Air Force Operational Letters, 1943-5*, vol. 2, AFHRA File No. 168.491; Brig Gen Lauris Norstad, Chief of Staff, Twentieth Air Force, to Brig Gen H. S. Hansell, Jr., CG, XXI Bomber Command, letter, subject: Marianas-based B-29 Operations, 10 Nov 1944, in "Twentieth Air Force Official File," AFHRA Microfilm Reel 32812, Frame 1245; Brig Gen Lauris Norstad, Chief of Staff, Twentieth Air Force, to Maj Gen Curtis E. LeMay, CG, XX Bomber Command, letter, subject: China and Marianas-based B-29 Operations, 9 Dec 1944, in "Twentieth Air Force Official File," AFHRA Microfilm Reel 32812, Frame 1255.

⁷ Kenney was *still* trying to get B-29s for attacks in the NEI. The tone of Arnold's response is rather emphatic. See Gen H. H. Arnold, CG, AAF, to Gen George C. Kenney, CG, Far East Air Forces, letter, subject: B-29 Operations, 15 Dec 1944, 2, in *Army Air Force Operational Letters, 1943-5*, vol. 4, AFHRA File No. 168.491; Builder, 97; Coox, "Strategic Bombing," 348.

⁸ Hansell, *Strategic Air War*, 34, 166-9 (quote p. 166), 184, 212-3, 251, 264; Hansell, *Air Plan*, 6-99; Overy, 96.

⁹ While Eisenhower sought to use these bombers against transportation targets, AAF leaders wanted to use them against oil. See Hansell, *Strategic Air War*, 55, 60-1, 64-8; Hansell, *Air Plan*, 186-92, 273-4; Overy, 98; Alfred C. Mierzejewski, *The Collapse of the German War Economy, 1944-1945: Allied Air Power and the German National Railway* (Chapel Hill, NC: Univ. of North Carolina Press, 1988), 61-85.

¹⁰ Lt Gen H. H. Arnold, CG, AAF, to Adm E. J. King, Commander-in-Chief, US Fleet, letter, subject: Diversion of AAF Bombers to Pacific Theater, 24 Feb 1942, in *Army Air Force Operational Letters, 1943-5*, vol. 2, AFHRA File No. 168.491; Maj Gen Willis H. Hale, CG, Seventh Air Force, to Gen H. H. Arnold, CG, AAF, letter, subject: Request for Operational Control of B-29s Deployed to Marianas, 5 Apr 1944, in *Army Air Force Operational Letters, 1943-5*, vol. 4, AFHRA File No. 168.491; Hansell, *Strategic Air War*, 153-8; Craven and Cate, xvii, 12, 35, 48-50. The majority of letters in *Army Air Force Operational Letters, 1943-5*, vol. 4 (cited herein), concern various jurisdictional disputes between the AAF and theater CINCs regarding B-29 command and control.

¹¹ Hansell, *Strategic Air War*, 141 (quote); Brig Gen Lauris Norstad, Chief of Staff, Twentieth Air Force, to Maj Gen Curtis E. LeMay, CG, XXI Bomber Command, letter, subject: Marianas-based B-29 Operations, 10 Apr 1945, 2, in "Twentieth Air Force Official File," AFHRA Microfilm Reel 32812, Frame 1204.

¹² Builder, 68.

¹³ *Ibid.*, 69-70.

¹⁴ The Joint Planning Staff (JPS) consisted of an Army brigadier general, AAF brigadier general, and Navy rear admiral chairman. In his memoirs, Hansell states that he joined the JPS about a month before Sextant,

and that Adm Bieri, the chairman, virtually refused to acknowledge Hansell's existence. In a curious bit of reasoning, Hansell argues that this helped his (Hansell's) advocacy for centralized control and a strategic bombing campaign in the Pacific. This was "because [if] Admiral Bieri would not bring himself to recognize my existence, he could not very well argue against the items I presented and supported." See Hansell, *Strategic Air War*, 135-40 (quotes p. 136), 148, 151-2.

¹⁵ The grand strategy, while hoping to obviate an invasion of Japan, hedged its bets and left this as a possibility. The CCS also recommended approval of "Operation Matterhorn" on a provisional basis. See CCS 397, "Specific Operations for the Defeat of Japan," cited in Joint Chiefs of Staff, "VLR Bombers in the War Against Japan: Report by the Joint Staff Planners (JCS 742/6)," Washington, DC, 6 Apr 1944, in *Records of the Joint Chiefs of Staff, Part I: 1942-1945, The Pacific Theater*, ed. Paul Kesarsis (Frederick, MD: University Publications of America, Inc., 1981), microfilm, reel 1, frames 0749-0779, 35; Combined Chiefs of Staff, "Over-All Plan for the Defeat of Japan (CCS 417/2)," 1, 3, 10; Craven and Cate, 22-6.

¹⁶ The JCS's reasons for taking the Marianas included their value as "(1) a base for VLR [e.g., B-29] aircraft, (2) protection of our flank, (3) denial of Japanese air reconnaissance of our movements through the Carolines." (JCS 713/1, p.18) Elsewhere, they direct establishment of "land-based aircraft, VLR bases, and secondary naval facilities." (JCS 713/4, p. 38) See Joint Chiefs of Staff, "Future Operations in the Pacific (JCS 713/1-4)," Washington, DC, 10-12 Mar 1944, in *Records of the Joint Chiefs of Staff, Part I: 1942-1945, The Pacific Theater*, ed. Paul Kesarsis (Frederick, MD: University Publications of America, Inc., 1981), microfilm, reel 9, frames 0024-0070, 713/1: 10-29, 713/2: 30-3, 713/3: 35 & Annex A 1-10, 713/4: 36-8; Spector, 279-80; Craven and Cate, 29.

¹⁷ H. H. Arnold, *Global Mission* (New York: Harper, 1949), 347-8. Arnold also claimed no Pacific commander would concede control of the bombers to another Pacific commander.

The AAF's historians speculate that Arnold may have had a personal motive for retaining control of the bombers because he missed out on combat in World War I, and it looked as if the same thing would happen in World War II. Thus, command of a combat unit--no matter how displaced--would at least partially satisfy his desire to participate directly in the war. See Craven and Cate, 33-41.

¹⁸ Hansell, in his memoirs, says he literally pulled King aside as the admiral and Gen Arnold were walking toward the JCS Conference Room. Hansell (with Arnold's permission) appealed to King in the latter's capacities as both a JCS member and wartime commander of the US Fleet.

Craven and Cate say, "Admiral King's advocacy of the AAF view in this issue is difficult to explain; but the result is as precise as the motives are uncertain" (p. 38). This stimulates two conjectures; either King agreed with Hansell's "rational" analogy, or he was paying Arnold back for the latter's support for seizure of the Marianas. Craven and Cate go on to say Pres. Roosevelt approved the retention of control over VLR bombers by the JCS--with Arnold exercising "executive direction" for the Joint Chiefs--in February 1944. However, as in many other B-29 issues, formal action lagged initial presidential approval. See Craven and Cate, 30, 37.

Also, to Hansell, without the formation of the 20th AF, "there might have been no United States Air Force." See Hansell, *Strategic Air War*, 153-8, 159 (quotes); Joint Chiefs of Staff, "Command and Control of VLR Bomber Forces in the War Against Japan (JCS 742/5)," Washington, DC, 1 Apr 1944, in *Records of the Joint Chiefs of Staff, Part I: 1942-1945, The Pacific Theater*, ed. Paul Kesarsis (Frederick, MD: University Publications of America, Inc., 1981), microfilm, reel 1, frames 0746-0748, 29.

¹⁹ The actual tasking to the 20th AF was to control all VLR (very long range) bombers in the Pacific. During the war, except for the very end when a handful of B-32s flew some missions, the B-29 was the only such aircraft in the theater. B-29s were also sometimes referred to as "VHB" (very heavy bombers). See USSBS, *Strategic Air Operations (Twentieth Air Force)*, 3; HQ, Twentieth Air Force, "General Orders No. 3," Washington, DC, 6 Apr 1944, in Perera, *History of COA*, vol. 2, Tab 88, 2; Craven and Cate, 4.

²⁰ JCS 742/5, 1 Apr 1944, 29-30. Craven and Cate say the JCS inserted this clause at the instigation of the British Chiefs of Staff. See Craven and Cate, 37.

²¹ Hansell, *Strategic Air War*, 165, 173-4, 182-3 (quote), 207-8. As the earlier discussion shows, not all the calls for bombers came from the Navy, whom Hansell claimed to work well with. Several regional AAF commanders were quite put upon by the presence of AAF aircraft in their theater that they did not "own." The antipathy between Hansell and Willis Hale, 7th AF commander, was particularly notable.

²² Memorandum for information No. 59, Joint Intelligence Committee, subject: Japanese Economic Capabilities: Oil, 17 Apr 1943, in *Records of the Joint Chiefs of Staff, Part I: 1942-1945, The Pacific Theater*, ed. Paul Kesarsis (Frederick, MD: University Publications of America, Inc., 1981), microfilm, reel 1, frames 0236-0254, 2. The JIC members came from the AAF and Navy intelligence staffs.

²³ These reports are notable in their failure to mention home island oil facilities as a target. See JIC 152/1, "Optimum Use, Timing, and Deployment of VLR Bombers in the War against Japan," 6 Jan 1944, cited in JCS 742/6, 6 Apr 1944, 47-51; JIC, "The Importance of the East Indies in the Japanese Fuel Oil Position," 13 Apr 1944, in Joint Chiefs of Staff, "Bombing of Refineries at Balikpapan, Palembang, and Surabaya (JCS 797/1)," Washington, DC, 20 Apr 1944, in *Records of the Joint Chiefs of Staff, Part I: 1942-1945, The Pacific Theater*, ed. Paul Kesarsis (Frederick, MD: University Publications of America, Inc., 1981), microfilm, reel 1, frames 0784-0800, 11-13; Report of Joint Intelligence Committee, "Optimum Use, Timing, and Deployment of VLR Bombers in the War Against Japan (J.I.C. 152/3)," Washington, DC, 25 Jan 1944, 1-7. AFHRA File No. 118.04D-3; Craven and Cate, 28.

²⁴ The COA recommended Pladjoe because they thought it would increase tanker requirements more than any other refinery. The Navy representatives on the COA surprisingly gave much credence to the idea of hitting Inner Zone oil targets in hopes of affecting the sea control battle. As for the disagreement between the AAF and civilian COA members, one of the AAF advocates for Inner Zone targets was the erstwhile Col Guido Perera, COA historian and key player in later Air Staff planning. The key civilian in this controversy was Mr. Gregory Hewlett, chairman of the COA's Subcommittee on Far Eastern Petroleum. See Memorandum, Committee of Operations Analysts, to Gen Arnold, CG, AAF, subject: Economic Objectives in the Far East, 11 Nov 1943, 1-9, Enclosure A: 1-4, Enclosure B: 3. AFHRA File No. 118.04D; Perera, vol. 1, 69-70, 77-9, 93; Memorandum, Col Guido R. Perera, COA, to AC/AS, Plans, subject: Strategic Economic Targets for VLR Operations from Davao, Chengtu, and Saipan, Washington, DC, 6 Feb 1944, in Perera, vol. 2, Tab 45, 2; Minutes of meeting of the Committee of Operations Analysts, 17 Sep 1943, 18-24. AFHRA File No. 118.04L. The position of AAF members regarding B-29 efficacy against shipping is exemplified by Memorandum, Col Guido R. Perera, COA, to Col Lindsay, AAF, subject: Attack on Japanese Strategic Targets, Washington, DC, 8 Jun 1944, in Perera, vol. 2, Tab 89, 1. Also see Craven and Cate, 27-8, 30.

²⁵ JCS 742/6, 6 Apr 1944, 31-41 (quote p. 37).

²⁶ *Ibid.*, 38 (quote), 40. At the time of this report's release in Apr 1944, the surface campaign for the Marianas had not yet begun (this would take place in mid-June 1944; see Chapter 2). According to Craven and Cate, the continued "holding out [by various joint planning agencies] for operations from Australia reflected what was essentially a Navy point of view." However, this is a little implausible given the COA's support for Australia-based B-29 operations. See Craven and Cate, 30.

²⁷ Lindsay also expressed fear that such a deployment would be a dispersion of effort detracting from future Marianas operations. As for Arnold's influence, it is extremely unlikely that a colonel (Lindsay) would have been acting completely on his own accord on an issue of such vital importance to the AAF. See Minutes of meeting of Joint Planning Staff held in Combined Chiefs of Staff Building, Washington, DC, 19 Apr 1944 (1415 hrs.), in *Records of the Joint Chiefs of Staff, Part I: 1942-1945, Meetings*, ed. Paul Kesarsis (Frederick, MD: University Publications of America, Inc., 1980), microfilm, reel 6, frames 0103-0113, 4; Craven and Cate, xvi.

As for Lindsay's use of logistic difficulties to argue against a SW Pacific deployment of B-29s, the 6 Apr 44 JCS report stated, "Logistic problems involved in the operation of VLR [bombers] from Australia or New Guinea are for the most part problems of trans-Pacific transportation only." See JCS 742/6, 6 Apr 1944, 38.

²⁸ JCS 797/1, 20 Apr 1944, 1-10 (quotes 3, 8); Kenney, 378, 426. Kenney had again appealed to Arnold for B-29s in March 1944. The AAF's official history claims Arnold knew in March of plans to cancel B-29 deployment to the Southwest Pacific and use Calcutta-based B-29s to strike Palembang (the biggest NEI oil complex). In any case, Arnold would certainly have been aware of the AAF's B-29 "game plan" since he commanded both the AAF and 20th AF. See Craven and Cate, 31.

²⁹ Hansell, *Strategic Air Warfare*, 159-61.

³⁰ Sallagar, 15-23; Memorandum for information No. 31, Joint War Plans Committee, 10 Jul 1944, 2.

³¹ Among Marshall's other actions supporting Army airmen were his move to save the B-17 program in 1938, his selection of Air Corps (AAF) officers for key General Staff billets and commands (an airman, Lt Gen Frank Andrews, was ETO commander before Eisenhower, but was killed in a 1943 plane crash), and, most importantly, his approval of the "Magna Carta" for US air power, AWPD-1. In the words of an AAF observer of the time, "If only one man could be credited with pioneering our mighty surge to airpower that dominated the world, that man would have to be George Catlett Marshall." (Kuter, 65) See Hansell, *Strategic Air Warfare*, 20-1, 30, 40, 45; Futrell, 92; Gen Laurence S. Kuter, USAF (Ret.), "George C. Marshall, Architect of Airpower," *Air Force* 61, no. 8 (Aug 1978): 65-7; CCS 417/9, "Over-all Objective in the War Against Japan," in Joint Chiefs of Staff, "Operations for the Defeat of Japan (JCS 924/5)," Washington, DC, 27 Oct 1944, in *Records of the Joint Chiefs of Staff, Part I: 1942-1945, The Pacific Theater*, ed. Paul Kesarsis (Frederick, MD: University Publications of America, Inc., 1981), microfilm, reel 9, frames 0517-0544, 126-7.

³² USSBS, *Effects of Strategic Bombing*, 3; USSBS, *Summary (Pacific)*, 83.

³³ Gen H. H. Arnold, CG, AAF, to Lt Gen Barney M. Giles, CG, AAF, Pacific Ocean Areas, letter, subject: Strategic Bombing Campaign in Pacific Theater, 14 Apr 1945, in *Army Air Force Operational Letters, 1943-5*, vol. 4, AFHRA File No. 168.491; Hansell, *Strategic Air Warfare*, 251, 264.

³⁴ Brig Gen Lauris Norstad, Chief of Staff, Twentieth Air Force, to Maj Gen Curtis E. LeMay, CG, XXI Bomber Command, letter, subject: Public Pronouncements re: Marianas-based B-29 Operations, 17 Apr 1945, in "Twentieth Air Force Official File," letters collection, AFHRA Microfilm Reel 32812, Frames 1200-1202; Craven and Cate, xx.

³⁵ Meaning such shipping should not be attacked systematically for strategic purposes. See Hansell, *Strategic Air Warfare*, 177-8; Memorandum, Maj Gen L. S. Kuter, AC/AS, Plans, to Brig Gen Byron E. Gates, Chairman, Committee of Operations Analysts, subject: Revision of Basic Study (Report of COA, 11 Nov 1943), 8 Sep 1944. AFHRA File No. 118.04D-1; Report of Committee of Operations Analysts, "Revised Report on Economic Targets in the Far East," Washington, DC, 10 Oct 1944, 2-4, 29-30, 40-6. AFHRA File No. 118.04D-1; Sallagar, 22-4; Perera, vol.1, 115; "Directive Determining Weight of Effort by US Air Forces Which Will Be Required to Accomplish the Earliest Possible, Conclusive Defeat of Japan," Washington, DC, 15 Mar 1944. AFHRA File No. 118.04D-7; Col R. C. Lindsay, AAF, Basic Assumptions to Meet Directive [Determining Weight of Effort by US Air Forces Which Will Be Required to Accomplish the Earliest Possible, Conclusive Defeat of Japan], staff study, Washington, DC, 8 May 1944. AFHRA File No. 118.04D-7; AC/AS Intelligence, Analysis Division, Estimation of Force Required to Neutralize a Selected List of Japanese Targets, staff study, Washington, DC, 15 May 1944, 3-4. AFHRA File No. 118.04D-7; Memorandum for Col Lindsay, AC/AS, Plans, subject: Attack on Japanese Strategic Targets, 8 Jun 1944, 5-9. AFHRA File No. 118.04D-7.

³⁶ Hansell, *Strategic Air Warfare*, 228-32, 277; Report of Joint Target Group, "Background History," Washington, DC, 1944, 1-38. AFHRA File No. 142.6601-1; Report of Joint Target Group, "Strategic Air Employment Suitable to the Current Strategy of the Japanese War (JTG Estimate No. 1)," Washington, DC, 23 Dec 1944, 1-6, Annex A: JTG/IA, 3. AFHRA File No. 142.6602-1; Joint Target Group, Current Joint Target Group Priorities, staff study, Washington, DC, 4 Jan 1945, 1, Tab A: 1-3. AFHRA File No. 142.6601-2; Joint Target Group, The Strategic Mining of Japan, staff study, Washington, DC, 1 Feb 1945, 1-33. AFHRA File No. 142.6602-4; Joint Target Group, Air Bombardment Necessary to Invasion of the Japanese Home Islands, staff study, Washington, DC, 20 May 1945, 1-8 (quote p. 8), Annexes A, B. AFHRA File No. 142.66021-12; Craven and Cate, xix-xx. The JTG was larger than the COA, but was similarly placed under the AAF for administrative purposes, a move possibly influencing its findings. Its membership, at war's end, was equally divided between AAF, Navy, and civilian (mostly from gov't. agencies) representatives.

³⁷ Sallagar, 25-30.

³⁸ The modest effort by CBI-based B-29s against Palembang and East Asian ports notwithstanding.

³⁹ USSBS, *Offensive Minelaying Campaign*, 1, 110. Recalling the recommendations in the last chapter, an earlier mining campaign from the Marianas might have been particularly effective against oil if combined with B-29 attacks on the NEI. "Starvation" started in Mar 1945, but mining from the Marianas could have started by Nov 1944 (or even earlier).

⁴⁰ Hansell, *Strategic Air Warfare*, 198-201 (quote p. 200); Sallagar, 25-30; Craven and Cate, 662-4.

⁴¹ Brig Gen Lauris Norstad, Chief of Staff, Twentieth Air Force, to Brig Gen Roger Ramey, CG, XX Bomber Command, letter, subject: China-based B-29 Operations, 17 Feb 1945, in "Twentieth Air Force Official File," AFHRA Microfilm Reel 32812, Frame 1248; Sallagar, 24-30; Hansell, *Strategic Air Warfare*, 198-201; Gen Curtis E. LeMay and Bill Yenne, *Superfortress: The Story of the B-29 and American Air Power* (New York: McGraw-Hill, 1988), 130; Craven and Cate, 664-6.

⁴² Mierzejewski, 179-82; Hansell, *Strategic Air Warfare*, 170. The mirror-imaging of AAF leaders was partly a result of the War Department's pre-war policy forbidding the teaching of offensive doctrine. This in turn was a product of the isolationist sentiment of the 1930s. Hence, ACTS used the US as the example in their case studies, exacerbating the tendency to mirror-image. However, even had airmen been allowed to use other countries for their studies, an appalling lack of foreign intelligence might have led to the same outcome.

⁴³ For a definitive work on the USSBS, see David MacIsaac, *Strategic Bombing in World War Two: The Story of the United States Strategic Bombing Survey* (New York: Garland Publishing, 1976), 84, 99-102.

⁴⁴ Arnold, 566. Arnold, engaging in a bit of mirror imaging of his own, linked strategic bombing to the national and industrial collapse of Germany, and by extension, to Japan.

The idea of bombing Inner Zone oil "had the enthusiastic indorsement of Gen. Carl Spaatz, slated to command all B-29s under USASTAF [US Army Strategic Air Forces], who had been an advocate of the oil campaign in the ETO." See Craven and Cate, 660. Spaatz' advocacy for oil was the other side of the bomber controversy in Europe discussed earlier in relation to Eisenhower. For more on the European controversy, see Hansell, *Air Plan*, 216-28, 232-7.

⁴⁵ Their assessment of the state of Japanese home island oil came from recent AAF intelligence reports. Memorandum, Brig Gen A. W. Kessner (for), CG, XXI Bomber Command, to Maj Gen L. S. Kuter, Chief of Plans, Twentieth Air Force, subject: Comments on 20 May 1945 Joint Target Group Study, 22 Jun 1945, 1-5. AFHRA File No. 142.66021-12; Craven and Cate, 660.

⁴⁶ Dennis M. Drew and Donald M. Snow, *Making Strategy: An Introduction to National Security Processes and Problems* (Maxwell AFB, AL: Air University Press, 1988), 163.

⁴⁷ Memorandum, Kessner to Kuter, 1.

⁴⁸ Gen H. H. Arnold, CG, AAF, to Lt Gen Millard F. Harmon, CG, AAF, Pacific Ocean Areas, letter, subject: Strategic Bombing Campaign in Pacific Theater, 17 Dec 1944, in *Army Air Force Operational Letters, 1943-5*, vol. 4, AFHRA File No. 168.491.

⁴⁹ While the AAF had only used the APQ-13 against three oil targets, its poor assessment came from its results during a variety of attacks, including urban incendiary strikes.

⁵⁰ The JCS had delayed the redeployment of the 315th from the CBI to the Marianas over the objection of some AAF planners. However, the 315th used this opportunity to train with the Eagle radar. The delay was due to the time required to prepare bases in the Marianas. As additional bases became available, the JCS deployed B-29 units from the US and redeployed CBI-based units to the Marianas. The 315th was one of the last units to go to the Marianas. See USSBS, *Strategic Air Operations (Twentieth Air Force)*, 18; Hansell, *Strategic Air Warfare*, 234; Craven and Cate, 658-9.

⁵¹ Hansell, *Strategic Air Warfare*, 238. See also USSBS, *Air Campaigns of Pacific*, 52.

⁵² Quoted in Hansell, *Strategic Air Warfare*, 244-5. Ironically, as the USSBS discovered after the war, the 315th's results with radar bombing in the oil campaign were disappointing. For every 100 bombs dropped on oil facilities, only 17 landed within plant areas, and only half of *these* actually caused any damage (8.5 percent hit rate). Not only were these results no better than previous bombing efforts, but among the oil attacks themselves, radar bombing was less accurate than visual attacks. Considering these missions were all flown at night, this speaks poorly for the 315th's performance. See USSBS, *Oil in Japan's War*, 121-123.

⁵³ Yet another example of Marshall's support for the AAF. See JCS 742/6, 6 Apr 1944, 44; Hansell, *Strategic Air War*, 20-1.

⁵⁴ "Far Eastern Sources of Information," Apr-Sep 1943. AFHRA File No. 118.04D-8; Draft memorandum by Committee of Operations Analysts, to Gen Arnold, commanding general, AAF, subject: Economic Targets in the Far East, 7 Jun 1944. AFHRA File No. 118.04D-2; USSBS, *Oil in Japan's War*, 120-1; Craven and Cate, 661.

⁵⁵ Even the bottom end of this figure is more than the Japanese produced throughout the war. The COA's high estimates of synthetic fuel production may have been an effort by its AAF members to bolster their position favoring Inner Zone oil attacks. See USSBS, *Oil in Japan's War*, 71; Board of Economic Warfare, Enemy Branch, Notes on Current Economic Information, staff study, Washington, DC, 21 Dec 1942, 3-5. AFHRA File No. 118.04D-6; Minutes of COA meeting, 17 Sep 1943, 3; Perera, vol. 1, 78; Memorandum, Col Guido R. Perera, COA, to Col Lindsay, AAF, subject: Comments on Chart of Proposed VLR Employment, Washington, DC, 5 Aug 1944 in Perera, vol. 2, Tab 93, 1-2; Report of COA, 10 Oct 1944, 41-2; Foreign Economic Administration, Special Areas Branch, Far East Enemy Division, Japanese Potentialities in Liquid Colloidal Fuels, staff study, Washington, DC, Jun 1944, 1, 7-8. AFHRA File No. 142.041-25.

⁵⁶ For example: looking at the flow of feedstocks to synthetic plants; interpreting photos for signs of activity at plants and refineries; integrating photo intelligence with sea search results, e.g., matching tanker flow with plant activity, etc. On the other hand, the resolution of WW II-era aerial photographs was nowhere near as good as today's overhead imagery, so the whole process was rather limited.

⁵⁷ Examples of such works include John W. Dower, *War Without Mercy: Race and Power in the Pacific War* (New York: Pantheon Books, 1986), Ronald Schaffer, *Wings of Judgment: American Bombing in World War II* (New York: Oxford Univ. Press, 1985), and Michael S. Sherry, *The Rise of American Air Power: The Creation of Armageddon* (New Haven, CT: Yale Univ. Press, 1987). For additional sources for this paragraph, see also Kecskemeti, 156, 169-76, 193-7, 209-11; MacIsaac, 107.

⁵⁸ Builder, 73.

Chapter 4

Conclusions, Implications, and Recommendation

This thesis has attempted to show why a blockade was the most effective means of attacking Japan's oil in World War II and why AAF leaders preferred strategic bombing of the Japanese home islands, including Inner Zone oil facilities, over blockade support. The AAF's actions generated much controversy, with B-29 deployment and employment issues at center stage.

While the AAF recognized oil as a center of gravity for Japan, they favored the wrong targets--Inner Zone facilities--to affect it. Why was a blockade effective against Japanese oil? The answer lies in Japan's specific supply and demand conditions. First, Japan had a high demand for oil, demand linked to their military forces and strategy. At the war's start, this demand was at its peak, with Japanese forces executing an aggressive strategy over the entire Western Pacific and East Asian areas. As their territory contracted with the Allied advance, Japan's oil requirements decreased somewhat, but remained relatively high until late 1944. Accompanying their high demand, Japan had serious supply problems. They were forced to import oil over long and contested sea LOCs because they lacked sufficient indigenous oil or synthetic substitutes to satisfy their demand. Furthermore, their tanker resources proved inadequate, and poor blockade countermeasures only exacerbated this inadequacy. Geographic isolation completed Japan's oil dilemma, prohibiting oil storage in neighboring sanctuaries. In sum, the oil blockade was crucial in denying Japan's strategy, although this in itself did not compel Japan to quit fighting due to the complex nature of the Japanese government.¹

However, the fact that a blockade was effective against Japanese oil does not reveal why it was the *most effective* means of targeting oil. To understand why blockade was the best approach, one need only ask what might have happened had there been no blockade? In that case, even if B-29s had destroyed all the oil and refineries in the Inner

Zone, tankers could have taken refined fuel from the NEI to any destination the Japanese desired. Even if B-29 attacks included NEI refineries, the Japanese might have been able to get by on the nearly pure Borneo crude while dispersing smaller refining facilities throughout their empire. Thus, one still arrives at anti-shipping as the focus of a strategy to deny oil to the Japanese military.

For the AAF, this seemingly intuitive answer appears to have drowned in a sea of political, doctrinal and operational motives. In general, service parochialism was the dominant factor in strategy formulation for the Pacific. The AAF's overriding concern was to conduct a strategic bombing campaign against the Japanese homeland. The weapon of choice for such a campaign was the very long range B-29, the AAF's newest and most expensive airplane.² This aircraft was also to prove highly contentious.

The AAF's political motives stemmed from a desire for post-war service independence. Since World War I, Army airmen had gained ever-increasing autonomy, usually over significant resistance from elements in the Army and Navy. Strategic bombing in Europe, expected by air advocates to prove the case for an independent air force, had been inconclusive and had not obviated the need for a surface invasion. To many in the AAF, future independence would require a dramatic, visible demonstration of the effectiveness of strategic bombing. The B-29 program had been more expensive than the Manhattan Project, and "General Arnold and his Air Staff were determined to employ B-29s against the Japanese homeland."³ Blockade support, with its delayed effects, was not visible enough for the AAF. Besides, the blockade was primarily a Navy effort, while strategic bombing was AAF-dominated. Even the bombing of NEI oil facilities, actions meeting the definition of "strategic," would not do, because these facilities were too dispersed and distant from the centers of Japanese political power.⁴

Thus, "the drive for an independent Air Force colored almost everything the AAF planners saw or did" during the war against Japan.⁵ First, these planners persuaded Allied leaders to include strategic bombing in the Pacific strategy. Next, they advocated

seizure of the Marianas, whence B-29s could expose almost the entire Japanese homeland to bombardment. Third, Gen Arnold guaranteed centralized control of the B-29s--resisting "diversions" like maritime missions--by fostering creation of the JCS-controlled and AAF-commanded 20th Air Force. Finally, AAF leaders fended off the main strategy competing for B-29s, support for the blockade through attacks on shipping and NEI oil. Throughout this bureaucratic battle, the AAF shifted their allegiance freely, supporting Navy efforts to acquire the Marianas, then switching their support to the Army's invasion scenario when the Allied grand strategy moved in that direction.⁶ Hence, in late 1944, AAF planners developed target lists linked to an invasion of Japan. In this scenario, planners viewed Inner Zone oil targets as valuable for denying Japan's ability to defend the home islands. However, oil targets fell from favor after Joint Target Group advisors removed support for them, claiming oil required too much effort for the anticipated benefit.

Ultimately, such advice could not overcome AAF strategic bombing doctrine, and Inner Zone oil targets resurfaced as a priority. Doctrinal tenets such as "centralized control of air power by airmen" had already served political ends. Now doctrine was to influence the AAF's operational strategy for the B-29. This doctrine had its roots in pre-war ACTS teaching, wherein oil was integral to a modern nation's industrial web, and the best way to target oil was by bombing refineries and associated oil storage. The AAF's experience in Germany--documented by the USSBS--reinforced these beliefs, adding synthetic fuel plants to the generic oil target set. Ignoring caveats regarding fundamental differences between Germany and Japan, AAF leaders in Washington used preliminary USSBS findings as justification for bombing Inner Zone oil. These AAF leaders never seriously considered the maritime approach to targeting Japanese oil, opposing Navy efforts to use B-29s for aerial mining of LOCs. By the time the AAF finally relented on B-29 aerial mining, when it appeared the Navy might acquire their own heavy bombers

for this purpose, it was too late to affect Japanese oil shipments. The blockade had already eliminated them.

Besides politics and doctrine, the AAF had operational reasons for pursuing Inner Zone oil targets. First, these targets appeared promising for testing radar bombing because their metal construction and (generally) coastal locations promised excellent radar returns. Radar bombing had proved disappointing, and true all-weather capability could buttress arguments for service independence. After all, an air force capable only of day, fair weather operations could not claim equal footing with surface forces, who were somewhat less affected by the environment. Thus, the AAF launched an assault on Inner Zone oil using specially trained and equipped B-29 crews.

Further, the AAF suffered from a shortage of strategic intelligence on the Japanese, increasing their uncertainty. Pre-war air intelligence was terrible, and Army General Staff resistance hampered development of a separate air intelligence organization. After the war's start, analysts met with great difficulty in penetrating the closed Japanese society, and the extent of the Japanese empire precluded US aerial reconnaissance. As a result, planners consistently overestimated Japanese synthetic fuel production and strategic oil reserves. These planners also lacked insight into the nature of the Japanese political system, failing to recognize who held power, who did not, and how US military actions might serve to influence these arrangements in the US's favor. What planners did know--emphatically--was Japanese resistance on Pacific islands had been fierce, and an invasion of the home islands would only be bloodier. Hence, given the wealth of resources available to the US, if Inner Zone oil attacks might help reduce casualties, the AAF felt justified in pursuing them.

Finally, the AAF was not the only service guilty of parochialism in the Pacific Theater. At least one analyst was

left with the impression that each of the forces deployed in the Pacific planned and fought its own separate war, without much regard to its effect

upon, or its possible benefits from, other operations that served essentially the same objective.⁷

The USSBS also criticized the "automatic adherence of military leaders to two concepts of warfare which had become outmoded" due to the evolution of air and submarine power--surface naval engagements and invasion of the Japanese homeland. The USSBS lamented the diversion of resources away from attacks on Japanese LOCs and the NEI to support these concepts. For the Navy's submarines, the influences at work were analogous to strategic bombing's pull on the B-29. Politically, the Navy needed to confront the Japanese military onslaught visibly and directly. Doctrinally, submariners had to overcome the pre-war idea of submarines as only a surface fleet adjunct. Operationally, equipment and training problems hampered their efforts. Together, these forces kept the submarines from pursuing a strategic campaign against Japanese oil tankers until late 1943.⁸

Implications: Future of the USAF Maritime Mission

Interest in maritime operations has ebbed and flowed throughout the USAF's history. After World War II, the new USAF, under budgetary pressure, abandoned much of the maritime capability it had gained during the war. The 1948 Key West Agreement on service roles and missions made interdiction of enemy sea power by air operations, antisubmarine warfare, shipping protection, and aerial minelaying primary Navy functions and collateral Air Force functions. After Key West, USAF maritime capability lay dormant until the mid-1970s, when the rise of a Soviet "blue water" naval threat renewed the US Navy's interest in long range USAF air power for sea surveillance, anti-ship attacks, and aerial mining. This in turn spurred a series of agreements between the Navy and Air Force to increase joint maritime efforts. After the Falklands War, interservice cooperation grew even greater. B-52s were the primary USAF participants, flying "Busy Observer" sea surveillance missions and maintaining maritime capability in several units.⁹

Today, the Soviet threat inspiring USAF maritime capability is gone. The Cold War's end has also spawned an era of defense down-sizing. Almost all B-52Gs, the USAF's premier maritime platform, have been retired "due to fiscal realities and high operating costs" and the Air Force plans to retire the remaining aircraft shortly.¹⁰ Moreover, the change in strategic environment drove the USAF to reverse its plans to give Pacific-based F-16s anti-ship capability. As a collateral function, the USAF cannot use maritime missions to justify additional forces, and in an era of tight budgets, it is also difficult for them to defend taking money "out of hide" to support these missions.¹¹

These moves may be entirely appropriate and rational given the present strategic environment. However, they may also prove ill-suited for the future. Is there a possibility the US may require a USAF maritime capability in the near- or long-term? The answer depends on several factors one can distill down to a single proposition--*if the strategic environment dictates requirements for US maritime capability and if US Naval capability proves insufficient to satisfy these requirements, then the US should develop the USAF's maritime capability.*¹² This proposition--probably a little too imprecise as it stands--clearly requires detailed analysis to validate its independent and dependent variables, as well as the relationships between and among them.

If the above proposition passes the rigors of analysis, there are a number of circumstances where USAF maritime capability could prove valuable. The January 1993 *National Security Strategy of the United States* lists four fundamental elements of national defense strategy. These are: strategic deterrence and defense; forward presence; crisis response; and reconstitution (preparing to fight a resurgent superpower threat). USAF maritime capability could conceivably play a role in the last three of these, and might be especially useful in crisis response and forward presence. While no threat of Soviet magnitude is on the horizon, several potential adversaries, e.g., Iran and China, have recently begun acquiring significant naval capabilities. Warfighting commanders-in-chief (CINCs) could find a robust USAF maritime capability valuable in future

regional crises, especially when they need a fast response. Maritime operations also fit USAF visions of power projection under the Global Reach--Global Power banner. Global Reach--Global Power also suggests power projection might substitute for forward presence, an idea USAF Chief of Staff General Merrill A. McPeak has recently advanced in several speeches. Gen McPeak believes "modern air and space power offers our nation a new form of peacetime presence."¹³

In an uncertain world--whether unipolar, multipolar, or oriented around non-state actors--maintaining a USAF maritime capability might provide decision makers with strategic flexibility. This is especially true if a future adversary is either a naval power or dependent on seaborne imports for vital commodities such as oil and munitions. In these cases, forward presence in the form of quickly responding USAF aircraft with maritime capability can provide a credible deterrent, particularly when Naval forces are not able to respond rapidly enough. Such maritime capability can also enhance power projection if deterrence fails.¹⁴ Conversely, it is also possible the Navy's "From the Sea" maritime strategy, with its emphasis on power projection over sea control, may prove wrong. Navy leaders clearly expect future adversaries in the littoral environment to pose a less potent surface threat than the Soviets.¹⁵ Again, the situation begs objective study.

However, as in World War II, a potential impediment to objectivity today is an apparent USAF bias against maritime operations. Service independence seems secure, and is thus not an issue, although primacy in the post-Cold War strategic environment is at stake. Hence, one needs to look at today's emerging USAF doctrine for indications of service priorities. Today's USAF seems focused on hyperwar and strategic attack, methods used to justify air power's dominance not only in The Gulf War, but also in the new "regional" focus of DOD planning scenarios.¹⁶ Hyperwar depends on stealth, precision, and time compression to concentrate fires on multiple targets simultaneously (parallel attack). This theoretically can overwhelm an enemy's ability to respond, inducing a state of strategic paralysis. Time compression is the key to hyperwar, and this

aspect is inconsistent with the USAF perception of most maritime operations--exemplified by the AAF's experience with Japan--as slow working.¹⁷

Service doctrinal manuals reflect the USAF's diminished interest in maritime operations. The two volume AFM 1-1, *Basic Aerospace Doctrine of the United States Air Force*, scarcely mentions these operations. Only one volume of Air Force operational doctrine covers the subject, and it is 19 years old. Tactical doctrine, the "nuts and bolts" of how to employ specific weapon systems, is also notably deficient in the maritime area. Further, while the Air Force Doctrine Center plans to begin developing maritime doctrine in the summer of 1994, this is not their top priority.¹⁸

Recent USAF decisions regarding maritime-capable systems may also reflect institutional preferences. For years, the USAF leader in maritime operations was the B-52G. Within the last ten years, as many as six B-52G squadrons at a time had maritime capabilities, training with the Navy in sea surveillance, aerial mining, and anti-ship attacks. With the retirement of almost all B-52Gs, much of this capability is gone. The USAF plans to modify only 20 of its 95 B-52Hs for enhanced maritime capability in a program starting immediately but stretching until the third quarter of FY 97. Rethinking its policy--and the need for an interim capability--the USAF recently added a program "to have a 'strap on' Harpoon [anti-ship missile] capability on a few 'H-models' to cover the Harpoon requirement" until the B-52H modification is complete. Gen McPeak himself directed this interim modification of four B-52Hs using components stripped from retired B-52Gs.¹⁹ Conversely, the USAF does not plan to pursue dedicated maritime capability on the B-1 until Phase III of the Bomber Roadmap, putting it at least ten years down the road. The USAF also has no near-term plans to acquire maritime capability for any of its fighter units beyond what these units can provide with existing weapons.²⁰

Absent detailed, and perhaps competing, analyses, USAF attitudes and actions reflect uncertainty as to the need for future maritime capability, or the shape any such

capability might take. Perhaps USAF leaders would benefit from the advice of future Chief of Staff Lt Gen Nathan F. Twining at the end of World War II,

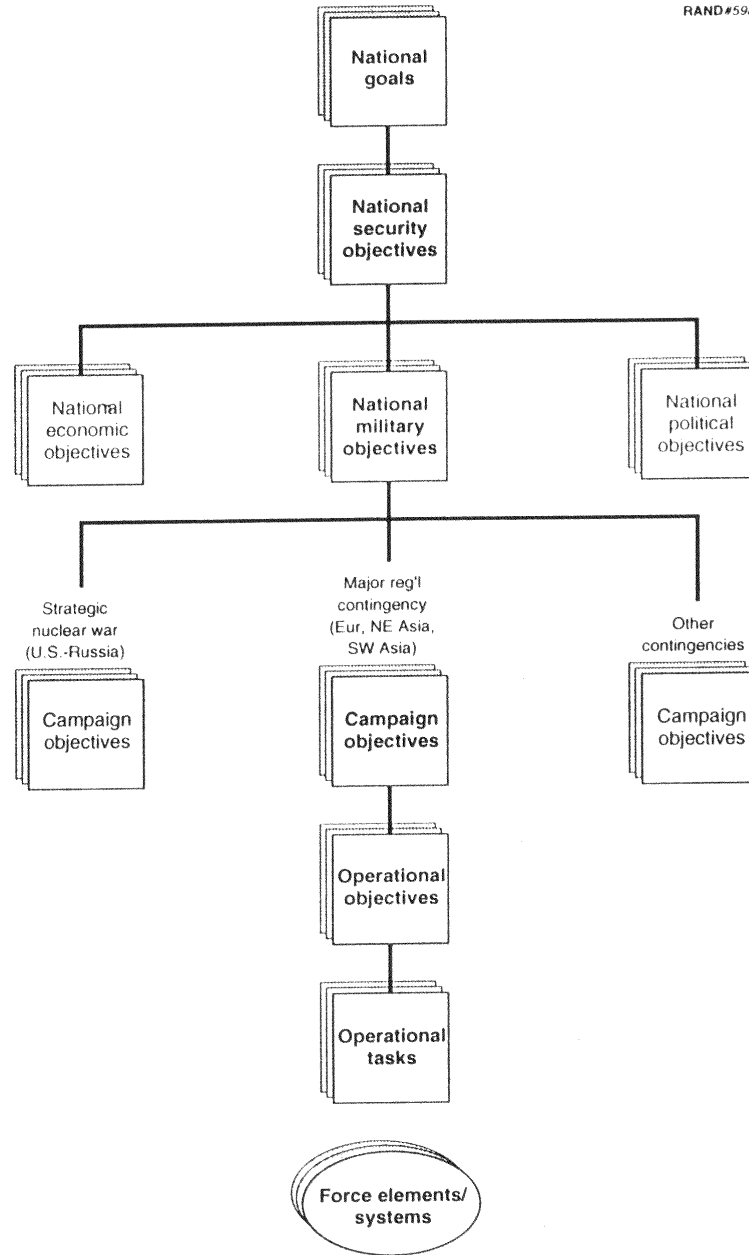
Since the B-29 mining campaign demonstrated for the first time that air power can carry the brunt of a strategic blockade of a powerful maritime nation, it is recommended that [employing such maritime capability] be given careful consideration and evaluation in future military planning.²¹

Recommendation

How can the USAF give "careful consideration and evaluation" to developing future maritime capability? Rather than acting on parochial interests or short-term political and budgetary considerations, perhaps the USAF should pursue a more rational approach. Thus, this thesis offers a single recommendation--*the USAF should systematically identify any future maritime requirements and act accordingly*. This would hopefully accomplish two aims: 1) determining if USAF maritime capability will be required in the future strategic environment, examining both the near- and long-term; and 2) overcoming or minimizing bureaucratic bias against such capability.

An excellent approach for such an analysis would be the "strategies-to-tasks" framework developed by a former USAF general, Glenn A. Kent. This methodology, widely adopted by various USAF organizations, including the Air Combat Command (ACC), works "top down" to determine requirements. Strategies-to-tasks starts with broad national objectives, links national military objectives to these, and repeats the process with ever-increasing specificity through campaign objectives, operational objectives (e.g., for air missions), and operational tasks performed by systems (see Figure 4). After tasks necessary to support the campaign (theater) strategies are identified, alternative operational concepts and their associated systems can be evaluated in terms of how well they achieve the required tasks. Advocacy then works in the opposite direction, linking systems to tasks and so on up through the national level. According to ACC Commander Gen John M. "Mike" Loh, "If we cannot clearly make this link, we are unlikely to find support for the need."²²

To illustrate, one can cursorily examine how strategies-to-tasks analysis might work in considering future USAF maritime capability. First, analysts would need to develop a vision, or alternative visions, of the future strategic environment, determining what time frame(s) to examine. Today, a top down look from national security objectives, through national military objectives, would almost certainly indicate a regional focus, perhaps revealing a relatively benign environment for maritime threats as well.²³ However, if the future vision indicates the need for the US to conduct maritime tasks, it would be necessary to analyze alternative operational concepts. Such an analysis might involve a cost-effectiveness comparison between concepts involving forecast Naval forces acting alone, USAF forces acting alone, and a mix of forces.



Source: David E. Thaler, *Strategies to Tasks: A Framework for Linking Means and Ends*, RAND Report MR-300-AF (Santa Monica, CA: RAND Corporation, 1993), x.

Figure 4. Strategies-to-Tasks Model

In deciding who should perform these strategies-to-tasks analyses, the USAF has two options. They can either generate the studies themselves or concede the initiative to outside agents. Clearly, an internal effort would be more palatable to USAF leaders, but

would have to be as free of institutional bias as possible to be credible and avoid outside intervention.²⁴ Gen Kent, among others, has argued for a greater use of analysis within the USAF, even urging decision-makers to make wide use of competing analyses. He also criticizes analysts who lack discipline, or worse, let their analyses cross the line into advocacy. On an optimistic note, according to Carl Builder, the USAF has historically been the most comfortable of all the services with analysis, having a number of resources at its disposal for this purpose.²⁵ Possible candidates for such studies include the Air Force Studies and Analyses Agency, Air Staff/MAJCOM planners, Air University research teams, or commissioned studies by organizations like the RAND Corporation.

If the USAF decides not to conduct a study of its future role in maritime operations--or cannot do it in an unbiased manner--then it may be faced with choices imposed by outside agencies. Either warfighting CINC staffs or the JCS's Joint Staff can determine requirements. Some experts, including Gen Kent and political scientist Barry Posen, believe these staffs merely substitute "purple" parochialism for service parochialism, and are more interested in maintaining *status quo* shares of existing resources than achieving truly integrated strategies. In a provocative article, Edward Luttwak recently accused the Joint Staff of using disingenuous methods to ensure adherence to its own preferred strategic vision, thereby usurping civilian control.²⁶

To Posen, since "no service willingly accepts second priority [in strategic plans], with an inferior claim on resources," only civilian intervention can forge integrated, i.e., rational, military strategies.²⁷ He believes the services have traditionally preferred a less activist model of civilian control oriented around a carefully negotiated split of resources and missions among the services. This is the basis of the 1948 Key West Agreement, and may also influence the work of Congress' newly mandated "private" commission to review roles and missions periodically.²⁸

However, Posen finds such arbitration insufficient, believing the only way to break parochial shackles and force the services to innovate honestly is by active civilian

intervention in military doctrine and strategy. "Civilians must carefully audit the doctrines of their military organizations to ensure they stress the appropriate type of military operations, reconcile political ends with military means, and change with political circumstances and technological developments."²⁹ For civilian leaders, it is only a short leap from auditing to intervening in charting the course of future service development. Thus, if the USAF cannot or will not be an honest broker, it is quite likely that civilian leaders will eventually force the Air Force to accept choices it could have more easily made for itself.

The Last Word

Since Billy Mitchell's time, airmen have touted their ability to destroy ships. In World War II, land based aircraft got the chance to prove it. Despite internal forces limiting their participation in the blockade of Japan--a blockade featuring oil as its centerpiece--AAF aircraft proved effective at sea surveillance, anti-ship attacks, and aerial mining. Their attacks on the NEI oil facilities served as a force multiplier for their own maritime strikes, as well as those by Navy submarines. Although this blockade proved highly effective in denying Japan's strategy, when faced with vastly reduced budgets, the post-war USAF let their maritime capability atrophy. In that era, they put their faith behind strategic bombing and nuclear deterrence. The USAF and US Navy, fearing an emergent Soviet naval threat, revitalized USAF maritime capabilities in the 1970s and 80s. However, with the Cold War's end, the emergence of hyperwar, and slashed defense budgets, the USAF now finds itself with little maritime capability once again. While this may be an appropriate choice for today, only a detailed and unbiased analysis--preferably self-initiated by the Air Force--can determine whether the future will require an increased USAF emphasis on maritime operations.

NOTES

¹ While oil attacks against Japan helped deny the Japanese strategy, they had little punishing effect on the Japanese people for reasons discussed in Chap. 2. Whether punishment might work as a coercive mechanism in an oil blockade is not known, but would depend on a host of factors. Certainly, the UN thinks it might, as their actions (detailed in Chap. 1) against Serbia and Haiti indicate.

² The B-29 was ideal for covering the great Pacific distances, particularly from available and foreseeable bases.

³ Builder, 67-73, 97; Hansell, *Strategic Air War*, 141 (quote).

⁴ According to the AAF's official history, before the 15 June 1944 initiation of the B-29 "Operation Matterhorn" from CBI bases, "A few strikes against oil installations in the Netherlands East Indies (NEI) had most nearly approximated the AAF's classic concept of strategic bombardment, but those targets, at the very edge of the tactical radius of Liberators [B-24s], were far from metropolitan Japan." See Craven and Cate, 4.

⁵ Builder, 72.

⁶ In short, when such a move became prudent politically due to the weight of support, especially by Gen Marshall, behind it. As for the Marianas campaign, the key opponent to any Central Pacific thrust was Gen MacArthur, who exerted a powerful influence over Army decision-making due to the sheer weight of his prestige as the senior Army general and former chief of staff.

⁷ Sallagar, 70-1 (quote). Also see Miller, 366-8.

⁸ USSBS, *Air Campaigns of Pacific*, 3-4; Middleton, 92-112.

⁹ Executive Order 9950, Functions of the Armed Forces and the Joint Chiefs of Staff ["Key West Agreement"], 21 Apr 1948, in *The United States Air Force: Basic Documents on Roles and Missions*, ed. Richard I. Wolf (Washington, DC: Office of Air Force History, 1987), 161, 164, 167; Futrell, *Ideas, Concepts, Doctrine*, 198; Chilstrom, 38-9; Memorandum of agreement between the Chief of Naval Operations and the Chief of Staff, United States Air Force, subject: the Concept of Operations for USAF Forces Collateral Functions Training, 2 Sep 1975 in Wolf, 396-400; Maj Michael E. Moeller, USAF, former Chief, Weapons and Tactics Division, 42 BMW (DOJ), interview with author, Maxwell AFB, AL, 6 Apr 1994; Lt Col Robert C. Kuhlo, USAF, *Attacking Ships: Command and Control of Joint Antiship Operations* (Maxwell AFB, AL: Air University Press, 1990), 4, 39-41.

Also see Memorandum of agreement between the Chief of Naval Operations and the Chief of Staff, United States Air Force, subject: Joint USN/USAF Efforts to Enhance USAF Contributions to Maritime Operations, 9 Sep 1982 and Memorandum of agreement between the Department of the Air Force and the Department of the Navy, subject: Joint USN/USAF Efforts for Enhancement of Joint Cooperation, 25 Oct 1982. The former document pledged the services to increase: joint maritime exercises; C3 interoperability; shared technical training; exchange officer programs; cooperation in tactical weapons effectiveness; and shared use of training ranges and facilities (e.g., RED FLAG). The latter document sought increased

USAF support for: maritime LOC defense; indications and warning; surveillance and targeting; C3; aerial minelaying; electronic warfare; delivery of Navy SEALs; and air refueling.

¹⁰ Secretary of the Air Force, Air Force Issues Team (SAF/LLX), *Air Force Issues Book 1993* (Washington, DC: GPO, 1993), 17 (quote); Message, 301700Z Mar 94, Chief of Staff, USAF to Commander, Air Combat Command and Commander, Air Force Materiel Command, subject: Recovery of Have Nap/Harpoon Capability, Washington, DC, 30 Mar 1994.

¹¹ Maj Robert Liebl, USAF, Chief, Air to Surface Section, Operations and Training Branch, HQ ACC (DOTOS), telephone interview with author, 7 Mar 1994; DOD Directive 5100.1, 13; Chilstrom, 39, 42-3.

¹² This is more of an illustrative proposition than one ready for detailed testing. Obviously, it could be applied to other military forces besides the USAF if these services could fulfill maritime requirements.

¹³ The last (official) national security strategy document was released by the Bush Administration. See The White House, *National Security Strategy of the United States* (Washington DC: GPO, 1993), 14-5.

For an explanation of Global Reach--Global Power's vision of power projection and its link to forward presence, see Department of the Air Force, *The Air Force and U.S. National Security: Global Reach--Global Power*, Washington, DC, June 1990, 8-10. Interestingly, the cited section of this document is followed by a pitch for USAF maritime capability, particularly anti-shipping. Also see David R. Mets, *Land-Based Air Power in Third World Crises* (Maxwell AFB, AL: Air University Press, 1986), 144.

Finally, for the latest USAF position on forward presence, see Gen Merrill A. McPeak, chief of staff, US Air Force, address to Air Force Association Symposium, Orlando, FL, 18 Feb 1994 (quote, p. 2); Gen Merrill A. McPeak, chief of staff, US Air Force, address to the Houston Forum Club Luncheon, Houston, TX, 16 Mar 1994.

¹⁴ For quick response, one must also remember that, like the other services, the future Navy will also be smaller as well, making it less responsive. A notional quick response, offensive scenario might be heavily dependent on land-based air power, as Gen John M. "Mike" Loh, ACC Commander, points out in John M. Loh, Gen, USAF, "Advocating Mission Needs in Tomorrow's World," *Airpower Journal*, Spring 1992, 10.

¹⁵ To the author, "From the Sea" is more a doctrine than a strategy due to its notional nature, but such is the way of interservice semantics. In testimony to Congress on the new Naval strategy, CNO Adm Frank Kelso listed the following Joint Mission Areas: Joint Strike, Joint Littoral Warfare, Joint Surveillance, Joint Space and Electronic Warfare/Intelligence, Strategic Deterrence, Strategic Sealift/Protection. Again, he depicted sea control--a portion of what he calls "battlespace dominance"--as a naval force responsibility. Seeing a lower threat from surface combatants in regional scenarios, the Navy appears to feel its already robust force of Harpoon "shooters" can handle the job. See Lt Col William H. Franklin, USAF, Chief, Operational Doctrine Development, Air Force Doctrine Center (XD), telephone interview with author, 3 Mar 1994; Statement of Adm Frank Kelso, Chief of Naval Operations, in Senate, *Department of Defense Appropriations for FY 1994: Hearings before a Subcommittee of the Committee on Appropriations*, 103d Cong., 1st sess., 1993, pt. 1: 257-65.

¹⁶ For example, see Christopher Bowie et al., *The New Calculus: Analyzing Airpower's Changing Role in Joint Theater Campaigns*, RAND Report MR-149-AF (Santa Monica, CA: RAND Corporation, 1993).

¹⁷ It also does not help that the model for hyperwar occurred in DESERT STORM, a physical environment as different from the maritime arena as one can get. The Persian Gulf itself is an exception to this, of course. For discussion of hyperwar, see Warden, 79-81. For an extrapolation of hyperwar into the idea of strategic paralysis, see Maj Jason B. Barlow, USAF, "Strategic Paralysis: An Airpower Theory for the Present (unpublished thesis, School of Advanced Airpower Studies, Maxwell AFB, AL, May 1992).

The attitude of WW II AAF leaders toward maritime missions, specifically aerial mining, is detailed in Sallagar, 53-7.

Ironically, today's planes carrying modern maritime weapons (mines and anti-ship missiles) pose a combination rivaling precision guided munitions in accuracy. This brings up an interesting point; such precision, coupled with high volume delivery, responsiveness, and (possibly) stealth, could spearhead a form of maritime hyperwar, provided an enemy depended on seaborne imports for critical military items.

¹⁸ AFM 1-1 devotes one sentence to maritime operations in vol. 1, and vol. 2 only mentions it in an appendix reprint of portions of DOD 5100.1 (USAF collateral functions). See AFM 1-1, *Basic Aerospace Doctrine of the United States Air Force*, vol. 1, March 1992, 18-9; AFM 1-1, vol. 2, 260; AFM 2-13, *Sea Surveillance Operations*, 30 Apr 1975; Franklin interview; Capt Robin Vanderberry, USAF, Instructor Weapons Officer, USAF Weapons School Det. 1, telephone interviews with author, 18 Mar 1994, 5 Apr 1994.

¹⁹ Kuhlo, 4, 41; Vanderberry interview; Maj Gary Brand, USAF, Chief, Bomber Operations Section, Doctrine Branch, HQ ACC (XPJD), telephone interview with author, 8 Mar 1994; Maj Gary Brand, HQ ACC/XPJD, to Maj Stephen L. Wolborsky, SAAS student, letter, subject: Current Status of USAF Maritime Mission, 17 Mar 1994, 1 (quote); Lt Col Van Davis, USAF, Chief, Guided Munitions Section, Armaments Branch, HQ ACC (DRAS), telephone interviews with author, 11 Mar 1994, 5 Apr 1994.

For additional information on the B-52H modification program, also see Franklin interview; Maj Gary Martin, USAF, Action Officer, Weapons Division, Directorate of Forces, HQ USAF (XOFW) telephone interview with author, 3 Mar 1994; Secretary of the AF, AF Issues Team, 19; Message, 301700Z Mar 94.

The latter reference, a message from Gen McPeak to the ACC and AFMC commanders, directs immediate modification of four B-52Hs for the AGM-142 Have Nap missile as well as the four with Harpoon. The USAF has reprogrammed \$3.3M for this action. The message also directs ACC and AFMC "to continue the retirement of remaining B-52Gs."

²⁰ For B-1 status, see Senate, *Department of Defense Appropriations for FY 1994*, pt. 4: 221-2; Letter, Brand to Wolborsky, 17 Mar 1994, 1; Davis interview; Franklin interview; Martin interview.

As for fighters, according to an F-16 instructor at the USAF Weapons School, some F-16 units conduct anti-ship training using their normal surface attack weapons (e.g., AGM-65 "Maverick" missiles, laser guided bombs, cluster bomb units, etc.) instead of specialized maritime weapons (e.g., the AGM-84 "Harpoon" missile). This instructor likened support for such missions as equivalent to supporting CAS, i.e., a relatively low priority mission, but one F-16 units realize they need to be ready to perform if necessary. Other missions USAF fighters fly to support joint maritime operations (JMO) are their normal doctrinal missions, e.g., counterair, interdiction, CAS, etc. However, in JMO they do train with the Navy, coordinating critical areas like command and control. See MCR(ACC) 51-50, vol. 8, *F-16 Pilot Training*, 19 Feb 1993, 37; Liebl interview; Davis interview; Capt Ron Garan, USAF, Air-to-Ground Flight Commander, F-16 Division, USAF Weapons School, telephone interview with author, 16 May 1994.

²¹ USSBS, *Offensive Minelaying Campaign*, 5.

²² Loh, 4-9 (quote p. 6). Also see Glenn A. Kent, *A Framework for Defense Planning* (Santa Monica, CA: RAND Corporation, 1989); David E. Thaler, *Strategies to Tasks: A Framework for Linking Means and Ends*, RAND Report MR-300-AF (Santa Monica, CA: RAND Corporation, 1993).

²³ Loh, 6; Edward N. Luttwak, "Washington's Biggest Scandal," *Commentary* 97, no. 5 (May 1994): 31.

²⁴ Recognizing that it is unlikely one can avoid bias completely, it is important to make analysts and decision-makers more sensitive to bias and its effects.

²⁵ Glenn A. Kent, Maj Gen, USAF, "In My Opinion: Decision-Making," *Air University Review* 22, no. 4 (May-Jun 1971): 62-5; Builder, 104-5.

²⁶ Kent, "In My Opinion," 62; Barry R. Posen, *The Source of Military Doctrine: France, Britain, and Germany Between the World Wars* (Ithaca, NY: Cornell Univ. Press, 1984), 226; Luttwak, 29-33.

²⁷ Posen, 226.

²⁸ Such mechanisms establish traditional patterns that may prove hard to deviate from in the future. They also let the services buttress their positions with the force of law. For example, the Key West model of service roles and missions is, with only minor changes, what the US military adheres to today. As for the new roles and missions commission, the president appoints this commission's members. Congress took this step in response to their dissatisfaction with former CJCS Gen Colin Powell's report on service roles, missions, and functions. See House, *National Defense Authorization Act for Fiscal Year 1994: Conference Report to Accompany H.R. 2401*, 103d Cong., 1st sess., 10 Nov 1993, 197-9; Chairman of the Joint Chiefs of Staff, *Report on the Roles, Missions, and Functions of the Armed Forces of the United States*, Washington, DC, 10 Feb 1993.

Also see Posen, 226; Executive Order 9950 ["Key West Agreement"], 21 Apr 1948, in Wolf, 161-7.

²⁹ Posen, 220-36, 241 (quote). Posen's historical study of France, Britain, and Germany between the world wars shows such civilian intervention to be appropriate whether one ascribes to either Balance of Power or Organization Theory as an explanation for nation-state behavior.

Bibliography

A. PRIMARY SOURCES

1. Articles and Books

Arnold, H. H. *Global Mission*. New York: Harper, 1949.

Hansell, Haywood S., Jr. *The Air Plan that Defeated Hitler*. Atlanta: Higgins-McArthur, Longino & Porter, 1972.

----- *The Strategic Air War Against Germany and Japan*. Washington, DC: GPO, 1986.

Ike, Nobutaka, ed. and trans. *Japan's Decision for War: Records of the 1941 Policy Conferences*. Stanford, CA: Stanford Univ. Press, 1967.

Kenney, George C. *General Kenney Reports*. 1949; rpt. Washington, DC: GPO, 1987.

Kuter, Laurence S., Gen, USAF (Ret.). "George C. Marshall, Architect of Airpower." *Air Force* 61, no. 8 (Aug 1978): 65-7.

LeMay, Curtis E., Gen, and Bill Yenne. *Superfortress: The Story of the B-29 and American Air Power*. New York: McGraw-Hill, 1988.

Mitchell, William. *Winged Defense: The Development and Possibilities of Modern Air Power--Economic and Military*. 1925; rpt. New York: Dover Publications, 1988.

Webster's New Collegiate Dictionary. Springfield, MA: G. & C. Merriam Co., 1977.

"Wide-ranging Sanctions Imposed Against Yugoslavia." *UN Chronicle* 29, no. 3 (Sep 1992): 5-12.

Wolf, Richard I., ed. *The United States Air Force: Basic Documents on Roles and Missions*. Washington, DC: Office of Air Force History, 1987.

2. Interviews

Brand, Gary, Maj, USAF. Chief, Bomber Operations Section, Doctrine Branch, HQ ACC (XPJD). Telephone interview with author, 8 Mar 1994.

Davis, Van, Lt Col, USAF. Chief, Guided Munitions Section, Armaments Branch, HQ ACC (DRAS). Telephone interviews with author, 11 Mar 1994, 5 Apr 1994.

Franklin, William H., Lt Col, USAF. Chief, Operational Doctrine Development, Air Force Doctrine Center (XD). Telephone interview with author, 3 Mar 1994.

Garan, Ron, Capt, USAF. Air-to-Ground Flight Commander, F-16 Division, USAF Weapons School. Telephone interview with author, 16 May 1994.

Liebl, Robert, Maj, USAF. Chief, Air to Surface Section, Operations and Training Branch, HQ ACC (DOTOS). Telephone interview with author, 7 Mar 1994.

Martin, Gary, Maj, USAF. Action Officer, Weapons Division, Directorate of Forces, HQ USAF (XOFW). Telephone interview with author, 3 Mar 1994.

Moeller, Michael E., Maj, USAF. Former Chief, Weapons and Tactics Division, 42 BMW (DOJ). Interview with author, Maxwell AFB, AL, 6 Apr 1994.

Vanderberry, Robin, Capt, USAF. Instructor Weapons Officer, USAF Weapons School Det. 1. Telephone interviews with author, 18 Mar 1994, 5 Apr 1994.

3. Manuals and Regulations

AFM 1-1. *Basic Aerospace Doctrine of the United States Air Force*, 2 vols., March 1992.

AFM 2-13. *Sea Surveillance Operations*, 30 Apr 1975.

DOD Directive 5100.1. *Functions of the Department of Defense and Its Major Components*, 25 Sep 1987.

Joint Pub 1-02. *Department of Defense Dictionary of Military and Associated Terms*, 1 Dec 1989.

Joint Pub 3-0. *Doctrine for Joint Operations*, 9 Sep 1993.

Joint Pub 3-04. *Doctrine for Joint Maritime Operations (Air)*, 31 Jul 1991.

Joint Pub 3-15. *Joint Doctrine for Barriers, Obstacles, and Mine Warfare*, 30 Jun 1993.

MCR(ACC) 51-50, vol. 8. *F-16 Pilot Training*, 19 Feb 1993.

4. Other Published Documents

Chairman of the Joint Chiefs of Staff. *Report on the Roles, Missions, and Functions of the Armed Forces of the United States*. Washington, DC, 10 Feb 1993.

Department of the Air Force. *The Air Force and U.S. National Security: Global Reach--Global Power*. Washington, DC, June 1990.

Energy Information Administration. *International Energy Annual: 1991*. Washington DC: Government Printing Office, 1992.

Gulf War Air Power Survey (GWAPS). Vol. 1, *Planning and Command and Control*. Washington, DC: GPO, 1993.

----- Vol. 2, *Operations and Effects and Effectiveness*. Washington, DC: GPO, 1993.

Headquarters, US Army Air Forces, AC/AS, Intelligence. *Mission Accomplished*. Washington, DC: GPO, 1946.

House. *National Defense Authorization Act for Fiscal Year 1994: Conference Report to Accompany H.R. 2401*. 103d Cong., 1st sess., 10 Nov 1993.

Kesarsis, Paul, ed. *Records of the Joint Chiefs of Staff, Part I: 1942-1945, The Pacific Theater*. Frederick, MD: University Publications of America, Inc., 1981. Microfilm, 14 Reels.

----- *Records of the Joint Chiefs of Staff, Part I: 1942-1945, Meetings*. Frederick, MD: University Publications of America, Inc., 1980. Microfilm, 7 reels.

King, Ernest J., Adm. *US Navy at War 1941-1945: Official Reports to the Secretary of the Navy*. Washington, DC: GPO, 1946.

Secretary of the Air Force, Air Force Issues Team (SAF/LLX). *Air Force Issues Book 1993*. Washington, DC: GPO, 1993.

Senate. *Department of Defense Appropriations for FY 1994: Hearings before a Subcommittee of the Committee on Appropriations*, pt. 1. 103d Cong., 1st sess., 1993.

----- *Department of Defense Appropriations for FY 1994: Hearings before a Subcommittee of the Committee on Appropriations*, pt. 4. 103d Cong., 1st sess., 1994.

Statement by Ambassador Perkins, US Permanent Representative to the UN, before the UN Security Council. "Aggression by the Serbian Regime," 30 May 1992. *US Department of State Dispatch* 3, no. 23 (8 Jun 1992): 448.

UN Security Council Resolution 841, "Crisis in Haiti," 16 Jun 1993. *US Department of State Dispatch* 4, no. 26 (28 Jun 1993): 469-70.

UN Security Council Resolution 757, "Sanctions Against the Former Yugoslavia," 30 May 1992. *US Department of State Dispatch* 3, no. 23 (8 Jun 1992): 448-451.

United States Strategic Bombing Survey (USSBS), Office of the Chairman. *Summary Report (Pacific War)*. 1 Jul 1946; rpt. Maxwell AFB, AL: Air Univ. Press, 1987.

USSBS, Oil and Chemical Division. *Oil in Japan's War (Pacific War No. 51)*. Washington, DC: GPO, Feb 1946.

USSBS, Overall Economic Effects Division. *The Effects of Strategic Bombing on Japan's War Economy (Pacific War No. 53)*. Washington, DC: GPO, Dec 1946.

USSBS, Transportation Division. *The War Against Japanese Transportation 1941-1945 (Pacific War No. 54)*. Washington, DC: GPO, May 1947.

USSBS, Military Analysis Division. *The Effect of Air Action on Japanese Ground Logistics (Pacific War No. 64)*. Washington, DC: GPO, Apr 1947.

----- *The Strategic Air Operations of Very Heavy Bombardment in the War Against Japan (Twentieth Air Force) (Pacific War No. 66)*. Washington, DC: GPO, 1 Sep 1946.

----- *Air Operations in China, Burma, India World War II (Pacific War No. 67)*. Washington, DC: GPO, Mar 1947.

----- *The Thirteenth Air Force in the War Against Japan (Pacific War No. 69)*. Washington, DC: GPO, 30 Sep 1946.

----- *The Seventh and Eleventh Air Forces in the War Against Japan (Pacific War No. 70)*. Washington, DC: GPO, May 1947.

----- *The Fifth Air Force in the War Against Japan (Pacific War No. 71)*. Washington, DC: GPO, Jun 1947.

----- *Air Campaigns of the Pacific War (Pacific War No. 71a)*. Washington, DC: GPO, Jul 1947.

USSBS, Naval Analysis Division. *The Offensive Minelaying Campaign Against Japan (Pacific War No. 78)*. Washington, DC: GPO, 1 Nov 1946.

----- *The Campaigns of the Pacific War (Pacific War No, 73)*. Washington, DC: GPO, 1946.

The White House. *National Security Strategy of the United States*. Washington DC: GPO, 1993.

5. Other Unpublished Documents

AC/AS Intelligence, Analysis Division. Estimation of Force Required to Neutralize a Selected List of Japanese Targets. Staff study, Washington, DC, 15 May 1944. AFHRA File No. 118.04D-7.

Arnold, H. H., Gen, CG, AAF, to Lt Gen Barney M. Giles, CG, AAF, Pacific Ocean Areas. Letter, subject: Strategic Bombing Campaign in Pacific Theater, 14 Apr 1945. *Army Air Force Operational Letters, 1943-5*, vol. 4. AFHRA File No. 168.491.

Arnold, H. H., Gen, CG, AAF, to Lt Gen Millard F. Harmon, CG, AAF, Pacific Ocean Areas. Letter, subject: Strategic Bombing Campaign in Pacific Theater, 17 Dec 1944. *Army Air Force Operational Letters, 1943-5*, vol. 4. AFHRA File No. 168.491.

Arnold, H. H., Lt Gen, CG, AAF, to Adm E. J. King, Commander-in-Chief, US Fleet. Letter, subject: Diversion of AAF Bombers to Pacific Theater, 24 Feb 1942. *Army Air Force Operational Letters, 1943-5*, vol. 2. AFHRA File No. 168.491.

Arnold, H. H., Gen, CG, AAF, to Gen George C. Kenney, CG, Far East Air Forces. Letter, subject: B-29 Operations, 15 Dec 1944. *Army Air Force Operational Letters, 1943-5*, vol. 4. AFHRA File No. 168.491.

Arnold, H. H., Gen, CG, AAF, to Maj Gen Curtis E. LeMay, CG, XX Bomber Command. Letter, subject: B-29 Operations, 17 Dec 1944. *Army Air Force Operational Letters, 1943-5*, vol. 2. AFHRA File No. 168.491.

Board of Economic Warfare, Enemy Branch. Notes on Current Economic Information. Staff study, Washington, DC, 21 Dec 1942. AFHRA File No. 118.04D-6.

Brand, Gary, Maj, HQ ACC/XPJD, to Maj Stephen L. Wolborsky, SAAS student. Letter, subject: Current Status of USAF Maritime Mission, 17 Mar 1994.

Chennault, C. L., Maj Gen, CG, Fourteenth Air Force, to Gen H. H. Arnold, CG, AAF. Letter, subject: Operations in China, 14 Sep 1944. AFHRA File No. 142.041-34.

“Directive Determining Weight of Effort by US Air Forces Which Will Be Required to Accomplish the Earliest Possible, Conclusive Defeat of Japan.” Washington, DC, 15 Mar 1944. AFHRA File No. 118.04D-7.

Draft memorandum, Committee of Operations Analysts, to Gen Arnold, CG, AAF. Subject: Economic Targets in the Far East, 7 Jun 1944. AFHRA File No. 118.04D-2.

Fairchild, Muir S., Maj. “National Economic Structure.” Lecture Number AF-9-C/10-C, Air Corps Tactical School, Maxwell Field, AL, 5 Apr 1939. AFHRA File No. 248.2020A-9.

----- “Primary Strategic Objectives of Air Forces.” Lecture Number AF-14-C, Air Corps Tactical School, Maxwell Field, AL, 11 Apr 1939. AFHRA File No. 248.2020A-14.

"Far Eastern Sources of Information." Apr-Sep 1943. AFHRA File No. 118.04D-8.

Foreign Economic Administration, Special Areas Branch, Far East Enemy Division. Japanese Potentialities in Liquid Colloidal Fuels. Staff study, Washington, DC, Jun 1944. AFHRA File No. 142.041-25.

Giles, Barney M., Maj Gen, Chief of Staff, HQ USAAF, to Lt Gen George C. Kenney, CG, USAAF, Southwest Pacific Area. Letter, subject: Declining B-29 Deployment to Theater, 16 Nov 1943. *Army Air Force Operational Letters, 1943-5*, vol. 2. AFHRA File No. 168.491.

Hale, Willis H., Maj Gen, CG, Seventh Air Force, to Gen H. H. Arnold, CG, AAF. Letter, subject: Request for Operational Control of B-29s Deployed to Marianas, 5 Apr 1944. *Army Air Force Operational Letters, 1943-5*, vol. 4. AFHRA File No. 168.491.

Joint Target Group. Air Bombardment Necessary to Invasion of the Japanese Home Islands. Staff study, Washington, DC, 20 May 1945. AFHRA File No. 142.66021-12.

Joint Target Group. Current Joint Target Group Priorities. Staff study, Washington, DC, 4 Jan 1945. AFHRA File No. 142.6601-2.

Joint Target Group. The Strategic Mining of Japan. Staff study, Washington, DC, 1 Feb 1945. AFHRA File No. 142.6602-4.

Kenney, George C., Lt Gen, CG, USAAF, Southwest Pacific Area, to Gen H. H. Arnold, CG, AAF. Letter, subject: Request for B-29 Deployment to Theater, 29 Oct 43. *Army Air Force Operational Letters, 1943-5*, vol. 2. AFHRA File No. 168.491.

Lindsay, R. C., Col, AAF. Basic Assumptions to Meet Directive [Determining Weight of Effort by US Air Forces Which Will Be Required to Accomplish the Earliest Possible, Conclusive Defeat of Japan]. Staff study, Washington, DC, 8 May 1944. AFHRA File No. 118.04D-7.

McPeak, Merrill A., Gen, Chief of Staff, US Air Force. Address to Air Force Association Symposium, Orlando, FL, 18 Feb 1994.

----- Address to the Houston Forum Club Luncheon, Houston, TX, 16 Mar 1994.

Memorandum of agreement between the Chief of Naval Operations and the Chief of Staff, United States Air Force. Subject: Joint USN/USAF Efforts to Enhance USAF Contributions to Maritime Operations, 9 Sep 1982.

Memorandum of agreement between the Department of the Air Force and the Department of the Navy. Subject: Joint USN/USAF Efforts for Enhancement of Joint Cooperation, 25 Oct 1982.

Memorandum, Committee of Operations Analysts, to Gen Arnold, CG, AAF. Subject: Economic Objectives in the Far East, 11 Nov 1943. AFHRA File No. 118.04D.

Memorandum, Brig Gen A. W. Kessner (for), CG, XXI Bomber Command, to Maj Gen L. S. Kuter, Chief of Plans, Twentieth Air Force. Subject: Comments on 20 May 1945 Joint Target Group Study, 22 Jun 1945. AFHRA File No. 142.66021-12.

Memorandum, Maj Gen L. S. Kuter, AC/AS, Plans, to Brig Gen Byron E. Gates, Chairman, Committee of Operations Analysts. Subject: Revision of Basic Study (Report of COA, 11 Nov 1943), 8 Sep 1944. AFHRA File No. 118.04D-1.

Memorandum for Col Lindsay, AC/AS, Plans. Subject: Attack on Japanese Strategic Targets, 8 Jun 1944. AFHRA File No. 118.04D-7.

Message, 301700Z Mar 94, Chief of Staff, USAF to Commander, Air Combat Command and Commander, Air Force Materiel Command. Subject: Recovery of Have Nap/Harpoon Capability. Washington, DC, 30 Mar 1994.

Minutes of meeting of the Committee of Operations Analysts, 17 Sep 1943. AFHRA File No. 118.04L.

Norstad, Lauris, Brig Gen, Chief of Staff, Twentieth Air Force, to Brig Gen H. S. Hansell, Jr., CG, XXI Bomber Command. Letter, subject: Marianas-based B-29 Operations, 10 Nov 1944. "Twentieth Air Force Official File," letters collection, AFHRA Microfilm Reel 32812, Frame 1245.

Norstad, Lauris, Brig Gen, Chief of Staff, Twentieth Air Force, to Maj Gen Curtis E. LeMay, CG, XX Bomber Command. Letter, subject: China and Marianas-based B-29 Operations, 9 Dec 1944. "Twentieth Air Force Official File," letters collection, AFHRA Microfilm Reel 32812, Frame 1255.

Norstad, Lauris, Brig Gen, Chief of Staff, Twentieth Air Force, to Maj Gen Curtis E. LeMay, CG, XXI Bomber Command. Letter, subject: Marianas-based B-29 Operations, 10 Apr 1945. "Twentieth Air Force Official File," letters collection, AFHRA Microfilm Reel 32812, Frame 1204.

Norstad, Lauris, Brig Gen, Chief of Staff, Twentieth Air Force, to Maj Gen Curtis E. LeMay, CG, XXI Bomber Command. Letter, subject: Public Pronouncements re: Marianas-based B-29 Operations, 17 Apr 1945. "Twentieth Air Force Official File," letters collection, AFHRA Microfilm Reel 32812, Frames 1200-1202.

Norstad, Lauris, Brig Gen, Chief of Staff, Twentieth Air Force, to Brig Gen Roger Ramey, CG, XX Bomber Command. Letter, subject: China-based B-29 Operations, 17 Feb 1945. "Twentieth Air Force Official File," letters collection, AFHRA Microfilm Reel 32812, Frame 1248.

Perera, Guido R. History of the Organization and Operations of the Committee of Operations Analysts, 16 Nov 1942-10 Oct 1944, 2 vols.

Report of Air War Plans Division. "A.W.P.D.-42: Requirements for Air Ascendancy." Washington, DC, 9 Sep 1942. AFHRA File No. 145.82-42.

Report of Committee of Operations Analysts. "Revised Report on Economic Targets in the Far East." Washington, DC, 10 Oct 1944. AFHRA File No. 118.04D-1.

Report of Committee of Operations Analysts, Subcommittee on Far Eastern Petroleum Including Aviation Gasoline Supplement. "Revision of [11 Nov 1943] Report to Committee of Operations Analysts." Washington, DC, 1 May 1944. AFHRA File No. 118.04D.

Report of Joint Intelligence Committee. "Optimum Use, Timing, and Deployment of VLR Bombers in the War Against Japan (J.I.C. 152/3)." Washington, DC, 25 Jan 1944. AFHRA File No. 118.04D-3.

Report of Joint Target Group. "Background History." Washington, DC, 1944. AFHRA File No. 142.6601-1.

Report of Joint Target Group. "Strategic Air Employment Suitable to the Current Strategy of the Japanese War (JTG Estimate No. 1)." Washington, DC, 23 Dec 1944. AFHRA File No. 142.6602-1.

Reports of HQ Tenth Air Force and HQ Fourteenth Air Force. "Japanese Sea Lanes." 1943-45. AFHRA File No. 142.041-8.

Report of HQ USAF/XOOC (Checkmate). "The Checkmate Air Campaign Concept Development Process." Washington, DC, 9 Jul 1993.

Vanderberry, Robin, Capt, Instructor, USAF Weapons School, to Maj Stephen L. Wolborsky, SAAS student. Letter, subject: Additions to Interview on USAF Maritime Capabilities, 5 Apr 1994.

"Weight of US Air Effort to Accomplish Earliest Possible Defeat of Japan." Washington, DC, 6 May 1944. AFHRA File No. 118.04D-7.

B. SECONDARY SOURCES

1. Articles

Adelman, M. A.. "Oil Fallacies." *Foreign Policy*, Spring 1991, 3-16.

Anderson, Irvine H., Jr. "The 1941 *De Facto* Embargo on Oil to Japan: A Bureaucratic Reflex." *Pacific History Review* 44 (1975): 201-31.

Kent, Glenn A., Maj Gen, USAF. "In My Opinion: Decision-Making." *Air University Review* 22, no. 4 (May-Jun 1971): 62-5.

Loh, John M., Gen, USAF. "Advocating Mission Needs in Tomorrow's World." *Airpower Journal*, Spring 1992, 4-13.

Luttwak, Edward N. "Washington's Biggest Scandal." *Commentary* 97, no. 5 (May 1994): 29-33.

Morton, Louis. "The Decision to Use the Atomic Bomb." *Foreign Affairs* 35 (Jan 1957): 334-53.

Pape, Robert A. "Why Japan Surrendered." *International Security* 18 (Fall 1993): 154-201.

"UN Security Council Votes for Yugoslavia Sanctions." *Editorials on File* 23, no. 11 (1-15 Jun 1992): 664.

2. Books

Blair, Clay, Jr. *Silent Victory: The U.S. Submarine War Against Japan*. Philadelphia: J. B. Lippincott Co., 1975.

Brodie, Bernard. *Strategy in the Missile Age*. Princeton, NJ: Princeton Univ. Press, 1965.

Builder, Carl H. *The Masks of War: American Military Styles in Strategy and Analysis*. Baltimore, MD: Johns Hopkins Univ. Press, 1989.

Clodfelter, Mark. *The Limits of Air Power: The American Bombing of North Vietnam*. New York: The Free Press, 1989.

Colombos, C. John. *The International Law of the Sea*, 6th ed. rev. London: Longmans, 1967.

Coox, Alvin D. "The Rise and Fall of the Imperial Japanese Air Forces." *Air Power and Warfare: The Proceedings of the 8th Military History Symposium, US Air Force Academy, 18-20 Oct 1978*. Eds. Alfred F. Hurley and Robert C. Ehrharts. Washington, DC: GPO, 1979.

----- "Strategic Bombing in the Pacific: The American Air Assault on Japan, 1942-1945." *Case Studies in Strategic Bombardment* (Draft). Washington, DC: Center for Air Force History (scheduled for 1994 release).

Craven, Wesley Frank and James Lea Cate, eds. *The Army Air Forces in World War II*. Vol. 5, *The Pacific: Matterhorn to Nagasaki, June 1944 to August 1945*. 1953, rpt. Washington, DC: GPO, 1983.

Dower, John W. *War Without Mercy: Race and Power in the Pacific War*. New York: Pantheon Books, 1986.

- Drew, Dennis M. and Donald M. Snow. *Making Strategy: An Introduction to National Security Processes and Problems*. Maxwell AFB, AL: Air University Press, 1988.
- Futrell, Robert F. *Ideas, Concepts, Doctrine: Basic Thinking in the United States Air Force*. Vol. 1, 1907-1960. Maxwell AFB, AL: Air University Press, 1989.
- . *The United States Air Force in Korea 1950-1953*, rev. ed. Washington, DC: Office of Air Force History, 1983.
- Greer, Thomas H. *The Development of Air Doctrine in the Army Air Arm 1917-1941*. 1955; rpt. Washington, DC: GPO, 1985.
- Hagan, Kenneth J. *This People's Navy: The Making of American Sea Power*. New York: The Free Press, 1991.
- Kecskemeti, Paul. *Strategic Surrender: The Politics of Victory and Defeat*. Stanford, CA: Stanford Univ. Press, 1958.
- Keegan, John. *The Price of Admiralty: The Evolution of Naval Warfare*. New York: Penguin Books, 1988.
- Kent, Glenn A. *A Framework for Defense Planning*. Santa Monica, CA: RAND Corporation, 1989.
- Lang, S. Houston, Robin Churchill, and Myron Nordquist, eds. *New Directions in the Law of the Sea*. Vol. 2, *Documents*. Dobbs Ferry, NY: Oceana Publications, 1973.
- MacIsaac, David. *Strategic Bombing in World War Two: The Story of the United States Strategic Bombing Survey*. New York: Garland Publishing, 1976.
- Mets, David R. *Land-Based Air Power in Third World Crises*. Maxwell AFB, AL: Air University Press, 1986.
- Middleton, Drew. *Submarine: The Ultimate Naval Weapon--Its Past, Present, and Future*. Chicago: Playboy Press, 1976.
- Mierzejewski, Alfred C. *The Collapse of the German War Economy, 1944-1945: Allied Air Power and the German National Railway*. Chapel Hill, NC: Univ. of North Carolina Press, 1988.
- Miller, Edward S. *War Plan Orange*. Annapolis, MD: Naval Institute Press, 1991.
- Morrison, Samuel Eliot. *History of United States Naval Operations in World War II*. Vol. 8, *New Guinea and the Marianas, March 1944-August 1944*. Boston: Little, Brown, and Co., 1953.
- Overy, R. J. *The Air War 1939-1945*. 1980; rpt. Chelsea, MI: Scarborough House, 1991.

Posen, Barry R. *The Source of Military Doctrine: France, Britain, and Germany Between the World Wars*. Ithaca, NY: Cornell Univ. Press, 1984.

Potter, E. B., ed. *Sea Power: A Naval History*, 2d ed. Annapolis, MD: Naval Institute Press, 1981.

Schaffer, Ronald. *Wings of Judgment: American Bombing in World War II*. New York: Oxford Univ. Press, 1985.

Sherry, Michael S. *The Rise of American Air Power: The Creation of Armageddon*. New Haven, CT: Yale Univ. Press, 1987.

Spector, Ronald H. *Eagle Against the Sun: The American War with Japan*. New York: Vintage Books, 1985.

Warden, John A., III, Col, USAF. "Employing Air Power in the Twenty-first Century." *The Future of Air Power in the Aftermath of the Gulf War*. Eds. Richard H. Schultz and Robert L. Pfaltzgraff, Jr. Maxwell AFB, AL: Air Univ. Press, 1992.

3. Reports and Studies

Barlow, Jason B., Maj, USAF. "Strategic Paralysis: An Airpower Theory for the Present." Unpublished thesis, School of Advanced Airpower Studies, Maxwell AFB, AL, May 1992.

Bowie, Christopher et al. *The New Calculus: Analyzing Airpower's Changing Role in Joint Theater Campaigns*. RAND Report MR-149-AF. Santa Monica, CA: RAND Corporation, 1993.

Chilstrom, John S., Maj, USAF. *Mines Away!: The Significance of US Army Air Forces Minelaying in World War II*. Thesis, School of Advanced Airpower Studies, Maxwell AFB, AL: Air University Press, Oct 1993.

Felker, Edward J., Maj, USAF. "Does the Air Force Practice Its Doctrine? A Limited and Focused Air Campaign Concept." Unpublished Master's thesis, Army Command and General Staff College, Fort Leavenworth, KS, 1991.

Graper, Mark, Andrew Weaver, and Stephen L. Wolborsky. "Petroleum as a Center of Gravity." Unpublished Air Campaign Planning Course Paper, Air Command and Staff College, Maxwell AFB, AL, Jun 1993.

Kuhlo, Robert C., Lt Col, USAF. *Attacking Ships: Command and Control of Joint Antiship Operations*. Maxwell AFB, AL: Air University Press, 1990.

Sallagar, Frederick M. *Lessons From an Aerial Mining Campaign (Operation 'Starvation')*. RAND Report R-1322-PR. Santa Monica, CA: RAND Corporation, Apr 1974. AFHRA File No. K.146.003-112 (74/04/00).

Thaler, David E. *Strategies to Tasks: A Framework for Linking Means and Ends*. RAND Report MR-300-AF. Santa Monica, CA: RAND Corporation, 1993.

Wuesthoff, Scott E. "Utility of Targeting the Petroleum-Based Sector of a Nation's Economic Infrastructure." Unpublished thesis, School of Advanced Airpower Studies, Maxwell AFB, AL, May 1993.