



UNDERSTANDING
SACRIFICE

Activity: Examining Effectiveness: The Strategic Air Campaign in World War II



Guiding question:

Was the Allied strategic bombing campaign effective and was it necessary for the Allies to win the war?

DEVELOPED BY BRADLEY LIEBRECHT

Grade Level(s): 6-8, 9-12

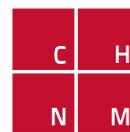
Subject(s): Social Studies

Cemetery Connection: Florence American Cemetery

Fallen Hero Connection: Staff Sergeant George R. Kennison



NHD
NATIONAL
HISTORY DAY



ROY ROSENZWEIG
Center FOR
History AND
New Media

Overview

Using interactive campaign maps from the American Battle Monuments Commission, short text selections, photographs, and primary and secondary sources, students will develop and support a claim on the effectiveness of the Allied strategic bombing campaign in the European Theatre of World War II.

Historical Context

World War II was a major global event that brought the world into the modern age, using weapons of war that had been developed or upgraded since the end of World War I. Improvements in aviation technology gave Allied and Axis commanders more aerial military options. One of the more controversial decisions of the war was the bombardment of German cities and industrial centers in an attempt to break German will and hasten the end of war. The morality and effectiveness of strategic bombardment (especially the intentional targeting of civilians) was a source of debate when the campaign was launched and intensified after the American decision to drop atomic bombs on Japan.

Objectives

At the conclusion of this lesson, students will be able to

- Describe the role the U.S. Army Air Forces (USAAF) and the Royal Air Force (RAF) Bomber Command played in the overall war effort; and
- Assess the role of strategic bombing in ending the war.

Standards Connections

Connections to Common Core

CCSS.ELA-LITERACY.RI.8.1 Cite the textual evidence that most strongly supports an analysis of what the text says explicitly as well as inferences drawn from the text.

“My students inspired me to learn more about World War II. The war is a frequent research topic for NHD (National History Day) projects in my classroom. Since my fallen hero was a B-24 gunner, I took an interest in researching the effectiveness of the strategic bombing campaign.”
— Bradley Liebrecht

Liebrecht teaches at West Valley Junior High School in Yakima, Washington.

CCSS.ELA-LITERACY.RI.8.9 Analyze a case in which two or more texts provide conflicting information on the same topic and identify where the texts disagree on matters of fact or interpretation.

CCSS.ELA-LITERACY.W.8.1.A Introduce claim(s), acknowledge and distinguish the claim(s) from alternate or opposing claims, and organize the reasons and evidence logically.

CCSS.ELA-LITERACY.W.8.1.B Support claim(s) with logical reasoning and relevant evidence, using accurate, credible sources and demonstrating an understanding of the topic or text.

Connections to C3 Framework

D2.His.3.6-8. Use questions generated about individuals and groups to analyze why they, and the developments they shaped, are seen as historically significant.

Documents Used ★ indicates an ABMC source

Primary Sources

“Conclusion,” United States Strategic Bombing Survey
United States Department of War, September 30, 1945
Hathi Trust Digital Library
<http://hdl.handle.net/2027/mdp.39015049492716>

Painting, *Fire Over Ploesti*
Air Force Historical Support Division

Photograph, *The aftermath of the bombing shows an apocalyptic scene as the city residents attempt to pick through the rubble...*, 1945
Air Force Historical Support Division
<http://www.afhso.af.mil/shared/media/photodb/photos/100225-F-5102W-005.jpg>

Photograph, Alfred T. Palmer, *Part of the cowling for one of the motors for a B-25 bomber is assembled in the engine department of North American [Aviation, Inc.]'s Inglewood, California, plant.*, October 1942
U.S Office of War Information, Library of Congress

Photograph, *B-17s from 8th Air Force were the other arm of the Dresden attacks...*, 1945
Air Force Historical Support Division
<http://www.afhso.af.mil/shared/media/photodb/photos/100225-F-5102W-004.jpg>

Photograph, *The first big raid by the 8th Air Force was on a Focke Wulf plant in Marienburg...*, 1943

National Archives and Records Administration (535972)

<https://catalog.archives.gov/id/535972>

Photograph, Howard R. Hollam, *Production. B-24E (Liberator) Bombers at Willow Run...*, 1942

Library of Congress (LC-USE6- D-008769)

<https://www.loc.gov/item/oem2002007234/PP/>

Photograph, *Last Moments of a Flaming B-24 Liberator after Raid over Austria...*, c. 1942-1945

Library of Congress (LC-USZ62-43778)

<http://www.loc.gov/pictures/item/2002722136/>

Photograph, *Production. B-24E (Liberator) Bombers at Willow Run...*, July 1942 - February 1943

Library of Congress (LC-USE6- D-008769)

<https://www.loc.gov/item/oem2002007239/PP/>

Photograph, *The B-17 Flying Fortress "The Memphis Belle"...*, June 9, 1943

Air Force Historical Support Division

<http://www.afhso.af.mil/shared/media/photodb/photos/021001-O-9999J-009.jpg>

Photograph, *View from B-17 Flying Fortress U.S. Army 8th AF Bomber command...*, December 31, 1944

Library of Congress (LC-USZ62-64814)

<http://www.loc.gov/pictures/item/2002721596/>

Photograph, *War Theatre #12 (Italy)*, June 21, 1944

National Archives and Records Administration (A22763)

Photograph, *War Theatre #12 (Italy)*, February 2, 1944

National Archives and Records Administration (A22763)

Photograph, *War Theatre #12 (Italy) Airplanes...*, December 20, 1944

National Archives and Records Administration (A22763)

Photograph, *War Theatre #12 (Italy) Wrecks*, July 18, 1944

National Archives and Records Administration (A22763)

Photograph, *War Theatre #12 (Genoa, Italy) Bombing*

National Archives and Records Administration (A22763)

Photograph, *Waves of Consolidated B-24 Liberators of the 15th AAF Fly over the Target Area, the Concordia Vega Oil Refinery, Ploesti, Romania, Unmindful of Bursting Flak, after Dropping Their Bomb Loads on the Oil Cracking Plant, on 31 May '44...*, May 31, 1944

Library of Congress (LC-USZ62-97497)

<https://www.loc.gov/item/89712239/>

“The Role of Air Power,” United States Strategic Bombing Survey

United States Department of War, September 30, 1945

Hathi Trust Digital Library

<http://hdl.handle.net/2027/mdp.39015049492716>

Various graphics, U.S. Strategic Bombing Survey

United States Department of War, September 30, 1945

<http://hdl.handle.net/2027/mdp.39015049492716>

Secondary Sources

Strategic Bombing Campaign Interactive ★

American Battle Monuments Commission

http://www.abmc.gov/sites/default/files/interactive/interactive_files/SBC_Web/index.html

Materials

- Sets of Strategic Bombing Campaign Picture Cards
- Photograph Analysis Worksheet
- Strategic Bombing Campaign Interactive Worksheet
- Strategic Bombing Campaign Assessment
- Strategic Bombing Campaign Assessment Rubric
- Computer with internet capability and projector to access *Strategic Bombing Campaign Interactive*
- Speakers to listen to the interactive videos
- Computer lab time for students to work on the assessment
- Headphones for individual student use while listening to the interactive videos

Lesson Preparation

- Create one set of the Strategic Bombing Campaign Picture Cards for each group of four to six students.
- Print one copy of the Photograph Analysis Worksheet for each student.

- Print one copy of “The Role of Air Power” and “Various Graphics” from the U.S. Strategic Bombing Survey for each student.
- Print one copy of the “Conclusions” excerpt from the U.S. Strategic Bombing Survey for each student to read after completing his or her assessment.
- Set up classroom technology.
- Test all online resources before class.
- Divide students into groups of four to six students each.

Procedure

Activity One (30 minutes)

- Hand each group of four to six students one set of Strategic Bombing Campaign Picture Cards.
- Give each student one copy of the Photograph Analysis Worksheet.
- Project the following questions on the screen for students to discuss as they examine the picture cards:
 - *What is the purpose of bombing in war?*
 - *Imagine that an enemy were to bombard our hometown from the air. What would that be like?*
 - *What sort of targets would an enemy want to target if they were bombing our town? Why would those targets be important?*
- Push students to understand the material and psychological costs of aerial bombardment.
- Ask each student to select one image and complete the Photograph Analysis Worksheet. This can be completed for homework if needed.

Activity Two (60 minutes)

- Give each student a copy of each the following:
 - The Role of Air Power, U.S. Strategic Bombing Survey
 - Various Graphics, U.S. Strategic Bombing Survey
 - Strategic Bombing Campaign Interactive Worksheet
- Pull up the *Strategic Bombing Campaign Interactive* online and watch the first clip that explains how strategic bombing developed after World War I. If students have their own device, this could be done individually.
- Direct students to answer the questions on the Strategic Bombing Campaign Interactive Worksheet.
- Instruct students to watch the next video in the series and continue answering the questions. Stop and check for understanding as needed.
 - *Teacher Tip:* Students can use the briefings and map features in the interactive to complete the questions in addition to the videos.

Assessment

- Review the Strategic Bombing Assessment as a class.
- Review the Strategic Bombing Assessment Rubric and solicit questions from students to provide clarity.
- Introduce the excerpts from the Strategic Bombing Survey. Have the students read “The Role of Airpower” for discussion.
- Instruct students to read silently and then discuss excerpts in their table groups.
- Provide time with computers and additional supports as needed.
- Use the rubric and the scoring guide to evaluate the project.

Methods for Extension

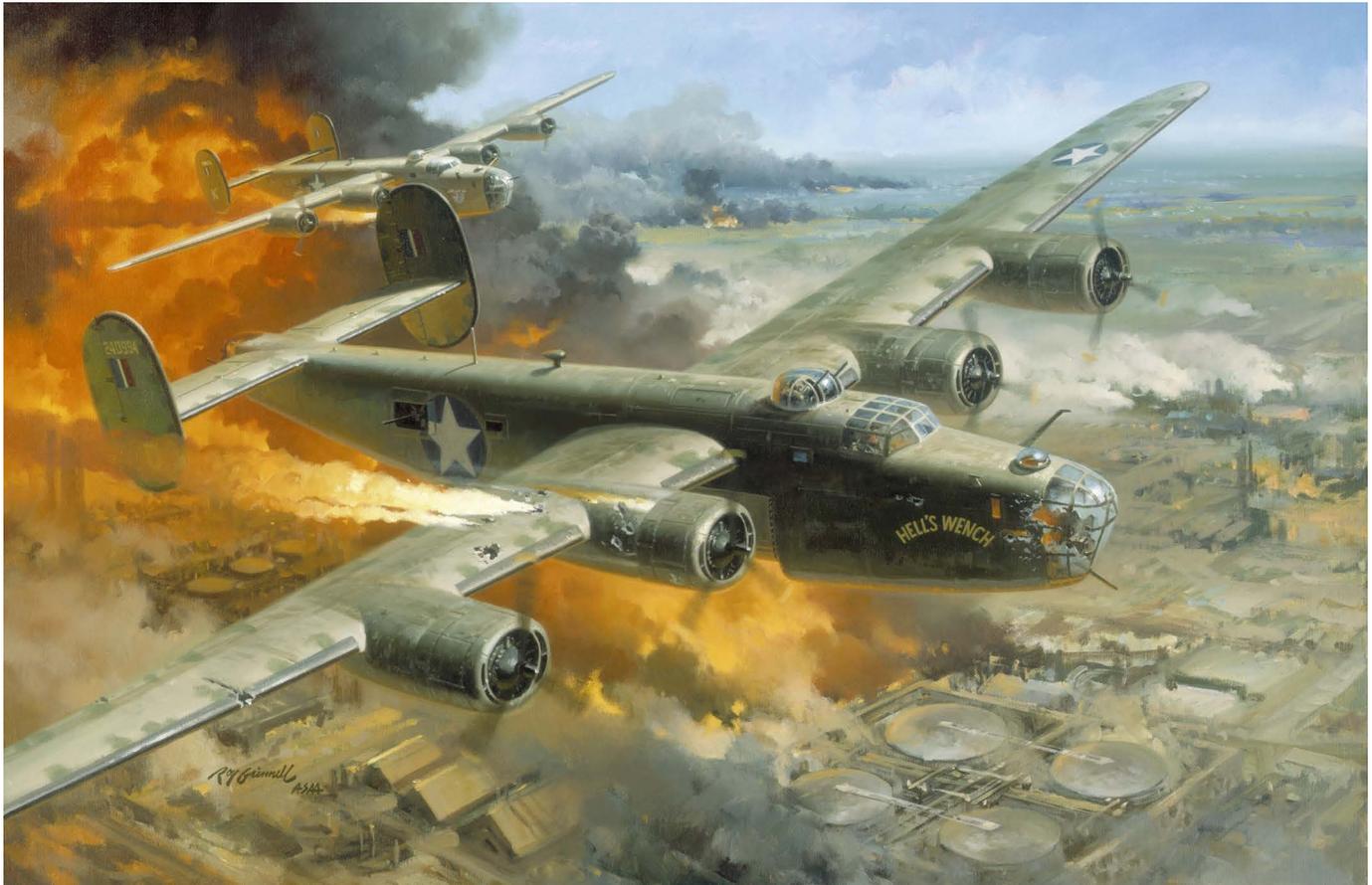
- Students with more interest in the U.S. Air Force can learn more about the Army Air Forces in World War II and compare and contrast its role with that of the modern Air Force.
- Students can explore the role air power plays in modern military campaigns, such as the recent conflicts in Iraq and Afghanistan.
- Students could research and add information to their projects comparing the bombing campaign in Germany to the bombing campaign in Japan.
- Students who are interested in reading fiction relating to this topic could read Kurt Vonnegut’s *Slaughterhouse 5* (with parental permission).
- The American Battle Monuments Commission maintains U.S. military cemeteries overseas. These cemeteries are permanent memorials to the fallen, but it is important that students know the stories of those who rest here. To learn more about the stories of some of the men and women who made the ultimate sacrifice, visit www.abmceducation.org/understandingsacrifice/abmc-sites.

Adaptations

- Teachers can adapt this activity for struggling readers (or younger grade levels) by allowing the students to complete a graphic organizer before writing the essay. Teachers could also provide additional picture cards to help students grasp the importance of the air campaign.
- Teachers can provide sentence stems to help ESL/ELL students.

Painting, *Fire Over Ploesti*

Air Historical Support Division



Photograph, *The first big raid by the 8th Air Force was on a Focke Wulf plant in Marienburg..., 1943*

National Archives and Records Administration (535972)



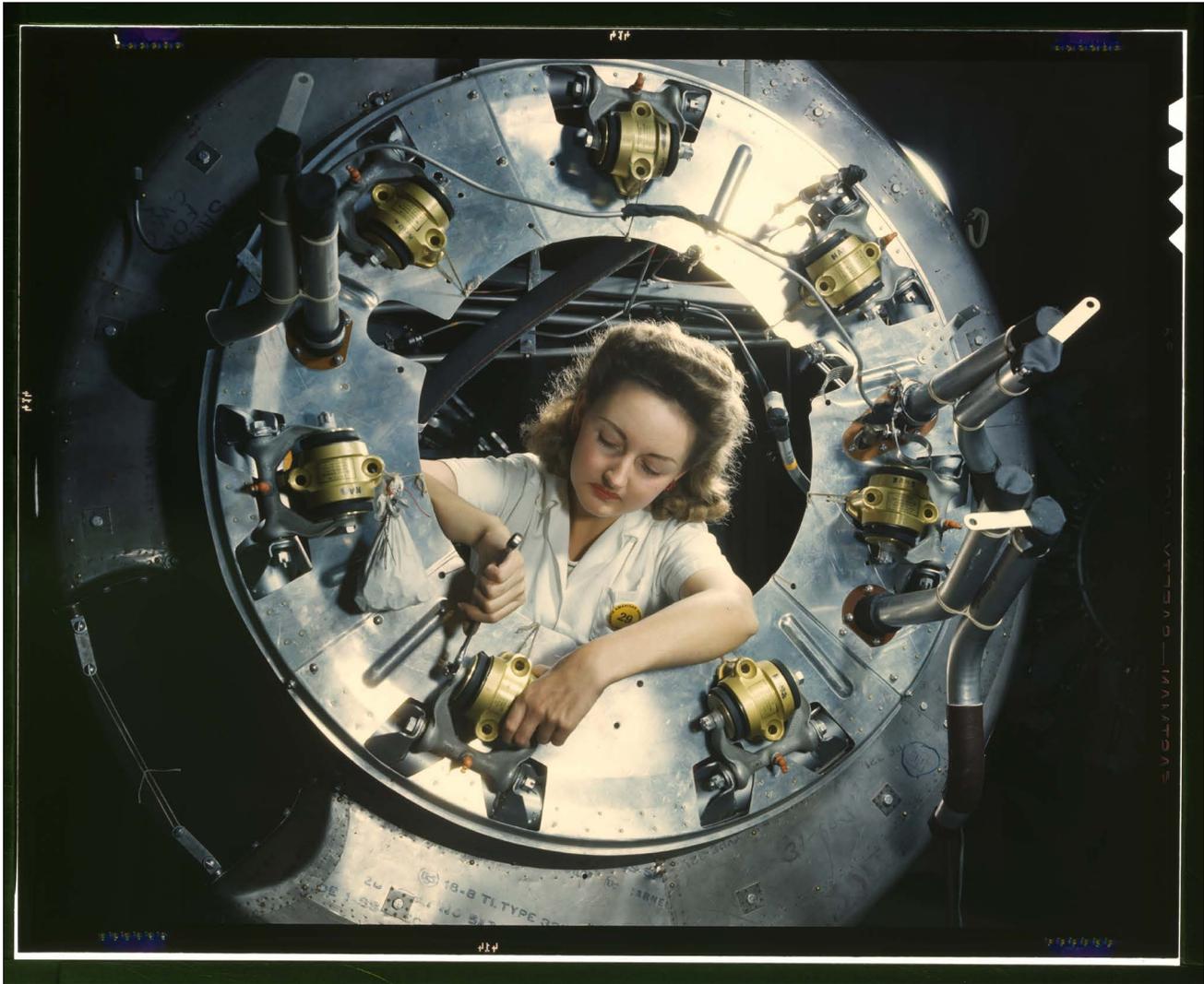
Photograph, *View from B-17 Flying Fortress U.S. Army 8th AF Bomber command..., October 31, 1944*

Library of Congress (LC-USZ62-64814)



Photograph, Alfred T. Palmer, *Part of the cowling for one of the motors for a B-25 bomber is assembled in the engine department of North American [Aviation, Inc.]'s Inglewood, California, plant., October 1942*

U.S. Office of War Information, Library of Congress



Photograph, *B-17s from 8th Air Force were the other arm of the Dresden attacks..., 1945*

Air Force Historical Support Division



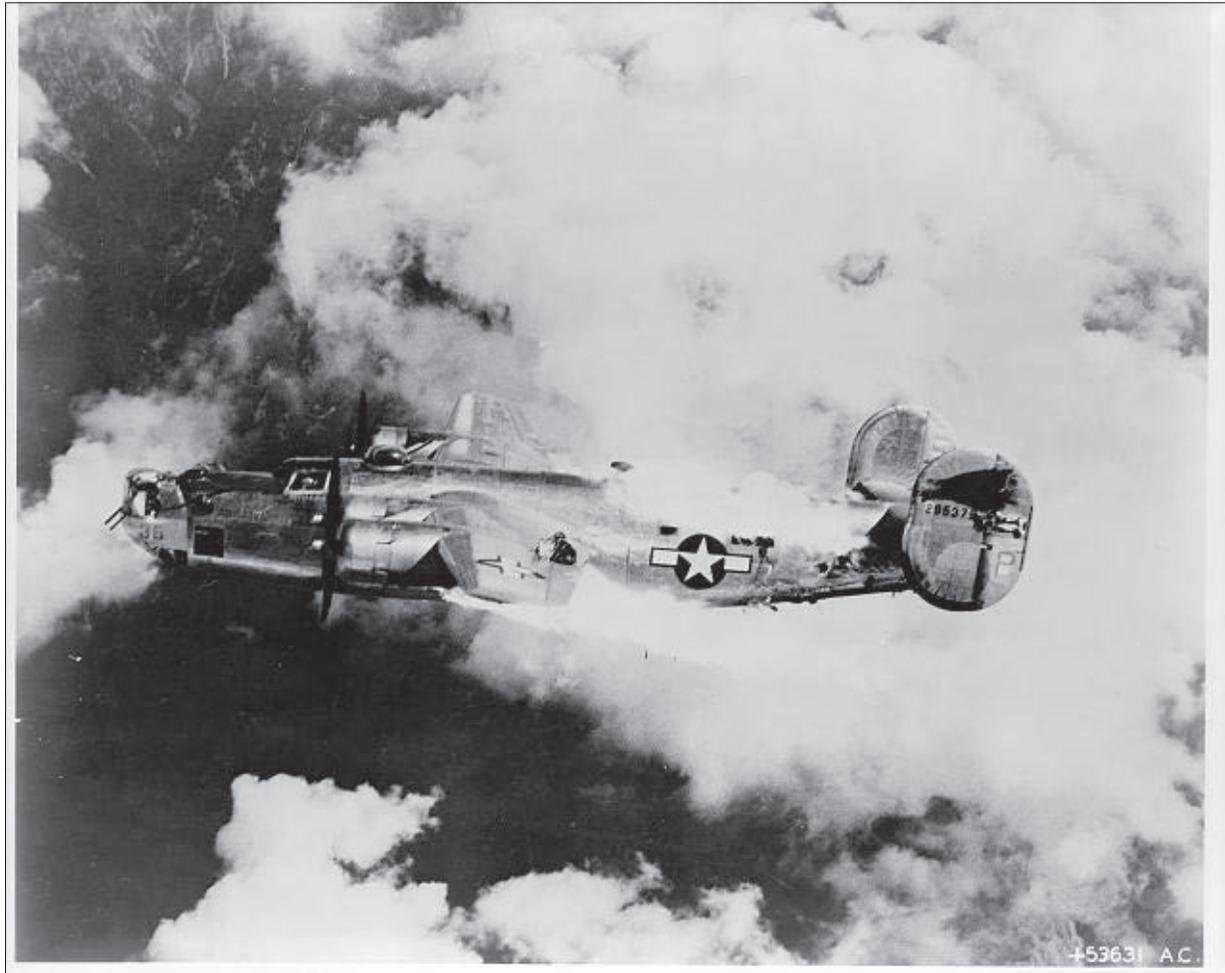
Photograph, *The aftermath of the bombing shows an apocalyptic scene as the city residents attempt to pick through the rubble...*, 1945

U.S. Office of War Information, Library of Congress



Photograph, *Last Moments of a Flaming B-24 Liberator after Raid over Austria...*, c. 1942-1945

Library of Congress (LC-USZ62-43778)



Photograph, Howard R. Hollam, *Production of B-24E (Liberator) Bombers at Willow Run..., 1942*

Library of Congress (LC-USE6-D-008769)



Photograph, *Production of B-24E (Liberator) Bombers at Willow Run...*, July 1942- February 1943

Library of Congress (LC-USE6-D-008769)



Photograph, *The B-17 Flying Fortress "The Memphis Belle" ...*, June 9, 1943

Air Force Historical Support Division



Photograph, *War Theatre #12 (Italy)*, June 21, 1944

National Archives and Records Administration (A22763)



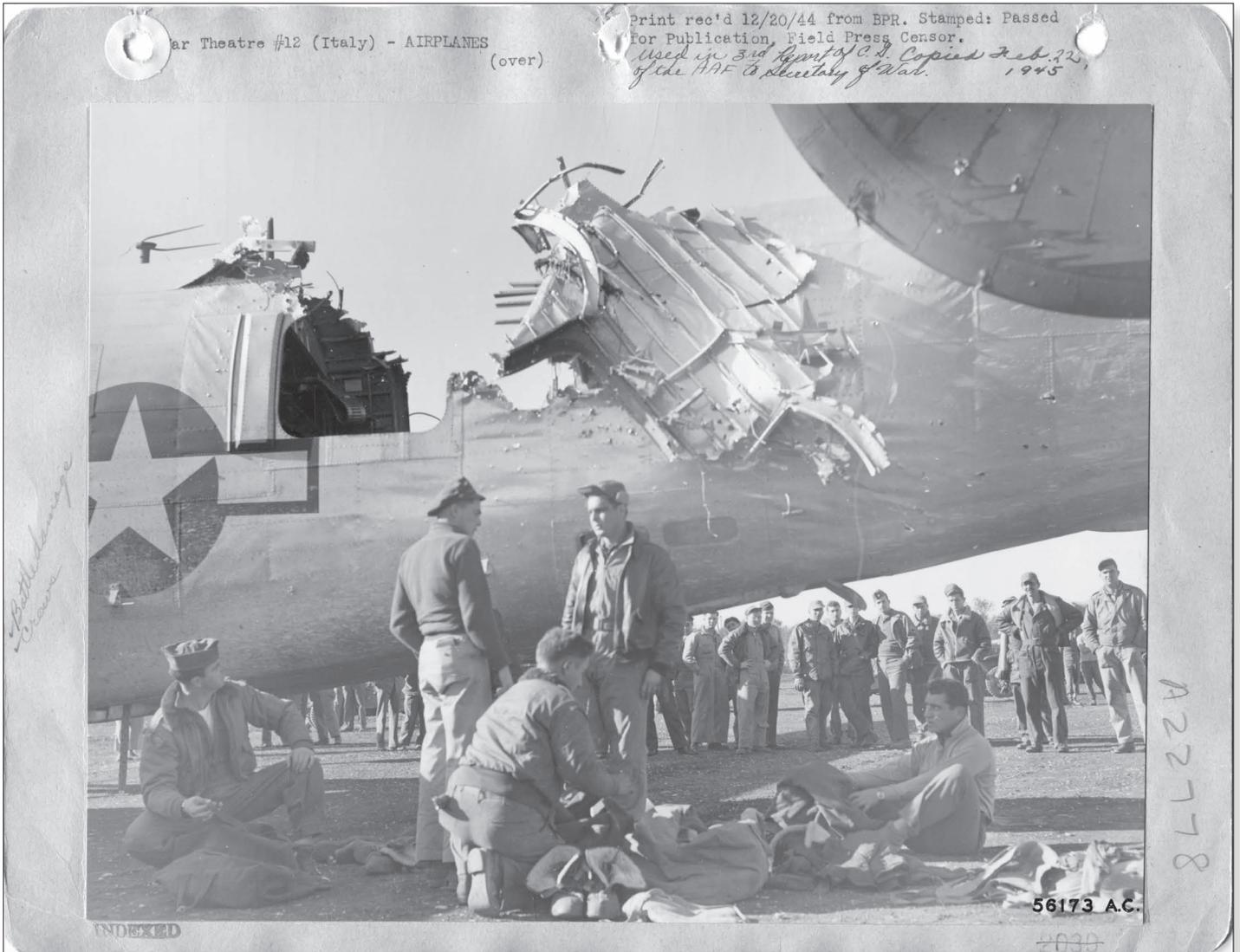
Photograph, *War Theatre #12 (Italy)*, February 2, 1944

National Archives and Records Administration (A22756)



Photograph, *War Theatre #12 (Italy) Airplanes...*, December 20, 1944

National Archives and Records Administration (A22778)



Photograph, *War Theatre #12 (Italy) Wrecks*, July 18, 1944

National Archives and Records Administration (A24579)

U.S. Office of War Information, Library of Congress



Photograph, *War Theatre #12 (Genoa, Italy) Bombing*

National Archives and Records Administration (A25185)



Photograph, *Waves of Consolidated B-24 Liberators of the 15th AAF Fly over the Target Area, the Concordia Vega Oil Refinery, Ploesti, Romania, Unmindful of Bursting Flak, after Dropping Their Bomb Loads on the Oil Cracking Plant, May 31, 1944*

Library of Congress (LC-USZ62-97497)

U.S. Office of War Information, Library of Congress



Strategic Bombing Campaign Interactive Worksheet

The decision to engage in strategic bombing during World War II was one of the most significant of the war. The effectiveness and morality of the air campaigns are still debated by historians today. Using the interactive from the American Battle Monuments Commission (found online at http://www.abmc.gov/sites/default/files/interactive/interactive_files/SBC_Web/index.html), please answer the following questions by using complete sentences in preparation of your writing assessment.

Prelude:

What is strategic bombing?

Which nation developed the B-17 bomber and why was the B-17 a major achievement?

September 1939-June 1940:

What are some of the challenges Britain faced as it began strategic bombing?

July 1940-June 1941:

How were the British able to fend off the Germans during the Battle of Britain?

What caused the Germans to attack British cities?

Why did Hitler cancel his plans to invade Great Britain?

July 1941-December 1941:

What ended the Blitz?

Strategic Bombing Campaign Interactive Worksheet cont.

How did the Allies draw the Germans away from the Soviet Union?

Why did the United States enter World War II?

January 1942-June 1942:

Why was the air raid on Romania important?

How did the Allied attacks harm the German war effort?

July 1942-November 1942:

Why does the 8th Air Force initially only attack German targets in France?

December 1942-May 1943:

How does Germany fight back against the American daylight bombing raids?

How does strategic bombing change the outcome of the Battle of the Atlantic?

June 1943-October 1943:

What happened when the Allies bombed Hamburg?

Strategic Bombing Campaign Interactive Worksheet cont.

November 1943-February 1944:

How does the development of the P-51 help the Allied bombing effort?

Why would the Allies want to destroy the Luftwaffe?

March 1944-May 1944:

Why would the Allies bomb railways and communication centers before launching Operation Overlord?

June 1944-August 1944:

How did bombing improve the odds of success for Operation Overlord?

September 1944-December 1944:

How was air support used by the Allies during the Battle of the Bulge?

January 1945-May 1945:

Why would the Allies attack civilian areas in German cities?

Strategic Bombing Campaign Assessment

Today you will write an essay that explores the Strategic Bombing Campaign and assesses how effective strategic bombing was in determining the outcome of the war.

Your mission will be to read the provided documents and respond to the following prompt:

Was the Strategic Bombing Campaign an effective component of the Allied war effort? How did the campaign influence the outcome of the war?

You can use the following sources as evidence in your essay:

- The photographs that you analyzed;
- The video files from the *Strategic Bombing Campaign Interactive*; and
- The excerpts from the U.S. Strategic Bombing Campaign Survey.

You will need to construct a claim regarding the effectiveness of the Strategic Bombing Campaign and its role in the outcome of World War II.

You may create a PowerPoint/Prezi, poster board, or a multiparagraph essay for this task. Take care to create a claim, address potential counterarguments, and provide support for your argument from the primary and secondary sources. Remember to develop your ideas using your own words (unless using a direct quote from a source). Clearly reference the sources that you use.

Scoring:

Your project will be evaluated using the following criteria:

- **Claim/Organization:** How well did you state and maintain your claim with a logical flow of ideas from the introduction to the conclusion? How effectively did you use transitions? How effective was the introduction and conclusion to your response?
- **Evidence/Commentary/Conclusion:** How well did you integrate and evaluate information from at least three sources? How did you elaborate and comment on your ideas? How did you reference the sources that you used?
- **Conventions:** How well did you follow the rules of grammar, spelling, and punctuation?

Strategic Bombing Campaign Assessment Rubric

Prompt: Was the Strategic Bombing Campaign an effective component of the Allied war effort? How did the campaign influence the outcome of the war? Support your answer with evidence from primary and secondary sources.

| | Advanced | Proficient | Basic | Emerging |
|---------------------|---|--|---|--|
| Claim | Claim used important words from the prompt and is written in a provable sentence. Shows sophisticated thought and organizational strategy. | Claim used important words from the prompt and is written in a provable sentence. | Claim used important words from the prompt, but the thesis is not provable with the available evidence. | Claim is unclear or not present. Thesis is not provable with the available evidence. |
| Organization | Response has a clear and logical structure. Response is clear from beginning to end and makes effective use of transitions to connect ideas and evidence. | Response has a clear and logical structure. Response is clear from beginning to end and is generally focused and makes use of transitions to connect ideas and evidence. | Response is unclear and/or demonstrates an attempt at organization. Response lacks transitions and ineffective introduction and conclusion. | Response is unclear and/or shows little evidence of organization. |
| Evidence | Evidence includes strong quotes or explicit references from more than three sources that relate directly back to the thesis. Sources are clearly cited in the response. | Evidence includes strong quotes or explicit references from three sources that relate directly back to the thesis. Sources are clearly cited in the response. | Evidence is general in nature. It relates to thesis but response does not contain a specific reference or quote. Some citations may be missing. | Evidence does not relate to the thesis. Sources are not cited in the response. |
| Commentary | Explains how evidence clearly proves the thesis while adding their own analysis and interpretation of the text. | Explains how evidence proves the thesis while adding some analysis or interpretation of the text. | Attempts to explain how evidence proves the thesis but may rely on restating evidence rather than interpretation. | Does not explain how evidence relates back to the text. Restates evidence only. |
| Conclusion | Clearly and uniquely restates thesis in own words using keywords or phrases. | Restates thesis in own words using keywords or phrases. | Uses exact thesis as a conclusion. | No conclusion present. |

“The Role of Air Power,” U.S. Strategic Bombing Survey, p. 1

United States Department of War, September 30, 1945

The Role of Air Power

The air forces of the Western Allies which were marshaled against Germany during the European war reached a peak of almost 28,000 combat planes and of 1,335,000 men assigned to combat commands. More than 1,440,000 bomber sorties and 2,680,000 fighter sorties were flown against the enemy. Almost 2,700,000 tons of bombs were dropped. The number of men lost in action was 79,265 Americans and 79, 281 British. The bombing effort is summarized in Table 1.

More than 18,000 American and 22,000 British planes were lost or damaged beyond repair. Chart 1 shows graphically both for American and British forces the total tonnage of bombs dropped in the entire European war and the countries and target systems upon which it was dropped. The expenditure in dollars made by the United States to sustain its part of the air war in Europe, up to VE-day, exceeded 43 billions. Allied Air Forces destroyed or heavily damaged 3,600,000 dwelling units, approximately 20 percent of the total in Germany. Records of the German Air Ministry show that through January 1945 a total of 250,253 civilians were killed and 305,455 seriously injured. It is virtually certain that the number of dead and wounded exceeded these figures. An estimate for the whole war period prepared by the Survey places total deaths at 305,000 and wounded at 780,000. The number of German aircraft claimed to have been destroyed or probably destroyed in combat and on the ground exceeded 57,000.

But the record of persons killed and buildings damaged is not the measure by which to judge the real accomplishments of the Allied air attack; rather, those accomplishments must be measured by the extent to which they contributed to the destruction of the enemy's military strength. Nor must military strength be confused with economic strength. The general economy of a country could be strong and dynamic and yet its military

strength fatally weakened if it were denied some vital military need, such as oil, or planes, or tanks. Of far more significance than statistics of strength and damage is the outstanding fact that the Allied Air Forces won the air war over Germany and obtained mastery of the skies in Europe. The significance of this achievement and the results which followed from its exploitation are developed in these pages.

In order, however, properly to evaluate that achievement and those results, it is necessary to consider briefly the evolution of air power and the functions it was called upon to perform in this war.

Air power in the last war was in its infancy. Behind its dogfights and hit-and-run tactics there were some glimmerings of the concept of using air power to attack the sustaining resources of the enemy, but these bore only a hint of future developments. In this war, air power may be said to have reached a stage of full adolescence. Its growth and development still continue.

In the period between the wars, many different theories as to the proper use of air power were propounded. Some said its role should be merely one of cooperation with land and surface forces. Others said that air power alone was sufficient to achieve victory and should be used independently of other forces. Between these extremes, there were, of course, many gradations of thought. One fact was certain; no one could be sure of what was the best manner to utilize what was virtually a new instrumentality of war. Hence the development of plans and planes in the United States proceeded upon the assumption that air power would be used in many roles. There was a strong current of belief, however, that air pow-

NOTE.—In this report, bomb tonnage figures are in short tons (2,000 pounds). All other tonnage figures are in metric tons (2,204 pounds).

“The Role of Air Power,” U.S. Strategic Bombing Survey, p. 3

United States Department of War, September 30, 1945

er's most vital role would be to reach far into the enemy's country and destroy his sustaining sources of military power and particularly that this could be done by precision bombing in daylight.

In Great Britain, because of her geographically more vulnerable position, developments placed more emphasis on defensive fighters and less on long-range bombers. Perhaps the two most notable developments during the period were the development by the United States of the Flying Fortress and by the English, of the Spitfire, both eminently adapted to the emphasis of planning of the respective countries. The Germans, however, took a different course and concentrated primarily upon an air force designed for use in support of ground operations and paid relatively little attention to the building of an effective heavy bomber force.

When war came, the Germans were the first to demonstrate their theory and, in the blitzkrieg campaigns of 1939 and 1940, the world was temporarily stunned by the seemingly invincible power of the Panzer-Stuka combination. But when the Germans ventured away from support of ground troops and used their airplanes to attack England in the Battle of Britain, the English pilots in their Spitfires won a magnificent defensive victory. Thus was demonstrated the striking power of air in tactical support of ground troops, and the vulnerability of bombers, particularly in daylight, to unbearable losses from fighters. Perhaps this should have disturbed our plans. Fortunately, it did not. The United States, with the knowledge that air power was yet too untried to rely upon it or any phase of it for final victory, continued with its plans for the use of air power in many roles, all designed to make possible a successful invasion of the Continent and the defeat of Germany on the ground. Still the emphasis lay upon the long-range bomber and, despite the German and English experience, upon precision attacks in daylight. Much had to be accomplished, however, before any large-scale bomber offensive could be mounted. England had been saved but it had to be kept safe as a massive base from which to launch offensives in the air and on the land. The attacks by submarines rose in steady crescendo, particularly after the United States entered the war. Unless the sea lanes were kept open, all else would fail. Air

and sea power worked together, and the submarine was hunted out and attacked from the coastal waters of America, across the Atlantic, around the shores of England, in the Mediterranean, and to the far reaches of the northern run of lend-lease to Russia. The menace never ended, but air and sea power won and the base of Britain was established and supplied. German shipping had vanished from the seas except in her coastal waters and the runs from Scandinavia bringing vital iron ore to the blast furnaces of the Ruhr. Again the air-sea team attacked, and kept attacking, with mines and bombs and guns.

By July 31, 1942, United States combat aircraft based in England had grown to some 423 planes. On August 17 of that year, 12 Fortresses, with Spitfire escort, had attacked the marshalling yards at Rouen without loss. The portent of the future had appeared. But Rommel had been loose in Africa and was knocking at the doors of Alexandria. The whole Mediterranean and the Near East and Russia's southern flank were gravely menaced. The weight of war—and of air—shifted to the south. Aircraft carriers carried fighters to the defense of Malta. The land-air team—fighters and fighter-bombers and heavy bombers, in close cooperation with land forces—turned the tide at El Alamein. Aircraft from carriers and Gibraltar covered the landings in north Africa. Everything that flew was thrown into the breach at the Kasserine Pass. Transport planes flew paratroopers from England. Rommel's supply lines across the Mediterranean were attacked from the air and under the sea. Africa was cleared. The “soft underbelly” of the Axis lay open. The triumvirate—land, sea, and air—attacked it at Sicily, Sardinia, and Italy. The airfields of southern Italy were captured and the way opened for long-range bombers to reach over the Alps at southern Germany.

In 1943, the emphasis again turned toward the north and the interrupted build-up of our forces in England was resumed. In January 1943, the Casablanca Conference had authorized an enlarged scale of air attack against Germany, with its primary objective “the destruction and dislocation of the German military, industrial, and economic system and the undermining of the morale of the German people to the point where their capacity for

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“The Role of Air Power,” U.S. Strategic Bombing Survey, p. 9

United States Department of War, September 30, 1945

armed resistance is fatally weakened.” Although in the directive certain primary target systems were specified for attack, wide discretion was given to the commanders of the air forces to use their own judgment on how best to carry out the attack. Many difficulties beset any quick growth in the striking power of the still small American forces. There were limitations of range, limitations of fighter escort, limitations of numbers, limitations forced by weather over the European continent, which was particularly unsuited to the desired form of attack. The German defenses were strong and vigorous and the hope that heavily armed bombers could protect themselves without fighter escort proved disappointing. The sting of the German fighter made it impossible to achieve sufficiently effective bombing to produce decisive results. Our air commanders quickly realized that the German Air Force must be destroyed before a sustained and devastating attack on the enemy resources could be carried out and air supremacy, vital to the landing of troops on the Continent, be obtained. Thus, for the first time in history, there developed an air war with a strategy and tactics of its own just as truly as land and sea forces have always had strategy and tactics of their own. Each penetration into the heart of Germany was as truly an invasion as the landing of troops on her soil. The role of the heavy bomber was to threaten the vitals of German war industry and thus force the Germans to deploy their primarily defensive air forces to protect those vitals and come up and do battle with Allied forces. But many vital plants lay out of effective range because of lack of long-range fighter escort. This lack was remedied by the advent of the P-51—the Mustang—at the beginning of 1944. In the fierce battles over Germany in the early months of 1944, the air war was won. It was not finished, but its outcome was no longer in doubt. The concentration of invasion forces in England could proceed without fear of serious air attack. The domination by Allied air power of the invasion beaches of Normandy was assured.

With the successful landings in Normandy, the role of air power in conjunction with land forces again came into full play. The break-through at St. Lo was preceded by saturation bombing of an area approximately 8,000 yards by 7,000 yards con-

ducted by approximately 1,500 heavy bombers, 400 medium bombers, and 550 fighter-bombers, during a period of 2½ hours. The land-air team pursued the Germans to the Siegfried Line; they fought it out in the Battle of the Bulge; pushed forward again up to and across the Rhine, and so into the heart of Germany. There were assaults on defended river lines, assaults on lines of permanent fortifications, assaults on fortress cities and fortified areas, and in all, air power played its vital role. In the dark days of the Battle of the Bulge, the enemy planned to offset his lack of air superiority by timing the attack to coincide with predicted adverse weather. The predictions were correct, and the counteroffensive met with initial success. But the threat was met with determined ground and air counteraction. Attacks on supply dumps, railroad and road communications, communication centers, forward dumps, reconnaissance flights—these and many others are the varied functions of air in conjunction with land forces.

This, in brief, is the broad sweep of the many roles which air power was called upon to play—partner with the Navy over the sea lanes; partner with the Army in ground battles; partner with both on the invasion beaches; reconnaissance photographer for all; mover of troops and critical supplies; and attacker of the enemy's vital strength far behind the battle line.

But what were the forces with which air power had to play these many roles? Prior to the war the foundation for the expansion of the air forces had been laid; yet when the Japanese struck in the Pacific, they virtually wiped out our overseas air arm, and there were left within the continental limits of the United States a mere 631 airplanes suitable for combat. After Pearl Harbor, the AAF completed plans calling for substantial increases in planes and personnel. Revisions were made from time to time, as the requirements of the air war became more apparent.

As these plans materialized, men and planes began arriving in Europe. The first units of the Eighth Air Force were in England 2½ months after Pearl Harbor. Six months later, thirteen Liberators, flying from Africa, bombed the oil refineries at Ploesti. Concurrently with the building-up of U. S. air power in Europe, the Royal Air

“The Role of Air Power,” U.S. Strategic Bombing Survey, p. 10

United States Department of War, September 30, 1945

Force was gaining in strength, which made possible an increasing tempo in our combined air efforts against the enemy. The statistical story of the growth and employment of British and American air power and activity is shown in the preceding charts.

Charts 2 and 3 show the build-up, month by month, of combat planes and personnel assigned to combat units in the European and Mediterranean theaters of operation. Chart 4 shows the growing tonnage of bombs dropped by the Allied Air Forces. Chart 5 shows on which countries this tonnage was dropped. Chart 6 shows the tonnage dropped upon different target systems. It is of vital significance that, of all the tonnage of bombs dropped on Germany, only 17 percent fell prior to January 1, 1944, and only 28 percent prior to July 1, 1944. Not until the war in the air had been won and the landings in the Mediterranean and France successfully accomplished, were the heavy bombers free to exploit the victory in the air and attack in full force the centers of oil production, the centers of

transport, and the other sustaining sources of military strength within the heart of Germany. Even then the attack could not be fully concentrated, for the V-1 and the V-2 were serious threats to England, and again air power was called upon to attack this threat by bombing the launching sites in France, Belgium, and in Holland.

In the pages which follow, the effect of these many attacks is evaluated. A better picture can be given in describing the effect of each particular role, but the reader must bear in mind that these roles were not played in separate scenes but that all were going on together. The menace of the submarine was never ended; support of ground troops went on from day to day; the war in the air required constant attention; and, although the weight of the attack was sometimes on oil, sometimes on aircraft factories, sometimes on transport or other target systems, each had to have some attention all the time. The greatest single achievement of the air attack on Germany was the defeat of the German Air Forces, and therefore we first treat with that subject.

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THE BOMBING EFFORT STATISTICAL SUMMARY

| | UNITED STATES ARMY AIR FORCES | ROYAL AIR FORCE * |
|---|-------------------------------|----------------------|
| TONS OF BOMBS DROPPED | 1,461,864 | 1,235,609 |
| BOMBER SORTIES | 754,618 | 687,462 |
| FIGHTER SORTIES | 991,750 | 1,695,049 |
| CLAIMED ENEMY AIRCRAFT DESTROYED AND PROBABLY DESTROYED | 35,783 | 21,622 |
| BOMBER PLANES LOST | 9,949 | 11,965 |
| FIGHTER PLANES LOST ** | 8,420 | 10,045 |
| PERSONNEL LOST IN ACTION | 79,265 | 79,281 |
| BOMBER PLANES ASSIGNED TO COMBAT UNITS *** | March 1945 7,177 | April 1945 6,956 |
| FIGHTER PLANES ASSIGNED TO COMBAT UNITS *** | May 1945 6,203 | August 1944 7,728 |
| PERSONNEL ASSIGNED TO COMBAT UNITS *** | August 1944 619,020 | July 1944 718,628 |

* All Royal Air Force statistics quoted in this Report are preliminary or tentative

** Includes fighter bombers and reconnaissance planes.

*** Maximum strength of each air force.

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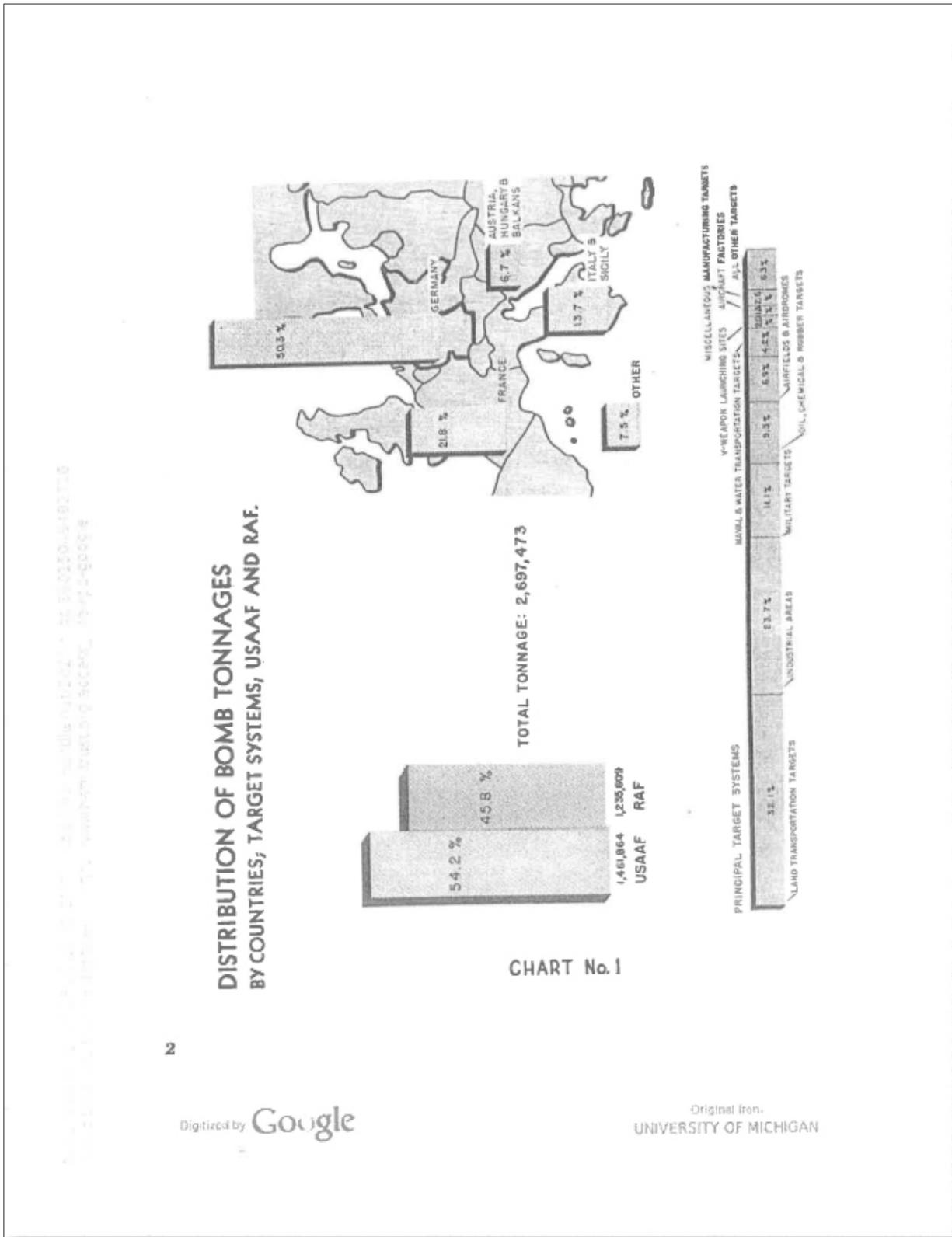
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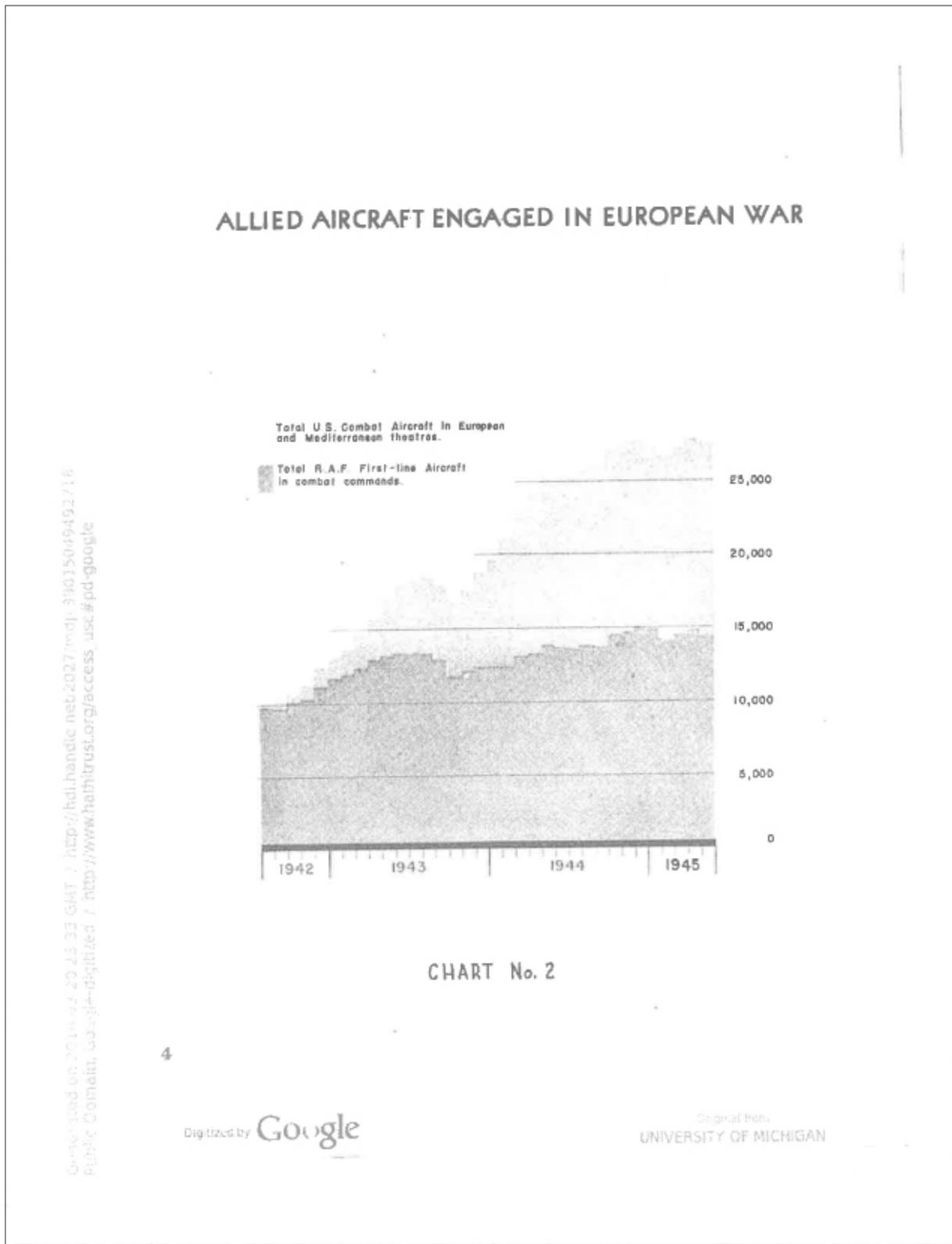
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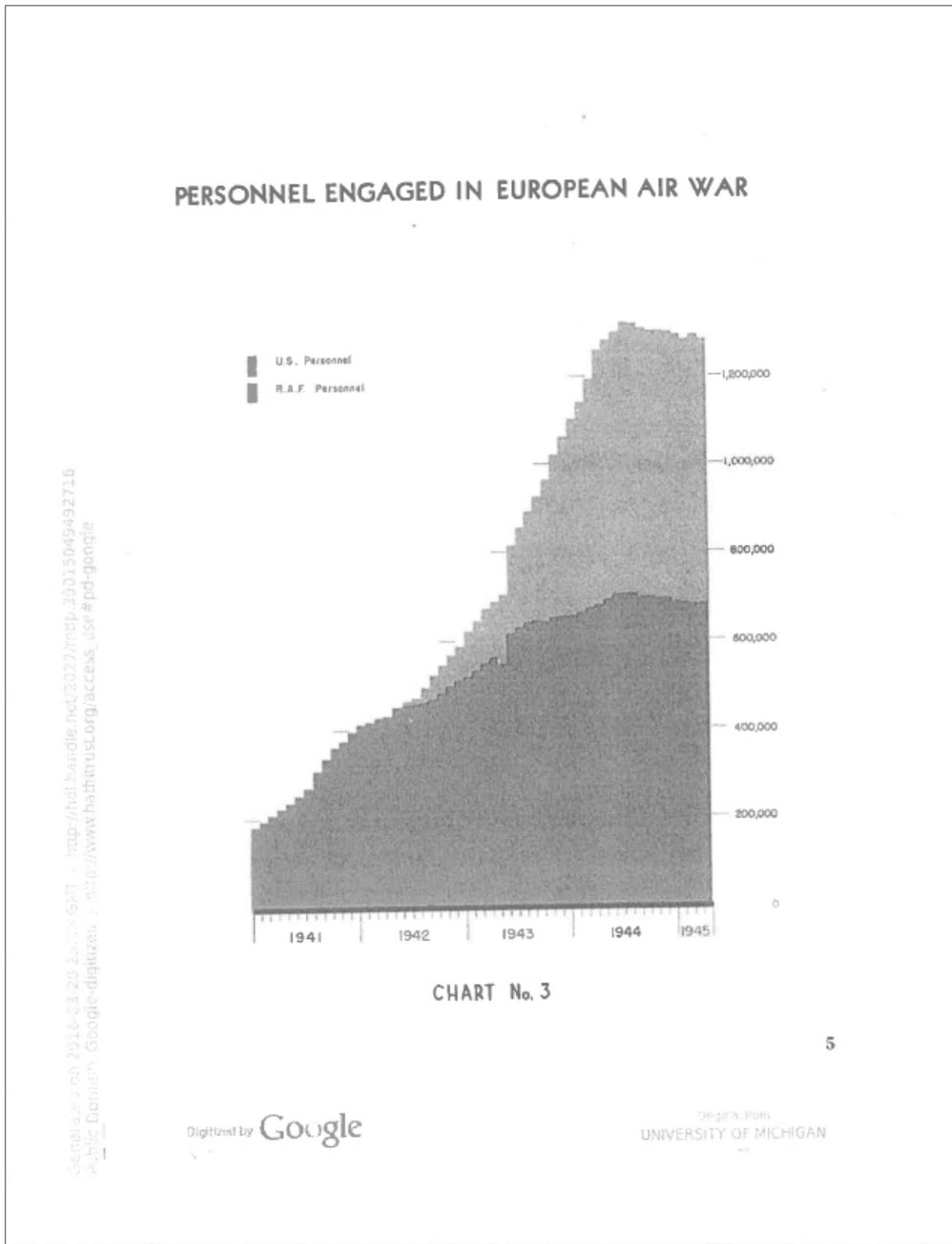
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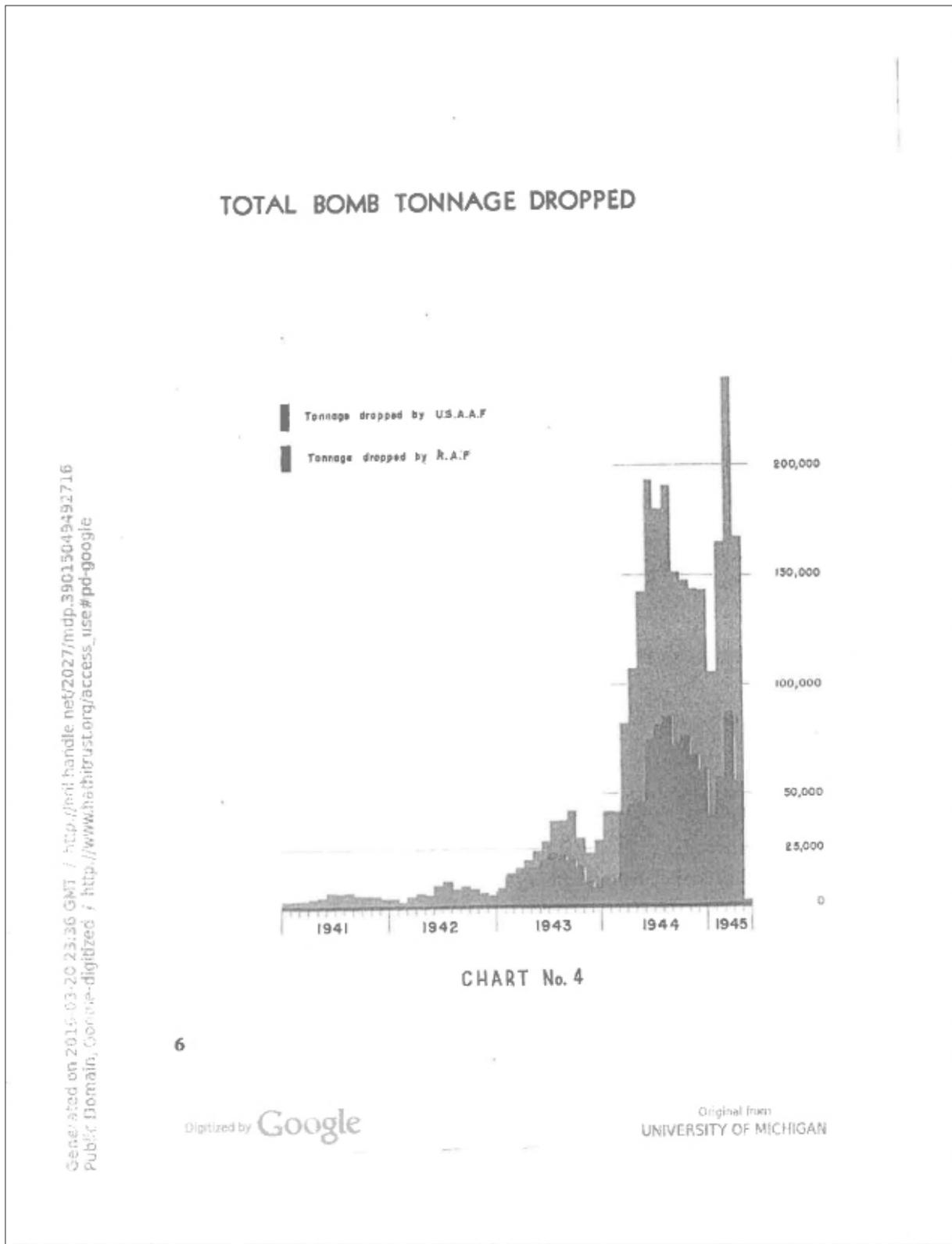
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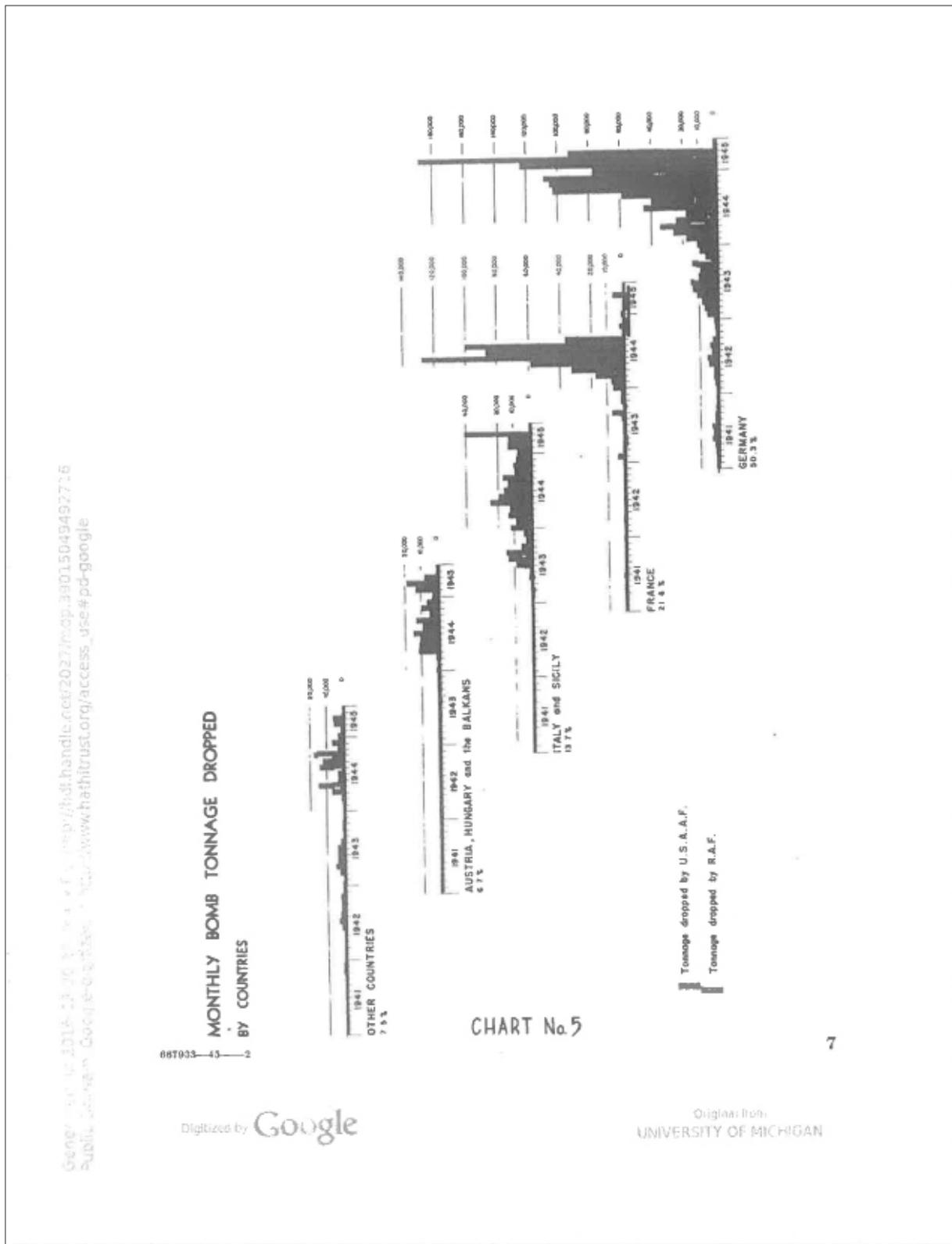
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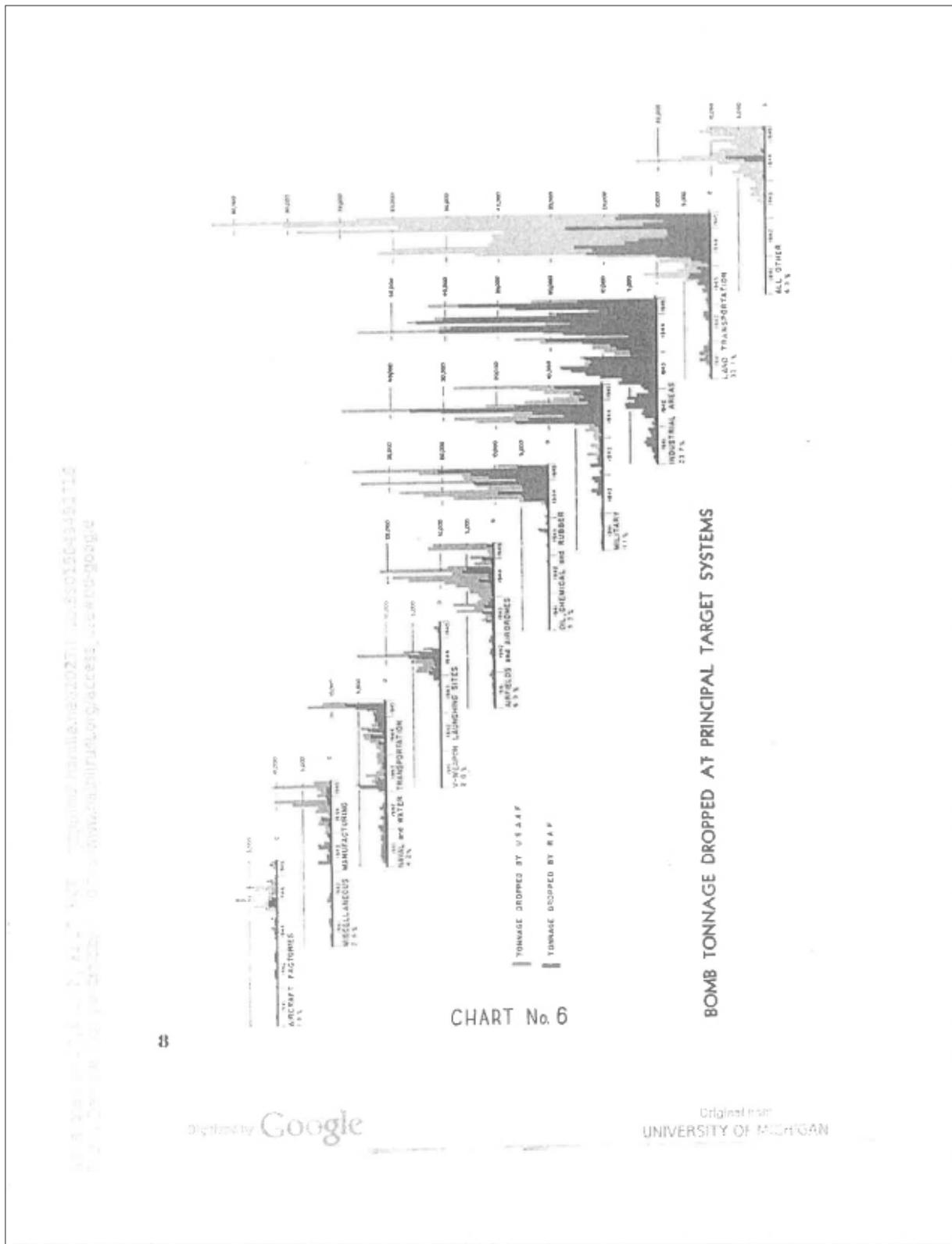
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United States Department of War, September 30, 1945



Conclusion, U.S. Strategic Bombing Survey, p. 107

United States Department of War, September 30, 1945

Conclusion

The foregoing pages tell the results achieved by Allied air power, in each of its several roles in the war in Europe. It remains to look at the results as a whole and to seek such signposts as may be of guidance to the future.

Allied air power was decisive in the war in western Europe. Hindsight inevitably suggests that it might have been employed differently or better in some respects. Nevertheless, it was decisive. In the air, its victory was complete; at sea, its contribution, combined with naval power, brought an end to the enemy's greatest naval

threat—the U-boat; on land, it helped turn the tide overwhelmingly in favor of Allied ground forces. Its power and superiority made possible the success of the invasion. It brought the economy which sustained the enemy's armed forces to virtual collapse, although the full effects of this collapse had not reached the enemy's front lines when they were overrun by Allied forces. It brought home to the German people the full impact of modern war with all its horror and suffering. Its imprint on the German nation will be lasting.

Some Signposts

1. The German experience suggests that even a first-class military power—rugged and resilient as Germany was—cannot live long under full-scale and free exploitation of air weapons over the heart of its territory. By the beginning of 1945, before the invasion of the homeland itself, Germany was reaching a state of helplessness. Her armament production was falling irretrievably, orderliness in effort was disappearing, and total disruption and disintegration were well along. Her armies were still in the field. But with the impending collapse of the supporting economy, the indications are convincing that they would have had to cease fighting—any effective fighting—within a few months. Germany was mortally wounded.

2. The significance of full domination of the air over the enemy—both over its armed forces and over its sustaining economy—must be emphasized. That domination of the air was essential. Without it, attacks on the basic economy of the enemy could not have been delivered in sufficient force and with sufficient freedom to bring effective and lasting results.

3. As the air offensive gained in tempo, the Germans were unable to prevent the decline and eventual collapse of their economy. Nevertheless, the recuperative and defensive powers of Germany were immense; the speed and ingenuity with which they rebuilt and maintained essential war industries in operation clearly surpassed Allied expectations. Germany resorted to almost every means an ingenious people could devise to avoid the attacks upon her economy and to minimize their effects. Camouflage, smoke screens, shadow plants, dispersal, underground factories, were all employed. In some measure all were helpful, but without control of the air, none was really effective. Dispersal brought a measure of immediate relief, but eventually served only to add to the many problems caused by the attacks on the transportation system. Underground installations prevented direct damage, but they, too, were often victims of disrupted transportation and other services. In any case, Germany never succeeded in placing any substantial portion of her war production underground—the effort was largely limited to certain types of aircraft, their components, and the V-weapons. The practicability of going under-

107

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Conclusion, U.S. Strategic Bombing Survey, p. 108

United States Department of War, September 30, 1945

ground as the escape from full and free exploitation of the air is highly questionable; it was so considered by the Germans themselves. Such passive defenses may be worth while and important, but it may be doubted if there is any escape from air domination by an enemy.

4. The mental reaction of the German people to air attack is significant. Under ruthless Nazi control they showed surprising resistance to the terror and hardships of repeated air attack, to the destruction of their homes and belongings, and to the conditions under which they were reduced to live. Their morale, their belief in ultimate victory or satisfactory compromise, and their confidence in their leaders declined, but they continued to work efficiently as long as the physical means of production remained. The power of a police state over its people cannot be underestimated.

5. The importance of careful selection of targets for air attack is emphasized by the German experience. The Germans were far more concerned over attacks on one or more of their basic industries and services—their oil, chemical, or steel industries, or their power, or transportation networks—than they were over attacks on their armament industry or the city areas. The most serious attacks were those which destroyed the industry or service which most indispensably served other industries. The Germans found it clearly more important to devise measures for the protection of basic industries and services than for the protection of factories turning out finished products.

6. The German experience showed that, whatever the target system, no indispensable industry was permanently put out of commission by a single attack. Persistent re-attack was necessary.

7. In the field of strategic intelligence, there was an important need for further and more accurate information, especially before and during the early phases of the war. The information on the German economy available to the United States Air

Forces at the outset of the war was inadequate. And there was no established machinery for coordination between military and other governmental and private organizations. Such machinery was developed during the war. The experience suggests the wisdom of establishing such arrangements on a continuing basis.

8. Among the most significant of the other factors and combinations of factors which contributed to the success of the air effort was the extraordinary progress during the war of Allied research, development, and production. As a result of this progress, the air forces eventually brought to the attack superiority in both numbers and quality of crews, aircraft, and equipment. Constant and unending effort was required, however, to overcome the initial advantages of the enemy and later to keep pace with his research and technology. It was fortunate that the leaders of the German Air Force relied too heavily on their initial advantage. For this reason they failed to develop, in time, weapons, such as the jet-propelled planes, that might have substantially improved their position. There was hazard, on the other hand, in the fact that the Allies were behind the Germans in the development of jet-propelled aircraft. The German development of the V-weapons, especially the V-2, is also noteworthy.

9. The achievements of Allied air power were attained only with difficulty and great cost in men, material, and effort. Its success depended on the courage, fortitude, and gallant action of the officers and men of the air crews and commands. It depended also on a superiority in leadership, ability, and basic strength. These led to a timely and careful training of pilots and crews in volume; to the production of planes, weapons, and supplies in great numbers and of high quality; to the securing of adequate bases and supply routes; to speed and ingenuity in development, and to cooperation with strong and faithful Allies. The failure of any one of these might have seriously narrowed and even eliminated the margin.

Conclusion, U.S. Strategic Bombing Survey, p. 109

United States Department of War, September 30, 1945

Of the Future

The air war in Europe was marked by continuous development and evolution. This process did not stop on VE-day; great strides have been made since in machines, weapons, and techniques. No greater or more dangerous mistake could be made than to assume that the same policies and practices that won the war in Europe will be sufficient to win the next one—if there should be another. The results achieved in Europe will not give the answer to future problems; they should be treated rather as signposts pointing the direction in which such answers may be found.

The great lesson to be learned in the battered towns of England and the ruined cities of Germany is that the best way to win a war is to prevent it from occurring. That must be the ultimate end to which our best efforts are devoted. It has been suggested—and wisely so—that this objective is well served by insuring the strength and the security of the United States. The United States was founded and has since lived upon principles of tolerance, freedom, and good will at home and abroad. Strength based on these principles is no threat to world peace. Prevention of war will not come from neglect of strength or lack of foresight or alertness on our part. Those who contemplate evil and aggression find encouragement in such neglect. Hitler relied heavily upon it.

Suggestions for assuring the strength and security of the United States are by no means intended as a recommendation for a race in arms with other nations. Nor do they reflect a lack of confidence in the prospect of international relationships founded upon mutual respect and good will which will themselves be a guarantee against future wars. The development of an intelligent and coordinated approach to American security can and should take place within the framework of the security organization of the United Nations.

In maintaining our strength and our security, the signposts of the war in Europe indicate the directions in which greater assurances may be found. Among these are intelligent long-range planning by the armed forces in close and active cooperation with other Government agencies, and with the continuous active participation of independent

civilian experts in time of peace as well as in war; continuous and active scientific research and technical development on a national scale in time of peace as well as in war; a more adequate and integrated system for the collection and evaluation of intelligence information; that form of organization of the armed forces which clarifies their functional responsibilities and favors a higher degree of coordination and integration in their development, their planning, their intelligence, and their operations; and, finally, in time of peace as well as in war, the highest possible quality and stature of the personnel who are to man the posts within any such organization, whatever its precise form may be—and in this, quality, not numbers, is the important criterion.

The air has become a highway which has brought within easy access every point on the earth's surface—a highway to be travelled in peace, and in war, over distances without limit at ever-increasing speed. The rapid developments in the European war foreshadow further exploration of its potentialities. Continued development is indicated in the machines and in the weapons which will travel the reaches of this highway. The outstanding significance of the air in modern warfare is recognized by all who participated in the war in Europe or who have had an opportunity to evaluate the results of aerial offensive. These are facts which must govern the place accorded air power in plans for coordination and organization of our resources and skills for national defense.

Speed, range, and striking power of the air weapons of the future, as indicated by the signposts of the war in Europe must—specifically—be reckoned with in any plans for increased security and strength. The combination of the atomic bomb with remote-control projectiles of ocean-spanning range stands as a possibility which is awesome and frightful to contemplate.

These are some of the many factors which will confront our national leaders who will have primary responsibility for correctly reading the signposts of the past. It is hoped that the studies of the German war, summarized here, and the studies being conducted by the Survey in Japan, will help them in their task.

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109

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