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WERE THERE STRATEGIC OIL TARGETS IN JAPAN IN 1945?

Manny Horowitz. **Air Power History**. Rockville: Spring 2004. Vol. 51, Iss. 1; pg. 26, 10 pgs

Abstract (Summary)

Between Jun 26, 1945 and Aug 14, 1945, the 315th Bomb Wing, Twentieth Air Force carried out fifteen bombing missions against Japanese oil refineries and inflicted heavy damage upon the petroleum industry. Here, Horowitz presents a reassessment of Japan's oil refineries and oil storage facilities, and examines the conventional view that no suitable target remained.

Full Text (4974 words)

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[Photograph]

(Overleaf) B-29s on a bombing run in the Pacific theater. (All photos courtesy of the author.)

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(Overleaf) B-29s on a bombing run in the Pacific theater. (All photos courtesy of the author.)

During World War II, the 315th Bomb Wing, Twentieth Air Force, was assigned the task of destroying the oil refining capacity and oil storage facilities of Japan.¹ After careful analysis and evaluation, the Strategic Intelligence section of the Air Staff in Washington, D.C. concluded that destroying the Japanese petroleum industry would produce an immediate effect on the tactical situation in the Pacific Area of Operations. The Joint Chiefs of Staff believed that aerial bombardment of Japanese refineries would deprive them of critically needed crude oil and gasoline and would shorten the war. Gen. Carl A. Spaatz, commander of the U.S. Strategic Forces in Europe had seen Germany's ability to wage war severely damaged by the strategic bombing missions against the German oil industry. Later, when he assumed command of the U.S. Army Strategic Forces in the Pacific, Spaatz supported the plan to destroy Japan's petroleum industry, as did Maj. Gen. Curtis E. LeMay, commander of the Twentieth Air Force, and Brig. Gen. Barney Giles, the deputy commander.

Between June 26 and August 14, 1945, the 315th Bomb Wing carried out fifteen bombing missions against Japanese oil refineries and inflicted heavy damage upon the petroleum industry. After reviewing the post-strike photographs of the air attack on one target, the Maruzen oil Refinery at Shimotsu, General LeMay wrote to the Wing Commander, Gen. Frank Armstrong, "you achieved ninety-five percent destruction, establishing the ability of your crews with the APQ-7 to hit and destroy precision targets, operating at night. This performance is the most successful radar bombing of the Command to date."

The United States Strategic Bombing Survey (USSBS) reports that, "the bombing offensive against the Japanese oil industry did not begin until May 1945. By that time the blockade had achieved its maximum effect and the refineries were largely inactive for lack of crude oil. Many tank farms were completely empty when bombed" ² Elsewhere, the Survey states that, "the total amount of oil stocks destroyed between May 1945 and the end of the war amounted to 471,379 barrels (19,797,918 gallons)." ³ These figures are very close to the cumulative data obtained for the oil destroyed in bombing missions from May to August 1945, shown in Table 1. These data indicate that 471,341

barrels (19,796,322 gallons) of crude oil, aviation gasoline, motor gasoline, kerosene, gas oil, diesel fuel, fuel oil, aviation lubricating oil, other lubricating oil and miscellaneous oil products were destroyed. In July and August, the last two months of the war, 164,082 barrels (6,891,444 gallons) of oil supplies were destroyed in the bombing campaign.

Table 1: Oil Supplies Destroyed by Aerial Bombing of Japanese Mainland Refineries		
1945	Barrels	Gallons
May	203,814	8,560,188
June	103,445	4,344,690
July	103,673	4,354,266
August	60,409	2,537,178
Total	471,341	19,796,322

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Table 1: oil Supplies Destroyed by Aerial Bombing of Japanese Mainland Refineries

In Chapter 4 on The Air Attacks and Their Effectiveness, the USSBS reports,

At the Akita refinery of the same company (Nippon oil Co.) 12,000 100 and 250 pound bombs were released over the target during the last raid of the war. Over 1,200 of them fell into the refinery and oil storage areas. The refinery was in full operation, with furnace fires lighted and equipment filled with oil; a storage area located on a rise of ground adjacent to the refinery contained steel tanks partially filled with oil.... The burning oil from the ruptured tanks in the storage area flowed over the operating section, utterly ruining it.⁴

A review of the data on crude oil production and refining in the U.S. Strategic Bombing Survey reveals some inconsistencies, as the ones cited above, and leads to an entirely different conclusion than was reached by the authors of the Survey with regard to the availability of oil at Japanese refineries during the Twentieth Air Force's bombing offensive in 1945.

It appears that various authors⁵, perhaps relying on the conclusions of the U.S. Strategic Bombing Survey, have also reported that the bombings of the Japanese oil refineries were futile and unnecessary because there was no oil to destroy at these installations. For example, Bradley⁶ reports, "The efforts, however, was criticized by the USSBS. It states that the Japanese were refining virtually nothing by the time the bombing effort started since the blockade had cut off its supply of crude oil from the Netherlands East Indies and the Asian Continent." "Our target selection of the oil industry for the 315th Bomb Wing could be faulted, since it was hitting an already dead industry as a result of the naval blockade and B-29 mining campaign." Historian Kenneth Werrell wrote,

Despite its great success, Eagle [radar] did not help the war effort. There was no point in destroying Japan's oil plants since their production had peaked between July and September 1943, well before the Boeing B-29 Superforts began their bombing campaign. It was the cutting of the oil imports, not the bombing of the refineries that throttled Japanese fuel.... The bombing destroyed 85 percent of the industry, yet contributed little to ending the war since the facilities were essentially closed down for lack of crude oil.⁷

In his book, *Downfall-The end of the Imperial Japanese Empire*, Richard Frank writes, "LeMay assigned the 315th the mission of destroying the Japanese petroleum industry. But ultimately this was the least effective component of the strategic attack upon Japan because the loss of these processing facilities had almost no impact due to the overall lack of crude oil to refine." ⁸ J.B. Smith, in his account of *The Last Mission* flown by the 315th Bomb Wing, reports that "By 1 April [1945] the Allied blockade had effectively shut off all of Japan's foreign oil supply. By the time we began our missions Japan's oil output had been reduced to 3 or 4 percent of its normal refinery yields. Little fuel was being produced domestically, and no supplies were coming from the Southeast. The storage tanks were mostly empty." ⁹ Professor Jerome Cohen provides a scholarly review of Japan's economy during the war and reconstruction, with a useful discussion about the role of oil but, he, too, reflects the view set forth in the USSBS, "Seven percent of all U.S. bombs dropped on Japan fell on the oil industry. Every important refinery on Honshu was hit; 85 percent of the total capacity was rendered inoperative but for the most part the bombs fell on inactive plants."¹⁰

While these authors wrote that the Japanese oil refineries and storage facilities did not qualify as strategic targets, because they lacked significant quantities of crude oil and petroleum products the debriefing verbal accounts by the combat crews who flew the oil missions against the Japanese refineries reported raging fires after the bombing runs, fires being fed by the petroleum supplies contained in the refineries. This discrepancy led to a research project whose purpose was to verify or disprove the claim that "there were no strategic oil targets left to destroy in Japan in 1945." Relying on quantitative data obtained from the United States Strategic Bombing Survey, the Nippon oil Company, the Japan Statistical Yearbook (1950)¹¹, the Geological Survey of Japan¹² and other publications this paper examines these claims about the lack of oil at Japanese refineries and finds them to be unsubstantiated and incorrect.

Name of Refinery	April		May		June		July		August		September		Total	
	Kiloliters	Gallons	Kiloliters	Gallons	Kiloliters	Gallons	Kiloliters	Gallons	Kiloliters	Gallons	Kiloliters	Gallons		
Kashiwazaki	5,125.5	1,351,794	1,039.1	270,217	2,235.4	584,439	2,741.1	717,897	7,372.0	1,932,382	2,385.6	624,494	15,960.5	4,190,401
Niigata	1,387.5	362,323	5,423.5	1,426,379	1,892.4	496,289	1,628.0	427,238	2,084.0	549,492	1,110.0	290,453	10,881.5	2,847,475
Akita	8,711.9	2,286,788	8,032.3	2,104,063	4,548.5	1,193,245	10,073.9	2,653,730	3,583.3	932,984	8.8.6	2,307.2	36,867.3	9,739,603
Yokohama	124.0	32,728	888.9	231,476	753.2	196,244	350.7	91,797	362.7	93,271	784.4	204,544	2,144.7	559,747
Kudamatsu	8,268.2	2,160,493	5,144.9	1,349,950	1,333.3	349,287	354.9	92,479	89.8.9	23,418	6,103.5	1,584,051	16,910.8	4,414,262
Hokkaido	131.3	34,447	1,644.2	429,424	985.4	257,388	513.9	134,270	802.4	209,137	101.6	26,542	4,526.8	1,195,890
Tsushima	193.9	50,688	133.4	34,835	124.8.9	32,418	304.9.9	79,418	77.4.9	19,854	5,124.9	1,330,451	1,000.0	261,800
Total	33,153.4	8,551,839	30,375.2	7,951,232	16,375.1	4,280,402	18,189.8	4,752,395	10,868.9	2,823,811	4,573.8	1,179,361	83,152.8	21,967,307

* Nippon Oil: 49.9 (about 50%) for the refineries, 50.1 percent for the Navy.
* For White Refinery only located at the Tsushima Plant in Japan.
* The Japanese Oil Company (JOC) is not included in this table.

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Table 2. Crude Throughput at Nippon oil Refineries* in 1945

Nippon oil Company Data

After more than a year of correspondence and communication with various Japanese organizations (including the Petroleum Association of Japan, the Japan National oil Corporation, the Petroleum Department of the Ministry of International Trade and Industry, the Japanese embassy in Washington, and the Japan Technical Information Group), quantitative data on crude oil and processed by-products were obtained from the Nippon oil Company for the period April to September 1945. Table 2 lists the crude oil throughput at nine of the Nippon oil Company refineries. The original data (in kiloliters), have been converted to U.S. gallons and both sets of data are presented. Of the nine refineries listed, data were furnished for the six refineries located on the Japanese mainland (Kashiwazaki, Niigata, Akita, Yokohama, Kudamatsu and Hokkaido). The data reveal that there were inventories of crude oil at all of these refineries and, in some, significant quantities. (No data were provided for the refineries at Tsurumi and Kansai.) The facility on Taiwan was the only refinery not located on the Japanese mainland.

Total crude oil throughput for each refinery, for the period April-September 1945, is provided as well as the total for each month for all of the refineries. The quantities of the oil at the six mainland refineries are as follows: Kashiwazaki: 15,010.3 kiloliters (3,965,421 gallons), Niigata: 10,881.5 kiloliters (2,874,675 gallons), Akita: 36,867.3 kiloliters (9,739,603 gallons), Yokohama: 3,144.7 kiloliters (830,767 gallons), Kudamatsu: 12,722.2 kiloliters (3,360,951 gallons) and Hokkaido: 4,526.8 kiloliters (1,195,890 gallons). The total crude oil throughput from April-September 1945 for these six refineries amounted to 83,152.8 kiloliters (21,967,307 gallons). The grand total for all the refineries was 83,440.8 kiloliters (22,093,391 gallons).

Refinery	Bombing Mission No.	Date	Crude Oil Throughput, 1945 (Kiloliters)	Percent Reduction
Kashiwazaki	15	August 16, 1945	1481,702.000	0.0
Niigata	15	July 10, 1945	10,881.500	0.0
Yokohama	15	August 9, 1945	10,881.500	0.0
Kudamatsu	2	June 26, 1945	1,282.121.547	0.0
Hokkaido	2	June 26, 1945	1,282.121.547	0.0

Name of Refinery	April	May	June	July	August	September	Total
Kashiwazaki	1,039.1	1,039.1	1,039.1	1,039.1	1,039.1	1,039.1	6,214.6
Niigata	5,423.5	5,423.5	5,423.5	5,423.5	5,423.5	5,423.5	32,538.0
Akita	8,711.9	8,711.9	8,711.9	8,711.9	8,711.9	8,711.9	52,270.4
Yokohama	124.0	124.0	124.0	124.0	124.0	124.0	744.0
Kudamatsu	5,144.9	5,144.9	5,144.9	5,144.9	5,144.9	5,144.9	30,869.4
Hokkaido	1,644.2	1,644.2	1,644.2	1,644.2	1,644.2	1,644.2	9,865.2
Tsushima	133.4	133.4	133.4	133.4	133.4	133.4	799.6
Total	22,126.0	22,126.0	22,126.0	22,126.0	22,126.0	22,126.0	132,756.0

Material	Quantity (Kiloliters)	% of Total
Gasoline	12,171.7	14.5
Paraffin	7,238.2	8.7
Coal	5,738.2	6.8
Fuel Oil	28,075.9	34.3
Lubricating Oil	15,067.4	18.2
Total	68,291.4	82.5

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Table 3. Nippon Refineries Bombed by the 315th Bomb Wing

Table 4. Gasoline Production: Kiloliters (Gallons) (1945)

Table 5. Data on Production of Finished Products from Crude oil (April-September 1945)

Three of the Nippon oil Company refineries were struck by the 315th Bomb Wing and this information is given in Table 3. These data demonstrate that at the Akita Refinery, the oil inventories in August 1945 were 3,493.7 kiloliters (922,966 gallons) and after the bombing mission on August 14, 1945 the oil inventories were zero. From April to July 1945 the monthly oil inventories at the Akita Refinery ranged from 4,516 kiloliters (1,193,248 gallons) to 10,913 kiloliters (2,883,128 gallons). The oil inventories at the Kudamatsu refinery in June 1945 were 1292 kiloliters (341,347 gallons) and after the air strike on June 29, 1945 the oil inventories fell to zero (July 1945).

A clue to the origin of the crude oil at the Akita Refinery is contained in the Target Information Sheet for the Akita bombing mission shown in Appendix 1. section 3 of this document identifies the Akita refinery as "one of the most important targets in the Japanese Petroleum Industry." And it also, "Processes crude oil from the oil fields around Akita, which are the largest natural petroleum producers in Japan proper." The annual crude oil capacity of these oil fields, in late 1944, was estimated to be 1,320,000 barrels (55,440,000 gallons). The subject of the Japanese oil fields will be discussed later in this paper.

Thus, while the naval blockade and air strikes against Japanese shipping were effective in curtailing or preventing crude oil imports to Japan, domestic oil fields were still capable of supplying shipments of this much needed resource to the refineries.

Table 4 provides data on the quantities of gasoline processed from the crude oil listed in Table 2. Again, in addition to the monthly (April-September 1945) entries for each refinery for which data were available the total quantities in kiloliters and gallons are given for the refineries listed. The total monthly production of gasoline for all the refineries ranged from 1,154.4 kiloliters (304,969 gallons) to 3,445.0 kiloliters (910,100 gallons). The grand total amount of gasoline produced during this period was 12,717.1 kiloliters (3,359,604 gallons).

The Nippon oil Company also provided useful data on kerosene, gas oil, fuel oil and lubricating oil supplies processed from the crude oil listed in Table 2. This information is summarized in Table 5.

The total quantity of the by-products listed in Table 5 amounts to 81,236.8 kiloliters (21,461,138 gallons). Fuel oil represents 48.7 percent of the total volume of the products, the largest single component, followed by lubricating oil (18.6 percent) and gasoline (15.7 percent).

The data in Table 6 represent the quantities of crude oil at the Nippon oil Company refineries in 1945 obtained from two independent sources, the U.S. Strategic Bombing Survey (1946) and the Nippon oil Company in the year 2000. These data are in close agreement, differing by about 9 percent. Both sets of data show that there were between 495,453 and 544,136 barrels (20,809,026 to 22,853,712 gallons) of crude oil at the Nippon oil Company refineries during the period April to August 1945.

Japan Statistical Yearbook (1950) Data

For the period 1941 to 1945, data on crude oil production in Japan as well as crude oil imports and heavy oil imports have been obtained from the Japan Statistical Yearbook (1950)¹³ and are tabulated in Table 7.

Prior to Japan's entry into World War II crude oil production, for example, in 1940, was 334,834 kiloliters (88.5 million gallons). During the war years crude oil production ranged from 305.720 kiloliters (80.8 million gallons) in 1941 to 245,452 kiloliters (64.8 million gallons) in 1945. It is interesting to note that crude oil production in 1945 was only 26.6 percent lower than peacetime production in 1940. Total crude oil throughput at Nippon oil Company refineries, from April to September 1945, for which data are available, amounted to 83,440.9 kiloliters (22.0 million gallons), 34 percent of the total crude oil production in Japan as reported in the Japan Statistical Yearbook for 1945. In 1944 the crude oil imports were 208,728 kiloliters (55.3 million gallons) and represented 45.1 percent of the available crude oil. Crude oil imports in 1945 dropped to zero because of American interdiction tactics while heavy oil imports managed

to reach 6,786 kiloliters (1.8 million gallons), 2.7 percent of available oil. Based on the data published by the Japanese Statistics Bureau in 1950, it is evident that significant amounts of crude oil were being produced domestically in Japan in 1945 (245,452 kiloliters, 64.8 million gallons). According to Hansell, the Japanese petroleum industry was extremely critical to their war effort and the destruction of their refining and storage facilities would make it much more difficult for them to successfully continue to conduct their war effort.¹⁴

Table 6. Crude Oil: Nippon Oil Company (1945), Barrels

Month	U.S.S.B. (1945)	Nippon Oil Co. (1945)
April	138,568	143,028
May	139,832	143,028
June	140,000	143,028
July	140,000	143,028
August	140,000	143,028
Total	688,400	688,400

* The U.S. Strategic Bombing Survey Data (1945), p. 17, Table 11, on crude oil loss inflicted upon Nippon Oil Refineries at Katsushika, Yokohama, Kanagawa, Fukuoka, Nagasaki, Yamaguchi, Osaka, Kobe, and Tokyo.

** The data obtained directly from the Nippon Oil Company in January 1945 reflected crude oil at the following refineries: Katsushika, Yokohama, Kanagawa, Fukuoka, Nagasaki, Yamaguchi, Osaka, Kobe, and Tokyo.

Table 7. Crude Oil and Heavy Oil, 1941-1945

Year	Crude Oil (Barrels)	Heavy Oil (Barrels)	Total (Barrels)
1941	1,000,000	1,000,000	2,000,000
1942	1,000,000	1,000,000	2,000,000
1943	1,000,000	1,000,000	2,000,000
1944	1,000,000	1,000,000	2,000,000
1945	1,000,000	1,000,000	2,000,000

Table 8. Gasoline, Kiloliters (Gallons)

Year	Production (Kiloliters)	Imports (Kiloliters)	Total (Kiloliters)	% Imports
1941	384,107	0	384,107	0.0
1942	384,107	0	384,107	0.0
1943	384,107	0	384,107	0.0
1944	165,257	0	165,257	0.0
1945	39,450	77,988	117,438	66.4

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Table 6. Crude Oil: Nippon Oil Company (1945), Barrels

Table 7. Crude Oil and Heavy Oil, 1941-1945

Table 8. Gasoline, Kiloliters (Gallons)

Based on published Japanese data, Table 8 provides useful information on gasoline (kiloliters and gallons) production, imports, total, and percent imports for the years 1941-1945. If one notices that for the year 1944 gasoline imports were zero, but in 1945 imports amounted to 77,988 kiloliters (20.60 million gallons). This is difficult to explain, except that from September through December, during the Allied occupation of Japan, gasoline may have been imported by the occupying forces.

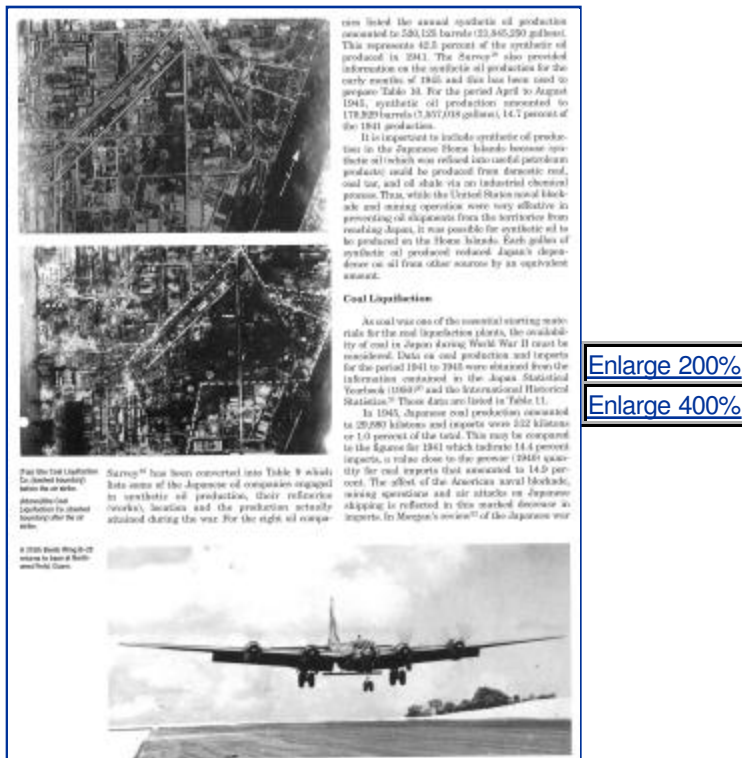
Japanese publications reveal that domestic gasoline production increased steadily from 1926 to 1937, reaching a maximum of 826,562 kiloliters (218.4 million gallons) in 1937. In that year imports amounted to 42.7 percent. From that point there was an annual decline in gasoline production and in 1941, 384,107 kiloliters (101.7 million gallons) of gasoline were produced. By 1944 annual production was reduced even further to 165,257 kiloliters (43.7 million gallons) and in 1945 it reached a war-time low of 39,450 kiloliters (10.4 million gallons). This latter figure may be compared to the gasoline produced at the Nippon oil Company refineries for which data are available. Table 4 indicates that between April-September 1945 12,717.1 kiloliters (3,359,604 gallons) of gasoline were processed from Nippon crude oil stocks. Therefore, it is estimated that 26,732.9 kiloliters (7,040,396 gallons) of gasoline was produced at other Japanese refineries for which data were unobtainable.

Synthetic oil

The production of synthetic oil from coal and its subsequent refining into gasoline should also be factored into the question of whether there were strategic oil targets remaining in Japan in 1945. Of the eleven oil refineries bombed by the 315th Bomb Wing the Ube Coal Liquefaction Company in Ube, Japan was the one that was capable of processing coal into hydrocarbon stock destined for conversion into gasoline and other needed products. Chester Marshall reports that, "the Ube plant was one of the few plants that remained in high production in Japan until we [315th BW] came along. It was not only destroyed on August 5, but also 'sunk' when the surrounding dikes were breached and the area inundated." 1G Figure 1 provides an aerial view of the Ube Coal Liquefaction Company prior to the air strike and Figure 2 shows the destroyed installation after the bombing mission. According to reports on 315th Bomb Wing Operations synthetic oil production dropped 44 percent, representing a loss of 265,000 barrels (11,130,000 gallons). Perhaps, this is why Bradley, in describing the 315th Bomb Wing air attack against the Ube Coal Liquefaction

Company states that, "it was probably the most significant of the oil campaign."17

In 1941, Japan's Inner Zone total annual synthetic oil production was 1,222,000 barrels (51,324,000 gallons). The information in the Survey18 has been converted into Table 9 which lists some of the Japanese oil companies engaged in synthetic oil production, their refineries (works), location and the production actually attained during the war. For the eight oil companies listed the annual synthetic oil production amounted to 520,125 barrels (21,845,250 gallons). This represents 42.5 percent of the synthetic oil produced in 1941. The Survey19 also provided information on the synthetic oil production for the early months of 1945 and this has been used to prepare Table 10. For the period April to August 1945, synthetic oil production amounted to 179,929 barrels (7,557,018 gallons), 14.7 percent of the 1941 production.



[Photograph]

(Top) Ube Coal Liquefaction Co. (dashed boundary) before the air strike.

(Above) Ube Coal Liquefaction Co. (dashed boundary) after the air strike.

A 315th Bomb Wing B-29 returns to base at Northwest Field, Guam.

It is important to include synthetic oil production in the Japanese Home Islands because synthetic oil (which was refined into useful petroleum products) could be produced from domestic coal, coal tar, and oil shale via an industrial chemical process. Thus, while the United States naval blockade and mining operation were very effective in preventing oil shipments from the territories from reaching Japan, it was possible for synthetic oil to be produced on the Home Islands. Each gallon of synthetic oil produced reduced Japan's dependence on oil from other sources by an equivalent amount.

Coal Liquefaction

As coal was one of the essential starting materials for the coal liquefaction plants, the availability of coal in Japan during World War II must be considered. Data on coal production and imports for the period 1941 to 1945 were obtained from the information contained in the Japan Statistical Yearbook (1950)²⁰ and the International Historical Statistics.²¹ These data are listed in Table 11.

Table 5. Production of Synthetic Oil at Plants in Japan, Hong Kong ^a				
Name	Location	Production Started	Capacity	Planned Annual Production
Nippon Ref. Manufacturing Co. (Nippon Refining Co.) Nagasaki Refinery	Nagasaki, Nagasaki	58	140,000	
Nippon Oil Chemical Industry Co. Nippon Yuka Sangyo K.K. Kawasaki Refinery	Kawasaki, Kanagawa	58	250,000	
Nippon Kasei Kogyo Co. Nippon Yuka Sangyo K.K. Onoda Plant	Onoda, Yamaguchi	175	100,000	
Yokohama Refinery	Yokohama, Kanagawa	175	80,000	
Nippon Refining Co. Nippon Yuka Sangyo K.K. Mitsubishi Works	Mitsubishi, Fukuoka	180	120,000	
Nippon Ref. Manufacturing Co. Fukuoka Yuka Sangyo K.K. Sasebo Refinery	Sasebo, Yamaguchi	187	170,000	
Nippon Refining Co. Nippon Yuka Sangyo K.K. Tokyo Refining Co.	Yokohama, Kanagawa	20	9,000	
Nippon Refining Co. Tokyo Refining Co. Tokyo Refining Co.	Yokohama, Kanagawa	51	3,475	
Yokohama Refining Co. Yokohama Refining Co. Yokohama Refining Co.	Yokohama, Kanagawa	208	70,000	
Yokohama Refining Co. Yokohama Refining Co. Yokohama Refining Co.	Yokohama, Kanagawa	1,000	100,000	

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Table 10. Production of Synthetic Oil (1945-54)		
Company	Production Began	Capacity
1. Imperial Ref. Industry Co. *	1945	62,000 bbl
2. Nippon Refining Co. *	1945	1,200,000 bbl
3. Nippon Refining Co. *	1945	1,200,000 bbl
4. Nippon Refining Co. *	1945	1,200,000 bbl
5. Nippon Refining Co. *	1945	1,200,000 bbl
6. Nippon Refining Co. *	1945	1,200,000 bbl
7. Nippon Refining Co. *	1945	1,200,000 bbl
8. Nippon Refining Co. *	1945	1,200,000 bbl
9. Nippon Refining Co. *	1945	1,200,000 bbl
10. Nippon Refining Co. *	1945	1,200,000 bbl
11. Nippon Refining Co. *	1945	1,200,000 bbl
12. Nippon Refining Co. *	1945	1,200,000 bbl
13. Nippon Refining Co. *	1945	1,200,000 bbl
14. Nippon Refining Co. *	1945	1,200,000 bbl
15. Nippon Refining Co. *	1945	1,200,000 bbl
16. Nippon Refining Co. *	1945	1,200,000 bbl
17. Nippon Refining Co. *	1945	1,200,000 bbl
18. Nippon Refining Co. *	1945	1,200,000 bbl
19. Nippon Refining Co. *	1945	1,200,000 bbl
20. Nippon Refining Co. *	1945	1,200,000 bbl
21. Nippon Refining Co. *	1945	1,200,000 bbl
22. Nippon Refining Co. *	1945	1,200,000 bbl
23. Nippon Refining Co. *	1945	1,200,000 bbl
24. Nippon Refining Co. *	1945	1,200,000 bbl
25. Nippon Refining Co. *	1945	1,200,000 bbl
26. Nippon Refining Co. *	1945	1,200,000 bbl
27. Nippon Refining Co. *	1945	1,200,000 bbl
28. Nippon Refining Co. *	1945	1,200,000 bbl
29. Nippon Refining Co. *	1945	1,200,000 bbl
30. Nippon Refining Co. *	1945	1,200,000 bbl
31. Nippon Refining Co. *	1945	1,200,000 bbl
32. Nippon Refining Co. *	1945	1,200,000 bbl
33. Nippon Refining Co. *	1945	1,200,000 bbl
34. Nippon Refining Co. *	1945	1,200,000 bbl
35. Nippon Refining Co. *	1945	1,200,000 bbl
36. Nippon Refining Co. *	1945	1,200,000 bbl
37. Nippon Refining Co. *	1945	1,200,000 bbl
38. Nippon Refining Co. *	1945	1,200,000 bbl
39. Nippon Refining Co. *	1945	1,200,000 bbl
40. Nippon Refining Co. *	1945	1,200,000 bbl
41. Nippon Refining Co. *	1945	1,200,000 bbl
42. Nippon Refining Co. *	1945	1,200,000 bbl
43. Nippon Refining Co. *	1945	1,200,000 bbl
44. Nippon Refining Co. *	1945	1,200,000 bbl
45. Nippon Refining Co. *	1945	1,200,000 bbl
46. Nippon Refining Co. *	1945	1,200,000 bbl
47. Nippon Refining Co. *	1945	1,200,000 bbl
48. Nippon Refining Co. *	1945	1,200,000 bbl
49. Nippon Refining Co. *	1945	1,200,000 bbl
50. Nippon Refining Co. *	1945	1,200,000 bbl
51. Nippon Refining Co. *	1945	1,200,000 bbl
52. Nippon Refining Co. *	1945	1,200,000 bbl
53. Nippon Refining Co. *	1945	1,200,000 bbl
54. Nippon Refining Co. *	1945	1,200,000 bbl
55. Nippon Refining Co. *	1945	1,200,000 bbl
56. Nippon Refining Co. *	1945	1,200,000 bbl
57. Nippon Refining Co. *	1945	1,200,000 bbl
58. Nippon Refining Co. *	1945	1,200,000 bbl
59. Nippon Refining Co. *	1945	1,200,000 bbl
60. Nippon Refining Co. *	1945	1,200,000 bbl
61. Nippon Refining Co. *	1945	1,200,000 bbl
62. Nippon Refining Co. *	1945	1,200,000 bbl
63. Nippon Refining Co. *	1945	1,200,000 bbl
64. Nippon Refining Co. *	1945	1,200,000 bbl
65. Nippon Refining Co. *	1945	1,200,000 bbl
66. Nippon Refining Co. *	1945	1,200,000 bbl
67. Nippon Refining Co. *	1945	1,200,000 bbl
68. Nippon Refining Co. *		

Table 11. Coal, Kiilotons

The Japanese oil fields located on Hokkaido and Honshu, contained more than 4,000 oil wells. Table 12, dealing with the quantities of oil produced at these oil fields, has utilized data from the Survey.²⁵

During the first half of 1945, the oil produced at the 4,277 operating oil wells on the mainland of Japan amounted to 739,600 barrels (31,063,200 gallons). This was about 50 percent of the crude oil produced by these wells in 1944, 1,482,500 barrels (66,265,000 gallons). According to other survey data²⁶ during the first seven months of 1945 the total crude oil still amounted to 950,000 barrels (39,900,000 gallons). When equivalent time periods are used for the production in 1945 the difference between the two sets of figures is about 10 percent.

In 1941 the oil storage capacity in Japan was about 60,000,000 barrels, (2,520,000,000 gallons). As a result of the aerial bombing in 1945 85 percent of the storage capacity was destroyed. The remaining 15 percent oil storage capacity amounted to 9,000,000 barrels (378,000,000 gallons).

Table 13 contains 1945 data on crude oil and refined oil from seven Japanese oil companies and two military refineries extracted from the United States Strategic Bombing Survey.²⁷ For each of the oil companies and the military installations their operating refineries and depots are identified. Also, the specific production period (months) during the year 1945 are indicated when such information was provided. In 1945, the Nippon Mining Company produced the largest amounts of crude oil, 189,173 barrels, (7,945,266 gallons) and refined oil, 187, 459 barrels (7,873,278 gallons). The total production of crude oil for all these companies and refineries in 1945 was 595,000 barrels (24,990,168 gallons) and the quantity of refined oil amounted to 661,498 barrels (27,782,916 gallons). Because semifinished products were used in addition to the crude oil the quantity of refined oils is greater than the crude oil. Grant²⁹ reports that in 1945 proved oil field reserves at the beginning of the year amounted to 17,977,000 barrels (755,034,000 gallons). Thus, there was a very large quantity of crude oil potentially available for use by the Japanese oil refineries in 1945 if the facilities had not been destroyed or damaged by the 315th Bomb Wing air raids.

Location	Number of Wells	Producing Wells	Crude Oil Production, Barrels	Refined Oil Production, %
			1944	1945
Homeland Islands	8	944	35,400	97,890
Formosa				
1. Hsin	10	1,320	871,000	389,800
2. Tainan	7	250	275,000	154,700
3. Hsin	24	2,250	364,000	170,700
4. Hsin	10	4,277	1,482,500	739,600
			(95,000,000) (39,900,000)	(38,000,000) (15,800,000)

1. Crude oil fields in Japan are located along a north-south line from Hokkaido to the West Coast of Formosa.
2. First half of 1945.

Oil Company	Crude Oil Produced, Barrels	Crude Oil Produced, Gallons	Refined Oil Produced, Barrels	Refined Oil Produced, Gallons
1. Mitsubishi Oil Co. (Kure Refinery)	75,000 ²	3,150,000	13,870	580,780
2. Maruubei Oil Co. (Kure Refinery)	38,730 ³	1,615,060	8,100	340,200
3. Idemitsu Oil Co. (Kure Refinery)	145,381 ⁴	6,036,882	131,000 ⁵	5,488,800
4. Daikin Oil Co. (Kure Refinery)	No Data Available for 1945			
5. Ino Enjin Co. (Kure Refinery)	15,190 ⁶	631,780	10,400	437,500
6. Nippon Mining Co. (Kure Refinery)	189,173 ⁷	7,945,266	187,459 ⁸	7,873,278
7. Tera Refinery Co. (Kure Refinery)	75,000 ⁹	3,150,000	14,000 ¹⁰	584,000
8. Japanese Naval Refineries (Kure Refinery)	80,100 ¹¹	3,364,200	62,200 ¹²	2,608,400
9. Japanese Army Refineries (Kure Refinery)	0 ¹³	0	21,000 ¹⁴	882,000
10. Total	595,000	24,990,168	661,498	27,782,916

1. Includes Kure Refinery, Osaka, Yokohama, and other refineries in Japan, Formosa, and Manchuria.
2. Includes Kure Refinery, Osaka, Yokohama, and other refineries in Japan, Formosa, and Manchuria.
3. Includes Kure Refinery, Osaka, Yokohama, and other refineries in Japan, Formosa, and Manchuria.
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12. Includes Kure Refinery, Osaka, Yokohama, and other refineries in Japan, Formosa, and Manchuria.
13. Includes Kure Refinery, Osaka, Yokohama, and other refineries in Japan, Formosa, and Manchuria.
14. Includes Kure Refinery, Osaka, Yokohama, and other refineries in Japan, Formosa, and Manchuria.

1. April-July 1945
2. April-September 1945
3. April 1945
4. April-September 1945
5. April-June 1945
6. April-May 1945
7. April-August 1945
8. April-June 1945
9. April-June 1945
10. April-June 1945
11. April-June 1945
12. April-June 1945
13. April-June 1945
14. April-June 1945

(Note: This table does not include data from the crude oil refineries which were located outside Japan and Formosa.)

Enlarge 200%

Enlarge 400%

Table 12. Crude oil Production, Japan (Homeland Islands)

Table 13. Production of Crude oil and Refined oils (1945)

Conclusion

The United States Strategic Bombing Survey and other publications dealing with crude oil and synthetic oil production and refining concluded that by 1945, Japan had so little oil at its refineries and storage facilities, as to make them unworthy targets for bombardment. This conclusion is both unsubstantiated and incorrect. In fact, the data presented in this article refutes the conclusions reached by the Survey and the other publications cited. The data presented here arrives at an altogether different set of conclusions, summarized as follows:

1. oil production from the 4,277 operating oil wells in Japan during the first six months of 1945 amounted to 739,000 barrels (31,038,000 gallons). Data in the Survey report for the first seven months of 1945 list the oil production as 950,000 barrels (39,900,000 gallons).

2. The Survey reported that during May-August 1945, B-29 air strikes against the Japanese Home Islands petroleum industry destroyed 471,379 barrels (19,797,918 gallons) of oil supplies. Other data in this literature report the oil supplies destroyed in bombing missions as 471,341 barrels (19,796,322 gallons). There is less than 1 percent of difference between these two sets of figures.

3. Data on crude oil supplies for the Nippon oil company for the period April-August 1945 from two independent sources reveal the following:

	USSBS (1946)	Nippon Oil Co.(2000)	
Barrels	544,136	495,453	Enlarge 200%
Gallons	22,853,712	20,809,026	Enlarge 400%

4. Data on crude oil supplies for 1945 from other Japanese oil companies and refineries:

	Crude Oil Charged	Refined Oils	
Barrels	595,004	661,498	Enlarge 200%
Gallons	24,990,168	27,782,916	Enlarge 400%

5. Combining the Survey report crude oil figures for the Nippon oil Company and the other Japanese oil companies and refineries for which data are available:

	Crude Oil		
	Barrels	Gallons	
	544,136	22,853,712	Enlarge 200%
	595,004	24,990,168	Enlarge 400%
	1,139,140	47,843,880	

6. As it has not been possible, thus far, to obtain crude oil and refined oil data on all the Japanese oil companies in operation during 1945, the quantities cited must be considered an underestimate. To support this assumption the data from the Japan Statistical Yearbook (1950) shows that total crude oil production in Japan in 1944 was 254,542 kiloliters (67,244,906 gallons) and in 1945 it was 245,452 kiloliters (64,843,509 gallons). The 1945 figures represent 80.3 percent of the total crude oil production for 1941 (305,720 kiloliters, 80,765,110 gallons), the peak year for crude oil production in Japan during World War II. The quantity for crude oil production in 1941 (80,765,110 gallons) derived from the Japan Statistical Yearbook is in good agreement with the amount noted in the Akita Target Information Sheet for crude oil produced from homeland wells in 1941 (81,522,000 gallons).



[Enlarge 200%](#)
[Enlarge 400%](#)

[Photograph]

B-29s fly in formation over the Marianas.

7. The goal of this article is to stimulate discussion of this important military historical question. Hopefully, this discussion will lead to additional research on this subject and make it possible to further improve our understanding of the B-29 aerial bombing campaign against the Japanese petroleum industry in 1945.

[Sidebar]

THE USSBS REPORTS THAT, THE BOMBING OFFENSIVE AGAINST THE JAPANESE oil INDUS- TRY DID NOT BEGIN UNTIL MAY 1945... THE REFINERIES WERE LARGELY INACTIVE FOR LACK OF CRUDE OIL

A REVIEW OF THE DATA ON CRUDE oil PRODUCTION AND REFINING REVEALS SOME INCONSISTENCIES,
AND LEADS TO AN ENTIRELY DIFFERENT CONCLUSION

[Sidebar]

THE COMBAT CREWS WHO FLEW THE OIL MISSIONS AGAINST THE JAPANESE REFINERIES REPORTED
RAGING FIRES AFTER THE BOMBING RUNS

[Sidebar]

SYNTHETIC OIL COULD BE PRODUCED FROM DOMESTIC COAL, COAL TAR, AND OIL SHALE

[Footnote]

NOTES

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Indexing (document details)

Subjects:	Military air strikes, Petroleum industry, Crude oil, Refineries, World War II
Locations:	Japan
Author(s):	Manny Horowitz
Author Affiliation:	During World War II the author served as a B-29 navigator with the 315th Bomb Wing, Twentieth Air Force, stationed at Northwest Field on Guam. After the war he returned to the City College of New York and obtained his undergraduate degree in chemistry. Then he completed his graduate work at George Washington University, earning a Ph.D. in polymer chemistry. Dr. Horowitz was employed at the National Bureau of Standards, now the National Institute of Standards and Technology (NIST) for 29 years as a research chemist and later as Deputy Director of the Institute for Materials Research and the National Measurement Laboratory. In 1980 he joined the faculty of Johns Hopkins University and is currently a research professor in the Department of Materials Science and Engineering and teaches courses in biomaterials.
Document types:	Feature
Document features:	Tables, Photographs
Publication title:	Air Power History. Rockville: Spring 2004. Vol. 51, Iss. 1; pg. 26, 10 pgs
Source type:	Periodical
ISSN:	1044016X
ProQuest document ID:	596774991
Text Word Count	4974
Document URL:	http://library.mtroyal.ab.ca:2048/login?url=http://proquest.umi.com/pqdweb?did=596774991&sid=1&Fmt=4&clientId=1751&RQT=309&VName=PQD

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