



The Allied Bomber Offensive Against Germany

ALLIED LOSSES PER MAJOR CAMPAIGN

CAMPAIGN	DURATION	LOSSES	EFFECT
Aircraft	Aug 1943 – Feb 1944	US-792, British-379	Production: effect lasted some two months; losses soon overcome*
Oil; Transportation	May 1944 – Apr 1945	US-968, British-525	Oil: Production drop of 66%
Area Bombing	July 1943 – Apr 1945	British-875	No real effect

*However, over 1,000 German airmen were lost; thus the raids crippled the Luftwaffe in experienced manpower.

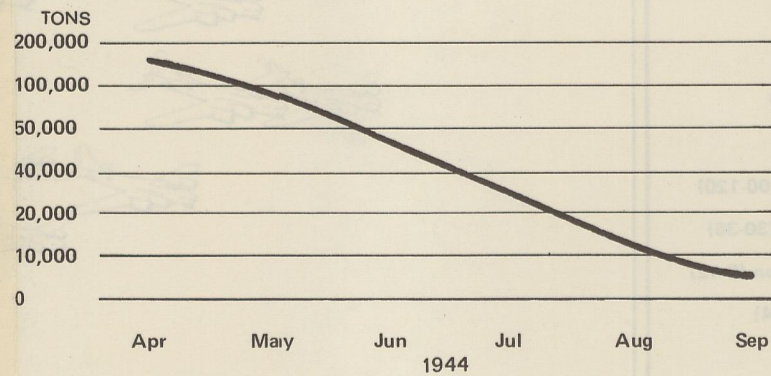
NOTES: The losses are given in terms of bombers only. The British devoted some 30% of their effort to the strategic oil and transportation campaigns during the height of the bomber offensive, even less, about 20% to the aircraft campaign; on the whole, over 50% of their effort was in the area bombing campaign, which produced no real effects. The rest of their effort was in support of the ground and naval forces. Almost all of the American effort was devoted first to the aircraft campaign, then to the oil and transportation campaigns, save for during the Normandy invasion and the Ardennes Offensive, plus other efforts in support of the breakout from Normandy. The effects show what measurable results were gleaned from that phase of the offensive.

ADDITIONAL NOTES ON EFFECTS: Transportation: the bombing of German transportation succeeded in crippling the flow of traffic and tying up the transportation network. This was acutely felt when the German industries were dispersed and the parts had to be transported from all around for final assembly. Also, it prevented the smooth flow of oil, parts, replacements and other necessities, thus tying up German industries. The armies at the front had trouble receiving replacements, oil, etc. Aircraft: the air battles, not the bombings, succeeded in destroying the Luftwaffe. In the battles against the US forces, the Germans lost most of their experienced aircrew, thus leaving the Luftwaffe without the necessary core of experienced men. Galland said, "The time has come when our weapon is in sight of collapse." Oil: the RAF contributed the greater amount of tonnage on the oil system than did the US, 63,000 to 60,000, since the RAF

bombers possessed greater bombloads. It has been argued that the tight US formations did not allow for an individual concentration on the target: they dropped when the group leader dropped, while the RAF allowed the pilots to make individual drops when over the target, under supervision of the Master Bomber. However, in daylight, better concentrations were possible, for on clear days the US bombers had a clear shot, while at night the RAF could only dump in the approximate area of the target, thus not getting the greater concentration.

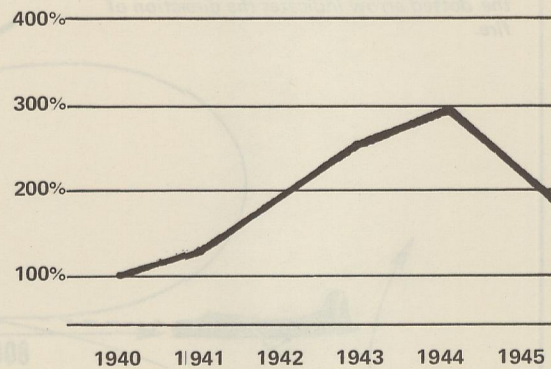
GERMAN PRODUCTION DECLINE

HIGH OCTANE FUEL

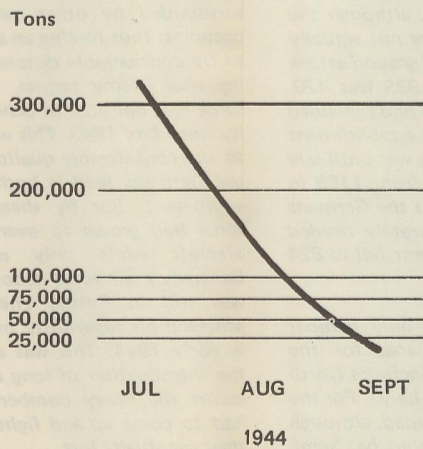


As can be seen from these tables, Allied bombing did have an effect upon German production, especially that of fuel. This drop caused the Germans to use up their available reserves by September 1944; after that they were faced with a fuel crisis, for production could not keep up with demand. This caused the Army to cut back on fuel allowances to panzer and motorized forces, thus forcing them into a less mobile role than before. The Luftwaffe was forced to cut training to a bare minimum and to hoard its available fuel for one great strike whenever they had enough. This certainly all but eliminated the Luftwaffe as a threat.

ARMS



SYNTHETIC FUEL



TONNAGES OF BOMBS DROPPED British and US 8th Air Force: 1939-45

Date (% total)	Bomber Command	8th Air Force	Total (tons)
1939 (negl)	31 tons	none	31
1940(.8)	13,033	none	13,033
1941(2)	31,704	none	31,704
1942(3)	45,561	1561	47,122
1943(12.8)	157,457	44,185	201,462
1944(57.9)	525,518	389,119	914,637
January	18,428	10,532	28,960
February	12,054	16,480	28,534
March	27,698	19,892	47,590
April	33,496	22,447	55,943
May	37,252	32,450	69,702
June	57,267	54,204	111,471
July	57,615	40,784	98,399
August	65,855	44,120	109,975
September	52,587	36,332	88,919
October	61,204	38,961	100,165
November	53,022	36,091	89,113
December	49,040	36,826	85,866
1945(23.5)	181,740	188,303	370,043
1939-45(total)	955,044	623,168	1,578,212

Half of all bombs dropped were dropped after August 1944. In addition 1.118 million tons were dropped by other Allied air units. About half of this was dropped by Allied air forces (mainly the US 15th) in Italy and adjacent areas. The remainder was dropped by tactical air forces. In western Europe, 41% of all US bombs were dropped by B-17's, 29% by B-24's, 11% by B-26's, 8% by B-25's, A-20's, and A-26's, 7% by P-47's and 4% by other fighter-bombers.

DISTRIBUTION OF BOMB TONNAGES

US Army Air Force 54.2%
(1,461,864 tons)

Royal Air Force 45.8%
(1,235,609 tons)

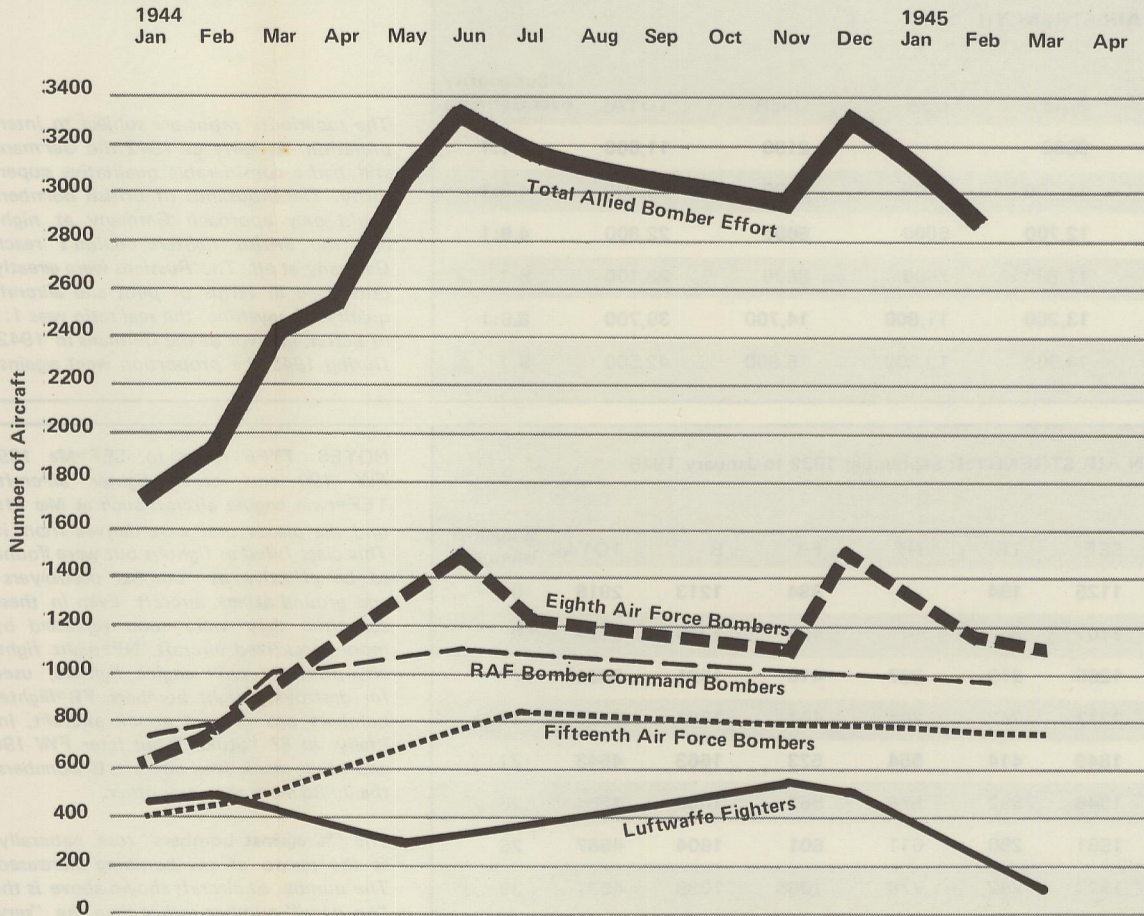
BY AREA

France 21.8%
Germany 50.3%
Italy & Sicily 13.7%
Austria, Hungary & Balkans 6.7%
Other 7.5%

BY TARGET SYSTEMS

Land Transportation 32.1%
Industrial Areas 23.7%
Military Targets 11.1%
Oil, Chemical & Rubber 9.3%
Airfields & Air Depots 6.9%
Naval & Water Transportation 4.2%
V-1 & V-2 Launching Sites 2%
Aircraft Factories 1.8%
Miscellaneous Manufacturing 2.6%
All Other Targets 6.3%

THE NUMBER OF BOMBER AIRCRAFT OVER GERMANY COMPARED WITH LUFTWAFFE FIGHTER EFFORT



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STATISTICAL SUMMARY OF THE BOMBING EFFORT	USAAF	RAF	TOTAL
Tons of Bombs Dropped	1,461,864	1,235,609	2,697,473
Bomber Sorties	757,818	687,462	1,445,280
Fighter Sorties	991,750	1,695,045	2,686,795
Claimed Enemy Aircraft Destroyed	35,783	21,622	57,405
Bomber Planes Lost	9,949	11,965	21,914
Fighter Planes Lost	8,420	10,045	18,465
Personnel Lost in Action	79,265	79,281	158,546
Bomber Planes Assigned to Combat Units (max.)	7177	6956	14,133
Fighter Planes Assigned to Combat Units (max.)	6203	7728	13,931
Personnel Assigned to Combat Units (max.)	619,020	718,628	1,337,648

ALLIED AIR STRENGTH					
Date	Britain	USA	USSR	TOTAL	Superiority over Germans
6/42	9500	—	2100	11,600	3.1:1
12/42	11,300	1300	3800	16,400	4.8:1
6/43	12,700	5000	5600	22,800	4.9:1
12/43	11,800	7500	8800	28,100	6:1
6/44	13,200	11,800	14,700	39,700	8.6:1
12/44	14,500	12,200	15,800	42,500	5:1

GERMAN AIR STRENGTH: September 1939 to January 1945							
TYPE	SEF	TEF	NF	FB	B	TOTAL	% against bombers
9/39	1125	194	—	384	1213	2916	0
6/40	1107	357	—	483	1380	3327	0
6/41	1266	210	227	410	1321	3434	7
6/42	1277	362	244	461	1381	3725	17
6/43	1849	414	554	523	1663	4643	21
9/43	1646	392	574	562	1080	4254	26
12/43	1561	290	611	601	1604	4667	26
6/44	1523	242	778	1005	1089	4637	39
1/45	2260	105	1256	892	528	5041	50
Serv:	59-77	43-86	54-84	50-83	41-83		

NOTES: TYPE refers to; SEF=Me 109, FW 190 and other fighter aircraft; TEF=twin engine aircraft such as Me 110 and the planes that were derived from it. This class failed as fighters but were found to be effective as "bomber destroyers" and ground attack aircraft. Even in these capacities they were soon replaced by more specialized aircraft; NF=night fighters, primarily twin engine fighters, used for destroying night bombers; FB=fighter bombers and ground attack aircraft, initially Ju 87 "Stukas" but later FW 190 and other specialized aircraft; B=bombers, the Ju 88 more than any other.

The "% against bombers" rose, naturally, as the tempo of the bombing increased. The number of aircraft shown above is the "on hand" number rather than the "serviceable" or "authorized" number. The Serv. % figures show the lowest and highest percentage of the "on hand" aircraft that were "serviceable" for action. The percentage fluctuated according to the tempo of operations and climatic

conditions. The lowest figure usually occurred during the early spring (the "mud" season) after active winter operations. For example, the low figure for twin engine fighters, night fighters and fighter bombers occurred during the late winter of 1941/42. The third, and least reliable, method of counting aircraft was the "authorized" number. This was the number of aircraft all the active units were supposed to have. This number, if nothing else, shows what the high command was trying to do. For single engine fighters (SEF) the "establishment" at the beginning of the war was 1174 planes. This stayed fairly constant until 12/40 when it was raised to 1375. From there it grew steadily until, by March '43, it was at 1712 planes. From there on enormous increases were made, from 2172 planes in June '43 to 3016 a year later. By late '44 the number was 4084, although only about half of these planes were actually "on hand." Twin engine fighters (TEF) began the war at 168 and climbed to 448 by August 1940. The Battle of Britain

proved the inadequacy of this aircraft as a fighter and the number authorized fell to 51 by late '41. But then the need for more fighter bombers and bomber destroyers saved the TEF and the establishment immediately went up to 466 in early '42. This stayed constant until June '44, when better fighter bombers and Allied long range fighters eliminated any need for the TEF. Establishment fell to 104 by the end of the war. Night fighters didn't come into existence until late '40, when 195 were authorized. By late '41 this had increased to 406, as the British night bombing increased. Nine months later this had risen to 506 and six months later to 665. A year later the number was over a thousand (1046) and, by the end of the war it had reached 1319. The night fighter program was the only one which showed a real problem in obtaining sufficient pilots. "Sufficient pilots" was calculated on the basis of the number of serviceable aircraft that were available. The night fighter force was often short 50 or 60 crews. By the end of 1944 the shortage had risen to 314

crews. Part of this was due to the high degree of skill needed for night operations. Although other types of aircraft did not have shortages, the level of skill among German fighter pilots dropped considerably during the war while the Allied training (with the exception of the Russians) stayed rather high. From 1939 to late '42 the Germans gave each new pilot 240 flight hours before sending him into combat. This was forty hours more than British pilots received. Starting in October '42 this changed. German pilots now received 205 hours while British pilots received 340 hours and US pilots 270. In July '43 this changed even more, German pilots now received 170 hours, British pilots 335 hours and US pilots 320. By July 1944 it was all over for the German air force. Their pilots, from that point on, received only 110 hours of flight training compared to 340 hours for British and 360 hours for US pilots. The decline in German training was due only partially to the increased need for more pilots. As the war went on the chief reason for this

decline was the lack of fuel for training aircraft.

Fighter bomber establishment went up continually during the war, although the first "fighter bombers" were not actually "fighters" but rather purely ground attack aircraft. Establishment in 1939 was 420. This rose to 964 by June '44 and remained there until the end. Bomber establishment rose throughout most of the war until late '43. By then it had risen from 1188 in 1939 to 2053. At that point the Germans finally saw that they desperately needed fighters. Bomber establishment fell to 824 by the end of 1944.

The figures above include only combat aircraft in the European area for the British and Americans (this includes North Africa, the Middle East and Italy). For the Russians all aircraft are included, although about 20% of this total would be "semi-combat" types such as reconnaissance and transport craft. Although the Allies had a clear advantage over the Germans early in

the war there was not much they could do with it. In an air war the defender has a considerable advantage; particularly if the defender (in this case, Germany) is surrounded by other nations which she occupies, thus forcing an airborne attacker to fly considerable distances before reaching vital enemy targets. The Russian air force was not able to achieve air superiority until late 1943. This was primarily due to the considerable qualitative superiority the Germans held in both manpower and equipment. But by then the Soviet air force had grown to over eight thousand aircraft while only about 30% of Germany's air force (about 1400 planes) was still in Russia. The western Allies achieved air superiority over the Germans in early 1944. This was due primarily to the introduction of long range fighters to escort the heavy bombers. The Germans had to come up and fight. Outnumbered, they eventually lost.

Fig. 3 — The Head-On Attack. The solid arrow indicates the flight path of the German — his two options of climbing over the bomber or diving under it, and the dotted arrow indicates the direction of fire.

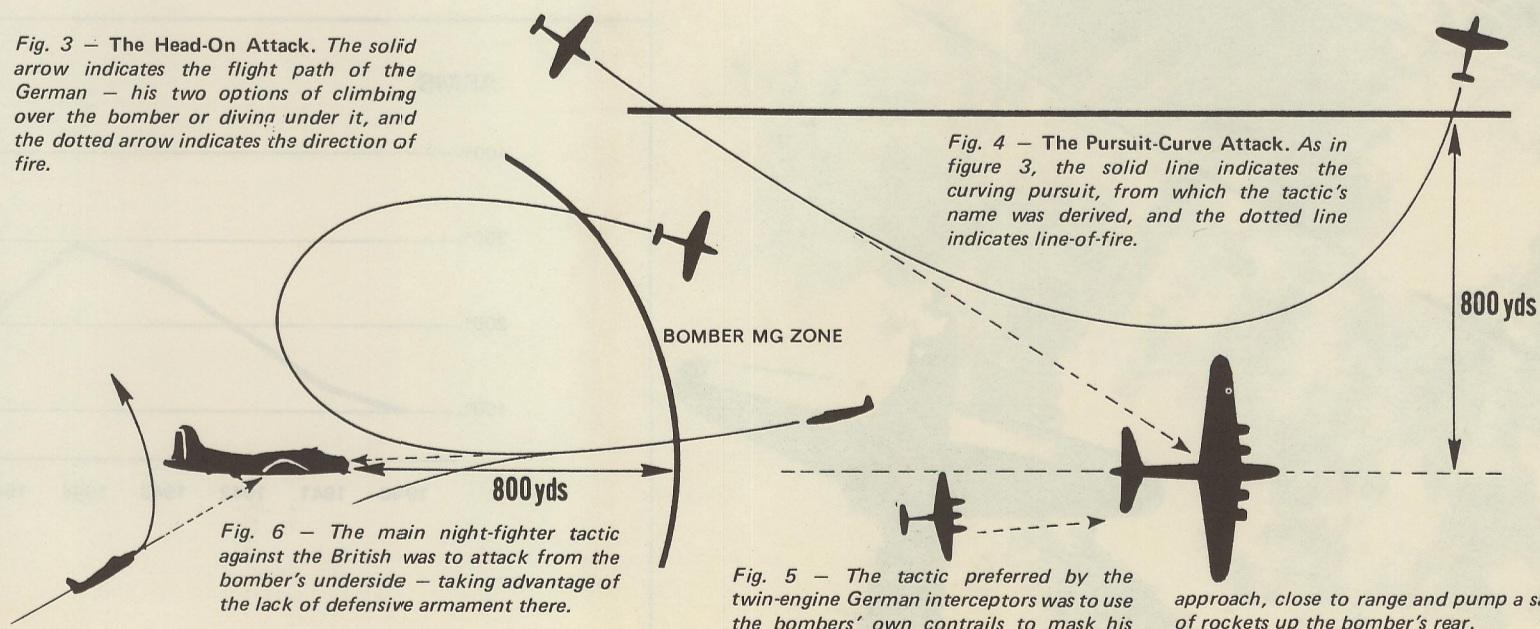


Fig. 6 — The main night-fighter tactic against the British was to attack from the bomber's underside — taking advantage of the lack of defensive armament there.

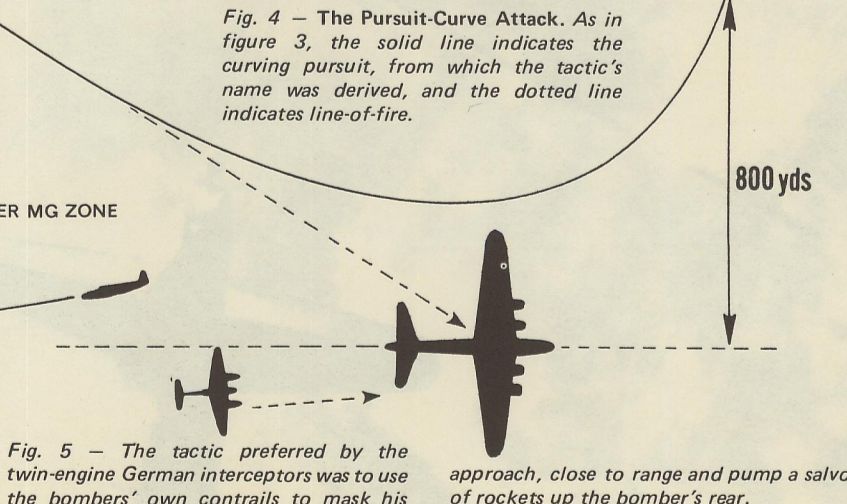


Fig. 5 — The tactic preferred by the twin-engine German interceptors was to use the bombers' own contrails to mask his approach, close to range and pump a salvo of rockets up the bomber's rear.

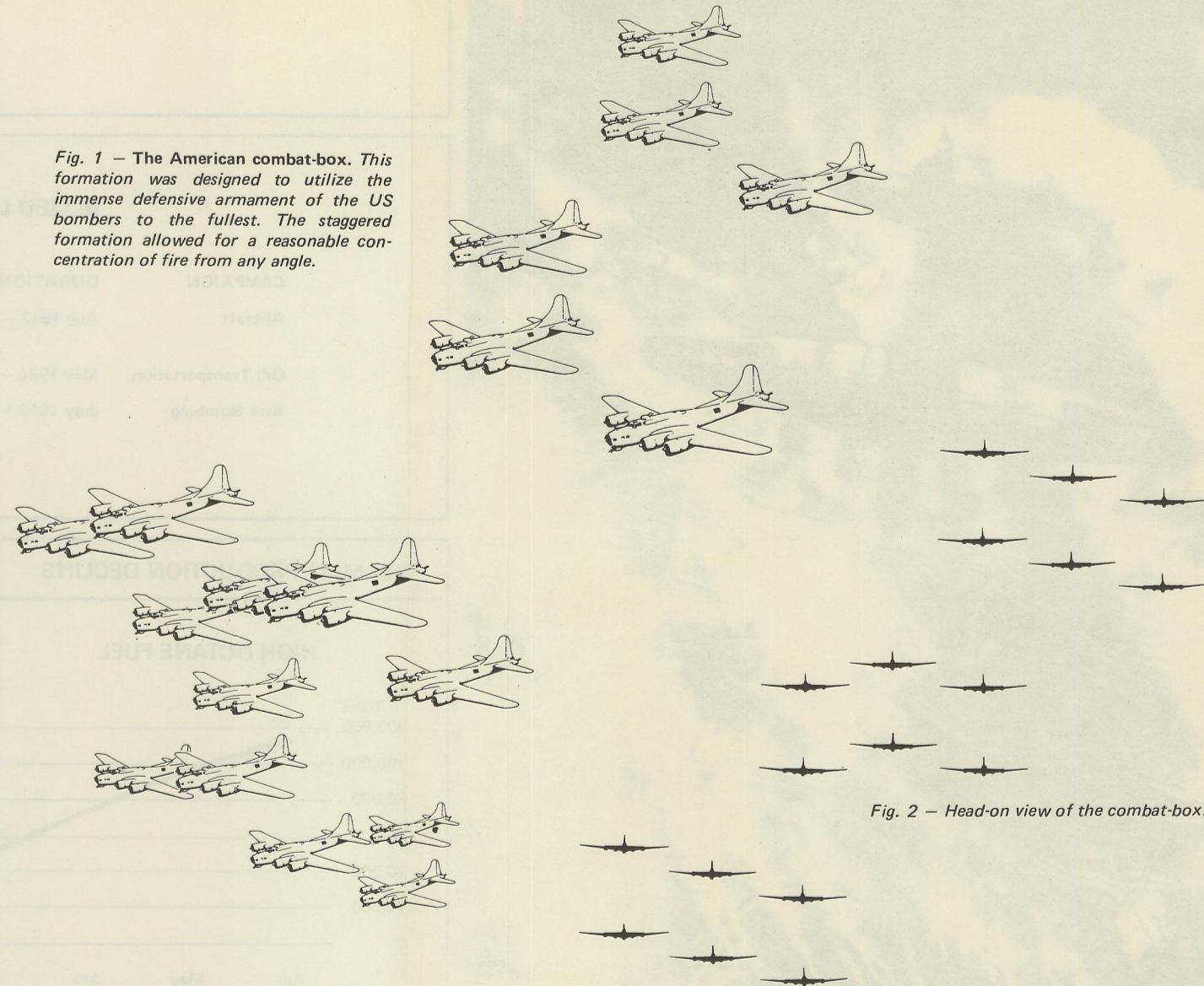


Fig. 1 — The American combat-box. This formation was designed to utilize the immense defensive armament of the US bombers to the fullest. The staggered formation allowed for a reasonable concentration of fire from any angle.

Fig. 2 — Head-on view of the combat-box.