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MARCH 1970

GERMAN AIR ATTACKS AGAINST INDUSTRY
AND RAILROADS IN RUSSIA, 1941–1945
Oleg Hoeffding

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PREFACE

This Memorandum is issued in support of a current study of aerial interdiction under Air Force Project Rand. It is largely based on source materials not readily available otherwise, and deals with a facet of German air operations in Russia that has not been explored elsewhere in the historiography of World War II. Although primarily a historical note, the study brings out some lessons still applicable to modern aerial warfare. Most notably, it highlights the difficulty of improvising in wartime the prerequisites for a mission -- in this case, strategic attack on industry -- that had been neglected in prewar research and development and force procurement.

The author is indebted to Rand colleagues T. E. Greene and R. Perry for valuable comments and criticisms.
SUMMARY

Until well into 1942 the German air force in the Russian theater showed no interest in strategic attacks on Soviet industry, although German ground advances had brought important Soviet targets within reach of the Luftwaffe's medium bombers. This abstention from strategic operations was not dictated by formal Luftwaffe doctrine, which was broad and flexible enough to include such operations among possible Luftwaffe missions. However, the German war plan for the Russian campaign explicitly enjoined the air force from attacking industry in the first and decisive phase of the campaign, and limited it to the air superiority and ground support missions. Only in the event -- which never came to pass -- that Soviet resistance had not ceased after the Wehrmacht had closed the Volga-Arhangelsk line was the Luftwaffe to attack the remnants of Soviet industry, mainly in the Urals region.

The failure of the Blitzkrieg plan and the prospect of a long and hard struggle against the USSR, as well as the entry of the United States into the war, resulted, from early 1942 on, in increasing advocacy within the Luftwaffe of air attack on Soviet industry. However, these efforts were initially frustrated by the emergence of a new constraint: As German hopes for early victory over the USSR were briefly rekindled by the first successes of the 1942 summer offensive, influential civilian elements argued that Soviet industry should not be bombed but captured intact for exploitation under German control. This controversy was not resolved until the Stalingrad disaster forced Germany into a defensive strategy, and also inflicted heavy casualties on the Luftwaffe.

When, by spring 1943, the Luftwaffe had somewhat recovered, it was pressed by the Army into attacking Soviet tank production. Only one major tank plant, at Gorki, was found to be within range of the Luftwaffe's short-legged medium bombers. In June 1943, about 1,000 tons of bombs were aimed at it, in six attacks. Together with simultaneous attacks on a synthetic rubber plant and an oil refinery, this modest campaign was to remain the only German attempt at attacking Soviet industry.
However, planning for more, and more effective, strategic operations was only beginning. The impact of Stalingrad induced Albert Speer, Reich Minister of War Production, to make himself a vigorous advocate of air attack on Soviet industry. Speer secured Hitler's authority for setting up a committee of civilian industrial experts, drawn from his ministry, which was to advise the Luftwaffe on Soviet economic targets. This group, headed by Speer's Director of Electric Power Planning, a Dr. Carl, became the mainspring of German plans to attack Soviet industry. They proceeded from the realization that target selection in Russia would be governed, and severely restricted, by the Luftwaffe's limitations of force and range. The unit nominally earmarked for long-range strategic attack -- Air Corps IV -- consisted of some 300 medium bombers with a combat radius of 600 miles. Efforts and hopes to have a force of heavy, long-range He-177 bombers assigned to the Russian front were to no avail, and in any event the He-177 proved a notorious design failure.

In August 1943 the Carl Committee proposed to the Luftwaffe an attack on eleven power plants in the Moscow-Upper Volga (MUV) region, the only important Soviet industrial region within the Luftwaffe's reach. Elimination of these plants, it was estimated, would deprive the MUV region of 50 percent of its power supply and thus paralyze production even in high-priority war industries.

This proposal was promptly endorsed by the Luftwaffe Operations Staff, and operational planning was started. Two hydro-electric plants were to be attacked with radio-controlled glider bombs. For the nine thermal plants targeted, and to be attacked with HE and incendiary bombs, minimum force requirements were optimistically set at 30 aircraft per target.

There were concurrent plans to attack additional hydro-power plants with specially designed floating mines. However, tests of the latter failed and this plan was shelved. Still in the hope that a force of He-177 heavy long-range bombers would be assigned to the Eastern front, plans were also laid for attacks on power plants in the Urals industrial
region. However, after the German retreats in 1943, most of these plants slipped out of range even for the He-177.

Soviet aero-engine production was the only target system to compete seriously with electric power for the Luftwaffe's attention. This interest directly reflected the passage of air superiority to the Soviet air force. It was soon found, however, that the bulk of Soviet aero-engine capacity was located well beyond the Luftwaffe's reach.

Thus, by late 1943, the Luftwaffe -- or rather its only "strategic" force, Air Corps IV -- seemed to be poised to execute the MUV electric power attacks. It is not clear what occupied Air Corps IV during the 1943/44 winter, but late in March 1944 it was diverted, apparently on Hitler's direct orders, to what became the first and only major effort of the Luftwaffe aimed at systematic interdiction of a segment of the Soviet railroad network. In about six weeks, Air Corps IV launched 17 night attacks on eight railroad centers in the Western Ukraine, for a total of about 2,700 medium bomber sorties. The object of this campaign was to interfere with what German intelligence interpreted as a buildup for a Soviet offensive aimed at Kovel and Brest-Litovsk. Postwar German sources have claimed that this interdiction campaign was actually directed against a Soviet feint designed to simulate an offensive buildup by movements of empty trains, in order to draw German reserves from the central front sector against which the Soviet summer offensive was to be launched.

After this episode there is no record of further operations by Air Corps IV, except for a highly successful attack in June 1944 on the USAAF shuttle base at Poltava. Most probably, Air Corps IV was drawn full-time into badly needed tactical support of the German Army Group Center. German retreats all along the front in 1944 were soon to place the MUV power plants beyond the range of conventional German medium bombers.

However, alternative plans for attack on Soviet power plants, with somewhat exotic means, continued to be hatched until almost the end of the war. Himmler's Reich Security Service was promoting a scheme for commando attacks on power plants in the Urals, by groups of saboteurs
carried in long-range transport aircraft. Also under Himmler's auspices there was a plan for one-way suicide attacks on Soviet power plants. Finally, late in 1944 and early 1945, Albert Speer and the last Chief of Staff of the Luftwaffe were advocating a plan for attacking power plants with long-range "Mistel" composite aircraft (fighter plane riding on the back of a medium bomber), taking off from airfields in East Prussia. The latter, however, were overrun by the Russians before other preparations had been completed. Early in March 1945 the "Mistel" aircraft earmarked for this plan were expended in attacks on Russian river crossings on the Oder and Neisse.
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I. INTRODUCTION

The core of this Memorandum is an attempt to reconstruct and relate a somewhat obscure episode in the history of air warfare in World War II: German air force plans to mount a strategic bombing offensive against industrial target systems in the USSR, and the reasons why these plans were never executed in full. This part of the study is largely based on hitherto unpublished research on wartime German documents I undertook some fifteen years ago. At that time, when "massive retaliation" was the guiding concept for future wars, this story seemed to be a mere footnote on past history, devoid of topical lessons.

Since then, however, history has shown that non-nuclear air war is still with us, and may be with us in the future. Thus, in spite of all the incomparabilities introduced by changes in the technology even of conventional air war, the experience of air forces involved in World War II may still hold interesting lessons for the present. Study and understanding of these lessons should not be impeded by the emergence over time of various stereotypes characterizing the nature and behavior of World War II air forces. In our case, there is a widely held belief that, by virtue of doctrine, force structure, and actual use, the Luftwaffe (in contrast to the air forces of the United States and Britain) was a predominantly "tactical" force, confined in its activities to air superiority and, particularly, close support missions. An excursion into "strategic" bombing against Britain in 1940-1941 had been ineffectual.

Without disputing that the tactical role in support of ground forces was, indeed, the predominant use of the Luftwaffe in Russia, this study shows that such role was adopted not because of doctrinal constraints or preferences; formal prewar Luftwaffe doctrine was flexible enough to accommodate "strategic" bombing, as well as "deep" interdiction attacks, even though its primary emphasis was on air superiority and close support of ground forces.
What had been lacking, as will be seen, was elementary foresight and common sense in prewar force structure planning and building. There was failure to match doctrinal positions favorable to strategic operations with capabilities appropriate to this role. Thus, when the will to engage in strategic operations in Russia had permeated the Luftwaffe's top command echelons in 1943, the capabilities for doing so were woefully lacking. What had been neglected by prewar long-term planning could not be supplied by intra-war crash programs and improvisations.

Except for published sources, as cited, this study leans heavily on German documents obtained in 1954-1955 at the Air University Library and the U.S. Army's German Military Documents Center, Alexandria, Virginia. Since a very large number of individual documents were involved, only the major items are cited with indication of date and origin. It will be seen that most of the documents are attributed to "German air intelligence." This term stands for the Intelligence Division of the Luftwaffe Operations Staff (Luftwaffen Fuehrungstab, Abteilung Ic). Most of the documents used originated in the Economic Intelligence Branch of this Division (Ic Unterabteilung Wirtschaft) and the Foreign Air Forces/East Branch (Ic Unterabteilung Fremde Luftwaffen Ost, Gruppe C).

It should be noted that this Memorandum lays no claim to being an exhaustive or definitive study of its subject. The source materials contain many lacunae and uncertainties which have been filled in by speculation or left open.
II. THE GEOGRAPHIC SETTING

Some prefatory observations on the wartime geographical distribution of Soviet industrial output will be useful to counter the widely held notion that soon after the German invasion the bulk of Soviet industry was located -- or relocated -- somewhere in the Urals and Siberia and thus was beyond the reach of the Luftwaffe.

These "Eastern Regions," after Soviet territorial losses in 1941, indeed, both contributed a major share of wartime industrial output and witnessed dramatic industrial expansion. However, their share in total Soviet industrial output (measured in terms of gross output of industry in 1926/27 rubles) declined as the war went on, from roughly three-quarters in 1942 to under two-thirds in 1944.*

This decline was due not so much to the comeback of the areas liberated in 1943-1944 as to expansion of industrial output in the "Central Industrial Zone," which had remained in Soviet hands throughout (except for brief incursions in late 1941) although its industrial potential had been affected by extensive evacuation of industrial plants in 1941. This expansion represented largely a striking recovery of industry in Moscow City and Region (oblast'). In 1940, this area contributed 22.5 percent of Soviet industrial output; or 31.5 billion rubles. Moscow City alone accounted for 14.5 percent. By early 1942, evacuation and transport difficulties as well as stoppage of nonwar industries had reduced Moscow City, industrially, to a hollow shell. In June 1941, its industry had been producing at an annual rate of 23 billion rubles; in January 1942 it was down to 7.5 billion rubles. From then on, revival was rapid, but for 1942 as a whole Moscow City output was still only around 11 billion rubles and Moscow oblast' output some 4.7 billion rubles. Together, their industrial output at around 15 billion rubles, was less than half the 1940 volume. By 1944, however, Moscow City and oblast' had expanded output to 29.5

*Data on geographic distribution of industrial output are from N. Voznesenskii, Voennaia ekonomika SSSR v period otechestvennoi voiny (The war economy of the USSR during the patriotic war), Moscow, 1948.
billion rubles, or 20 percent of a total Soviet industrial output which (by the Soviet measure used) was three percent greater than in 1940.

It will be seen presently that the Luftwaffe's interest centered not on the central industrial region as a whole, but on a segment of it roughly bordered by the triangle Tula-Rybinsk-Gorki. See Fig. 1 for a map of the region.* Its share in total Soviet wartime industrial output cannot be determined exactly with the available data. Very roughly, however, it may be placed at about 25 percent of the total in 1942, and about one-third in 1944. Between these years, its output expanded by approximately 60 percent.

This triangle is the geographical focus of most of the following discussion. Following the language of German Air Intelligence, let us call it the Moscow-Upper Volga region or MUV for short.

From late 1941 to early 1944 MUV was well within range of the Luftwaffe, which, for reasons to be shown, was limited to a radius of some 600 miles or 950 km. In fact, the heaviest air attacks on industry actually undertaken, in June 1943, were on Gorki, at the eastern corner of the triangle.

One may recall in this connection that the central and northern sectors of the land front remained relatively static for these two and a half years. It was the southern half of the front that (pivoting roughly on Kursk) swung forward to Stalingrad and the Caucasus range in 1942; and then swung back to the Rumanian border by early 1944.

In short, the Soviets were not timid, once Moscow had been held, to place and expand industry in an area exposed to air attack. The only direct statement available on Soviet policy in this respect is an order issued in June 1942 and captured by the Germans, prescribing evacuation of industrial plants from a front zone 200 kilometers

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*The map is adapted from a German original enclosed with a list of Soviet electric power plants issued in April 1943 by the War Economy Staff of the Wehrmacht High Command (Wehrwirtschaftsstab im OKW: Liste der Industriebetriebe der UdSSR. Teil II: Elektrizitätswerke).
Fig. 1—Map showing location of MUV region
deep. German air intelligence took this to mean that the Soviets were anxious not to expose industry to fighter-escorted daylight attacks. * One may presume that it also reflected Soviet fear of the then impending German summer offensive of 1942, which the Soviet high command, erroneously, had expected to be aimed at the central rather than southern sector. ** In late 1943 and 1944, when German ground advances had become unlikely and German fighter forces on the eastern front pitifully weak, there was probably no need even for this precaution.

To some extent, the Soviets made up for this boldness by reinforcing the defenses against night attack of industrial centers within the German 600 mile bomber range, after the desultory German attacks on Moscow in 1941-1942 had stopped. *** In any event, as will be seen, night attacks on cities in the Soviet hinterland proved to be low-cost enterprises for the Germans: Less than one percent of the nearly 700 bombers launched to attack the ZTM tank plant in Gorki in June 1943 were lost; and even in March to May 1944, when the Luftwaffe launched fairly substantial attacks on rear railroad targets in the Ukraine its losses were triflingly small, although they were using types of aircraft that had been withdrawn from night attacks on Britain in 1941 and 1942 because of heavy losses.

At the same time, the Soviets had not neglected passive defense of important targets: German attack planners were to be troubled by intelligence of blast walls around power plant machinery, net barriers

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* IC IV memorandum of July 6, 1942, "Evacuation and correct timing of attacks on industrial targets."

** See, for example, A. M. Samsonov, Stalingradskaya bitva (The Stalingrad battle), 2nd revised ed., Moscow 1968, pp. 58-60. Samsonov adds that "Soviet strategic intelligence, in March 1942, had disclosed (German) intentions to launch an offensive on the southern wing of the front."

*** "After the defeat of the Hitlerites before Moscow...some air defense units and formations deployed around the capital were transferred to the defense of major industrial and administrative-political centers, as well as to the defense of the front line ground forces." Col. V. M. Bezimiamiyi et al., Na strazhe neba stolitsy (Guarding the capital's sky), Moscow, 1968, p. 227.
protecting hydro-power dams, earth walls protecting pressure steam pipelines, and such like.

The Urals industrial region was a much-coveted promised land. In 1943, plans were laid for attacks on power plants there. These were based on the hope that Hitler might be prevailed upon to revise his priorities for use of the small force of long-range, four-engined bombers of the Luftwaffe; he had assigned them to the Battle of the Atlantic and "retaliation bombing" of Britain. This hope failed.

Also in 1943, and later, there were adventurous plans (emanating not from the Luftwaffe) to overcome the range handicap by airborne commando raids -- using long-range transports and possibly glider tows -- on the Urals power plants, the Magnitorgorsk iron and steel center, and Baku, a then vital POL target.

The Luftwaffe caught a fleeting glimpse in 1942 of the promising-looking target system of the Soviet oil production centers in the Caucasus and the POL transportation and refining system along the Volga. These were left alone, partly because Luftwaffe bombers were otherwise engaged, and partly because of an awkward conflict of "motives" which hampered German strategy in 1942, on which more presently.
III. DOCTRINAL BACKGROUND

One may now turn to "motive" in the sense of briefly considering the place of strategic air war, and especially air attack on industry, in German air doctrine in general and in German strategy in Russia in particular. As things turned out, this place was a small and unhappy one. But a brief plunge into history seems in order, if only because it provides an essential part of the answer to the question of why the Germans were unable to bomb Soviet industry when they wanted to. The decisions that tied their hands in 1943 and 1944 had, in a vital part, been taken in 1937 or thereabouts.

These decisions did not stem from any formal doctrine on the wartime use of the Luftwaffe. Rather -- and not surprisingly -- they reflected mainly the judgments of successive incumbents of the office of Chief of the Luftwaffe General Staff; an office invested with probably unforeseen authority and decisionmaking powers because of the supineness and frivolous insouciance of the Luftwaffe's nominal Commander-in-Chief, Hermann Goering.

Formal doctrine was ostensibly laid down in a document first issued in 1935 and known as "Luftwaffe Service Manual No. 16" (or "Ldv. 16," short for "Luftwaffendienstvorschrift No. 16"), and entitled "Luftkriegführung," or "Conduct of Air Warfare."

Two versions of this document have been available for this study: a photostat of the German original 1935 edition, and an English translation of a 1940 edition. As far as one can judge, given the very poor quality of the translation, the 1940 version differs only very slightly from the original one; the differences mostly reflect changes in Luftwaffe organization and command arrangements.

Luftwaffe roles and missions are defined in Ldv. 16 in a very comprehensive fashion and without explicitly indicating relative priorities among them: the air superiority mission is given prime emphasis, and so is cooperation with ground and naval forces. But room is also left for independent "strategic" operations against industrial and
other targets.* Considerable attention is also given to attacks on railroad and other transportation systems, both to achieve general dislocation of an enemy economy and to interdict lines of communication to the land battle front. Some characteristic excerpts follow, defining roles and missions in general. They are translated here from the German text of the 1935 edition (italics in original).

9. . . . The ultimate objective in war is to defeat the enemy armed forces.

10. The task of the air force is to serve this objective by the conduct of aerial warfare in the context of the war as a whole.

   Combat against the enemy air force weakens the enemy's armed forces and simultaneously protects our own armed forces, our people, and our living space.

   By intervening in operations and combat on land and sea the air force directly supports the army and the navy.

   By combat against the resources feeding the enemy armed forces and by interdiction of the flow of resources to the front the air force seeks to subdue the enemy armed forces.

11. Only in the context of the overall war situation can it be determined how to achieve the maximum effect upon the outcome of the war, and what task should accordingly be assigned the highest priority.

   The most important target system must be identified after careful consideration of all military, political, and economic aspects.

   The enemy, the weather situation, and the season, as well as the structure of the country, the character of its people, and our own capabilities must also be considered in making the decision. The potentialities and limitations of the Luftwaffe must also be taken into account.

   Generally, the doctrines laid down in Ldv. 16 seem to reflect the views of Lieutenant-General Walther Wever, the Luftwaffe's first

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* Whereas "attacks on cities intended to terrorize the population are ruled out as a matter of principle," "retaliatory attacks" in response to prior enemy "terror attacks" are in order as "the only means of forcing the enemy to desist from this brutal form of air warfare" (Ldv. 16, para. 186).
Chief of Staff in 1935-1936. In an address delivered in November 1935, he defined "the tasks which we set our air force" as follows:

1. To destroy the enemy air force by attacking it with our bomber formations in its own country and destroying its bases and factories, while enemy formations sent out to attack Germany are destroyed by air and ground forces.

2. To prevent the movement of large enemy ground forces to decisive areas by destroying railways and roads (particularly bridges, tunnels, etc.) indispensable to the movement and supply of such forces.

3. To support the operations of army formations independent of railways, for example, armored forces, by impeding the enemy advance and participating directly in ground operations.

We believe that if its forces are suitably concentrated in a decisive situation, the air force will enable our army to achieve a modern Tannenberg by keeping enemy reserves, even reserve armies, away from the battlefield.

4. To support our naval operations . . .

5. To paralyze the enemy armed forces by stopping production in armaments factories.*

Wever's mention not only of "strategic" air warfare (in the sense of industry attack) but also of rail and road interdiction is interesting. As will be seen, echoes of it survived in Hitler's basic directives for the attack on Russia.

According to another German air general, General Wever "was convinced, like Douhet, that modern war could not be limited at will in time and space," and had intended to "introduce long-range bombers in order to create a strategic bombardment force as the backbone of German bomber aviation."** Five prototypes of long-range four-engined bombers


**Werner Baumbach, Zu spät? Aufstieg und Untergang der deutschen Luftwaffe (Too late? Rise and Decline of the German Air Force), Munich, 1949, pp. 23-26. In a contrary opinion, that of H. D. von Rohden, ex-chief of the Luftwaffe's Historical Division, Jeschonnek had "always
of two designs (Ju-89 and Do-19), commissioned by Wever, were undergoing tests in 1936. After his death, in an air crash in June 1936, they were scrapped on orders of Goering's Reich Air Ministry, and development work on heavy long-range bombers remained almost dormant until nearly the outbreak of the war.

In contrast to Wever, General Hans Jeschonnek, Chief of Staff from 1937 until his death in August 1943:

... was a firm advocate of the view that light and medium bombers should form the mainstay of the German airforce. This view was shared by Goering, CinC of the Luftwaffe, and General Udet, his Director of Development and Procurement.*

The views of Jeschonnek, Udet, and Goering in the late 1930s are said to have rested on three considerations, summarized as follows by General Werner Baumbach:**

1. Germany, due to raw material and manufacturing limitations, could not afford large fleets of multi-engined bomber aircraft.

2. Area bombing being uneconomical, the Luftwaffe should concentrate on dive-bombers.

(Soon after Jeschonnek took office, dive-bombing capability was specified as a requirement for all bombers to be developed. This directive was adhered to with fine consistency, to the point of trying to turn the only four-engined bomber subsequently developed into a dive-bomber, which prevented it from ever becoming truly operational.)

3. Most important, Hitler -- in sharp contrast to Wever's dictum on war -- was convinced that Germany would be able to confine its wars to the European continent, and would not have to fight England.

been an advocate of a strategic employment of the Luftwaffe before the war." At the same time -- and more in line with other appraisals of Jeschonnek -- Rohden adds that "there is no evidence that Jeschonnek had any other opinions than those Hitler asked for." (H. D. von Rohden, "The German Air Force in the war against Russia, 1941-1945," unpublished typescript in Air University Library.)


According to Baumbach's account:

German leadership reckoned, in principle, only with a European war. It believed that the building up of an up to date airforce, such as Germany had shortly before the war, had created all the prerequisites for destroying enemy air forces in surprise blows at the outset of the conflict and thus preventing them from intervening in land operations.

Thus, although German official air doctrine was catholic, actual prewar aircraft design and procurement policy, and the resulting force structure, essentially confined the Luftwaffe to a mission of first achieving air supremacy and then operating in support of the ground forces.

This mode of employment, as we know, was well vindicated in the Polish and western campaigns. The subsequent failure of the improvised strategic air offensive against Britain showed the Luftwaffe's ineffectiveness in attempting a task for which it had not been designed.

With this background, it is not surprising that no strategic mission was assigned to the Luftwaffe in the first and vital stage of the German war plan against Russia, Operation Barbarossa. In Hitler's Directive No. 21 of December 18, 1940, its mission was defined as follows:*

For the Air Force it will be a matter of releasing such strong forces for the eastern campaign in support of the Army that a quick completion of the ground operations may be expected and that damage to Eastern German territory by enemy air attacks will be as slight as possible. This concentration of the main effort in the East is limited by the requirement that the entire combat and armament area dominated by us must remain adequately protected against enemy air attacks and that the offensive operations against England, particularly her supply lines, must not be permitted to break down.

In fact, the directive explicitly enjoined the Luftwaffe from attacking war industry targets in the "mobile operations" phase -- an

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injunction that would not have been necessary if strategic attacks or industry had been entirely banished from Luftwaffe doctrine:

In order to concentrate all forces against the enemy Air Force and to give immediate support to the Army, the armament industry will not be attacked during the main operations. Only after the completion of the mobile operations may such attacks be considered -- primarily against the Ural Region.

Thus, the directive did contemplate a strategic role for the Luftwaffe in a second, post-Barbarossa phase of operations in Russia -- one that never came to pass. After the envisioned destruction of the Soviet armies west of the Volga,

... a line is then to be reached from which the Russian Air Force will no longer be able to attack Reich territory. The ultimate objective of the operation is to establish a defense line against Asiatic Russia from a line running approximately from the Volga River to Archangel. Then, in case of necessity, the last industrial area left to Russia in the Urals can be eliminated by the Luftwaffe.

The Barbarossa directive, it should also be noted, explicitly assigned an interdiction mission to the Air Force:

The Russian railroads, in the order of their importance for the operations, will be cut or the most important near-by objectives (river crossings) seized by the bold employment of parachute and airborne troops.

The notion of destroying Urals industry by air attack from the Volga was on Hitler's mind as early as the last of July 1940, when he first announced his intention to attack Russia, and outlined his strategic objectives, to the German Wehrmacht staff. In subsequent discussions of the Barbarossa plan, Hitler repeatedly reverted to this idea. * Thus, the notion of a Luftwaffe coup-de-grace to Urals industries must have been prominent in Hitler's mind. His Air Staff, however, does not appear to have taken the least notice of it. At any

rate, there is no record of any preparation for the post-Barbarossa air mission, although according to Hitler's timetable for Barbarossa it might have had to be undertaken before the end of 1941.

Perhaps, however, the Luftwaffe command had a right to be confused: Hitler had also given solemn assurances that he would require the services of the Luftwaffe in Russia for four or five months only, after which it would go back to the attack on Britain.* In any event, at least according to postwar testimony of German generals, military leaders refused to think beyond Barbarossa: even the objectives of the first phase seemed to them attainable only if there was political collapse in Russia.

In the light of this background it is not surprising that there is no record of any German interest in air attack on Soviet industry until early 1942. The few erratic bombing missions against cities beyond the zone of operations in 1941 were evidently intended to dislocate and demoralize the Soviet rear, without serving any defined strategic purpose. German sources speak of "weak attacks on the industry targets" of Moscow, Gorki, Rybinsk, Tula, Kharkov, and Iaroslavl as having been "without significance."** German intelligence was soon to find that these attacks had not even prompted evacuation of war industry from the target towns, except where they were threatened by the German ground advance.

The situation changed, however, during the 1941-1942 winter as the German Moscow offensive bogged down and this front sector and others suffered winter reverses, and as the Germans (or some of them) began to realize the powers of recuperation displayed by the Soviet economy. Early in 1942, interest in attacking Soviet industry began.

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* Adolf Galland, "Defeat of the Luftwaffe: Fundamental Causes," Air University Quarterly, Vol. VI, No. 1, Spring 1953, pp. 27, 33. Hitler's instruction to the Luftwaffe (in the Barbarossa directive) that it must also provide for effective air defense of the Reich and do its share in the blockade of Britain cannot have clarified the Luftwaffe's mind as to exactly what the priorities assigned to it were.

** Baumbach, op. cit., p. 177.
to appear. Nevertheless, the year went by without more than symbolic attacks, although geographically it had brought the Germans opportunities that were not to recur again. The motive to act became even stronger by 1943. But by then opportunity as well as means were wanting.
IV. LUFTWAFFE BOMBER CAPABILITIES IN RUSSIA

Before we review the developments in 1942-1943 that led up to the first serious German designs on Soviet industry, let me say a few words on German bomber capabilities in Russia, qualitatively and quantitatively. Jeschonnek's decision to make light and medium bomber forces the mainstay of the Luftwaffe resulted in commitment to two basic types of twin-engine medium bombers, of prewar design, with which it was to live through the war, the Heinkel 111 and Junkers 88. In the melancholy observation of a German Luftwaffe historian and ex-general: Heinkel 111s flew the first attacks on the British fleet in September 1939 and also delivered the last Fritz-X guided bombs on the Russian Oder crossings in March 1945. Steady efforts were made to stave off obsolescence of these aircraft by improvements and modifications, as well as adaptations for purposes for which they were not originally designed. All these changes did not benefit their range for bombing operations, which remained limited to a combat radius of some 600 miles. Over this radius they carried something like one ton of bombs, in shorter-range operations 1.5 tons or a little more. Their low speed condemned them even for night operations in the west at a relatively early stage; the Heinkel 111 was withdrawn from night missions over Britain in fall 1941 and the Junkers 88 a year later.

On the other hand, early in 1943 the Luftwaffe's Inspector of Bombing Aviation described the Junkers 88 as "still usable for night attacks in the east, with tolerable losses."* Baumbach claims that due to the inferiority of Russian fighter and AA defenses, bombing opportunities remained much less restricted in the east than they soon had become in the west.**

The qualitative deficiencies of Heinkel 111 and Junkers 88 for strategic use in Russia were coupled with numerical weakness. Initial

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*Some models of the He-111 and Ju-88 turned out late in the war were remarkably improved over the early models, in payload, range, and speed. There is no indication, however, that these late models were employed on the eastern front.

total strength in the attack on Russia was about 1,300 serviceable combat aircraft, of which some 600 were bombers. This initial strength was never to be exceeded. Heavy attrition in the 1941 offensives was followed by large non-combat losses in the 1941-1942 winter. Already then, bombers were pressed into emergency transport service for improvised airlifts, mainly to supply the encircled 16th Army in the Demiansk pocket on the northern front sector. There were also diversions to other fronts, such as that of Kesselring's Air Fleet to the Mediterranean.

By August 1942 (when the German advances to Stalingrad and the Caucasus were under way) total combat aircraft strength was down to 1,200, with 570 bombers. By March 1943 these figures had dwindled to 855 total and 340 bombers, indicative of the extent to which the Stalingrad disaster had involved the Luftwaffe, mainly due to Goering's rash promise to Hitler that his Luftwaffe could airlift 500 tons daily to the 6th Army. It actually delivered barely 100 tons on the average, and suffered heavily in doing so. Every kind of improvised transport aircraft was employed, including bombers, with heavy losses to unopposed Russian fighters, and heavier losses yet to the weather. ** With regard to future German plans to bomb Soviet industry it may be noted that the Stalingrad airlift used up a dozen or so Heinkel 177 four-engined bombers, in their only appearance on the Russian front, as well as a number of Heinkel 111s specially converted for testing the Fritz-X guided rocket bomb. *** It will be seen that both the He-177 and Fritz-X carriers were badly wanted a few months later for industry attacks, and neither were forthcoming.

Some recovery in bomber strength in Russia occurred after the 1942-1943 winter disaster. No total figures are on hand, but it is possible to assess the force of bombers actually available for strategic

* Bekker, op. cit., pp. 219, 373; Baumbach, op. cit., p. 175.
** Kurt von Tippelskirch, Geschichte des zweiten Weltkrieges, Bonn, 1951, pp. 312 ff.
operations from data on the few operations of this kind by Air Corps IV, the force that from spring 1943 on was nominally earmarked for strategic attacks.* In its heaviest attack on Gorki in June 1943 it flew 150 bombers. A year later, in the spring 1944 attacks on railroad targets (to which it was diverted by Hitler when ready to strike at Soviet power plants) it averaged 170 sorties in 16 attacks (over a five week period), with a heaviest attack by 250 aircraft.

This was a special effort and a last fling.** While more impressive than anything the Luftwaffe was able to do in offensive operations elsewhere by that stage, it was poor compared with the nearly 800 bomber sorties flown in its heaviest attack on London on April 20, 1941;*** and pitiful compared with what the Western airforces were doing by that time.

The data on twin-engined bomber strength describe actual Luftwaffe capabilities on the eastern front. Since in 1943 and 1944, German planners looked beyond what was on hand, a few words about longer-range and heavier bomber capabilities, which, as regards the war in Russia, were not to materialize.

Heinkel 177:**** After the Air Staff had disclaimed interest in long-range bombers in 1936, the Development Office of the Air Ministry had nevertheless encouraged several manufacturers to proceed with development work even with no prospect of production contracts. This was just as well, as after Munich Hitler decided that he might have to fight England after all, and found that the Luftwaffe had no aircraft for long-range anti-shipping operations. Early in 1939, Heinkel

* Also referred to as "Air Corps Meister," after its commander from September 1943 to October 1944, Lieutenant-General Rudolf Meister.
** Except for the highly successful IV Air Corps attack on the U.S.A.A.F. "shuttle base" at Poltava on June 21/22, 1944, which destroyed 43 B-17s and 15 P-51s. (Bekker, op. cit., p. 355; Craven, Wesley et al., eds., The Army Air Forces in World War II, Chicago, 1951, Vol. III, pp. 313-314.)
*** Greiner, op. cit., p. 147.
**** This brief account of the history of the He-177 is mainly based on Baumbach, op. cit., pp. 72, 151-156.
was ordered to get its He-177 design into production. This was a four-engined aircraft of the dimensions of the B-17. Its engines were mounted side by side and coupled through a common gearbox (which made it look like a twin-engined plane). This arrangement caused no end of trouble, and was blamed for an innate tendency to catch fire which He-177 never outgrew in its unhappy career. Two prototypes were produced in 1940, when Hitler changed his mind again. A general "development stop" on projects not expected to mature "immediately" set back production of the He-177 by at least a year. It went into production in January 1942, and showed itself promptly to be full of bugs. Only 33 of the 102 built by September were accepted by the Luftwaffe. At this time Heinkel told Goering that extensive further modifications were required to make the He-177 a dive bomber, whereupon Goering withdrew the dive bombing requirement, calling it an "idiocy from the outset." Heinkel's assurance that the aircraft could be regarded as operational if it didn't have to dive prompted Hitler to order that the He-177 "must appear in operations in Russia as soon as possible," for use in attacking targets beyond the range of other bombers. Goering notified Heinkel, urging him to give him the "kind of plane which really could fly to Sverdlovsk." Heinkel's assurance that the aircraft was "ripe for the front" and its engine fire troubles (and other bugs) overcome was clearly premature. Of the dozen used in the Stalingrad airlift, four were lost by engine fire and the remainder were soon grounded by maintenance troubles. This was the nearest the He-177 got to Sverdlovsk.

In June 1943, when production was running at forty a month, Hitler changed his mind once again and reserved the He-177 primarily for the Atlantic Battle. Soon thereafter he insisted that they should also be used to carry blockbusters in "retaliation raids" on England. They were, on a small scale, although the general in charge of these attacks ("Angriffsfuehrer England," General Dieter Feltz) had protested that he was not anxious to have his pilots spend any time over England in "these giant furniture vans."
After endless modifications, performance of the He-177, as to speed and range, fell far short of the original specifications. Its weaknesses might have been less of a handicap in Russia, and in 1943 German planners of air attack on Soviet industry pleaded for assignment of the aircraft to the east, where its 1,100 mile radius would have come in useful. Nothing was done, however, until He-177 production was stopped in July 1944, to make room for desperately needed air defense fighters. For good measure, Hitler ordered the scrapping of the existing fleet of He-177, of which over 1,000 had been built.*

Mention may be made of some of the improvisations and expedients considered to overcome the range handicap in Russia. One was the "Mistel" piggy-back aircraft, a piloted single-engine FW-190 fighter riding atop a pilotless Ju-88 with a four-ton load of explosives, which was released on the target in a power glide from 3,000 feet. Originally proposed (according to Baumbach's account) as early as January 1942 for deep-penetration missions in Russia, it was used ineffectually against invasion shipping in the west, and was to be used in a last attempt on Soviet power plants finally abandoned in early 1945. The last Mistels were unloaded on Russian Oder crossings in March 1945. A combat radius of 930 miles (1,500 km) was claimed for the Mistel I. An improved version, Mistel II, with a radius of 1,550 miles (2,500 km) was to enter service in March 1945, but production orders were cancelled in February of that year. **

Use of the few other four-engined aircraft available to the Luftwaffe (mainly Junkers-290, used as a transport and in armed reconnaissance against shipping) was considered, in 1943 and 1944,

*Baumbach, op. cit., p. 156, seems to be the sole authority for the scrapping order. According to United States Strategic Bombing Survey, Aircraft Division Report, 1947, Exhibit IIIB, a total of 1,092 He-177 aircraft were accepted by the Luftwaffe in 1942-1944.

The apparent fact that more than 1,000 of the He-177 were produced during the war belies the argument (above, p. 11) that Germany, because of resource limitations, "could not afford" to build large multi-engined aircraft. The resources, evidently, were made available, but were totally wasted, as things turned out.

**Baumbach, op. cit., pp. 96 ff.
for carrying commandos for sabotage attacks on Soviet plants; these plans came to nought because both the aircraft and the commandos were continuously otherwise engaged. Finally, there was even a plan to use six salvaged B-17s for towing gliders in similar operations. It was not carried out, inter alia, because the B-17s were destroyed by American bombs as soon as they had been recommissioned. *

V. PLANS IN 1942

As noted, German interest in attacking Soviet industry first appeared early in 1942. How little had been done by then even by way of preparatory work is shown by the fact that German Air Intelligence, in April 1942, completed its first "map of Soviet key targets" which was to serve as a basis for target selection. At that time, the idea had emerged to attack Soviet electric power supply, first by dropping "cable bombs" on overhead transmission lines. Air Intelligence took a dim view of this idea and argued that what was needed was not "interference with production in general" but "blows at a few decisive points which will rapidly and directly reduce supply to the front of the most important weapons, equipment and motor fuel." This disagreement initiated a controversy between Air Intelligence and the advocates of the power attack which, it appears, went on for the next two years, and may have contributed to failure to undertake either attacks on power plants or significant industry attacks. In July 1942, Air Intelligence presented to the air staff the first fruit of its work on Soviet target selection, a recommendation to attack POL targets -- refineries, storage farms, and transshipment facilities along the Volga. Particular stress was put on what was regarded as a critical Soviet aviation gasoline situation. For the rest of 1942, Air Intelligence continued its advocacy of POL targets.

This recommendation, however, ran into conflict with a high-level policy which at the same time was influencing (or confusing) German strategic objectives in Russia. In July 1942, we find Air Intelligence urging "absolute rejection of the point of view that air attacks on Soviet war industry must be avoided in order to keep it available for work on German behalf." It pointed out that, up to that time, Soviet demolitions and evacuations had denied industrial

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*Ic Wi/IVA Memorandum, March 31, 1942.
**IcWi study of Soviet aviation gasoline situation, December 10, 1942.
facilities to the Germans in any event; and it also cited the captured order, referred to above, about Soviet preventive evacuation. It warned that Soviet industry, unless attacked right away, would be demolished or moved to safety.

These warnings were addressed to a change that German economic objectives in Russia had undergone between 1941 and 1942, under the impact, no doubt, of America's entry into the war, continued Russian resistance, and the resulting prospect of a long and hard war. Originally, in June 1941, the intention had been to make quite selective use of Soviet economic resources. Goering, who was not only head of the Luftwaffe but also titular director of the German war economy, had identified grains, oilseeds, petroleum, and light metals as the only "key sectors" in the USSR of interest to Germany. By 1942, however, the various Special Commissioners whom Goering had placed in charge of the German economic effort began to stake out extensive claims on captured facilities in Russia. Characteristic of this empire-building was a decree that empowered the Special Commissioner for the Chemical Industry to "mobilize maximum production capacity on behalf of Reich defense" of petroleum products, synthetic rubber, nitrogen, light metals, propellants, explosives, and synthetic fats, in each case "including all basic and intermediate products." Similar claims were staked out by other "Special Commissioners" on Soviet motor vehicle plants, communications equipment production, power plants, the iron and steel industry, and production of weapons and ammunition.

Thus, German desires to capture and operate precisely those industries that might have qualified for target selection came into conflict with the awakening interest in industry bombing. To make this "conflict of interest" worse, the German summer offensive of 1942 still promised to gain the Volga-Arхangel line and thus to capture those very industrial areas that alone were in Luftwaffe range.*

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*This German "conflict of interest" is reflected in several decrees and directives reproduced in a compendium of instructions on the economic exploitation of occupied Soviet territory issued by the Wehrmacht High Command: Oberkommando der Wehrmacht, 'Richtlinien fuer die Fuehrung
Access to Soviet oil, needless to say, was paramount among German economic objectives in Russia. Although Air Intelligence had identified POL as the top priority target system, and although the German advance to the Caucasus and Stalingrad was bringing the Luftwaffe within range of the Soviet POL sources and lifeline, the German appetite for Russian oil appears to have imposed a virtual embargo on attacking oil targets.

One qualification is needed: It is difficult to judge how effective this constraint was. Full tactical commitment of German bombers may have been a sufficient reason for the failure to attack Soviet industry in 1942. On the other hand, this commitment might not have been so full if the above constraint had not existed. Also, this survey is confined to plans for strategic air attack on industry, which is not to say that Germans refrained from "strategic" air warfare in Russia altogether in 1942. The sustained and effective attacks by Air Fleet 5 on Lend-Lease convoys in the north may be regarded as "strategic interdiction" operations.

By November 1942, in any event, the Stalingrad encirclement and airlift, and then the German retreat from the Caucasus, diverted the Luftwaffe thoroughly from excursions into industry bombing. Caucasus oil and most of the Volga refineries were slipping out of range. However, the Stalingrad disaster and the drastic change in the war situation that it signified also were instrumental in turning the attention of some Germans more urgently to the proposition of attacking Soviet industry.

der Wirtschaft in den neubesetzten Ostgebieten, Teil II." Berlin, September 1942. See, particularly, decrees dated April 9, July 27, August 14 and 30, and November 19, 1941. Another valuable source is a lengthy memorandum by General Thomas, Chief of the War Economy Office (Wehrwirtschaftsamt) of the OKW, "War economy and armaments policies in 1941."
VI. PLANNING IN 1943: THE CIVILIANS MOVE IN

The newly aroused German interest in air attack on Soviet industry took three directions early in 1943:

(1) The Luftwaffe, at the request of the Army, tried to prepare for what was then still expected to be the German summer offensive by an attack on Soviet military production, undertaken in June.

(2) Outside the Luftwaffe, the dynamic Minister of War Production, Albert Speer, made himself a vigorous backer and salesman of air attack on Soviet economic objectives.

(3) Also outside the Luftwaffe, plans were hatched in the nether regions of Himmler's SS-Gestapo empire to dispatch airborne wrecking troops against Soviet plants.

These plans became the prelude to the pathologically, or frivolously, adventurous schemes conceived in the last phase of the war, and will be best reviewed in that context.

THE JUNE ATTACKS

Some time early in 1943, precise date unknown, the Army had asked the Luftwaffe to attack Soviet tank production. One can well see why. Stalingrad had cost the Wehrmacht 3,600 tanks (November 1942 to January 1943). At the end of January 1943, on the entire eastern front, it could muster only 495 combat-ready tanks. No early relief could be expected from the adoption at that moment of the "Adolf Hitler Panzer Program," due to raise output from some 600 a month at the end of 1942 to 1,500 by the end of 1944. All the Wehrmacht could muster for its last offensive in July 1943 (Operation ZITADELLE) was about 1,500 tanks, and this only by denuding the rest of the eastern front.* By contrast, German intelligence in mid-1943 placed Soviet tank production at 1,300

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monthly, Lend-Lease receipts at 300, and Soviet tank strength in units at 6,000, backed by a reserve of 8,000.*

The Luftwaffe had benefited from relative calm on the eastern front since March, and had been able to build up a "long-range" bomber force, Air Corps IV. This force was assigned to meet the Army's request. It seems, however, that the Army, unwisely, had also asked for other services in preparation of its offensive.

Air Corps IV began its activity with a major leaflet drop operation, hopefully codenamed Silver Lining, in which, between May 5 and 15th, it dropped 84.5 million leaflets, with appeals to desert, over the Soviet lines. According to Air and Army Intelligence the results were most gratifying, but they were evidently insufficient.**

The next effort was an attack by 164 bombers on Kursk railroad station, on June 2, reportedly with good results.*** Since Kursk was the main rail and supply center for the salient against which the intended German offensive was aimed, the purpose of the attack was obvious. Its timing, however, seems odd, as the Kursk offensive was not launched until July 5. This excessive interval is explained by the fact that Hitler repeatedly postponed the starting date of the

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*Joint estimates by OKW, OKH and Air intelligence, dated September 6 and November 7, 1943. Soviet sources still credit the Germans with no less than 5,850 tanks and SP guns on the eastern front, as of summer 1943, before the Kursk offensive. Soviet front-line armor strength, as of July 1, 1943 is given as 9,580 tanks and SP guns. Soviet tank production in 1943 averaged 1,670 monthly. (M. V. Zakharov, ed., 50 let vooruzhennyky sil SSSR, Moscow, 1968, pp. 361-362; Kravchenko, op. cit., p. 295.)

**Ic/IV memorandum, May 20, 1943, Unternehmen Silberstreif.

***Soviet data for the June 2/3 attack on the Kursk railroad center are: Daylight attack, June 2, by 424 bombers and 119 fighters; night attack June 2/3 by 300 bombers. 145 (sic) German aircraft destroyed. Kursk railroad junction resumed operations 12 hours after end of night attack (P. F. Batitskii, ed., Voiska Protivovozdushnoi Obrony Strany, Moscow, 1968, pp. 238-240).
offensive, by several weeks all told, in order to await receipt at
the front of more Panther tanks.

This delay, however, also appears to have imposed a period of
temporary unemployment on Air Corps IV which it used for its tank
production attacks, and some others of which the purpose is none too
clear.**

Between June 4 and 21, it flew 993 bomber sorties and released
1,538 tons of bombs on three industrial targets. The ZIM automobile
plant at Gorki, converted to tank production, was attacked on six
nights by a total of 682 aircraft dropping 1,015 tons of bombs, two-
thirds of the total expended in this attempt at a strategic air
offensive. Six German bombers were lost in the Gorki attacks. 324
tons of bombs were aimed at the Iaroslavl synthetic rubber plant, and
181 tons at an oil refinery at Saratov. Only light token attacks were
made between June 22 and July 5, when the German offensive broke. Then,
the Luftwaffe reverted to its accustomed role of artillery for the
Army.

The ZIM plant in Gorki had been chosen as a target as a matter
of necessity rather than of choice. It was producing light tanks --
not the dreaded T-34 medium tank -- and was estimated to have turned
out 4,000 in 1942, or 60 percent of total light tank output. There
was another tank plant in Gorki producing T-34s (Krasnoe Sormovo) but
it was believed to account for only 1,500 yearly, 15 percent of total
output, the rest of which was out of reach in the Urals and Siberia.

* The timing of this attack suggests that the Luftwaffe, probably
not through its own fault, violated one doctrinal tenet laid down in
the Ldv. 16 manual on interdiction operations:
Pre-emptive attacks on transportation routes in
anticipation of a suspected imminent transportation move-
ment will rarely be indicated. They can result in mis-
directed effort and unnecessary attrition, and may leave
the enemy with enough time for repairing destroyed rail-
road tracks or for re-routing of movements. (Ldv. 16 [1935],
par. 165).

** This account of the June 1943 industry attacks is based on a
large number of memoranda, operations summaries, and damage assessment
reports from the files of German air intelligence.
German air intelligence was pleased with the results of the attacks on the ZIM plant, which it described as "50 percent out of action." Although later on the Gorki attacks were claimed to have caused a "considerable loss of tank production," this finding was not significantly reflected in German estimates of Soviet tank production, which went up from 1,300 a month before the attack to 1,700 by August 1943. In the light of the German figures above on Soviet tank strength and reserves it is unlikely that any immediate effect of these attacks on impending operations could have been expected.*

The extension of the June attacks to the Iaroslavl and Saratov targets is somewhat of a puzzle. German intelligence studies on the Soviet synthetic rubber and POL industries indicate that in neither case could much have been expected from attacks on single plants. Saratov, apparently, was selected because it was thought to be a "vital link" in Soviet aviation gasoline production, supplying intermediate products for blending to the inaccessible avgas refinery at Ufa. In the most charitable explanation, these attacks were sandwiched between those on Gorki for tactical reasons.

THE CARL COMMITTEE

The somewhat aimless and dispersed nature of the June attacks suggests that Speer and his group had good reason to take a hand in planning air attack on Soviet industry. When I interrogated Speer after the war, he complained that German military staffs "lacked appreciation of economic warfare," had few economic experts, and did not consult civilian specialists.** His entry into this field displayed his general disdain for the "military mind" and his faith in civilian "technicians." There is indirect evidence only to support Speer's postwar claim that his interest turned to industry bombing as soon as he became Minister of Armaments Production in February 1942.

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*By an unusually candid Soviet admission, Gorki's air defenses, although strong numerically, were woefully inefficient in meeting these attacks. See Batitskii, op. cit., pp. 241-248.

We have seen that 1942 was not propitious for efforts along this line, and it seems that it was only after the Stalingrad winter that Speer started making headway. By that time, his prestige with Hitler stood high, on the strength of his successes in boosting German armaments production.

It appears that his first success was the setting up early in 1943 of a research group known as the Steinmann Office after its head, an electric power specialist, and attached to an administrative rear echelon of the Luftwaffe (the Luftwaffeverwaltungsamt). Steinmann was to carry out a series of studies on Soviet electric power supply as a target system and "assist the target selection work of Air Intelligence."* The fact that he was tucked away far from the Air Staff, and that the latter expected his work to be wound up in a few weeks, suggests that the Air Staff was not keen on this civilian assistance.

Then, Speer went to work on Hitler. Conferring with the Fuehrer on May 30, 1943, he proposed formation in his Ministry of a "working committee on economic targets." Hitler's reaction, as recorded by Speer, was halfway between lukewarm support and buck-passing:**

The Fuehrer feels that there is no prospect of convincing the Air Staff that industrial and technical specialists should be put in a position to give authoritative advice on the planning of bombing attacks on industry targets. He suggests, however, that I talk again to Col. Gen. Jeschonnek, although he himself had repeatedly pointed out to the Luftwaffe the need for such consultation.

A month later, Speer (again, in the words of him "memcon")**: ***

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\text{... reported to the Fuehrer that a working committee has been set up for selection of suitable economic objectives for air attack, composed of Pleiger, Schieber, Rohland and Dr. Carl; the latter to serve as executive chairman. It is collaborating most closely with the Air Staff.}
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* Air Intelligence memorandum, June 19, 1943.
** Speer's memorandum of Fuehrer conference on May 30, 1943, item 10.
*** Speer's memorandum of Fuehrer conference, June 28, 1943.
The group, henceforth known as the Carl Committee, consisted of prominent industrial executives who had also become high-level officials in the Speer Ministry.* Pleiger presided over German coal production and allocation. He had another interest in Russian industry under the imposing title of Director-General for the Donets Basin. Schieber, a ball-bearing executive, headed the Ministry's division that controlled component and material supply to the armaments industry. Rohland was in charge of tank production, and later of the steel industry.

Dr. Carl, the Chairman, was Chief of Power Planning under Speer in the latter's capacity as "Inspector General of Water and Power." His appointment to head the group strongly suggests that while its formal task was to undertake target system "selection," its choice had actually been made before it was formally constituted. Its subsequent activity was largely confined to sealing the plan of attacking Soviet power supply to the Luftwaffe. The earlier establishment of the Steinmann project points in the same direction.

What alternatives, if any, had been considered before the choice was made is not known. The main arguments that led to the selection of power as the most promising target, however, can be readily reconstructed from the Committee's later recommendations. The Speer Ministry group, which by then had some experience in the economic effects of British attacks on Germany, appears to have realized (probably more so than the Air Staff, judging by the June performance) that limitations of force and range completely ruled out Luftwaffe attacks on a broad front against Soviet industry. It placed all emphasis on "concentration on one vital point" (Schwerpunktbildung), and evidently looked for a target system against which even the light-weight attack which the Luftwaffe was capable of would promise substantial payoff. Its choice of Soviet power, or more specifically the power plants of the MUV region, directly reflected German experience of power management in war economy conditions. As the man in charge of German power

*Officially called Arbeitsausschuss Wirtschaftsobjekte fuer Luftangriffe.
planning, Carl must have been thoroughly familiar with the difficulties experienced by Germany, and also impressed by German fears that these difficulties would be augmented by systematic Allied attacks.

According to the postwar inquest by the U.S. Strategic Bombing Survey, these fears may well have been justified:*

The German electric-power situation was in a precarious condition from the very beginning of the war and became more so as the war progressed. The German electric-utilities system was vulnerable to bombing because of the continuous critical shortage of electric energy, the lack of reserve capacity, the relative ease with which electric generating and transmission equipment can be seriously damaged . . . , the inability to . . . shift power losses, and the absolute dependence of industry on electric energy . . . Electric energy cannot be stored . . .

. . . Any loss of production would have directly affected essential war production, and the destruction of any substantial amount would have had serious results.

One finds that the Carl Committee's reports characterize the Soviet wartime power situation in very similar terms, and use precisely the same arguments to establish its vulnerability to air attack. While they invoke the analogy of German experience, they also stress that the absence in the Soviet Union of a national grid system, and the existence instead of limited and more or less self-contained regional power systems, made it impossible to replace power losses suffered in one region by power imports from other areas.

Another observation by USSBS on German war experience may be quoted. It found that, in fourteen bomb-damaged power plants studied: **

. . . a density of two-tenths of a ton of bombs per acre of plant area in all instances disrupted operations for a period of weeks or months, and that a density in excess of four-tenths tons per acre made restoration a matter of from six months to a year or longer.

This finding should be borne in mind in assessing the realism or otherwise of the large expectations attached to the power attack by

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* USSBS, Overall Report (European War), 1945, p. 84.
** Ibid.
its promoters, and of their estimates of the forces required for the planned attack, which were negligible in comparison with those engaged, even then, in the Allied air offensive against Germany. In any event, Steinmann's research and later consultations by the Carl Committee with German power and electrical engineering experts led them to the belief that in power supply they had found a Soviet "panacea" target system both vulnerable to a well-planned and precisely executed "rapier thrust" attack and whose partial destruction would cause serious production losses in Soviet war industries.

The choice of the MUV power region as the objective for an initial attack was not hard to make. For reasons that are not clear, Steinmann had started his research by barking up a few conspicuously wrong trees. His first reports, submitted to Air Intelligence and the Committee in June and early July, dealt with the Leningrad, Murmansk-Onega, and Moscow City power systems.* All were ruled out as unworthy of attack, for rather obvious reasons. Besieged Leningrad had large reserves of generating capacity, with its industry nearly at a standstill. The Murmansk region held no important industries, and the northern, electric section of the Murmansk railroad could, at a pinch, be operated with steam traction. As to Moscow, the Germans were quite uncertain as to the status of evacuation and re-installation of power plant equipment (and industry in general), and they also believed that Moscow City received more than half its power from the outside.

One is not surprised that Steinmann's early work prompted Air Intelligence to voice its skepticism of the civilians' enthusiasm for power attack. Commenting on the Leningrad report, it wrote:

The assertion that it will always require less resources to paralyze armaments plants by destroying power supply than to destroy the armaments plants themselves still has to be verified by further study... 

*Reports by Steinmann office on Leningrad power supply (June 3, 1943), the Murmansk-Onega power system (June 19, 1943), and Moscow power supply (June 26, 1943). IcIV comments on these reports, July 7-8, 1943.
By this time -- July 1943 -- Air Intelligence was already promoting its own preferred target system, aero-engine plants. Late in July, Steinmann turned in a detailed report on the MUV power region, which enlisted the enthusiasm of the Carl Committee, although not of Air Intelligence.

Steinmann proposed attacks on 23 power generating plants, to be followed up by attacks on 20 principal transformer plants. Five of the target generating plants were in Moscow City, the others were supplying power to the capital and the industrial concentrations Iaroslavl-Ivanovo, Gorki, and Tula-Stalinogorsk. The 23 plants were believed to account for 1.99 million kilowatts, or 78 percent of total installed capacity in the MUV region. Steinmann urged that attack on all proposed targets should be undertaken within the shortest possible period. He claimed that, with proper preparation and execution, the attack would produce "a decisive paralysis of armament industry in the target region."

Air Intelligence, which got in its comments first, was not impressed.** It believed, probably with good reason, that "effective destruction of all 23 plants would require a relatively large operation," and noted that Steinmann's emphasis on the need for a second-phase attack on transformer plants "requires, in effect, an attack not on 23 but about 40 pinpoint targets." It concluded:

Even if these are hit, destruction of the power plants cannot be taken for granted. To close down the plant, the boiler house, which is hard to hit, must be decisively damaged in each case.

Everything considered, one must conclude that concentrated attacks on the principal manufacturing plants are preferable to attacks on 40 pinpoint targets.

Steinmann's proposal was better received by the Carl Committee.***

It deferred to the objection by Air Intelligence on the excessive

** IC/IVD memorandum, August 5, 1943.
number of pinpoint targets. However, its consultations with other power experts convinced it that transformers would not have to be attacked if enough generating plants were put out of action. It also decided that it was not necessary to knock out as much as 78 percent of MUV power capacity, and proposed a bill of eleven targets accounting for about 50 percent (50.6 percent, to be exact). This view rested on the judgment of the Reich Power Dispatcher, who felt that a fifty percent reduction in power supply to an industrial area of this type would "preclude the possibility of orderly industrial activity," and would make it impossible to channel remaining power supplies to top-priority users.

Carl's selection of eleven targets omitted power plants in Moscow city altogether. Instead, to "paralyze" Moscow City industry, he proposed attacks on two hydro-electric plants north of Moscow, and three thermal plants south of the capital, which together were believed to furnish the 56 percent of Moscow's power consumption brought in from outside.

The Gorki-Dzerzhinsk industrial region was to be hit by attacks on three plants contributing 54 percent of its self-contained power supply.

Finally, three plants in and near Iaroslavl were proposed as targets. Formally recommending the attack to Goering and the Chief of Air Staff on August 23, 1943, the Carl group urged simultaneous attacks on all targets in each of the three sub-regions, "attacks to be continued until total destruction" of vital portions of each plant. Anticipating skepticism, it added:

The Committee knows that in attacks on London no power plant of importance was destroyed, although major power plants were among the assigned targets. Similarly Anglo-American attacks have not as yet seriously hit German power plants. It might be objected, therefore, that a luftwaffe attack on pinpoint targets, such as eleven power plants, has but a slight chance of success.

To this it must be said: No concentrated attack on power plants has yet been attempted by the German side. On the other hand it has been shown that, given precise target selection, careful preparation and accurate
execution -- as for instance, in the English attacks on the West German dams -- success is assured.

One should note that the RAF low level attack on the Moehne dams on May 16, 1943, had provided much of the inspiration for German designs on Soviet power plants. Two days after the attack, Speer had urged Hitler to reinforce defenses of German power plants.* The Moehne attack, it will be seen, also inspired Steinmann into talking the Air Staff into a scheme for an attack, by unconventional tactics and weapons, on a group of relatively unimportant Russian hydro-power plants, which clearly attempted to emulate the RAF's tactical masterpiece.

At the stage of the Carl proposal, however, it seems that the civilian technicians failed to appreciate the difference between the accuracy of a low-level attack by highly and specially trained crews, and that of high-level visually aimed night bombing by General Meister's general-purpose IV Air Corps. A year later, Speer himself evidently did not think highly of this force, when he was urging Hitler to sanction Kamikaze-style suicide attacks on Soviet power plants, "in view of the low bombing accuracy of Corps Meister."

* Speer notes on conference with Hitler, May 18, 1943.
VII. THE LUFTWAFFE BUYS THE POWER PLANT ATTACK

The timing of the Carl Committee's recommendation was propitious only in the sense that it coincided with personnel changes in the Luftwaffe that augured well for strategic bombing schemes. It was made on August 23, 1943, a few days after the suicide of Jeschonnek, no friend of strategic air warfare. His successor, Korten, is said to have favored "strategic bombardment" in both east and west. Moreover, he appears to have been on good terms with Speer. More important, in September 1943, the Luftwaffe Air Operations Staff received a new chief, General Koller, who soon endorsed the Carl proposal, in spite of competing projects favored by his intelligence staff. In October 1944, Koller succeeded Korten. In September 1943, Colonel Werner Baumbach, an experienced and imaginative bomber commander, had been appointed "General of Bomber Aviation." In this nebulously defined "inspectorate" position, he was able to exert some influence on behalf of strategic employment of the Luftwaffe's bombers. Baumbach was also commodore of a special unit, K.G. 200, which controlled a mixed inventory of long-range aircraft and unconventional devices, such as the Mistel parasite aircraft and Fritz-X and other guided missiles and their carriers. Later in the war and somewhat involuntarily he also found himself in command of the Self-Sacrifice Men, a tragicomic force of would-be suicide airmen, of whom more later.

Needless to say, weighty factors militated against the Carl plan. Belatedly but with determination, the Luftwaffe was switching its major effort to home defense. In June 1943 Hitler had assigned the serviceable He-177 bombers to the Battle of the Atlantic, and otherwise his interest in air warfare was limited to "retaliation" against

*According to Hermann Plocher, a former Luftwaffe general, in The German Air Force versus Russia, 1943, USAAF Historical Division, 1967, pp. 225 ff. This volume in the USAAF series on the history of the Luftwaffe appears to be the only one that briefly mentions German plans for strategic bombing in Russia.

Britain. Lastly, in July 1943 the land battle had finally turned the tide in Russia's favor, and the German central and southern front was steadily being pushed back.

General Koller, new Chief of Air Operations Staff, appears to have bought the Carl proposal without delay, and the methodical preparations demanded by its authors were set in motion. The Carl Committee arranged extensive consultations between Luftwaffe officers and specialists in the power and power equipment industries on physical vulnerability, aiming points, and weapons selection. For the MUV strike, weapons experts recommended use of the Fritz-X guided bomb, which had just recently become operational and, on September 13, had sunk the Italian battleship Roma.* However, carrier aircraft were found to be scarce,** and it was decided to reserve the Fritz-X for the two water power plants on the target list, regarded as the toughest targets. The nine thermal plants were to be attacked with conventional HE and incendiary bombs. One "group" of 30 aircraft was estimated as the "minimum" force required for each of the latter targets (a remarkably optimistic judgment). Preparations appear to have been completed by December 21, when Carl and Steinmann gave Generals Koller and Meister a final briefing on the plan, and proceeded to discuss targets "to be attacked after the destruction of the eleven power plants."

For three months from this point, Air Corps IV was nominally ready to strike at the MUV power plants.

However, the actual status and activities of Air Corps IV during the winter 1943/44 are not clear. According to Plocher,*** its component units (three bomber groups and one pathfinder wing) were withdrawn from front-line service and assigned to a new Rehabilitation Staff East (Wiederauffrischungstab Ost), to be prepared for their new "strategic" mission. On the other hand, according to a British Air Ministry Study, "pressure from the Army Commanders through Hitler,

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* Ic/Wi Memoranda September 25, October 7, 1943.

**Partly, it seems, because one-third of the 30 HE-111s converted as Fritz-X carriers had been used up in the Stalingrad airlift.

and the events on the Russian Front from August 1943 to the end of December 1943 . . . precluded any withdrawal of the bomber forces for their training for the proposed strategic bombing offensives."

Concurrently with preparations for the MUV power attack, plans were made for further attacks on power and other targets.

When reporting on the MUV power system, Steinmann had asserted that if the plan in its entirety was found to be infeasible, attacks would still be worth while on the Rybinsk and Uglich hydro-power plants, if they were designed so as to breach their dams. They would thus (apart from immobilizing the plants) cause grave transportation and water supply difficulties in Moscow by draining the Moscow-Volga Canal, as well as produce "catastrophic flooding" in the Rybinsk and Iaroslavl industrial areas, followed by shipping difficulties on the Volga.

This idea, clearly inspired by the Moehne dam attack, appears to have found favor with General Koller. By October, Steinmann expanded it into a proposal to attack six Soviet hydro-power plants "with special bombs and by special attack tactics." These were the Uglich and Rybinsk plants, the Ivankovo plant on the Moscow-Volga Canal, Nivastroi and Murmansk in the far north, and Volkhovstroi east of Leningrad. Selection of the latter three made little sense in view of Steinmann's earlier findings on the Leningrad and Murmansk power regions. Steinmann's report on the MUV region had also warned that attacks on individual plants were pointless in the presence of an integrated grid system. Moreover, as planning commenced, the original dam-busting idea was lost sight of, as well as the expectations connected with it. The "special weapons and tactics" adopted were intended to destroy hydro-power plants without breaching the Rybinsk and other dams.

** Steinmann Memoranda, Vorschlag fuer Luftangriffe auf die WKN Rybinsk und Uglitsch, August 10, 1943; Vorschlag zur Zerstoerung von 6 der wichtigsten Wasser Kraftwerke der S.S. durch besondere Bomben und besondere Angriffstaktik, October 30, 1943.
The intention was to drop into the reservoirs mines that would drift toward the turbine intake channels, explode on contact with the intake screens, and demolish the turbines. Development work was started on two devices, code-named Winter Balloon and Summer Balloon.*

Winter Balloon was conceived as a "quick solution," to be ready for use in March 1944. An existing aerial mine was to be fitted with a CO₂ bottle and a rubber balloon. Upon penetrating the ice, the balloon would inflate, and the mine would drift toward its destination under the ice.

Summer Balloon, scheduled for completion by early summer 1944, was a mine of "low positive buoyancy," designed to sink to the reservoir bottom and creep toward the turbine intake. This method was chosen to avoid the risk of detection and destruction of a floating mine, and also to evade net barriers known to be installed on Soviet reservoirs, but believed not to extend to their bottoms.

Tests of prototypes of both weapons began in January 1944 and revealed numerous unforeseen difficulties. Winter Balloon, after many modifications, was to be put through its "final tests" in late June, on a lake in Lapland where even at this season there were fifty inches of ice and slob. The results were disappointing. Of five mines dropped, four stuck in the bottom mud and only one was retrieved. The fifth could not be found at all. Further improvements were deemed necessary, with new ice tests to be held in November 1944, but no more was heard of Winter Balloon.

Summer Balloon fared little better. The first models settled on the bottom and refused to creep. However, by June 1944, an order for 100 Summer Balloons had been placed for August delivery. The production schedule had to be revised when several Berlin plants working on the contract were themselves damaged by Allied bombs. A statement that 300 would be available by the end of September 1944 "unless

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*This account of the "Balloon" episode is based on numerous documents from Luftwaffe files, dated from October 1943 through July 1944.
unforeseen difficulties arise" ends the story of Summer Balloon and the hydro-power scheme.

The MUV power strike plan was designed to make use of the limited capabilities available to the Luftwaffe on the Eastern front. Its authors stressed that the target region proposed was a second choice, and that much greater payoff could be expected from a similar attack on the power system of the Urals. Steinmann's assignment had included a study of this system. His work was much hampered by lack of photographic cover. In April 1943, the only area covered east of the Volga was that of Ufa, Sterlitamak, and Ishimbaev (all of them mainly POL targets), well to the west of the main Urals industrial regions.* All through 1943, Air Intelligence and the Carl Committee were pleading with the Air Operations Staff to obtain cover for the Urals, evidently without success, for in December 1943, Air Intelligence was still regretting the "total absence of photo cover," as well as the inadequacy of available maps.** These deficiencies, it seems, were never remedied, as even in May 1944 Speer personally urged Hitler to get the Luftwaffe to reconnoiter the Urals.

Intelligence deficiencies apart, any attack on Urals power called for aircraft of much longer range than the He-111 and Ju-88. In December 1943, Carl and Air Intelligence were hopeful that "small forces" of aircraft, probably Heinkel 177, with a radius of 1000 miles would be available. However, it was found that even with this radius, only six plants could be reached, accounting for 25 percent of the estimated 2.2 million kilowatt installed capacity on the Urals grid.

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* IC/IVD report to "Chef Ic" on conference with Captain Otto Skorzeny, concerning plans for sabotage raids on Urals power plants, April 28, 1943.

** IC Memorandum, Zielauswahl fuer die Elektrizitaetsversorgung des Uralgebietes, December 18, 1943. Its conclusion was: "Lack of usable maps and of reliable intelligence and the total absence of photo cover makes target finding exceedingly difficult. Only very few of the target plants are more or less reliably pinpointed as to precise location. The accuracy of the pinpoints cannot be checked due to the inadequacy of cartographic material. Only aerial reconnaissance can achieve precise pinpointing of the targets."
Since it was estimated (as in the case of the MUV plan) that at least 50 percent of capacity should be destroyed, Air Intelligence advised that "attack on power plants within range at present would be senseless." It also suggested use of an advanced airfield at Petrozavodsk (northeast of Leningrad) as a staging base, in order to place within range fifteen plants, accounting for 65 percent of capacity. There is no further record of Luftwaffe interest in the Urals plan. However, it will be seen that as late as July 1944, Speer was urging Hitler to sanction suicide one-way missions against Urals and other power plants.

Soviet aero-engine production appears to have been the only target system to compete seriously for German attention with electric power in 1943. It was insistently sponsored by Air Intelligence, which evidently preferred it to the MUV power strike proposal. On August 22, the day before Carl recommended the power attack, Air Intelligence had urged that "aero-engine plants take first place among all Soviet targets." Its case rested on the Luftwaffe's experience in the Russian theater in the 1943 summer campaign. In contrast to the 1941 and 1942 summers, the Luftwaffe had been unable to impose a rate of attrition in excess of replacements on the Soviet air force. By September 1943, Soviet combat aircraft strength in front-line units was believed to have been slightly reduced due to heavy losses of ground-attack aircraft, but total aircraft strength was thought to have risen. Air Intelligence also stressed that owing to a Soviet policy of first using up obsolete aircraft while "hoarding" modern types, the Soviet air force was rapidly gaining in combat effectiveness. It warned that by spring 1944 the Germans would be facing 29,000 Soviet combat aircraft, 80 percent of them modern types, unless front-line attrition was supplemented by air attack on production.*

*Carl Committee Memorandum to Ic, Vorschlag zur Bekämpfung der sowjetrussischen Flugzeugproduktion, August 27, 1943. The Germans estimated that the USSR had entered the war with 28,000 "front-line" aircraft (fighter, ground-attack, bomber, and transport aircraft). Heavy attrition in the 1941 and 1942 summers and production loss due to evacuation were believed to have reduced strength to a low of 16,000 in September 1942. By the end of June 1943, strength was
Aero-engine plants were favored as targets over airframe assembly plants. There were believed to be only seven of the former but nineteen of the latter, and engine plants were also preferred on other grounds. They had more compact machine shops and more special equipment, were slower to repair and more difficult to evacuate. It was held that production loss could not be replaced by imports, as Allied aero-engines were unsuitable for Soviet airframes; while any increase in Lend-Lease deliveries of complete aircraft would relieve Germany on other fronts.

Locations and output rates of Soviet aero-engine plants were estimated as follows:

<table>
<thead>
<tr>
<th>Plant</th>
<th>Monthly output</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ufa</td>
<td>1,400</td>
</tr>
<tr>
<td>Kuibyshev</td>
<td>1,200</td>
</tr>
<tr>
<td>Kazan</td>
<td>600</td>
</tr>
<tr>
<td>Gorki</td>
<td>500</td>
</tr>
<tr>
<td>Moscow</td>
<td>750</td>
</tr>
<tr>
<td>Molotov</td>
<td>500</td>
</tr>
<tr>
<td>Omsk</td>
<td></td>
</tr>
</tbody>
</table>

Somewhat surprisingly, in its early advocacy of the plan in July and August 1943, Air Intelligence claimed that all save the Omsk and Molotov plants were within range, and recommended attacks on the Kuibyshev, Kazan, and Ufa plants, which were all beyond the 600 mile radius then generally assigned to the He-111 and Ju-88. Presumably, this advice rested on hopes that the He-177 would be forthcoming, as in October it was conceded that only Moscow and Gorki, accounting for some 10 percent of total output, were accessible.

By this time, the Carl Committee presumably had decided that the aero-engine plan, because of the range problem, was no serious competitor for its own MUW power scheme, while it was useful as a lever...
by which to push for assignment of long-range bombers to Russia. The Committee submitted a formal proposal to the Air Staff to attack aero-engine production as a second-priority target system after the MUV power plants. *

Appealing to the Luftwaffe's charity-begins-at-home instincts which had evidently fathered the aero-engine plan, the Committee concluded:

An early execution of this operation would save severe strain on the Eastern front in the future, and especially on the Air Fleets engaged there. Therefore, it should be most urgently considered whether use of the He-177 in the east might not be possible, after all, within the next few months.

In December, Air Intelligence repeated the same plea to General Koller, but evidently with no great hope that it would be heeded, for it also suggested attacks on airframe factories in Moscow and Gorki as an "emergency solution" which would have "at least some perceptible effect" in slowing the buildup of Soviet air strength.

* Vorschlag zur Bekämpfung der sowjetrussischen Flugmotorenerzeugung, October 9, 1943.
VIII. EARLY 1944: MARKING AND WASTING TIME

The status of German designs on Soviet industry at the start of 1944 may be reviewed with the aid of a briefing administered by Air Intelligence to Generals Koller and Meister on December 21, 1943.* The surviving text opens with "Section I. Space (Raum) in Air Warfare," and this section is introduced by a very sensible, if obvious, observation:

A decisive datum in warfare against the Soviet Union is provided by the extent of its space. This applies to warfare by air as well as by land.

After dwelling on the melancholy implications of this datum for the Luftwaffe, the briefer offered a ray of hope in stressing that Soviet industrial structure -- concentration of output in few "giant combines" -- was vulnerable to air attacks. Getting down to particulars, and having conceded that only the MUV region was within Luftwaffe range, he listed the following target system priorities:

(1) MUV power plants; that is, the eleven plants selected by the Carl plan.

(2) Aero-engines (Ufa, Kuibyshev, Kazan). Admittedly out of range, but stressed in the hope that long-range bombers would become available. The Moscow and Gorki aircraft plants were offered as an "emergency solution."

(3) A miscellany of "worthwhile" targets in the MUV region, and within range:

<table>
<thead>
<tr>
<th>Synthetic rubber plants</th>
<th>Iaroslavl</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ball bearing plants</td>
<td>Two in Moscow</td>
</tr>
<tr>
<td>Aviation gas refineries</td>
<td>None specified</td>
</tr>
<tr>
<td>Communications equipment</td>
<td></td>
</tr>
<tr>
<td>plant Elektrozavod</td>
<td>Moscow</td>
</tr>
</tbody>
</table>

*According to Plocher, op. cit., p. 229, Meister "was ordered on December 10 to Goering's headquarters for orientation on his future mission."
Communications equipment plant Lenin
Tank plants
Truck plants

Gorki
ZIM Gorki (still "worthwhile"), Krasnoe Sormovo, Gorki
ZIM, Iaroslavl

Production in all "third priority targets," within range, it was stressed, would be affected by the MUV power attack. However, they would have to be attacked even after that strike, to prevent either evacuation or partial operation using local power sources.

After the briefing Koller instructed Air Intelligence to advise him in greater detail on target selection for attacks "after destruction of the eleven power plants." There are records of hopeful efforts in this sense, including consultations with other Wehrmacht intelligence agencies (Army, Wehrmacht High Command) not so far concerned with target selection. Their responses were not interesting except for rather striking proposals made by the OKW: Its economic intelligence branch gave top priority to a few obscure iron and steel mills within range, although on its own showing they accounted for less than 10 percent of estimated Soviet steel capacity.

It is not easy to reconstruct what went on in the first quarter of 1944. Koller, in postwar interrogation, claims that Air Corps IV stood ready to strike at the MUV power plants, until diverted on Hitler's orders to the railroad offensive of April-May 1944, on which more presently. Documentary evidence suggests that this diversion did not begin until late in March and provides no explanation for the inactivity of Air Corps IV in the 1943-1944 winter.

It is not likely that before that time Air Corps IV was substantially diverted into tactical activities. While sustained Russian winter operations undoubtedly kept the rest of the Luftwaffe busy, it is not likely that the slow He-111 and Ju-88 bombers dared by then to challenge Soviet supremacy in daylight; and the season was bad for tactical support night operations. Moreover, when the railroad attacks began on March 27, Air Corps IV was quite remarkably up to strength for a Luftwaffe formation at that time. On its best night in the railroad
offensive it sent out 241 bombers, suggesting a total strength of at least 300.

Two explanations appear most likely:

(1) That execution of the attack was delayed by continued indifference to industry bombing on the part of Goering and Hitler. There is no record of either endorsement or rejection by Goering of Koller's recommendation to undertake the MUV operation. Baumbach, by then a strong backer of the operation, in his postwar comments on failure to launch it, blames Hitler for spending all his time shifting flags denoting companies and batteries on the map of the eastern front, while never looking at a war industry map.

(2) That German retreats had forced Air Corps IV to pull back its bases, and rendered it inoperative during the winter of 1943/1944; and that the moment for carrying out the MUV strike had already been missed. As early as November 1943, Air Intelligence had expressed doubts whether the Gorki area was still effectively within range. There was no mention of such doubts, however, at the December 21 briefing.

However, on March 1, four weeks before the railroad attacks, Air Intelligence produced a memorandum on "Soviet targets in MUV region -- other than power plants -- which can be reached from airfields at Minsk-Baranovici-Dvinsk." It was concluded that Gorki was no longer within the 950 kilometer radius.

Presumably this went for power plants serving Gorki, too. As the authors of the MUV attack plan had strongly stressed that anything less than an attack including the Gorki grid was not worthwhile, it seems likely that by the end of February the MUV power strike, as originally conceived, was no longer feasible.

*Baumbach, op. cit., p. 184-185.
IX. THE 1944 RAIL INTERDICTION CAMPAIGN

The diversion, late in March 1944, of the "strategic" Air Corps IV to a rail interdiction campaign in the Ukraine concerns us here mainly because it put an end to German hopes of using their medium bomber force against Soviet industrial targets. However, it is interesting in its own right as the only effort by the Luftwaffe on the eastern front to engage in a relatively "deep" and systematic rail interdiction campaign, executed while the Wehrmacht ground forces were in a defensive mode.

The weight of this attack was fairly large by Luftwaffe standards at that time: In about six weeks -- March 27 to May 5 -- some 2,700 sorties were launched in 17 attacks (on 16 nights). About 2,300 aircraft claimed to have released their bombs on target. As most attacks were at rather short range, bombs dropped probably amounted to some 3,500 tons. Needless to say, this was quite unimpressive in comparison with the weight of the simultaneous USAAF-RAF offensive against railroad centers in the west, in which 32,000 tons of bombs were dropped in April 1944 alone.

A German Air Intelligence memorandum dated May 9, 1944 described the rail interdiction campaign, with some exaggeration, as "Large-scale attacks by Air Corps IV against the Soviet railroad system." Actually, this series of attacks was confined, with one insignificant exception (Velikie Luki), to a narrow segment of the Soviet railroad system, covering an area some 50 km wide and 150 km deep to the west and northwest of Kiev. The eight rail junctions attacked were located at distances of roughly 50 to 175 km from the German-Soviet front. A summary of the German Air Intelligence data on this campaign appears in Table 1. The data contain a number of gaps and ambiguities that preclude a precise quantitative assessment of the campaign, but the general pattern stands out clearly enough.

The campaign occurred when the Soviets, in the Kiev sector, were "between offensives." German intelligence (on the basis of air reconnaissance and radio intercepts) assumed that the next Soviet offensive
### Table 1

**AIR CORPS IV ATTACKS ON UKRAINIAN RAILROAD CENTERS**  
(March 27 – May 5, 1944)

<table>
<thead>
<tr>
<th>Date</th>
<th>Target</th>
<th>Aircraft Dispatched</th>
<th>Aircraft on Target</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>March 27</td>
<td>SARNY</td>
<td>50</td>
<td>46</td>
<td>2 aborts, 2 A/C lost in collision at take-off</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&quot;</td>
<td>&quot;</td>
<td>138</td>
<td>136</td>
<td>2 aborts</td>
</tr>
<tr>
<td>April 4</td>
<td>&quot;</td>
<td>160</td>
<td>158</td>
<td></td>
</tr>
<tr>
<td>&quot;</td>
<td></td>
<td>185</td>
<td>?</td>
<td>ROVNO secondary target</td>
</tr>
<tr>
<td>&quot;</td>
<td>5 KOROSTEN</td>
<td>160</td>
<td>160</td>
<td></td>
</tr>
<tr>
<td>&quot;</td>
<td>7 KIEV</td>
<td>172</td>
<td>172</td>
<td></td>
</tr>
<tr>
<td>&quot;</td>
<td>8 FASTOV</td>
<td>166</td>
<td>159</td>
<td>1 missing, 2 crashed</td>
</tr>
<tr>
<td>&quot;</td>
<td>10 KOROSTEN</td>
<td>168</td>
<td>159</td>
<td>1 missing, 2 crashed</td>
</tr>
<tr>
<td>&quot;</td>
<td>15 SARNY</td>
<td>190</td>
<td>150</td>
<td>Foggy, 42 Ju-88, 148 He-111, 2 He-111 missing, 1 Ju-88 crashed</td>
</tr>
<tr>
<td>&quot;</td>
<td>16 ROVNO</td>
<td>183</td>
<td>?</td>
<td>SHEPETOVKA primary target, not found by most. 3 A/C lost, not to enemy</td>
</tr>
<tr>
<td>&quot;</td>
<td>17 KIEV-DARNITSA</td>
<td>167</td>
<td>156</td>
<td>2 missing, 1 crashed</td>
</tr>
<tr>
<td>(&quot;</td>
<td>(VELIKIE LUKI) (90)</td>
<td></td>
<td>(90)</td>
<td>(2 missing, 1 crashed)</td>
</tr>
<tr>
<td>&quot;</td>
<td>ZDOLBUNOV</td>
<td>188</td>
<td>?</td>
<td>144 He-111, 43 Ju-88, 1 Do-217. 1 Ju-88 crashed on take-off.</td>
</tr>
<tr>
<td>May 1</td>
<td>SHEPETOVKA</td>
<td>137</td>
<td>137</td>
<td>1 He-111 missing</td>
</tr>
<tr>
<td>&quot;</td>
<td>ROVNO</td>
<td>241</td>
<td>56</td>
<td>SARNY primary, ROVNO secondary target</td>
</tr>
<tr>
<td>&quot;</td>
<td>KIEV-DARNITSA</td>
<td>217</td>
<td>217</td>
<td>2 crashed</td>
</tr>
</tbody>
</table>

**Note:**

*Velikie Luki, on the northern flank of German Army Group Center, was far from the Ukrainian railroad network under attack by Air Corps IV. Presumably, Air Corps IV was called in on this single occasion to buttress the inadequate air support provided to A.G. Center by the heavily depleted Air Fleet VI. (cf. von Tippelskirch, op. cit., pp. 450, 538).*
would strike in a northwesterly direction from Kiev, with Kovel as the immediate, and Brest-Litovsk as the ultimate, objectives. According to generally credible German sources, however, the Luftwaffe fell for a Soviet ruse that simulated rail movements with "empty trains" and, presumably, generated deceptive radio traffic. The object of this Soviet feint, supposedly, was to draw off German reserves from the Central Army Group to the Brest sector.*

Leaving this aspect aside for the present, the target selection was an obvious one for hampering rail traffic from or via Kiev in the Kovel direction.** As shown in Fig. 2, the targets included two rail centers in Kiev (Kiev and Kiev-Darnitsa), and six junctions arranged horse-shoe fashion west of Kiev. Destruction or sustained blockage of the latter points would have achieved "perfect interdiction" of rail traffic pointed at Kovel. Sarny, as the nearest major railhead for an attack on Kovel, was the main target in terms of bomber sorties launched; about 43 percent of all sorties dispatched during the campaign against primary targets (excluding Velikiye Luki). Sarny would have been "perfectly interdicted" if Zdolbunov or Shepetovka had been closed to the south of Sarny, and if Korosten to its west also had been closed. Blockage of Kiev, including Kiev-Darnitsa, was not strictly necessary if all the above had been achieved, but these presumably large rail centers may have been picked as specially "lucrative targets," and as a choke point for all or most westbound traffic on this sector. Between them, these two centers accounted for some 31

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*Tippelskirch, op. cit., pp. 448-450, 528; Hermann Teske, Die Silbernen Spiegel, pp. 209 ff. General Teske was "Chief of Transportation" on the staff of Army Group Center.

**However, the selection as targets of major depots and junctions seems to have run counter to the prescriptions of Luftwaffe rail interdiction doctrine. According to Ldv. 16 (1935), par. 173: "Major depots and rail junctions are tempting targets because of their size. However as a rule they are not to be selected as targets for attacks. The presence of multiple tracks at such depots will provide enough rerouting opportunities even if several tracks are damaged or put out of action. The destruction of signal and switching equipment will impede and delay traffic but will not paralyze it." Elsewhere, Ldv. 16 (par. 167) also warns against enemy deception by simulated rail movements.
-50-

- Rail centers attacked
- German-assumed objectives of Soviet offensive
- Rail junctions not attacked:
  - B - BERDICHEV
  - K - KAZATIN
  - L - LUNINET (held by Germans)
  - M - MOYER
  - NV - NOVOGRAD-VOLYN
  - T - TARNOPOL
  - Z - ZHITOMIR

Railroads
--- Approximate front line, mid-April 1944

Fig. 2—Kiev area rail targets
percent of the total sorties launched. Fastov, southwest of Kiev, may have been selected to impede bypassing of Kiev by westbound traffic. Rovno was attacked twice as a secondary target only, by aircraft primarily targeted at Sarny and Shepetovka. Indeed, Fig. 2 shows that Rovno would have been a redundant target if closure of Shepetovka or Zdolbunov to the south and Korosten to the east of Sarny had been effected. Nor, given the actual target selection, would there have been a need to attack the five rail junctions, identified by letters in Fig. 2, that were not targeted.

The above, however, requires three major qualifications:

(1) It is not clear whether Air Corps IV was out to "interdict" by damaging marshalling yards and other structures at "strategically" selected "fixed" targets, as distinct from being guided by "tactical" considerations, such as the relative concentration of rolling stock observed at the centers targeted prior to the attack.

(2) Available evidence suggests that the Germans, given their modest resources, were realistic enough not to expect the campaign to achieve anything like total blockage of the targets. While "interdictive" in concept, the campaign was probably not intended to achieve more than temporary interference with troop and supply movements to the front.

(3) Greater or lesser respect for Soviet anti-aircraft defenses at the different rail centers may have influenced target selection.

That these three considerations may have affected targeting, and the expectations attached to the campaign, is suggested by an Air Intelligence appraisal of "targets in the railroad system of the Soviet Union," dated April 5, 1944, soon after the start of the campaign.

This document noted that "in view of the fluid conditions affecting attacks on the enemy's rail system, and the frequent changes in the most important targets brought about by ground fighting, no schematized evaluation of the entire railroad net is possible . . . . Attacks persistently carried out by fairly large forces . . . will not only lead to difficulties in supplying the front but will affect the entire
economy. Delays in delivery will in particular affect the food situation, especially where perishable products are concerned. In the armaments industry sector, however, they will probably have only slight effects initially."

After these uninspired and largely irrelevant comments, Air Intelligence proceeded to warn that certain areas and points near the front and thus accessible to the Luftwaffe were "strongly defended:

1. Leningrad area, "with about 160 anti-aircraft positions, strong fighter defenses, six radar stations, and Naval flak;"

2. Chudovo-Staraya Russa-Nevel* with about 250 anti-aircraft positions;


Finally, the document recommended attacks on "heavily used rail centers," in order to destroy locomotives and rolling stock, which the authors regarded as a "Soviet bottleneck."** They also favored attacks on "complex railroad structures," but warned that "simple damage to tracks" would be quickly repaired by the "efficient Russian repair service."

It would seem that the authors did not stop to consider the simple fact that the Luftwaffe's capabilities in the east were grossly inadequate for "persistent" and truly "large-scale" attacks. Similarly, there is no indication that they took into account German experience with Allied attacks on rail centers in the west at that time, executed by vastly larger forces than the Luftwaffe could muster in Russia. Had they done so, they might have realized that attacks on the scale that Air Corps IV was capable of, given the acknowledged Russian efficiency in repairs, would not have had more than nuisance value.

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* All on the northern front, south of Leningrad.
** Teske, op. cit., p. 212, observes that this "bottleneck" cannot have been serious if the Soviets were willing -- as he has it -- to expose large concentrations of rolling stock to air attack in a deception maneuver.
Soviet accounts of ground operations west of Kiev in early 1944 indicate that shortly before the start of the German rail interdiction campaign, Kovel, and Brest beyond it, had been prominent objectives of Soviet offensive planning:

The liberation of Rovno and Lutsk [on February 2; Zdolbunov was recaptured the next day. O.H.] made it possible for the right wing of the 1st Ukrainian Front to resume the offensive towards Kovel, and then Brest and Lublin. It was decided to form a new Front [Army Group, O.H.], the 2nd Belorussian, to operate in this direction, and . . . to strike toward Kovel-Brest.

This offensive was opened on March 17, and was none too successful:

Soviet troops advanced 50 to 70 km, threw the enemy back on Kovel, and surrounded its garrison.

German counter attacks then succeeded in relieving and holding Kovel, and the Soviet troops "consolidated their positions east of the city.

This situation is depicted on Fig. 2 as the approximate location of the Soviet-German front on the Kovel sector in mid-April. The Kovel sector, thereafter, remained quiet for some months. South of it, the three Ukrainian "Fronts" had swept from the lower Dnepr to, and beyond, the Dnestr and had entered Rumania late in March. To the north of Kovel, the Russians started planning the offensive which in summer 1944 was to smash the German Army Group center. Kovel itself did not change hands again, and for good, until July 1944.

Soviet accounts emphasize that the German command, even in June, wrongly estimated that the Russian's summer offensive would strike at the southern wing of their front rather than in the center. There is no indication in Soviet sources, however, that the Soviets themselves reinforced this belief by deceptive maneuvers. Thus, the question whether the German rail interdiction campaign was conducted against "real" or "dummy" targets remains undecided. It is possible that the rail movements observed by the Germans represented a genuine buildup of Soviet forces after the March failure of the Kovel-Brest offensive.

It is even possible, although not likely, that Air Corps IV, with its railroad campaign, did achieve enough "interdiction" to make the Soviets change their minds. Against the German theory of Soviet deception there is also the argument that the Soviets would not have wanted to provoke serious damage to rail centers that, sooner or later they would be using themselves. There is also a fairly detailed Soviet account available of their defense measures against air attacks on the Ukrainian rail network in the first half of 1944.* It indicates that anti-aircraft defenses of rail centers in the Kiev-Kovel sector were heavily reinforced. Most of the Air Corps IV targets are mentioned in this connection. This large investment in anti-aircraft resources also seems inconsistent with the deception theory. If the intention was to combine strategic deception with setting an air defense trap for the Luftwaffe, it was negated by the very light casualties incurred by the latter in the railroad campaign.

There is a somewhat plaintive account by General Koller -- supplied in a postwar interrogation -- of how the rail interdiction came about, and of its consequences. When asked why the Luftwaffe never attacked Soviet industry, Koller declared that they had been "on the verge of attacking power plants," when:

... at the last moment, everything was wrecked, and the formations which were standing by were ordered to attack Russian railroads. Hitler had promised me that these attacks would, so to speak, be final major practice missions for the power strike, and that the formations would be released for that strike after ten days. The promise was not kept. Again and again, the Corps had to attack railroads, until all territory had been lost and the airfields assigned for the power attacks were in enemy hands. Three times we rebuilt our force, with new equipment, for the intended mission. But each time developments caught up with us, or Hitler himself blocked the operation.**

An inquiry into whether Hitler was as self-evidently wrong as Koller had it in his choice of an attempt as railroad interdiction

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** A typescript in Air University Library identified only as "Air interrogation of General Koller," dated November 17, 1945.
in preference to industry bombing -- given the critical situation on
the land front -- would be interesting, but also academic in the sense
that the attempt at railroad interdiction, as it turned out, was made
at the wrong time and at the wrong place, regardless of whether it was
aimed at a Soviet deceptive operation or not.

We have no record of the fate of Air Corps IV after the Ukrainian
railroad attacks other than Koller's vague account.* Koller's impli-
cation that Air Corps IV was used up during the railroad offensive is
not borne out by German records. With the exception of Kiev, it found
its targets ineffectively defended. In the ten attacks for which there
are German attrition and force records, it lost 23 aircraft out of over
1,600 engaged (1.4 percent), and only 10 due to enemy action. It is
more likely that Air Corps IV was drawn into full-time tactical support
once the Army Group Center disaster got under way in June. At the time
of the Russian offensive, AG Center was served by "Air Fleet VI," a
proud name for a force of some forty fighter aircraft "supporting"
forty-five divisions.**

* Except for its successful strike at the Poltava USAAF shuttle
  base, in June 1944 (see above).
** Tippelskirch, op. cit., pp. 533 ff.
X. THE FINAL PHASE

By April-May 1944, the Luftwaffe command had already given home defense top priority over other missions. Only a few stubborn individuals, notably Koller and Baumbach, apparently went on giving thought to attacking Soviet industry. The Soviet economy section of Air Intelligence, by September 1944, was pinning its last hopes on attacks to interfere with Soviet industrial reconstruction in the recaptured Donbas coal and steel region.

Yet, there were also those who would not give up to the bitter end. Their activities may be reviewed as a contribution to the pathology of air warfare. If they have a madhouse air about them, one should bear in mind that they were conducted in the general madhouse atmosphere of the last year of Nazi Germany. They may be classified under three headings; in chronological order, more or less.

(1) Plans for airborne commando attacks on Soviet plants.

(2) Plans for one-way suicide missions.

(3) The final plan to carry out the MUV power strike with Mistel composite aircraft.

AIRBORNE SABOTAGE PLANS

In April 1943, SS Captain Otto Skorzeny (then at the beginning of a colorful and partly unsavory career) called on the Soviet economic experts at Air Intelligence to seek cooperation in the following plan (as recorded by Air Intelligence):

Department VI of the Reich Security Service [that is, Himmler's special operations department. O.H.] intends to carry out an air-landing operation against the principal power plants of the Urals grid system. Each of the five power plants selected is to be attacked by a squad of 30 men. Each squad is to consist of 5 Germans and 25 aliens from special camps of the Security Service. It is planned to blow up the turbines of the plants while they are in operation. This can be done with relatively small explosive charges.

The operation is to be undertaken simultaneously against the five plants. Four to five Junkers 290 aircraft
are to be used for each mission. Execution of the plan is proposed for approximately September, after thorough preparation in detail."

These preparations (which were to include the small matter of getting photographic cover of the targets) were nipped in the bud when an unnamed official of the Speer Ministry convinced Hitler that the proper target for an attack of this kind was the Magnitogorsk blast furnaces. ** Hitler promptly instructed Skorzeny to lay off Urals power plants and carry out "total destruction" of Magnitogorsk. Skorzeny concluded quickly that his saboteurs could not carry enough explosive to destroy blast furnaces. However, his superiors warned him not to say so to Hitler and to make as if he was preparing the operation. Officially the plan was not abandoned until late in 1944. Fortunately for Skorzeny, Hitler had given him another assignment in July 1943, to liberate Mussolini. While Skorzeny himself was engaged in doing so, and on miscellaneous activities thereafter, his organization (Friedenthal Special Units) went on hatching ambitious plans, including an attack that was to "stop production" in the Baku oil-fields, which were all frustrated, as Skorzeny claims, by the chronic lack of long-range transports. Things got so bad that some time in 1944 he persuaded the Luftwaffe to repair six crash-landed B-17s, to be used for towing gliders in his fanciful missions. They were, however, destroyed by American bombs as soon as they had been recommissioned. ***

There is one indication -- as we shall see -- that Skorzeny's gliders may have been destined, in part or in whole, for Soviet power plants.

Also, in mid-1944, we find Speer assuring Hitler that Skorzeny controlled a force of airmen willing to undertake suicide missions with their aircraft. **** Skorzeny himself (in his book) takes pains

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* Inc Memorandum of meeting with Skorzeny and others. April 28, 1943.
** Skorzeny, op. cit., pp. 31-34.
*** Ibid., pp. 141-147.
**** Ibid. Memorandum of conference with Hitler, on May 22-23; dated May 26, 1944.
to stress that the mixed armory of unconventional weapons and specialists in their use which he managed in 1944 -- manned torpedoes, midget submarines, frogmen swimmers, radio-controlled tanks and speedboats, and so on -- did not include suicide weapons, and that he did not believe in suicide missions. He even asserts that the air-launched manned V-1 bomb, which the SS developed over strong Luftwaffe objections, gave the pilot a chance to escape, although he doesn't say how.

In spite of these disclaimers there is little doubt that Skorzeny played a part in the next episode.

**SUICIDE MISSIONS**

What little documentary evidence there is on the suicide missions theme is best presented in a few entries from Speer's Memoranda on his conferences with Hitler. On May 27, 1944, soon after the diversion of Corps Meister to railroad bombing had foiled the conventional variant of his pet scheme, the MUV attack, Speer records the following:

Again called the Fuehrer's attention to the importance of attacking MUV power supply, and begged him at the same time to have air reconnaissance in the Urals expedited.

Also reported to the Fuehrer that the Luftwaffe as well as the Waffen SS had a considerable number of men available for total commitment (Totaleinsatz -- German for Kamikaze. O.H.), and that presumably a destruction of all electric power plants can only be achieved by total commitment, in view of the low bombing accuracy of Air Corps Meister.

In contrast to his previous views, the Fuehrer's opinion is that this total commitment mission must be prepared.

Speer adds in his minutes that after seeing Hitler he talked to General Korten, Chief of Air Operations Staff, who "pledged his full support" in influencing Hitler.

A month later, Speer came back to the subject, and recorded on June 19:

*Memorandum of meetings with Hitler, June 19-22.*
The Fuehrer is of the opinion that destruction of the power plants in the Urals and the Upper Volga region is of decisive importance for the outcome of the war. He does not believe however, that there exist at present bombers of sufficient range and in sufficient numbers.

Speer added for the benefit of Dr. Carl and Field Marshal Milch:

"It is my opinion that it is the business of the Luftwaffe to promote this mission with maximum vigor. One day, the Fuehrer will demand this operation anyway, and then it would take months to make the necessary preparations.

It is not certain whether "total commitment" was under discussion here, but Speer became quite specific on July 28, 1944, when he addressed to Hitler his much-quoted Memorandum on Allied attacks on German POL production, warning the Fuehrer of their disastrous effects. Having pointed out that these attacks showed that success could be achieved by scientifically conceived attacks on economic objectives, he proceeded:

"There is still a possibility to destroy the Russian power plants from the Finnish and Baltic area, and thus to paralyze a large portion of Russian war production."

"It is known to me that numerous daring men have gathered around Skorzeny, and also in the Luftwaffe, who are voluntarily prepared to dive with their machines on the target.

"Efforts to commit these men ... against the enemy invasion fleet should be opposed, as their commitment against Russian power plants would achieve more lasting results of altogether greater importance.

"As the penetration range of aircraft is doubled in one-way missions, it is fully possible to destroy a large number of Russian power plants.

"I beg you therefore, my Fuehrer, to give orders to the C.I.C. of the Luftwaffe to carry out such a total commitment mission in cooperation with the Reich Leader of the SS.

"Even now it is certain that we shall have an acute shortage of motor fuel in September and October, which will deprive us of much of our mobility.

"On the Russian front we could partly offset this handicap by closing down a major part of Russian tank and aircraft production at least for some months."
Although Speer's interest in Soviet power plants did not cease at this point, there are no further references to "total commitment" missions in the Speer documents. For what follows one has to rely on the account by Baumbach, who by fall 1944 had become (in his own words):*

... Commander of all surviving remnants of bomber formations. Long-range aircraft and special weapons were put in my charge, as well as, for good measure, the total commitment men.

Baumbach claims to have come by this latter honor involuntarily, as a result of a Luftwaffe intrigue (conducted, apparently, by Milch, Klemeyer** and others) designed to sabotage Himmler's intentions to use the "total commitment" volunteers. Baumbach, like most Luftwaffe professionals, did not approve of the notion of suicide missions.

As Baumbach has it, these men (also known as SO-Men for Selbstopfer-Männer or Self-Sacrifice Men) had been organized by Skorzeny. Some were genuine volunteers, "others had been more or less coerced into this unit by Skorzeny." Baumbach took one look at his new command and diagnosed the SO-Men as phoney's. Most of them were out to earn decorations in some spectacular "special operation" like the Mussolini rescue, and all of them, in his words, "wanted to live, not to die." Baumbach notes with disdain that "there were no experienced bomber or fighter pilots among them." It appears from his account that this force had emerged in 1943, mainly in connection with the piloted V-1 idea of the Waffen SS. (Some V-1s were flight-tested by a noted SO-woman, Hanna Reisch.) After the Normandy invasion, Himmler and Goebbels were pressing for early use of the SO-Men, presumably (as Speer had it) against invasion shipping, and they were maneuvered into Baumbach's charge with express orders to him to "stop this madness," as he had the reputation of being able to negotiate with Himmler.

Oddly enough, if Baumbach's account can be trusted, he allied himself with none other than Speer for this task. Speer took him to

*Baumbach, op. cit., pp. 267 ff.
**Colonel Siegfried Klemeyer was Luftwaffe "Chief of Aircraft Development" in 1944-1945.
Hitler, and they obtained an opinion from the Fuehrer that he wanted no "total commitment." Baumbach quickly translated this into a "Hitler order" to disband the SO-Men force, narrowly forestalling a last try by Himmler to send them into action even over Hitler's objection.

Evidence of Speer's role in the whole episode is somewhat contradictory. It might be clearer if Baumbach had been more careful in specifying the chronology of his own part in it. Unless he is lying (which is unlikely for various reasons), it seems likely that Speer -- in March-July -- had been led to believe that the SO-Men were more genuine than they seem to have been, and he may have been enlightened subsequently by Baumbach. Also, Baumbach's effort with Speer most likely occurred quite late in 1944, by which time Speer had become something of a defeatist, and his state of mind was quite different from what it had been in summer 1944. In any event, by November 1944 Speer and Baumbach had joined forces in planning a new and final version of the MUV power strike, not involving suicide missions.

EISENHAMMER

The precise date at which this last intended operation was conceived is uncertain, but one may place it some time in October or November 1944. Its originators were Speer and Baumbach. When interrogated after the war, Speer made no mention of his "total commitment" ideas, but took credit for Eisenhammer; which he described as a "private scheme" of his, "not taken seriously by Hitler, the Luftwaffe and the Army High Command." Speer also then gave credit to Baumbach for "developing" the Mistel aircraft which was to be used in the attack.*

While Speer gave the impression that he conceived Eisenhammer still as "economic warfare" by air, with purely military objectives, Baumbach's book gives a somewhat different version of their motives. His account may serve as a brief review of this intended last fling

*SHAЕF G-2 Speer interrogation, 5th Session.
of the Luftwaffe. He relates that after a first-class row with Goering in October 1944 he
operated directly with Albert Speer, intentionally by-passing Goering. We planned, at the last minute, to
undertake a heavy strategic air attack against the Russian power plants with our remaining bombers.
Preparations for this mission carried the code name Eisenhammer.

As the military collapse of the Reich appeared certain within a few months, we intended, by this
operation, to influence the outcome of the War as favorably as possible, by cutting off supplies to the
Russian steam roller in its westward advance at the source of its electric power. After that there might have been a possibility of delaying the Soviets. The effects of such an attack would have been felt at the front in 3 or 4 months' time at the earliest.

Operation Eisenhammer was to be carried out by KG 200 [Kampfgeschwader = Bomber Group. O.H.], under
my command, which had become the last collection pool of all . . . special aircraft of the bomber force.
These included, above all, the Mistel aircraft, which were to fly the power plant attack . . .

Operation Eisenhammer was not carried out because East Prussia, the intended take-off point, was too rapidly seized by the Russians.

In March 1945, improved Mistel aircraft with increased range were completed, which were to fly from the Berlin area. By this time it was evident that the Anglo-Americans would yield Berlin and Eastern Germany to the Russians, and it would have been madness to proceed with the operation. Hundreds of thousands of German PWs would have had to repair the damage caused. Hence, we used the last Mistels against the Oder bridges built by the Russians . . .

Except for the alleged motives, and the reason for abandoning Eisenhammer, Baumbach's account is substantially borne out by two documents from Luftwaffe files, which show that he must have failed in "by-passing Goering." One is a recommendation to Goering to execute Eisenhammer, dated January 18, 1945, by General Koller, now Chief of Staff of the Luftwaffe. The other is a recommendation to Goering to shelve Eisenhammer, by General Christian, Koller's successor as Chief of Air Operations Staff, dated February 7, 1945.
Koller -- at a time when the Russians were already in East Prussia -- was urging execution of Eisenhammer with early-model Mistels, of 1,500 kilometre (1,000 mile) radius, stressing that the operation would be impossible if East Prussia was lost. His memorandum reveals that the targets were the familiar eleven power plants in the MUV region, picked by Carl in 1943, plus two further plants, Aleksin and Tula.

Eighteen Mistels were available for the attack. They were to be accompanied by a pathfinder force of Ju-88 and Ju-188 with wing fuel tanks. Koller noted that the target plants accounted for 60 percent of MUV power capacity, and he estimated boldly that "with 60 percent hit probability for the Mistel," 40 percent of the MUV power capacity would be knocked out. Koller made his recommendation after emphasizing the uncertainties and difficulties attending to the scheme. It was planned to attack early in the morning, and at that season that was high probability of ground fog, which would "place in jeopardy the entire attack." He also noted that aviation gasoline requirements for the mission were more than the Luftwaffe, by then, could afford without restricting other air operations on the eastern front. Nevertheless, he regarded the operation as worthwhile.

Nearly three weeks later -- February 7th -- when most of East Prussia had been lost, General Christian showed good reasons for expressing a contrary opinion.

He held that 100 Mistels were needed for the operation, with only 18 available and the rest due for delivery by the end of February. Modifications for extending the range of the pathfinder aircraft were not yet complete. Gorki could no longer be reached from the last remaining East Prussian bases around Danzig, and only the Tula group of targets could be reached from bases west of the Oder.

Christian took an equally dim view of the longer-range Mistel referred to by Baumbach, with 1,700 mile radius. One hundred were on order, but were not to be delivered until early in May. Completion of this order would seriously interfere with night fighter and jet fighter production. Even if the long-range Mistels were completed, there would
be no aircraft of comparable range to serve as pathfinders; and in any event, no aviation gasoline for the operation. In conclusion, Christian recommended:

(1) Cancel operation Eisenhammer.
(2) Complete 1,500 km Mistels under construction.
(3) Cancel construction of further Mistels and especially those with increased range.

On March 5th, Hitler ordered Baumbach to use Mistels, Fritz-Xs and all other remaining paraphernalia of KG 200 against the Russian crossings over the Oder and Neisse.

* * *

Chronologically the last documentary contribution to the subject is Speer's last letter to Hitler of March 29, 1945. In highly emotional tones, Speer set out the reasons why he had lost faith in German victory and in Hitler himself. (He did not tell Hitler that by that time he had also been conspiring against his life and sabotaging his scorched-earth orders.) Before his loss of faith, Speer wrote,

I was determined myself to fly with the gliders against the Russian power plants, in order to help reverse our fate by personal commitment and at the same time to set an example.

One is left to wonder whether there was a time when Skorzeny had intended to dispatch his B-17 glider tows against Soviet power plants, with Speer among the passengers.