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DEPARTMENT OF THE AIR FORCE
AIR FORCE HISTORICAL RESEARCH AGENCY
MAXWELL AIR FORCE BASE, ALABAMA

24 August 2009

AFHRA/RSA
600 Chennault Circle
Maxwell AFB, AL 36112-6424

Mr. John Greenewald, Jr.
[REDACTED]

Dear Mr. Greenewald,

This is in response for your request received 20 August 2009 (our inquiries reference number 65534) concerning IRIS Number 214623, Proposed Speech for General Arnold. Since your request was made under provisions of the Freedom of Information Act it has been designated 2009-03272-F.

Please find enclosed a photocopy of the requested document.

Thank you for your request.

Sincerely,

A handwritten signature in cursive script, reading "Barry L. Spink", is written over a horizontal line.

BARRY L. SPINK
Archivist

Attachment:
Proposed Speech for General Arnold, IRIS # 214623.

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519.04-6 1942-44	RETURN TO: Director Aerospace Studies Inst AFMTC Archives Branch Maxwell AFB, Alabama
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PROPOSED SPEECH FOR GENERAL ARNOLD

9274-30A

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HEADQUARTERS, ARMY AIR FORCES
Washington

SMC

15 November 1944

5 19. 516.173

Major General F. L. Anderson
U. S. Strategic Air Forces in Europe
APO 633, c/o Postmaster
New York, New York

Dear Anderson:

Just finished reading your memorandum concerning development of air power by various nations in Europe. It was a grand technical story of development and changes in air power as the war progressed.

I think that it will be of great help.

With kindest personal regards and best of luck to you,

Sincerely,

/s/ H. H. ARNOLD

/t/ H. H. ARNOLD,
General, U. S. Army,
Commanding General, Army Air Forces.

00214623

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Introduction

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I have been asked to speak to you gentlemen on Air Force Operations in Europe. It is my purpose to review them through the time of our participation in that Theater. I intend to concentrate upon the more general experiences and observations from it rather than upon any statistical record of change and growth.

The statistics are vital to Command and are, of course, readily available. In the end however they measure only size. It is a curious thing that at one time or another in the course of the war in the European Theater each of the Air Forces involved, except the Italian, has been the largest one.

But size is not power. Nor is it the even more important factor in war which is the use of power. At one time or another each of the Air Forces had held complete aerial supremacy over its own territory. Four of the five, at other and various times have held supremacy over the air of their enemies. One has vanished in complete extinction, one has fought back from the brink of it to prodigious power, one now totters over the abyss.

All, excepting possibly again the Italian, have held positions of overwhelming advantage. Yet none of them has yet been able to produce a military decision. It is possible that Air Power never can produce a final military decision. I say possible for it is not certain. At times in this war it has come very close to doing just that. It would be more modest than wise to assume that Air Power cannot do it. For the weakness may not be in the Air Power but in the use that has been made of it. If our enemies, present or future, should understand this more clearly than we do, we might live to see air power, properly used, produce a decision we should not like.

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I propose therefore to review Air Force Operations in Europe by examining the experiences, effects and counter-effects of the various Air Forces acting and reacting not only upon each other but upon the purposes of their various nations. One advantage of this system is that it enjoys the surest of all wisdom which is, in fact, the wisdom of hindsight.

It is very easy now to see what might have been done differently or better in the heat of the fray. It was never so easy at the time. Everyone of the five air forces in Europe (excepting still the Italian) has been a very formidable foe for any commander; all have made mistakes. But each has had to realize that while one kind of mistake might only mean delay the other kind would surely mean disaster. The decisions have not been easy. We may be very sure however that these matters will be carefully studied by future belligerents. If we fail to understand the mistakes as well as the triumphs of our own record we shall be inviting future enemies to capitalize on that misunderstanding. If we fail to correct those immediately discernible we shall be delaying the maximum contribution of Air Power to victory.

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Background

At the time of the Eighth Air Force's entry into European operations in August of 1942 there were already four other Air Forces in operation on or against that Continent. Each one had originally been tailor-made to the aspirations or apprehensions of its own country. Each was then already changing with the changing fortunes of the war, some voluntarily and some only after painful lessons. Two of these Air Forces had already almost three years of actual combat experience, one nearly two and the youngest fifteen months. Their theories had been tested and evolution was already in process. The testing of these theories had in fact produced the existing air doctrines from which evolution of types and practices followed.

1. The Italian Air Force.

It is perhaps only a courtesy to include the Italian Air Force among the major ones even of 1942. It is however a courtesy due age for the Italian Air Force was, in actual combat experience, the oldest of modern ones. Even by the outbreak of this war however it was old beyond its usefulness. It had at various times good fighter planes. Its torpedo planes and dive-bombers clearly reflected the imperial aspirations that played a significant part in the power politics of the 1930s. But the force that made the British Navy uneasy and looked so superior against the spears of the Abyssinians was a discredited laughing stock by the summer of 1942.

Like the Italian Navy it had for a time a nuisance value among sorely preoccupied neighbors. It never had any stomach for offensive work and even a complete change of opponents and co-belligerents finds it still more conspicuous for prudence than for performance.

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2. The German Air Force was tailor-made to fit two closely related aspirations. The first of these was the long game of Hitler's power politics, through which the German bombers threw their shadow over every capital in Europe.

The second was of course the more elementary purpose of conquest which lay behind the power politics themselves. This was an ancient German aspiration. It was natural, though fortunately fatal, that the youngest military weapon should have been fitted to the classic tradition of the ground campaign. Bismarck's old dream of the perfect artillery had in fact taken wings.

The preponderance of dive-bombers, the limited range of even the long-range bombers and the proportions of single and twin engine fighters and short range reconnaissance early bespoke the intention of a glorified army support force which the original German Air Force was. The negligible development of long-range reconnaissance and either an anti-shipping force or adequate strategic bombardment are further clues to intent.

They indicate that the Germans had never thought through the problem of reducing England by air bombardment. Until it was too late they apparently never realized the full possibilities of combining air power with their evident preparation of the submarine blockade.

The German Air Force was designed for Continental campaigning. Its reserve, repair, training and production policy all suggest that it was also designed for quick summer campaigns and long winter recuperation and remodelling.

In its early campaigns the German Air Force fulfilled its purposes admirably. It disposed of the Polish Air Force in a week and spearheaded the ground forces' conquest of that unhappy country in a month.

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Nine months later it covered the short sea-borne assault on Norway with conspicuous success. Two months later it had cracked the Maginot Line. By the end of June the Armies it led had conquered the Low Countries and France. As an accessory of the ground campaign the Luftwaffe was a prodigious and unquestioned success.

It must be recorded however that these successes of the air were won without mentionable air opposition. Indeed on the one occasion which matched substantial numbers of opposing aircraft the British Fighter Command had won and held brief aerial supremacy over Dunkirk. In fact, however, the German successes of that time had taught no new lessons. The power of Air against unprotected troops was already well known. It was the defensive power of fighter aircraft against attacking aircraft which stood out in the Dunkirk experience as the major air milestone to that time.

The Battle of Britain was shortly to underline this lesson. As the world knows the G.A.F. was given the job of softening England up and destroying the Royal Air Force preparatory to invasion. As the world also knows it failed completely. Neither German bombardment nor the fighters escorting it were equal to their task. If they had not changed target systems and intentions three times during the operation the result might have been different.

But, failing to win by the attrition, they invited through shipping and harbor attacks, they squandered another valuable part of their force on airdrome attacks. Then in a final frenzy of rage and purposelessness they tried pure area blitzing of London. At the conclusion of the experiment the German bomber force withdrew into the darkness it kept for the remainder of the war.

The effort it wasted on night blitzing of London both in that winter and in the succeeding one accomplished no military purpose. It left the German bomber force unable finally to operate anywhere but in the relatively undefended Russian and Mediterranean Fronts.

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The German bomber force did good service again in the Balkan, Grecian, African and Russian campaigns but only in the absence of adequate fighter defense. It had never recovered from its original beating at the hands of the Spitfires. Though it ruled the Mediterranean briefly it was an uneasy reign which could neither overpower Malta nor protect its own shipping from the depredations of British aircraft based there.

In the first Russian campaign the German Air Force, operating again as a ground support instrument, swept everything before it and destroyed most of the Russian Air Force. Germany clearly had complete air superiority over Russia as it had complete military superiority over everything but the problem of its own supply. Yet even with this air superiority it could not force a decision. The Russians could still retreat. And the Germans had not strategic bombardment equal to the task of finding and destroying the thin thread of supply and replacement upon which they fell back.

By the summer of 1942 the process was repeating itself. German Air Power, as a ground support instrument could drive the Russians back again and farther. It could not reach behind them and effect a decision by strategic bombardment.

3. The Royal Air Force unlike the German Air Force began the war dedicated to the defensive. Its fundamental concept was to hold the British Isles and the shipping lanes on which they depended. Its bomber squadrons had been built with an eye on the sea. Their first attack was on a German Naval Base. The largest part of their tonnage up to mid-1942 was against essentially naval targets. They too had learned, less expensively but equally conclusively, the lesson that daylight bombardment in the face of fighter defense was impossible for the types of aircraft they had chosen.

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Their experiments with daylight attack indeed had been substantially abandoned in 1939. Except for two or three brilliant but isolated forays, British bombers were not seen in daylight again until 1944.

In both its design and its performance, the superb British Fighter Command of that time had first accepted and then vindicated the doctrine of air power for defense. Its overwhelming victory in the Battle of Britain had indeed produced a kind of daylight aerial truce in this Theater, through which the Germans wasted while the British patiently accumulated resources and experience for night bombing.

From Malta again the British had maintained through this period an aerial defense of the Mediterranean which was to have the far-reaching effect of stopping Rommel in his tracks outside Alexandria for want of supply. It was a significant contribution to the war but it too was essentially a defensive triumph.

The third defensive success of the R.A.F. was the all important one of maintaining the shipping lanes into the British Isles. For this the Coastal Command deserves a credit often overlooked.

The Royal Air Force as then constituted had fulfilled its responsibilities brilliantly. It is no reflection on it, however, to observe that even at that time it remained in the preponderance of its strength and intent a defensive instrument. What it could spare of resources and energy from this commitment was going steadily into the formation of an offensive Bomber Command but it was only then becoming a serious factor in the war. It was moreover committed by equipment, technique and experience to night area bombing. We have already noted the essential failure of the German effort with this technique. To practice it successfully against Germany itself would require a prodigious force to offset the inevitable margin of inaccuracy at night. Yet after careful examination of the experience of daylight

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bombardment in this Theater the R.A.F. had adopted that intention.

4. The Russian Air Force remains to this day something of an enigma. It is clear that in the early stages of the war it either never had a long-range bombardment force or could never use it effectively. Its ground support forces were good but neither so good nor so numerous as the German ones. They were swept off their feet, leaving the armies virtually undefended. There was still fighter cover for Moscow and rather less for Leningrad. But in the main it is fair to say that the Russian Air Force did well to keep some remnants of its strength alive in the first campaign and was only slowly recovering by the second one.

It is notable that the Russians, too, thought nothing of daylight bombardment. By now there was good reason to neglect it. Their lines had been pushed back so far that no worthwhile strategic targets were in range of them. In any case they were content to rebuild with fighter defenses and fighter-bombers for army support. The worth of these steadily increased but at that time it was probably low. The Germans enjoyed complete air superiority over the Russian Front.

Whoever doubts this may consult their claims. For if there is one mistake that no air force has ever yet made it is in underclaiming its victories. In the summer of 1942 the Germans were hard pressed to find Russian aircraft even for claiming purposes.

5. This briefly was the history of the warring Air Forces among whom the American Eighth Air Force began operations in August 1942. The experience, though apparently miscellaneous, added up to a few firmly held doctrines.

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Among these none was more universally believed than the apparently proven one that daylight bombardment against competent fighter defense was impossible in this Theater.

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III

Rouen to Casablanca

The American Air Forces began operations in Europe with a technique specifically defying the major bombardment doctrine of the Theater. We expected to bomb precision targets in daylight. We expected Fortresses to fly above the levels of preclusive flak and to defend themselves from fighters by the mutual support of massed .50 caliber machine gun fire and by long range escort of friendly fighters. We expected to hit our targets by use of a new and revolutionary bombsight. We expected, moreover, to hit only small targets vital to the enemy's war economy.

The possibilities of destroying the enemy's war economy by precision bombing of its indispensable bottlenecks were glittering. The technique offered a perfect complement to the Royal Air Force's rising weight of night area bombardment. The American Air Forces were from the first happily freed from the defensive commitment which had shaped all of Europe's air forces and which made it possible for us to concentrate on the fighter plane as an offensive co-instrument of the bomber.

Finally there was as yet no theater in which we could apply that part of our own Air Forces which were preparing for the close support of armies. The idea of daylight precision bombardment was the one contribution America could make to offensive warfare at that time. After consideration it was adopted for this Theater in spite of the best advice experience could offer.

Before it could be fairly tested in execution however this original intent had to give way temporarily to a change in the broader Allied strategic policy. When our first squadrons were marked for the U.K. the intention had been to build up a really strong striking force there and protect it with high priority allocation of the long-range fighters then available and forthcoming.

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The decision to divide this force between the 8th Air Force and the Torch operation however delayed the projected build up in the U.K. by several months. From mid-October 1942 until late March 1943 the 8th Air Force never had more than six heavy groups and was never able to dispatch more than 80 bombers on a mission. It had no American fighter support at all and what help the R.A.F. Spitfires generously gave was limited to their range.

The consequence was to restrict our operating capability to the fringes of the European coast from Lorient to Rotterdam until late February 1943 when a small force of less than 60 bombers turned in from the protection of the Atlantic to hit Wilhelmshaven and run again for the open sea.

The actual value of these operations is difficult to assess as any beginning must be except in relation to the final result. The damage done to enemy installations in France and the Low Countries was certainly negligible. The lessons and portents of the experiment were not.

In the first place the Fortresses and Liberators proved that they could hit targets from above the levels of preclusive flak. In the second place they proved that they could defend themselves from what part of the German fighter force was then disposed against them.

But here exactly was the crux of the problem. For the Germans understood these portents and acted immediately. The Fortresses that could hit Rouen could, with experience, also hit Berlin or anything else in Germany, unless stopped. The vigor and the immediacy of the German decision to stop our operations leave no doubt of how clearly they realized their latent potentialities.

In direct response to daylight precision bombing from the U.K. the Germans began, by October 1942, to withdraw fighter squadrons from other fronts and to place them upon the Western Front. It was a process that continues

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to this day. It was the first indication of the major change that our operations were to force upon German Air Force disposition, composition, production, repair and allocation. This change was to extend as a blight and a denial to the armies dependent on German air support. It was to influence every campaign from Alamein and Stalingard to the present.

Even after the threats of both Alamein and Torch were apparent in that autumn of 1942, even after Stalingard had already assumed the shape of the debacle it was to become, the Germans continued bringing fighter squadrons from both the Russian and Mediterranean Fronts to oppose our daylight bombing on this one.

The first contribution of American strategic bombardment therefore, and one that continues to this day, was in the direct and immediate relief it gave to two Allied field armies. It was a contribution more valuable than any that could be read on the strike photos of our early missions.

This relief to the Allied armies in the east and south was bought by direct and heavy cost to the Eighth Air Force itself. The fighter defenses deployed against it thickened in an unbroken succession, not only by the return to the west of the far flung squadrons but by the establishment of a whole new fighter wing, the 11th Jagdeschwader which was the first but not the last formed to operate against us.

German fighter plane production was intensified at the direct cost of the replacement of their waning bomber power. German bombers had failed in their assault on Britain and had shown only too late their high value for blockade and anti-shipping work. But now the force that had critically menaced all Arctic shipping, endangered the Suez and, with the help of subs, almost cut the Atlantic lines slumped even further into decline as more and ever more of German industrial and military resources were shifted hastily to fighter defense.

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This complete alteration of German air policy and capability was the first direct result of American strategic bombardment.

This result, however, was not immediately apparent. Even by the time of Casablanca the American strategic dream had only a handful of photos of damage to French installations and the certain undeniable shifts of a few German fighter squadrons to show for its work.

The Combined Chiefs had to measure these against the experience of Air Power in the Torch landings. There and subsequently in Africa, American Air Power had played a useful role. But the preponderance of it was the classic role, familiar from Norway, Crete, the Perakop Isthmus and Kirch Straite, of supporting a sea landing and afterwards a ground campaign. Air Power had made the useful conventional contribution expected of it. Yet it was notable that it had forced no final decision in the African campaign. It was equally certain that no air power based on Africa in the foreseeable future could have strategic effect either upon the bulk of the German armies or upon the German economy that supported them.

These things the Combined Chiefs had to weigh against some photos of damage to sub pens, a reported shift in German dispositions and the remarkable fact that Fortresses had survived sharp encounters with German fighters and flak.

The African campaign was in fact going slowly. There was a natural urge to add even more weight to the overwhelming air superiority that backed it. But over and against that were the photos, the unexpected survival of the 8th Air Force, the shift of the German fighters. They added up to a new potential in the war, to the possibility of striking the enemy in his homeland where no other Allied agency could yet touch him.

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At Casablanca the Combined Chiefs of Staff decided to build up the Eighth Air Force and intensify daylight strategic bombardment of Germany by the highest priority of allocation.

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III

Casablanca to Cairo

1. The Casablanca directive confronted the 8th Air Force with a whole new set of problems. Its previous concerns had been comparatively simple. The first was to survive. The second had been to vindicate a theory of offensive air war. Actually the two concerns had been in bitter conflict, for it had been necessary to hold operations down to a very low rate of loss replacement.

Now with replacements and buildup in sight the 8th Air Force found itself again caught between two conflicting purposes. The first was to inflict the maximum damage possible on the enemy; the second was to build the force up so that it could inflict even greater damage.

With replacement and expansion promised, however, the 8th Air Force could at long last settle to the planning of its new function. Previously it had wondered what German targets it could hit. Now, with the help of the Operations Analysts the 8th Air Force sat down in cold blood to the more ambitious project of determining what targets must be hit to shatter the German war economy.

This study resulted in the program known as the Combined Bomber Offensive from the United Kingdom. Briefly, it had been determined that Germany's vulnerability lay in six industrial systems. Submarines, aircraft, ball bearings, oil, rubber and military transport were indispensable to the German war effort.

The vital installations producing each were measured by a yard stick of bomb damage ascertained from the 8th Air Force's demonstrated destructiveness to date. From this requirement of bomb damage, in its turn, was computed the number of attacks necessary to make it. This number was transmuted again through the measurements of serviceability and size of the force required to deliver those attacks through a given time.

From these computations there emerged a military plan carceously resembling

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a contract. The 8th Air Force said in effect "Give us the quantities of planes, at the times stipulated in this four phase program, and we shall perform the destruction indicated in the plan".

The plan was presented to the Combined Chiefs of Staff late in April of 1943. They approved it and from then until the establishment of USSTAF, eight months later, it was the operating charter of American Strategic Bombardment in this theater.

Implementation of the plan had, in fact, begun before its formal approval. All authorities had for some time been agreed that the reduction of the German Air Force was indispensable to the continuance of our strategic bombing. The German reaction to the portent of our presence has already been mentioned. It was continuing with a steady flow of new fighters to the Western front. We were already engaged in fact in a desperate race as to whether we could mount a sufficiently heavy bombardment before they had reinforced their Westwall of fighters to a strength that could turn back any scale of bombardment. The world had seen Spitfires turn the Junkers and Heinkels back from England.

Already the steadily rising German fighter strength was a close match for our slowly growing strength. The sharp upward turn of German fighter production that spring left no doubt of the German intent to win the match. This race was in fact to continue another full year with advantage alternating between attackers and defenders in precarious balance until the overwhelming strength of USSTAF decided the issue in 1944.

Even in the early spring of 1943 however, the outlines of the coming struggle were already uncomfortably clear. On April 17th the 8th Air Force took advantage of its first weather chance to make a milestone in its history with attack upon a German fighter factory in Bremen.

From that time forward the history of our bombardment and the history of the German fighter force became as inseparably linked as only mortal antagonists

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17

may be. Our purpose was to break through the defense, check the roots of that defense and then do the necessary damage we had planned. The German purpose was at all costs to stop us.

The clarity of these conflicting purposes began to produce at once the heaviest air fighting yet seen in the war. This scale of fighting, and inevitable loss of planes, had in fact been foreseen. It was one of the lessons learned by rueful experience and it had translated itself into the 8th Air Force's insistence on an adequate flow of replacement and buildup to perform the damage contemplated in the Combined Bomber Offensive. The buildup never materialized in time. Throughout the most critical fighting and the best weather months the 8th Air Force was always hundreds of planes behind the minimum requirements it had estimated for the job it was fighting so hard to accomplish.

The delay was not only responsible for its inability to make the most of the rare good summer bombing days. It was very nearly fatal to the whole enterprise. The air fighting of May and June was critical. By then the Germans had more than doubled the fighters which opposed our first attacks, and the expansion was continuing.

Fighting value as well as numbers had risen. The introduction of the 21 cm. mortar in May not only offset the range superiority of our .50 mm machine guns had enjoyed, but it proved a particularly effective weapon against our tight formations because of its very large lethal burst. Weapon had now bred counter-weapon with a vengeance. The advantage of armament on which we were dependent had become in fact the enemy's advantage.

It may and should be stated categorically that the American Air Forces could not have continued their daylight strategic bombardment in this theater long after the introduction of the rocket if it had not been for still a new factor which this time was on our side.

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The factor was, of course, fighter escort. In a sense it was not new for it had been envisaged as part of the original dream. The 8th Fighter Command had arrived here within a few days after the 8th Bomber Command, but the dispatch of its original groups to the Torch movement left it unable to operate again with any strength until July of 1943.

Its intervention turned the tide in our favor. Although they were badly outnumbered at first, the range and aggressiveness of our fighters were to add a new chapter to the story of offensive air warfare. And again the change in our luck was felt almost reflexively in a change of German technique.

At first our bombers had drawn German fighters from Norway, Africa and Russia to defend the fringes of Europe. Now our fighters drove these same defenders steadily back from the fringes into Germany itself. What is more, their very presence immediately reduced a leverage of enormous additional strength to the German defenders. Much of their success with rocket mortars had been won with twin engined fighters. The success of this innovation had made large numbers of Ju 88s and Me 110s an unexpected additional threat to our forces.

In conflict with our fighters, however, the German twin engine fighters were much too vulnerable. They had to be withdrawn beyond the range of our Thunderbolts. Though they did much damage on missions that subsequently took us beyond Thunderbolt range, their capability for such damage was materially reduced. Indeed, once our bombers had their own fighter escort, we began to see the grotesque counter-measure of German single engine fighters acting as escort to protect the twin engine fighters from our fighter escort.

Under friendly fighter cover, the preponderantly coastal attacks of March, April, May and June gave way to deep penetration in July against such places as Kassel and Oschersleben and Warnemuende. Our fighters could still not reach these places but they could go most of the way and the stakes were high enough to send bombers unescorted the rest.

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19

For these were fighter factories and it was now only too plain that even with fighter escort we could never be safe until we had stemmed the rising tide of German aircraft production. In addition to this immediate purpose there were, of course, the other commitments of the program. Fortunately most of these other industrial systems still had vital targets which could be hit under our own fighter cover or from the protection of the sea.

Ball bearings, however, were believed uniquely concentrated in Germany. Their importance to all rolling equipment, as well as aircraft manufacture, was known. For these we accepted the record losses of the war to date on the Schweinfurt-Regensburg, Stuttgart and second Schweinfurt missions in August, September and October.

The summer produced the bitterest air fighting of the war and the best index of our bombing efficacy was the German willingness to accept such combat losses in resistance to it.

The effectiveness that had been hoped for, however, was limited by two critically restrictive factors. The first, as I have said, was replacement. Not until the summer weather was irrevocably past did the flow of new planes ever reach the requirements that had been soberly estimated for the Combined Bomber offensive. The second factor was the weather itself, although its inhibitory effect was magnified by the smallness of our force. The planners of the Combined Bomber Offensive had carefully considered the expectancy of weather suitable for precision bombing in this theater. It was for this that they had stipulated not only eventual buildup, but buildup by time stages. These were not fulfilled. We never had the force we needed in time. This is a problem that happily will not recur in the European Theater, but it is presented as a valid explanation of the fact that although our forces were fought to the very limit of their endurance the result was not conclusive in that year because the material was not provided

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to make it so.

By hindsight, one further feature of the Combined Bomber Offensive is well worth particular attention. It proved that there were too many systems and too many targets for the time allotted. This is only in part another way of saying that our forces were too small for the task.

From this perspective it now appears that we should have modified our ambitions to our capabilities and concentrated more of our energy on performing the most necessary task before we diluted precious effort among the other ones. The most necessary task was, of course, the destruction of the German Air Force. As is well known we did substantially check its production and cut the planned expansion of its strength. We did not soon enough realize how imperative a task it was and concentrate every available ton of bombs upon it.

2. It is worthwhile, however, to review the effect of our operations on the German Air Force. Indeed the subject is so inseparably related to all of our own effort that any discussion of either must confuse the speaker himself. It is, therefore, appropriate to say now that in the very week which cost us the record bomber losses of the war to date over Schweinfurt, Marshal Goering considered his defenses against our bombardment a failure and informed his fighter command so.

This view is the more significant because of the extremities of effort the Marshal had already devoted to countering our air attacks. We have noted the gradual shifting of units from other fronts. This procedure was highlighted however by the removal of the crack German 3rd Fighter Wing from the Russian Front. Two of its groups were actually withdrawn at the very time in August when the Germans were beginning to reel from the Russian offensive between Kursk and Orel. They came straight to the Western Front to be followed by the other two after a brief period of rest, refit and mortar training.

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Goering had, moreover, continued to spread the use of the mortar rocket through all the groups engaged against us. In addition he had more than doubled his air force signals personnel and welded them into the most tightly organized system of fighter controls ever seen. In the early spring of 1942 he had prodded Milch into reorganizing all of German fighter aircraft construction to give fighters highest priorities. On the strength of this he and his Fighter Commander, General Galland, had held a big meeting of their Geschwader Kommodores and promised them that the prevailing strength of fighter groups would be raised from the current average of about thirty to fifty.

The promise was doubtless made in good faith. But as both our bombing and air fighting of the summer cut down all possibilities of such accretion Goering was forced to another expedient. This was organizing an elaborate network of re-fueling and re-arming bases throughout the defense area and then calmly informing his commanders that instead of having their strength almost doubled, they would henceforth see to it that they flew double sorties with whatever strength they had.

Yet by mid-October Goering considered that even these expedients had failed. It was then, that with characteristic bombast and ruthlessness, he called for volunteers and demanded the organization of the *Sturmstaffel*.

Its operating charter was simple. Pilots joining it were committed to a vow to ram our bombers if they could not secure victories otherwise. This suicidal dream actually never came to much; the fighters had too much sense to obey it. And someone, probably Galland, had too much sense to insist on its enforcement. Its presence in official orders however indicates the German view of the gravity of our continuing onslaught.

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By every indication the battle for aerial supremacy had almost reached its climax over Europe in October of 1943. A few more large scale engagements might have seen either side victorious. We still lacked the Mustang strength to provide friendly fighter cover over the more remote targets. And beyond fighter cover the Germans now appeared to have the better of unescorted bombers. It must be soberly admitted that a few more battles beyond fighter cover might have condemned daylight strategic bombardment for all time.

Yet we have seen the proof of Goering's desperation and the immediate future looked little brighter for him with his production substantially cut and his units weary from unprecedented attrition. The decision battles however were not fought in that year.

The reason was, in fact, weather. From October 14th to the end of the year we did not again get foreseeably good weather for deep penetrations and visual bombing. Nor did the Luftwaffe, licking its own wounds, choose to aggravate them by resistance to our experiments with blind bombing.

Except for occasional shallow raids to objectives of secondary importance we were restricted to blind bombing from October 14th to January 11th. This technique as first practiced by the R.A.F. had begun to show distinct promise for promiscuous destruction on sizeable objectives. It was not yet dependable for hitting precision targets.

By hindsight it now appears that our forces might have been more effective throughout the European War if we had had time to train and perfect them in blind bombing. On the other hand this could only have been done at the price of delay in the application of our own technique. When we began in Europe, all bombing was blind because it was done at night without sober hope of any more specific accomplishment than occasionally hitting large cities.

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The necessity of fumbling in the dark had mothered British excellence in navigation and was to see them perfect blind bombing to a remarkable extent. Yet it was a slow process; they had already been thirty five months experimenting with it when we began to hit small targets by selection.

As necessity overtook us last autumn we began our own slow and painful education with blind bombing and made good progress with it. But we had behind us already a summer's bombing which no air force in existence had yet matched for accuracy or selectively applied damage. The wonder is not that it just barely failed but how close it came, in less than fourteen months operations to its first objective of destroying the German Fighter Force and so leaving the Reich wide open to all Allied bombers.

Between the times of Casablanca and Cairo the role of the American Air Forces in the Mediterranean was less revolutionary. They had been committed from the first to what was essentially a combined operation. In support of this the heavy bombardment did contribute highly valuable work in establishing a very effective aerial blockade of Mediterranean shipping which was most vital for reducing the supplies Rommel needed.

Heavy bombardment again took advantage of unique opportunity for counter-air action against the relatively few and concentrated air bases on which the enemy depended. Its results were apparent in his complete loss of anything like air equality.

As a third contribution heavy bombardment from the Mediterranean Theater did contribute important operations to the truly strategic purpose of attack on the enemy's home industry. The two raids on aircraft factories in Vienna and the first Ploesti raids were notable strategic operations and the more remarkable for being conducted at such very long range.

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24

Range, in general, however prevented application of the full strategic power that was not to make itself felt down there until the capture of the Italian bases opened up adequate facilities within reasonable striking distance of more strategic targets.

At actual close army support both the American and British Forces down there were making excellent progress at the mastery of a trade which had served the Germans so well in their early campaigns. In this we produced no innovations but the successful support of the landings in Sicily and Italy augured well for the future.

On the other hand the very immensity of our aerial supremacy in Tunis, in Sicily and in Italy was at once so overwhelming and so limited in conclusive effect as to validate the corollary that has been noted before. This is that although you cannot win ground campaigns without aerial supremacy you do not necessarily win them because you have it. This blunt fact the Germans had already discovered to their pain in Russia. It requires only a glance at the present situation on the Italian Front to see that time has raised the corollary to equal status with the proposition itself.

The richest fruit of the Mediterranean air experience was the education in combining land, sea and air forces for airborne assault and for this it may be said that all classes of our air power made excellent contributions.

It is no derogation however to point out that all of these operations were simply variations on uses of air power which other nations had practised successfully. For unique contribution to the use of air power it is necessary to turn back to the record of the strategic forces in the U.K. with their progress at the development of long-range precision bombardment and long-range fighter escort. Both of these innovations marked an epochal advance in air warfare. The American Air Forces were not only attempting but in less than a year had demonstrated

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unquestionable success with a technique which two other air forces had abandoned in despair and two more had never considered worth trying.

The course of this experiment had produced a counter-revolution, and a most disadvantageous one in the composition and operations of the German Air Force. Its damage had spread, by the removal of their air cover, to both of their field armies.

The continuing shift from bomber to fighter production and from offensive strength to defensive strength was more than a symbol of the end of Germany's aggressive capability. The uncovering of those field armies was a profoundly important, if not decisive factor in the almost unbroken series of defeats and retreats which characterized their ground campaigns through the period from Casablanca to Cairo.

These in themselves were prodigious accomplishments and yet they occurred almost as by-products of our intent to destroy the German war economy with precision bombing. I have said before and must acknowledge freely that the six target system proved too large for destruction by the force we were able to assign against it. In retrospect it is clear that we should have limited our objective to our means and assigned every available ton to the destruction of the German Fighter Force while it was yet as relatively inexperienced as we were. Yet even with the available forces we came very close to accomplishing that destruction that year.

3. The effects of this upon the remainder of the German Air Force have been indicated but should be summarized again here. The period from Casablanca to Cairo saw the once vaunted Stuka disappear even from the Mediterranean Front and though it lingered in use on parts of the Russian Front and for the suppression of Balkan guerillas, it ceased to be a major factor in the war.

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The decline of German long-range bombardment was equally clear if not quite so rapid. It is notable that throughout this period it dared to make no major attack upon Great Britain, was powerless against the rich targets of the Sicilian and Italian landings and continued to decline steadily in effectiveness against both Atlantic and Arctic shipping.

The reason of course was the steady shifting of emphasis, production, crews, training and even units from offensive to defensive purpose throughout the German Air Force. The preponderance of this effort went into single-engined fighter day defense. It is noteworthy however that the twin-engined night fighter force throughout this time was expanding steadily in direct response to the growing effectiveness of the R.A.F. night bombing program. This rise in twin-engine fighters was actually a more direct and immediate drain on German bombardment than their single-engine expansion since in the former they actually converted bomber types to fighters.

Night fighter defenses were in fact to become the most formidable branch of the Luftwaffe at bay until they too were cannibalized to the last ditch requirements of day fighting. This step in the process was, however, months in the future, at the turn of the year which found the G.A.F. irrevocably committed to the defense of its homeland at the direct expense of all future air aggression and even adequate support to its beleaguered field armies.

The R.A.F. operations during this span followed the already predetermined course of their own evolution. It is to be noted that this was a voluntary one. Though they did send a token force of bombers and very substantial numbers of fighters both day and night to do excellent work in the Med, the Royal Air Force's Bomber Command was in fact emerging as the offensive instrument for which they had so patiently accumulated it.

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Carefully nursed heavy squadrons were finally giving their night force both homogeneity and vastly increased tonnage as Lancasters, Halifaxes and Stirlings superseded the miscellany of mediums with which Bomber Command had begun. They were designed for the night, for low speed, low height and heavy lift with the darkness as their principle reliance for protection. Their strategical purpose was likewise limited to the promiscuous destruction which is all that can be hoped in darkness. But in this their growing weight was making rapid advances.

The development of its strength throughout this phase was to make possible for the R.A.F. three major assaults with a concentration of tonnage that had never been matched before. The first of these was the protracted drive on the Ruhr. The second was the blitzing of Hamburg on a unique scale and the third was the beginning in the autumn of '44 of that winter's intensive bombardment of Berlin. It is still impossible to assess fully the exact results of these operations. It is quite probable that by indirection they spread from the point of the bomb strikes to the field armies and contributed in large measure to the scarcity of supply and replacements that had settled like a blight over the German forces everywhere.

It is very certain that their effect within Germany itself was extremely serious. The best index we have was the rapid build-up of the twin-engine night fighter force for defense against the steady bludgeoning, inefficiency as in naked strength its resources were increased by every possible means and also, be it noted, at the direct expense of all other branches of the G.A.F. except single-engine fighters. Between the twin-engine night fighter force and Bomber Command they developed exactly such a duel as was now joined between our daylight precision bombing and the single-engine fighter force. In this duel too the advantage alternated with a precarious balance. The introduction of the

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Window technique did give Bomber Command a brief advantage which it brilliantly exploited.

With the autumn German signals control, radar development and sheer weight of numbers were rapidly regaining a kind of parity for the defense. Nor could Bomber Command look as we had done to its own fighters to turn the balance again. The R.A.F. Fighter Command still carried the entire commitment of aerial defense of the U.K. and even had it not been so burdened it is doubtful if escorting fighters by night would ever prove the balance of power that they had become by day. In both night fighting and intrusion the R.A.F. had reached high peaks of development but for protection in its strictly offensive work Bomber Command had to look principally to the ingenuity of its planning and the simple courage of its personnel. By the time of Cairo these were constituting only a slender advantage over the rising efficiency of the German night defenses.

5. The Russian Air Force insofar as we can judge changed little in this time from its original forms. It did grow powerfully. Though they had produced as yet no long-range bombardment the growing strength of their fighter-bomber arm was continuous and found its reflection in the growing success of their ground armies. Indeed by the end of 1943 the wheel had probably come full cycle. Thanks largely to German removals to this front the Russians now had local tactical air superiority almost everywhere along their line.

It is notable however that even with the revival of this they made no efforts toward strategic bombardment. Perhaps they could not afford the production commitment. Perhaps they felt they did not need it for the moment. Perhaps their view of the future saw something beyond long-range bombardment.

IV

Cairo to Normandy

1. By the time of the Cairo Conference daylight precision bombing was no longer an experiment but a proven capability, the most powerful offensive one then at the disposal of the Anglo-American commanders. For even as it had shaped so it had clarified the outlines of the struggle by which it would survive or perish.

Only two important problems therefore confronted it. As usual, the first of these was the decisive one of survival. As has been noted, bad weather at the end of 1943 terminated its mortal duel with the German fighter force. To win that engagement when it reopened was so imperative that it obscured all other purpose. Hindsight had indeed taught us by then that concentration of purpose and resources was vital.

To further this principle USSTAF was created, placing both the veteran 8th Air Force and the fledgling 15th, now based in striking distance of the Reich, under the same command and the same directive.

Target priorities were re-examined but the scrutiny at the time was academic. At long last everyone understood that until we had mastered the German fighter force there could be no prudent thought of other objective. In this purpose itself, however, there was now involved a stake of even greater significance than the continuance of strategic bombardment.

However the air doctrines of all nations might differ, there was no divergence of view on the facts that aerial supremacy was indispensable to safe shipping, to sea-borne assault or to victorious ground campaigning. The plans for Overlord had already committed the Anglo-American forces to the greatest single experiment with those three-fold functions ever undertaken.

The condition of the German Air Force at the time of Overlord was

correctly foreseen as the most critical single factor upon the success of that operation. For two reasons, then, for survival and for its contribution to Overlord, USSTAF was committed to the destruction of the G.A.F. as a priority which admitted of no other objective until its accomplishment.

I shall not elaborate here the details of USSTAF's success with that accomplishment. By mid March we had bombed almost every known source of German aircraft manufacture, most of them several times. The intensity of our attacks had provoked a rate of attrition unique so far in air warfare. In this fighting our Mustangs, Thunderbolts and Lightnings now had the numbers and range to vindicate their early promises.

American long range fighters were in fact the first American planes over Berlin. Instead of planning to evade, we now designed our missions to provoke the rate of attrition which was wasting the German Air Force to death. In this way we further exploited the unquestioned air supremacy over Europe which unified and concentrated attack had won for us. By April our bombardment had won the entire freedom of the German skies for which it so long had fought.

This freedom placed us belatedly, but firmly, upon the threshold of the dream of strategic precision bombardment. We had reached, in overwhelming strength, the point at which we could apply our full striking power to the enemy without the restriction of serious resistance.

There remained a continuing commitment to police the German Air Force for we had seen enough of its recuperative power to leave a very lasting impression. But apart from this we now had a prodigious tonnage and the hard-won experience of twenty months to apply against whatever forms of the German military and industrial power appeared most vulnerable.

The imminent invasion had, of course, strong claim on much of this tonnage and in support of that necessary preparation our heavies joined with the mediums

and fighter bombers of A.S.A.F. to establish and maintain an almost continuous bombardment of the enemy's supply lines, transport, batteries, ordnance dumps, and, toward the end, concentration points of the resisting forces.

Over and above this, however, the strategic bombardment forces now began to apply their range and precision to what was considered the most vulnerable of all the enemy's war resources. This, of course, was oil, and our major drive upon it was mounted in April.

The oil attacks produced immediately such a flood of indisputable intelligence on their value as to assure their limited continuance with the consent of all concerned. Since that beginning we have had overwhelming proof that oil shortage has actually restricted the operations of every branch of the German armed services. It hastened the complete disintegration of the German bomber force, and caused the withdrawal from operations of whole units of long range reconnaissance and anti-shipping forces. It grounded tactical fighters over the armies on every front rapidly and at critical junctures, and at this moment it is actually curtailing defensive fighter operations within the Reich.

It has caused continuous delay and postponement of the desperate German efforts to reconstruct their submarine service. It caused the abandonment of valuable equipment and the retreat north of German armed forces from Finland to Italy and from Sicily to Normandy. Immobility from oil shortage has caused the capture of tens of thousands of German soldiers.

Throughout this time, you have been informed of these results by unquestionably accurate intelligence, which sometimes even preceded the event. From the very first, we had sound reason to know the effects of our attacks on oil must be cumulative and that our progress toward complete strangulation would be in direct proportion to the effort we concentrated upon it.

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Once before I remarked that, by hindsight, it appeared probable that we might have achieved better result in the period between Casablanca and Cairo by fuller concentration of our strategic effort on fewer target systems than we attempted.

This was said with no wish to blame a brilliant effort at the time but with the simple purpose of looking at our own record to see if we can improve it for the future. It appears from the evidence now that fuller concentration on oil attacks through this span might have tightened even further the stranglehold we now have upon the enemy's oil. This concentration is presently being applied. The experience of all branches of our forces now shows that the stranglehold we have obtained upon German oil is already of major significance in weakening their resistance. The tightening of this stranglehold will constitute a decisive shortening of the war, and it is being prosecuted with all possible energy.

During this period our forces in the Mediterranean continued their development and application of army support work. The strategic precision half of our team in the Fifteenth Air Force was likewise not only a major factor in the reduction of the German Air Force, but settled to the oil program with exemplary fidelity and resourcefulness. Long before the Russian capture of Ploesti they had cut deeply into its usefulness to Germany and had ranged even further into Germany itself to attack vital refineries and synthetic plants there.

It is no depreciation of our other efforts to say flatly that oil attacks was the second greatest contribution that American air effort has made to the war. It was a form of attack for which we had unique capability and ranks second only to the major contribution with which it was so intimately connected. This was, of course, the reduction of the German Air Force to impotence by the time of Overlord.

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2. We have already seen that the German fighter force was refusing combat even two months before D-Day. With its production deeply cut and its units decimated by killing and fatigue it had no other course but to husband its strength against the ominously certain demands of the summer.

On D-Day this fighter force came forward in strength again, moving every one of the eighteen day groups available in Germany up to the front within a week. Their record was pitiful. All winter they had been flying high interception work on every flyable day. Their brief respite in the spring, when they voluntarily withdrew was not enough for normal resting. Neither was it enough to learn close support work during the rest.

These units were decimated within two weeks and withdrew to Germany completely shattered along with the others, which had originally formed their hastily improvised army support fighter force. The division of fighters continued throughout the summer and indeed until the present in two commands with units shuffling back and forth between them in a mad effort to perform the two separate functions of tactical and strategic defense.

Chiefly however the German policy was one of conservation. Even at the cost of permitting virtually unopposed bombing and denying their ground troops the cover that might have saved many of them in the summer's campaign they chose to conserve. It was a last ditch hope that they could drag the force through to the protective weather of the winter. Toward this end they sped up production of fighters in dispersal and this accomplishment ranks as one of the most remarkable of the war.

In every month from April forward they managed to increase their actual production of fighters. And though the summer's wastage held down actual strength for a while, by August their conservation policy was so rigorously applied that they began to increase in numbers. The quality of this force

however was another matter. It remained young, green and inept for either ground support or strategic defense as our crews continued to report.

It produced an anomaly of the war. The German fighter command actually grew in numbers while it declined in fighting value. Time and better crew training were its only hopes for a remedy. Against Overlord as during the remainder of the summer it was virtually useless.

The period marked also the final ruin of the German bomber force. It began curiously enough in a revival of activity which looked somewhat like a renaissance after its long skulking. This took the form of the little blitz on London which continued sporadically through the first four months of this year. The attacks on London had no military effect whatever and the three occasions when they varied them with assault on the shipping ports even less.

Whatever this effort may have done for home morale or crew training its intrinsic effect was worse than useless for it was pursued at a high rate of loss. It will remain one of the mysteries of the war that the Germans did not reserve this force for use against the uniquely rich targets of the impending invasion flotilla. Instead they systematically squandered not only their conventional bomber force but what remained of their torpedo bomber squadrons and their patiently hoarded radio controlled bomb groups.

After the winter's misfortunes these wretched units came to the time of Overlord with less than half of even the very weak effort that had been expected of them. Their effect upon the operations was negligible. The summer and autumn have seen the cannibalization or dissolution of almost every one of these units. Even by a week after Overlord they were capable of little more than a low scale of sporadic sea mining.

The one exception to the decay and ruin of the German Air Force in this period was the twin engined night fighter branch. Its strength and effectiveness rose to have critical counter-effect upon the operations of the R.A.F. with which it will presently be more fully considered. In all its other departments the German Air Force was a hollow facade of front line strength that barely covered acute shortage of planes, crews and fuel at the time of Overlord. The first week's operations shattered it for the remainder of the summer but the victory was not won in that week. It was won in the first three months of the year by American Strategic bombing. Parts of it might survive in hibernation to rise again but it was down when the Germans most needed it and it was down because USSTAF had knocked it down.

3. The R.A.F.'s development throughout this period was marked by a drastic change in policy. Its policy of area bombardment by night was actually reaching its critical test over Berlin while USSTAF was concentrating on the German Air Force. This test remained inconclusive. The continuing build up in strength and effectiveness of the German night fighter force shows how seriously they regarded the menace. Yet it must be recorded that the record tonnages showered upon Berlin produced no decisive result in the war. The damage was indubitable but not mortal.

The cost of inflicting such damage however had begun seriously to imperil the whole program of night bombing. The R.A.F. had always counted on masses of tonnage. To deliver them on a rising scale however had begun to mean accepting an equally rising scale of loss. Whether further effort might have produced capitulation or the ruin of Bomber Command will never be known for the effort was not continued.

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By spring the combination of shortening nights, sobering losses and its tactical commitment to the marshalling yard program withdrew the R.A.F. from anything but occasional and sporadic continuance of their policy of night area bombing against the more remote German cities.

In fact the change marked the substantial end of area bombing as a solitary program. For USSTAF had done its work well. By the time the R.A.F. was through with its marshalling yard program it was evident that the weakness of the German Air Force was such as to permit the gradual emergence of Bomber Command into the daylight.

This in fact happened, gingerly at first but with ever increasing scope as the low loss rate sustained corroborated the essential helplessness of the German fighter force to resist even the weakly armed British bombers. The tendency continues and its development will be considered in the later stages of the report.

4. Our knowledge of the Russian Air Force throughout this time remains scant as to detail but impressive as to result. By last winter even the Germans were frankly acknowledging loss of Air Supremacy on that front. Their continuing retreats from it are a matter of record. All observers are agreed that the Russians have now overwhelming strength in first rate fighter bombers and fighter craft. The total collapse of German offensive capability on that front has left the Russians relatively free from defensive commitments and the progress of their troops through hard campaigns shows how well they have learned to exploit the advantage of the air.

It is curious that they have yet shown no interest in long-range bombardment. Territorial gain, or rather recovery has now brought them back to bases from which they might readily exploit it but there is no sign of its existence as anything like a powerful component of their Air Force.

V

Cherbourg to Aachen

1. The period from Overlord to the present has seen the Army Air Forces support two more sea-borne invasions both accompanied by large-scale air-borne troop landings. In addition they have provided large army support forces for both undertakings, have continued their strategic bombardment and have supported one further extensive airborne landing behind enemy lines.

These operations cannot truly be considered independently for all of our forces were at various times engaged in all of these functions except for the Strategic bombardment which remained exclusively the capability of USSTAF.

The influence of Strategic Bombardment upon all of these undertakings was profound and of long standing. Indeed it was implicit in their first operations. We have noted the complete inadequacy of the German Air Force to oppose any of these operations successfully.

Now it should be said reciprocally that the success of our other air force activities at close support and air landings was due in large measure to the absence of the German Air Force, which USSTAF had driven from the skies. Neither our ground forces nor the overwhelming air strength that closely supported them ever met anything like competent air resistance.

This factor left them substantially free to work out perhaps the best technique of tank-air cooperation ever seen, and its success was a major factor in the advance of our troops. Because strategic air power had done its work well, our other offensive air operations took on a high if not unique efficiency.

2. The German Air Force, through this latter phase from Overlord to Aachen, presents a curious spectacle. There is no effective branch of it left. And yet it contains still by virtue of its conservatism the possibility of a last

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flicker of effectiveness.

This will come, if it does come, from the single engine fighters. It has abundant quantities of these and sufficient crews of low quality. Its most critical problem is fuel and the improvement of these crews which will require fuel to achieve. Yet it must fight to defend fuel and its crews cannot stand the sustained fighting we can force upon them. They may be capable of giving us a few bad days yet, but they are powerless to prevent our bombardment. If properly directed, it can only hasten their final ruin.

The German bomber force also has reached the end of its rope and between the problems of crews and fuel no recovery for it appears possible. It is doubtful if it could now raise two hundred planes in one night. And the crews that could not hit either Bristol or Plymouth last spring are less likely to do so in the future. We may have dying flickers of activity from it, but they will be of negligible military importance.

From its death bed, however, the German Air Force did produce the most portentous military development of the war. The Crossbow flying bomb is still in a stage of development comparable to the flintlock. Only desperate haste to get it into operation, and the limited resources of an overstrained war economy, have prevented Crossbow from becoming a major if not a decisive turning point in this war.

The Overlord landings were, of course, its doom, but with another six months it might have become the factor in this war that it must be in all thought of the future of the air. Even negatively it did much for the Germans. The energy the Germans put into it undoubtedly envisaged an offensive success for it. But though they did not achieve it, the effect of Crossbow as a bomb decoy alone has probably lengthened the war by several months.

The German development of jet and rocket propelled aircraft is not

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39

comparably revolutionary. It does represent a long forward step in natural evolution. Like Crossbow itself it has probably come too late in this war to effect a critical influence, but it is dangerous enough to warrant the most careful policing and vigilance from now to the end.

German twin engine night fighters, which were so long the last formidable element of their air force, have now also entered hopeless decline. Part of it is due to the steady cannibalization that has drawn off their best crews to day fighter work against us. Part of it is due to lost effectiveness from the loss of their forward radar and control stations. But, in the long run, the force has declined mostly because of evolution in the Royal Air Force, which has finally rendered the German night fighters useless.

3. This major evolution of the Royal Air Force is, of course, the emergence of its offensive force, Bomber Command, into daylight. It is an advance that was won for it by daylight strategic bombardment which cleared the skies of Europe. The trend began last spring and has continued steadily ever since. It marked not only a prodigious forward step in the use of Bomber Command's tonnage, but a bright augury for the interrification of our joint strategic bombardment.

This prospect becomes more of a reality daily as the R.A.F. Fighter Command continues its present tendency toward the offensive with the development of its own long range escort. Its defensive commitments are happily and honorably behind it. But during the recent period Fighter Command has had a brief resurgence of defensive usefulness against the Crossbow threat.

Yet in this there is a lesson for all of us to ponder. It is no reflection upon one of the proudest aerial records in aerial history to point out that the Spitfire which saved England, and the war, in 1940 were not equally successful against the challenge of the technological advances of 1944. The portent is

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apparent that the usefulness of conventional fighter types for defense may, in the long perspective, be discovered to have been as brief as it certainly was brilliant.

This matter is even more open to question in the light of what the Crossbow portent and another and newer factor may do toward revolutionizing our future ideas of long range offensive bombardment. We have seen its triumphs in this war and they present a proud chapter in the record of both USSTAF and Bomber Command. Yet we have seen too by what a narrow margin they survived and have seen beyond doubt the vulnerability of the long range bomber by itself to competent defensive technique.

The essential idea of long range strategic bombardment was and will remain a brilliant contribution to the technique of war making. But its instruments and details will change as surely as all weapons change. They have served us well in this war but it would be folly to suppose that their present forms could do so in another war.

We have seen already in Crossbow a hint of what may be the future. And I come now to another development less readily apparent but perhaps even more significant.

It has remained something of an enigma that the Russians, even as they might have begun to afford it, have not developed long range bombardment. They have in general been content to improve their fighter bombers and with them to drive steadily but slowly toward the enemy's frontiers.

We now see that long and patient effort standing almost at the threshold of Germany itself, and standing there with overwhelming air superiority. In both geography and chronology the war has come to the point from which all of this air power may suddenly be turned to strategic purpose. We may yet see the German industry and populace under continuous and swarming attack of the fighter bombers that have driven back the German armies.

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If our reports of their numbers are even partly correct, and if the Russians can concentrate them sensibly upon the critical targets now within their reach, we shall shortly see another logical development of the essential idea of strategic bombardment which is to reach behind the enemy's lines and rob him there of the roots of his war strength.

The astonishing development of our own long range fighters has already indicated the possibilities of this. After all it was only to get at the roots of the enemy's war potential that we and the R.A.F. have conducted our strategic bombardment at such terrible disadvantages of weather, defense and distance.

This war has seen all distance shrink, not only with the advance of the Russian armies, not only with the development of a projectile that is reasonably accurate at two hundred and twenty miles, but also with the development of the Mustang and the jet and rocket planes which will surely supersede it.

We have already seen air power change from an artillerist's accessory to the indispensable factor for an army's success. We have seen it reach behind the enemy's armies and come breathtakingly close, even with the limitations of the present technique, to effecting a decision far from the front. Time, technology and the recovery of geographical position which air power itself made possible, have brought us to the last phase of this war. It is the phase in which all forms of allied air power can now reach over the German armies to strike at the industrial strength and populace that support them. It will be for this war the final fruition of the idea of strategic bombardment which we had to begin at long range. As we watch it happen we shall be looking farther into the future than we think.

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