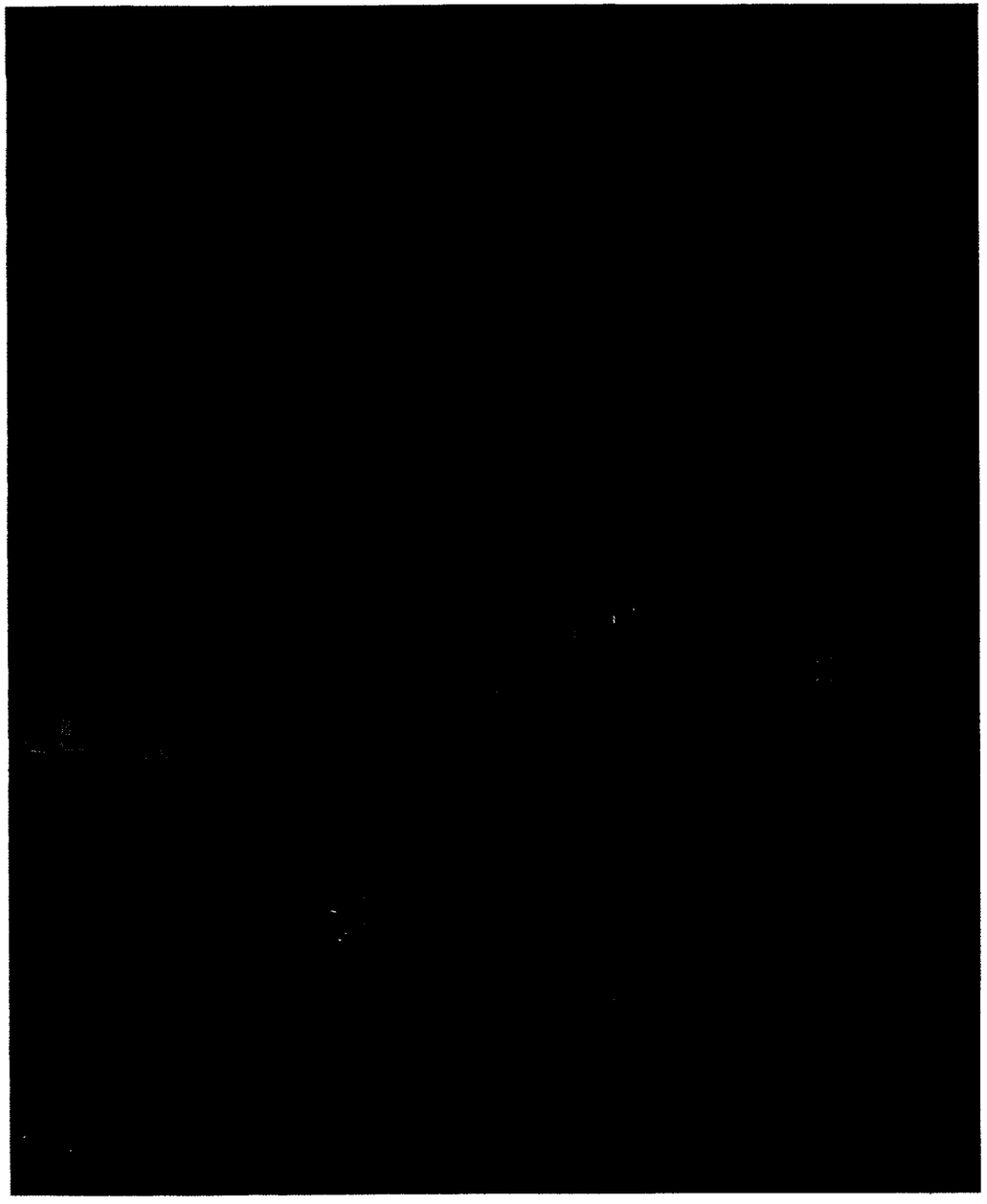

G.R.P.
by Aiden L. Ripley

Leaves from My BOOK OF LIFE

BY
GUIDO R. PERERA

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Contents

tion was almost identical with that suggested after the war by the United States Strategic Bombing Survey. However, AWPD–1 could hardly be classified as a reasonable operational plan in the light of forces available within any reasonable time nor within the operational capacities of such forces.

AWPD–42, prepared in September 1942, in answer to a request for a statement of air requirements to obtain air ascendency, set up a different list of priorities—aircraft assembly and engine plants, submarine building yards, transportation, electric power, oil, aluminum and rubber. The Navy vigoriously opposed the AWPD–42 program as it wished priority for strategic materials to be given to aircraft carriers, naval aircraft and other naval weapons. AWPD–42 was severely criticized by the Joint Intelligence Committee for lack of systematic evaluation of industrial intelligence and unsatisfactory presentation of target information.

The Committee of Operations Analysts

ON THE afternoon of December 3, 1942, General Fairchild made an informal call on Colonel Byron E. Gates, who was then Assistant Chief of Air Staff Management Control. I occupied a desk in his office and was included in the conversation, which was most interesting. After some general discussion, General Fairchild stated that he was disturbed at the preparation and handling of air matters for presentation to the Joint Chiefs of Staff. Such matters were prepared by various sections of the Army Air Forces and he felt that it was inevitable that, under the pressure of daily affairs, officers holding responsible positions at Headquarters Army Air Forces could not find sufficient time to give to the research and analysis necessary to the formulation of plans and a solution of strategic bombardment problems. He also pointed out that this type of activity was one for which a regular Army career did not necessarily prepare an officer. General Fairchild had read my study on the history and organization of the Army Air Forces and also had worked with me on AR 95-5 problems. He also knew that Major Leach had just been attached to Management Control with the function of establishing Operations Analysis Sections in overseas air commands. The conversation turned to analyses in general and Colonel Gates mentioned that both Leach and I could be made available to General Fairchild to render him such assistance as he might desire. At this point, General Fairchild turned around to me and said, "All

right, I have a job for you. How can Germany be so damaged by air attack that an invasion of the Continent may be made possible within the shortest possible period, say one year?" Needless to say, I could hardly take this challenge seriously at first. In the first place, if Fairchild were serious, it meant that, in his capacity as a member of the Joint Chiefs of Staff organization, he was bypassing the Commanding General of the Army Air Forces and all of the Assistant Chiefs of Air Staff. To be sure, he would be able to obtain the authority of the Commanding General, General Arnold, but one can imagine the feelings of such officers as the Assistant Chief of Staff, Intelligence, and the Assistant Chief of Staff, Operations, not to mention the Assistant Chief of Staff, Plans. But Fairchild was not joking and, when I mentioned the matter later to Leach, he was full of fire to do the job on our own.

The exact machinery which might be adopted was not discussed with General Fairchild but was the subject of considerable discussion among Colonel Gates, Leach and me. It was apparent that the work might be undertaken in one of several ways: (a) for the Joint Strategic Survey Committee by a committee, (b) for General Arnold in his capacity as one of the Joint Chiefs of Staff, (c) for General Arnold as Commanding General, Army Air Forces. Some form of committee appeared necessary as, at the very least, we would have to obtain all the necessary basic information from various sources and we did not have sufficient staff to undertake such a task nor to analyze the vast amount of material which would be forthcoming. Moreover, a committee would better forestall outrage on the part of senior Generals who had been bypassed. Leach and I, therefore, prepared a memorandum for Colonel Gates's signature to General Fairchild pointing out that the formation of a committee would imply no criticism of any endeavor or group and that personnel of the Research and Analysis Section of Management Control were available on a loan basis to the Joint Strategic Survey Committee, if desired. But to cap the climax, imagine my surprise when on December 9,

1942, General Fairchild appeared and handed me a document signed by General Arnold and addressed to Colonel Guido R. Perera. The document read as follows:

> You are directed to have the group of Operation Analysts under your jurisdiction prepare and submit to me a report analyzing the rate of progressive deterioration and what should be anticipated in the German war effort as a result of the increased air operations we are prepared to employ against its sustaining sources. This study should result in as accurate an estimate as can be arrived at as to the date when this deterioration will have progressed to a point to permit a successful invasion of western Europe.

After Fairchild had left the room and as soon as I could get hold of Colonel Gates, I showed the paper to him. When he saw it he swore and said, "That can't be addressed to you". Whereupon he took the letter, erased my name and put in his own. I certainly had no objection to this, because channels were being violated outrageously as it was and, furthermore, Colonel Gates indicated that he personally would only participate in the enterprise ex officio and that the actual work would be left entirely to myself and Leach. This was in fact done. Colonel Gates signed all reports as Chairman but I was made Deputy Chairman and, as I outranked Bart and moreover gave my full time to the enterprise, I was de facto the chief permanent military representative.

It was fortunate that Bart Leach was available for it happened that, in the course of setting up an operational research section for the Eighth Air Force, he had selected—as previously pointed out—as its Chief, John Harlan. Harlan was an old acquaintance of Bart's and Bart had had an opportunity to talk at length, not only with him, but with his senior law partner of the New York firm of Root, Clark, Buckner & Ballantine, Elihu Root, Jr., on the general subject of Operations Analysis. Mr. Root, the son of the famous Secretary of of War, Elihu Root, was a director of many large firms including the American Telephone Company, the Carnegie Foundation and various insurance companies and banks. He had been an infantry officer

in World War I (he and Grenville Clark had been among the original sponsors of the Plattsburg Officers Training Camp) but was too old for active service in World War II. Nevertheless, he retained an active interest in military matters.

Bart had also made contact with Lieutenant Colonel Malcolm Moss of Air Intelligence who was in charge of the Target Objectives Section of that office. In the course of his talks with Colonel Moss, Bart learned that Moss had contacted Dr. Edward Mead Earle of the Institute for Advanced Study at Princeton for assistance in selecting prime targets. Dr. Earle was both a student of economics and a military historian. Bart's suggestion was that he go to New York and line them both up. With his usual alacrity, he took off at once and got their agreement to serve on our proposed committee, to give up all other engagements and to be in Washington on December 9th.

At Dr. Earle's suggestion, the first meeting was postponed to December 10th and was enlarged to include Dr. Edward S. Mason, a professor of economics at Harvard who then occupied an important position in the Office of Strategic Services, Fowler Hamilton of the Board of Economic Warfare and Noel Hall of the British Ministry of Economic Warfare. The meeting was duly held on December 10th, there being present General Fairchild, Colonel Gates, Joe Clark, Art Wood, Messrs. Mason, Root, Hall, Earle and Hamilton and Bart and I. General Fairchild addressed the meeting at some length, outlining possible methods of approach and stressing the necessity for thoroughness as well as speed. The original name chosen for the committee was "Advisory Committee on Bombardment".

A subcommittee, the Steering Committee, consisting of Dr. Earle, Mr. Root, Bart and myself, was set up to analyze and classify enemy industries in the order of their relative importance to our task. By December 15th the Steering Committee had progressed sufficiently in its thinking to formulate three categories of priorities:

(a) Those industries which on grounds of indispensability or vulnerability and direct relation to the German capacity to resist invasion, appeared to offer the most promise; that is to say, would bring about the most rapid deterioration of enemy military power.

(b) Those elements in the German military and economic potential which would be seriously affected by attrition over a longer period of time.

(c) Those items in the German economy which, however important in themselves, offered unsatisfactory targets or which could be affected only indirectly by some such method as interference with transportation, electric power, sources of raw material or otherwise.

The Steering Committee also concluded that a broad survey of the German economy should be instituted with a view to obtaining the picture as a whole and uncovering items previously overlooked which might prove critical to the German war effort.

Aircraft, electric power, oil, rubber, transportation, chemicals, electric equipment and submarine operations were tentatively put in category (a). Targets which offered a greater promise for area bombardment than for precision attack were not considered. It was felt, however, that it would be highly desirable to coordinate American and British bombardment practices in order that maximum results might be achieved.

On December 16th the main Committee held its second meeting. At this meeting two new members were present. One was Colonel Edgar P. Sorenson, Assistant Chief of Air Staff A–2, and the other Colonel Thomas G. Lanphier of the Air Unit Military Intelligence Division, War Department General Staff.

The meeting considered a report of a subcommittee on petroleum headed by Fowler Hamilton. This memorandum was of particular interest. It divided the subject into four parts:

1. A section listing and describing all facilities required to produce petroleum products.

2. A section on supplies and requirements, including the elements of capacity, present production and consignment, stocks on hand and requirements with reference to particular needs including the possibilities of decreased use and substitution for the product.

3. A section on the physical vulnerability of the industry to air attack.

4. A section on the effect of enemy military capacities of the destruction of the most important targets together with the estimated time when the maximum effect would be felt.

The Committee approved the approach but voted to eliminate any consideration of the amount and kind of bombs required, it being felt that this problem could be handled more effectively by a Subcommittee on Probabilities and Force Required. Such a subcommittee was set up under the chairmanship of Colonel Edgar P. Sorenson. It included Colonel C. G. Williamson of the Directorate of Bombardment, Lieutenant Colonel C. B. Thornton of Statistical Control, Mr. G. B. Dantzig of Statistical Control, Major Foss and Mr. O. B. Dyer, both of A–2, and Elihu Root. To this Committee there was added, as a result of a conference between Bart and myself and Dr. Vannevar Bush, Director of the Office of Scientific Research and Development, Dr. John E. Burchard of that office, a former professor at Massachusetts Institute of Technology and an expert on explosives.

The field assigned to the Subcommittee on Probabilities and Force Required was particularly controversial and delicate to handle. To begin with, there was no satisfactory body of statistical data with respect to the accuracy of high-level bombing, as planned by the Air Forces, in time of war. Most air officers drew their conclusions from prewar Air Corps experience. This approach had been used in estimating force requirements in AWPD–1 and AWPD–42. But peacetime records established by a few highly trained crews under good weather conditions in the United States were a doubtful measure of bombing accuracy under the pressure of wartime conditions involving antiaircraft fire and fighter opposition as well as the bad weather common to northern Europe. The experience of the Royal Air Force with daylight bombing of Germany had been a dismal failure but American air officers denied its relevancy to the American effort because of differences in training, equipment and tactics. Not unnat-

General Muir S. Fairchild, USAF

urally, the British were skeptical of American analyses of the American air potential. Nor did they lack support within the United States military. The conservative War Department view was that any air effort should be evaluated primarily in terms of its contribution to the ground battle. The Navy, for its part, argued that no air effort could achieve victory independently and that the air campaign advocated by the Army Air Forces would fail because the capabilities of our Air Forces and the vulnerability of the enemy to air attack had been exaggerated, or, at least, could not be proved.

The basic technical questions the Subcommittee had to wrestle with were bombing accuracy and the types and amounts of bombs required to deal with different classifications of targets. Both of these matters had long been studied within the old Air Corps and strong views were prevalent. Elihu Root was quick to perceive the desirability of obtaining dispassionate advice and he was correct in concluding that the best place to obtain it, so far as bomb sizes and fusing were concerned, was the Office of Scientific Research and Development. The assignment by that organization of Dr. Burchard to the Subcommittee was an important step forward. Unfortunately, there was no similar source of assistance with respect to bombing accuracy. In the absence of statistical experience, the most that could be done was to sample the opinions of Air Force officers who had specialized in the bombardment field. While their estimates of the percentage of bombs falling within a given radius of a target, known as the circular error probable, differed, it seemed to Mr. Root, Fowler Hamilton, Bart Leach and me that they were weighted on the side of optimism. Had our task been to deal with national priorities between the allocation of men and materials to the Army, Navy and their air components, we might have insisted on the use of more conservative criteria. But because of the impossibility of obtaining satisfactory evidence of the prospective results of the anticipated American-type high-level daylight bombing and the urgent time schedule we were working under, it seemed to me, at least, that by discounting the weighted

views of the professional bombardment experts by what seemed a conservative factor of 25 to 30%, one might apply a reasonable common denominator to the several target systems being considered in order to rate their relative vulnerability. Furthermore, on this line of reasoning, the discount rate adopted would not be crucial for this particular purpose.

The Subcommittee on Probabilities and Force Required led a stormy and frustrating existence. The majority opinion in the bombardment field was that no change should be made in the calculations of circular error probable or the types and amounts of bombs required from those used in previous Air Corps position papers such as AWPD–1 and AWPD–42. Although I did not attend meetings of the Subcommittee, I was kept abreast of the lack of progress and divergence of views. In the end, as will appear hereafter, this aspect of the study was sharply curtailed because of lack of internal progress and, more especially, because of the violent objections of officers of the Eighth Air Force in England who felt that this area was one in which they had sole expertise.

It became obvious at the outset of the Committee's work that the quality and depth of intelligence available varied greatly between industries. This was perhaps not too surprising as American engineers and businessmen and others had not participated broadly in the construction and operation of German industry. In certain sectors, such as petroleum, the intelligence picture was brighter.

One of the most frustrating aspects of the Committee's problem was to determine supplies on hand, to weigh them against requirements and to estimate the possibilities of decreased use of and substitution for the product. All intelligence available to the Committee was that German war industry was operating at full capacity. If this were so, bottlenecks would be more apt to occur and strains to develop. The Committee was in no position, within its time schedule, to assess independently the accuracy of this general view which, as it turned out upon analysis by the United States Strategic Bombing

Survey, was completely mistaken. Indeed, in view of the course of the Russian campaign and the buildup of British and American military power, Hitler made another of his fatal mistakes in actually cutting back on war production during 1941–1942. Nevertheless, the Committee could only operate on the theory that his actions would be reasonable. To the extent that any doubts existed, they applied more to specific industries than to the general level of industrial activity. It has always been a source of amazement to me that British and American intelligence proved unable to assess this factor accurately. After all, it was of such a pervasive nature that it could hardly have been concealed.

Enemy military requirements were a particularly difficult problem for they clearly depended upon the scale of military action to be anticipated. No immediate invasion of Europe by the British and Americans appeared likely. The principal drain upon German war resources, therefore, was the Soviet Front and, at this time, it was difficult to conclude whether the Germans would be able to renew their blitzkrieg and, if not, whether that front would remain static or not. Our directive, of course, called for attacks on targets which would make possible the earliest invasion of Europe. This necessitated the selection of targets calculated to have an immediate and maximum effect upon front line military strength. It was not a question of devising a plan to reduce or demoralize German economic production generally. Such a plan clearly would have included attacks on electric power and other broadly based industries. This all-important point was unfortunately overlooked by many critics, particularly the professional economists of the United States Strategic Bombing Survey. Another factor overlooked by the same critics was the imperative necessity to concentrate on industries where a significant proportion of targets lay within the operational range of our bombers, as that range was estimated in 1943 at four hundred miles from England, and not as it might have been estimated in 1944 or 1945 when an overwhelming force of bombers and long-range fight-

ers had become available. Attacks on oil, for example, depended primarily on attacks on German synthetic production. Unfortunately, a sizeable portion of this production lay beyond 1943 operational range.

While all this was going on, other Subcommittees were set up as follows:

Aircraft under Colonel Sorenson.
Electric Power under Captain Lowe of A-2.
Transportation under Dr. Ralph M. Watkins of the National Resources planning Board.
Electric Equipment under Mr. Herbert S. Pierce, Vice-President of International General Electric.
Rubber under Lieutenant Colonel Moss.
Chemicals under Fowler Hamilton.
Overall Effects under Mr. Otto Tolischus, foreign correspondent of the *New York Times*.
Coke under Dr. J. Z. Schneider of the Board of Economic Warfare.
Non-ferrous Metals under Lieutenant Colonel Neil W. Rice, ex-President of U.S. Smelting.
Machine Tools under Dr. Eric Oberg, editor of the magazine *Machinery*.

Each of these Subcommittees was to assemble all information available both from government and nongovernment sources as well as to attempt to evaluate it along the lines of the petroleum report previously described—an almost impossible job in the time available. To illustrate the tightness of the schedule, the first interim Subcommittee reports were received as follows: on December 21st, Electric Power and Aircraft; on December 22nd, Rubber and Transportation; on December 23rd, Electrical Equipment, Oil and Chemicals.

General Arnold was insistent that the study upon which the Committee was engaged be completed before the forthcoming Casablanca Conference between President Roosevelt and Prime Minister Churchill. This meeting was scheduled for and, in fact, was held in the middle of January. The scope of the problem, however, was such that it clearly was impossible to submit a final report prior to the

conference. At General Fairchild's suggestion, two separate interim reports were submitted: one on bombardment objectives in Axis Europe and the other on the Western Axis oil industry. The latter recommended destruction of fourteen Bergius Hydrogenation plants, three tetraethyl plants, eleven Fischer Tropsch plants and the Ploesti oil refineries. This program would almost completely destroy the German synthetic fuel industry and it was estimated that, if accomplished, four-fifths of all Western Axis petroleum production, including 75% of aviation gasoline production, would have been accounted for.

The interim report, as well as the final report of the Committee, was drafted by Mr. Root, Bart Leach, Fowler Hamilton and myself. Mr. Root's contribution to the draftsmanship as well as to the development of the entire project was outstanding. I recall his prophetic statement that it was impossible to determine in advance what man's ingenuity might accomplish when faced with desperate necessity. We could never conjure up all of the methods the enemy would devise to repair the damage inflicted on his vital targets, to substitute other products for those being produced there or even to manage to get along without such products. Elihu Root, Jr., was a very modest man but his modesty was in no sense affected; it was securely based on a thorough and penetrating intellect and a flawless character.

The interim report contained the following cogent comments:

Some things are already beginning to emerge clearly.

It is clear that it is better to cause a high degree of destruction in a few really essential industries or services than to cause a small degree of destruction in many industries.

It is clear that results accumulate and that a master plan, once adopted, should be adhered to with relentless determination.

It is clear that our day operation and the night operations of the Royal Air Force should be correlated so that both may be applied to the same targets, each at a point where it is most effective.

It is already clear that, with the forces available during 1943 concentrated

on the right targets, very grave injury can be done to the Western Axis economic system.

There are substantial grounds for hope that the study now in hand, if pressed further, may indicate that this injury will critically impair the military strength of the Western Axis.

On December 30th, reports were received from the Subcommittees on rubber, aircraft, chemicals and electrical equipment, and on December 31st, from the Subcommittees on electric power, nonferrous metals, machine tools and probabilities.

The report on machine tools was of particular interest to me. On December 20, 1942, I had met Mr. Sexton Wolmar at an informal gathering at the home of his father-in-law, the Swedish Ambassador, Mr. Bostrom, a friend of Dr. and Mrs. Phillips. The conversation ranged over various subjects until Mr. Wolmar suddenly said to me, "I see you are now in the Air Corps. Why doesn't the Air Corps knock out the ball bearing plants at Schweinfurt? Germany could not get along without them." Although I made a point of evincing no great interest, this remark appeared particularly significant because Mr. Wolmar was then Vice-President of the SKF Company, an important producer of ball bearings in the United States. The President of SKF and a close friend of Mr. Wolmar's was Mr. William Batt, then Chairman of the War Production Board. Mr. Batt was in accord with Mr. Wolmar's views and I suggested to Mr. Oberg that antifriction bearings be given careful study. Oberg found this a logical suggestion, adding that he himself felt they might prove particularly important—as in fact they did.

After the transmission of the Committee's interim report and its report on the oil industry, questions arose, both within the Committee and outside, particularly in Air Intelligence, as to the extent of General Arnold's acquaintance with the progress of the Committee's work. Mr. Root was of the opinion that the nature of the project required that General Arnold constantly be kept informed and he undertook to obtain an interview with General Arnold at which the

matter was thoroughly discussed. Mr. Root suggested to General Arnold that it might be advisable for him to obtain the services of some outstanding industrialist as a "senior economic advisor". Various names were discussed, more particularly Mr. Walter Gifford, President of the American Telephone and Telegraph Company, Mr. George L. Harrison, President of the Federal Reserve Bank of New York and Mr. Thomas W. Lamont of J. P. Morgan and Company. All three were men of outstanding ability and close friends of Mr. Root's. Finally, General Arnold telephoned to Mr. Lamont in New York and asked him to come to Washington for a conference. Mr. Lamont arrived in Washington the very next day, January 7, 1943, and after conferring first with General Arnold and then with Mr. Root and myself agreed to serve on a full-time basis. The necessary papers for his appointment as a special consultant were prepared and executed and Mr. Lamont moved to Washington on a permanent basis on January 12th where he occupied one of three desks in one small room—the other two desks being occupied respectively by Mr. Root and myself. Mr. Lamont proved of invaluable assistance to the Committee for he brought to it a wide knowledge of industry, both in the United States and Europe, together with a source of personal contact with leaders of industry and banking. In addition, he contributed a high degree of perspicacity and balanced judgment to the analysis of problems for which no precedent existed.

When he first arrived, Mr. Lamont suggested to Mr. Root that it might be desirable for him to call on the Secretary of War, Henry L. Stimson, whom both he and Root had known closely for many years. Mr. Root felt, however, that, as Mr. Lamont was working "in the back room" for General Arnold, it was unnecessary for him to pay a formal courtesy call on the Secretary of War. Subsequent events, however, proved that Mr. Lamont's original intuition was correct. When the question arose as to which members of the Committee should go to England to compare their material with that of the Eighth Air Force and the British, Mr. Lamont was selected to-

gether with Mr. Root, Bart Leach, Fowler Hamilton and myself. As luck would have it, on the morning of January 20, 1943, while this question was under discussion, Mr. Lamont was wandering down the hall near the Pentagon river entrance when he ran into Mr. Stimson. Mr. Stimson said, "Tom, what the devil are you doing here?" and when Lamont explained to him what it was, Mr. Stimson's famous temper rose. He said with some irritation, "Bob Lovett never told me you were here". Apparently Mr. Stimson's temper kept on rising as he walked up to his office and, once arrived there, he summoned in Mr. Lovett. The upshot was that thunderbolts began to fly. Mr. Lamont was informed that the Secretary believed it unnecessary for him to undertake any overseas travel and that it would be best for all future contacts with the Committee to be confined to New York City. Mr. Root was informed by Mr. Lovett that because he, Mr. Root, was a Director of Pan American Airways, he should not proceed to England because he might become involved in matters of postwar aviation policy. This was obviously absurd under the circumstances, but the point was stressed nevertheless. General Arnold being abroad at the time, representations were made to General Stratemeyer, Chief of the Air Staff, and both Mr. Root and Mr. Lamont were denied permission to accompany us to England.

Mr. Lamont returned to New York and arranged to give an excellent dinner to Leach, Hamilton and me at the Links Club the night before we flew over to England. Imagine our surprise six days after we arrived when Mr. Root appeared! A gentle person by instinct, Mr. Root was a fighter when aroused and, in this case, he was aroused. Reversing all War Department procedures, he went directly to the Secretary of War and demanded an audience. Mr. Stimson was in a very bad temper but so was Mr. Root, who told Mr. Stimson he did not know what was going on and he had better wait until he had all the facts before he made any further decisions. Mr. Stimson called in Mr. Lovett and a long discussion was held on the status of target analysis to date. Mr. Lovett at first suggested that this

subject was adequately covered by AWPD–1942. Mr. Root jumped on this with both feet, pointing out why it did not meet the issues now being raised. The upshot was that Mr. Stimson reversed his previous decision and Mr. Root was given high-precedence transportation to London. This decision was incorporated in two documents—a letter from the Secretary of War to Mr. Lovett and a memorandum to General Stratemeyer from Mr. Lovett.

As a matter of last-minute adjustments, Dr. Earle was dropped from the roster of those going to London. Dr. Earle was displeased because he was the only member of the Steering Committee left behind and subsequent relations with him were somewhat impaired although he did continue to participate in the Committee's work. Dr. Earle wrote a letter to Mr. Winfield Riefler, head of the Economic Warfare Division of the American Embassy and a former colleague of his at Princeton, informing him of our activities, which did not notably assist our relations with that organization.

TRIP TO LONDON

FOWLER HAMILTON, BART AND I left from New York by American Export Air Lines on the morning of January 22, 1943, arriving in Bermuda that afternoon. The next morning at 10 A.M., we left Bermuda and flew through bad weather, including rain, fog and cold, to Foynes in Ireland where we arrived at 7 A.M. on January 24th. The weather was so poor at Foynes that we could not continue our flight for two days. While thus immobilized we were put up at a most attractive village, Adair, in a very pleasant local inn known as the Adair Arms. The village of Adair lies on both sides of a small salmon river. On the west bank of the river is an impressive ruin of an old castle. I had never been to Ireland before and found the country charming. We bicycled for some distance through the farmland surrounding the village. Most of the roads were enclosed by thorn hedges but we

could get frequent views of the fields and cottages beyond. The second evening at the Adair Arms turned out to be quite an event for there had arrived during the day a group of Free French who were on their way from Africa to London. Among them was one of the great French "diseuses" who was travelling with her brother. It happened that Leach was in a somewhat festive mood and, when the French party came down to dinner, he was singing some of his inimitable compositions and accompanying himself on the piano. One thing led to another and we finally had the French lady singing her repertoire with accompaniments by myself and such Frenchmen as could get to the piano. Fortunately it turned out in the course of the evening that the Adair Arms had a reserve stock of champagne, and this reserve was somewhat dented before morning.

The next morning, conditions had improved to a point where our seaplane could take off again and so we proceeded to our destination, which was the city of Poole on the southern coast of England. Poole is only some thirty to forty miles as the crow flies from Southhampton and the crow that day turned out to be the *Luftwaffe*, which chose to attack the Southampton area, including Poole itself. Fortunately, our pilot was advised of this by radio and we were able to circle at a safe distance until the raid was over. Once at Poole, we took the train to London and proceeded immediately to our quarters which turned out to be the highest VIP accommodations, to wit, a regal suite at Claridge's Hotel.

We had hardly had an opportunity to set down our things when the telephone rang and John Harlan was announced. Harlan had made the effort to see us as soon as possible to warn us that we were in for a rocky reception at the headquarters of the Eighth Air Force. An amusing sidelight was that, before anything of importance was said, Harlan and Hamilton checked the walls behind all pictures and then unhooked the telephone and tapped it to insure that any listening devices would be put out of order. Harlan dined with us and our conversation continued for some time thereafter. While he was most

diplomatic, there seemed to be no question but that our appearance in England was resented by local American intelligence agencies and probably by the British as well. This situation was not entirely unexpected by us.

The organization of military and strategic intelligence in the United States Government prior to World War II was highly decentralized and its capabilities varied from excellent, as in the case of code breaking, to questionable, as in the case of the collection and evaluation of information affecting strategic bombardment objectives. Each intelligence unit operated in competition with every other and jealousy and empire building were not unknown. The principal intelligence activities of the government with which we had to deal during the war were Air Intelligence, Military Intelligence, Naval Intelligence, the Office of Strategic Services and the Board of Economic Warfare. The latter two agencies were only set up after World War II broke out. The Military Intelligence services were enormously enlarged during the course of the war. The new personnel consisted largely of business and professional men, many of good potential, but the quality of their superiors was uneven. This was much less the case with respect to combat intelligence than with respect to strategic intelligence.

When General Spaatz went to England in the summer of 1942 to become senior American air officer in the European Theatre of Operations, an informal agreement was reached between A–2 in Washington and the Intelligence Section of the Eighth Air Force and the British under the terms of which the preparation of basic Western Axis industrial studies and target information folders were made the province of the Eighth Air Force and the British while Far East intelligence was left to A–2. The principals in this arrangement were Colonel Malcolm M. Moss, then Chief of the Target Information section of A–2, and Colonel Henry R. Berliner, an old Washington friend of General Spaatz who became head of the Eighth Air Force Intelligence, and Colonel R. D. Hughes of the Plans Section of the Eighth Air Force. This arrangement was partly due to the fact that

the British were known to have considerable material on strategic bombardment in London and perhaps partly because the quality of A–2's work was not impeccable.

In addition to the work done by A–2, studies of the Axis industrial objectives had been made by the Military Intelligence Division of the War Department General Staff, by the Research and Analysis Section of the Office of Strategic Services under the particular direction of Dr. Edward S. Mason and by the Enemy Branch of the Board of Economic Warfare under Fowler Hamilton. Each of these organizations had exchanged information with the Ministry of Economic Warfare in the United Kingdom.

Dr. Mason had been a professor of economics at Harvard. I surmise that he became disenchanted with the quality of strategic intelligence which he encountered in Washington for he recruited a group of bright young academicians to work for OSS. An arrangement was made with the Eighth Air Force for Dr. Winfield Riefler of the Office of Strategic Services to set up, under the American Embassy in London, an organization known as the Enemy Objectives Unit, staffed by members of the Office of Strategic Services and the Board of Economic Warfare. The chief of this organization in early 1943 was Mr. Chandler Morse and it included Messrs. Charles Kindelberger and Walter Rostow, two fine intellects.

We made an early call on Mr. Riefler. The tenor of his conversation was that the work of the Committee should be handled in London and that everything it was undertaking already had been accomplished successfully in London. He added that Colonel Berliner held similar views.

We were informed by Eighth Air Force sources that Colonel Sorenson had written to General Kuter, the Assistant Chief of Staff, Plans, in Washington, outlining his concept of the scope of the Committee's activities with particular reference to the Subcommittee on Probabilities and that this letter had found its way to Major General Ira C. Eaker in London. General Eaker's reaction, and that of Colonels Berliner and Hughes, was that the Committee was not only a

nuisance but probably a dangerous one. I can readily understand this initial reaction. The Committee's directive inevitably required it to intrude into activities, responsibility for which had been assigned to others, primarily Air Force Staff officers and, to a somewhat lesser extent, Eighth Air Force commanders. Furthermore, the Committee included many civilians then unknown to the Eighth Air Force Command which readily might have led to a hasty conclusion that the whole operation was amateurish.

It was fortunate that Fowler Hamilton was with us. He was wholeheartedly in favor of the Committee's operations and had become a close and intimate associate of Mr. Root, Bart Leach and myself. Fowler Hamilton had an outstandingly clear mind and a superb sense of politics. He came from St. Louis, had studied at Oxford, had become a lawyer and had joined the Antitrust Division of the Department of Justice. There, as he told me while we were flying across the Atlantic, he concentrated upon proceedings against the so-called "glass trust." Among its principal members were the Emhart Manufacturing Company and the Corning Glass Works. He painted such a fascinating picture of the potentials of the latter that I made up my mind to buy stock in Corning, then unlisted, and this has proved a rewarding investment. Fowler was the model of a perfect diplomat. Had it not been for him, our relations with the civilian segment of the intelligence world would have been difficult, if not impossible. But beyond this, Fowler contributed immeasurably to the final success of the Committee's work by his penetrating analysis of problems and good sense and judgment in conceiving solutions. After the war, he became one of the most prominent corporation lawyers in the city of New York. One of Fowler's friends, George W. Ball, did yeomen's work with the Committee and subsequently with the Strategic Bombing Survey. George had a keen mind and an adventurous and independent spirit which stood him in good stead in his brilliant postwar career of lawyer, Under Secretary of State and partner of the private banking firm of Lehman Brothers.

The next morning, January 27th, Bart Leach, Fowler Hamilton

and I proceeded to the headquarters of the Eighth Air Force to report to General Eaker. Upon our arrival, we met my old acquaintance Lucius P. Ordway, then a Colonel and Assistant Chief of Staff, A–2, who informed us that our reception would be decidedly cool. As the spokesman for the party, I must admit that I was decidedly nervous when we entered General Eaker's office. However, we found General Eaker outwardly very courteous. After asking us to seat ourselves, he stated that he had heard about the Committee from Washington and that he would like to inquire in some detail as to the nature of its work. Knowing how the ground lay, I explained at great length how the Committee was organized and what it had done to date, pointing out that its conclusions were still tentative and that the purpose of our mission was not to tell General Eaker and the British what to do, but to check economic data against sources in the United Kingdom and to obtain the views of responsible officers of the Eighth Air Force as to the general feasibility of the program and the probabilities and trends affecting its performance. General Eaker replied that such advance notice as he had had of the Committee's activities had given him misgivings but that "now that I see your attitude, I will only be too glad to cooperate in every way". He went on to say that he would make all Eighth Air Force material available to us and would also make arrangements for additional material needed to be obtained from British sources. We left the interview elated for, although we knew that there were other dragons to conquer, we felt that we could take them on successfully.

On January 28th, the three of us met with Colonel Berliner and Colonel Hughes to compare notes. Neither, I may add, was as affable as General Eaker had been. The petroleum industry was selected as the point of departure and it was concluded that the Committee's information was accurate so far as the Eighth Air Force was concerned and that its selection of targets could be supported. In the case of the aircraft industry, it appeared that the British Air Ministry had more recent and detailed information than had been available to the

Committee. Colonels Berliner and Hughes reluctantly agreed to introduce us to the Air Ministry stating they doubted that we could be certain of obtaining its full cooperation. Colonel Berliner favored attacks on aircraft assembly plants rather than on aircraft engine plants because of their quicker effect. In the case of the machine tool industry, ball bearings were viewed favorably as a target. No work had been done in England on the abrasives industry.

We wished to compare all of our material with British officials. Colonels Berliner and Hughes, however, argued strongly against our having any direct meetings with British officials on three grounds: first, that it might raise serious problems of security; second, that the British had been bothered too much already; and third, that the proper function of the Committee was not to ask questions but merely to submit all relevant data in its possession. After lengthy discussion, it was finally agreed that we would reduce our questions to the British to writing, that they would be submitted by Colonel Berliner to the British authorities and that arrangements would be worked out for us to meet British officials, in the company, however, of either Colonel Berliner or Colonel Hughes.

Our next move was to compare our material with that of the Enemy Objectives Unit of the Office of Strategic Services. This involved an interview with Mr. Morse in the presence of Colonel Berliner. It appeared that their material was not completely organized but that several studies on specific industries had been made. Mr. Morse did not appear desirous of furnishing us with any of his material. We, on our part, nevertheless requested him to review and criticize our studies and to assist in the preparation of written questions to appropriate British sources. When prepared, these were forwarded by Colonel Berliner, in part to the Air Ministry and in part to the Ministry of Economic Warfare, then under the direction of Colonel G. C. Vickers. We insisted on a personal interview with the British officials, who prepared answers. These turned out to be Squadron Leader Allom at the Air Ministry and Colonel Vickers and Mr.

Lawrence of the Ministry of Economic Warfare, all of whom were ready to talk at length to us without any limitations whatsoever, quite contrary to what Colonels Berliner and Hughes had told us.

As our work progressed, it became evident that one of the principal sources of friction between the Committee and the Eighth Air Force was the work of the Subcommittee on Probabilities. This Subcommittee, under the direction of Colonel Sorenson, was attempting to arrive at a solution to operational problems such as bombing accuracy and types of bombs to be used, which officials in England felt that they alone were qualified to answer. We explained that, in our opinion, the work of the Subcommittee on Probabilities did not necessarily form a cornerstone to our studies. Any standard of force required, arrived at however inaccurately, could be applied to each separate industry to determine the force required to destroy it relative to the force required to destroy any other industry. Admittedly, to water down the work of the Subcommittee on Probabilities would make it difficult to reply directly to the question contained in General Arnold's directive but, in the absence of data obtained from experience—of which, at this early stage in the operations of the Eighth Air Force, there was not enough to rely upon—we could still answer General Arnold's question on the basis of a meeting of the minds between ourselves and officers of the Eighth Air Force on the general parameters of force required.

As the days went by, constant association maintained with the Eighth Air Force and the Enemy Objectives Unit resulted in a considerable clearing of the atmosphere. At every opportunity, we stressed that we wanted to submit a report that would be helpful and useful to the Eighth Air Force and that we did not think that the Committee should undertake in its report to deal in detail with operational factors peculiarly within the province of the Eighth Air Force or to set up a rigid system of target selections which would "get all around Washington". Our meetings were conducted in an atmosphere of gradually increasing cordiality as it became apparent that

the target pattern which had emerged from the Committee's studies was based on sound reasoning from the available intelligence.

Bart Leach and I conferred with General Eaker again on February 1st and on February 4th, with particular emphasis on operational matters. At the February 4th meeting, General Eaker brought in Brigadier General Longfellow, commanding the Eighth Bomber Command, who discussed operational factors at great length based on experience to date in the European Theatre. His conclusion was that, for some time to come, the maximum range of the Eighth Air Force Bomber Command would be within a radius of four hundred miles from England and that the nature and type of targets which we envisaged would require a force of not less than three hundred bombers per mission.

On February 4th Mr. Root arrived in London still smarting at the delay occasioned by his battle with Mr. Stimson. I arranged for him to have a long interview with General Eaker at the first possible opportunity and this was supplemented by a conference with Air Marshal Harris, commander of the British Bomber Command. Although Air Marshal Harris was known as a proponent of area attack, he admitted to Mr. Root that precision bombing could have important complementary effects. One of the more amusing situations was the series of conferences between our group and Mr. Vickers of the Ministry of Economic Warfare. Mr. Vickers and Mr. Root were perfect examples of the best of the British and American Bars. Mr. Vickers had been senior partner of Slaughter and May, one of the best-known firms of solicitors in London. He appeared as meek as a mouse but he had won the Victoria Cross in World War I. Despite his derby hat, folded umbrella and retiring manner, he was a stalwart citizen within. Conversation between Messrs. Vickers and Root consisted of hems, haws and silences broken by pungent comments.

There was one subject upon which there appeared to be significant differences of opinion between the British, the London office of the Office of Strategic Services and ourselves—the abrasives industry.

In our meetings with Chandler Morse of the Enemy Objectives Unit in London he gave no hint that his unit had made any study of this subject. Neither, apparently had the Ministry of Economic Warfare. Curiously enough, however, during one meeting with Morse he produced a document signed by one Isaiah Frank of the Office of Strategic Services in Washington which derogated abrasives as a target system. This document, which was in the form of an interoffice memorandum, had been forwarded to the Enemy Objectives Unit in London without our knowledge. Quite obviously, whoever forwarded it did so to embarrass us. We were not able to answer the memorandum's allegations without further study and hence this industry was downgraded for the time being.

Bart Leach, Fowler Hamilton and I left London on February 8th under orders giving us access to the most rapid air transportation available. This turned out to be the Pan American Airways Clipper flight to New York via Spain, Africa and South America. Our fellow passengers were few but one of them turned out to be a lot of fun. He was Group Captain Knox-Knight, an Australian veteran of the Battle of Britain.

We flew at night to Lisbon in order to avoid German fighter planes over the Bay of Biscay and spent one day there and one night at the famous resort town of Cintra. I liked Lisbon and wished we could have seen more of it. Our next stop was of a different nature—a small lake in the middle of the Liberian bush. The natives of this area presumably never had seen an airplane before World War II although they no longer seemed curious about them. They still lived in the same conditions as their ancestors two thousand years ago. We spent a portion of the day walking along a trail through elephant grass higher than our heads to visit the nearest native village, which turned out to be a series of round huts along a central pathway. The inhabitants had acclimated themselves to tourist traffic and clustered around trying to sell objects, allegedly of gold, which they claimed to have made. Bart bought one but I could find nothing that was

particularly interesting other than a spider web with a spider on it which, after some consideration, I passed over.

That same evening, we took off again, flew across the South Atlantic Ocean where we made a landfall on the east coast of Brazil and landed at Recife. After refueling, we followed the coastline of the hump of Brazil to the town of Belém in the mouth of the Amazon River. By this time, we had become quite intimate with Knox-Knight, who was full of Australian songs and stories and it was decided that we would celebrate our successful transit of the South Atlantic at Belém. Belém is an interesting city. In its heyday, which was during the period when the world looked to Brazil for rubber, and that meant natural rubber rather than the present artificial rubber, Belém was one of the great cities of the world. Its streets were reminiscent of Paris and the Opera House was particularly impressive. I was told that the Paris Opera then appeared in Belém rather than New York. Since that time, however, Belém has fallen upon evil days and, as of 1943, it was famous for its houses of ill repute and little else. We had dinner at the best hotel and then set out to see the town, which involved having our group picture taken and visiting en masse some of the principal places of entertainment without, however, participating in the festivities offered. As Hamilton said of the picture when he looked at it next morning "I hope the F.B.I. never sees me in this company". Incidentally, imagine my surprise to see in a jewelry store a spider web in gold identical to the one I saw in Liberia! This time I went in, found the price less than in Liberia, and bought it! Knox-Knight did himself proud that evening and now that he has retired as Commander of the Australian Air Force, I can testify to the fact that he had a lordly hangover the next morning.

We took off early the next morning and crossed the equator shortly thereafter. My recollection is that Knox-Knight recovered after the equator ceremonies had been completed. Our trip that day took us across Brazil, the Guianas and Venezuela to Trinidad. After refueling at Trinidad we took off for Bermuda. I had never been to

Bermuda prior to the war but had enjoyed my very short stay on the way over to London so I looked forward to this stop. We were put up at one of the good hotels. The next morning we started out for New York but, when we were approaching Long Island, a radio message was received to the effect that the landing area at LaGuardia Field had iced up and that we would have to return to Bermuda. This was annoying from the point of view of our mission but we managed to assuage our sorrows once back at the hotel. The next day we were told that there was no chance of getting to New York so Leach and I rented a bicycle built for two and spent the day pedalling around the island. This was not only much needed exercise and fun but a perfect way to see the beauties of the island. The following morning, we again boarded our trusty airplane and this time we made New York!

THE COMMITTEE'S REPORT

ONCE RETURNED to Washington, we plunged back into the work of the Committee. Mr. Root returned within a few days and added his weight to our views. There were no significant differences of opinion within the Committee as to the proper priorities of the several industrial target systems which we had studied but there was considerable controversy as to the manner in which the report should be oriented. Those of us who had made the trip to London argued for the submission of a report which would (a) leave out all references to the work of the Subcommittee on Probabilities; (b) would not openly rate target systems by order of priority; (c) would give the greatest latitude to the operating authorities in England. This viewpoint was finally adopted and a drafting committee consisting of Bart Leach, Fowler Hamilton and myself, together with Messrs. Root and Lamont, was appointed. Mr. Root, incidentally, took a leading part in this effort. The report concluded that the

destruction of sixty selected targets through attacks of the weight of five hundred bombers would have grave effects within eight months and that, if the force available were a thousand bombers, the result might be crippling.

The report read in part as follows:

The Committee is not attempting in this report to rate in the order of preference the bombardment targets discussed in this report. The officers of the 8th Air Force, the Economic Warfare Division of the American Embassy and the British Ministry of Economic Warfare all expressed the feeling that it is inadvisable, for reasons of security, to make a formal written priority report.

The Committee, from the beginning has felt that close correlation between the British target selection was of primary importance. A good deal of latitude has to be allowed the forces in the field with respect to operational matters such as weather, diversion of enemy attention and concealment of bombing designs. The 8th Air Force is now aware of and agrees with the Committee's conclusions as to general principles of selection, the effect o concentrated attack and the elements to be considered in target selection. It is recommended, therefore, that the current selection of particular targets be left to the responsible authorities in England, subject only to such directions as may be called for by broad strategic considerations.

The Committee recommends that there should be continuing evaluation of the effectiveness of air attack on enemy industrial and economic objectives in all theatres for the information of all authorities charged with the allocation of air strength.

The Committee has arrived at certain conclusions with regard to target selection. To a high degree, results are cumulative and a plan once adopted must be adhered to with relentless determination.

In the determination of target priorities there should be considered (a) the indispensability of a product to the enemy war economy, (b) the enemy position as to current production, capacity for production and stocks on hand, (c) the possibilities of substitution for the product, (d) the number, distribution and vulnerability of vital installations, (e) the recuperative possibilities of the industry, (f) the time lag between the destruction of installations and the desired effect on the enemy effort.

In your directive of December 9, 1942 you enquired as to the date upon

which the sustaining source of Western Axis material strength might be so reduced through aerial bombardment as to permit invasion of the Continent. The Committee is unable to give a precise answer to this question. We cannot yet make a reliable forecast of the forces available because of doubt as to the permanence of present allocations. Destruction and neutralization of 60 targets would greatly impair and might paralyze the Western Axis war effort. Only the most vital considerations should be permitted to divert the allocation of adequate air striking force to this task.

The list of sixty targets was taken out of the report at General Fairchild's suggestion but Colonel Sorenson insisted that General Arnold give the Committee formal permission to do so and this was done on March 25, 1943. The name adopted by the Committee was "Committee of Operations Analysts". Although no formal list of target priorities was submitted, the arrangement of the document plus oral statements made by the Committee to General Arnold indicated that priorities by industry were as follows:

1. Fighter Assembly Plants
2. Ball Bearings
3. Petroleum
4. Abrasives
5. Munitions
6. Metals
7. Rubber
8. Submarine Construction
9. Military Transport Vehicles
10. Electric Power
11. Electrical Equipment
12. Optics
13. Chemicals
14. Food – Nitrogen

When the report was submitted to General Arnold, he turned it over to his Advisory Council, consisting of Colonels C. P. Cabell and Jacob Smart, who reported favorably. On March 25, 1943, General Arnold received Colonel Gates, Messrs. Root and Lamont, Bart Leach, and myself. There were also present General Stratemeyer, Chief of Air Staff, and Colonels Cabell and Smart. General Arnold stated that he was highly pleased with the report and was directing Colonel Cabell to take it to England for implementation. He then read a directive dated March 23, 1943, addressed to the Committee ordering it to furnish similar reports (a) as to Italy alone and (b) as to Japan.

Colonel Cabell left on March 26th for London. A Committee was formed in England to review our report consisting of Generals Hansell and Frederick Anderson of the Eighth Air Force and representatives of the Royal Air Force, the Air Ministry and the Ministry of Economic Warfare. This group formulated a plan based on our report except that it left out abrasives and added submarines. The reviewing committee said of our report:

The report of the Committee of Operations Analysts is eminently sound. It is a magnificent piece of work. A careful review of it indicates that its conclusions coincide with the facts available to us and with all information available to the Royal Air Force and the Air Ministry which was freely placed at our disposal.

Air Chief Marshal Sir Charles Portal, the highest ranking officer in the Royal Air Force, wrote General Arnold as follows:

The Plan . . . is based on our combined resources in the matter of intelligence and operational data including the very valuable report of your Operations Analysts.

General Eaker flew to Washington and presented the plan to the Chief of Staff and to the Combined Chiefs of Staff who approved it on May 18, 1943. The plan known as "The Combined Bomber Offensive" thus became the authoritative fulfillment of the mission of air power as defined at the Casablanca Conference, to wit,

To conduct a Joint U.S.–British air offensive to accomplish the progressive destruction and dislocation of the German industrial and economic systems and the weakening of the morale of the German people to a point where their capacity for armed resistance is fatally reduced.

The report of the Committee of Operations Analysts was signed by the following:

Edward Mead Earle, Special Consultant, USAAF
Fowler Hamilton, Board of Economic Warfare
Thomas W. Lamont, Special Consultant, USAAF
Edward S. Mason, Office of Strategic Services

Elihu Root, Jr., Special Consultant, USAAF
Colonel Edgar P. Sorenson, Assistant Chief Air Staff
Intelligence A–2 Hq. A.A.F.
Lieutenant Colonel Malcolm W. Moss of A–2
Lieutenant Colonel Thomas G. Lanphier of G–2
Lieutenant Colonel W. Barton Leach, USAAF
Colonel Guido R. Perera, USAAF

and was marked "approved" by Colonel Byron E. Gates, Assistant Chief, Air Staff, Management Control.

In 1970, twenty-nine years after the report was delivered to General Arnold, Albert Speer, German Minister of Armaments and War Production did the Committee of Operations Analysts the honor of quoting from our report (which he mistakenly attributed to the "American Economic Warfare Division") as setting forth the correct principles for the bombing of Germany. This will be discussed in more detail hereafter. He also paid an unconscious tribute to General Fairchild's action in setting up the Committee when he stated that, on April 11, 1943, he suggested to Hitler that a group of experts be set up to select prime targets in Allied territory—particularly in the Soviet Union. Apparently Hitler replied that the Chief of Staff of the *Luftwaffe* was not interested in taking advice from industrialists! Nevertheless, Speer set up such a committee and it recommended the destruction of certain large power plants in the Soviet Union. The electric power system in the Soviet Union, incidentally, differed substantially, according to Speer, from that in most European countries including Germany. Moreover, Speer doubted that the attack, if made, would decisively affect the war. Luckily for the Allied cause, the aircraft collected for the attack were diverted to the bombing of Soviet railroads with little apparent effect.

It normally would be assumed that all of those signing the report of the Committee of Operations Analysts concurred in its conclusions and recommendations. However, this was not quite accurate with respect to the Air Intelligence members. Unfortunately, the

creation of the Committee was taken by Air Intelligence as a snub and the toning down of the activities of the Committee on Probabilities and Force Required was bitterly resented by Colonel Sorenson. In all fairness to Colonel Sorenson, it must have been most disturbing to have a sort of super reviewing authority set up within the Army Air Forces, but this was of no consequence to either General Fairchild or General Arnold. The burden of ill feeling, therefore, fell upon Bart Leach and me inasmuch as we were junior officers on the Air Force Staff. Since Bart was also wearing a separate hat as head of the Operational Research Section, and since I was solely immersed in the Committee's work at this time and was the only officer continuously on duty with it, the wrath of the Gods fell upon my shoulders. I became aware of this in various indirect ways but did not appreciate the depth of the feeling until Colonel Sorenson was relieved of his post as Assistant Chief of Air Staff A–2 and was succeeded by Major General Clayton W. Bissell, who had just returned from posts in India and the Far East. My chief protector and ally at Air Force Headquarters was Major General Kuter, then serving as Assistant Chief of Air Staff, Plans. Had it not been for him, I expect that my chances of being shipped to Tierra del Fuego would have been better than even. When General Bissell took over A–2, I went to call on him, at General Kuter's suggestion, in order to acquaint him with the work of the Committee, to request continued A–2 participation and to ask him to serve individually as a member. General Bissell received me coldly, listened to what I had to say and then said: "I have quite a file on you here in my desk and I want you to understand that I don't want any nonsense in the future". While this was hardly encouraging, he wound up by saying that both he and A–2 would continue to participate. Needless to say, I took a dim view of General Bissell and, as it later turned out, I discovered that he was by no means universally popular throughout the old Air Corps establishment.

The night before Smart left for North Africa to lay the plan before General Eisenhower and the Combined Chiefs of Staff, General Fairchild came to dinner at our house. Leach and I were in charge of all material which Smart was going to take with him and we went over it with General Fairchild. I then placed it under my mattress, so I can truthfully say that I slept on it.

After being approved at every level of authority, the plan was finally put into operation on August 1, 1943. The attacking force consisted of 177 planes manned by some 1700 men and our losses were 54 planes and 532 men. The operation was conducted with great courage, so much so that five Congressional Medals of Honor and several Distinguished Service Crosses were awarded. Unfortunately, it misfired for a number of reasons, not all of which could have been anticipated. I later saw moving pictures taken from a surviving bomber of the first mishap. En route across the Mediterranean, the lead plane of one group carrying the group's chief navigator mysteriously spun into the ocean and was lost. Then, as the formation reached the Danube in Bulgaria, it ran into severe thunderclouds which necessitated breaking up and, as a result, the attacking groups did not reach the target simultaneously as had been planned. Finally, the commander of one formation mistook one important town for another and turned incorrectly on a direct course over Bucharest. Bucharest was the center of Rumanian air defenses and, of course, word was flashed to Ploesti in time to alert the defenses before any of our planes arrived. The portion of the attacking force which flew over Bucharest found that it could not attack its targets accurately because of smoke and delayed-action bombs dropped by earlier formations. Despite all this, considerable damage was done, both at Ploesti itself and, more particularly, at nearby Campina. Some 40% of Ploesti's capacity was knocked out for a period of from four to six months but the attack was not the success that had been hoped.

COA Reports on Japanese Targets and on Propellants

IT WILL be recalled that General Arnold had ordered the Committee to prepare a report on Japanese targets. The official United States strategy was that an invasion of Japan would be necessary and that air power should be used to prepare for it. When the Committee first undertook to study the subject, Colonel Sorenson pointed out that A–2 had made a study of Japanese targets in March of 1943, which listed them, in order of priority, as aircraft, non-ferrous metals, naval bases and shipyards, iron and steel, petroleum and chemicals. Colonel Sorenson argued that this closed the matter and that there was nothing for the Committee to do. The Committee decided otherwise. One thing appeared obvious. In order to do a thorough job, it would be necessary to get the Navy in on the study for naval intelligence was thought to be particularly strong on Japanese matters. This was a touchy problem since the Committee was technically reporting to General Arnold and the Navy was not too sympathetic to Air Force ideas, particularly with respect to strategic bombardment. I undertook to break the ice and obtained an audience with Mr. Charles Ditmar, Secretary of the Navy Forrestal's executive assistant who, in turn, referred me to Captain Gingrich of the Office of Naval Intelligence. General Fairchild, for his part, endeavored to assist through connections with his Navy compeers in the Joint Chiefs of Staff organization. Progress in obtaining naval cooperation was not too rapid but, within a few months, Commander Francis

Bitter, USNR, was assigned as a member of the Committee. Commander Bitter, in civil life, was a professor of physics at Massachusetts Institute of Technology.

The Committee approached the problem of Japanese strategic targets in the same manner as in its study of Western Axis objectives. Subcommittees were set up for the same general industries plus shipping and the same type of analysis was applied. The Committee was fortunate in being able to obtain the cooperation and counsel of Colonel McCormack of G–2 of the War Department General Staff. Colonel McCormack, a prominent Wall Street corporation lawyer, was an excellent organizer. Under his direction, the work of G–2 on strategic intelligence improved enormously, doubtless because of the caliber of the staff he recruited from civil life.

The Japanese economy differed materially from that of Germany. To begin with, it had only some 10% of the potential of the economy of the United States. Moreover, despite heroic measures to develop homeland raw materials, the Japanese islands were deficient in coking coal, iron ore, rubber, ferroalloys, bauxite, oil and food.

The Japanese war plan was based on the concept that Russia was immobilized by Germany, that Great Britain was permanently on the defensive, that China could be isolated, that the United States, especially after the proposed destruction of a major portion of its fleet at Pearl Harbor, would be unable to prevent Japan's occupying all of the East Indies and the central Pacific and, finally, that the United States' will to fight would be so weakened by the democratic processes that it would agree to a compromise which would permit Japan to retain most of its conquests. In short, the Japanese recognized their economic weakness but speculated on the hope that they could win a quick victory in which relative economic potential would not be a factor.

In the years prior to Pearl Harbor, the Japanese had sought to make up for their economic weakness by establishing, primarily by conquest, an inner zone consisting of Manchuria, Korea, parts of the Chi-

nese mainland, Formosa and Indochina. But even these areas were deficient in bauxite and oil. In the first few months of the war, Japan seized Indochina and vast areas of the central and southwest Pacific, including Borneo and Sumatra, thereby gaining access to oil and bauxite reserves. Japanese war production, apart from some iron and steel in Manchuria, was primarily concentrated in the Japanese Islands, which, of course, necessitated shipping raw materials there. Shipping, therefore, was a prime economic target and shipping, in turn, depended on steel production which itself depended on coke production. While shipping was clearly a prime economic target, it was not of a type suitable for high-level air attack but it was rather a target for submarines and possibly for dive-bombers or torpedo planes. A possible exception was the aerial mining of bottlenecks such as the Shimonoseki Strait between the islands of Kyushu and Honshu. Oil stocks were limited. But, again, shipping seemed to be the principal bottleneck rather than refinery capacity. Electric power did not qualify as a prime target because of the number of small targets and the fact that there were many hydroelectric plants to be considered, none of which appeared outstandingly vulnerable. Railroad transportation was vulnerable in that the mountainous character of much of the Japanese islands gave rise to bottlenecks in bridges and on certain railroad lines, in precipitous mountain areas. However, these did not seem to the Committee to be easy targets to find or to destroy. Aircraft production was, of course, a most desirable target system. Its most vulnerable factor was believed to be aircraft engine production and this system of targets was finally recommended.

As the studies progressed, the coke industry loomed increasingly as an important target. Work on this industry was conducted under the leadership of Dr. Schneider of the Foreign Economic Administration. Most coking coal was imported from Manchuria. It was thought that six Japanese coking plants accounted for 72% of production, that they were producing at 95% of capacity, that stockpiles were small and that it would take two years after their de-

struction to get back into full production although the use of beehive ovens might cut this time somewhat.

In June 1943, while work on the Japanese report was going on, a Mr. Horatio Bond of the Office of Civilian Defense called on me stating that he was anxious to institute studies on the fire bombing of Japanese cities. He was most enthusiastic on the subject, especially in estimating civilian casualties! I referred him to A–2 where, as it turned out, he received a warm welcome.

On November 1, 1943, Mr. Bond completed his report for A–2, in which it was concluded that 1690 tons of incendiaries, properly placed, would destroy twenty of the most important cities of Japan, estimated to contain 74% of the targets listed in the March 1943 A–2 target lists, and 16,600,000 people. The theory underlying all this was that much of Japan's war industry was parcelled out to small city subcontractors. A–2 was enthusiastic but I felt that it was wrong for the Air Force to turn from precision bombing to area attack. The Committee finally agreed to include the system in its report provided that it did not take precedence over primary precision target systems. There was considerable heated discussion in the Committee on this subject and my views were supported by the Navy. A–2, on the other hand, made it clear that it supported the fire bombing concept and did not favor attack on coke ovens.

After the war was over, the U. S. Strategic Bombing Survey concluded that iron and steel production was a prime limiting factor in the Japanese war economy but that there was a cushion of excess capacity in 1942 and early 1943 caused, in part, by lack of raw materials and, in part, by operating problems resulting from poor refractory items. By the middle of 1944, shortages of steel became a major limitation in Japanese shipbuilding.

With respect to aircraft, the Survey concluded that engines were the critical weakness. The two principal Mitsubishi plants at Nagoya, one for airframes and the other for engines, and the principal Nakajima plant at Musashi had been correctly spotted. The Japanese made

a desperate effort to increase aircraft production in late 1943 but early B-29 attacks from the Marianas necessitated dispersal of the industry and, between the direct effects of attack and the indirect effects of lack of aluminum and fire attacks on cities in which many small shops producing important components were destroyed, the results did not measure up to programs. Even so, some twenty-six thousand planes were produced in 1944 as against twenty thousand in 1943 and ten thousand in 1942.

The Survey figures on merchant shipping are of great interest. Japan entered the war with a merchant fleet of almost six million tons. A year later, it had been reduced to five million tons, two years later to three million tons and in August of 1945 to two million tons. Over 60% of the loss was inflicted by submarines and the balance largely by carrier task force operations supplemented by aerial mining.

On September 21, 1943, General Kuter suggested that the Committee report be finished by mid-November in order that it be presented at the Cairo Summit Conference. Relationships between the Committee and General Kuter, Assistant Chief of Air Staff, Plans, were always close and became even more so as the year 1943 progressed. The reason was that both General Kuter and General Arnold were increasingly becoming aware of the difficulties of concentrating strategic bombardment operations against Germany on specified precision target programs. There had never been a war in United States history in which the direction of strategic operations had not been delegated to field commanders, but both General Kuter and General Arnold were coming to the view that the strategic air attack on Japan would be launched from bases as far separated as Central China and the Mid-Pacific islands and that, under such circumstances, it would be desirable to coordinate the attack at the highest level in Washington.

In late September 1943, Colonel Harman, Chief of Staff of the Twentieth Bomber Command, came in to report that he had been directed by General Arnold to contact the Committee in order to

acquaint it with the fact that his operational range would be eleven hundred miles from Chengtu in southern China and to discuss possible target systems within that range. On October 4th, Colonel Harman and General Wolfe of the Twentieth Air Force called to review the Committee's studies. On October 16, 1943, General Kuter asked for an immediate report on the coke industry and, on December 3, 1943, the Committee was instructed to give a copy of this report to the Joint Staff planners. On February 10, 1944, I was ordered to maintain contact with the Commanding General of the Twentieth Bomber Command. I therefore flew to Kansas, the headquarters of that command, where discussions were held on possible attacks on the oil refineries at Balikpapan in the Dutch East Indies and on the coking industry in Japan proper. At General Fairchild's suggestion, the Committee of Operations Analysts was shown on the chart of the Twentieth Air Force as reporting directly to its Chief of Staff, General Hansell. On April 6, 1944, I was assigned to represent the Committee on the staff of the Twentieth Air Force.

The process of ferrying sufficient supplies from India over the hump to Chengtu was a long and difficult one and it was not until June of 1944 that B-29s of the Twentieth Air Force arrived at Chengtu and were made ready for long-range attack on Japan. The first mission of the Twentieth Air Force against the Japanese homeland was directed against the steel complex of the Yawata Works on the island of Kyushu near the Shimonoseki Strait, the aiming points being primarily coke ovens. The attack was made on the night of June 15, 1944, by forty-seven B-29s. Being a relatively light attack, little permanent damage was done.

During the latter part of May 1944 and shortly before the Yawata mission, I received a telephone call from General Arnold's office stating that he was referring a visitor to me. Shortly thereafter, a florid, elderly man appeared. It was obvious that he was in a high state of irritation. His first comment was that it was an outrage to be shunted down from General Arnold to so unimportant a person as

myself but that he had been given to understand that I was in some way responsible for the stupidity of the Air Force in not following his advice with respect to target selection. When I inquired what that advice was, he said with scorn that he was a Vice-President of the Allied Chemical Company and an expert on coke, that he had travelled in Germany and Japan and that he personally could guarantee that had German coke ovens been attacked the war would be over. He went on to add that the Japanese coke ovens were even more important to the Japanese economy and that he was so indignant at his treatment by General Arnold that he was taking the next train to New York where he was going to the chief editor of the *New York Times* to get him to publish a detailed account of the scandal which he had uncovered. He went on to add that he knew many newspapermen and that he would see to it that this matter received early and full publicity throughout the country. There was obviously nothing that I could say which would be of any help for his mind was clearly made up. As soon as he left the office, I hastened to see what could be done to stop him for the publication threatened might frustrate the proposed Twentieth Air Force mission. There was no way of putting the man in custody so I concluded that the best chance would be to get hold of Mr. Root, who was then in New York, and ask if he knew of anyone who could deal with my coke character and with the *New York Times*. Mr. Root set to work at once and, before our friend got to New York City, Mr. Root had contacted the President of the Allied Chemical Company who, in turn, arranged to have our friend prevailed upon to abandon his self-appointed mission.

On September 10, 1944, General Norstad, Chief of Staff of the Twentieth Air Force, requested an immediate report as to the next mission to be undertaken. It was recommended that it be directed against the coke ovens at the Showa plant at Anshan in Manchuria. Three such attacks were made in all. The Anshan attacks resulted in a 28% drop in pig iron shipments to Japan and this, plus shipping

losses, reduced steel production by some 35% later in the year.

It had never been supposed that Chengtu operations would play a decisive part in the air war against Japan because the logistical difficulties were too great to permit continuous operations and the distance to the Japanese Islands was at the extreme range of the B-29 aircraft. In the Joint Chiefs of Staff, General Fairchild advocated the seizure of an island base within comfortable range of Japan at the earliest possible moment. This concept clashed with General MacArthur's thesis that the advance on Japan should be through the southwest Pacific to the Philippines and so on up. Eventually, both strategies were adopted! Advancing through the Gilbert and Marshall Islands, American forces, principally naval, occupied the Marianas Islands after heavy fighting in June and July of 1944. The necessary bases were hastily constructed and, on November 24, 1944, B-29s began operating from the Marianas against the Japanese aircraft industry. Some two hundred planes participated in these attacks. In February of 1945, the fire attacks of Japanese cities were begun in earnest. But, as target selection, within approved limits, had by then been decentralized to ground commanders and, as my personal connection with these operations ceased when I became associated with the U. S. Strategic Bombing Survey, I shall not dwell further in detail on problems of strategic bombing in the Pacific.

The Committee submitted its report on Japanese target objectives to General Arnold on October 10, 1944. The report stated that, on the assumption that the Japanese were to be defeated by naval and air blockade, the principal targets of air attack should be (a) shipping, (b) aircraft, (c) urban industrial areas and (d) coke. The inclusion of urban industrial areas was to mollify A–2. On November 22, 1944, General Kuter wrote of the Committee's report, "Like its predecessor, it has been a major factor in the strategic direction of our forces".

The work of the Committee terminated with the report on Japan and its functions were transferred to the Joint Target Group, A–2, in which the Navy was represented by Commander Bitter and Commander John Mitchell, a World War I ace and an old friend of mine and of Arthur Richmond's. The report on Japan was signed by all the signers of the European report except for Colonel Sorenson whose place was taken by General Bissell. It was also signed by Colonel Moss W. Pettigrew of G–2, Captain H. C. Wick, USN, Commander Francis Bitter, USNR, and Lieutenant Commander A. E. Hindmarsh, USNR.

PROPELLANTS AS A TARGET SYSTEM

DURING THE early months of 1944, the Committee worked primarily on Japanese target systems but the pressure for immediate action was less than in the case of European target systems. This was partly because coke had been informally discussed as a first objective and partly because B-29s were not in position to conduct continued large-scale operations against the Japanese Islands. I was thus able to turn my attention to additional matters. In the spring of 1944, intelligence sources suggested a review of propellant plants as a target system. It was thought that these plants were more concentrated than had been previously believed and that there was a growing shortage of propellants available to the enemy.

On July 17, 1944, Mr. Root and I went to London to discuss the subject with intelligence sources there. This visit coincided with the German V–1 attacks. When we arrived in London, the damage was widespread, particularly in the form of broken glass. We were staying at Claridge's Hotel in a magnificent suite in which there were numerous mirrors and other glass adornments. One morning while shaving, I heard a V–1 coming over and suddenly the motor cut off. This was a sure sign that it was about to explode somewhere in the vicinity and I could not help but glance with trepidation at the mirrors surrounding me. Fortunately, we were never subjected to dangerous near misses by V–1s or, in my later stay in London, by V–2s.

Our conclusion was that the propellant industry was a "businessman's risk" which might be indulged in if it would not reduce attacks on more important targets. Incidentally, the work of the U. S. Strategic Bombing Survey brought to light the fact that German propellant production indeed was affected by air attack but not in any way conceived of by United States or British intelligence sources. An indispensable ingredient of explosives is nitrogen. German nitrogen production was principally synthetic and, by extraordinary coincidence, synthetic nitrogen was derived from the German synthetic oil plants. The attack on oil, therefore, brought an unexpected reward in a drastic reduction of German supplies which became so serious that antiaircraft gunners were instructed not to fire "unless they were sure of hitting the planes". I must confess to amazement at this important failure of Allied intelligence agencies.

TRIP TO HAWAII

I NO SOONER had returned from London than Bart Leach asked me if I would take a group of Operations Analysts out to Hawaii and get them started with the Seventh Air Force. It turned out to be a most interesting experience. The leader of the group was Douglas Shearer, Director of Sound for Metro Goldwyn Mayer, one of the principal moving picture concerns. Douglas Shearer was a Canadian by birth and was educated there although he did not have the opportunity to take any advanced degrees. His sister, Norma Shearer, became a famous moving picture actress. Whether this had anything to do with Douglas Shearer's coming to Hollywood and entering into the scientific aspects of moving picture production I cannot say. In any event, he was a natural genius in more ways than one, as I came to discover. I flew to Los Angeles to pick him up and his chief aide, also a very attractive personality. I arrived about 6 P.M. and went directly to Shearer's office. After some general conversation on the subject of

radar, he suggested that we dine at what he described as a Polynesian restaurant where we would find the greatest collection of rum anywhere in the world. I am fond of rum so I readily agreed to this challenge. The restaurant was in Hollywood and I must say that it was both unusual and fascinating. The decoration was principally bamboo and palm in the South Sea Islands tradition and the walls were lined with bottles of different kinds of rum. Polynesian sculptures and decorations were also in evidence. The name of the place was Trader Vic's. In those days, Trader Vic's was the only Polynesian restaurant in the United States. But its fame became so great that a branch was later established in Chicago and similar types of restaurants have now spread throughout the country. Incidentally, in the postwar years, I learned from Herbert A. Murphy, with whom I was closely associated in connection with the affairs of Eastern Utilities Associates, that "Trader Vic" was, in point of fact, a young Texan who was brought up in the same town that Murphy was. The drinks at Trader Vic's were exotic. I never have been able to determine the numbers and kinds of fruit juices that were added to the different rums but it is not too difficult to understand the term "temptations of demon rum" under such circumstances.

The next morning we flew to San Francisco where we repaired to March Field for transportation to Hawaii. It turned out that our priority on this trip was only Grade B so we adjourned to San Francisco for a dinner at the best Chinese restaurant. This was also interesting but a definite anticlimax to the previous evening.

The following day we again reported to March Field but were told to go sit under a tree until evening. This led to one of the most interesting conversations I have had. Douglas Shearer was not only a scientist but also a philosopher. Among his achievements was the so-called "Davis Wing" which was used on the Liberator four-engine bomber. The design of this wing was a product of pure mathematics on his part. Discussion of the Davis Wing led us to consider the matter of development of man-made materials for diverse purposes but

with particular emphasis on aircraft. Shearer was of the opinion that most materials, including aluminum and magnesium, were basically unsatisfactory because they were not only too heavy but too weak. He then said, "I believe that the key to this problem is contained in something in nature. Take the porcupine's quill. It is hollow but very strong. If you analyze it, you will find that it is an ingenious combination of strong fiber with a substance you might describe as plastic. I believe that something of this type, using strong filaments such as titanium or boron, will prove to be the approach needed." I wish that I could remember all of his philosophical ideas. He was no theist but he did feel, as I did, that the principle of life embodied on this planet would strive to find some method of escaping from our solar system before the inevitable destruction of that system. Shearer's interest in sound had led him to develop many electronic devices for the motion picture field and he, therefore, was highly conversant with the principles, potentialities and limitations of radar.

The Seventh Air Force headquarters was at Pearl Harbor and I had an opportunity to see the ships that had been sunk there during the Japanese attack. I also ran into two college classmates and friends, James T. Baldwin and Harrison Gardner, both of whom were in Naval Intelligence. In an odd moment, I managed to go bathing at Waikiki Beach. This was a most disappointing experience as the water was full of coral obstacles, nor was the scene particularly inviting as there were, even in those days, some rather unattractive hotels in the immediate vicinity.

The United States Strategic Bombing Survey

IN THE normal course of events, with the termination of the work of the Committee of Operations Analysts I would probably have been assigned to duty with the Joint Target Group, which was then being set up in A–2, where I would have been subjected to the tender attentions of General Bissell. But as it happened, General Bissell was relieved from duty as Assistant Chief of Air Staff A–2 and was succeeded by Major General Thomas D. White, a very attractive officer who had once been a beau of my sister-in-law, Sallie. Moreover, I still had the support of General Kuter and General Gates so no immediate orders came to me with respect to the Joint Target Group. In the meantime, a new and fascinating subject was opening up. It will be recalled that the Committee of Operations Analysts, in its European report, recommended that there should be a continuing evaluation of the effectiveness of air attack in all theatres. Bart Leach was quite excited about this subject and kept harping upon it from time to time as something that should be pushed when conditions became appropriate. It was not until the spring of 1944 that the tide of battle in Europe turned sufficiently so that the victorious end of the war could be reasonably anticipated, although its exact timing was impossible to predict.

On March 27, 1944, Major Ralph L. Colbert of A–2, whom I had not then met, suggested that a unit be established to evaluate the strategic bombing in Europe. The paper came to General White's desk

and he, in turn, prepared a recommendation to be sent to General Arnold. Curiously enough, at about the same time a similar proposal came to General Arnold from London. It was from Cabell, by now a Brigadier General, who was attached to the Eighth Air Force. Working closely with him was a Boston lawyer and old acquaintance of mine, Colonel James Barr Ames. Cabell and Ames had had occasion to talk to General Fairchild about the subject and Ames raised the matter with Major General Frederick L. Anderson of the Eighth Air Force on March 28, 1944. Among those participating in the preliminary discussions was John M. Harlan, who had been commissioned a Colonel. General Arnold wrote General Spaatz on April 21, 1944, approving the establishment of the unit requested and, in June, General Spaatz approved a manning table consisting of twenty-one officers to be headed by a Brigadier General. Colonel Theodore J. Koenig was named the first Executive Director. However, it was never contemplated that he would actually direct the project, it being obvious that he lacked stature and that the task could only be undertaken by some high-powered person, preferably a civilian, in order to provide the necessary judicial aura.

Colonel Koenig came to Washington with a proposed table of organization consisting of three hundred civilians, three hundred fifty officers and five hundred enlisted men. The historian of the Survey wrote later, "the existing plans were submitted for comment and criticism to Colonel Perera of the C.O.A., later a member of the Secretariat of the Survey and to A–2 at Headquarters Army Air Force. Informal conversations took place but no report was rendered." What the historian did not know was that I thought the proposed manning table was an attempt to build up an unwarrantedly large empire so staffed as to be open to the charge that the entire effort was self-serving rather than judicially unprejudiced. The only concrete result of Colonel Koenig's visit was to make it clear that a decision would have to be made soon as to the appointment of a Chairman.

The matter of initial nomination of a Chairman was left, through General Kuter's influence, to Colonel Bradley P. Gaylord of the Plans Division, Bart Leach and me. Gaylord, a World War I bombardment pilot, had been in the investment business. We spent several hours considering potential candidates but with little success for they were either already tied up in war work of one sort or another or were individuals whose judgment we could not vouch for because we did not know them well enough personally. Our first choice was President Conant of Harvard who was then one of the top men of the Office of Scientific Research and Development. Leach and I went to call on him and he appeared genuinely interested, which I believe he was. However, he said that his present activities made it impossible for him to consider acceptance. Little did I know at the time, for the secret of the atom bomb was so well kept, that what was occupying him was the development of an atomic weapon which might revolutionize the lessons to be learned from the results of strategic bombing in World War II. Among other names considered were Justice Owen Roberts of the Supreme Court of the United States, President Sproul of the University of California and Lewis W. Douglas. Finally one morning, while we were both sitting in my office in most unmilitary fashion with our feet on a common desk, Gaylord said, "I have it. Let's try Franklin D'Olier, President of the Prudential Life Insurance Company. He was the first head of the American Legion and, so far as I know, he has not been engaged in any war work." I did not know Mr. D'Olier but we were having so much difficulty in our hunt for talent that I was willing to settle on Gaylord's suggestion. Gaylord rushed out of the office to see General Kuter. The next thing I knew, General Arnold had gotten in touch with Mr. D'Olier and prevailed upon him to come to Washington and become Chairman of the new organization. Mr. D'Olier, however, being an old hand at politics, stipulated that his acceptance was contingent upon receiving a directive to be signed personally by Franklin D. Roosevelt, President of the United States.

Despite some blushes, I cannot refrain from quoting the history of the Survey at this point:

As the start of the skeleton organization Colonel Gaylord suggested that Colonel Guido R. Perera, AC–O–344077 who had been on the Committee of Operations Analysts and who had been already consulted by the planning group in the objectives and scope of the Survey, would be of great assistance if he were available, as he might be, having just finished the report on the Bomber Offensive in the Far East. Mr. D'Olier met Colonel Perera immediately upon leaving General Arnold's office and was greatly impressed with his personality and qualifications. Mr. D'Olier then went to the office of Major General Laurence S. Kuter then Assistant Chief Air Staff Plans who had been monitoring the Survey affairs from the military angle. General Kuter offered all possible assistance and Mr. D'Olier asked for the assignment of Colonel Perera to him personally as "Assistant to the Chairman". This request was immediately granted as of that moment. Colonel Perera accompanied Mr. D'Olier to the European Theatre as his Assistant and was a valuable aid. Mr. D'Olier and Colonel Perera decided that a Vice Chairman was needed who would have the same type of qualifications as those leading to the selection of the Chairman and Colonel Perera suggested the name of Mr. Henry C. Alexander, a lawyer and banker who was a director and Vice President of J. P. Morgan and Company, Inc. and a director of several nationally and internationally known business and industrial corporations. Mr. Alexander was a personal friend of the Assistant Secretary of War for Air, Mr. Robert Lovett, who thoroughly approved of the suggestion of Mr. Alexander's name and, while doubting his ability to do so, offered to try to persuade him to accept the position.

As soon as I obtained Mr. D'Olier's approval to the selection of Henry Alexander, I called Henry up to warn him that he shortly would be approached by Mr. Lovett. Henry Alexander was a friend of Willie Simpkins. I had originally met and come to know him well as a result of sailing picnics and other festivities on the Cape. His career had been a dramatic one. His father died when he was very young and he was brought up on a farm in Murfreesboro, Tennessee, with little in the way of worldly goods to assist him. He had, however, that rare gift, a first-class mind to which were added the attributes of toughness and leadership. He worked his way through Vanderbilt University and thereafter attended the Yale Law School, from which he graduated in 1925. As one of the leaders of his class, he became associated with the New York law firm of Davis, Polk, Wardwell, Gardiner and Reed. In the course of his practice, he represented Mr. J. P. Morgan when the latter was called as a witness before the Senate Banking Committee and the famous incident occurred in which a public relations man put a midget on Mr. Morgan's lap. The purpose of the Senate investigation was political with a view to disparaging the banking profession. Henry did an outstanding job in this instance and, thereafter, was increasingly sought after for advice by members of J. P. Morgan & Company. In 1935 he was made a partner of Davis, Polk. In 1939 he was finally persuaded by the Morgan partners to leave the law and become a partner of J. P. Morgan & Company, which was incorporated in the following year. He was a director of General Motors, Johns-Manville, American Viscose and numerous other corporate and charitable organizations. His wife, Janet, whose maiden name was Hutchinson, had attended the National Cathedral School for Girls in Washington with Faith. After the war, he became President, then Chairman of the Board and Chief Executive Officer of J. P. Morgan & Company, Inc., until he was tragically smitten with a brain tumor from which he never completely recovered. One of his great accomplishments was engineering the merger of J. P. Morgan & Company, Inc., with Guaranty Trust Company of New York. I had exchanged views with Henry well enough to have the highest admiration for his judgment. He saw things clearly, pursued their implications logically and achieved solutions which were not only penetrating but sound. He was, in my opinion, the ideal choice for the position of active head of the U.S. Strategic Bombing Survey, a task which cried for the qualities he embodied.

My call to Henry Alexander was on Friday, October 20, 1944. Over the weekend, Mr. Lovett called him as promised and, in the

course of the conversation, Henry agreed to serve in any capacity which Mr. Lovett thought was important enough to warrant his taking on the job. Mr. Lovett added his arguments to mine and convinced Henry that the Survey would enable him to make an important contribution to the war against Japan as well as to lay the groundwork for the best possible organization of the air effort in the national military setup.

Henry came to Washington on October 25th where I introduced him to Mr. D'Olier and we then and there sketched out the organizational methods to be followed. Mr. D'Olier named Henry Vice-Chairman, pointing out to him that he would be the top executive officer and, as such, would make all policy decisions subject to final appeal to the Chairman. I was to serve as "The Assistant" to Mr. D'Olier. The work itself would be broken down into eight or ten sections, most paralleling those of the Committee of Operations Analysts but with added sections covering the physical effects of bombing, the attack on civilian morale and a general catchall section dubbed overall effects. Each section would be under the supervision of a civilian director. Each such director would be given a free hand with respect to the organization of his section, subject only to conforming with the general policy of the Survey. The final report of the Survey would be prepared by Henry and Mr. D'Olier assisted by a Secretariat.

The first problem, obviously, was to select the division chairmen. We set to work on this and within a week had selected the following, all of whom, except for Professor Bowman and Dr. Linkert, were known personally to either Henry or me. George W. Ball, who I had worked with in the days of the Committee of Operations Analysts when he was assisting Fowler Hamilton, agreed to head up the section on the effect of bombing of transportation facilities. Paul W. Nitze, an old friend of both Henry's and mine, who had previously been with the Foreign Economic Administration, agreed to handle the machine tool study. Fred Searles, Jr., a Vice-President of Newmont

Mining Company, was chosen to head the Steel and Munitions Division, and Professor Henry F. Bowman, of the Drexel Institute of Philadelphia, agreed to head the Physical Damage Division. I made a quick trip to Boston to obtain recommendations from President Leonard Carmichael of Tufts College as to candidates for the morale section. He recommended Dr. Rensis Linkert of the Division of Progress Surveys of the United States Department of Agriculture. Colonel Frank A. McNamee, Jr., in civil life an Albany lawyer who had been active in civil defense matters, agreed to handle the civil defense study. Mr. Robert S. Russell, Executive Vice-President of the Standard Oil Development Company, took over the oil section. Mr. Theodore P. Wright, formerly Vice-President of the Curtiss Wright Corporation and Director of the Aircraft Resources Control Office of the War Production Board, was chosen for the aircraft section. Bart Leach succeeded in getting Charles C. Cabot, who was then an Associate Justice of the Superior Court of Massachusetts, to take a leave of absence and become head of the Secretariat.

One area in which we had considerable difficulty was that of obtaining an economist to head up the Overall Effects Division. Several names were suggested but no one appeared to be available. Finally, at Paul Nitze's suggestion, as I recall it, J. Kenneth Galbraith, who had been Assistant Administrator in charge of the Price Division of the Office of Price Administration, was contacted and accepted.

On November 3, 1944, Mr. D'Olier finally received his official Letter of Appointment from Mr. Henry L. Stimson, Secretary of War. In this letter, the official name "U. S. Strategic Bombing Survey" was designated. In his letter, Mr. Stimson stated that the task of the Survey was one of great importance and urgency and that it would be the controlling organization within the field of evaluation of air attack. Mr. Stimson went on to say that the work of the Strategic Bombing Survey was of primary national importance because air power had involved major expenditures of manpower and natural resources and the results could only be evaluated by scientific in-

vestigation of evidence, much of which would not become available until after the defeat of Germany. Mr. D'Olier was promised the aid of all sections of the armed forces and urged to submit interim reports which might be helpful in the war against Japan. On the same day, General Marshall wrote Generals Eisenhower and Spaatz informing them of the Survey's formal organization and that members would be shortly on their way to London.

On November 4th, Henry Alexander, George Ball, Paul Nitze, Professor Bowman, Mr. Searle, Dr. Linkert and I flew to London. Our first move was to get in touch with Colonel Koenig and review what had been done locally to date. We next made arrangements for offices and were given the fifth floor of 20 Grosvenor Square where Mr. D'Olier, Henry and I had adjoining rooms. Our relations were close and informal and many decisions were arrived at in evening conversations as well as at daytime conferences. My immediate function, as I saw it, was to put Mr. D'Olier and Henry in touch with the proper sources, military and civilian, to educate them as to how strategic bombing had developed, to warn them of strongly held but conflicting views as to its methods, purposes and results and to help them to select competent personnel. In short order, they were given access to General Spaatz, then commanding the United States strategic air effort in the European Theatre; to his staff, notably General Orvil A. Anderson and Colonel Ames; to field commanders such as Major General LeMay who had led the great Schweinfurt raid; and Colonel Ramsay D. Potts, an outstanding young bomber commander who had won the Distinguished Service Cross in the low-level Ploesti raid. Mr. D'Olier also visited General Eisenhower and other leading military figures to acquaint them with the nature and scope of his assignment.

During many long hours spent with Mr. D'Olier and Henry Alexander the philosophical approach the Survey might adopt was examined at length. I took the position that the Survey might theoretically cover the following matters in its report:

(a) The economic results of the Combined Bomber Offensive.

(b) The military results of the Combined Bomber Offensive.

(c) An appraisal of the target systems attacked to determine their correctness for the purpose set out in the overall directive and conclusions as to what, if any, other target systems would have been preferable.

(d) The operational conduct of the Combined Bomber Offensive.

(e) The effect of diversion of forces assigned to the Combined Bomber Offensive to direct support of the invasion of Europe.

(f) The results of air attack in direct preparation and support of the invasion of Europe.

Subjects (a), (b) and (c) should clearly be covered. The degrees to which the Survey should delve into subjects (d), (e) and (f) were most difficult to establish, particularly the matter of diversion of effort and the results of operations in direct support of the invasion. However, it was obvious that operational difficulties in the course of the campaign such as training, equipment, weather, distance to enemy targets, lack of fighter support, enemy defensive action and forces available could not be ignored. Nevertheless, the Survey was primarily intended to be a civilian effort and to go into these matters in depth would require expert military assistance. The most likely place to obtain such assistance would be from those who had actually conducted operations. This might, in turn, lead to criticism that the Survey had merely adopted self-serving views. The matter of direct action in aid of the invasion, whether "strategic" or not within the terms of the directive—and none of us thought so—would be even more difficult for the members of the Survey to pass judgment on.

On November 19, 1944, Mr. D'Olier, Henry and I, accompanied by Colonel Koenig, flew to Italy. At Caserta, outside of Naples, we met with Generals Eaker, McNarney and Currie. Equally memorable was a chance meeting with my old Boston friend Sam Chamberlain, the artist, then a Major with Air Force Intelligence. Mr. D'Olier told General Eaker that he would ask for Sam's release so that he might join the Survey and this was later done. The following day, we flew to Bari to talk things over with General Nathan Twin-

ing, then having operational control of the United States strategic bombers based in Italy. We then went on to Rome where I drove Henry around sightseeing in a jeep. On Thanksgiving Day, we flew to Paris where we dined at General Spaatz's mess, at which a renowned French chef produced a most elegant meal entirely out of Army rations.

Early in December, Mr. D'Olier, Henry and I returned to Washington where we continued our search for personnel and sought to brief division heads as to what was expected of them. During this period, I persuaded Harris Ward, then an Army Major, and Philip Rhinelander, then a Navy Lieutenant, to seek transfers from their respective posts to the Survey and I also obtained General Gates's approval to the release of Art Wood, then a Lieutenant Colonel. Bill Morton, a partner of the State Street Investment Corporation of Boston, and Jimmy Reynolds, Harry Reynolds' brother, joined the Secretariat in civilian capacities. Among others who joined the Survey at this time were Willy Simpkins, Lincoln Boyden, then Lieutenant Colonel, and Thomas R. Sunderland, also a Lieutenant Colonel but in postwar years chief executive officer of the United Fruit Company. Harris Ward, in postwar years, as President of Commonwealth Edison Company, became a leader in the electric utility industry of the United States. Art Wood, as pointed out elsewhere, became President of Sears Roebuck & Company.

On December 15, 1944, Mr. D'Olier and I flew back to London to keep the pot boiling there. One area which best could be handled in London was setting up a Military Affairs Division to consider and evaluate the effect of operational factors on the bombing program. This was eventually headed up by Major General Orvil A. Anderson, assisted primarily by Colonel Ramsay D. Potts. Colonel James B. Ames was assigned to this group although he later wound up as Henry Alexander's assistant.

The creation of a Military Affairs Division in the Survey headed by a general officer with extensive operational responsibilities in the

European Theatre of Operations was, I submit, a proper decision although it had delicate and even dangerous implications. At issue was the possibility of Air Force influence on the Survey's findings and conclusions.

The 1943 report of the Committee of Operations Analysts on European targets best calculated to permit the earliest possible invasion of the Continent contained a recommendation that there be a continuing evaluation of air attack on enemy industrial and economic objectives in all theatres for the information of all authorities charged with the allocation of air strength. Bart Leach was the first member of the Committee to make the suggestion, which was adopted without dissenting vote. The Committee of Operations Analysts was composed essentially of civilians or civilians temporarily in uniform. The only regular officers closely connected with the Committee were Colonel Byron E. Gates, who took no active role, and Colonel Edgar P. Sorenson, Assistant Chief of Air Staff, Intelligence. The recommendation referred to was conceived of by Leach as calling for evaluation by a group independent of the Army Air Forces, preferably civilian. It was so understood by the drafting committee although it seemed inappropriate to stress the point at that early date.

The difficulties heretofore recited arising from the activities of the Subcommittee on Probabilities, while not unforeseen, proved to most members of the Committee that to superimpose outside generalists, no matter how renowned, on an organization of technicians could not succeed except under unusual circumstances. The success of the Committee's work was only made possible by the cooperation and support of the highest authorities, Generals Arnold and Fairchild. The success of the Army Air Forces effort in World War II in no small measure was due to the indifference to parochial tradition and privileges exhibited by these men and by many other high-ranking officers.

The evaluation of the results of strategic bombardment of enemy

industrial and economic objectives, by its nature, involved expertise beyond normal military requirements. Even more importantly, it involved the transposition of essentially judicial functions to the area of military operations. Those responsible for the original suggestion were positive that the task should be entrusted to unprejudiced civilians of a calibre capable of utilizing all necessary military assistance in a spirit of cooperation without sacrificing a shred of independence.

When the organization of the Survey was first sketched out, Mr. D'Olier insisted that I be shown thereon as "The Assistant". This was viewed by us both as the equivalent of a top-level appointment in a private company and without any implications as to military rank. Even so, by virtue of the uniform I wore and my past association with bombardment matters, I was potentially a hazard to the judicial atmosphere it was desired to cultivate.

Those in the European Theatre of Operations who independently had worked on setting up a bombardment evaluation organization developed a manning table which included a post for a general officer. Such an officer might have dealt solely with administration, transportation, supply and similar functions. In that case, outside suspicions of undue influence on the report of the Survey would have been ridiculous. On the other hand, he might have been responsible for giving expert advice on operational or planning problems which had arisen or on the actual conduct of operations. Such advice might have been essential to proper judicial evaluation and might have been given and received without any thought of undue influence. Nevertheless, hostile sources might seize upon the fact at some future date in order to belittle results achieved.

Mr. D'Olier naturally wished to avoid potentially embarrassing situations and I believe he succeeded in large part. After some delay and indecision, Brigadier General Sorenson was assigned to the Survey where his principal activities were administrative and "housekeeping". The remaining high-ranking officers attached to the Survey were assigned to the Military Effects Division.

In the latter part of February 1945, Colonel Bradley Gaylord of the Plans Division came in to see me. He said that he, "and others" were afraid that my position in the U. S. Strategic Bombing Survey organization chart as "The Assistant" to Mr. D'Olier and his obvious reliance on my advice, taken together with my friendship with Henry Alexander, might endanger the report of the Survey because sources hostile to the Air Force might argue that I had exerted undue influence on its authors. I was shocked. It would have been impossible to have exerted any such influence on Henry Alexander and Mr. D'Olier was nobody's fool either. Furthermore, the division heads such as George Ball, Paul Nitze and Kenneth Galbraith were not shrinking violets. And, in any event, I would not have used undue influence even if it had been possible. But if Gaylord "and others" feared what might be said, I felt that they must have some reasonable grounds to worry and that it would be pure selfishness for me to stand on any prerogatives. I concluded that I should not continue in the capacity of "The Assistant" to Mr. D'Olier. In this I may have been wrong—or at least Mr. D'Olier thought so. He indicated by his conduct that he felt that I had let him down and our close relationship deteriorated. On balance, I think that the best interests of the Survey were served by my decision to step down and seek reassignment.

On March 1, 1945, I wrote Colonel D'Olier as follows:

MEMORANDUM FOR THE CHAIRMAN, U. S. STRATEGIC BOMBING SURVEY:

1. At your request, the undersigned was detailed to the U.S. Strategic Bombing Survey on or about 1 November 1944 in the capacity of The Assistant to the Chairman.

2. Among the principal duties which were visualized for the undersigned was the furnishing of advice in connection with the organization and staffing of the Survey with key personnel and in the general development of operations. This task has now been completed.

3. It would appear appropriate at this time for the Office of the Assistant to the Chairman to be eliminated as such and for the undersigned, as a mem-

ber of the Armed Forces, to be assigned to some military position. This might possibly take the form of assignment to that segment of the Survey which comes under the heading of Military Advisors.

On March 6, 1945, he replied as follows:

MEMORANDUM FOR COLONEL PERERA, Room 3D1000, The Pentagon, Washington, D.C.

SUBJECT: Reassignment

1. I am in agreement with the position expressed in your memorandum to me of 1 March 1945.

2. The office of The Assistant to the Chairman is hereby abolished and you are assigned to that segment of the Survey which comes under the head of Military Advisors.

The fact that my relationship with Mr. D'Olier had cooled had no bearing on my relationship with Henry Alexander and other members of the Survey. Despite the wording of his letter assigning me to the "Military Advisors", I was in fact assigned to the Secretariat. The Secretary was Charlie Cabot and he and I occupied adjoining desks next door to Henry Alexander. The formal difference was that I did not attend meetings of the division heads with Mr. D'Olier, but this was of small consequence. As it turned out, I had a sort of "free-lance" billet from which to operate and I was fortunate enough to have several interesting special assignments as well as to be able to keep up on the deliberations of the civilian directors of the Survey and the progress of their reports.

On March 7, 1945, the Ninth Armored Division reached the Rhine and, by extraordinary good fortune, captured intact the railroad bridge across the river at Remagen. The British crossed the lower Rhine two weeks later and drove to the northeast. On April 1st, the Allied Forces had trapped the German Army Group B, consisting of twenty-one divisions, in the Ruhr. It surrendered on April 18th leaving the road to Berlin open. By April 11th the Elbe had been reached near Magdeburg—only sixty miles from Berlin. Instead of driving for Berlin, however, General Eisenhower turned southeast

with the object of preventing the Germans from making a last stand in the Bavarian Mountains. The result was that the Russians reached Berlin first and Germany was cut in two, the Russians keeping all of Germany east of the Elbe.

During their rapid advance into Germany, the British captured the headquarters of the Focke-Wulf Aircraft Company together with its President, Dr. Kurt Tank. This was a great intelligence prize for here was the first chance to obtain direct evidence of the effect of Allied air attack on the German aircraft industry, with particular emphasis on the production of one of Germany's best-known pursuit planes. British intelligence officers were naturally first on the spot. I do not recall the details but I was asked to go to Germany and interview Dr. Tank as quickly as possible. On April 13th I received my orders and, accompanied by a German-speaking Major named Holtzerman, proceeded by air to the Twenty-First Army Group headquarters where I picked up a jeep and drove to the Focke-Wulf office outside of Bremen. A British sentry with a rifle and fixed bayonet was marching up and down the corridor outside Dr. Tank's living quarters on the second floor and the entire building was heavily guarded. I rang the bell to his apartment and, somewhat to my surprise, it was opened by an attractive woman in her middle thirties. I asked to see Dr. Tank and she showed me into a room where a rather thickset man of possibly fifty sat reading. He got up at once and, not unnaturally, seemed much on the defensive. In order to put him at ease, I told him in my poor German that we had come to see him for one purpose only—to get information as to the effect of our bombing of the German aircraft industry. He seemed relieved but the interview went slowly at first. It was probably about 4 P.M. when we arrived. By 5:30, Dr. Tank had loosened up considerably and was describing how he had advocated the creation of a German long-range bombing force before the war broke out and how he had designed the Focke-Wulf Condor, a four-engine bomber which, fortunately, never went into large-scale production. As it was, a squadron or two of these planes,

based in southern France, caused havoc on the Atlantic shipping lanes and, had they been in greater supply, would have enhanced the effectiveness of the German submarine campaign which was already a deadly serious threat. When the conversation turned to the history of the Focke-Wulf 190 and the defeat of the *Luftwaffe*, Dr. Tank became positively discursive. He was obviously proud of the Focke-Wulf 190 for he had designed and built it and it had proved itself in combat. Not only that, but it had saved his life. It seemed that one day in 1944 he flew a 190 from Bremen to one of his plants which had been relocated in East Prussia after the first raid on his Bremen plant. The plane was unarmed. On the way he was jumped by two American Mustangs but he claimed that he was able to outmaneuver them and get away with only a few bullet holes to show for it. It being after 6 P.M. he suddenly broke off his story to ask us to stay and dine with him. There was an edict in effect that one should not fraternize with the enemy and I thought of the marching guard at the door, but things were going well and I decided that the end justified the means. I accepted. He appeared delighted, went to the door and called. The young woman appeared and he told her that we were staying for dinner and to please bring out the whiskey. He then excused himself and came back shortly with a tall, well-preserved, grey-haired man whom he introduced as Mr. Junck. We were joined for dinner by the lady of the house, who I assumed was Mrs. Tank. Conversation was non-cosmic but pleasant and the wine was good.

After dinner, cigars were produced and we continued our discussion. Mr. Junck joined us at Tank's request but said little. Tank sketched out the background of the German aircraft industry after World War I. Despite the fact that the Treaty of Versailles prohibited the creation of a German air force, such a force was secretly planned and constructed after Hitler came to power in 1933 with the connivance of the Soviet Union which, among other things, granted facilities for pilot training. Aircraft production, which in 1933 totalled less than four hundred planes, increased to over five thousand by

1936 and over eight thousand when the war broke out in 1939. The necessary factories were dispersed throughout Germany, primarily in hidden areas such as woods, and were laid out so as to minimize the effect of air attack. The ease with which Poland and France were defeated led to overconfidence as to aircraft requirements, an overconfidence which was not seriously shaken by the losses incurred by the *Luftwaffe* in the Battle of Britain nor by fear of what might happen in the course of the planned assault on the Soviet Union. From General Goering down, the conviction of victory was so strongly held that the *Luftwaffe* aircraft program was put in a priority lower than that of practically all other forms of military hardware. The Focke-Wulf 190 had been designed and developed by early 1940 and its performance characteristics were superior, according to Tank, to any other German single-engine fighter. Nevertheless, the *Luftwaffe*'s first order was not received until the fall of 1940 and that order was a small one. Despite the heavy losses of aircraft during 1941 and 1942 and the knowledge that American aircraft production quadrupled between 1940 and 1942 to a total almost three times that of Germany's, no large-scale increase in aircraft production was ordered until September 1942. Production was then increased from a level of fifteen thousand planes a year to twenty-five thousand for 1943. The Focke-Wulf plant at Bremen was dispersed to East Prussia and Poland after the first raids on that city, which occurred in 1941 and 1942, although these raids caused hardly any loss in production. Tank claimed that at no time during the war did Focke-Wulf production suffer from lack of plant capacity, labor, raw materials or components.

Here was a startling story which contradicted the official British and American economic intelligence view that German industry entered the war operating at full capacity and was therefore highly susceptible to serious damage from air attack. But how could Tank be correct in view of the fact that the *Luftwaffe* had lost control of the air over Europe by the spring of 1944? Tank's answer was that the fault lay with Hitler and whimsical changes of plans and with the

Luftwaffe itself. He also had to admit that the bombing of oil production was a prime factor. I asked him whether he thought that the attack on the ball bearing industry was sound; he replied that it might well have been if properly carried out but that he felt that considerable latitude existed for redesign of aircraft and other war materials to minimize the use of bearings. I finally said to him, "You may be right in all you are saying but frankly your story puzzles me". At this point Mr. Junck spoke up. "I don't understand it either. I was in command of Air Flotilla III at the time of the invasion of France in June 1944 and my mission was to prevent it. Despite the crucial nature of my task and the fact that I was facing attack by thousands of Allied planes, my entire force on D Day had been reduced to eighty operational planes out of a total stock of one hundred sixty and my pilots were exhausted, flying five or more sorties a day. Nor could I obtain sufficient reinforcements, in the crucial weeks that followed leading up to the breakthrough of our lines at Saint-Lô, to increase my force. The total reinforcements sent to me did not exceed six hundred planes and a large percentage were lost in the process of delivery because of accidents caused by poor pilot training. All I could get was hotly worded orders from headquarters which assumed I had adequate strength to act." I almost fell off my chair at this. Mr. Tank said, "Oh! I forgot to give you Junck's title. He is a Lieutenant General of the *Luftwaffe*." Our interview continued to dwell on the seemingly contradictory factors of an alleged aircraft production which increased sharply in the face of bombing attack and an ever-weakening *Luftwaffe*. A final interesting point was an aside to me by General Junck to the effect that the lady I had referred to as Mrs. Tank was not his wife but his mistress!

Tank claimed that, although the 1943 attacks on aircraft assembly plants reduced planned production of fighters by some 30% and thereby contributed significantly to Germany's losing control of the air over Europe prior to the 1944 invasion, actual production of aircraft increased throughout 1943 and surged dramatically to forty

thousand in 1944. A major reason for this was the transfer of aircraft production, primarily fighters, from the Air Ministry to a new subdivision of the Speer ministry known as the *Jaegerstab*. Albert Speer, an architect by profession, was entrusted by Hitler with full economic authority over war production. According to the Speer ministry, single-engine fighter production for 1944 totalled nearly twenty-six thousand planes. In 1945, with conditions becoming desperate, the emphasis was on the production of a new type of aircraft, the jet. Even under the then chaotic conditions, some fourteen hundred were produced before Germany's final collapse. Tank was bitter about Hitler's interference with the ME-262 jet program. He felt that had the ME-262 been pushed strictly as a fighter, Germany might have regained control of the air for the Allied air forces had nothing to match it. The program, however, was constantly altered and delayed, notably by Hitler's insistence in 1944 that the ME-262 be made into an attack bomber because, in his opinion, Germany's prime need was an offensive weapon rather than a defensive one.

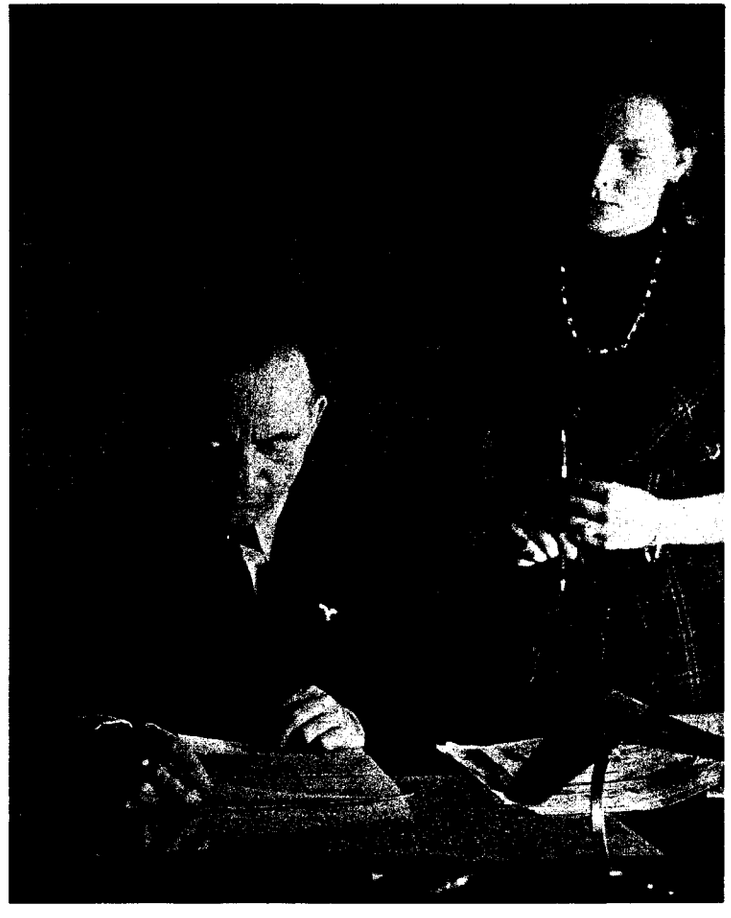
General Junck criticized Hitler for superimposing his judgment over that of professional soldiers and for issuing orders that were impossible to carry out under field conditions. Junck doubted the accuracy of the aircraft production figures of the Speer ministry. He felt that lack of proper pilot training, a by-product of the strategic attack on the German oil industry, was a primary cause of the *Luftwaffe*'s defeat. Other basic factors were delay and indecision on the part of the Air Ministry in setting up adequate fighter programs in 1942 and, in 1943, the advent of American long-range fighter escort, particularly the P-51 Mustang, and the overwhelming weight of American aircraft production and pilot training programs.

During the months of April and May, I made several trips to the Continent. One of the early ones was an inspection of the Cologne area with Mr. D'Olier, Henry Alexander, Paul Nitze, George Ball and Charlie Cabot. This was my first view of the results of area bombing. Cologne had been subjected to the first thousand-plane raid of the

RAF on May 30, 1942, and subsequently had been attacked several times, the ostensible aiming point being its railroad marshalling yards. Most of the city was in ruins and it was hard to imagine that all life had not ceased. However, it turned out that certain industrial plants in the area had managed to continue to operate despite all the devastation and one was obliged to admire the enemy's courage and persistence under fire.

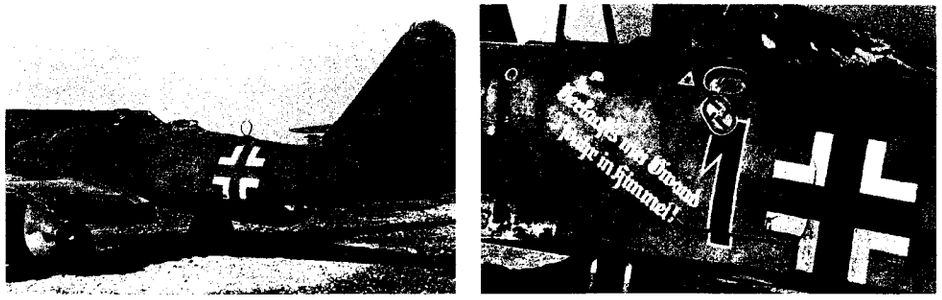
The Survey set up a forward headquarters at Bad Nauheim and I spent considerable time there using it as a jumping-off place for special trips. The first was to evaluate the effect of bombing on the principal industries of the city of Kassel. Kassel was not a primary target of the U. S. Air Forces for its principal products were locomotives and tanks, neither of which had a high strategic priority and both of which were products of industries relatively invulnerable to air attack. The war was still going on even though the Germans had retreated beyond the city. There was no place to stay so we picked out an abandoned private house which lacked windows but still had a roof of sorts. Kassel was not yet considered a secure area so we set up a guard detail and I took my turn patrolling the area armed with a forty-five pistol from 2 A.M. to 3 A.M. Nothing occurred but it made one sympathetic toward sentries in general. The situation in Kassel was similar to that in Cologne and, as it turned out, to Germany as a whole—utter destruction to the heart of the city and apparent heavy damage to outlying industrial plants. Available evidence, nevertheless, disclosed only slight loss of industrial production attributable to bombing alone.

Hitler committed suicide on April 30, 1945, and Germany surrendered unconditionally on May 7, 1945. I was in London at the time and could well understand the joy of the British people who unflinchingly had stood alone when all logic argued that their cause was hopeless. But the ending of the war only accelerated the timetable of the Survey. I made several interesting trips in the next few weeks. The first was by jeep from Bad Nauheim to Schweinfurt where I ex-



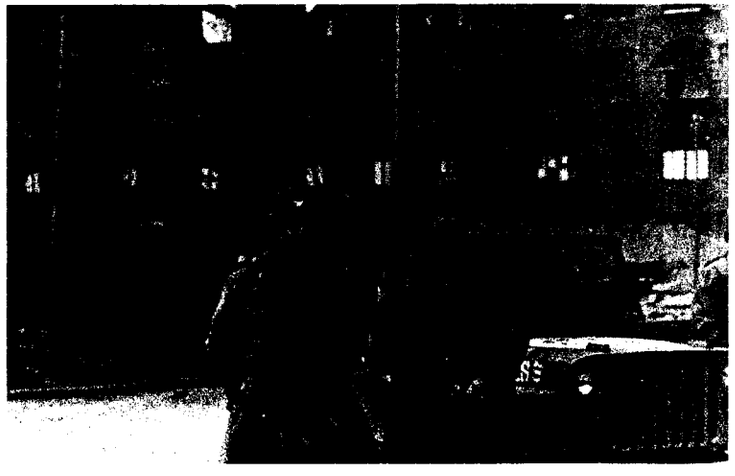
Kurt Tank and Friend

On a USSBS Field Trip



ME-262

Henry C. Alexander and Franklin D'Olier



Inspecting Ball Bearing Plants at Schweinfurt, May 1945

amined the two ball bearing plants, Kugel Fisher and SKF, which had been the primary objectives of our air attack. One was principally located in a three-story building; the other in single-story buildings of sawtooth-roof construction. The factory personnel I talked with expressed surprise that more damage had not been done in the first 1943 raid. They felt that the fusing of our bombs must have been botched for the few bombs that hit the multi-story building exploded on the top floor instead of penetrating to the lower floor where they would have damaged more delicate machinery and would have had a better chance of starting oil fires throughout the plant. They also claimed that several bombs were duds. All agreed that, if the original daylight raid by the United States Eighth Air Force had been followed up immediately by a night attack by the Royal Air Force or by a second daylight raid, the damage to machinery and stocks on hand might have had an early and severe effect on many vital elements of German front-line strength. But the Eighth Air Force could not immediately recoup the heavy losses incurred in the Schweinfurt raid and the Royal Air Force, for reasons which I shall discuss in some detail later, let the opportunity go by. The Germans were thus given a respite and the attack on ball bearings, which came within an ace of success, never achieved what had been hoped for it. On my return from Schweinfurt, I passed through a portion of the Black Forest of Germany which I had never seen before. It was lovely country, forests, quaint villages, trout streams and *gemütlichkeit* on all sides—and unravaged by war so far as I could tell.

On June 1st, I flew to Norway with General Sorenson to check on the effects of bombing with particular reference to the attack on the Knaben molybdenum facility. We flew in the Survey's DC-3 from Frankfurt. At Copenhagen we stopped to gas up and I had time to drive into the city. What a contrast to the cities of Germany! All the buildings were standing and in good order and the streets were full of bicyclists. It seemed as if I were back in the Copenhagen I had visited in 1937 and that nothing important had happened in the interim.

I even managed to stop at the George Jensen store and buy a necklace of silver hearts for Faith. The trip from Copenhagen to Oslo is one of the most beautiful in the world to those who enjoy island scenery. The coastline of southern Sweden and Norway is dotted with spruce-covered islands interspersed with lovely sounds and straits. We flew about two hundred feet above the water and this gave us a view comparable to that from a yacht. However, when we reached the gulf leading up to Oslo we encountered fog which thickened as we proceeded. There were no peacetime navigational aids available nor, for that matter, any aids at all other than a RAF radio station at the field outside Oslo. It must be remembered that the Germans had only just capitulated and that their equipment had been largely destroyed. The Norwegians, of course, had nothing of their own available because of the German occupation. After some difficulty, we made a safe landing and the RAF drove us to their quarters in Oslo. Imagine my surprise to find that these quarters were in the very hotel that I had stayed at in 1937! At the mess that evening, champagne was served free. The hotel had been used as a German headquarters and the Germans had collected and sent there the finest wines they came across when they occupied France.

After dinner, I went for a stroll around Oslo. Coming to a corner I looked up casually at the street sign and saw it read "Gildenlowesgade". I realized with a start that I was on the street where the Elsters, who had so kindly entertained us in 1937, lived. I turned and walked along until I came to a house from which hung large Norwegian, British and American flags. The lights were on throughout and I recognized it as the Elsters' old home. I went to the door and knocked. A young girl came to the door and, when she opened it, I heard sounds of revelry within. "Is this the Elsters' house?" I asked. She said it was and beckoned me to enter while she went to fetch Mrs. Elster. Soon both Mr. and Mrs. Elster appeared and both remembered me. "Come in", they said. "This is the first chance we have had since the Germans left to celebrate with our family and

friends." And what a celebration! Mr. and Mrs. Elster had survived the occupation, but only just. Because of his close association with British shipping interests, he was suspect from the outset. His sons succeeded in escaping and joining the Norwegian forces but Mr. Elster and his wife and daughter were kept under strict surveillance by the Germans. His house was searched more than once but his liquor supply had been so well concealed that it had remained intact and he had broken it out for the first time for this evening's party. Even more remarkable, the Elsters' house had been used as an underground headquarters with its own printing press—a risky business carrying the penalty of possible torture and certain death. Nearly everyone present had been on the verge of death for four years—either in battle or through illness and starvation or because of their underground activities. They were true Norwegian patriots and this was their hour of triumph for the King was to return to Oslo from his exile in England the next morning and Norway would once more have her freedom.

The next day I visited with the officials of the Norwegian aluminum company. In the course of the interview, several allusions were made to the Commando attack on the Norwegian heavy water plant, the only one in Europe. I was unaware of the relationship of this plant to any possible German atomic bomb project and, moreover, as the matter did not concern air attack, I made only passing reference to it in my report.

Shortly after the Norwegian trip, I flew to Berlin with General Sorenson and a Survey group including Philip Rhinelander. It was a fascinating experience; the city was a shambles—row upon row of gutted buildings or empty spaces where buildings had once stood. The inhabitants had practically disappeared. We went to the War Ministry, which was deserted and badly damaged. Wandering around I came across a half-open desk in which, to my surprise, were a number of printed bookmarks bearing the legend "Ex Libris Herman Goering". I took a handful as a souvenir. Shortly thereafter,

I came across an American officer who showed me some iron cross medals which he said were lying around in a room on the next floor. The only trouble was that to get to it one had to walk on a beam some thirty feet with a forty-foot drop below. Knowing that my boys would covet iron crosses, I took the chance. I can only think what a fool I would have appeared had I fallen!

The highlight of the trip was a visit to the Fuehrer's bunker. This was located in the section of the city occupied by the Soviets and consisted of an underground concrete structure of some three stories. A Soviet guard waved us in with a friendly gesture of his submachine gun. There was not much to see and the place where Hitler had his personal quarters had about a foot of water in it. Still, it was dramatic to be in the room where Hitler and Eva Braun died and to be there only a short time after the event.

My next trip took me to northern Italy. I again flew in the Survey DC-3 with General Sorenson. Our jeep was loaded on the plane so we were transportation-wise self-sufficient. Our first stop was at a Munich *Luftwaffe* field. While we were there, I saw a ME-262 standing near an uncovered runway and, being particularly anxious to inspect a jet aircraft—I had never seen one—I walked over to it, climbed on the wing and inspected the cockpit. For some reason, I was not tempted to become a Walter Mitty and jump into the pilot's seat imagining myself a *Luftwaffe* ace. It was just as well as I learned later that someone else tried to do so and was killed by a booby trap under the seat.

I regret to state that the calibre of the pilots assigned to the Survey's transportation section was, at best, mediocre. Two experiences will illustrate my opinion on this point. One was our trip over the Alps to Italy where low flying in a narrow valley during bad weather almost caused us to pile up on a mountainside. The other, more prolonged and hence more traumatic, was a trip to Paris in the early spring of 1945 in a single-engine Norseman. I was not much impressed with the pilot's appearance when I first met him for he

seemed old and seedy. His credentials were those of a utility pilot. We took off from Northolt Airdrome and crossed the Channel without incident. Between the French coast and Paris, however, a solid bank of fog was in evidence. I was sitting beside the pilot and saw that he was most unhappy so I asked him if anything was wrong. It turned out that several things were wrong. To begin with, he did not trust his competence to fly entirely on instruments and make a difficult instrument landing in Paris. Secondly, he doubted that he had enough gas to get back to London. We therefore decided to turn back and land at a small fighter field in France which we had flown over on our way. As we turned into the runway, red flares were fired to warn us off and our only remaining option was to return to England. The wind was strongly against us and I confess to the greatest relief when we finally surmounted the chalk cliffs of Dover.

Our investigation of bombing targets in northern Italy disclosed nothing of particular note. There had, of course, been few targets of significance there.

One of my more interesting assignments involved the Messerschmitt aircraft company. Willy Messerschmitt was an attractive, self-confident aircraft designer who played a leading role in the development of German aviation between World Wars I and II. He may or may not have been a Nazi party member but he was as intent as Hitler to rearm Germany in violation of the Treaty of Versailles and to restore her as the leading power in Europe if not in the world. Starting with gliders and sport planes, he was designing and surreptitiously building military-type aircraft even before Hitler. After the Nazis came to power, the official word was given to rearm and Messerschmitt's company designed and built some of the best-known German fighter planes. These were tested successfully in the Spanish Civil War. In World War II, the Messerschmitt 109 and the Focke-Wulf 190 were the mainstay of the *Luftwaffe* fighter force. When Charles Lindbergh visited Germany in the middle thirties, Messerschmitt played a leading part in convincing him that the Ger-

man war machine was supreme in Europe and that Germany had a rightful claim to leadership in Continental affairs.

Upon being taken into custody, Messerschmitt was flown to London for exhaustive interrogation and I interviewed him there. But before doing so, I visited the headquarters of the Messerschmitt company outside of Augsburg. My principal purpose was to interrogate two of Messerschmitt's principal assistants, whose names I have forgotten in the twenty-five years that have elapsed. To my annoyance, they had fled and it was only with the greatest of difficulty that I found out where they had gone. One of the two had had an important role in the development of the ME-262, the jet plane in which our Air Force was vitally interested, and both were eagerly sought as a source of technical information on this new development. I finally obtained the address of their hideaway together with a detailed road map showing how to get there. It turned out to be a summer home in the Alps above a village whose name I cannot now recall situated on the road from Garmisch to Innsbruck. The jeep trip involved led through some of the most magnificent mountain scenery in Germany and a good portion of it was over roads with which I had been familiar in peacetime. I attempted one shortcut, however, over a back road through a pass and suddenly came upon a complete SS regiment camped along the road. The war was over, of course, but this group had not as yet been rounded up for surrender. When they saw my jeep, they assumed that I had come for that purpose. The officers who spoke to me were tough looking characters but "correct". I would not have enjoyed meeting them face to face in battle. I told them that I was on a special mission but would report their presence so that proper arrangements might be made for their future.

It was somewhat after five o'clock when I arrived at the chalet I had been seeking. It was occupied by three couples, all most attractive. The men I sought were surprised at my arrival but all put on a good appearance. I explained to them, as I always did on such occasions, that I was seeking information on one subject only—that of the effects of strategic bombing—and that I was not interested in ferreting out "war criminals". But I added that there might well be other intelligence groups who would wish to question them on other matters, such as technical aircraft development, and that I would have to ask them to return with me and could not tell them how long they might be required to stay away from their families. The wives, who, incidentally, were quite stunning, obviously were upset but they all put on the best faces they could muster and asked me if I would join them for dinner. Once again I determined to violate the silly rules against fraternization with the enemy in the interests of our intelligence objectives. It was a most extraordinary evening. The wine was excellent, the ladies were at their most charming and the men spoke effectively and well—without rancor. Toasts were drunk to the U. S. Air Forces, as the winner, to the *Luftwaffe*, as the loser. I couldn't help wondering, however, how they would have behaved if they had won the war and our roles had been reversed.

The next morning, I drove back to the chalet after an early breakfast. My two "prisoners" said a tearful farewell to their wives, tossed their bags into the back of the jeep, climbed in and off we went. I sometimes wonder when they managed to get home again. We were a strange jeepload—my driver and I in the front seats and the mass of luggage surmounted by two very talkative Germans in the rear. My plan had worked well and there was nothing they did not tell me. We had not gone more than half an hour toward Garmisch-Partenkirchen when they insisted that we take a side road up a mountain in order to show me "something very special". We finally came to an Alpine farm. They took me to the barn and, once in, up to the hayloft. Then, stripping off the hay, they showed me the most modern jet engine yet devised—a rare intelligence prize.

Once again on the road, I was given an intimate picture of the successes and failures of the Messerschmitt aviation program in par-

ticular and of the German aviation industry in general. It did not differ significantly from what Dr. Tank had said. There was the same emphasis on the lack of urgency felt until late 1943, the admission that the 1943 raids caused some damage which contributed to Germany's losing control of the air in the severe air battles of early 1944, but insistence that bombing did not really disrupt German aviation production until almost the end of the war, and, finally, the claim that the failure of the *Luftwaffe* was Hitler's fault or that of the Air Ministry. The story of Hitler's intervention to change the ME-262 jet fighter program into an attack bomber cropped up again—and with it a certain smugness that the ME-262 was far in advance of any Allied plane.

When I interviewed Messerschmitt, I found him a cocky, self-satisfied character whose superficial charm quickly wore thin. Like Dr. Tank, he stressed that Germany's failure to build up a fleet of long-range bombers to supplement submarine warfare in the Atlantic was a grave strategic mistake because it enabled the United States to set up its own strategic air forces on British bases within range of prime German targets. Another major error was the failure to build a sufficient fighter force. Messerschmitt claimed that he had always assumed the United States would enter the war and that he believed in the validity of American aircraft production programs. He personally took up the matter of increased fighter production with Hitler in 1943 but found Hitler primarily interested in V-weapons programs. Messerschmitt considered the Combined Bomber Offensive a very serious threat. The 1943 attacks on the Messerschmitt plants at Wiener Neustadt and Regensburg caused a 30 to 40% loss of production for one month and the 1944 attacks a 50% loss of production for one month. While air attack on the German aviation industry did not prevent increases in subsequent production, it nevertheless contributed significantly to the defeat of the *Luftwaffe*. The attack on oil had pervasive effects which contributed most significantly to the *Luftwaffe*'s demise.

The information I had obtained from the Focke-Wulf and Messerschmitt companies was useful background when I interviewed General Kohler, Chief of Staff of the *Luftwaffe*. General Kohler's testimony as to the history of the *Luftwaffe* and the direct effects of air attack on the German aircraft industry was consistent with what I had already learned. He was much impressed by the overall effects of the strategic bombing campaign, which he felt were decisive. He singled out the attack on oil for high praise, not only for its conception, but for its execution. In his opinion, it had seriously hampered the *Luftwaffe*—both directly in its operations and indirectly through reduced pilot-training programs. I gathered that he also viewed Speer's figures of aircraft production in 1944 and 1945 with skepticism. He did not lose hope until the spring of 1945 for he felt that concentration of a jet fighter force of as little as a thousand planes manned by properly trained pilots might serve to regain command of the air over Europe. When this hope failed, Germany lost her last chance to survive World War II undefeated.

While not engaged in field trips, I continued at the Headquarters of the Bombing Survey in London where I occupied a joint office with Charlie Cabot, the Secretary. Information was feeding back from the several branches and it was not long before certain broad outlines developed. It was obvious that Germany had been devastated by RAF and United States air power. Some 2,700,000 tons of bombs had been dropped, somewhat over one-half by United States aircraft. Of this total, roughly one-third were on "land transportation", one-quarter on industrial areas and one-sixth on airfields, V-weapon bombing sites and naval targets. Only a pittance was actually delivered against the target systems set forth in the Point Blank plan, almost 10% against oil, chemical and rubber targets and 5% against "all other" target systems. Only 17% of these bombs were delivered prior to January 1, 1944, and 72% were applied after July 1, 1944. The RAF and the American air forces grew from a total of 10,000 aircraft in 1942 to 28,000 in 1945 despite the interim loss of

40,000 aircraft and 160,000 men. Against these losses, there had to be balanced the destruction of 57,000 German aircraft, most of the plants devoted to vital war production, one-fifth of all German housing and a civilian casualty total of over 1,000,000. Command of the air over Europe was won prior to the invasion of the Continent. In the final phase of the war, German industry was practically brought to a halt either by direct damage or through the effects of the attacks on transportation. Until the fall of 1944, however, production of weapons themselves had not been substantially reduced and in some instances, such as aircraft, had actually increased. Area attacks on cities resulted in heavy civilian casualties and property damage, yet production of the principal industries in the areas attacked made remarkable recoveries. The attack on the oil industry was the outstanding example of proper conception and execution of strategic bombardment and it had a decisive effect on Germany's continuing capacity to resist. The attack on transportation, when finally delivered, brought about a severe decline in production generally. And, finally, Allied intelligence failed to discover a vital factor which it seems incredible could be hidden from even superficial examination, namely, that the German war industry operated from the beginning of the war through the first half of 1943 at a low level of capacity, which gave it a far greater resiliency to air attack than had been contemplated by Allied air strategists.

The statistics I have quoted are those of the U. S. Strategic Bombing Survey. Their general validity still holds but it is distressing that they have been subjected to so many different interpretations. And, worse still, many commentators and "experts" overlook, either carelessly or deliberately, two vital elements: first, that the weight of attack, prior to the invasion of Europe, was only 28% of the total effort and, second, that the weight of attack during the entire war, on prime industrial target systems including aircraft production, ball bearings, petroleum and rubber amounted to less than 20% of the total effort. And yet, these target systems, especially petroleum, were

nevertheless so affected as to make it possible for the British and American air forces to gain control of the air over Germany and occupied Europe and thereby permit the successful invasion of the Continent in June of 1944.

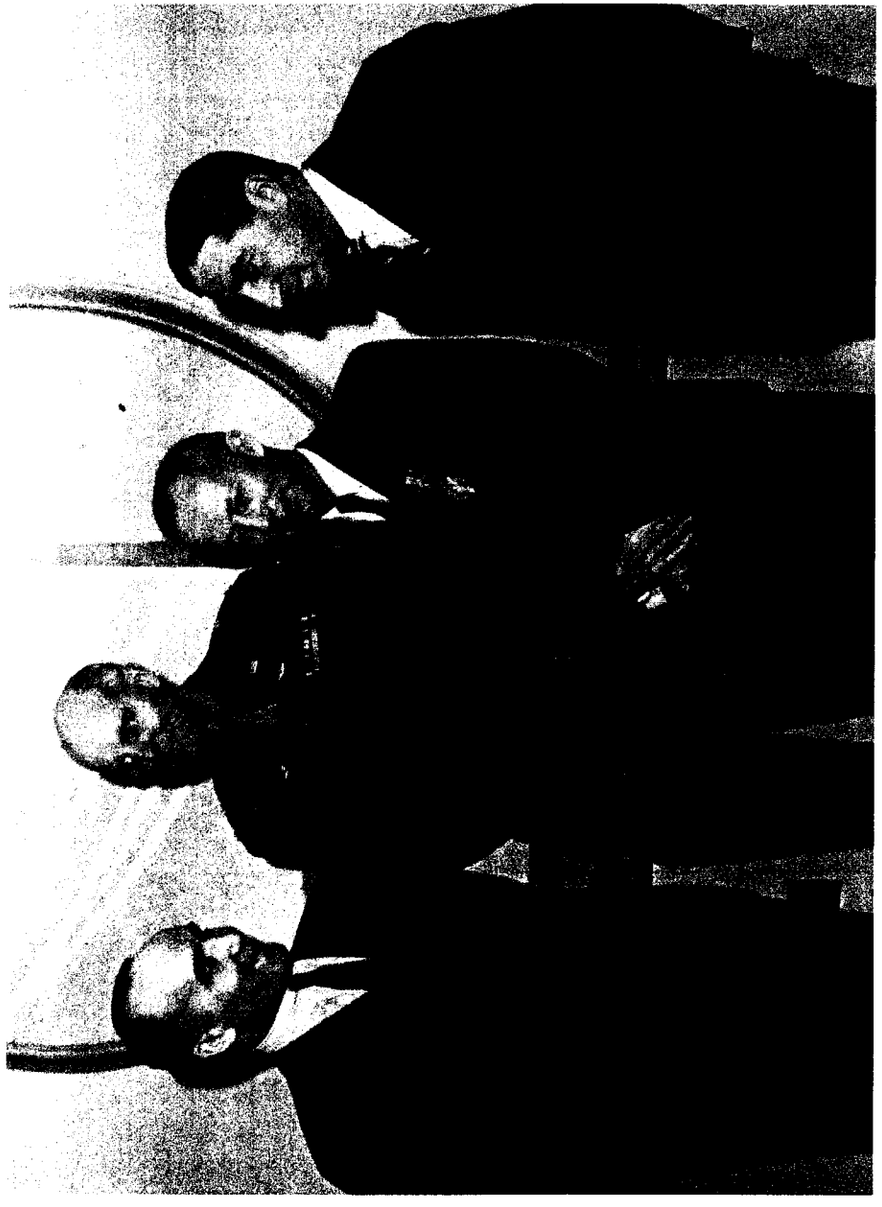
It was no surprise to those of us who had been engaged in the work of the Committee of Operations Analysts to find that target systems contained in directives from the highest military sources were ignored or only fitfully attacked. The subject was raised more than once during 1943 and 1944 by the Assistant Chief of Air Staff, Major General Laurence S. Kuter, and General Arnold made this known to senior United States air officers in England. It is difficult, however, for any senior officer to control the day by day operations of a field commander for operational factors, such as weather, enemy defenses, availability of aircraft, condition of air crews and the like can always be cited as reasons for not rigidly adhering to a plan. There were shining exceptions to this. The first was the concentration on optimum bombing targets in the summer of 1943, for which great credit belongs to Major General Frederick L. Anderson, and the second was General Spaatz's battle to concentrate his forces on petroleum targets instead of turning the strategic bombing effort over to attacks on tactical transportation objectives in the weeks preceding the invasion. General Spaatz was overruled by Air Marshal Tedder, General Eisenhower's air advisor, and by General Eisenhower himself.

Albert Speer was perhaps the best-situated individual in Germany to appraise the Allied strategic bombing effort. In February 1942 Hitler appointed him Minister of Armaments and War Production, a post he retained throughout the remainder of the war. Despite the fact that he was an architect by training and had no experience in industrial production or in administration, he achieved fantastic results. German armament production was increased in the face of Allied air attack until the final months of the war. In his memoirs, *Inside the Third Reich*, written during his lengthy confinement in jail and published in 1970, he shrewdly summarizes the weak and strong points

of the Allied bomber offensive. In no uncertain terms, he identifies the weaknesses as the RAF concentration on the bombing of cities, the failure of the attacks on city areas to substantially reduce production or to impair civilian morale and the failure to follow hard upon the attack on a vital target system, ball bearings. He admits, nevertheless, that the July–August 1943 attack on Hamburg "put the fear of God in me" and that he told Hitler that six more such raids would bring armament production to a halt. However, these statements clearly were based on his feelings at the time rather than on considered factual evaluation as in the case of the ball bearing attack. When he comes to consider the strengths of the air offensive, he pays the highest tribute yet made to the Committee of Operations Analysts by quoting our report to General Arnold, which, however, he mistakenly attributed to "the American Economic Warfare Division". The exact words as given on page 352 of his book are as follows:

> With benefit of hindsight I stated to an armaments conference on December 1, 1944: "We must realize that the men on the enemy side who are directing the economic air raids know something about German economic life; that there—in contrast to our bombings—wise planning exists. Fortunately for us the enemy began following this strategy only in the last half or three-quarters of a year. . . . Before that he was, at least from his standpoint, committing absurdities." When I said that I did not know that as early as December 9, 1942, a good two years before, a working paper of the American Economic Warfare Division had stated that it was "better to cause a high degree of destruction in a few really essential industries or services than to cause a small degree of destruction in many industries." The effects of such selective bombing, the experts pointed out, were cumulative and they argued that the plan once adopted should be pursued with unyielding resolution.
>
> The idea was correct, the execution defective.

In 1945 Elihu Root was awarded the highest civilian decoration, the Medal for Merit, for his work on the Committee of Operations Analysts. At that time, he wrote me a letter setting forth many of the difficulties which had been faced by the Committee and which, I would submit, constitutes a most valuable document for those in-



Elihu Root Receiving the Medal for Merit
L. to r.: Fowler Hamilton, W. Barton Leach, Elihu Root, G.R.P.

terested in the general subject of strategic bombing of the sustaining sources of enemy military strength.

31 Nassau Street
New York 5
May 16, 1946

Dear Guido:

Here is the group photograph taken at the presentation of the Medal for Merit.

There should have been four medals or none, for if four men ever worked in complete and unstratified equality you and Bart and Fowler and I did during our years on the steering committee of the COA.

We were given a strange job late in '42—to determine where, within the operating possibilities, bombing would most cripple the supporting enemy economy. Nobody had ever really tackled that job before. You will remember that on our first trip to England we found to our surprise that while the British had studied the vulnerability of individual plants they had not really considered economic systems of targets. There weren't any rules. There wasn't any preexisting body of doctrine to guide us. We had to start from scratch, and the problem was of major importance. The enemy economy was far too large—thousands of times too large—to blast it all. We had to choose vital points where small physical damage would cause great industrial disruption. We had to choose things which would give results within the time limit set, and we had to choose things which were within the operating possibilities. If the choice had not been well made the treasure and effort that went into building the strategic air force and the blood that was shed in operating it would have been wasted.

I think on the whole the job was well done. We made mistakes. In a new field we were bound to make some mistakes. But we developed early a sound philosophy. Certainly we very early came to the sense which the British had not yet come to, that it was better to destroy a great deal of a few things than a little of a great many. We came to the sense that the program should be simple and concentrated and that once laid down it should be adhered to with grim determination and pressed forward with inexorable energy, because there was bound to be a race between destruction on the one hand and repair and evasion on the other. Those doctrines became standard doctrines through the air corps and even the language of the early reports got into the air corps terminology and conditioned people's thinking in Washington and

in the field. There was some scattering of effort—a good deal of it. The weather caused some of it and the importunities of enthusiasts over seas caused some of it. But the air corps never lost sight of the fundamentals so that when the attacks on synthetic oil were delivered they afforded an almost perfect example of timing, concentration, rapidity and follow up, and wrecked the enemy's program. And let me say that they also furnished an example of the effect of holding one's fire until the time is ripe, and refusing to start an attack before it can be made effective or to give the enemy advance notice to begin the maneuvers of dispersal and concealment. I think the operations relating to the attack in the Pacific went more smoothly and rapidly, and were technically better than the operations relating to the attack on Germany. Before the end we had gone a long ways toward learning the new art.

A small army of people helped in the work—the FEA, the OSS, Ground Intelligence, Air Intelligence, Naval Intelligence, the British economic warfare section, and many others had a hand in it. But you, Guido—and Bart and Fowler—saw the venture born and gave it always first claim and were still standing by at the final wind-up. You were its mainspring and animating spirit. I hope you take from it a sense of accomplishment. I for one am sure that you shortened the war and saved God knows how much in life and treasure.

[Signed]
Elihu Root, Jr.

The reasons why strategic bombing in the European Theatre of Operations failed to concentrate on the selected target systems endorsed by such authorities as the Combined Chiefs of Staff are complex. One very important factor, a predilection for area attack on cities, may be ascribed to British sources rather than to American political leaders or military authorities. It arose in part from British operational experience and in part from Britain's desperate need to strike back in some way at Germany at a time when there were no other military means available.

The Germans initiated strategic bombing during World War I when they attacked English cities, at first with Zeppelins and later with the first four-engine bombers ever used. Direct damage was inconsequential. The principal indirect results were the implication that enemy morale was a justifiable target and the creation of an in-

dependent Royal Air Force. The Royal Air Force, in turn, created an independent strategic striking force under its principal advocate, Baron Trenchard. It came into existence too late in the war, however, to complete any significant bombardment campaign.

Baron Trenchard was Chief of Air Staff from 1919 to 1929. His position was that strategic bombing should be directed against military objectives and he considered industrial centers to be among such objectives. In so doing, he recognized that heavy civilian casualties would result but accepted the fact because he felt that the morale effect of bombing would prove to be twenty times more important than the material. This view was anathema to many fellow Englishmen who took the moral stance that open towns and cities should not be targets. This type of thinking led the British government in the League of Nations disarmament conferences to take a leading part in advocating the abolishment of bombing or, alternatively, limitation of bombers as "offensive weapons". Faith in legal measures of control, together with the lack of any sense of danger, kept England comfortably dormant until it was almost too late. The Royal Air Force position, throughout the period, was that bombers should be relied upon for offense but whether they should concentrate on attacking the enemy's morale or his sources of industrial strength remained unsettled.

Hitler came to power in 1933. Britain at first underrated the threat of German air power but, by 1935, evidence was accumulating that Germany was rapidly moving into a position of superiority. A crisis was at hand. Immediate emphasis had to be placed on the development and production of fighters for it was apparent that England was vulnerable to air attack. By good fortune, there were two excellent fighter models available, the Hurricane and the Spitfire. Their potential was enormously increased by the development of radar under R. A. Watson-Watt and Sir Henry Tizard. These two factors, plus the caliber of British pilots, were responsible for victory in the Battle of Britain.

Specifications for new heavy bombers were hastily prepared and

Bomber Command was reequipped by 1943. But for some time after World War II broke out, whatever the strategic theories, Britain did not possess the means to undertake a comprehensive strategic bombing campaign against industrial target systems. If any strategic bombing operations were to be undertaken they only could have been directed against civilian morale.

During the so-called "phony war" period, British government policy was to avoid initiating attack on German cities. An important reason for this noble posture was the realization that the Royal Air Force had neither the necessary aircraft, navigational aids, bombsights, bombs or training to undertake such a task. Even before the end of the so-called "phony war" in May of 1940, it had become clear, from air actions outside of Germany itself, that a daylight offensive against Germany proper could not succeed.

After the 1940 German breakthrough in France, the Royal Air Force attacked "target systems" in the Ruhr. It proved difficult to locate targets even as large as a city, however, and, despite early and inaccurate appraisals of success, no important damage resulted.

After the London blitz, the demand for retaliation grew, and by retaliation was meant attack on German morale through area bombing. Prime Minister Churchill was of this view: indeed, it was characteristic of him. He also may have discounted optimistic appraisals of bombing damage to specific targets which could not be fully documented. From that time on, despite misgivings within the Air Staff, specific target systems in practice were denigrated in favor of attack on German morale. There were notable exceptions, such as Wing Commander Gibson's low-level precision attack on the Möhne Dam which won him the Victoria Cross and late war attacks on certain oil and industrial targets.

As a result of early daylight operational experience, Bomber Command concentrated on night operations until the final stages of the war. Not unnaturally, British authorities, from Prime Minister Churchill down, were skeptical of the American air plan to attack

German industry by daylight. A crisis in strategic thinking resulted which, as I view the situation, had considerable relevance to the creation of the Committee of Operations Analysts. Both the British and the American Army and Navy differed with their respective air establishments as to the role of air power against Germany. The air leaders believed that the bombing effort should be independently directed to the destruction of Germany's war potential. The other service leaders argued that air power was merely ancillary to conventional ground and sea operations and that Germany would have to be invaded and defeated on the ground. In the United States, to complicate matters, the United States Navy and General MacArthur both urged concentration of effort in the Pacific rather than in Europe. How could precious resources be allocated among these conflicting claims?

The debate grew in force in the fall of 1942. It is stated in the RAF history, *The Strategic Arms Offensive Against Germany 1939–1945*, an outstandingly excellent work to which I am much indebted, that Sir Charles Portal, Chief of the Royal Air Force Staff, claimed, in October 1942, that a force of four to six thousand bombers, if made available in 1944, could create a situation where relatively small land armies could defeat Germany. The aim of such an air offensive would be the "progressive destruction and dislocation of the enemy's industrial and economic system and the undermining of his morale to a point where his capacity for armed resistance is fatally weakened". The British Chiefs of Staff at first concurred but, after reviewing the operational and economic assumptions underlying the RAF thesis, demurred. The argument ran through the months of October and November with the trend of thinking leading to the conclusion that the bomber offensive should be modified from the concept of victory through air power to that of permitting a successful invasion of the Continent. Similar arguments were taking place concurrently within the United States Joint Chiefs of Staff organization and it was clear that the matter would have to be determined by the highest level of

authority: to wit, the President of the United States and the Prime Minister of Great Britain. The solution would have to await the convening of the Casablanca Conference in January of 1943. Hindsight suggests that General Fairchild's original visit to Colonel Gates and the terms of General Arnold's directive of December 5, 1942, were not as incomprehensible as they might at first appear. There was no consensus on strategy and every opportunity to buttress the Army Air Force strategic doctrines was called for.

Air Marshal Sir Arthur Harris became Commander in Chief, Bomber Command, on February 23, 1942. "Killer Harris", as he was nicknamed, was an iron character who ran his command in his own efficient fashion with little respect for the opinions or orders of his nominal military superiors. He was wise enough, however, to establish a close relationship with the supreme authority, Winston Churchill, as appears from his book *Bomber Offensive*. By way of illustration, he states on page 106, "But I want to make it quite clear that I was never pressed by Mr. Churchill to do anything at his dictation, or anything with which I was not personally satisfied". Harris was a frequent visitor at Chequers and wrote the Prime Minister often. The postwar evidence is that he did not hesitate to express his own views without first consulting his superiors in the Air Staff.

Throughout the remainder of the war, Air Marshal Harris doggedly pursued one goal—and one goal only—the destruction of German industrial areas and cities. It is quite true, as he pointed out, that, at the time he took over, the decision to switch from precision bombing to night area attack had already been made. It is also true that he directed precision attacks on the Möhne Dam and on a daylight attack at low level on a submarine engine plant at Augsburg and a few attacks on aircraft plants. But Harris had nothing but contempt for what he called "panacea targets", meaning industrial target systems selected by the Ministry of Economic Warfare or any other "experts" including the Committee of Operations Analysts. In the end, he had to admit that the attack on oil, in which the RAF

participated, achieved its purpose, but he argued, "what the Allied strategists did was to bet on an outsider and it happened to win the race". Of ball bearings, he said, "the target experts went completely mad". Harris' argument was that the advocates of concentration failed to realize the many factors which made concentration impracticable. These were: (a) weather; (b) the fact that before all the targets were destroyed the enemy would know what was up and would strongly defend the remaining targets and disperse or go underground; (c) until the end of the war, the RAF could not identify or hit "an average large factory".

But why could not the operations of the RAF have been synchronized into the daylight operations of the Eighth Air Force? And more particularly, why did not the RAF follow up the first Eighth Air Force attack on August 17, 1943, on the Schweinfurt ball bearing plants? The answer Air Marshal Harris would probably give is on page 222 of his book: "With the weather went the factor of long and short nights. In June we could only attack within a circle, the circumference of which runs through Emden and Cologne, without getting caught in daylight either coming or going." Assuming this to be so, then why did not the RAF follow up the great Eighth Air Force raid of October 14, 1943, which shocked the Germans into an immediate and drastic program of dispersal and redesign of military equipment? It is true that the RAF finally attacked ball bearing production in 1944 but by that time the great opportunity to capitalize on the destruction of that industry had passed. The simple answer to these questions is that Air Marshal Harris did not approve of ball bearings as a target and no one was in a position to force him to act.

The authors of the RAF history, *The Strategic Air Offensive Against Germany 1939–1945*, to whom I again acknowledge my admiration and indebtedness, have ferreted out certain late 1944 and early 1945 correspondence between Air Marshal Harris and Sir Charles Portal, Chief of Air Staff, which illustrates the depth of feeling between

them. Sir Charles Portal was then attempting to get Bomber Command to attack oil, as had been directed, instead of cities. Harris' reply was to advocate an increased attack on twelve German cities, to question the accuracy of intelligence on oil, to stress operational difficulties and to make no bones of his opinion that he was being asked to waste his time upon another "panacea target". On December 12, 1944, Sir Charles Portal wrote Harris, "If we had tried a little harder in our attack on ball bearings I have little doubt that the full effects forecast by MEW would have been achieved". Harris retorted that he had lost no feasible opportunity to attack ball bearings and that both oil and ball bearings were "panaceas enthusiastically put forward by the amateurish, ignorant, irresponsible and mendacious MEW". As might be expected, the correspondence became more heated. The climax came in the form of a challenge to Sir Charles Portal to remove Air Marshal Harris from his command, a challenge that Sir Charles Portal did not feel he could accept in view of Air Marshal Harris' prestige.

In his memoirs, Albert Speer, the German Minister for Armaments and War Production, has dealt in great length with the attack on the ball bearing industry. He refers to the American attack of August 17, 1943, as a potentially catastrophic blow because it was directed against an industry largely concentrated in Schweinfurt which was a bottleneck in any attempt to increase German war production. According to him, 38% of ball bearing production was destroyed and immediate dispersal was impracticable because it would have required stopping production for some four months. Reserve stocks were used up within eight weeks. In the October raid 67% of production was knocked out and, as reserves had been exhausted and importations from Sweden were small, it was necessary to substitute slide bearings for ball bearings where possible. Dispersal of the industry was not accomplished until after January of 1944. Sir Arthur Harris, for his part, believed that such dispersal had been accomplished by December of 1943. In Speer's opinion, the ball bearing

industry was a prime target and the destruction of Schweinfurt and three or four other smaller plants by repeated attacks, as were later directed against the oil industry, would have brought German arms production to a standstill within four months. Speer could not understand why the attacks on ball bearings ceased after February 1944 when Schweinfurt, Steyr, Erkner in Berlin and Canstatt were attacked resulting in a loss of 70% of production. The reason, of course, was in part a shift to the attack on oil and in part the overriding decision of General Eisenhower to use the resources of the Eighth Air Force in direct preparation for the June invasion of Europe.

Reference has been made to Sir Arthur Harris' single-minded goal of destroying key German cities, whatever the views of his superiors. These views, incidentally, were not always uniformly adverse or, even when adverse, were not made explicit in carefully drafted orders. The result of his activities was the commitment of Bomber Command throughout the greater portion of the war to a series of attacks on cities which came to be known respectively as "The Battle of the Ruhr", "The Battle of Hamburg" and "The Battle of Berlin". There were, of course, numerous other city attacks such as those on Munich and Nuremberg, to which no such imposing title is attached. The last of these great attacks was that of February 1945 on Dresden.

The origin of the city attacks, as already described, was the necessity to strike Germany under circumstances where neither land nor sea power could be profitably utilized. In late April of 1942, Air Marshal Harris obtained Mr. Churchill's approval of a thousand-plane raid on the city of Cologne. This involved committing not only the entire first-line strength of Bomber Command but also its reserve and training squadrons. The attack was designed, in part, as a demonstration to convince British authorities that air power was a decisive force and, in part, to destroy the morale of German industrial workers. While the resulting physical damage to the city was great—some six hundred acres were devastated—the effect upon war

production, as analyzed by the U. S. Strategic Bombing Survey, was relatively mild. Air Marshal Harris claimed that an important consequence was a change in *Luftwaffe* production planning and order of battle which eventually stripped the German Army of its air cover. I believe this opinion to be based on the most dubious foundations.

In July 1943, Bomber Command had some five hundred operational aircraft available and this figure increased to around a thousand by July 1, 1944. Between March and July of 1943, repeated strong attacks by bomber forces, whose accuracy had been much improved by the introduction of new navigational aids known as Qboe and H2S, were made against Essen, the home of the Krupp works, Duisburg, Düsseldorf, Dortmund, Wuppertal and Cologne. These cities constituted the heart of the Ruhr industrial complex and the city centers were the aiming points, because they were of older construction and more congested and hence more inflammable. The cities of Frankfurt, Stuttgart, Kassel and Nuremberg were also attacked during this period. This series of actions was known as "The Battle of the Ruhr".

In July of 1943 there was delivered the great fire attack on Hamburg which came to be known as "The Battle of Hamburg". Incendiaries and blockbusters were dropped alternatively and the result was a fire storm which, according to Air Marshal Harris, was "even more cataclysmic than the bursting of the atom bombs over Japanese cities". Witnesses testified that these fire storms were so violent that the suction of air pulled trees out of the ground. The Hamburg attacks went on for a period of some ten nights, assisted by two small day attacks made by the Eighth Air Force.

"The Battle of Berlin" began in November of 1943 and lasted until the middle of March 1944, during which period some sixteen attacks were delivered. Once again, large areas of the main portions of the city were badly damaged but the effects were not what Air Marshal Harris had anticipated. On November 3, 1943, he had written to Mr. Churchill "We can wreck Berlin from end to end if the United

States Air Force will come in on it. It will cost us between 400–500 aircraft. It will cost Germany the war." The cost of the operation to Bomber Command was 681 aircraft, most of which succumbed to German night fighters, and the historians of the Royal Air Force have candidly stated as follows: "Moreover in the operational sense, the Battle of Berlin was more than a failure. It was a defeat."

Aerial reconnaissance disclosed heavy damage to the city centers attacked, which Air Marshal Harris himself described as the aiming points. The Krupp works were judged to have been heavily hit as was the Siemens electrical equipment works at Berlin. The British assessment of damage and loss of production was based on standards derived from experience under German attack in the early years of the war. It was faulty, among other things, in assuming that general loss of production would affect armament production more than production of consumer goods and in overestimating damage to machine tools. Loss of overall production for 1943 was estimated as 10%.

Postwar analysis by the U. S. Strategic Bombing Survey fixed the 1943 overall production loss at 9% and the 1944 overall production loss at 17%, mostly incurred in the latter half of the year. Had the percentages been confined to general armament production alone, they would have been 5% for 1943 and somewhat less for the first half of 1944. Although some four to five million men were diverted to reconstruction, dispersion of industry and other forms of passive defense, the indirect loss of general production was not felt in armament production until 1944 because other sources of labor were available. By the last half of 1944, this factor was no longer important because industrial production had already been sharply reduced by bombing.

Results of "The Battle of the Ruhr" were not anywhere as devastating as British estimates. For one thing, the Krupp works at Essen had been transformed into a development center from a production center and development work had been largely completed by 1943. Electric steel capacity suffered only slightly. Wuppertal lost two

months' production, Düsseldorf much less. For the whole area, loss of general production was approximately one to one and one-half months. "The Battle of Hamburg" incredibly only resulted in the loss of one and three-quarters months' general production. Some forms of production were lost for good but not those of the more important armament industries. The chief losers were the textile and food-processing industries. All this despite the fact that one-third of all houses were completely destroyed, another 10% severely damaged, one-half of all plants, offices and warehouses were destroyed, eighty thousand persons were killed or wounded and one million people had fled. "The Battle of Berlin" was even less impressive. Despite heavy damage to the Siemens works and the necessity of dispersing the electrical equipment and instrument industries, armament production in Berlin actually increased over the entire period.

The February 1945 attack on Dresden, one of the most devastating ever launched in the European Theatre of Operations and which has given rise to considerable postwar controversy, differed from other city attacks in that its principal purpose appears to have been to aid the Russian advance into Germany. The Russians, incidentally, although they did suggest certain other eastern German cities as targets, did not name Dresden itself. It was felt that Dresden was an important communication center and, being crowded with refugees from the East, its destruction would cause immense confusion and would upset troop reinforcements to the Eastern Front.

The attack on Dresden was carried out wholeheartedly by both Bomber Command and the Eighth Air Force. On the night of February 13, 1945, eight hundred British bombers attacked. The following day four hundred American bombers attacked and this attack was repeated twice again. The exact amount of damage done to Dresden, particularly to its industrial production, never has been adequately estimated because the city fell within the Russian sphere of influence.

It seems clear that city attacks, as advocated and carried out by Air

Marshal Harris, with assistance from the Eighth Air Force, not only failed to destroy German morale, but had no decisive or even major effect on German armament production generally, not even by way of preventing a great increase therein as planned and executed under the direction of Albert Speer. On the other hand, it would be unfair to the Royal Air Force to overlook the contribution which it made to the late 1944 attacks on oil and communications, both of which proved fatal to Germany's ability to continue the war. By this time, Bomber Command had progressed to a point where it could make more accurate night attacks using new bombs of great destructive power and also make daylight attacks supported by American fighter cover.

Considerable emphasis has been placed upon the development of the Royal Air Force and the primary commitment of Bomber Command to attacks on city areas with the underlying purpose of destroying German morale. Such emphasis is required in order to understand the apparent dichotomy in the conduct of Allied air operations against Germany. It is also basic to an understanding of the influences which operated to divert the American air effort from its announced purpose of selected precision attack to participation in city attacks which, although often concealed under the term "attacks on railroad marshalling yards", were, in fact, indistinguishable from operations of Bomber Command.

The influence of Royal Air Force thinking could not fail to be felt by American air commanders in Great Britain and their staffs. In the early period of operations by the Eighth Air Force, notably 1943, the numbers of aircraft available, the untested caliber of the crews and equipment and the lack of long-range fighter support made it impossible to concentrate solely upon target systems requiring deep penetrations of Germany itself. For purposes of training and morale, it was necessary to select less important targets such as submarine bases located along the Atlantic Coast, and other objectives which would not require long exposure to enemy fire. Even after com-

mand of the air had been achieved in the spring of 1944 and Hitler's Atlantic Wall had been successfully breached, it was deemed advisable by local air commanders to vary their attacks for operational reasons. In the latter months of the war when the attack on communications was on, cities came under attack because railroad marshalling yards were favored targets and these normally were located in built-up areas. Moreover, they were a type of target which could be attacked through cloud cover with more success than many primary industrial objectives.

The influence of British bombing philosophy is shown by the statistics of bomb tonnages dropped by American aircraft on principal target systems. In the year 1944, for example, over 60,000 tons were dropped on "land transportation targets" and approximately another 60,000 tons on "industrial areas" as compared with some 6,000 tons on "aircraft factories" and 35,000 tons on "oil, chemical and rubber targets". The relative figures would be even more startling were certain other target systems such as "all other" and "naval and water transportation" included in the "land transportation" category. In the year 1945, the relative figures were 95,000 tons on "land transportation" and approximately 43,000 tons on "industrial areas" as against 1,000 tons on "aircraft plants" and some 36,000 tons on "oil, chemical and rubber targets". Attacks on "military targets" are not included in the above calculations. Some 50,000 tons were dropped on such targets during 1944 and 45,000 tons in 1945. It should be noted that the strategic air forces were diverted during 1944 from attacks on primary industrial targets in Germany to attacks on transportation designed to assist the invasion and to attacks on strictly military targets.

The recitation of what Bomber Command failed to accomplish in its area attacks taken together with the conclusion of the U. S. Strategic Bombing Survey that the American attacks on the primary target systems of aircraft and ball bearings did not prevent German aircraft production from rising rapidly and did not slow up armament production for lack of ball bearings might well make one ask, "Just what, if anything, did the Combined Bomber Offensive and the Pointblank Plan accomplish?" The answer is, despite all errors and omissions, it accomplished everything that it had been designed to do, at least from the strictly American viewpoint, and more. The primary purpose of the strategic air offensive was to permit the earliest possible invasion of Europe, for such an invasion would have been impossible without command of the air. And whatever the economists and statisticians may have to say, Germany had lost control of the air over Europe to such an extent that only a handful of aircraft, fighters or bombers, were operationally available to meet the invasion or to assist the German armies in France in the battles that followed. The attacks on aircraft and ball bearings in 1943 and early 1944 forced the *Luftwaffe* to battle and June 1944 found it without fighters, bombers or crews ready and able to defend *Festung Europa*. Had this not been the case, the attempted invasion could have been a bloody rout.

The 1943 attacks on Germany's fighter aircraft plants caused a delay of three months in the planned production program. Acceptances of 560 such aircraft in December were at their lowest for the year. This may well have been due in part to poor weather which impeded acceptance flights. The April 1943 fighter production program called for some 1800 fighters to be produced in December 1943. In the following three months, American P-51 fighters first became available in quantity and accompanied Eighth Air Force bombers in attacks on German fighter factories. These, in my opinion, were the crucial months of the air war in Europe. Between January and March 1944, the *Luftwaffe*'s losses in experienced pilots and machines were so heavy—some 3500 fighters were shot down—that command of the air over Germany was lost and lost forever.

As I have repeatedly stressed, the Combined Bomber Offensive and, more specifically, the Pointblank Plan thereunder, achieved its primary purpose, at least from the American point of view, in

making possible the successful invasion of Europe in June of 1944. But it accomplished far more than what was originally required of it. The great post-invasion attack on the German oil industry, a primary Pointblank target system, virtually paralyzed the German military forces and, taken in conjunction with concentrated attacks on communications, reduced all German armament production to a mere trickle before the Allied armies crossed the German frontier.

The Combined Bomber Offensive, independent of any target systems attacked, achieved certain general results of no small value. One of the more important was the drain upon the German war machine caused by the necessity of assigning thousands of antiaircraft guns to defend the homeland. Many of these guns were dual purpose and could have been used to great advantage as antitank weapons. Large numbers of personnel were required to man them and the German electronic and optical industries were heavily engaged in production for this effort. Furthermore, the *Luftwaffe* was obliged to concentrate on air defense rather than on offensive operations in support of the German ground effort and, of course, the repair of bomb damage involved a great drain on men and resources. According to Albert Speer, a total of 350,000 skilled workers were required to repair damage to German hydrogenation plants alone.

It is unnecessary for my present purposes to dwell on the command difficulties and dissensions which took place in the months immediately preceding the invasion and continued during the balance of the year 1944. Briefly, General Spaatz urged that the strategic attack on oil be continued during the period of immediate preparation for the invasion but he was overruled by Sir Arthur Tedder who, as Commander of Air Operations under General Eisenhower, decreed that the entire Allied air effort be directed against French railroads and certain German communication targets. In this, he was supported by General Eisenhower, to whom supreme command, including the strategic air forces, had been entrusted.

During the three months following the invasion, the Eighth Air

Force was directed by General Eisenhower, as a first priority, to support the land battles in France and to attack V-weapon sites. Consequently only 44% of the bombs delivered during this period were dropped on targets within Germany. Nevertheless, such bombs as were dropped within Germany were dropped on well-selected targets, notably synthetic oil plants.

The attack on oil may be said to have begun with the Ploesti attack of 1943. Ploesti continued to be attacked by Fifteenth Air Force bombers based in Italy until August 1944 when the Russian advance eliminated it as a source of supply to the German armies. The most important oil targets were the synthetic plants located in Germany itself and, of these, the most vital single target was Leuna. The attack on German synthetic plants began on May 12, 1944, when five important plants were attacked. Bomber Command joined in the attack and, early in July, a special Anglo-American Oil Targets Committee was set up to assist the effort. Photographic reconnaissance indicated that the Germans were expending every effort to repair the damage done. Supreme authority was given Edmund Geilenberg over repair, reconstruction and dispersal and, in this task, he employed as many as 350,000 men. Fortunately for the Allied cause, the nature of the synthetic oil plants was such that it was most difficult to disperse them or to put them underground.

The U. S. Strategic Bombing Survey recites the history of the attacks on Leuna in some detail. Some twenty-two attacks by the Eighth Air Force and two by the Royal Air Force were made between May 12, 1944, and the end of the year. Time and time again, production was temporarily reduced to zero. Yet, within a remarkably short time, some degree of production would be restored, although not to preraid levels. However, the frequency of the attacks and their size and accuracy could only have one result and production at Leuna during the campaign against it averaged only 9% of capacity.

German oil consumption exceeded production after May 1944.

Stocks soon were used up and, by the fall of 1944, lack of fuel had reduced pilot training to a catastrophic level and, worse still, the movement of German armored divisions was restricted. By the end of the year, the situation was so desperate that, when the Ardennes offensive was launched, reserves of fuel were insufficient and the final success of the operation had to be based on the presumption that sufficient Allied fuel stocks could be captured. As pointed out earlier, another by-product, and a most important one, of the attack on oil was the destruction of Germany's synthetic nitrogen and methanol supplies—indispensable items in the manufacture of explosives. By the end of 1944, there was a shortage of ammunition on all fronts and antiaircraft gunners were told to be most careful in the use of their weapons.

Transportation, particularly by railroad and water, along the Rhine and in the Ruhr area, became a prime target in the fall of 1944. By this time, however, transportation was a far different target system than it had been in the past; command of the air had been won, forward bases were available which made it possible for medium bombers and fighters to participate in the attacks and the German armies were retreating both in France and on the Eastern Front. The U. S. Strategic Bombing Survey investigation disclosed that, until September of 1944, the German railroad and transportation complex had not been affected seriously by bombing attacks, area or otherwise. However, the great attacks of 1944 produced almost immediate results. Ruhr coal traffic dropped off 50% within a month and by February of 1945 it had stopped almost completely. By that time, there was insufficient coal even to fuel locomotives in certain areas of southern Germany and the German economy, which depended upon coal, was deprived of its supplies, with disastrous consequences.

The effects of the strategic air campaign against Germany subsequent to the invasion of Europe were cumulatively disastrous. Even so, there is ground to believe that, had the entire effort been directed

coherently against the oil industry, the war might have been ended in late 1944 or early 1945 with the result that the Soviets probably would not have been able to occupy Berlin together with the larger portion of eastern Germany. Had this been the case, one can only speculate as to the postwar advantages to the United States.

It can be argued that the attacks on oil and transportation, both of which were developed in force, were complementary. Air Marshal Tedder felt so according to his book *With Prejudice*.

The historians of the Royal Air Force in *The Strategic Air Offensive Against Germany 1939–1945* came to the following harsh conclusion as to dissension in high quarters during 1944 and 1945 over strategic target systems.

> But at this critical moment Allied strategy faltered. Where there should have been agreement, there was dissension, where there should have been decision, there was compromise and, where there should have been concentration, there was dispersal. Thus, at the end of the year when peace in Europe might have been imminent, there was still the prospect of months of war.

I mentioned earlier that, on the day of Pearl Harbor, I wondered where I would be when the war ended. I was in London on VE Day. I was also in London on August 6, 1945, the day the first atomic bomb was dropped on Hiroshima, and on August 14th, VJ Day, when Japan surrendered unconditionally.

I shared in the general enthusiasm surrounding VE Day but, unlike the celebrations at the close of World War I, this one was tempered by the thought that the war in the Pacific might extend for months and many of us might find ourselves transferred to duty in that theatre.

The news of the first atomic bomb did not fill me with joy. Its development had been a well-kept secret so far as I was concerned. I was hopeful that Hiroshima might signal an early end to World War II but I feared that it might prove a sad day for the United States in the long run. I had seen some of the damage caused by area attack on the cities of Germany and I was becoming increasingly aware of the fact

that such attacks had not resulted in any significant loss of important war production nor in the collapse of German morale. Although I had joined in signing the report of the Committee of Operations Analysts on Japanese target systems which included the fire bombing of Japanese cities as a target system, I had done so with some reservations, which I had enunciated before the report was finally adopted. It seemed to me then, and it still seems to me today, that the concept of selective attack on vital target systems is sound both militarily and morally. To the extent that civilians are killed in the course of such attacks, the scales must be weighed between their lives on the one hand and the lives of our forces and nation on the other. But the indiscriminate use of long-range weapons to attack the enemy's heartland with the primary objective of destroying his people does not appear to me to be a reasonable use of force in the context of the modern world. A cynic might add it is worse than immoral because it is ineffective.

The American strategic air effort in World War II was soundly conceived. I have tried to show that, in practice, it was not adhered to as it might have been. American air commanders in the European Theatre, possibly influenced by the doctrines of Air Marshal Harris and the views of Prime Minister Churchill and his scientific advisors, departed from the Pointblank target system and directed attacks on city areas. Many such attacks were euphuistically termed "attacks on marshalling yards".

When it came Japan's turn to be attacked and the American Strategic Air Forces were under the command of officers such as General Spaatz and General LeMay, with extensive experience in the European Theatre, conventional attacks on selected target systems soon gave way to incendiary attacks on Japanese cities, many of which proved nearly as devastating in loss of property and life as the later atomic attacks.

The use of atomic weapons against Japan was determined upon, as Secretary of War Henry L. Stimson stated and as is amply documented elsewhere, on the conservative argument that the Japanese Islands would have to be occupied in order to bring the war to a close and that such occupation would result in very high American casualties. A contrary view, principally advocated by the Navy but with some assistance within the Air Force, was that Japan had already been vitally weakened by sea blockade and air attack and that, if these were continued, no invasion would be necessary. However, there remained the question of what could be done to destroy the Japanese forces in Manchuria in the absence of Soviet Russia joining in the war.

In the spring of 1944, Mr. D'Olier, Henry Alexander, Paul Nitze and George Ball were called back to Washington to discuss Japanese strategy matters with the Air Staff. They gave it as their opinion that properly directed air attack against Japanese transportation targets could wreck Japan's economy and cause her collapse. This view was not adopted, but postwar evidence indicates that the Japanese themselves felt that they had lost the war even before Hiroshima.

After the collapse of the Western Axis, the thoughts of most American military personnel in the European Theatre of Operations turned to how soon they could shed their uniforms and return home. Two main difficulties presented themselves. The first was that the war against Japan was still in progress and might require reinforcements from the European Theatre and the second was that a continuing American military presence in Europe was envisaged by policy-makers at the highest levels of the United States government.

Relationships between the Anglo-Saxon powers and Communist Russia had been at best prickly. Hitler's 1941 attack on the Soviet Union was a most welcome event from the point of view of the hard-pressed British, but there was little that they could do from a strictly military viewpoint to assist the demoralized Soviet armies. Efforts were made, however, to supply the Soviet with much needed military equipment. But Britain had little to spare and, from the outset, the principal source of supply was the United States. Even after the Soviet armies had regained sufficient cohesion to halt the German

attacks and reverse the tide, the only way open for supplies to reach the Soviet Union was by water around Norway to the port of Murmansk. This route was made most perilous by the presence of German submarines, surface vessels and aircraft operating principally out of Norwegian bases. Stalin accepted the support that was given him with little grace, complaining that what was needed was a full-scale invasion of Europe which would necessitate a shift of German forces from the Eastern to the Western Front. Even though the American high command was anxious to undertake such a campaign as early as 1942, it was clearly an impossible task. The landings in North Africa were conceived, in part, as an answer to Stalin's requests but were never considered by him to have been adequate for his purposes. Worse still, they aroused his suspicion that what was basically intended was to occupy the Mediterranean as a jumping-off point to establish western power and influence in Greece and Eastern Europe generally. Dealing with the Russians, as has been testified to by all who engaged therein, including, notably, Mr. Churchill, Mr. Roosevelt, Averell Harriman and Air Marshal Tedder, was a difficult, hard-nosed procedure marked by paranoid suspicion of motives.

As the war progressed and the Soviet armies overran Eastern Europe, it became obvious that the Soviet aim was to advance its power across the previous borders of Finland, the Baltic states, Czechoslovakia, Hungary, Rumania, Jugoslavia and Greece and to establish a passage through the Dardanelles into the Mediterranean. Even more disturbing, there was evidence that large areas of Germany and Austria were probably included. The European powers were in no position to oppose this grand design. Great Britain alone could not do so. Only the United States had the men and the materials, together with the then ultimate weapon in the form of the fission atomic bomb and long-range bomber. There was need, therefore, to retain a substantial amount of American military manpower in Europe. There was great need for qualified individuals in such fields as military government and economic reconstruction.

I felt myself doubly vulnerable, first to a transfer to the Pacific

Theatre because of my relationship with Japanese target systems and strategic plans for attack thereon, and second to continuing duty in Europe because my experience with Western Axis target systems well might be construed as expertise either in intelligence area or in economic reconstruction. Having spent nearly five years in the armed forces, I was anxious to obtain my discharge and to return to the practice of law and life in Boston. This led to a rather unappreciated practical joke, the perpetrator of which was Charlie Cabot. Charlie and I occupied desks in the same room. One morning I was handed a document purporting to be orders to proceed to an assignment in Germany with the occupation authorities. This would have meant many months, if not years, of active duty and I blew up when I read it. Charlie's basic good nature got the better of his desire to enjoy the joke and he confessed that it was a fraud which he had perpetrated! I had arranged with Henry Alexander and Paul Nitze not to be required to join the group which was to analyze the result of strategic bombardment operations in the Pacific Theatre and the only hurdle remaining was my assignment to the Joint Target Group in Washington. However, after some maneuvering and no little difficulty, the way was cleared and in September of 1945 I returned to civilian life.

Incidentally, one hurdle which I surmounted was the possibility of assignment to a group of officers in Washington who were working upon a postwar plan for the creation of an Air Force independent of the War Department. The plan was essentially similar to the one for a Defense Department with land, air and sea branches that I had worked on with Ken Walker in 1941. Bart Leach served on this group and remained over a year in Washington to participate in the Congressional hearings resulting in the creation of the Department of Defense and the establishment of the United States Air Force. For this additional uniformed service, he was compensated by promotion to the grade of Brigadier General.

Before leaving Washington, General Fairchild asked me to submit to him my ideas with respect to the methodology of future selection of strategic targets for air bombardment. I replied as follows:

November 27, 1945

Major General Muir S. Fairchild
Strategic Survey Committee, Joint Chiefs of Staff
Public Health Building
Washington, D.C.

Dear General Fairchild:

I have given further thought to the subject of the establishment of a methodology for the future selection of strategic targets for air bombardment which we discussed briefly when I last saw you in Washington. Both matters of organization and of substance are involved.

So far as the matter of organization is concerned, I would submit that the evaluation of intelligence material for the purpose of selecting strategic air targets should be a responsibility of the Plans Section of a military staff. Possible friction between staff sections must at all costs be avoided and the best way to accomplish this is to settle questions of authority and responsibility at the outset. Under present forms of organization, the Plans Section of the Air Staff, the Policy and Strategy Group of the War Department General Staff and the Joint Staff Planners would all have a logical and proper place in the chain of authority. I would urge that final staff responsibility be fixed at the highest possible level, that is to say, at the present level of the Joint Staff Planners rather than at the level of Air Plans or of the War Department General Staff. In any reorganization of the armed services, the same principle would apply.

Responsibility for the collection and basic evaluation of strategic intelligence material should be fixed at a level above that of the Army Air Forces as presently situated in the scheme of military organization. It is my understanding that Col. Alfred MacCormack, who did such excellent work in G–2 during the war and who was recently appointed an Assistant to the Secretary of State, is to be responsible at the highest level for directing and supervising the activities of all Government agencies engaged in the collection and evaluation of this type of intelligence. Col. MacCormack, as you will remember, served as a member of the C.O.A. during its Japanese studies. This move appears entirely sound.

There should be set up, I further submit, at the highest Planning level, a body of similar character and composition to the C.O.A. with the function of passing upon such strategic air problems as might be referred to it by competent authority in the light, not only of all intelligence information

available but also in the light of forces available, estimates of their potentialities, operational considerations, and overall campaign plans. The early work of the C.O.A. was somewhat handicapped by a feeling, in some quarters, that it should not be entrusted with Top Secret material. This difficulty was finally corrected during the fall and winter of 1943–1944. Thereafter, not only did the Air Forces make available all relevant material but the Navy went so far as to make available matters of considerable importance with respect to its abilities and plans. This material was most useful in evaluating the possibilities of an aerial mining attack designed to isolate the Japanese Islands. It is fundamental that no worth while opinion can be expected of any individual or committee if all the relevant facts are not first made freely available.

In connection with the establishment of a Committee, it is clear that, if the C.O.A. contributed anything, it was because a nucleus of the group was always present and active. It will not suffice, in the future, to draw down to Washington at odd moments a group of "experts". This was the difficulty with the so-called panel of consultants contemplated by the Joint Target Group.

Most important of all, whatever the form of organization, is the selection of the right men. This issue transcends all other matters of substance. I know of no way in which this can be guaranteed. The subject is one which requires the highest quality of reasoned judgment rather than book learning, business reputation or even a distinguished flying record. Great masses of facts must be marshalled and weighed against each other and a course of action must be evolved which appears the most reasonable under the circumstances. Dogma and economic or military passing fancies must be ruthlessly eliminated. The type of thinking involved is analogous to that to which the military planner or lawyer is, or should be, accustomed. In retrospect, the Air Forces have been fortunate in the last few years, to have had a certain number of professional officers in high places who understood the problems involved and to have acquired the services of certain civilians renowned for their keen intellect and good judgment.

One cannot determine from a card catalogue, from Who's Who or from Dun and Bradstreet who has outstanding judgment. As we have seen, many men of distinction in their own fields have proved utterly unable to cope with so vast a field as that of strategic air attack. It would be my suggestion that such men as Root, Lamont, Hamilton and Mason (this list is not necessarily exclusive) should be requested to serve and that, in the event that they

are unable to do so, that they recommend someone to fill their place. In time of peace, this would involve four or five trips to Washington a year in order to keep up with developments.

Needless to say, the Committee as well as the Planners, should be kept current of scientific developments and the trend of new weapons.

So far as the approach to the problem is concerned, I know of no simpler or sounder statement than that embodied in the first C.O.A. report. The principles there laid out, if intelligently followed out, still appear valid.

A final word as to the teaching of this complex subject in the future. Reference to the files of the C.O.A. and of the U.S. Strategic Bombing Survey will disclose a wealth of valuable material from which a case system of teaching, similar to that used at several law schools with great success, might be developed. Cases on specific industries or related groups might be given utilizing freely the services of industrialists and technical experts. These might be supplemented by courses on weapons effectiveness, a brief course on economic trends, and a course on contemporary history. The greatest stress should be laid on the avoidance of dogma and the student should be taught to view the past with skepticism but not to ignore its possible valuable lessons. Any past mistakes or failures should be exhaustively studied to see why they occurred and how they might have been avoided.

I regret to state that I have not been able to think of any other officers of the regular establishment other than those whom I mentioned in the past who would appear eminently qualified to direct the classes of instruction of strategic air attack at an Air Force Academy, if established.

The above thoughts are still somewhat nebulous and I only hope that you will accept them in the spirit of constructive suggestion with which they are proffered.

Sincerely yours,
Guido R. Perera

Although I was delighted to resume my civilian career, I confess to a certain nostalgia upon severing my connections with those with whom I had been in partnership during the war years. The experience had been an extraordinary one. For one thing, I had met and worked both with professional military officers and with younger men from all over the United States who found their way into the armed services or other government posts. Many were to rise to the

top of their respective professions whether in government, private industry or academics during the next thirty years. On numerous occasions during this period I found them occupying key positions in matters in which I was involved. On such occasions, we always could meet together and cut directly to the more important aspects of the problem because we knew and trusted one another. I had formed a high regard for several of the regular officers with whom I had been thrown in contact—notably Generals Fairchild, Kuter, Fred Anderson, Spaatz and Norstad. The Army Air Forces, however, was a very different organization in 1945 than at the outset of the war. Its undeniable prominence in the achievement of victory had turned it into a large and ambitious organization determined to capitalize upon its achievements. I had favored the maximum of self-government for the air arm during World War II and I did not decry its ambition to equal status with the Army and the Navy under a single Department of Defense. What I feared was that, once its ambition had been achieved, it would tend to become stuffily bureaucratic and repeat the errors and omissions of the older established services. Might it not, for example, insist upon the continued use of aircraft to accomplish what might better be accomplished by new devices such as missiles? And might this not lead to extravagant expenditures without comparable military advantage? The answers to these and similar questions would depend, not only on how the Air Force itself was run, but on how the Department of Defense was organized, staffed and directed.