140 Data from the various national institutes and national associations not under the jurisdiction of the Ministry for Economics furnished the basis for the execution of the missions described.

The Armaments Office was required to insure that the armaments and wartime economy was fully operable so far as personnel and materials requirements were concerned, and was responsible chiefly in the following fields:

labor allocations
labor conditions and regulations
electricity and fuels supplies
industrial security
counterintelligence (industrial)
relocation of factories and contracts
Transportation and communications problems
measures taken under the Law Concerning General Requisitioning for Defense Purposes
supervision of operations and contract execution
official armament agencies and control thereof
exploitation of armament manufacturing facilities outside of Germany
examination and reporting of foreign currency requirements by the military establishment and auxiliary users
ministerial reportingrelating to reporting done by the Central Branch.

The Technical Office participated in execution of the routine or supporting missions and had the specific mission of improving the performances of all commodities and armament items produced. This involved
development and designing activities

140 examination and processing of inventions and recommended improvements

patents.

Whenever necessary the Technical Office was also to carry out special projects, give guidance to the corps area executives, and wherever required institute conversion to substitute materials.

141 Other functions in the general category of routine and supporting activities were handled by the Armaments Deliveries Office and included

planning

adjustment of manufacturing materials allocations and control of same

control of contracts in iron and steel

basic problems concerning the use of small artisans' workshops for armaments production

measures to develop industrial self-responsibility

control of chief and foreman personnel in the armament industries

control of electr-engineer personnel.

The Central Economics and Finance Sub-Section handled all budget and similar affairs, namely

representation of the Minister for Armaments and Wartime production in all matters of foreign trade

factory economy problems

tax matters

prices and price control

compensations and damages

financing

budgeting

special problems and special procurements in the economic field.

141 The Central Press and Propaganda Branch (Zentralabteilung Kultur) censored all publications concerning the fields of activities of the Ministry for Armaments and Wartime Production included under the headings

propaganda
press
libraries
photographic shops
matters of protocol
social and similar affairs
cultural requirements of personnel
technological documentation.

Coordination of efforts was the mission of the Central Office. This icluded

political indoctrination
organization and administration
legal affairs, etc.
liaison with top level government authorities and top level agencies of the National Socialist Party
special problems of rail, road, and inland waterways traffic.

During his tenure of office as Reich Minister for Armaments and Munitions Dr. Todt had appointed Corps Area Executives in the various corps areas, and the new Ministry for Armaments and Wartime Production continued to use these as its field agencies. Under Dr. Todt their mission initially had been to secure an accelerated procurement of munitions by avoiding burocratic channels. Consonant with the expanded

142 mission of the new Ministry their authority and their missions also expanded.

The previously mentioned decree issued by the Minister for Armaments and Wartime Production dated 29 October 1943 redefined the missions of the Corps Area Executives. According to the new mission assignment they were responsible for the execution of the main-effort program of the Technical Office of the Ministry at the intermediate levels, and for the proper application of technological methods within the Armament Inspectorates. For the execution of their mission they were allowed to use the Regional Offices for Technology of the National Socialist Party (Gauaemter fuer Te hnik der NSDAP). They were also required to cooperate with the industrial chiefs and foremen to insure uninterrupted progress in the manufacture of armaments.

Other agencies at intermediate levels which the Ministry for Armaments and Wartime Production made use of in the execution of its missions were the Armaments Commissions. These were bodies formed by consolidating the participating official agencies and representatives from the industrial organs operating on their own responsibility, the various industrial committees and rings, cartels, trusts, etc.

Each such Armaments Commission included as members the following:

143 the corps area executive
the armaments inspector
the regional industrial consultant
the Chief of the Agricultural Office
the President of the Regional Chamber of Economics
the President of the Regional Labor Office
the Plenipotentiary General for Building Construction
the Chief or foreman of industrial labor (armaments)
the Regional Missions coordinator (Bezirkslastverteiler).

Each commission thus comprised one representative from each of the following:

the Regional Office for Technology
the military establishment
the National Socialist Party

plus representatives from the various industrial organs operating on their own responsibility.

In each case the mission of the commission was to step up industrial output to the maximum; in particular the President was to bring about a clearly defined system of repponsibility for the individual factories and was to give uniform guidance and control to the intermediate level agencies involved in armament production missions.

To enable him to execute his mission, the President of each such commission was authorized to make final decisions.

144 Other agencies available to the Ministry for Armaments and Wartime Production were the Armaments Inspectorates and Armament Detachments, assigned unter the Armaments Office.

The authority of these agencies has been defined previous-

144 previously, in Section II, above, in greater detail.

With the removal of the industrial organizations, which were of great importance for the armament industry, from the jurisdiction of the Ministry for Economics, the responsibility for and control over all armament manufacturing activities, except for the Air Force, passed to the Ministry for Armaments and Wartime Production. Armamants production for the Air Force only became a responsibility of that Ministry in August 1944.

Pursuant to a decree issued by Hitler, the supply and distribution of consumer commodities for the civilian population had been placed under the national agencies. These were to compute current requirements and endeavor to balance requirements with the appropriate raw materials available.

These national agencies were also required to coordinate, with assistance from the Planning Office under the Plenipotentiary for Armaments, the demand for commodities required by both the civilian population and the military forces.

The final authority in deciding on the extent to which requirements in consumer goods were to be met was at all times the Minister for Armaments and Wartime Production, who had to balance these requirements with requirements for the rest of the wartime production.

In cases of doubt when allocations for the fields under the Reich Minister for Economics were reduced, the Minister for

144 Economics could request a revision from the Central Planning Committee (Zentrale Planung).

145 1. The Central Planning Committee. The purpose for which the Central Planning Committee was established pursuant to a decree by Hitler dated 2 September 1943 and connected with the decrees issued by Goering on 29 April 1942 and 4 September 1943 was to establish a uniform pattern for the entire wartime economy. The Central Planning Committee thus must be regarded as being superior to all other offices and departmentsand as the highest authority in the field of wartime economy. On the basis of data compiled by the Planning Office of the Ministry for Armaments and Wartime Production, the committee decided on the allocation of basic raw materials to the various users, measures to increase and distribute the output of the entire wartime industry, the allocation of man power to the various branches of the economy (industry, communications, etc.), and the establishment of priorities.

Consonant with its high importance the committee included as members representatives from the highest authorities in all fields involved in the military economy, plus the commanders in chief of the three military branches.

m. The Military Economy Inspectorates. For the conduct of warfare under modern conditions, the geographical position

and economic situation of any belligerent country a the deciding factors. Upon these factors will hinge the objectives aimed at and the planned duration of the war. import possibilities, and the reserve supplies of raw materials and foods will determine the extent to which the entire economy of the "ation can be used to serve the purposes of the war.

Germany's unfavorable tactical position and her economic dependence on imports necessitated stringent industrial and economic mobilization preparations in the event of war, and the failure to make such preparations had resulted in defeat in World War I.

The military economy authorities determined the measures to be introduced in the field of economy and industryto safeguard the conduct of war, including the conversion of industries not essential for the war effort to military purposes, and measures to insure increased output in the event of mobilization by the firms already engaged in armament production during peacetime. The military economy authorities thus were responsible in the field of armaments production, whereas the civilian requirements during war were a responsibility of the Plenipotentiary for Wartime Economy. Accordingly, the Military Economy Inspectorates were responsible for all measures required to insure that, so far as personnel and material requirements were concerned and in fields beyond the

146 control of the firms themselves, the various industrial firms were ready to go into full operation in the event of mobilization.[1]

In the personnel field this included measures to insure the availability of management, technical, and skilled personnel as well as unskilled labor, and to be taken in coop-

147 eration with the local labor offices and the local military recruiting offices to have the necessary personnel declared indispensable.

In the event of mobilization the local labor offices were to provide the labor, organized in groups, taken from installations that were to cease operations during war.

To insure secrecy concerning peacetime armaments production and preparations for mobilization, factory personnel, and this applied particularly to the management and other men in key positions, were to be screened carefully to insure their reliability, counterintelligence agents were to be appointed in each factory and given training, and in certain cases factory personnel were to be sworn to secrecy. The inspectorates were obligated to support factory managements in the organization of their factory defense and security services.

A matter requiring very especial stud[illegible]as that of

1. See "Aus der 10. Sitzung des Arbeitsausschusses des "eichsverteidigun srates vom 26.6.33 (pp.417-420)," compiled from "Nuernberger Dokumente Band XXXVI, 405-BC, and swern

147 the transportation and communications problems which would arise during mobilization. Here it was of high importance to arrange with the rail and other transportation services for the movement of personnel to and from work and for the movement of materials to and of finished products from the factories.

To insure the smooth operation of factories it was necessary to clarify in cooperation with the management of electricity, gas, and waterworks, the availability of electricity, gas, and water for the armament factories. If extensions in
148 this field appeared necessary, appropriate recommendations had to be submitted to the proper authorities.

In cooperation with the construction inspectors or supervisors it was necessary at the factories turning out the final article to insure that all installations already in operation or intended for operation in the armament production program were fully exploited. Here, particular importance attached to the whole sub-contraxting system, to insure that too heavy a burden would not be placed on the transportation services. Efforts were to be made to insure that the final factory would only employ sub-contracting factories in the close vicinity.

Each factory was required to enter all measures intended in the event of mobilization in a mobilization schedule, which were open for inspection by the Armament Inspectorate.

Footnote 1, p. 177--Continued: affidavit by Field Marshal Keiten, 29 March 1946 (See Nuernberger Dokuments, Band xxxx, p. 370-375).

When the Military Economy Inspectorates placed direct contracts, the execution had to be checked to insure proper adherence to the contract specifications and time schedules, and to arrange for new contracts to followsthose in process.

Each Military Economy Inspectorate compiled fact sheets giving all pertinent information on the manufacturing firms within its area of jurisdiction. These fact sheets served the Military Economy Office and/or the branches of the militar forces as planning data. The sheets contained information on such items as available manufacturing capacities, available skilled labor, semi-trained and unskilled labor, the manufacturing program of the firm concerned in the event of mobilization, its raw materials, electricity supplies, coal, and water requirements. Each inspectorate had a special Hollerith (punched card filing system) Branch to tabulate all this information

In the event of war the inspectorates had the responsibility of supervising the immediate commencement of manufacturing programs in accordance with the mobilization plans and to remedy any complications which might arise. Whereas supervision of the manufacturing processes as such was a responsibility of the construction supervisors or inspectors, the inspectorates concentrated chiefly on the delivery of materials, and the availability of labor and transportation.

149 For the execution of its missions, as just described, each Military Economy Inspectorate, later known as the Armaments Inspectorates,[1] was organized in five branches, namely,

a Central Branch
an Army, a Navy, and an Air Force Branch
an Administration Branch.

The three branches for the Army, the Navy and the Air Force were subject to dual controls, namely, by the chief of the Military Economy Inspectorate and by the military service channels concerned. The military authorities concerned had direct command authority over their respective staff branches in the Military Economy Inspectorates. Accordingly the three military ~~XXXXXXXXX~~ staff branches were required to represent the interests of their separate service branches within the Military Economy ~~XXXXX~~ Inspectorates and to implement the functional instructions they received.

These dual controls and the rivalry between the three military services in the field of armaments led to frequent controversies. This was caused in particular by the fact that during the initial stages of rearmament industrial capabilities were not commensurate with modern standards owing
150 to the preceding period of economic depression.

The chief mission of the Central Branch was therefore to serve as a coordinating factor between the military and civilian authorities of the Ministry for Economy in the matter

1. Appendix 18

150 the assignment of work to factories and was to submit appropriate recommendations on this subject to the chief of the inspectorate. This coordinating function of the Central Branch was to extend to all other activities of the inspectorate.

Another mission of the Central Branch was to insure the implementation of uniform passive air defense and factory air defense measures and all other measures in line with directives from the corps area commander. The latter category of measures involved such matters as the securing of standard trade items for use in the initial equipment of troops, industrial evacuation and salvage operations, and cooperation in planning for construction.

In dense industrial areas the Military Economy Inspectorates were unable to cope with the profusinon of missions. Armament Detachments were thereupon created to support them. The mission of these detachments was to execute the missions enumerated above within their assigned sectors of the area under the jurisdiction of the Military Economy Inspectorate. The staff organization and distribution of functions within the armaments detachments corresponded to the arrangement within the Armaments Inspectorates, from which they received their instructions.

The mounting importance of the Military Economy Staff of the Joint Military High Command had resulted in creation of the Military Economy and Armaments Office and a corresponding

150 redesignation of the Military Economy Inspectorates as Military Economy and Armaments Inspectorates.

151 Following establishment of the Armaments and Wartime Production Ministry under Minister Speer and the assumption by the new ministry of sole responsibility for all Army and Navy armaments production activities, armament production responsibilities were taken out of the Military Economy and Armaments Office of the Joint Military High Command in 1942 and assigned to the Armaments Office within the new Ministry, under General Waeger. At the same time the Military Economy and Armaments Inspectorates were redesignated Armaments Inspectorates and transferred to control by the Armaments Office of the Ministry for Armaments and Wartime Economy.

In practice the responsibilities of the Military Economy Office within the Joint Military High Command from then on extended almost exclusively to the occupied territories.

Finally, the Ministry for Armaments and Wartime Production in March 1943 ordered a reorganization of the armaments inspectorates.[1] Each inspectorate received a new branch designated the ~~XXXX~~ Staff Technical Branch (Technische Betriebsbereitschaft). The engineer heading this new branch served as the technical consultant and advisor to the chief of the inspectorate, and represented him in dealings with the innumerable other agencies

1. Appendix 19.

151 which had been newly created and were involved in the armament industry, such as the corps area executive, the regional headquarters of the National Socialist Party, the representatives of the Air Force, the industrial organs operating under their own responsibility, and so forth.

The branches representing the Army, the Navy, and the Air Force were reduced in size, and each inspectorate was from now on assigned only one field grade officer for weapons technology; on the other hand each inspectorate received a new Final Products Branch and an Industrial Deliveries Section.

It is safe to assume that this reorganization was due to the steadily deteriorating armament situation and the consequent necessity for improvizations. This necessitated a shift in the mission of the armament inspectorates from that of a directing body within an existing organization to the mission of devising improvized measures necessitated by the constantly changing situation.

n. ~~The Reich Defense Commissars~~. Pursuant to a decree dated 11 September 1939 Reich Defense Commissars were appointed to act as field agencies for the Ministerial Council. The mission of a Defense Commissar was to insure uniform direction of civilian defense activities within his areaof responsibility, and to coordinate within a uniform pattern the measures taken by civilian authorities. Since the civilian authorities

152 themselves were required to coordinate their measures in adherence to a uniform pattern , the Commissar only needed to intervene in cases where uniformity within his mapps area was jeopardized, or when difficulties developed among the various civilian authorities or between the civilian and military authorities concerned.

Furthermore the commissars were required to enforce the implementation of sprcial orders or detailed instructions received from the Ministerial Council, the Plenipotentiary for the Four Years Plan or the appropriate industrial authorities, the Chief of the Joint Military High Command, or the highest governmental levels.

The functions of the Commissar thus had nothing to do with current administration activities but were exclusively of a coordinating and supervisory nature. The Commissar had no office staff specifically for these purposes.

Since civilian interests had to be subordinated to military considerations, the area of responsibility of a Commissar corresponded to the delimitation of a corps area, for which reason the Commissar was stationed at the locality of the corps area headquarters.

In consonance with the then current principle of unity
153 of State and Party (the National Socialist Party), the Commissar had to be a Party official. Because of the high importance

153 of the missions assigned, the post was usually filled by a Regional Leader (Gauleiter) of the National Socialist Party.

Within the areas of his responsibility, the Reichs Leiter was authorized to issue directives to all authorities within his region of jurisdiction; furthermore the civilian authorities within the corps areachanneled their reports to the highest national and Prussian provincial authorities on basic matters of national defense, through him, while the corps area commander had to channel his recommendations and requests to the civilian authorities also through him. Within his area, the individual Commissar thus held a key position which was exceedingly effective.

During the first years of the war the activities of the Reich Commissars for Defense was hardly noticeable to the superficial observer. It was only after the commencement of the air offensives against German territory that they were in some cases able to give valuable assistance, for example in pressing through measures which had to be taken immediately

As difficulties mounted in the field of economics and industry during the last two years of the war, however, the Commissars tended to take steps which would insure the use of the stillaavailable machinery and man power in the interests of their own specific areas without regard for higher requirements.

153 Such action in a number of cases had a hampering effect on the production of military equipment, since some of the Reich Defense Commissars refused to permit the movement of tooling machines and man power from bomb-damaged factories for relocation in premises outside of their areas. In other cases they attempted to organize manufacturing operations without regard for the overall programs, producing items which could not be used because other parts ~~fxiixd~~ were lacking.

For the above reasons the activities of the Reich Defense Commissars had a hampering rather than a beneficial effect during the final stages of the war.

e. Industrial Organization. The industry was organized regionally and by function. The functional organization was subdivided into unions or chambers of industry, commerce, and trades, arranged in sub-groups, specific trades groups, industrial groups, central industrial groups and, at the highest level the National Boards of Industry, Commence, Banks, etc, headed finally by the Reich Chamber of Economics.

The mission of the local groups was to furnish instructions and guidance to their members, namely information concerning the introduction of new technical methods, new industrial materials, and technological progress in allied fields; furthermore, members were posted on all important economical problems of their particular branch of industry, measures

154 to reduce production expenditures, industrial finances, taxation and other general economic problems.

155 The regional organization was arranged in local chambers of industry, commerce, and trades, through chambers of economy (Wirtschaftskammern) to the Board of Industry and Commerce (or rederated Chambers of Industry and Commerce) and the highest level of the Board of economy within the Reich Ministry for Economy, where it acted as an advisory body.

As organs of the self-administered industries and commerce, the local chambers of industry and commerce represented the interests of their members within the scope of the overall economic system and maintained a balance between the various branches within their specific districts. As a service to the State they were required to support the local authorities with information and expert opinionsand to assist in the fields of raw materials supplies, foreign currency control, price control,and professional training.

The were combined under district chambers at the district level. The head of the district chamber was the district chief executive for industry and commerce. These district chief executives formed the advisory board for Industry and at the same time were members of the Advisory Board ~~XXXXXXX industryxxxdxxxxxxxxx~~ of the Chambers of Industry and Commerce (Beirat der Industrie- und Handelskammer). The mission of

155 the district chief executive was to represent the justifiable interests of their groups of the economy at the chambers.

The whole organization functioned in accordance with the principles of self-administration, and the only prerogative exercised by the Government was that the Reich Minister for Economy appointed the persons to head the organizations at the top levels, namely, the Chief of the Reich Board of Economy, the Chiefs of the Federated Chambers of Industry and Commerce, their deputies, and the Chiefs of the Reich and Central Industrial Groups (Reichs Gruppen und Hauptgruppender Industrie).

In many cases the delimitation of the areas of the district chambers of industry and commerce coincided with the regional and corps areas. In order to have the whole organization coincide with that of the regional subdivisions, regional chambers were established in 1943, in which the existing district chambers were consolidated.

At the same time the self-administered industrial agencies (committees and rings--~~Ausschuesse und Ringe~~) established by the Ministry for Armaments and Wartime Economy were integrated with the chambers of industry and commerce in order to coordinate overlapping activities for the benefit of the various factories and other concerns.

Planned economy and the complete isolation of Germany from inte national markets during the war gave rise later

156 to the establishment of national committees to control raw materials and manufactured commodities, such as the National Teetile, Rubber, Metals, and Fats Control Committees. In addition to their controlling functions, these committees were to relieve the burden on the Ministry for Economy.

Finally, raw materials shortages compelled industry to make a steadily increasing use of artificial substitutes. The federations at the national level assumed responsibility for the procurement of these substitutes. These federations represented a vertical combination of the various special and general bhambers of industry and commerce and the Reich industrial groups for various categories of commodities, such as the Reich Federation for Iron, the Reich Federation for Wool.

The organizational system of the industry functioned between the industrial concerns and the Government, and its salient f ature was that all problems of mutual interest to all members were discussed and the justifiable interests of all concerned were represented in relations with the State.

In addition to the organizational setup just described, over which the Reich Minister for Economy exercised Governmental supervision, an organization of committees and rings developed as a self-administered system during the war, from 1943 on, under supervision by the Ministry for Armaments and Wartime Economy.

157 Both of the above forms of organization, which existed side by side, had the same objective, that of promoting the interests of the economy, with the organizational setup supervised by the Minister for Economy gradually becoming les influential.

All important firms participating in the air armament program were combined in the Committee for Aviation Industries (Wirtschaftsgruppe Luftfahrtindustrie)[1] where they were subdivided into special groupings for aircraft fuselage, aircraft engine, and aircraft equipment manufacture. These special groups again were subdivided into sub-groups. In line with the previously stated general mission, the Committee for Aviation Industries handled all matters of common interest to the aviation industry, promoted marketing--in particular export sales, conducted statistical reviews, made preparations for participation by firms in fairs and shows, and assisted in patent problems, and the establishment of standardized sizes and qualities in the aviation industry.

158 One of the most important functions here was to maintain contact with the Reich Air Ministry, particularly with the Technical Office of the Ministry, and to represent the interests of the industry at this level. The detailed statistics

1. See "Die deutsche Luftfahrt, Jahrbuch 1937," Orlovius Schulz, "Abschnitt B, Industrie und Technik, a.Wirtschaftsgruppe Luftfahrtindustrie."

158 prepared by the committee in many cases served as important data for the work done by the Technical Office or by the Chief of Air Force Special Supply and Procurement Service.

The capacities of the aviation industry in Germany in 1933 were by no means adequate to cope with the missions the industry was assigned. The industry alone was not able to create the essential conditions for execution of these missions because the firms involved could not provide sufficient funds or sufficient trained personnel because of the economic crisis which had just passed.

This made it necessary for the Technical Office to systematically develop the industry, on the one hand to avoid investments which would not serve the production programs, on the other hand because Germany's unfavorable tactical position made it imperative that the appropriate offices should exercise an influence on the selection of localities for the more important factories to be established.

The firms forming the Committee for Aviation Industries were all directed and controlled exclusively by the Air Ministry. The Ministry for Economy exercised no influence whatever over them. The structural setup of the firms manufacturing aircraft fuselages and engines differed completely from that of firms in the general industries; furthermore a firm control over these firms was essential for an accelerated

rearmament program. For these reasons it was not possible for the industries under the Ministry for Economy to participate in the execution of the program. Furthermore, the need for secrecy made it necessary to confine within the narrowest possible limits the number of governmental agencies involved in armament projects.

From the organizational viewpoint the industry was subdivided basically into firms handling development and firms manufacturing under licence the models thus developed. Initially the firms in the two categories were completely independent one from the other, each executing its part of the program on its own responsibility.

However, the difficulties encountered in manufacturing under licence fuselages, engines, and items of equipment not yet completely out of the development stages, and the complications arising from changes and corrections made to the construction data during manufacturing processes finally made closer links between the developing firms and the manufacturing firms unavoidable. Initially, engineer personnel detached for the purpose served to insure cooperation.

One disadvantage in the separate categories system was the principle of commercial competition. The firms handling development feared that by turning over all their experience to the manufacturing firms, they were supporting post-war

159 competitors. This caused numerous difficulties in the manufacturing part of the program due to the reluctant and incomplete turnover of data by the developing to the manufacturing firms.

Apart from the considerably increased funds required for the system of factories manufacturing under licence the fuselages, engines, and items of equipment developed by other firms it was anticipated that the system would cause difficulties in the supply and/resupply services to troops, because the units would be equipped aircraft of differing manufacture.

160 To avoid this disadvantage, which would have had very serious consequences for the troops, a Patents Pool (~~Patentee-~~ ~~meinschaft~~) including all member firms of the Committee for Aviation Industries and manufacturing rings or cartels were established at the instance of the Technical office. A legal basis for the Patents Pool was provided by the licensing contract, which contained clauses protecting the rights of the patentee, established the obligations of the licensee towards the patentee, and determined the uses of the articles manufactured under licence and the duration of the contract under which the ~~xxxxxxxx~~ could be used.

Another condition for smooth collaboration between the developing and manufacturing firms was created by means of a licensed manufacturing contract stipulating the quatities

160 to be manufactured under the contract and deadlines for the manufacturing contracts involved, the extent to which use of the constructional and manufacturing data furnished was authorized, and the obligations of the contracting parties towards each other. The existence of these contracts made the establishment of manufacturing "rings" or cartels possible, in which the firms manufacturing a specific item were organized.

Rings of this kind were organized for the first time in 1933 and involved the firms manufacturing fuselages and engines Under instructions from the Chief of Air Force Special Supply and Procurement Service dated 15 August 1941, issued pursuant to recommendations from the Industrial Council, the system was extended to the entire aviation industry.

The direction of these rings was assigned to the developing firms, which were required to furnish in good time all

161 working data, blueprints, installations, etc., required for orientation of the personnel of the manufacturing firm. The development firms were also responsible for the timely transmission of all experience, particulars on modifications, for measures insuring rational manufacturing processes, and finally for the uninterrupted manufacture, in line with deadlines, of the items involved within the ring concerned.

In the case of firms using only certain departments of their factories on manufacturing contracts for the Air Force,

161 only these departments became members of the appropriate ring, and the ring authorities had no right to interfere with the other manufacturing activities of the firm concerned.

When the development of an item was completed so that it could go into production, control over the ring was transferred to the most reliable of the firms manufacturing the item under licence.

Approximately 100 such rings existed at the time.

From the commencement of rearmament activities the Technical Office had adhered to the principle of giving only guidance, and this was why the responsibility for the manufacture of Air Force equipment within the rings was assigned to the developing firm and later to the most reliable manufacturing firm. The idea was to refrain from interfering in the affairs of the individual firms and to promote the feeling of self-responsibility.

Another reason for the extension of the ring system to all firms engaged in armament development and production work for the Air Forcewas the heavy increase in the problems the Technical Office with its existing organization had to handle. The demands of the individual firms for factory expansions, semi-finished products, tooling machines, man power, and metals in short supply had assumed such proportions that it was impossible for a central

it was impossible for a central agency, such as the Technical Office, to verify their justification. It was to be assumed that various firms, with an eye to the peacetime economy of the future, would endeavor to create as favorable a position for themselves as possible by expanding their factories, rationalizing operations through the installation of tooling machines, and by stockpiling construction materials. If some centralized authority was required to verify the various claims it would have had to be built up to a size which would have hampered progress. Therefore, the various heads of rings, as independently operating organs of the industry, were assigned responsibility for insuring a rational use of existing capacities, tooling machines, man power, and for an economic use of metals in short supply. In each case the most efficient engineer in the leading firm of a ring took over the post as chief of his ring, and his firm made the necessary supporting personnel available to him.

The idea of industrial self-responsibility thus fostered by the Air Force Technical Office was adopted later by Dr. Todt, after creation of the Ministry for Munitions, and expanded to the industries supporting the Army and the Navy. For this purpose, the chiefs of the appropriate branches of the Technical Office addressed a meeting of representatives from the industries supporting the Army on the processes

of procurement, construction supervision, and acceptance. The meeting was under the chairmanship of Dr. Todt personally. However, Dr. Todt was killed in an air accident in 1941 and his death prevented implementation of the appropriate measures planned by him.

Under his successor, Reich Minister Speer, the Ministry was redesignated as the Ministry for Armaments and Wartime Production and its responsibilities extended gradually to include the entire Army and Navy armaments programs. The whole system of planning and executing projects then underwent fundamental changes.

The deteriorating military situation in 1942 called for a firmer consolidation of the entire armaments industry. For organizational and functional reasons it was not possible to make use of the Army and Navy Ordnance Offices for the purpose, so that the missions involved could only be accomplished with participation by the existing organizations of the armaments industries.[1] These were arranged in two categories: committees and rings (or cartels). The firms represented on the committees were those who were manufacturing final products; thos organized in rings were the firms who supplied semi-processed materials and semi-finished articles.

The committees were organized in Main Committees, Special Committees, and Working Committees. A number of committees

163 engaged on one and the same manufacturing project formed a Special Committee, and all other committees of the same category formed a Main Committee, as in the case of aircraft. The same arrangements applied to the rings.

Acting as self-responsible organs of the industry, the committee and ring chiefs insured that the capacities of the various firms were fully used, and that the whole process of production, including the preparatory work and the proper exchange of all experience in all production problems, functioned smoothly. Control of the committees and rings was in the hands of the leading engineers in the category involved.

In this system of self-responsible organization of the industry the main committees and rings were authorized to maintain their own district representatives, one to each area served by an armament inspectorate. These men served as advisors to and representatives of the factories within their district, which were members of their main committee or ring.

Another factor in this self-responsible organization was the Armaments Chief (Rüstungsobmann), an industrialist usually selected from among the district representatives. ~~He~~ The Armaments Chief represented industry on the Armaments Commission and it was his responsibility to remove differences

Footnote 1, p. 197: Appendix 20.

164 between planning and the man power available. As a rule, the Armaments Chief also headed the Industry Branch of the Chamber of Industry and Commerce.

This network of district representatives and industrial chiefs represented the final consolidated representation of the industrial concerns in relations with the various official agencies and the Central Planning Office, all of which furnished their own, and frequently conflicting, dircetives to the industry. A decree dated 29 October 1943 regulated the attachment of the Main Committees and Rings, in functional respects, to the appropriate Offices of the Ministry for Armaments and Wartime Production.[1] The decree mentions twelve Main Rings and fourteen Main Committees.[1]

Responsibility for the following categories was consolidated in the Main Committees:

165

Gunpowder and other explosives	(three Main Committees)
Electro-technology	
Fine Mechanics and optival instruments	
Steel and iron construction	
Armament equipment items	
Sheet iron and other metal	
Machinery construction	(14 Main Committees)
Weapons	(23 " ")
Ammunition	(18 " ")
Tanks and tractors	(8 " ")
Other motor vehicles	(16 " ")
Rail vehicles	(3 " ")
Shipbuilding	(7 " ")

165

Building construction	
Aircraft fuselages	(21 Special Committees)
Aircraft engines	(17 " "
Aircraft equipment items	(19 " ")

The following subjects were consolidated in Main Rings:

Iron production	(16 Special Rings)
Iron processing	(5 " ")
Metals	(7 " ")
Manufacturing installations and machinery parts	(15 " ")
Electrical appliances	(11 " ")

The Main Committees for fuselages, aircraft engines, and other aircraft equipment only came into being after deactivation of the Office of the Chief of Air Force Special Supply and Procurement Service, when the responsibility for Air Force armaments was taken over by the Ministry for Armaments and Wartime Production in August 1944.

By far the greater part of the entire German economy came under control by the Minister for Armaments and Wartime Production, since the previously mentioned decree attached all categories represented by the main committees and rings, as well as the councils (Wirtschaftsgruppen) for the textile industry, clothing, the leather industry, wood processing, paper manufacturing, printing, glass, ceramics, footwear, tobacco, building construction, the Reich Representative for Wooden

Footnote 1, p. 199: Appendix 21.

166 Building Construction, electricity, gas, and water supplies to the appropriate Offices of the Ministry

167 p. Personnel. At the beginning of 1933 the entire aviation industry employed only approximately 3 500 to 3 800 persons, the majority of themof advanced age, and some of them carried over from World War I.

A younger generation of employees in the industry was non-existent, since the profession held out no prospects for young people. Therefore, no personnel had received regular training for the industry for years past, although measures to promote aviation sports had successfully maintained interest in both glider and powered aviation.

Apart from the adverse factors just described, the economic depression had compelled most of the firms to discharge some of their experienced cadre personnel, and in some cases their entire staff, particularly in the 1930-32 period,which resulted in a serious loss of valuable experience gained during World War I.

The situation in regard to engineering personnel was similar. In spite of the successes achieved by the glider groups formed at the technical colleges, and in spite of the indubitable keen interest shown by the students, there was no incentive for them to choose this as a main subject in

167 their professional studies and training. On an average only one student per college and semester completed his studies in aircraft designing and construction.

Consequently, the Industrial Expansion and Procurement Programs drafted in 1933 by the Technical Office pursuant to the plans of the General Staff, and the execution of which was to be completed as the first phase of the rearmament, encountered serious difficulties in the personnel field. Exceptional measures had to be introduced to at least partially overcome these difficulties.

To meet planning requirements, personnel in the aviation industry had to be increased from approximately 3 800 to 70 000 within two years, 1933-1935. It seemed impossible to introduce such a large number of new personnel into the industry and have them oriented by the available cadre personnel without incurring serious manufacturing difficulties, serious reverses, and considerable losses in materials and time, thereby jeopardizing the completion of programs by the established deadlines.

The necessary measures had to be devised to meet the requirements not only for brief courses of retraining for skilled personnel coming from other industrial branches, but also of training for completely untrained workers, of factory apprentices, and later of directing personnel, in particular of

168 master craftsmen. Finally, the already available personnel had to be given refresher training to bring them up to the raised standards resulting from progressing developments. A program of speedy and nevertheless thorough trainigg was of particular importance because initially no plans existed or could be expected for introduction of synchronized work or production belt methods, which increased the number of skilled and semi-skilled personnel required.

To have transferred responsibility for this training mission to the aircraft factories would have exceeded the capabilities of the fuselage and engine manufacturing firms, who would have had to use some of their already completely inadequate number of cadre personnel for the purpose, and they were unable to dispense with these since they needed them for preparatory work and for execution of their parts of the procurement programs.

Furthermore, the executive personnel were occupied with measures to insure execution of the programs, namely with planning, the establishment of new or expansion of existing factories, the organizational steps necessary for production, the construction, designing and production of the manufacturing and accepting devices and installations, the creation of the operational organization necessitated by the transition from individual to serial construction, and so forth.

168 The manufacturing firms therefore could not possibly make suitably trained personnel available for training purposes.

169 The size of the missions to be executed simultaneously therefore in 1934 necessitated the establishment of a special agency, the Industrial Labor Buro. This buro received the mission of carrying out all necessary measures in the training field as a basic condition for the procurement of adequate personnel for the program. Since the most practical and speedy way to execute this mission was in close cooperation with the industry, the buro was placed under the Chief of the Technical Office.

The good results achieved by the bureau in the next few years resulted in the responsibility for the training of military pupils at the preparatory air technical schools being also assigned to it. These were the personnel who were to become members of the air technical NCO corps, and they also received their training without any necessity to use cadre personnel from the factories for the purpose. Then the bureau assumed responsibility also for the training of apprentices for assignment to air bases.

Unfortunately, the assignment to the Bureau of troop training activities led to controversies between the Chief of Air Force Special Supply and Procurement Service on the one hand and the Chief of Training on the other, with the outcome

169 that the Industrial Training Bureau was transferred from the Chief of Air Force Special Supply and Procurement Service to the Chief of Trainins, probably in 1942. This change unfortunately had a detrimental impact on training standards achieved, since it interrupted the existing close contact with the industry and excluded the beneficial influence of the Chief of Special Supply and Procurement Service.

The first practical step taken by the Industrial Labor Bureau was the establishment of training workshops in the more important industrial concerns participating in the air armament program.

170 The whole program was greatly facilitated by the use of the unemployed, of whom there were more than six million at the beginning of 1933. The measures instituted by the new Government (the National Socialist Party--Note by Translator) to create employment were not yet making themselves felt to any great extent, and Army and Navy expansion had hardly started, so that the Bureau was able to procure adequate numbers of skilled personnel from branches closely related to the aircraft fuselage and engine manufacturing industry for retraining.

Also the measures taken by the Bureau coincided with the efforts of the new Government to reduce the number of unemployed as speedily as possible.

179 For the above reasons the Bureau received very full support from all official sources, particularly from the industrial executives appointed by the Technical Office at the more important manufacturing firms, and later from the Armament Inspectorates.

In view of the progressive employment program instituted by the Government, however, it was to be assumed that within a relatively short time no skilled personnel from other branches of industry would be available, so that the training program then would have to rely on unskilled personnel.

Originally intended for only short duration, all retraining measures were extended time and again because of the steadily mounting size of the armament programs and because of the personnel shortages which became more and more evident from 1939 on, so that the retraining program continued right until the end of the war and finally was extended also to foreign civilian personnel.

The normal retraining course lasted six weeks, and was only extended under exceptional circumstances. Using experience accumulated in this field by the firm of Junkers a method was used. founded on a working-pedological system consisting of a preplanned and methodical orientation. The training data compiled by the Training Aids Center of the Reich Air Ministry

Footnote 1, p. 204: See "Bericht von Dr.Ing.E.Krause ueber die Ausbildung in der Luftfahrtindustrie."

171 at Dessau proved a valuable support. These consisted of a series of specific handicraft exercises to be practiced methodically in a concentrated form from the very first day on. The short term courses included all subjects of fuselage and engine construction, free-machining, smithy work, tempering, and welding.

The use of modern training methods and aids produced exceptionally good results, and the number of personnel trained in this way is estimated at several hundred thousand, of whom approximately 70 000 were accounted for by the firm of Junkers alone in its factories within Germany and in foreign countries.

T The Technical Office paid the firms two Marks daily per trainee to support their efforts. This support was discontinued when a stage was reached at which the firms could conduct retraining programs in their own interests.

As previously mentioned the need arose, besides the retraining courses, for the training of future qualified personnel. This was a long-range program and was to insure later availability of leading personnel. For this purpose the Bureau established special training systems at the more important factories to give training to apprentices and refresher training to qualified personnel in order to keep them abreast of current developments. One necessary condition here was the creation of two entirely new and separate crafts in the field

171 of engine construction.

The training course here followed the principles in use in most large concerns today, but lasted three-and-one-half years instead of the customary three years.[1]

The other missions of the Bureau, those of training for instructors and for master craftsmen to serve as shop foremen, and that of giving advanced training and education to employees in general assumed high importance for the fulfillment of the qualitative and quantitative requirements of the production programs when the majority of skilled craftsmen were called up for military service during the war, necessitating the employment of unskilled labor and foreigners.

The training and retraining activities of the Bureau provided a basis for in available personnel for the speedy build-up of the aircraft industry and thus for execution of the unit activation plans prepared by the General Staff. Their importance from this viewpoint increased still further during the war, which lasted longer than anticipated, when the drafting of personnel employed in the armament industries for military service necessitated the training of foreign labor.

Close cooperation with the Technical Office and with the Chief of Air Force Special Supply and Procurement Service

172 combined with the uniform control of the aircraft industry enabled the Bureau to engage in long-view planning in the training field. That the labor situation nevertheless became exceedingly acute later in the war was not due to any inadequacies in the training program but exclusively to the fact that the available labor potential was completely over-exploited and that the highest authorities failed to realize the limits of what was possible.

From the sources available it has not been possible to compile reliable figures on personnel movements in the aircraft industry.[1] The figures given are in some cases very contradictory, obviously because their computation was based on varying viewpoints. The compilation contained in the 1933 Industrial Plan included only the personnel employed at productive tasks on the fuselage and engine types involved, since the ratio of productive to nonproductive labor hinged largely upon the organization of manufacturing operations at the various factories.

The newly introduced labor training program and preparatory work for serial production caused only a relatively small increase in the number of personnel employed up to the end of 1933. In the following years, however, the gradual introduction of the newly trained personnel caused a steady rise in the numbers employed up to 1937. Although the totals given

173 from case to case up to 1935 contain all male and female personnel, and thus include both productive and unproductive labor, employed in the manufacture of fuselages and engines,[1] theywere not consonant with actual conditions, since they did not contain the proper percentage of personnel employed in armament factories which, besides aircraft, also manufactured other items of equipment, such as the firms manufacturing standard eqipment for aircraft, navigational and radio equipment, weapons, bombs, and other items.

The failure to include these figures was obviously due to the fact that these firms were not yet members of the National Association of German Aircraft Industries (Reichsverband der deutschen Luftfahrtindustrie) which furnished the data from which the figures were taken.

---

1. See IC III, 5 b, 15 June 1935.

Footnote 1, p. 209: Appendix..... Remark: For a survey of what impact personnel policies would have had on the Air Force armement activities if the program had been given a more favorable priority, a reliable overall survey of the total manpower available on the given dates. Since this information is not available only a general picture of personnel movements in the aircraft industry can be given.

Footnote 2, p. 209: On the basis of the present author's personal experience.

Footnote 1, p. 207: See "eport by Dr. Ing. Krause on Training in the Aircraft Industry (Ausbildung in der Luftfahrtindustrie).

Footnote 1, p. 208: Appendix.....

174 Furthermore, with few exceptions at the beginning of rearmament activities, the volume of work for aviation purposes in these factories was relatively small in comparison with the rest of their manufacturing activities.

The total achieved by 1935 was 70 000 persons employed in aircraft factories.[1]

Although records on the subject are lacking, it can be assumed that numbers increased at the same rate in 1936 and 1937, until this development was interrupted by the reduced defense budget of 1937. The planned total of personnel employed at fuselage and engine factories, plus a few general armaments factories was 105 000 in 1937.

The actual figure for 1937 must have been far higher. Quite apart from the personnel not recorded who were employed in [illegible] general armament factories, the fuselage and engine factories found themselves compelled, particularly during the early stages, to sub-contract with other firms to carry out a large part of their work. This they were forced to do because the expansion of their factories could not keep pace with the expansion of the production programs. This assumption is confirmed by the figure of 57 850 employees given for 1 June 1935, a total which did not include the number of personnel employed in factories manufacturing

1. See RLM IC III, 19 August 1935.

174 such aircraft fuselage and engine parts as radiators, compressors, aircraft propellors, crankshafts, cogwheels, and pumps, all of which were manufactured by firms specialising in such items.[1]

The curve showing personnel movements as based on a reconstruction of aircraft deliveries thus gives a truer picture of actual ci cumstances.[2] Here the totals are based on the man power hours calculated by the aircraft manufacturing firms on the basis of the numbers of aircraft delivered. The man-power at aircraft factories was subdivided into categories on the basis of experience factors, as follows

Employed at productive and unproductive repair tasks	15 percent
Employed on construction of new aircraft	10 "
Employed on construction of pilot models	10 "
Employed at productive and unproductive tasks for stockpiling and spare parts	15 "
Employed at productive and unproductive tasks in serial production processes (the ratio of productive to unproductive labor estimated here at 67:33).	50 "

To determine the overall total of personnel employed in the air armament industries, the figures thus obtained must be increased by 60 percent for 1933 increasing up to 100 percent for 1942.

This increasing percentage reflects the steadily

175 increasing expenditures for aircraft equipment, namely navigational and radar equipment, weapons, and particularly the extra equipment needed for multipurpose planes.

There can be no doubt that the figures computed by the method just described reflect more accurately personnel movements in the aircraft industry, excluding special items, such as V-1 weapons, special type weapons, ground equipment, torpedoes, and the bombs, ammunition, radar instruments and antiaircraft weapons procured by the other branches for the Air Force. The same applies in the case of extra expenditures during transition to new models, during reorganization of factories, etc.

As long as the man power requirements for the armaments program were met without difficulty, the expenditure of manpower for items of equipment and ammunition procured for the Air Force by the other military branches was not recorded by the Technical Office. These figures are therefore unknown for the period up to 1939 and are therefore not included in the presentations.

After the outbreak of the war, and above all after the introduction of controlled man power allocation, such personnel were included in the allocation for the Air Force.

Footnote 1, p. 212: See "Gegenueberstellung von Bestand und Mobfallbedarf," 1 June 1935 (684)
Footnote 2, p. 212: See "Querschnittsberichte ueber Spezialfragen der deutschen Luftfahrtindustrie," Stabs-Ing. Belter, p. 6.

176 This explains the exceedingly big discrepancy between the figures computed and those contained in the records.

It is probable that the manpower figures of 1 010 000-1 027 000 for the end of 1941 are fairly accurate and contain personnel employed on armaments production for the Army, Navy, and Air Force, but excluding the Antiaircraft Artillery. Since man power expenditures for Antiaircraft Artillery supplies are given as 800 000 it can be assumed that the maximum figure for personnel employed at armaments production was achieved in mid-1943, namely, 1 800 000-1 900 000.

The preferential treatment given to other armament items, serious fluctuations in the man power potential, and territorial losses later in the war had an adverse impact on personnel developments and caused a corresponding decrease.

The figure of 2 100 000 given by the Minister for Armaments and Wartime Production for mid-1944 appears too high. Obviously this figure was compiled from statistics prepared by Plenipotentiary General Saukel, which did not correspond to actual circumstances.

The placement of fighter production in the highest priority and the consequent step up in fighter production had no appreciable influence on the overall picture of personnel movements in the aircraft manufacturing industry, since the efforts were made to meet the increased requirements for

176 fighter production by curtailing or halting the production of other aircraft. In spite of this, it was also not possible to meet manpower requirements during this period.

As previously mentioned, the introduction of the required personnel to factories of the aircraft industry after they had been retrained presented no serious problems up to 1937, since adequate man power reserves were available. This process was interrupted by a sudden decrease in the defense budget in 1937. This automatically halted the procurement of additional man power for the aircraft industry. Studies conducted by the

177 Technical Office concerning the impact of these measures on the progress of rearmament reflect a planned reduction of man power in the aircraft industry of 10 000.[1]

Although this number can be considered relatively small when compared with the total figures involved, it nevertheless represented an incisive loss, since it included special skilled personnel who had been trained at a considerable expenditure in funds and effort, whom it was found ~~xxxxxx~~ impossible to replace later within the required short time. To what extent the planned retrenchments actually took place cannot be determined from the available records. However, the cessation of new employment of personnel and of training activities automatically had an adverse effect on all armament activities of

1. See LC III, 1, 3 June 1937 (345).

177 the Air Force, particularly on industrial expansion and the the preparatory measures for aircraft and equipment manufacture The consequences became apparent when the necessity for a further increase in armament activities developed in 1938 because of the hazardous political situation.

Meanwhile, the man power reserves which had been available in 1937 had been taken up by the extensive program of public construction work and were no longer available for a further increase in armament activities. What further complicated matters was Hitler's decision in approximately 1938 to give the Army and the Navy priority over the Air Force in armament requirements.

The difficulties encountered in efforts to provide additional man power for the aircraft industry increased markedly after the outbreak of the war and finally resulted in a continuing gap between the requirements stated by the General Staff and what was actually available.

The favorable opportunities for employment offered by the aircraft industry owing to the increased armaments production activities resulting from reestablishment of the Air Force, plus the enthusiasm of the younger generation for aviation had admittedly caused a strong influx of young people into the industry. This undoubtedly gave strong impetus to the rapid build-up of the industry. However,

177 these very factors produced circumstances which had a seriously adverse impact on the execution of the increased production programs after the outbreak of the war. Although the more important specialist personnel were declared indispensable, the factories suffered heavy losses through the induction of young men for military service, many of whom already had received military training.

178

After the victorious conclusion of the campaigns in Poland and France in 1939 and 1940, plans provided for deactivation of 35 divisions in order to relieve the strained man power situation in the armament industries. In actual fact, however, the personnel of only 15 divisions were given only temporary leave for assignment to the industry, the reason being the possibility of military action against Britain. It has not been possible to determine to what extent personnel from these fifteen divisions were allocated for employment in the air armament industries. In view of the priorities awarded to Army and Navy armaments, however, allocations for air armament industries presumably did not represent an appreciable support of the air armament programs. In any case, it is an established fact that the labor situation in the aircraft manufacturing industry showed no improvement whatever.

Initial successes in the Russian campaign and the exceptionally large numbers of prisoners taken there raised hopes for considerable improvements in the labor supply situation,

1. See Excerpts from Halder Diary.

178 that the procurement of labor would be eased considerably, and there can be no doubt that the requirements of the armaments industries could to a great extent have been met by the employment of prisoners of war after a relatively short period of training.

Requests for the allocation of prisoners of war were rejected, however, since their training was to be prevented. This decision was probably motivated by the fear of espionage and sabotage activities. In view of the extraordinarily serious difficulties encountered in efforts to fulfill the armaments production programs, and in view of the increased production which could have been achieved with additional labor, the advantages resulting from employment of the Russian prisoners would have far outweighed these disadvantages, and this is accentuated by the fact that later events in the war proved these fears unfounded.

Another obvious reason for this decision of such dire consequence for the armament industries was the faulty appraisal of the Russian military potential. It was assumed that the Russian campaign could be brought to a speedy and successful conclusion, that 50 divisions could then be deactivated, and that this would cover industrial man power requirements. The reverses suffered on the Russian front in the winter of 1941-42 prevented implementation of these measures.

179 The outcome was that the armament industry now had neither the man power from the 50 divisions nor the Russian prisoners. The only remaining solution in these circumstances was to use the Russian prisoners in spite of all misgivings. However, this decision could not produce results before mid-1942, since the Russians had meanwhile been allocated for employment in the agriculture and had to be recovered from there and then prepared for industrial employment by means of training courses.

What further increased the adverse effects of this late release of prisoners to the aircraft industry was the long duration of the war, which the Supreme Command had not anticipated, and the exceedingly heavy combat losses and the consequent induction of personnel from the armament industries for military service.

In March 1942 almost 50 percent of the personnel in categories which were important for serial production were awaiting their induction orders[1], although the Joint Military High Command had provided that "the majority" of specialized personnel were to remain in the industryand that key personnel were to be excluded from military induction.[2]

These heavy losses in personnel with special skills

1. See "GL-Besprechung," 21 March 1942.
2. Ibix 24 March 1942.

179 made the introduction of incisive measures in the personnel field a categoric necessity to insure execution of the production programs. The most important of these measures included the recruitment of foreign labor, particularly from occupied territories, and the increased use of prisoners of war from all nations for employment in the armament industries.

In order to secure uniform planning and uniform control for the overall requirements of the armaments industries, a Plenipotentiary General was appointed, whose mission was outlined in a decree issued by Hitler on 22 March 1942 as follows:[1]

> The secure provision of the necessary man power for the entire wartime economy, in particular for the armaments industries, necessitates a uniformly directed control, consonant with the requirements of military preparedness, of the use of all available labor, including the recruited foreigners and prisoners of war, and the mobilization of all still unexploited labor within the Reich, including the Protectorate (~~XXXXXXXXXXXXXXXXXXXX~~ Czechoslovakia--Note by Translator), the Generalgouvernement (Rump Poland--Note by Translator), and the occupied territories.

Reichsstatthalter and Gauleiter (National Governor and Regional Party Leader) Sauckel was assigned responsibility for the execution of this mission.

1. Nuernberger Dokumente 1666:PS (p.432), Band XVI.

180 In the 1942-45 period the excessive exploitation of the man-power potential became increasingly evident. In every case the authorities responsible for armament production resisted draft measures taken by the Joint Military High Command. Occasionally they succeeded in having personnel excluded from the military draft because of the urgent requirements of the armament industries, but the indispensability status thus grantedwas only for a limited period because of the heavy losses suffered at the fronts.

As previously mentioned, approximately 50 percent of the personnel employed at armament production were called up for military service in March 1942. Out of the 435 000 personnel with special skills formerly declared indispensable 60 000 were called up in February 1943.[1] These were followed by 220 000 from the 1894-1900 age-classes in March 1943,[2] the 1897-1922 age-classes a little later,[3] the 1914 and younger age-classes in September 1943,[4] further drafts in September[5] 71 000 in October,[6] 30 000 in December 1943,[7] and finally by indiscriminate drafting for service in the Volkssturm (National Levee) and for entrenchment work in October 1944.[8]

181 How serious the man power situation was is illustrated strikingly by the fact that the key personnel who were

1. See "GL-Besprechung, 29 Oct 43.
2. Ibid 12 Mar 43.
3. Ibid 17 Aug 43.
4. Ibid 19 May 43.
5. Ibid 18 Sep 43.
6. Ibid 29 Oct 43.
7. Ibid 1 Dec 43.
8. See "~~Besprechung Reestungsstab~~," 30 Oct 44.

181 absolutely indispensable for proper operations of the armament industries were also called up for military service in spite of the guarantee given four months previously by the Joint Military High Command that they would not be drafted for military service.

In a few cases armament authorities succeeded in obtaining from Hitler personally an order overriding orders from the Joint Military High Command[1], but in each such case the serious situation at the fronts made it imperative to rescind or circumvent such orders.

In considering Hitler's decisions in the matter of drafting for military service it can be presumed that his personal position as Commander in Chief of the Army made an unbiased appraisal of the demands made by the Navy and Air Force and the armament industries impossible and thus resulted in faulty decisions.

All possible avenues were exploited in measures to cover the losses and fill the vacancies caused by the call up for military service, and this applied particularly to skilled personnel. Thus, the training period for apprentices was reduced by one year, which released 25 000 skilled personnel[2]; 30 000 troops were released on leave[3] for allocation to the

1. See "GL-Besprechung," 28 Oct 43.
2. Ibid 17 Feb 42.
3. Ibid 24 Mar 43.

181 industry, a measure which had to be cancelled after a short while to meet needs for activation of the XII Air Corps; and another 85 000 recruits were released, but had to be recalled to military service shortly because of the complete destruction of the Air Force ground organization.[1] Then, efforts were made to meet labor needs by inducting women up to the age of 45 for assignment to the armament industries;[2] by closing down all installations not considered absolutely essential;[3] by the employment of 75 000 women who volunteered for service,[4] whose immediate use in industrial employment was prevented initially by certain difficulties; by increased use of small independent workshops, a measure introduced after Speer, as Minister for Production and Wartime Economy, had taken over full control of all production;[5] by the temporary release of 22 000 men drafted for the Air Force, under an agreement with the Air Force General Staff valid up to 1 March 1943;[6] and by introduction of the 72-hour working week.[7]

At an earlier stage Goering had endeavored to obtain an "aviation population" status for personnel employed in the aircraft industry, similar to the "seafaring population" status awarded for the Navy, so as to be able to protect such personnel against being drafted by the Army or Navy.

1. See "GL-Besprechung" 24 Aug 43; 2. Ibid 16 Feb 43;
3. Ibid 28 Aug 43; 4. Ibid 2 Mar 43;
5. Ibid 3 Aug 43; 6.
7. See "Generalstabsbesprechung," 25 Mar 43.

182 Under the pressure of events at the front, however, this measure did not prove very effective.

In spite of all measures taken, however, it proved impossible to any appreciable extent to satisfy the needs of the armament industries. The only remaining possibility was to make use of foreign labor, namely, foreign civilians, prisoners-of-war, personnel from related industries in foreign countries, particularly France, Czechoslovakia, Hungary, and in some cases Russia.

Even prior to Sauckel's appointment, foreign personnel had been brought in from abroad under working contracts, but since the numbers thus procured proved inadequate, Sauckel found himself compelled to resort to the compulsory transport of men and women from the occupied territories to Germany. This method was in direct contrast with the efforts of the Chief of Air Force Special Supply and Procurement Service to make use of foreign labor by employing them in factories resuming operations in their own countries. However, the measure of compulsory transportation of foreigners to Germany was finally put into effect, evidently on Goering's recommendation, because only 500 000 came voluntarily in 1942,[1] a number completely disproportionate with the needs of the

1. See "Besprechung Goering mit Sauckel, (date illegible)

German armament industries.

Although the labor employed in the armament industries in 1941 was doubled in 1942, the increased output was entirely disproportionate to the numerical increase of employees. this was due to a number of factors, among them the separation of families, the difficulty of providing enough suitable quarters, and the difficulty of providing sufficient food and other amenities, all of which contributed to reduce radically the individual performances of employees.

For the Air Force the measures taken by Sauckel produced particularly grave results, since the labor impressed for service in Germany included personnel employed in the French factories reopened by the Chief of Air Force Special Supply and Procurement Service to support the two air fleets stationed in the west.[1] Others employed in these French factories no longer came to work, obviously because they were afraid. Furthermore, the personnel thus taken from the French factories, most of them skilled in fuselage, engine, and aircraft weapons construction were not employed at appropriate tasks but at entirely different specialized work in Germany. Such personnel were allocated strictly in accordance with current priorities, which gave the Army and Navy preference over the Air Force.[2]

1. See "GL-Besprechung," 9 Feb 42.
2. See "Besprechung Hitler:Speer, 14 and 15 Apr 42 ueber Arbeitseinsatz."

183 Pursuant to a decision by Hitler, the plan was to bring to Germany 200 000 of the 900 000 craftsmen available in France. To what extent this target was achieved cannot be determined from the records available at time of writing.

Other plans by Sauckel aimed at bringing in Italian and Croatian labor, while the measure changing the status of French prisoners of war to the status of contracted employees aimed at achieving increased work performances.

184 In spite of all efforts, Sauckel failed in his efforts to provide sufficient labor. The exceptionally difficult labor situation is characterized strikingly by Milch, who stated that the overall increase in employees in the aircraft industry in 1942 over 1941 was far less than 100 000[1], and that the numerical strength of labor in the industries in 1944 was not appreciably higher than it had been in 1941.

With the progressive deterioration of the military situation resistance by foreign workers to the conclusion of working contracts increased. Furthermore, some personnel employed in Germany overstayed their home leave, other failed to return at all. These among other factors produced such fluctuations in the labor supply situation within Germany that it is impossible to obtain an accurate picture of circumstances as they actually existed.

1. See "Besprechung Goering:Milch, 28 Oct 43."

184 The statistics prepared by Sauckel on the labor supplied to the industries therefore in no way reflect the true circumstances, since they merely record the numbers brought in but disregard the numbers lost through fluctuation and other causes. Personnel returning from home leave or other absences appear again and again in the statistics as newly supplied labor and were debited to the Army, Navy, and Air Force. There can be no doubt that these statistics created false impressions in the supreme command concerning the actual supply of labor available, and this resulted in an appraisal of the industrial situation not commensurate with actual conditions.[1]

When new and expanded programs were planned and initiated, the initiating authorities almost invariably undertook to furnish the increased supplies of man power and materials needed, but the labor they actually furnished was always far less than that promised. This failure to create the essential conditions automatically resulted in smaller industrial deliveries than required, which in turn led to the establishment of modified and reduced programs. Quite apart from the fact that this made long-visioned planning impossible, the perpetual fluctuations in the numbers of personnel available prevented maximum benefit from the labor actually available in the factories.

1. See "Besprechung Goering:Milch, 28 Oct 43."

185 The fact that the labor provided was invariably less that that required in time produced conditions in which firms requested larger numbers of personnel than provided for in planning, the purpose being to secure larger allocations. This automatically increased the confusion already existing in the whole man power situation.

It is beyond doubt that the very serious shortage of leading personnel in the industries contributed towards these circumstances. The demands made by firms on their own personnel distribution agencies mounted during the war to such a volume that there was no possibility whatever to meet them properly. Prisoners-of-war of various nationality had in most factories turned the employees into a heterogeneous mass made up of French working under voluntary contracts, male and female Russians, Poles, Italians, Croats, Hollanders, Russian prisoners-of-war, and male and female Germans. In the cooperative employment of these various groups due regard had to be given to copious regulations governing such matters as the guarding, billeting, feeding requirements, the type of disciplinary action they were subject to, the nature of penalties which could be inflicted, and the matter of pay rates.[1]

1 27. See Diplomingenieru Schmidt in the Swiss Journal "Flugwehr und Technik", February 1947. Also from personal experience of Author No. 2.

185 It was already an exceedingly difficultyundertaking to organize properly functioning work groups within a factory, but the handling of the legal, social, cultural and other problems involved created problems demanding exceptional organizational performances on the part of the firm's management, since due regard had to be given to the spheres of authority of the large number of administrative and party agencies concerned, such as

the regional leader of the National Socialist Party (the Gauleiter;

the National Labor Front (Arbeitsfront);

the National Trustee of Labor (Treuhaender der Arbeit)

the Regional Labor Office (Landesarbeitsamt);

the Military District Recruiting Office (Wehrbezirkskommando);

the Armament Inspectorates (Ruestungsinspektionen);

the Labor Utilization Bureau (Arbeitseinsatzbuero);

the Ministry for Armaments;

the Plenipotentiary for Labor (or Man-Power) Utilization (der Generalbevollmaechtigter fuer den Arbeitseinsatz);

the SS.

Foreign civilian employees made up the following percentages of the labor in the armaments industries:

1942 36.5 percent, plus 6.5 percent prisoners-of-war;
1943 30 percent
1944 40 percent.[1]

In computing the above percentages, the entire complement of German employees has been included, meaning also the development and proving establishments, which were staffed exclusively with German specialized personnel. On the numbers employed alone in the serial production processes, foreign labor made up a far larger percentage, in some cases as much as 95 percent. In the serial production processes of the BMW-801 engine, which was of particular importance in German air armaments, the percentage of foreigners was 67.5 percent, in that of the Ju-52 aircraft, 85 percent.

1. See "GL-Besprechung vom 28.8.42, 14.10.43;" see also Excerpts from "Nuernberger Prozess, Band IX," p. 128.

187 Q. Industrial Finances. In 1933 the German aviation industry, and particularly the fuselage manufacturing firms, was in a financial position by no means commensurate with the requirements of a military armament program. The years of economic crisis, 1930-32, had so weakened them financially that they were no longer able with their own means to meet increased requirements above their current capacities.[1]

Lack of funds made capital investments on any appreciable scale impossible without outside support, since no own reserves were available.

A way was sought out of this dilemma through the establishment of State-owned factories and the soliciting of private capital.

The anticipated clumsiness and inflexibility of such an arrangement plus the hampering effects of dependence on Government agencies contrasted with the requirement for a speedy build-up of the industries, and this led to the decision to exploit private initiative and to endeavor to create the necessary industrial conditions for a quick build-up of the Air Force on the basis of private economy. One factor contributing to this decision was the desire to use budget funds exclusively for the development and procurement of the necessary aircraft and equipment, and the

1. See also Section I, G-D, above.

187 realization that the establishment of State-owned factories would take up a large share of the budget.

Funds to facilitate an accelerated initiation of the program and to make the initial investments possible were made available in the form of increased advanced payments on awarded contracts. This course was chosen because it made negotiations possible to bridge the time needed for the acquirement of private capital. However, it was acourse which could serve for only a limited period, since the expenditures for continued expansion of the industries could not be met by means of advances paid on awarded construction contracts.

188 Although a number of large industrial concerns declared their willingness to establish new factories with their own capital, it soon became obvious that these would not be able to cope alone with the constantly increasing demands made on the industries. Contrary to expectations, the fact that the aviation industry would depend almost exclusively on Government contracts, plus the fact that private investments far exceeding the normal peacetime scope would be required, made private capital reluctant to invest to the necessary extent in installations of the aviation industry.

This necessitated a basic decision concerning the procurement of additional investment funds.

188 One factor of primary importance here was still the desire to avoid the use of budget funds and to facilitate the borrowing of capital against securities, and as far as possible to prevent Government partnership participation. The problem was solved here by Government guarantees covering amortization and the interest on borrowed capital, a measure designed to enable firms supporting the Air Force to repay borrowed capital even if their turnpver decreased, provided this was not due to any fault of their own. The text of the guarantee was as follows:

198 Der Reichsminister der
Luftfahrt und Oberbefehlshaber der Luftwaffe Berlin (Date)

Firm:.....
Subject: Amortization and Capital Interest Guarantee.

In the event of the installations enumerated on List 1 falling into disuse or into smaller use than agreed upon because of reduced armaments requirements, I give you the following guarantee, valid until.....and not to exceed a maximum amount of Reichsmark.....

1. If you are not in the position to provide in your prices for the normal amortization amounts annually as set forth in List 2 I shall make you an annual payment to cover the missing sum after examination by my representative.

2. In addition I shall refund you the normal interest (currently about 2 percent above the Reichsbank rate of discount) on your own capital and on borrowed capital subject to the payment of interest invested in the said installations, but not to exceed the book value remaining after all factors included in your prices or accruing

198 to you in some other form as well as the amounts used for additional amortization write-offs.

By Order
S/.....

188 The obligation undertaken by the Government covered only the installations enumerated in the guarantee.

However, the amortization guarantee only enabled the industrial firms to cover their financial needs for a relatively short period. Since the amortization quotas were too small, so that it took approximately ten years to repay loans, and since the difference between the credit periods and the time required for amortization was too great, the banks were no longer in a position to meet the needs of the

189 firms for investment capital. The reason given by the banks here was that the volume of capital involved in the aviation industry exceed normal financing projects and had nothing in common with such, and that they were only authorized to give capital support within the scope of normal circumstances.

It was thus no longer possible to depend on the use of private capital, so that the Reich Air Ministry was compelled to make funds available from the budget. Loans from this source were free of interest and could be called up daily. The amounts were determined after examination by authorized inspectors, were contingent upon the progress made in con-

189 construction of the installations involved, and were paid out in instalments.

As rearmament progressed, however, the credits taken up by some manufacturing firms reached figures entirely disproportionate to their own finances. This was due primarily to the safety requirements stipulated by the Technical Office, since the wide spacing of individual buildings, the construction of air raid cellars and trenches required far greater expenditures than would have been the case normally for serial manufacture, namely, for the purchase of terrain, for road construction, and for transportation facilities.

In particular the extra expenditures for transportation and the resultant loss in time represented a burden which could not be carried under peacetime conditions, since decentralization was contrary to the principles of rational manufacturing methods. Funding of the costs thus arising from stipulated conditions therefore needed some special arrangement.

In the course of time the interim credits allowed by the Reich Air Ministry had reached a total of between 400 and 600 Million Reichsmark.[1]

The extent of the manufacturing installations had in the meanwhile assumed such proportions that the capital of some

1. See "Bericht Ministerialrat Dr. Nowak", p. 9.

190 of the firms involved was totally inadequate. This made some form of consolidation imperative, the purpose being to bring own and borrowed capital into a tolerable relationship. The solution tried here was that of inducing the proprietors to make of the firms a substantial contribution in order to increase the firm-owned capital.

Additional efforts to bring in private capital from other sources in spite of all difficulties failed. The share of the Government in many firms of the aviation industry exceeded 50 percent, for which reason measures were to be taken to meet the desire of proprietors that they should retain a share majority. This purpose was served by allowing a 3 percent architectures' fee on the costs of all approved installations.

Another measure designed to restore the firms to private ownership was that of option agreements, the value of the installations to be established at the time of acquirement by the firms. This measure was in line with the desires of the Reich Air Minister and the Chief of Air Force Special Supply and Procurement Service to support private initiative in order to secure maximum performances. In all firms thus partly owned by the Government, the Board of Directors included one member from the Technical Office and one from Industrial Economy Office, but these did little to support

190 the management. In other ways also, everything possible was done to avoid hampering operations through the application of official regulations or through interference in the management, unless steps were taken which directly contravened the basic administrative regulations.

A further measure designed to assist firms in consolidating the capital matters took the form of support amounting to the expenditures required for the air raid protection measures stipulated by the Technical Office. This support was known as the "Capital Average (Kapitalschnitt)" and was calculated with assistance from the Price Control Board of the Air Ministry. The figure arrived at was set off against investment loans received from the Government. The recipients

191 of such support were required to use the amounts thus received for amortization of short-life installations and air raid protection installations , the Air Ministry participating in the decisions made in this respect. The text of the contract regulating this form of State support was as follows:

199 AGREEMENT

Between the German Reich Treasury (Aviation), represented by the Reich Minister for Aviation and Commander in Chief of the Air Force, hereinafter called the Reich

and

the Firm.....

represented by the proprietor, hereinafter called the firm.

199 the following contract concerning the ..... factory is agreed upon:

I

1. The Reich will award the firm a one-time support from public funds in the amount of Reichsmark.....

2. This support will be made available by being set off against an appropriate claim of the Reich resulting from interim credits in the amount of RM...., repayable on daily notice, and free of interest, for the purpose of expanding the .....factory.

3. The book value of the installations is RM..... The firm is obligated to use the support amounts thus received for special amortization of short-life installations and air raid protection installations in agreement with the Reich.

II

The firm is also obligated

1. To maintain the factory installations in operable condition and, on demand by the Reich, to make them available for the preferential execution of aviation contracts. The execution of other contracts in the factory installations is subject to approval by the Reich, which can be granted in general.

2. The sale of terrain and/or buildings, installations and facilities serving the manufacture of aviation equipment is subject to approval by the Reich.

3. The "Amortization Guarantee" given to the Firm by the Reich with letter dated.....is cancelled.

4. The amounts to be finally written off will be calculated on the basis of the acquirement value computed after the Special Amortization Amounts have been written off.

200 5. The Firm cedes to the Reich and the Financial Controlling Court of the Reich (Rechnungshof des deutschen Reiches) the auditing rights prescribed in Paragraph 45, c, 2 of the National Budget Law (Reichshaushaltsordnung) and agrees to submit to price and economy examinations by the Air Ministry or its duly appointed representatives.

III

The costs and taxes due on this agreement will be borne by the Firm.

The Reich Minister for
Aviation and Commander in
Chief of the Air Force

S/.....

S/.....

191 In cases where capital investments were needed for the execution of missions rendered necessary by the exigencies of war, the establishment of partial or complete factories had to be ordered by the Technical Office or the Chief of Air Force Special Supply and Procurement Service. The purchase of ground and the construction of buildings was permissible only under orders from this authority.

The establishment of partial factories took place in the case of firms hetherto manufacturing for civilian markets.

Note by Translator: The various contracts and agreements referred to by the author will be found at the end of this present section in the German original. They are not numbered, and to have numbered them in the translation would have caused considerable confusion. For this reason they have been included in the text in the translation.

191 When completely new factories were established they were let under contract to industrial firms. Such projects were financed exclusively by the firm of Luftanlagen G.m.b.H.

The capital investments rendered necessary for the requirements of war received further support by the allocation of financial support grants from the State known as Mobilization Credits (Mob-Kredite). These were granted on the basis of a plan worked out during peace by the Reich Ministry for Economy, which contained the principles, types, and methods under which support could be granted by the Government to concerns taking up the manufacture of military materiel or expanding their already available facilities for such purposes.

The plan extended to all areas of armament producing activities and served to standardize the financing methods of the Army, Navy, and Air Force, the old methods of whom were to be replaced by the new plan.

For these purposes the Ministry for Economy had authorized the Deutsche Industrie-Kreditbank to make credits not to exceed 500-600 Million Marks available for investment in the armaments industries.

The method employed by the Aviation (Luftfahrt) Bank to implement the plan was to use funds accruing partly from repaid loans and partly from long-term deposits from

192 insurance companies. The method employed by the Industriebank to obtain the funds necessary for the credits to be given was by means of the issue of obligations. If the firms needing credits were unable to furnish proper securities to meet bank regulations, so that implementation of the armaments investments plan would have been jeopardized, the Government agreed to assume partial or full responsibility for the credits granted.

The granting of credits under this plan was only permissible if the firm involved could not be justifiably expected to make other financing arrangements by the use of its own funds or credits. The basic condition here was that the firm asking for support must first have applied to its bank for the credits needed.

The plan worked out by the Reich Ministry for Economy contained rules according to which the credits granted were classified as Class A, B, or C credits. Class A credits could be given on the risk of the applicant alone, without colateral guarantees; for Class B credits part of the sum requested had to be guaranteed by a third party; in the case of Class C credits the entire amount had to be guaranteed by a third party. Other rules in the plan concerned the responsibility XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX of the industrial groupments consolidated by the Ministry for 10

192 percent of any losses incurred, and the methods to secure funds by means of assessments to make up losses, resulting from the failure of any firm or firms.

Another financing possibility was found in the War Risks Clause (Kriegsrisikoklausel). The purpose here was to free firms hitherto manufacturing only for civilian markets from the burden of risks involved in initial investments or investments to expand existing factories to meet war requirements, whenever such investments could not be considered justifiable from the viewpoint of private economy. The wording of the clause was as follows:

rather than footnote, translated pg 201 and then continued with pg 192

201 STANDARD CLAUSE

If the ..... installation can no longer be used profitably because no more or only reduced contracts are received, the installation having been constructed during the war at the instance of Government authorities, the bank will relieve the industrialist either by decreasing his debt to enable him to write off the necessary amounts or by other measures, if without such measures the industrialist would be caused losses which he cannot justifiably be expected to carry with due consideration to all circumstances and the interests of his concern.

The amount of such relief shall be determined, after consultation with the industrialist, by the Reich, represented by the Reich Credit Council, when necessary with assistance from the Association of Chartered Accountants and Trustees (Deutsche Revisions- und Treuhand-Aktien-Gesellschaft.

192 Another form used was the Object Clause and Special Clauses, the purpose of which was to insure that the profitability of the industrial concern involved would not suffer at the end of the war if the armament factory established was closed down. The wording of the Object Clause (Objektklausel) was as follows:

OBJECT CLAUSE

page 202

If the ..... installation, established during the war at the instance of Government authorities, can no longer be used profitably because ~~many~~ no more or only reduced contracts are received, the bank will relieve the industrialist either by decreasing his debt to enable him to write off the necessary amounts or by other measures, if without such measures the industrialist would be caused losses which he cannot be justifiably expected to carry in view of the operational results produced and the future usability of the (special) installation concerned.

After consultation with the industrialist the amount of such relief shall be determined by the Reich, represented by the Reich Credit Council, when necessary assisted by the Association of Chartered Accountants and Trustees.

192 Investment financing by means of Mobilization Credits and by means of the granting of War Losses Clauses were the financing methods most used throughout the war to promote investments in the armaments industries.

The work connected with implementation of the credits plans was of such a nature that it could not be handled by

193 a ministry of the Government. A completely Government controlled firm under the name of Luftfahrtkontor G.m.b.H. (Aviation Bureau Ltd.) was therefore established in 1933 with a capital of 20 000 Marks. This firm initially handled the administration of lands, buildings, factory installations, and participation on a share basis in the field of commercial aviation, and now was assigned responsibility for the bank processing and settlement of interest-free interim investment credits. The steadily increasing activities in this field, which were in the nature of the activities of a banking institute led to the decision to give the firm the status of a bank and increase its capital to 70 Million Marks. At the same time the new bank established a subsidiary firm, the Luftfahrtanlagen G.m.b.H. (Aviation Installations Ltd), with a capital of 5 Million Marks, to handle the administration of real estate.

Finally, what had formerly been the Luftfahrtkontor G. m. b. H. in 1948 became the Bank der deutschen Luftfahrt A.G (Aerobank) with its capital increased to 150 Million Marks. The function of the bank now was to act as a financing institute for investments in the aviation industry, to grant credits for current operational costs, etc., and to take up shares in factories of the aviation industry. The steps to establish a special bank to furnish credits to the German aviation

193 industry had been found necessary because other existing banks had declared themselves unable to grant credits to the industry on the required scale.

The book value of German Government investments in the aviation industry on 31 March 1939 represented a total of 261 400 000 Marks, increasing to 848 000 000 by 31 March 1944. The funds made available by the Aerobank for Mobilization Credits by 31 March 1944 reached the figure of 1 600 000 Marks, of which 1 400 000 was absorbed through credits granted.

194 Government capital was invested in 65 firms. Fifty of these were limited liability companies with a total capital of 1 094 800 000 Marks, 859 000 000 Marks of which was held by t the bank. In 51 companies the bank held a majority, whereas in the case of 32 companies, the bank owned more than 90 percent of the capital.

This Government participation extended to firms producing basic raw materials; firms manufacturing weapons and ammunition, equipment and appliances, fuselages, and engines, besides firms engaging in commercial aviation.

In short, it remains to be said that the financing of the aviation industry and of its factory installationsmade special measures necessary because the scope and the speed of the rearmament made it impossible to rely from year to

year on the funds provided in the annual budget. Such funds had to be requested anew each year and industrial planning had to extend years into the future. Reliance on the annual budget would have caused intolerable delays in the build up of the aviation industry.

Since the whole rearmament had to be carried out under wartime conditions or conditions closely approximating those of war, financial considerations frequently had to be disregarded in favor of technical requirements. Measures were frequently planned for years ahead and completely independent of the budget provision of the year in which the planning was done, and this circumstance created conditions in which the current budget in many cases was exceeded on a scale which increased steadily as the rearmament program progressed. Since ready funds were not available to cover these excess expenditures, the industrial firms had to take up credits, which were granted on the basis of future payments approved by the Reich Air Ministry.

A new type of financing document, the Mefo and Oeffa Bank Draft (Mefo- und Oeffa-Wechsel) was introduced to remove these difficulties. This document created the possibility for the Government to participate over a protracted period in the guarantee of payment.

Similar difficulties were encountered in meeting the

194 financial obligations incurred through execution of the development and procurement programs . In order to secure rational manufacturing processes and thereby insure the minimum e penditures of man-power hours, the firms involved in these programs had to plan their dispositions at least two years ahead of time. In the case of bomber aircraft two years was the bare minimum in view of the relatively long time required for the various processes involved.

Although itself restricted by a one-year budget, the Technical Office therefore had to assign the programs as firmly awarded contracts covering a period of two years and as planning data for a continued period so that the industrial firms could arrange for the required investments. In the interests of as direct as possible a movement of the procurement programs based on the requirements stated by the General Staff to the industry, it was essential to avoid delayed commencement of production which might have been caused by the formal methods of awarding contracts.

The procurement programs furnished by the Technical Office to the industrial firms, after incorporation of their comments, therefore were in the nature of advance contracts, on the basis of which the firms were obligated to immediately initiate all measures necessary for execution of the programs. Furthermore these advance contracts provided the

195 vouchers required in the requisitioning of funds from Reich Air Ministry for advance payments.

In addition to the above, the xxxxxxxxxx programs served the firms as a basis on which they could formulate their formal tenders in line with administrative requirements, and enabled the Department (Later Office) for Industrial Economy under the Chief of Air Force Special Supply and Procurement Service to process these tenders administratively. Before the contracts were awarded in the final form to the firms, they had to be inspected by the Technical Office to avoid deviations from the specifications contained in the advance contracts.

The tenders submitted contained only tentative prices which were rectified in a later reexamination during the year.

196 The special advantage of the above procedure was that it prevented conditions in which manufacturing activities would become dependent upon the awarding of the formal contract. This was particularly important, since the final contract had to clarify various points, such as licencing details, the licencing fee, special expenditures by the firm manufacturing under licence, price alignment between this firm and the firm owning the patents, expenses for modifications, and so forth.

196 The Reich Air Ministry paid the licence fees directly to the licensing firm in order to avoid their inclusion in the prices charged by the manufacturing firm and to promote smooth cooperation between the licensor and the licensee.

The formal contracting procedures outlined above were modified during the war owing to the expansion of the armaments program and to prevent excessive administrative work. Under the new procedures there was no longer any necessity to award an advance or tentative contract, to submit tenders, or to draw up a formal final contract. When the fuselage or engine manufacturing firm received information on the quantities required under the program this was considered as an awarded contract.

During the build up of the aircraft fuselage and engine industries support was given in the form of lump sums consonant with the amounts required, these r quirements being ascertained currently by the Office for Industrial Economy. After the end of this initial periodit was possible to return to the normal methods of payment in the case of large projects, under which the contracting firm received 30 percent of the value of the contract upon signature as an advance payment, 50 percent upon completion, and the balance of 20 percent upon acceptance of the finished product.

After the necessity for advance or tentative contracts

196 followed by formal final contracts had been dispensed with, payment was made in instalments commensurate with the progress made in the manufacturing processes. The advance payments from the Reich Air Ministry were safeguarded by means of a general security contract concluded with the individual firms.

The desire to induce the personal initiative of the heads of contracting firms also during the financial procedures involved in the contracts caused the Industrial Economy Office at an early stage to establish standard prices, so that the profits of firms would be determined by their own performances. However, difficulties were often encountered here, since the internal administration of some firms had not kept pace with outward growth and their accounting services were often faulty.

The time pressure under which the industries had been built up and the factories had been equipped, combined with the measures introduced to secure rationalized manufactruing processes had created problems for the accounting services of the individual firms which they were, in most cases, unable to master.

For the price control agencies of the Office for Industrial Economy within the Reich Air Ministry it was an exceedingly difficult matter to determine the fund requirements of the firms and to check the actual financial expenditures

197 made.

In order to establish a uniform system throughout the entire armament industries, the Reich Council for Business Management (Reichsausschuss fuer Betriebswirtschaft) established by the Reich Ministry for Economy in 1937 had published basic principles of bookkeeping. These contained details on the organization of bookkeeping illustrated by examples, and of cost accounting for factory establishments.

The establishment of standard prices was first applied successfully to the firms manufacturing items of equipment. It was easier here to g in the necessary insight because of t the relatively small amount of labor involved in the manufacture of individual items of equipment. It was 1939 before standard prices could be established for aircraft.

What proved particularly complicated was the checking of subcontractors. Since they had only indirect contacts with the Technical Office and/or the Industrial Economy Office it had only been possible to exercise control over them at a late stage. It was found in some cases that firms in this bracket were charging increased prices far above normal standards, and these discrepancies were corrected.

German pages 198, 199, 200, 201, 202 provisional, translated with English pages 233 to 243. English pages have been renumbered to reflect German version sequence of pages.

203 APTITUDES REQUIRED IN CANDIDATES FOR THE PROFESSION OF INSTRUCTOR IN METAL AIRCRAFT CONSTRUCTION

Educational Requirements

Essential: Elementary Public School (~~Volksschule~~)

Good knowledge of arithmetic, geometry, drawing, and German, requiring the ability to give oral and written reports on technical processes, particularly in view of a possible later employment in the field, possible in foreign countries.

The metal aircraft constructor will constantly in his work require a knowledge of mathematical processes and gauging. A knowledge of geometry and drawing ability will be required, for example in the tracing and laying out of plans, etc.

Desired : Training in a wide variety of sports: this will further ability to work on scaffoldings and in various body postures.

Disabling Factors : If the applicant has needed extra tuition, training for persons who have poor eyesight, are blind, hard of hearing, deaf and dumb, or have speech impediments.

Physical Requirements

Essential: At last medium-strong constitution:
The candidate will occasionally have to raise and carry aircraft parts, such as wings, bodies, etc., will have to operate compressed-air riveting machinery.
What is needed is a person with an agile, flexible, wiry body, not easily exhausted:
The candidate will have to work in the most varied positions and postures, at times in almost inaccessible parts (for example in the

203

body of a plane), lying face down or face up, in a stooping position, kneeling, working upwards or downwards for protracted periods.

He will need strong arm and leg muscles and healthy feet:
His work will call for chaniging speeds, changes in the force applied, and constant application.

He will require good respiratory organs:
He will have to work in large sheds, exposed to the vagaries of weather, for example in sheds open for aircraft to enter and leave.

The applicant will need at least normal vision and the ability to distinguish between various shades of grey:
He must be able to recognize the distinguishing colors of manufacturing materials, and so forth, such as the various shades of gray in light metals

The candidate must have perfect hearing (should be able to hear with either ear a person whispering six meters away).

Desireable: Persons not requiring eyeglasses.

Disabling Factors: Congenital obesity; tuberculosis; chronic bronchial catarrh; asthma; chronic kidney troubles; organic nervous disorders, including epilepsy; chronic rheumatism in the joints with impeded agility; chronic ear troubles, including disturbances of equilibrium (the candidate will be exposed to weather conditions, will have to work on scaffoldings); open gums (dust dangers); ruptures and susceptibility to ruptures (unless removable through surgery); Second and third degree spinal curvature; chronic inflammable

204 : flat feet, folding leg (Spreizfuss), incomplete flat feet (Knickfuss); varicose veins, particularly if inflammable and recurring; susceptibility to inflammable skin troubles; seriously sweaty hands.

Mental Requirements

Essential : Very keen sense of responsibility:
Very great demands will be made on the candidates carefulness, conscientiousness, and powers of concentration. Even when performing monotonous tasks, tiredness must under no circumstances result in relaxed reliability. A case of very slight carelessness in making or putting together individual parts, or the failure to report flaws detected, such as a barely perceptible crack in material subjected to severe strains during operations could seriously endanger and possible lead to the loss of human lives and the aircraft concerned.

"ental and practical flexibility far above the average: the candidate will be required to perform widely varying work processes (rapidly changing conditions of metal aircraft structure require easy adaptability).

Highly developed sense of geometrical proportions: the candidate will have to read blueprints, a difficult matter in metal aircraft construction because of the close proximity of the thin lines used in metal plate structures). The metal aircraft constructor must be able to identify parts, tools, and appliances by their shapes and must be able to decide where they are to be used (innumerable shapes of sheet metal are used) or how they belong together.

205 : The candidate must have a steady hand, steady aim, and well coordinated use of both hands: for example when measuring or doing tracing work.

The candidate must have an instinct for force impulses, and a keen sense for forming: He will be required to form sheet metal, for example to do crimping or flange, and fold work, to hammer out, and curve metals, and so forth.

Desireable: Capability for teamwork: the candidate must have an understanding for the way various jobs go together.

Disabling factors : Unreliability.

Hasty, slipshod, type of worker.

Slowwitted workers.

SUMMARY

After its transfer from the Army Ordnance Office in 1933 the Air Force Technical Office adhered to its traditional pattern of subdivision into development and procurement branches but in the execution of its missions gave due consideration to the changed conditions resulting from technological progress.

In the realization of the hazards that serious difficulties and interferences might result from intervention in the internal management of the firms concerned, the basic principle was followed of avoiding as far as possible any and all measures which might influence the areas of responsibility of the private industry. The Technical Office therefore recognized only one person, or one agency, in industry as responsible for the execution of contracts, and that was the manufacturer of the final product.

Consequently, the activities of the Technical Office extended primarily to planning, guiding, and support of the industrial economy, with every effort being made to avoid interference in its internal structure. When this proved unavoidable, the interference was due to difficulties which the firms themselves were powerless to remedy, or to special circumstances during the war.

The unfavorable industrial conditions created by the economic crisis prior to 1933 in Germany, the scope of the planned armament missions, to cope with which the German industry was not equipped to cope, neither in financial respects nor in respect to the requirements of wartime operations, called for a guided development and guided investments aiming at obtaining maximum performances and complete exploitation of all facilities at any time available.

Furthermore, Germany's unfavorable tactical position made it necessary to exercise a decisive influence in the selection of sites for factories to be newly established or expanded.

One serious disadvantage resulting from these circumstances which had to be accepted as unavoidable was that contracts would have to be awarded without exploitation of the competitive spirit among firms.

The contracting firms were solely responsible for the execution of their contract missions.

The uninterrupted and systematic development of the organizations of the Technical Office under General Wimmer from 1933 on had an exceptionally favorable impact on the execution of the missions that Office was assigned for the Air Force and for the industries and produced maximum performances both within the Office itself and in the industry.

208 These favorable conditions remained very much unchanged after Wimmer's replacement by Udet in 1936 for a period of bout two years, until 1938. It was during this period, and particularly during the first years, under Wimmer, that the aircraft, engines, and equipment came into being which the field units had in service during the war.

With the reorganization of the Technical Office in 1938, however, a period of repeated organizational changes set in, which had an unfavorable impact on the execution of missions.

The reorganization of 1938 was followed already in 1939 by establishment of the post of a Chief of Air Force Special Supply and Procurement Service. Only two-and-one-half years this service, later, under Field Marshal Milch at the time, underwent a complete reorganization, in which its specialized departments were deactivated and, in basic points, the former organization was restored, with the subdivision into agencies for research, development, proving, and procurement.

Again two-and-one-half years later the most important part of the program for the conduct of air warfare, namely, fighter aircraft production, was taken away and placed under the newly established Fighter Production Staff, an agency of the Ministry for Armaments and Wartime Production.

This was part of measures deactivating the Office of

208 Chief of Air Force Special Supply and Procurement Service and establishing a Technical Air Armaments Office (Technische Luftruestung) to handle the functions left to the Air 208 209 Force.

These fundamental organizational changes at such short intervals naturally resulted automatically in the reorganization of controlled agencies and widespread personnel changes, and these caused frequent interferences and interruptions of work.

The reasons for the changed circumstances just described were to be sought largely in the personal views of those concerned on their field of activities

The period of logical and consistent development of the C-Office under Wimmer had been too short to give the office the firmness of structure which would have been necessary to encounter difficulties and changes of personnel. Furthermore those in the higher levels of command at no time sought the causes for difficulties in faulty planning or guidance, but always in the existing form of organization XXXXXXXXX beneath their level and in the personnel in control there. This explains their tendency to seek a remedy to each difficulty in reorganization and personnel transfers.

The organization as such thus was not employed to serve its true purpose as a firm foundation for the positive and

209 uninterrupted flow of working processes. Instead, it was used at least in part for the achievement of personal objectives. The principle generally valid in the economy of never changing the organizational pattern to suit a person, but rather to select suitable personnel for an organizational pattern proved sound by experience was disregarded in the most important control authorities.

210 Here, the creation of the Fighter Production Staff can be taken as a special example. The creation of the agency was indubitably due exclusively to the personal ambition of the office Party chief Saur to gain control over the armaments programs for all three branches of the military forces and to his dislike of the military.

Initially, the Fighter Production Staff was intended as an agency controlled mutually by the Ministry for Armaments and Wartime Production and the Chief of Air Force Special Supply and Procurement Service. However, Saur forcibly prevented any influence by the latter and squeezed Field Marshal Milch out of control.

The cause given for the assumption of responsibility for fighter production was the heavy air attacks against the fighter aircraft factories at Augsberg, Regensburg, and Wiener Neustadt on 26-27 February 1944, and the fact that the Chief of Air Force Special Supply and Procurement Service could

210 not with the means available under his organization repair the damage done.

Another contributing factor here was that Saur with the authority vested in him as Special Plenipotentiary for Tank Production was empowered to withdraw, for his purposes, factory spaces, labor, and tooling machines from other programs; since the industrial programs in support of the Air Force did not fall within the provinces of the Ministry for Armaments and Wartime Production, measures of this nature taken by Saur produced serious repercussions, and the Chief of Air Force Special Supply and Procurement Service found himself practically powerless with the small means finally left available to him.

Once the Office of the Chief of Air Force Special Supply and Procurement Service lost control of fighter production, the handling of its other production missions soon encountered difficulties. Very soon it became evident that it was not possible to take out of an integrated complex of work the most important part, and continue with the rest alone.

211 This was why the Ministry for Armaments and Wartime Production already took over the rest of the production program for the Air Force in August 1944. The main point here was that Saur now had finally achieved his old target of uniting all armament production activities for all three military

211 branches under his direction.

On principle, the combination of all armament production under one head would have been sound if it had been brought about already during peace. The Military Economy Staff within the Joint Military High Command could have assumed responsibility for the direction of armament production for all three branches in consonance with uniform principles. However, the Staff was not furnished the powers it would have required for these purposes. What prevented any such measure was the concern of the three Commanders-in-Chief, and particularly of Goering, for the dignity of their personal positions.

As early as in 1935 the Military Economy Staff had endeavored to coordinate the production programs planned by the three military branches against the event of a mobilization. However, systematic preparations in this direction were complicated by the independent status of the three military branches, and finally had to be abandoned at the beginning of the war because no industrial mobilization was declared.

For the anti-military leaders of the National Socialist Party it was therefore not very difficult to inject themselves into the armament production mission when the flaws of the existing organization became evident.

The main weaknesses of the e isting organization were that, in view of the overruling influence armament production

212 would have on the entire national economy in the event of a mobilization, it would be too small and inadequately staffed to make the momentous and speedy decisions which would become necessary because disruptions had to be expected in spite of all preparations for mobilization.

The failure to establish a uniform control and uniform guidance for the armaments industries became evident in the diverging opinions concerning the division of responsibilities between the Plenipotentiary for Wartime Economy on the one hand and the Military Economy Staff on the other. The position here had not even been clarified by the time war broke out. In addition, the agency under the Plenipotentiary General was neither organizationally nor in point of personnel equipped to handle its missions, for which reasons it was deactivated at the beginning of the war.

The difficulties encountered finally resulted in attachment of the large majority of the existing free organs of the industrial economy, such as the national industrial associations, the economic groups, etc., hitherto under the Ministry for Economy or the Plenipotentiary for Wartime Economy, as well as the newly established self-responsible organs of the armament industries, to the Ministry for Armaments and Wartime Production.

This admittedly created a uniform control of the

212 entire wartime economy, but the system lacked an inherently firm organization. The personnel in the system could not be considered as a homogeneous community accustomed to mutual endeavors. The members of this controlling body included leading industrialists, personnel from the National Socialist Party Reich Office for Technology, and representatives from the Army, Navy, Luftwaffe, and from the various administrative departments of the Reich. Experience proves that an apparatus of this large size needs years of close cooperation before it can be expected to function smoothly.

In actual fact, Saur repeatedly during conferences of the Armaments Staff severely criticized the other offices of the Armaments and Wartime Production Ministry.

A decree issued by the Minister for Armaments and Wartime Production and Plenipotentiary for Armament Functions on 29 October 1943 concerning the division of activities in the wartime economy admittedly regulated the distribution of fields of activities, defined authority, and assigned the various industrial organs to the various offices of the Ministry, but in many cases it proved impossible to implement the measures in practice.

Mounting difficulties in the whole field of wartime economy and the frequent changes in assigned missions created the necessity for improvisations and plenipotentiaries were

213 appointed for such purposes with growing frequency. The number of such authorities consequently increased con ensurately with the increasing difficulties, and in many cases their powers and responsibilities overlapped. Matters were very much the same at the intermediate levels of control.

The corps area executives functioned parallel with the military economy inspectorates, later known as the armaments inspectorates. Both had practically the same mission to execute, so that cooperation between them was largely a matter of personality factors. Exceptionally serious controversies ruled in many cases. In an effort to remedy the difficulties existing in the field of military economy within thm each corps area and the corresponding area of responsibility of the armament inspectorate, armament commissions were constituted, which at the same time were to serve to coordinate the work of the various agencies. These commissions included as members the heads of the various ministerial offices and Party officials at intermediate levels participating in armament activities, besides representatives from the industry, factory managers, and so forth. Given good cooperation this arrangement could have averted many contradictory measures. But here again exceptionally serious controversies repeatedly became evident which hampered the execution of the assigned missions.

214 The position at the end of the war was thus that the entire field of armament production was subdivided into a plurality of detail missions, managed and controlled by individuals working in complete independence one from the other. In this way it was impossible to achieve a uniform direction.

The self-responsibility of the industry as it developed under the Ministry for Armaments and Wartime Production exceeded by far the acceptable bounds. Without question the industry endeavored to justify the confidence it enjoyed, but the transfer of governmental authority to various concerns was contradictory to the structure of the firms, which was of a private economy nature.

215 In an address to representatives of the Rhine-Westphalian industries on 9 June 1944, Minister Speer stated as follows on this subject:

> If I had had ten years time to prepare and put into operation an organization of the armament industries at my leisure, I possible would have chosen different courses.[1]

The impossibility for a newly created ministry to understand and control the complicated processes af a wartime economy without participation by the industries led to a widespread transfer of trusteeship authority to the industries.

---

1. "Nuernberger Dokumente, Band XXXI," pp. 402-408.

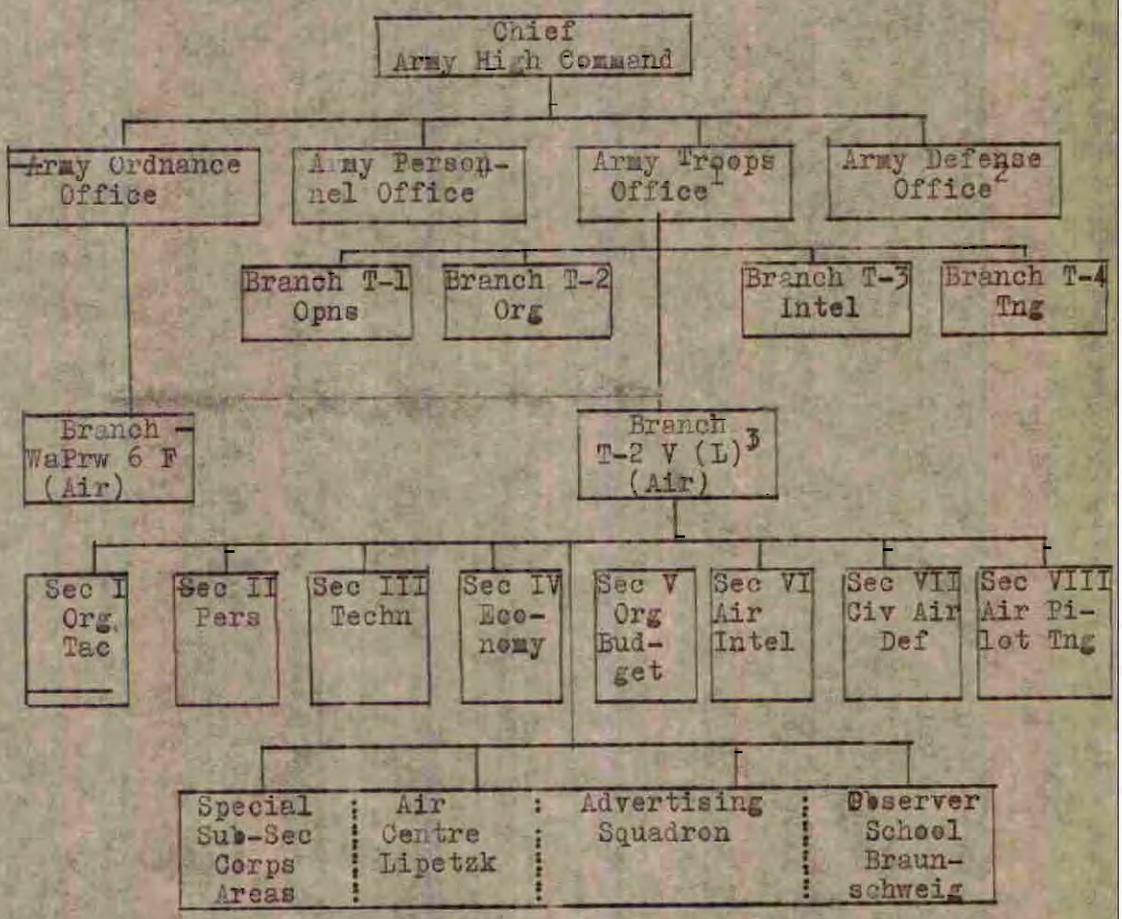
215 In conclusion it can be stated that as an indispensable condition and as a foundation for an armament industry there must be a smoothly functioning organization which, particularly during a war, should be subject to fundamental changes only in compelling circumstances.

In the interests of a uniform direction of the armament industries of a nation, there should be only one organization responsible for handling the armament activities of all three branches of the military establishment.

The complicated processes of an economy and the ~~XXXXXX~~ ~~XXXXXXX~~ the results which technical measures will produce, and which a person lacking the proper training and experience cannot possibly predict, require that th control should be ex ercised only by experienced authorities fully familiar with the principles of military command.

To obtain maximum results, the firms involved should be brought into competitive action on the fullest possible scope during times of peace. In the event of war, the highest level of military command, which should be kept as small as possible, should be supported by an advisory body of experienced industrial leaders.

AIR FORCE AGENCIES IN 1928
(Integration with the Reichswehr)



1. Later became Army General Staff
2. Later became Defense Ministry
3. Later became Inspectorate 1.

AIR FORCE AGENCIES IN 1921-28
(Integration with the Reichswehr)

Legend:

Amt	Office Status
Chef Insp Waffen und Geraet	Chief, Weapons and Equipment Inspectorate (Army)
Amts-gruppe	**Office Department Status**
Ltr. Wa Prw Wesen	Chief, Developing and Proving (Army)
Ltr. Wa B Besch.	Chief, Procurement (Army)
Gruppen	**Section Status** (Air)
Wa Prw-6F Hptm.Student	Tank & Mot Equip Sec (Air) Chief: Captain Student
Wa B 6F Hptm. Volkmann	Procurement Section (Air) Chief: Captain Volkmann
Haushalt Wille	Budget Section (Air) Chief: Wille
Adjutant v.Meyern-Hohenberg	Adjutant (Personnel Sec) (Air Chief: von Meyern-Hohenberg
Besch. Geraete Seldner	Equipment Procurement (Air) Chief: Seldner
Referate	**Sub-Section Status** (Air)
Flugzeuge Buero Nicolaus	Aircraft Firm of Nicolaus
Motoren Buero Lorenz	Engines Firm of Lorenz
Bord-Ausr. Buero Genthe	Aircraft Equipment Firm of Genthe
Waffen Schulz u. Co.	Weapons Schulz & Co.

Appendix Z--Continued

Referate	Sub-Section Status (Air)
Bomber	Bomber Aircraft
Gelg	Firm of Gela
~~XXXXXXXXXXXXXXXX~~ FT	Radio Equipment
Buero Schwartz	Firm of Schwartz
Wa Prw 7	(Controlled by Army Signal Branch)
Bildgeraete	Photographic Equipment
Buero Spieweck	Firm of Spieweck
DVL[1]	(Controlled by Institute for Aviation Research)
Flugzeuge	Aircraft
Boehme	Firm of Boehme
~~XXXXXX~~ Motoren	Engines
Bullinger	Firm of Bullinger
~~XXXXXXXX~~Ausruestg	Equipment
Grosch	Firm of Grosch
Bauaufs.	Construction Supervision
~~XXXXXX~~ Schwarz	Firm of Schwarz
Wehrwirtsch.	Military Economy
Wegner	Wegner
~~XXXX~~Aussenstellen	Field Agencies
Erprobung	Proving
Abtlg M.DVL	(Controlled by Powered Aircraft
1 Nov 25-31 Oct 28	Branch, Institute for Aviation Research) 1 Nov 25-31 Oct 28
Schaedlingsbekaempfung	Crop Dusting & Pest Destruction
Fertigung	Manufacturing

1. DVL--Abbreviation of Deutsche Versuchsanstalt fuer Luftfahrt.

AIR FORCE AGENCIES IN 1928-29
(Integration with the Reichswehr)

Legend:

Amt	Office Status
Chef Heereswaffenamt	Chief, Army Ordnance Office
Abteilung	**Branch Status**
Leiter Wa L	Air Branch
Hauptm. Volkmann	Chief: Captain Volkmann
Gruppen	**Section Status** (Air)
Entwicklung	Development
Hptm. Jeschonnek	Chief: Captain Jeschonnek
Beschaffung	Procurement
Hptm. Seldner	Chief: Captain Seldner
Wirtschl. Ruestung	Industrial Mobilization
Chief Wegner	Chief: Wegner
Referate	**Sub-Section Status** (Air)
Flugzeuge	Aircraft
Motoren	Engines
Bord Ausruestung	Aircraft Equipment
Waffen	Weapons
Bomben	Bombs
Bildgeraet	Photographic Equipment
F.T. Geraet	Radio Equipment
Flugzeuge	Aircraft
Motoren	Engines
Geraete	Aircraft Equipment
Bauaufsicht	Construction Supervision

Aussenstellen	Field Agencies (Air)
Erprobung Rechlin	Rechlin Proving Station
Erprobung Albatros	Albatros Proving Station
Fertigung	Manufacturing

Legend:

AIR FORCE AGENCIES IN 1929-33
(Integrated with Reichswehr)

Amtsgruppe[1]	Department Status
Heereswaffenamt	Within Army Ordnance Office:
Ltr Wa Prw (Pruefwesen)	Chief: Proving Department (Air)
Abteilung	**Branch Status** (Air)
Wa Prw 8 Major Wimmer	Within Branch Wa Prw 8 (Army)[2] Major Wimmer controlled Air Force activities
Haushalt Wille	Budget[3] Wille
Ing. b. Stabe Nicolaus	Staff Engineer[3] Nicolaus
Adj. I	Adjutant I[3](Russia)[4]
Adj.II(Pers.) v. Meyern	Adjutant II[3](Personnel) v. Meyern
Gruppen	**Section Status** (Air)
Gruppe I Entwicklung Flugzeuge	Section I Aircraft Development
Hptm. Riesch Hptm. Konrad	Captains Riesch & Conrad
Gruppe II 2 Entwicklung Ausruestung	Section II 2 Development of Aircraft Equipment.
Hptm. Ploch	Captain Ploch
Gruppe III 3 Erprob. Stellen	Section II 3 Proving Stations of the Youth
R. d. L. J.[5]	Aviation Society
v. Massenbach	von Massenbach

1. The Army Ordnance Office itself had Office Status.
2. Branch Wa Prw 8 was the Army branch handling optical instruments, surveying, weather services, fire control equipment, and mapsprinting equipment. Within this branch Major Wimmer controlled the branch Air Division.
3. All within Branch Wa Prw 8 (Army), but handling air matters.
4. Under an agreement with Russia, Germany was allowed to test military equipment in Russia. The agreement was voided by Hitler after his accession to power in January 1933.
5. Abbreviation of Reichsbund der Luftfahrende Jugend.

Remark: Footnotes by Translator.

Gruppe 4
Beschaffung
Hptm.Seldner

Section 4
Procurement
Captain Seldner

Gruppe 5
Wehrwirtschaft
Ruestung
Wegner

Section 5
Military Economy and Armaments
Wegner

Referate

Sub-Section Status (Air)

1a
Flugzeuge
Nicolaus,Lucht,Hertel
(bis/1 1931)

1a
Aircraft
Nicolaus, Lucht, Hertel
(until 1931)

1b
~~XXXXXX~~ Motoren
Sachse & Mahnke

1b
Engines
Sachse & Mahnke

1c
Bordausruestung
Genthe,Hechner,Repenthien

1c
Aircraft Equipment
Genthe,Herhner,Repenthien

2a
Waffen
Thuy, Mix

2a
Weapons
Thuy, Mix

2b
Bomber
Marquard,Hohn

2b
Bomber Aircraft
Marquard, Hohn

2c
Chem.Kampfstoffe
Voelker

2c
Chemical Weapons
Voelker

2d
Bildgeraete
Spieweck

2d
Photographic Equipment
Spieweck

2e
FT
Navigation
Schwarz

2e
Radio & Navigational Equipment
Schwarz

2f
Sonder Munit.Schutz
Viereck

2f
Special Ammunition Protection
Viereck

4a
Flugzeuge
Boehme (bis 1931)
Hertel (vom 1932)

4b
Motoren
Bullinger

4c
Ausruestung
Grosch

4d
Bauaufsicht
Schwarz

4e
Bestaende-Verwaltung
Grosch (ab 1932 bei WaN)

Aussenstellen

Erprobung Rechlin[1]

Erprobung Albatros[1]

Erprobung Staaken[1]

1.1.11.1928-Fruehjahr 1929 d.R.d.L.J.

Fertigung

4a
Aircraft
Boehme (until 1931)
Hertel (from 1932)

4b
Engines
Bullinger

4c
Aircraft Equipment
Grosch

4d
Construction Supervision
Schwarz

4e
Administration of Stores
Grosch (to Signal Equipment Branch in 1932)

Field Agencies

Rechlin Proving Station[1]

Albatros Proving Station[1]

Staaken Proving Station[1]

1. 1 Nov 28-Spring 1929 Youth Aviation Society.

Manufacturing

Appendix 5 was skipped in the German version as well.

ASSEMBLIES AND SUBASSEMBLIES USED IN AIRCRAFT CONSTRUCTION

Construction Assembly Group	Sub Assemblies (Examples)	Sub-Assembly Identifying Number
Air Frame		
Fuselage	Single-piece fuselage	10-19
	Nose part	100-199
	Center piece	
	Rear part	
	Shell	
	Installations	
	etc.	
Undxrcarriage	Undercarriage	20-29
	Tail skid or wheel	200-299
	Brake Assembly	
	Floats	
	Float frame	
	etc.	
Controlling Surfaces	Horizontal stabilizer	30-39
	Elevator	300-399
	Vertical stabilizer	
	Rudder	
	aerlirons	
	Landing flaps	
	etc.	
Control System	Control system in air frame	40-49
	" " " wings	400-499
	Elevation trimming system	
	Side trimming system	
	Oil pressure system for steering	
	etc.	
Supporting Surfaces	Upper wings	50-59
	Lower wings	500-599
	Struts	
	Bracings, etc.	

Construction Assembly Group	Sub-Assemblies (Examples)	Identifying Numbers
Power Unit		
Engine installations	Aircraft engine	60-69
	Engine mounting	600-699
	Engine cowling	
	etc.	
Power Unit Operating and Servicing System	Engine controls	70-79
	Tubings	700-799
	Water radiator	
	Oil radiator	
	Fuel tanks	
	Lubrication tanks	
	etc.	
Equipment		
Permanent & Supplementary Equipment	Rigid-mount weapons	80-89
	Swivel-mount and portable weapons	800-899
	Bombs	
	Photo Equipment	
	etc.	
	Operating equipment items	90-99
	Electr. installations in air frame	900-999
	Enectr. installations in wings	
	Radio equipment items	
	Oxygen system	
	Tools and appliances kit	
	Items of ground equipment required specifically for aircraft	
	etc.	

Construction Assembly Group--	Sub-Assemblies (Examples)	Identifying Numbers
Crank Case	Crank-case top	100-199
	Crank-case bottom	
Crank gear	Crank shaft	200-299
	Connecting rod couple (Pleuelpaar)	
	Pistons	
	Transmission	
Cylinders	Left cylinder	300-399
	Right cylinder	
Cam Gears (Steuerung)	Valve cams, right	400-499
	" " left	
	Cam drive	
Auxiliary Drives (Hilfsantriebe)	For Ignition magneto	500-599
	" Lubrication pump	
	" Fuel injection pump	
	" Revolution gage	
	" Generator	
Auxiliary Installations	Carburettor	600-799
	Ignition system	
	Fuel injection system	
	Lubricating system	
	Cooling system	
	Starter system	
	etc	
Supplementary Items (not included with engine as delivered from factory)	Engine mountings	800-899
	Cowlings	
	Exhaust system	
	Electrical installations	
	Controls	
	Cooling system	
Special Operating Equipment, According to Engine Type	Special Tools	900-999
	Tool containers	
	Spare parts containers	
	Protective parts for shipping	
	Packing	

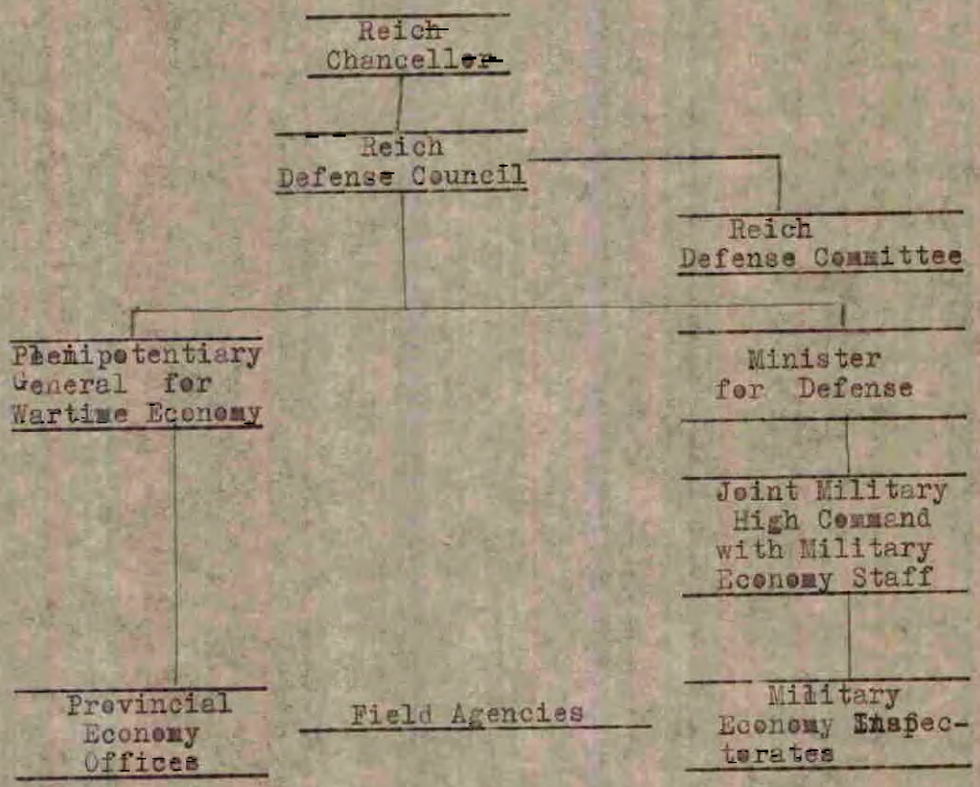
MATERIALS CATEGORIES NUMBERING SYSTEM FOR
AIR FORCE EQUIPMENT AND AMMUNITION

Category Number	Used for
8	Aircraft
9	Aircraft engines and accessories
10	Rescue and safety equipment items
11	Nautical aircraft equipment
13	Ammunition, including equipment and containers (Developed by Army Ordnance Office, see also 113)
18	Bomb release equipment
19	Multi-purpose electricity supply equipment on aircraft
102	Machine guns, mounts, traverses, and appliances
106	Aircraft-type canon and equipment
108	Gliders
109	Special type power units
112	Water surface craft
113	Ammunition (developed by Reich Air Ministry), cartridges, bombs, drop containers, multi-bomb containers, detonators (see also 13)
121	Surface motor vehicles
124	Telephone, radio, and flash signal equipment
125	Searchlight equipment
126	Aircraft lighting equipment, electrical installations, excluding radio equipment
127	Observation and surveying equipment
130	Engineer items of equipment
132	Camouflage equipment and materials
133	Firefighting equipment
134	Items of Ordnance equipment
135	Photographic equipment
139	Housekeeping equipment
140	Workshop and artisan's tools and equipment, power plants and working machinery

Individual standard commercial items are numbered in

accordance with details stated in the equipment catalog (Geraete-mappe. The Materials Categories Numbers given are currently taken with ~~XXXX~~ approval of the Army Ordnance Office from the Materials Categories List of the Army, and are applied to the materials categories stated. Status October 1942.

Appendix 8



Appendix A does not appear to have been translated.

GERMAN AIR FORCE
ORGANIZATION CHART
1933-1936

Legend:

Amt	Office Status
C-Amt	C-Office
Chef-Ing Beck bis 1934 Lucht ab 1934	Chief Staff Engineer Beck until 1934 then Lucht
Chef-Ing P Ing-Personal	Chief Staff Engineer Engineer Personnel Section
Chef des Stabes Drumv.Bercke	Chief of Staff--Drum von Bercke
Adjutant Pendele	Adjutant--Pendele

Abteilung	Branch Status
C I Forschung Baeumker	Branch C I Research Baeumker
C II Entwicklung Sieburg von Richthofen	Branch C II Development Sieburg von Richthofen
C III Beschaffung Loeb	Branch C III Procurement Loeb
Ing.b.Stabe Tschersich	Staff Engineer--Tschersich
Ing.z.b.V Heckner	Special Missions Engineer-- Heckner
C IV Haushalt	Branch C IV Budget Mueller

Gruppen	Section Status
C II 1 Flugzeuge Huebner	Section C II,1 Aircraft Huebner
Motoren C II, 2 Sachse	Section II, 2 Aircraft Sachse
Bordausruestung C II, 3 Wolle	Section C II, 3 Aircraft Equipment Wolle

F T	Section C II, 4
C II, 4 Schwartz	Radio Equipment Schwartz
Bomben Waffen C II, 5 Marquard	Section C II, 5 Bombs, Weapons Marquard
Fertigung C II, 6 Bauer	Section C II, 6 Manufacturing Bauer
~~XXXXXXX~~ Flugzeuge C III, 1 He tel	~~XXXXX~~ Section C III, 1 Aircraft Hertel
Motoren C III,2 Bullinger	Section C III, 2 Engines Bullinger
Ausruestung C III, 3 Maasshoft	Section C III, 3 Equipment Maasshoft
Bau-Aufsicht C III, 4 Schwarz	Section C III, 4 Construction Supervision Schwarz
Wirtschaft.Inspektion C III, 5 Witting	Section C III, 5 Economy Inspection Witting
Flakverbindungsstelle Aderholt	Liaison w/AAA Aderholt

~~Field Agencies~~

DVL Adlershof Braunschweig	Research Institute for Aviation (Deutsche Versuchsanstalt fuer Luftfahrt), Braunschweig
Erprobung Rechlin[1]	Rechlin Proving Station[1]
Erprobung Staaken[1]	Staaken Proving Station[1]
Erprobung Travemuende	Travemuende Proving Station
bis 31.3.33 Erprobungsstellen der Luftfahrtindustrie	until 31 Mar 33 industry-owned proving stations
B.f.I (Buero fuer Industrie-Arbeiter (ab 1936 B.f.L).	Office foer Industrial Labor until 1936, then Office for Aviation-Industry Labor).

GERMAN AIR FORCE
ORGANIZATION CHART
1936-1938

Legend:

Amt	Office Status
C-Amt	C-Office
Oberst Udet	Colonel Udet
Chef des Stabes	Chief of Staff
Adjutant Pendele	Adjutant Pendele
Chef Ing.	Chief Staff Engineer
Chef-Ing.P	Engineer Personnel Section
Ing.Personal 1.9.36.20.6.40	1 Sep 36-20 Jun 40

Abteilungen	Branch Status
C I	Branch C I
Forschung Baeumker	Research Baeumker
C II	Branch C II
Entwicklung Junck	Development Junck
C III	Branch C III
Beschaffung Ploch	Procurement Ploch
Ing b. Stabe	Staff Engineer
C IV	Branch C IV
Haushalt	Budget

Gruppen	Section Status
Flugzeuge C II, 1	Section C II, 1 Aircraft
Moteren C II,2	Sedtion C II, 2 Engines

Bord-Ausruestung C II, 3	Section C II, 3 Aircraft Equipment
F T C II, 4	Section C II, 4 Radio Equipment
Waffen Bomben C II, 5	Section C II, 5 Bombs and Weapons
Fertigung C II, 6	Manufacturing Section C II, 6
Flugzeuge C III, 1	Section III, 1 Aircraft
Motoren C III, 2	Section C III, 2 Engines
Ausruestung C III, 3	Section C III, 3 Equipment
Bau-Aufsicht C III, 4	Section C III, 4 Construction Supervision
Wirtschaft. Insp. C III, 5	Section C III, 5 Economy Inspection

Aussenstellen	Field Agencies
Erprobung Rechlin	Rechlin Proving Station
Erprobung Travemuende	Travemuende Proving Station
B.f.I.P. (Bevollmaechtigter fuer Industrie Personal ab 1936)	Plenipotentiary for Industrial Man Power, from 1936)

GERMAN AIR FORCE
ORGANIZATION CHART
1938-1939

Legend:

Amt	Office Status
C-Amt	C-Office
Udet	Udet
Chef d.Stabes	Chief of Staff
Adjutant	Adjutant
Haushalt	Budget
Chef Ing.	Chief Staff Engineer
Chef-Ing.P	Engineer Personnel Section
Ing.Personal	

Abteilungen	Branch Status
Planung LC 1	Branch LC 1 Planning
Wehrwirtschaft LC 2	Branch LC 2 Military Economy
Fertigung LC 3	Branch LC 3 Manufacturing
Pruefung Bauaufsicht LC 4	Section LC 4 Inspection, Construction Supervision
Forschung LC 5	Branch LC 5 Research
Sicherheit LC 6	Branch LC 6 Security
Flugzeuge LC 7	Branch LC 7 Aircraft
Motoren LC 8	Branch LC 8 Engines
Navigation LC 9	Branch LC 9 Navigational Instruments

Allg.Ausruestung LC 10	Section LC 10 General Equipment
Waffen, Munition LC 11	Section LC 11 Weapons, Ammunition
Bomben Abwurfwaffen LC 12	Section LC 12 Bombs and Bombing Equipment
Bodan-Geraet LC 13	Section LC-13 Ground Equipment

Aussenstellen	Field Agencies
Rechlin Flugzeuge Moteren Allg.Ausruestung & Navigation Waffen Bomben Bodengeraet	Rechlin Proving Station Sections for Aircraft, Engines, General Equipment and Navigational Equipment, Weapons, Bombs, Ground Equipment
Travemuende (Same as Rechlin)	Travemuende Proving Station (Same sections as Rechlin)

German Air Force
Organization Chart
1939-1941

Legend:

Generalluftzeugmeister Udet	Chief of Special Supply & Procurement Service: General Udet
Chefd.Stabes	Chief of Staff
Asjutant	Adjutant
Ltd. Chef Ing.	Directing Chief Staff Engineer
Chef-Ing P Pers.Ing	Engineer Personnel Section
Technisches Amt Udet	Technical Office General Udet
XXXXXXXX XXXX	XXXX
Nachschub Amt GL/E	Supply Office
Amtsgruppe Industrie-wirtschaft	Department for Industrial Economy
XXXXXXXXXXXX Planung GL 1	Branch GL 1 Planning
Wehrwirtschaft GL 2	Branch GL 2 Military Economy
Fertigung GL 3	Branch GL 3 Manufacturing
Pruefung GL 4	Branch GL 4 Proving
Mineraloele GL 5	Branch GL 5 Mineral Oils
Sicherheit GL 6	Branch GL 6 Security

Appendix 13--Continued

Verbindungs-Ing. zu Mun. W. im[+] GL V Ing.	Branch GL V Ing Engineer Liaison Branch for Ammunition Section for Liaison w/Ministry for Munitions[+]
Bf. S. Sonder-Aufgaben	Special Projects Branch
B/SA Abwehr	Counterintelligence
Forschungsfuehrung GL/C 1	Branch GL/C 1 Direction of Research
Flugzeuge GL/C 2	Branch GL/C2 Airctaft
Motoren,Triebwerke C 3	Branch C 3 Engines, other Power Units
Nachrichten Navigation C 4	Signal & Navigational Equipment Branch (Branch C 4)
Allg.Ausruestung C 5	Branch C 5 General Equipment
Schusswaffen Munition C 6	Branch C 6 Shooting Weapons, Ammunition
Abwurfw. Bomben C 7	Branch C 7 Bombs and other Drop Ammunition
Bodengeraet C 8	Branch C 8 Greund Equipment
Reparaturen C 9	Branch C 9 Repair Services
Auftraege,Export GL/F 1	Branch GL/F 1 Contracts, Exports
Betriebswirtschaft Preispruefung F 2	Branch F 2 Industrial Operations, Price Control

[+] According to letter General Deichmann to H. Weitzen,5 Oct 60, this should read Mun M (munitionsministerium) not Mun W

Wirtschaftinvestitionen F 3	Branch F 3 Industrial Investments
Gruppe Patente F 4	Branch F 4 Patents
Nachschub Org. GL/E 1	Branch GL/E 1 Supply Organization
Fliegergeraet GL/E 2	Branch GL/E 2 Aircraft Equipment
Waffen und Geraet GL/E3	Branch GL/E 3 Weapons and Equipment
Flakgeraet Munition GL/E 4	Branch GL/E 4 AAA Equipment, Ammunition
Kommandeur Erprobungs-stellen, erst ab 1941	Commander of Proving Stations, (Post established in 1941)
Rechlin	Rechlin Proving Station
Travemuende	Travemuende " "
Tarnewitz	Tarnewitz " "
Peenemuende	Peenemuende " "
Udetfeld	Udetfeld " "

German Air Force Organization Chart 1941-1944

Legend:

Generalluftzeugmeister Milch	Chief of Special Supply and Procurement Service: Field Marshal Milch
Industrierat	Industrial Council
Adjumantur	Adjutants Office
Forschungsfuehrung	Direction of Research
C-Amt Technisches Amt GL/C	C-Office Technical Office
Industrie-Wirtschafts-Amt GL/F	Industrial Economy Office
Planungs Amt GL/A	Planning Office
Amtsgruppe Flakentwicklung GL/Flak E (ab 1942)	Department for AAA Development (From 1942 on)
Amtsgruppe Geraete- und Industrie-Planung GL/A-Pl	Department for Equipment and Industrial Planning
Amtsgruppe Wehrwirtschaft GL/A-W Wi	Department for Military Economy
Amtsgruppe Entwicklung von Fl. Geraet GL/C-E	Department for Development of Air Equipment
Amtsgruppe Beschaffung v. Flieg.-Geraet GL/C-B	Department for Procurement of Air Force Equipment
Ballistik Flieg GL/Flak El	Branch GL/Flak E 1 Ballistics, AAA

Flakgeraet Entwicklung Optik & Kommando-Geraet E 2	Branch E 2 Optical and Fire Control Equipment
Techn.u.allg.Zentralabteilung E 3	Branch E 3 Technical and General
Flakwaffen Entwicklung Geschuetze	Branch E 4 AAA Weapons Development (Guns)
Flak-Ruestung GL/Flak-Rue	Branch GL/Flak Rue AAA Armaments
Geraete Planung GL/A-Pl 1	Branch GL/A-Pl 1 Equipment planning
Rohstoffstelle Pl 2	Branch Pl 2 Raw Materials Planning
Industrie Ausbauplanung Pl 3	Branch Pl 3 Industrial Development Planning
Industrie Pers. Planung Pl 4	Branch Pl 4 Industrial Man Power Planning
Verbindung zu Minister V-Ing	Engineer Liaison Branch Liaison with Minister
Wehrwirt. Organization W Wi 1	Branch W Wi 1 Military Economy Organization
Techn. Wehrwirtschaft W Wi 2	Branch W Wi 2 Technical Military Economy
Abwehr u. Industrie W Wi 3	Branch W Wi 3 Security and Industry
Lw Personal Einsatz W Wi 4	XXXXX Branch W Wi 4 Assignment of AF Personnel
Mineral Oele GL/A-M	Branch GL/A-M Mineral Oils
Beauftragter Sonderaufgaben Bf/S	Branch Bf S Special Missions

Beauftragter Verb.-Stellen Bf V	Branch Bf V Control of Liaison Agencies
Flugzeuge E 2	Branch E 2 Aircraft
Triebwerke E 3	Branch E 3 Engines
Nachrichten,Navigation E 4	Branch E 4 Signal and Navigational Equipment
Allg.Ausruestung E 5	Branch E 5 General Equipment
Schusswaffen,Munition E 6	Branch E 6 Shooting Weapons, Ammunition
Abwurf Waffen, Bomben E 7	Branch E 7 Bombs and other Drop Weapons
Boden Geraete E 8	Branch E 8 Ground Equipment
Lufttorpedos (lenkb. Geraete) E 9	Branch E 9 Air Torpedoes (Guided Missiles)
Front Reparatur Chef Nachrichten E 10	Branch E 10 Front Areas Repair Services Chief of Signals
Fertigung Fertg	Production Branch Manufacturing
Bauaufsicht Ba	Branch Ba Construction Supervision
Auslands-Ruestung C-Rue	Branch C-Rue Foreign Armaments
Auftraege,Export F 1	Branch F 1 Contracts, Exports
Betriebswirtschaft Preispruefung F 2	Branch F 2 Industrial Operations, Price Control

Industrie Bewirtschaftung F 3	Branch F 3 Industrial Economy
Patente (Gruppe) F 4	Patents Section Section F 4
Kommandeur Erprobungs-Stellen	Commander of Proving Stations
Rechlin	ProvingsStations Rechlin
Travemuende	Travemuende
Tarnowitz (Waffen)	Tarnowitz (Weapons)
Udetfeld	Udetfeld
Peenemuende (V 1)	Peenemuende (V-1 Weapons)
Getenhafen	Gdynia (Torpedoes)
Maduesee	Maduesee (Torpedoes)
Werneuchen	Werneuchen (Radar)
Foggia	Foggia (Aircraft
Muenster-Nord	Muenster-Nord
Kraftfahr-Verfuegungs-Trupps	Motor Pools

There does not appear to be an appendix #15 in the German version.

~~Appendix 16~~

GERMAN AIR FORCE ORGANIZATION CHART 1944-1945

~~Legend~~:

Chef T L R	Chief Technical Air Armaments
Adjutantur	Adjutants Office
Registratur/Adj III	Records and Adjutant III
Genst. O.	General Staff Officer
Programm	Program
Lw. Bergung	AF Rescue and Salvage Services
Forschungs-Fuehrung	Direction of Research
K. d. E	Commander of Experimental Units
Technische Akademie	Technical Academy
Amtsgruppen	Departments [for]
Fl. Entwicklung	Aircraft Development
Mineraloele	Mineral Oils
Beschaffung	Procurement
Flak-Entwicklung	AAA Development
Abwicklungs-Stelle	Accounting
In- u. Ausland-Ruestung	German and Foreign Armaments
Flak-Ruestung [End of Departments]	AAA Armaments
Chef Abtlg	Policy Branch
Statistik, Berichte	Statistics, Reporting,
Sonder-Aufgaben	Special Missions
Flugzeuge E 2	Branch E 2 Aircraft
Triebwerke E 3	Branch E 3 Engines
Nachrichten, Navigation E 4	Branch E 4 Signal & Navigational Equipment

Ausruestung E 5	Branch E 5 Equipment
Schusswaffen E 6	Branch E 6 Shooting Weapons
Abwurfwaffen E 7	Branch E 7 Bombs, Air Mines, etc.
Bodengeraet E 8	Branch E 8 Ground Equipment
Luftterpedo Sondergeraet E 9	Branch E 9 Air Torpedoes, Special Equipment
Werkstoffe E 10	Branch E 10 Manufacturing Materials
Planung	Planning Branch
Entwicklung	Development Branch
Beschaffung	Procurement Branch
Einsatz	Operations Branch
Reparatur Chef B 1	Branch B 1 Chief, Repair Services
Zellen B 2	Branch B 2 Fuselages
Triebwerke B 3	Branch B 3 Engines
Nachrichten,Navigation B 4	Branch B 4 Signal & Navigational Equipment
Ausruestung B 5	Branch B 5 Equipment
Schusswaffen B 6	Branch B 6 Shooting Weapons
Abwurfwaffen B 7	Branch B 7 Bombs, Air Mines, etc.

Bodengeraet B 8	Branch B 8 Ground Equipment
Luftterpedo,Sondergeraet B 9	Branch B 9 Air Torpedoes, Special Equipment
Ln. Rep. Chef B 10	Branch B 10 Chief, Air Signal Repair Services
Auslands Geraet	Foreign Equipment Branch
Ruestung des Auslandes	Foreign Armaments Branch
Sonder-Beauftragter Japan	Special Commissioner, Japan
Ballistik Flak E 1	Branch Flak E 1 Ballistics (AAA)
Geraete Flak E 2	Branch Flak E 2 Equipment (AAA)
Fertigungs-Vorbereitung Flak E 3	Branch Flak E 3 Production Preparations (AAA)
Geschuetze Flak E 4	Branch Flak E 4 Guns (AAA)
Verwaltung von Sondermuni- tion Flak E 5	Branch ~~XXX~~ Flak E 5 Special Ammunitions Administration
Flak Rep. Chef	Chief, AAA Repair Services
Abwicklungsstelle GL/A	Branch GL/A Accounting
Rohst.	Raw Materials
Flugplaetze	Airfields
Bildstelle	Photographic Station
Abwehr	Security (CI)
Bildstelle	Photographic Station

ECONOMIC AND INDUSTRIAL GROUPS, ASSOCIATIONS, AND RINGS ATTACHED TO OFFICES OF THE MINISTRY FOR ARMAMENTS AND WARTIME ECONOMY

1. Attached to the Raw Materials Office.

National Association of Coal Producers and Handlers

" " " Chemical Fibres Producers and Handlers

" " " Natural Fibres Producers and Handlers

National Wool Combine

Main Cartel (Ring) Metals

Industrial Group for Wood Pulp, Paper, and Cardboard

Industrial Group for Chemical Products

Industrial Group for Fuel Producers

2. Attached to the Armaments Deliveries Office.

National Association of Iron Industries

Main Cartel for Iron Production

" " " Roller Mill Production, Armaments Trading

" " " Cast Iron and other Metal Products

" " " Forged Metal Products

" " " Manufacturing Materials Improvements

" " " Machinery Parts Producers

" " " Welding and Forging Techniques

" " " Molding Plastics and other Synthetic Materials

" " " Stones and Earths

" " " Technical Glass and Ceramics

Main Committee for Gunpowder, other Explosives, and Chemical Warfare Agents, and Auxiliary Products Contained in Special List

" " for Electrotechnics

" " " Fine Mechanics and Optical Instruments

" " " Steel and Iron Construction

" " " Armament Equipment

" " " Iron, Sheet, and Other Metal Products

Main Committee for Mechanical Engineering

3. Attached to Production Office

Textile Industries Group

Clothing Industries Group

Leatherware " "

Footwear Industries Association

Woodworking Industries Group

Paper " "

Printing " "

Glass I " "

Ceramics " "

Tobacco " "

4. Attached to Construction Office

Main Committee for Building Construction

Group for Building Industries

Reich Plenipotentiary for Wooden Building Construction

5. Attached to Technical Office

Main Committee for Weapons Industries

Main " " Ammunitions Industries

" " " Armor Plated Vehicle Manufacturers

" " " Automobile Industries

" " " Rail Vehicle Manufacturing Industries

" " " Shipbuilding Industries

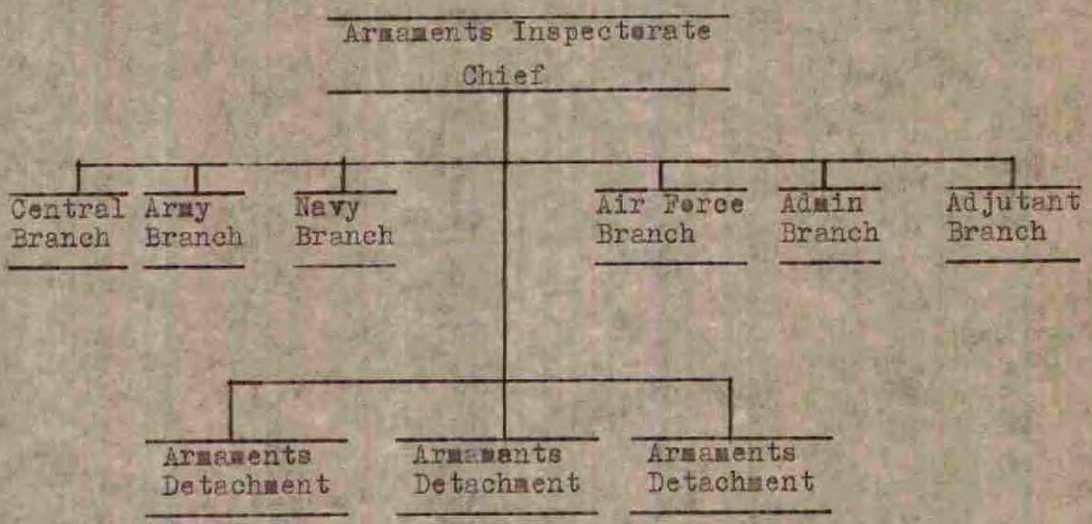
6. Attached to Electricity Office.

National Group for Electricity Control

Electricity Supplies Group

Gas and Water Supplies Group

ARMAMENTS INSPECTORATES
(Specimen Table of Organization)
(1935-1943)



ARMAMENTS INSPECTORATES
(SPECIMEN TABLE OF ORGANIZATION)
(from March 1943 on)

Armaments Inspectorate Chief

Staff Officers from Army, Navy, and Air Force

Army; Navy; Air Force; Admin

Reports on Availability of Machinery

Central	Branch for Technical Operability	Branch for Final Production	Branch for Semi-Finished Parts
Labor Allocation Deferments POW Allocations Trans & Com Priorities Planning Industrial Def Security Routine Management Inspectorate Office	Eng. Missions, primarily: Tool Mach Distribution Gas, Water, Electricity Sup; Coals, Substitute Materials; Relocations; Control of Raw Materials Consumption; Search for New Facilities	(Organized in Committees) Weapons, Ammo, etc.; Shipbuilding, etc.; Fuselages Engines Equipment for AF Surface Motor Vehicles etc.	(Organized in Committees) Tools Patterns, gages etc. Manufacturing Installations; Precision Mechanics and Optical Instruments; Electrotechnics; etc.
Requirements Procurement		Requirements Auditing	Support to Industries

Armaments Detachment | **Armaments Detachment** | **Armaments Detachment**

Appendix 20

GERMAN AIR FORCE
PROCUREMENT

RELATIONSHIP ORGANIZATION OF MAIN COMMITTEES[1] AND CARTELS[2]

Main Com wpns (Tix	Main Com Ammo (Geilenberg)	Main Com Tanks & Tracters (Rohland)	Main Com Shipbldg (Blohm)	Main Com Naval Sub-Surface Wpns (Paulus)	Main Com Fuselages (Frydag)	Main Com Engines (Werner)
.....	.....	.....	.....	.....	.....	.....
					Spec Com each for Junkers, Messerschmitt, Heinkel, Focke-Wulf, Dornier, Arado, Siebel, Henschel, Blohn & Voss, Buecker, Fieseler, Gotha, Klemm, fuselages. For Engines & Tail Spurs, Wheels, Fuselage Castings Standard Servicg Rods, Guns, Containerss	Spec Com each for Junkers, Daimler-Benz, BMW, Argus, engines, & for Wood. Propellors, Steel " & Regulaters, Light Metal Castings f Engines & Appliances, Armatures, Exhaust, Slide Bearings, Fuel PresPumps PresPump Valve Air Eliminaters, Askania Regulaters, Hirt Engines, Engine Cowlings, Carburetters.

VERTICAL ORGANIZATION

....

Main Com Aircraft Equipm (Heyne)	Main Com Mil & GenEquip (Zangen)	Main Com Machinery (Lange)	Main Com Rail vehicles (Degenkolb)	Main Com Krauch Program (Krauch)	Main Com Motor Vehicles (Werneva)	Main Com Signal Equip (Lueschen)
Spec Com each for telecompass equip, Mech.Gages,Parachute etc, Air-Drop Sup,Oxygen Equip, Aircraft Hydraulic, Compr.Air Equip.,Small Gears,Remote Control & other Steering Gear f.Aircraft,Hvy & Light Gun Mounts,Remote Gun Controls, Bombs & other Drop Weapons, Mine-Bombs, Parachute Mines Air Torpedoes						

1. Abbreviated as Main Com
2. Abbreviated as Main Cart

Horizontal Organization

Main Cart: Iron Production — Roechling

Special Cart.:

- Raw Steel (Peech)
- Sheet Iron Products (Meett)

Main Cart: Iron Processing--Neell

- Castings (Naaf)
- Forgings (Langenohl)
- Refinement (Schroeder)

Main Cartel: Metals -- Fitzner

Special Cart:

- Light Metals Raw Materials & Processing (Westrick)
- Hvy Metals Raw & Processing (Borchers)
- Hvy Metals Processing (Herster)
- Light Metals Processing (Eychmueller)
- Metal Casts (Schwietzke)
- Precious Metals (Hirtes)
- Industrial Raw Materials (Haas)

Main Cartel: Factory Equipment & Machinery Elements -- Kluy

- Machinery Requirements (Kluy)
- Tool Requirements (Kluy)
- Armatures (Pape)
- Cogwheels & Gears (v.Westermann)
- Roller Bearings (Schaefer)
- Standard & Spec Thread Screws (Deussen)
- Pistons (Mahle)
- Piston Rings Packings (Fervers)
- Radiators (Behr)
- Valves (Teves)

Main Cartel: Electro-Technical Products -- Lueschen

- Electro-Motors (Scharowsky)
- Transformers (Fischer)
- Switch Equipment (Hartmann)
- Gen Electr-Technical Constr. Elements (Koehn)
- Lighting Techniques: Carbons & Commutators (Freiberger)
- Electro-Ceramics (Scheid)
- Gages, Meters, & Parts for low voltages (Leifer)
- Wires, Cables (Maier)
- Special Electr Articles (Lueschen)
- Ships Electr Equip (Buss)
- Aircraft Electr Equip (Heyne)

Special Cartels not members of Main Cartels:

- Varnishes (Pomper)
- Molding Plastics Synthetic Materials (Lueas)
- Industrial Textiles (Otten)
- Wood (Baldeweg)

GERMAN AIR FORCE

PATTERN OF COOPERATION BETWEEN MINISTRY FOR ARMAMENTS AND WARTIME ECONOMY WITH COMMITTEES AND OTHER AGENCIES

Legend:

Min Ruk	Ministry for Armaments & Wartime Economy
Amt Bau	Building Construction Office
Techn.Amt	Technical Office
Rue-Lieferungs Amt	Armaments Deliveries Office
Produktions-Amt fuer Verbrauchsgueter	Office for Production of Consumer Commodities
Hauptausschuss Zelle	Main Committee for Fuselages
Hauptausschuss Panzer	" " " Tanks
Wirtschaftsgruppe	Group for Economy
Hauptring	Main Cartel (or Main Ring)
Wirtschafts-Gruppe	Group for Economy
Sonderausschuss Baumuster A	Special Committee for Model A
Sonderausschuss Baumuster B	Special Committee for Model B
Unterausschuss	Sub-Committee
Arbeits-Kreis	Working or Study Committee
Wehrkreis-bezw. Inspections-Bereich	Corps Area, simultaneously Inspectorate Area
Bezirks-Beauftragter	District Commissioner
Bezirks-Obmann Zelle	District Industrial Chief's Committee
Bezirks-Obmann	" " Chief
Ruestungs-Obmann	Armaments Factory Chief
Bau-Bevollmaechtigter	Commissioner for Building Construction

Gauarbeitsamt	Regional Labor Office
Ruestungs-Inspektion	Armaments Inspectorate
Wehrkreis Beauftragter	Corps Area Commissioner
Bezirks-Lastverteiler	
Gau Wirtschafts-Kammer der Landes-Wirtschafts-Aemter	Regional Chambers of Industry of the Provincial Chambers or Boards of Industry
Ruestungskommission	Armaments Commission

THE GERMAN AIR FORCE

AIRCRAFT PROCUREMENT

PART TWO

by

STUDIENGRUPPE GESCHICHTE DES LUFTKRIEGES

KARLSRUHE, GERMANY

this pg not in German version

PR 217

THE GERMAN AIR FORCE

AIRCRAFT PROCUREMENT

PART TWO

CHAPTER 1

INDUSTRIAL PLANNING AND DEVELOPMENT[1]

Preparations for Mobilization and for Relocation of Industries.

a. Industrial Development, 1933-1939. The eight aircraft manufacturing firms still in existence in 1933, namely, the firms of Junkers, Dornier, Bayerische Flugzeugwerke, Heinkel, Arado, Focke-Wulf, Fieseler, and Klemm, combined had 8 976 square yards (7500 square meter) of factory space available.

Each firm followed its own construction principles, some making wooden, some mixed, and some light metal structures, and their organization set up accordingly varied widely one from the other.

The same applied to the six aircraft engine firms still in existence at the time, namely, the firms of Junkers, Siemens, BMW, Daimler-Benz, Argus, and Hirth. With the only exception of the firm of Hirth, the aircraft-engine manufacturing firms were only subsidiaries of larger manufacturing

1. The presentation given in this chapter is based on reports from Oberst-Ingenieur Haase-Berton and Oberst-Ingenieur Thomas, both retired, plus the personal experience gathered by the present writer while serving as Chief of Aircraft procurement.

218 concerns, a circumstance which applied to most of the firms engaged in the manufacture of general armaments.

In spite of the limited funds and technical facilities available, progress had been made in the field of development, by mid-1933, particularly so far as commercial aviation and aviation sports were concerned, a fact which had also found recognition abroad. However, the essential conditions did not exist in Germany, neither in respect to the necessary funds nor to factory facilities, for the serial production of aircraft to create an air force even on a very limited scale.

In view of the large armament program required in 1933, and in particular in view of the necessity to create an entirely new air force, the newly established Technical Office found itself compelled to exercise a powerful influence on the expansion of the entire industry and extending beyond the activities of development and procurement, a circumstance very different from circumstances in most countries.

The necessity to achieve optimum results in respect to economy and technical performances with the industrial capacities in existence and those to be newly created called not only for

219 the issue of basic directives concerning the locality of factories in line with tactical considerations and their size, but also concerning their operational installations out of consideration for the planned missions of the individual

219 firms concerned.

What made this particularly difficult was the necessity on the one hand to exercise a far more than normally powerful influence on the internal affairs of industry while, on the other hand, avoiding as far as possible any restriction of the industries' own systems of economy and initiative.

The program planned by the General Staff for the activation of units in the 1933-1938 period provided the basis for the industrial planning study worked out in the Technical Office within a number of days and nights.

The purpose of this study was to insure that, so far as capacities and operational requirements were concerned, the conditions would exist in the industry which were essential for the activation of an Air Force of the initially planned size and to keep that Air Force operable against the eventuality of a mobilization, besides developing the industry in conformance with a pattern which would meet these requirements.

Another purpose of this planned direction of industrial development was to provide against faulty investments, which would have had to be expected with certainty if the firms had carried out their own expansion in accordance with their own plans and desires.

The limited man power and raw materials supplies

220 at Germany's disposal made it impossible to proceed in conformance with the principles of free economy.

The outcome of the whole study was that the whole aircraft industry was subdivided into a number of concerns for the production of bomber aircraft, plus individual firms for the manufacture of fighter, reconnaissance, dive-bomber, and liaison, school and other training aircraft, while the engine manufacturing industry was organized in categories producing liquid-cooled and air-cooled engines, and engines for training planes.

In deciding on the locations for new factories and on the expansion of existing factories, careful consideration had to be given to Germany's exposed position to air attack, in order to reduce to a minimum the hazards of an unexpected air attack or a surprise advance into Germany by ground forces. For this reason new factory establishments were permitted only in the areas designated Inner Germany, bordered on the west by an almost straight line, on the east by a line east of Stettin to west of Breslau, and in the northwest by a line from west of Bremen to Cassel to east of Friedrichshafen. In view of the striking range of aircraft in these days, ~~[illegible]~~ plus the air defense measures taken, these areas could be considered safe against air attack.

The only exception to the above rule was that of the

220 Ruhr region. Here, the establishment of new factories had to be permitted whenever necessary because of the impossibility to relocate the basic materials industries situated in the area, for the air defense of which special measures were planned.

221 In other cases, the expansion of existing factories outside of "Inner Germany" was permitted only when the expansion planned depended on local conditions.

Any departure f om the above principles could only be considered if it could serve to enable existing factories to accelerate armament activities during the first phase of the rearmament program. A condition imposed in such cases was that a start was to be made at establishing a shadow factory within the protected area which, as the rearmament progressed could serve as a substitute for the original factory if needed, and at the same time could be operated to overcome bottlenecks which might occur.

A Repair factory containing all required installations was planned and actually established in Eastern Prussia to support any units which might have to be committed from that area, which was separeted from the rest of Germany ~~XXXXXX~~ by the Polish Corridor.

Consideration for the methods of approach and attack in these days imposed further restrictions on decisions

221 concerning the choice of locations for new factories and on plans to expand existing factories. Approach and attack in these days depended on visual observation, which made it necessary to avoid placing factories in the vicinity of salient landmarks, rail installations, important bridges, river bends, rail intersections, lakes, and so forth. The same restrictions applied to targets which it had to be presumed were already marked in the target folders of foreign powers.

222 Another thing which had to be avoided was the erection of residential houses in the vicinity of large factories situated on the outskirts of cities or elsewhere, since any such buildings would have come within important target areas and this would have exposed the civilian population to increasingly serious hazards.

Against these tactical considerations, the factories themselves made fully justifiable demands, since these factories had to rely on the availability of the required manpower in the interests of as smooth a progress as possible in the manufacturing processes. For this reason, the management in most cases desired to locate factories a close as possible to large man power reserves, meaning in the vicinity of large cities.

The C Office therefore had to take all arguments and counter-arguments into careful consideration before any

222 decision could be made concerning the individual sites chosen. Other factors of decisive importance in such decisions were the conditions upon which the successful operation of a factory hinged, namely facilities for the transportation of personnel and materials and finished products to and from the factory, the availability of adequate electricity supplies, water, and gas, etc.

One underlying cause in many cases for the desire of industrialists to establish their factories as close as possible to large cities was the wish to keep operating costs as low as possible for later peacetime operations, in order to be able to compete with other firms, another was the wish o avoid the difficulties which had to be expected in the

223 transfer of personnel from one locality to another. It was for such reasons that many industrialists showed such a merked preference for Berlin.

As a matter of fact, the movement of personnel from large cities to the vicinity of small or medium-sized towns did encounter exceptionally serious difficulties, because it was almost invariably impossible to provide family quarters for some time, so that the separation of families was unavoidable. Man power fluctuations in such factories were therefore extraordinarily high and were one of the causes for disrupted operations within the factories.

223 Another restricting factor in the selection of factory sites was the consideration which had to be given to agriculture. The German Government was doing everything possible to make the country as independent as possible of food imports, so that factories could not be established on agriculturally valuable ground. In like manner it was essential to avoid depriving agriculture of man power.

A careful analysis of all important factors involved in the selection of factory sites produced the factory distribution plan illustrated by the map included with this study as Appendix 22.

The plan provided that at least two physically separated factories must exist for the production of each type of aircraft and each type of engine. From the viewpoint of industrialists it was obvious that a consistent application of such measures would encounter exceedingly serious difficulties. The fact that conditions were actually created in which it was possible whenever operating difficulties developed in a factory, or when a factory was destroyed during the war, to fall back on a shadow factory without too serious difficulties was due to the understanding shown by the firms involved and their willingness to sacrifice their own business interests.

224 The newly established concerns for the manufacture of bomber aircraft were as follows:

Dornier-Nord, with an assembly factory in Wismar and subsidiary factories in Wismar and Luebeck;

Heinkel with factories at Rostock, Marienehe and subsidiary factories in Rostock;

Henschel with factories at Berlin-Schoenefeld and subsidiary factories at Johannistal and Wildau;

Dornier-Sued with factories at Oberpfaffenhofen and subsidiary factories at Aschersleben, Leopoldshall, and Schoenebeck;

ATG with factories at Leipzig-Mockau and subsidiary factories at Leipzig-Eutritzsch and Grosstschocher.

The dangerously located Dornier-Friedrichshafen works remained in operation as development stations, which also applied to the limited possibilities for expansion of the Junkers Works at Dessau.

The following individual factories were established or expanded:

Focke-Wulf	at Bremen
Arado	at Warnemuende and Brandenburg
Fieseler	at Cassel
Bayerische Flugzeugwerke	at Augsburg
AGO	at Aschersleben
Weser Flugzeugbau	at Bremen
Erla	at Leipzig.

225 For the aircraft engine manufacturing industry the following factories were planned and then established:

Bayerische Motorenwerke	at Muenchen-Allach and Eisenach
Junkers	at Koethen
Daimler-Benz	at Genshagen, near Berlin
Siemens	at Berlin-Spandau and Basdorf
Pommerische Motorenwerke	at Stettin-Arnimswalde
Niedersaechsische Werke (Nimo)	at Braunschweig-Querum
Mitteldeutsche Motorenwerke (Mimo)	at Leipzig-Taucha

plus the following to manufacture engines for school and practice aviation:

Hirth Motorenwerke	at Waltersdorf
Argus Motorenwerke	at Berlin-Reinikendorf.

The development factories of Daimler-Benz at Stuttgart-Untertuerkheim, and Hirth-Motorenwerke at Stuttgart-Zuffenhausen, both outside the region considered safe against air attack, remained in operation for the time being as development stations. Serial production of the engines developed by these two firms was moved to the factories at Genshagen and Waltersdorf, respectively, mentioned in the above lists.

In the case of the firm of Junkers, serial production of both fuselages and engines was transferred to Koethen, the object being to loosen up the industrial concentration at Dessau.

The planned locating of factories and the fact

226 at least two factories existed for the manufacture of each aircraft type provided reasonable safeguards. Efforts were made to make the industry even safer against the impact of war through the issue of directives regulating the lay out of the individual workshops, and by means of air defense and air raid protection measures as well as measures to be taken within the factories.

Initial regulations restricted the size of individual construction sheds to a maximum of 4000 square meters (approximately 4790 square yards), and of hangars to a maximum of 6000 square meters (approximately 7 200 yards), and they were to be spaced at least twice the width of the structure concerned apart. The individual structures were placed so as to minimize the risks of being hit in stick-bombing runs. Roofs were designed to avoid reflecting the sunlight, and the colors of roofs and walls were to match the surrounding terrain as closely as possible. Arrangements were also to be provided for blackouts and for protection and action against fire and explosions.

A regulation requiring the construction of air shelters either under or outside of the workshops initially met opposition by the industrialists because of the higher construction costs involved. Later, during the war, however, these shelters proved a very sound measure.

227 Owing to the unsettled international situation in the first few years after 1933, the German Government pressed for an accelerated execution of the rearmament program. Since the purchase of aircraft and other armament equipment from foreign countries could not be entertained, so that the activation of the planned units depended entirely on the output by the German industry, special measures were needed to accelerate industrial development. Innumerable matters had to be cleared up concerning the building operations involved, and to have used the normal bureaucratic channels in doing this through the various administration, building control, passive air defense, and planning authorities would have cost considerable time, and resulted in serious delays. To avoid any complications and to clear up other details, the Technical Office appointed its representatives at the more important works as its local industrial executives. The mission was to establish the closest possible cooperation between the factories and the Technical Office, as the mission assigning agency, to accelerate the execution of sub-contracts an to bring about the speediest possible settlement of all formal details with the local authorities. In practice, their functions corresponded to those of the Wartime Economy Inspectorates, which were still under organization and therefore not yet fully operable.

228 In addition to the activities outlined above, the industrial executives were to organize within the individual firms the Mobilization Planning Offices, which were to be responsible for the maintenance of the factories at a level adequate to meet the requirements of any possible mobilization, and were to train factory personnel for their missions. In addition to looking after military interests, in the matter of preparations against the eventuality of a mobilization, they therefore also had to assume responsibility for industrial-economic missions.

Industrial Executives were appointed only at a few of the more important firms active in the armament program, namely, the following:

Bayerische Motorenwerke	Muenchen-Allach and Eisenach
Dornier Aircraft Works	Friedrichshafen and Muenchen-Oberpfaffenhofen
Heinkel Aircraft Works	Warnemuende and Rostock, Marienehe
Arado Aircraft Works	Warnemuende

The measures introduced had an exceedingly favorable influence on the operability of the factories mentioned, and after the desired objectives had been obtained the posts of Industrial Executives were abolished and all responsibilities for such action in the factories was transferred to the permanent local Armaments Economy Inspectorates.

Plans to activate an increased number of units in

228 the next few years presupposed the implementation and execution of new procurement programs, and this in turn presupposed increased industrial capabilities. As a guide to the continuing expansion of the industry, the industrial firms were therefore furnished project planning missions(Projektierungsaufgaben). These mission letters stated the production and mobilizations-preparation program for a specified period, and this was to serve as a basis on which firms could recommend measures for further expansion of their plant, for the allocation of further installations, for air defense measures, for the allocation of the necessary skilled and unskilled labor, for the use of additional sub-contractors, and also as a means to determine in advance probable future difficulties, in particular bottle-necks which might develop.

The Project Plan submitted by a firm on the basis of the Project Planning Mission, was used to initiate any measures which might be necessary for the timely removal of anticipated difficulties in the fields of planning, production facilities, raw materials supplies, labor, and the use of sub-contractors.

By means of this method the Technical Office was able to remain clearly posted on the progress made in the armaments industries, and on the current capabilities and operational conditions of the whole industry as such.

229 b. Industrial Preparations against the Eventuality of Mobilization. In addition to the programs the firms were to fulfill during peace, the Project Planning Mission Letter gave precise details on the manufacturing procedures in the event of mobilization.

230 To insure the availability of the supplies essential to maintain the units in a tactically operable condition and for increased training activities, it was therefore necessary to coordinate the measures planned for industrial development and factory investments with the Mobilization Plan, which thus, in the final essence, was the deciding factor in all planning.[1] In contrast with the peacetime program, which provided for one working-shift per day in factories, calculations for execution of the mobilization program had to be based on two daily shifts of 8-10 hours. Peacetime and wartime production requirements were to be so coordinated that, once the program resulting from the Project Planning Mission Letter was completed, there would be no further need for investments for the peacetime or wartime manufacturing program or for any operational changes in the factories. This was something that definitely had to be avoided in the interests of a speedy transition to wartime production.

1. Plans provided for factories to have a operating capacity 25 percent larger than the mobilization requirements, so that if one factory was incapacitated through enemy action, its manufacturing program could be divided among four other factories.

230 To insure this smooth transition to the mobilization production plan, a number of internal measures had to be taken such as the procurement of appliances and gages in the quantities needed for fulfillment of the mobilization program, measasure to insure that all construction data was safely stored outside of the factories in shelters as proof as possible against bombing, and measures to insure that the prescribed supplies of materials for six months in advance were stockpiled.

231 A Mobilization Planning Office established in each factory and staffed by personnel trained by the Military Economy Inspectorate, which also investigated them to insure their reliability, was responsible for all planninf for the peacetime and mobilization program. The other important mission of this office was to compile the factory mobilization working schedule.

Each firm was required to adaptete its specific requirements the the specimen mobilization schedule furnished by the Technical Office as a guide. This schedule was to state the logical sequence of all individual measures after the declaration of industrial mobilization, starting with the first instructive telephone discussion with the firm's directorate, followed by notefication of the various departments of the firm, in each case adapted to the needs of

231 the program established by the Technical Office and the aircraft, aircraft engine, or other equipment types involved. Any change to a program or the issue of a new procurement program necessitated a revision of the mobilization schedule. In each case, the appropriate branch of the Military Economy Inspectorate supporting the firm involved maintained continuing checks to insure proper implementation of these measures.

The proper handling of all details concerning preparation of the organizational and operational conditions insured timely recognition of any difficulties and hindrances developing in operating procedures and the introduction of measures 232 to remove them.

For control purposes and to gather experience, the Technical Office in 1935 and 1936 ordered a test mobilization, based on the mobilization schedule, for a number of firms. The measures were taken without prior warning to the firms involved, the first case being that of the aircraft manufacturing firm of Arado, Brandenburg. The reason why this firm was chosen was that it was at the time establishing its factory in Brandenburg and at the same time was converting its program from mixed to metal construction of aircraft.

At the commencement of the trial mobilization the output was twenty aircraft monthly. Within six weeks the firm increased its output to forty and within eighteen weeks to

232 120 per month. This fulfilled the requirements established in the official Mobilization Plan and the test mobilization was halted.

The aircraft manufactured in the test were as follows:

Arado 68 Fighter Model
Arado 96 Training Model
Arado 66 School Model,

all od the mixed-construction type, and

Junkers W-34 Model for Advanced Trainin , a light-metal construction.

233 The initial number of employees was 2000 and mounted during the test to 6000. The additional personnel were moved in according to plans by the Technical Office in response to requests by the firm, and were taken from the most varied professions. The firm's mobilization program included the establishment of training courses to retrain new personnel, and this part of the program was also implemented. All prescribed measures for the billeting and feeding of new personnel were taken, so that no difficulties worth mentionen occurred.

At the beginning of the test the factory had in operation 11 000 square meters (approximately 21 560 square yards) of factory space, and plans provided for expansion to between 20 000 and 21 000 square meters (approximately 39 200 and

233 41 160 square yards, respectively) by the autumn of 1936. The increased output required under the mobilization plan also necessitated an accelerated expansion during the test, and the final target of 21 000 square meters was achieved within four months.

During the initial stages of the test, production operations encountered difficulties in the transition from mixed to light-metal construction, since an entirely new branch had to be established to handle manufacturing activities under licence.

Parallel with the incerased factory personnel and the enlarged factory space, office staffs, clerical personnel, and technical staffs naturally also had to be increased, while stocks, control systems, former construction operations also had to be built up to meet the mobilization schedule requirements. The same applied to the procurement of the additional tooling machines, particularly for the processing of light metals, the forms, gages, expendable, and manufacturing materials needed.

234 Since housing shortages within the city of Brandenburg made it impossible to billet the newly moved in personnel there, they had to be billetted in the surrounding areas, and transport facilities had to be provided.

Pursuant to regulations the firm kept the Technical

234 Office currently posted on the progress made and the experience gathered, and the Technical Office used this information in the preparation of revised Mobilization Schedules.

One important requirement revealed was that the planned increase in output necessitated the timely provision of an increased number of supervisory personnel, who had to be trained under the peacetime manufacturing program for the missions they might have to assume in the future. Furthermore, it was found more advisable to expand the various branches step by step in line with the progressing program rather than to expand them all simultaneously immediately upon initiation of the test mobilization. This would naturally incur a smaller initial acceleration, but any such loss would soon be made up by the high increase achieved later. The big advantage here is that the whole manufacturing process can be advanced more systematically.

Although the demands made in the test mobilization of only one factory were relatively small, so that it was not possible to draw inferences for a general industrial mobilization, the experience gained was nevertheless exdeedingly valuable because of the light it shed on the processes of a mobilization within any one factory.

Project Planning Missions were assigned only to firms manufacturing final products with direct support from the

235 Technical Office. The final manufacturing firm was fully responsible for the final product, including the parts supplied by the sub-contractors it employed.

In comparison with the large number of firms participating in the manufacture of equipment, the number of firms thus involved as manufacturers of a final product was relatively small. In cases where such firms manufactured only a single final product for only one branch of the military establishment, no difficulties were encountered in giving it the necessary support or in preparing it for mobilization.

For internal operational reasons, however, the majority of the sub-contracting firms endeavored to obtain contracts to manufacture for more than one military branch. In addition to their mission of general supervision over the whole field of sub-contracting activities, the Military Economy Inspectorates in such cases had to clarify the situation and regulate allocations from and responsibility by only one military branch, and to take the necessary steps to prepare such firms for their mobilization missions.

In each Military Economy Inspectorate, the Central Branch thus had to bring about a fair balance between the three military branches in the field of sub-contracting activities. Proper arrangements had to be made in close cooperation between the Cnetral Branch Chief and the final

236 manufacturing firm for the assignment of mobilization missions and cont acts to the sub-contracting firms.

This whole complex of sub-contractin, was of basic importancebut it was only at a relatively late juncture that the problems involved could be attacked, since the primary need was to build up the decisively important firms. An examination of the conditions which had meantime developed in the sub-contracting field in many cases revealed the necessity for the final manufacturers to e change their sub-contractors . This was necessary for transportation reasons, since some final manufacturers in the southern parts of Germany had important sub-contnactors in the northern parts of the country and vice versa.

Other measures which had to be properly planned to insure the smooth functioning of a possible mobilization included clarification of the demands which would be made on the transportation and communications system and the steps which would have to be taken in cooperation with the appropriate local authorities; steps which would have to be taken in cooperation with the local military recruiting offices and the local labor offices to insure procurement of the necessary man power for the armament industries in the event of a mobilization; and the inclusion,in cooperation with the appropriate organs of the Plenipotentiary for the National

236 Economy, of civilian requirements in all planning.

c. Industrial Expansion and the Re-Location of Industries During the War. Up to 1936 the systematic expansion of the German aircraft manufacturing industry proceeded according

237 to plan without encountering any serious difficulties. The ready availability of large numbers of unemployed had a favorable impact on the consistent and speedy execution of the industrial program, so that the Air Force gained a considerable lead over the other branches, the Navy and the Army.

Increasing activities in the building industries to meet new requirements developing from the expansion of the Army and the Navy; from the measures introduced for execution of the Four Years Program; and for the comprehensive program of public building activities, which included construction of the Autobahn superhighways, finally resulted in excessive demands on the construction potentials available, which led to supply shortages in building materials and to a shortage of skilled personnel. A stage of complete exploitation of the available building potential was reached already early in 1937.

For the above reasons efforts to execute the next stage of the Air Force industrial expansion program, which was to be completed in 1942, encountered difficulties. Iron shortages made it impossible to complete this phase according to

238 plan and resulted in quite considerable delays in the meeting of deadlines.[1]

Difficulties encountered in building construction for industrial purposes encountered particularly serious difficulties after the outbreak of the war, and the final outcome was the establishment of a "Herman Goering Construction Program" in June 1941, responsibility for the execution of which was assigned to Speer. Pursuant to directives from Goering the structures provided under this plan were to be of non-permanent types, and were to be demolished and replaced after the war. It has not been possible to ascertain to what extent this program was actually carried out. Obviously it failed to produce any improvement in the building construction field.

The manufacturing programs established on the basis of the resupply requirements stated by the General Staff presupposed the allocation of increased quantities of building and manufacturing materials, as well as additional labor. After approval of the program by Goering, assurances were received that these requirements would be met, but in most cases nothing of the sort happened. The manufacturing programs were passed on to the industry for execution, and the

1. See letter "St. L6 III Nr. 2130/37 geh.Ks., 30. 10. 1937" to Goering.

238 industrial firms involved set about putting up the necessary buildings. Owing to the failure to fullfil the necessary conditions, however, the firms were unable to complete these buildings within the required time.

In almost all cases the results of the above circumstances were that only approximately 20-30 percent of the intended numbers of personnel could be placed in the incompleted buildings.[1]

On the assumption that the required prerequisites would be met, the Army, the Navy, and the Air Force, independently one from the other, were to implement the programs involved, and this led to a very serious scattering of effort in the building industry. These circumstances finally influenced

239 Speer to request approval from Hitler "to reduce the buildings in consonance with the existing conditions and to cancel all long-range programs."

There can be no doubt that a curtailment of the building programs and the employment of the available man power and use of the available material to complete a few projects would have led to the speedy completion and early use of the projects thus handled, and would have produced greater advantages than the simultaneous continuation of a large number of building projects.

1. From "Bericht der Sitzung der Zentralen Planung," 25 March 1942.

239 This was a case in which the lack of a central authority to control all armament activities produced unfavorable conditions for proper exploitation of all available raw material supplies and all available man power. Proper control would have insured far greater advantages through better exploitation of these potentials.

The same year brought the commencement of heavily massed enemy bombing attacks and created the categoric necessity to shift emphasis in building construction to measures for the relocation and wider distribution of industries. The implementation of such measures was triggered by the air attack against the Heinkel Works at Rostock, Marienehe.

The factories located along the northwest coastline of Germany and in the general northwestern areas were regarded as being most endangered. The immediate measures planned aimed initially at moving the Heinkel Works, for serial production, to the Polish areas of Budzyn and Baranov, and the development stations of the same firm to Schwechat, near Vienna. Other plans provided for movement of the factories of the Weser Flugzeugbau to Berlin-Tempelhof while the parts-manufacturing section of the firm were to go to Boehmisch-Kamnitz (in Bohemia), with an air base at Kamenz, Saxony; and for movement of the factories of the firm of Focke-Wulf, Bremen to alternate sites in Sorau/Niederlausitz and

240 later in Poznan. For the time being it appeared unnecessary to move the factories of the firms of Blohm & Voss and Dornier, both in Wismar, because of the measures taken by these two firms on their own initiative to distribute their works more widely. However, the firm of Dornier was assigned additional alternative sites in the form of the Neustadt-Glewe airfield.

In addition all organizational preparations were ordered for the movement of the other firms located in the northwestern coastal areas, and a few months later for the manufacturing plants still situated west of a line extending from Stettin through Berlin to Munich.[1]

Investigations were initiated to determine possibilities for the relocation of each and every important factory. In the case of factories already in process of movement it was essential to maintain production in the old premises as long as possible in order to thus create an additional reserve of manufacturing facilities. In the case of factories to be relocated because of damages incurred, a number of new sites were to be determined, one site in such cases being provided for more than one firm when necessary.

In cases where more than 75 percent of all manufacturing

1. See "Stand der Verlagerungen 1942, GL-A-Pl., 14.10.1942," and "GL-Besprechung vom 9.9.1942."

241 plant of a firm was located west of the previously mentioned line, relocation factories were to be placed in operation immediately.

Internal air raid precautions to be taken included the erection of fragmentation-proof walls between the various tooling machines, the distribution of stores and the mechanical workshops, the construction of ponds for firefighting water supplies, and of boxes affording protection against fragmentation for completed aircraft.

The order implementing relocating measures for the entire Air Force supporting industry from areas west of a line extending from ~~XXXXXX~~ Stettin through Berlin and Munich initially applied to 280 factories engaged exclusively in the manufacture of items for the Air Force. In collaboration with the Air Force Branches and Sections attached to the various armaments industries authorities, with various special committees, cartels, and with the factories themselves, the data needed for the establishment of a special schedule was completed by December 1942.

Since the measures thus ordered naturally also affected firms not working exclusively for the Air Force, the Ministry for Procurement and Munitions (Min Bum)* issued general directives for the entire armaments industry to prepare a study on alternative sites.[1]

1. See "GL-Besprechung, 5.2.1943"

* Should read "Min. B. u. M." in German text

241 Investigations pursuant to an order from the Chief of Air Force Special Supply and Procurement Service dated 26 August 1942 had revealed that difficulties were to be found more particularly in the case of sub-contracting and raw materials supply firms.

Adoption by Ministry for Procurement and Munitions (Min Bum)* of the orders formerly issued by the Chief of Air Force Special Supply and Procurement Service and the order extending the measures to the entire armament industry meant that all firms working for the armament industry were affected.

It was found that building and space considerations made relocation on such a comprehensive scale unfeasible, so that definitions had to be modified. For this reason the movement of factories was dispensed with if their loss would not cause serious disruptions throughout the entire manufacturing industries.

In the case of factories manufacturing small items of equipment and the relocation of which proved difficult, adequate precautions could be taken by stockpiling in the receiving factories, provided adequate supplies were thus stored to last until the factory concerned could be restored to operability.

In the case of factories closed down because the manufacture of their products had been concentrated for more

* See Transcriber's footnote p. 334

242 rational operations, the tools and installations thus falling into disuse were to be stored at some other location, so that a new factory could be established immediately if the factory currently manufacturing the items should be damaged.

In spite of all these modifications, however, the relocation of numerous installations manufacturing vitally important and unique items had to be set in motion.

During the relocation processes it was not possible to distinguish between the factories established for relocation purposes and those established for the expanding program, since the alternate factories in eastern regions were placed in operation at once while the manufacturing processes in the original factories located in the western regions continued. This automatically increased manufacturing potentials. The firm of Heinkel can be quoted here as an example. In this case complete alternate factory installations were established at Schwechat, while the installations at Marienehe nevertheless continued in full operation and were even expanded.[1]

A case meriting special mention here is that of the movement of the ball-bearing manufacturing industry after the two air attacks against Schweinfurt on 17 August and 14 October 1943. The reason why the damage done by these two attacks was particularly perilous for the entire armament

1. "G.I. Besprechung" 5 February 1945

243 industry ~~XXXXXX~~ was that 60 percent of all ball bearings manufactured in Germany came from Schweinfurt, while firms in that town produced 100 percent of all German-made conical, cylindrical, and roller bearings. The loss of this production could have resulted in a decisive reduction of the German armament output, in some cases could even have put a complete stop to armaments manufacturing, for an indefinite period.

Steps had already been taken prior to the attacks to relocate and redistribute the industry, so that Schweinfurt at the time was only producing 60 instead of 80 percent of the total German output. However, the scope of past relocations was far from adequate to insure an output adequate to meet the minimum requirements for German armament production.

A commission appointed immediately after the second attack and headed by Director General Kessler of the Bergmann Werke, Berlin, succeeded, by using all means available, in restoring at least some parts of the Schweinfurt manufacturing installations to operability. The Commission also managed to move out and repair some of the damaged machinery within a very short space of time, to relocate some of them in other factory premises, some standing unused until then, to further distribute manufacturing activities, to establish all conditions necessary for a speedy resumption of manufacturing activities, and to find quarters for the personnel re-

244 required, besides arranging for the necessary transportation facilities, and so forth. Other measures introduced, primarily by the Chief of Air Force Special Supply and Procurement Service, included the use of slide bearings instead of ball bearings in cases where it was not to be anticipated that the change would impair functions. By all these measures combined the Commission succeeded in averting a very serious disruption of German armament manufacturing activities.

When the Western Allies continued their concentric attacks against the ball-bearing factories in February 1944, serious repercussions on the German industries were again successfully averted by extemporized local and practical measures, such as the concrete protection of underground cellar premises, further decentralization, relocation of installations to underground tunnels, to limestone quarries, and so forth. It goes without saying that the execution of the necessary

245 measures made severe demands on all members of the Commission and on the staffs of the factories concerned, all of which demands were fully met by all concerned.

The investigation of relocation measures carried out pursuant to instructions from the Ministry for Procurement and Munitions (Min Bum)* had created the possibility to establish alternate or shadow factories for the manufacture of unique items not yet determined, and to lessen and in some cases completely

* See Translator's footnote on p. 334.

245 avert the influences of air attacks. By 1 September 1944 areas totalling 6 883 259 square meters (roughly 13 225 457 square yards) were made available to the firms represented by the three main committees for aircraft fuselages, aircraft engines, and Air Force equipment, or arrangements had been made for the availability of this space, so that a start could be made at putting a large part of the relocation program into effect at once.[1]

However, the measures thus taken to safeguard manufacturing activities were still inadequate in view of the fact that the Allies were gradually extending their air operations to as far as the eastern and southern areas of Germany, and to Austria and Hungary since the end of 1943.

In connection with the ex cution of the Home Defense Program, Field Marshal Milch had considered it essential to place primarily the factories manufacturing engines in caves and those manufacturing fuselages in two completely concrete-protected factories, and had reached agreements with Speer for construction of the latter.[2]

246 Plans also provided for protected premises in the case of of the Ostmarkwerken at Vienna, the Avia Works and fuselage factories at Wiener-Neustadt, and the Messerschmitt Works at Augsburg. However, implementation of these plans hinged

1. See "GL-Besprechung vom 13.10.1943."
2. See Ibid

246 upon allocation of the required quantities of concrete, which were not available because of the low priority awarded for the Air Force supporting industries. This made it unavoidable to use the small allocations available for expansion of the existing factories, as in the past, in order to achieve optimum results.[1]

It was not until the Fighter P oduction Staff assumed responsibility for the manufacture of fighter aircraft on 1 March 1944, when these activities were awarded top priority, that conditions were created which made it possible to place at least the factories manufacturing fighter aircraft in protected premises.

In view of the ~~xxxxxx~~ pressingly urgent need for fighter productionHitler ordered the immediate construction of two large factories for the purpose in addition to the movement of other factories to underground premises. Preference in the movement to the bomb-proof premises was to be given primarily to those factories whose products made "a great technical improvement possible," and represented a bottleneck in the whole manufacturing program.[2]

247 Hitler had ordered that 600 000 square meters (roughly 1 152 000 square yards) should be prepared in the form of

~~1. See "[illegible] Besprechung vom [illegible].1944."~~
~~2. See "Besprechung [illegible] 29.[illegible].1944."~~
1. See "GL-Besprechung vom 13.10.1943."
See "Protokolle der Besprechung bei Goering vom 4.3.1944."

247 bunker type shelters for factories to produce 1000 Me-262 Jet fighters and 2000 piston type fighters, a total of 3000 per month, and plans provided for the completion of these premises by the end of 1944.[1]

One of these factories was to be located in the Bohemia-Moravia (Czechoslovakia) region. For the second factory, the project already under construction north of Kauferring was to be enlarged to the required size.

To what extent these two projects were completed or placed in operation by the end of the war cannot be said without further research on the subject.[2]

Relocation of the entire aircraft industries would have required a total space of 5 000 000 square meters (roughly 9 600 000 square yards), of which approximately 1 000 000 square meters (roughly 1 920 000 square yards) were required for semi-finished products and parts or part-assemblies, some of which could not be relocated so that protected premises would have had to be constructed for them on the spot. Of the remaining 4 000 000 square meters (roughly 7 680 000 square yards), 2 300 000 square meters (roughly 2 208 000 square yards)were needed for fuselage and 1 700 000 square meters (roughly 1640000 square yards) for engine construction.

1. See "Generalstab Besprechung Vom 8.4.1944."
2. See "Besprechung Guerlac am 29.4.1944."

247 The intention was to meet these requirements through the use of existing underground premises or tunnels, and the construction of concrete bunker type shelters.

The available building construction potential was inadequate even for these purposes, so that the movement of underground premises had to be restricted to factories producing the most important items. The projects in question here were the Do-335 and Me-262 aircraft types and the tooling machinery used in the manufacture of fuselages and aircraft engines. Assuming that 80 000 machines existed and that each required between 10 and 12 square meters (roughly 19.6-23.52 square yards), this meant that 1 800 000 square meters (roughly 3 528 000 square yards) of space were needed for the two aircraft types mentioned above.

These requirements were to be met by the use of mine-shafts, tunnels already in existence, and fortifications, plus natural caves, the two concrete-protected works previously discussed, and tunnels still to be constructed.

The spaces thus available for use were as follows:

Tunnels	295 000 square meters (roughly 570 200 square yards)
Fortifications	78 000 square meters (roughly 152 880 square yards)
Natural Caves	58 000 square meters (roughly 113 360 square yards)

Mine Shafts (assumed) 1 900 000 square meters (roughly 3 648 000 square yards).

In the case of mine shafts, however, it had to be borne in mind that mining operations had to continue undisturbed, and that some of the spaces available would be unsuitable for use owing to mining factors (exposure to weather, inaccessibility, etc).

No protection could be provided for the rest of the space required, namely, 3 200 000 square meters (roughly 6 144 000 square yards), so that efforts had to be made to escape the effects of air attack through wide dispersion.[1]

In preparing premises for the movement of industries underground, the least work was required in mine shafts, tunnels, and fortifications. Then followed concrete structures, and as the most unfavorable the construction of new caves. The records available at writing are inadequate for a complete survey of all work done up to the end of the war on the program to move industries underground. The same applies to the detail work accomplished in this field, since developments in the military situation necessitated frequent changes in the measures taken.

249

Besides the increased efforts during the last years of the war to move industries underground, current work continued on the above-surface relocation of unprotected fac-

1. See "Baeuerstab-Besprechung vom 26.5.1944."

245 continued to relocate above-surface, unprotected, factories and to repair factories damaged by bombs on a steadily increasing scale, so that labor forces had to be shuffled around constantly. Finally, the need arose towards the end of the war to move back to Germany the factories which had been relocated in other parts.

SUMMARY

The build up of the German aircraft industry proceeded in accordance with the mobilization plans issued by the Technical Office periodically as long as adequate construction materials and man power were available, which was the case up to 1936. In the following year the defense budget was drastically and unexpectedly cut; besides curtailing manufacturing programs, this interrupted the consistent development of the industry.[1]

It is to be assumed that the reasons for these incisive measures were of politico-financial and foreign-policies nature. On the one hand, a rapid rearmament would have considerably reduced Germany's foreign currency reserves, on the other hand the harmony evident at the 1936 Olympic Games /held in Germany--Note by Transbator/ seemed to indicate lessening tension in foreign affairs. It was 1938 before

1. See letter from "Betriebsdirektor der Junkers-Werke Thiedemann vom 10.5.1955;" information also from personal experience of the present writer.

industrial expansion and the production of armaments again gained momentum. Then, however, it was no longer possible to carry out the program according to schedule, since the continued build up of the armament industries in general, building projects under the Four Years Plan, and a comprehensive program of public building construction by far exceeded the available potentials.

If the build up of the aircraft industry had continued consistently and without interruption, far larger manufacturing capacities undoubtedly would have been available at the outbreak of the war. In the absence of a general industrial mobilization it is difficult to judge whether and to what extent the larger capacities of the aircraft industries would have produced results at the beginning of the war. However, a certain lead would have been gained before building materials began to become scarce from the end of 1937 on.

Once the war had begun, conditions improved because of the curtailment of private building operations and because of the use of prisoners of war as labor, but mounting resupply requirements nevertheless seriously delayed the completion of projects under construction.

The requirements stated by the General Staff changed constantly, usually with an upward trend, in accordance with

the current military objectives aimed at. This naturally resulted in larger and continuously fluctuating production and building programs. The planned programs were coordinated with existing technical capabilities. They were approved by the Commander in Chief of the Air Force, and the undertaking was received that the necessary allocations of additional man power, tooling machines, and building materials, upon which execution of the programs depended, would be made available. Usually, however, only partial allocations were received and in some cases none at all. On the assumption that these stated conditions for executionsof the programs would be fulfilled, a beginning was made on the various projects, but progress was usually exceedingly slow. The outcome of these circumstances was that a number of construction projects were initiated simultaneously, but each of them received only a small percentage of the required personnel.

These conditions ruled not only in the case of the Air Force, but also in the cases of the Four Years Plan, the Mineral Oil Plan, the Electricity Development Plan, and the aluminium Production Plan, and probably also in the fields affecting the Army and the Navy.

These methods resulted in a serious dissipation of effort in the building industries which could have been averted

251 if a superior authority had existed to insure uniform direction of all armament production activities. The lack of such an authority had a particularly adverse i pact on the expansion of the armament industries, since the simultaneous start on a large number of projects, each with only a small percentage
252 of the labor required, logically caused delays in the armament programs.

A concentration of all available labor and materials on a small number of construction projects would have insured a speedier completion and usability of the buildin, thus given preference, under the methods actually employed there was no possibility to conjecture when any particular building currently under construction could be used.

The difficult situation in the building industries finally influenced Minister Speer to request approval from Hitler ".....to ruthlessly cut back building activities to a scale resulting from existing conditions, and in doing so to be allowed for the time being to postpone execution of all programs established as long-view projects."[1]

Although this measure clarified the situation in the building industriesthe lack of a uniform direction of building activities nevertheless continued to have disadvantageous influences.

It was 1 May 1944 before Ministerial Director Dorsch,

---

252 and thereby the Ministry for Armaments and Wartime Economy, was placed in control of the entire building construction industry, at a time at which there was no longer any thought of continued expansion of the various industries.[1]

253 The only projects which could now be taken into consideration were those connected with the reapir of bomb-caused damages, the above-surface relocation of facteries, and the preparation of underground premises in tunnels and so forth for bomb-proof factories.

The independent status of the three military branches and the lack of a uniform directi n of armament activities had adversely affected efforts to obtain an optimum use of available man power and materials, and building facilities.

That the factory space of 3 500 square meters (roughly 6 860 squar meters) available in 1933 was increased to 3 000 000 square meters (roughly 5 760 000 square yards) available in 1945 represents an exceptional performance by the industry, and it must be borne in mind that the actual total space available was probably larger, since the fugures given here have been computed from the number of man hours recorded and the time items were under construction in factories.

The plan of dispersing the various buildings of a factory in the terrain , so far as the Air Force supporting industries

253 were concerned, was devised with due regard to the approach and attack methods of air warfare at the time, in order to reduce the risk of losses in the event of stick bombing. The tactics of area bombing introduced in 1943 to some extent made such measures illusory. The dispersion of factory activities in individual and physically separated workshops nevertheless still offered considerable advantages over large single structures of the types then customary. It was only later, in the light of experience with the properties of reinforced concrete structures, that the construction of large buildings again appeared justifiable.

The only effective protection against area bombing, however, was the movement of factories to underground premises in caves and tunnels, or to premises under reinforced concrete covers, under the premise, however, that all manufacturing processes from the receipt of semi-finished products, including all appliances and articles of equipment, must then be concentrated in one such spot. These possibilities had been discussed between the Chief of Special Supply and Procurement Service and Reich Marshal Goering immediately after the first attacks of the new type in 1942, and partial agreements had been reached with Minister Speer.

Footnote 1, p. 347: See "Sitzung der Zentralen Planung, 25. 3. 1942."
Footnote 1, p. 348: See "Jaegerstabsbesprechung vom 1.5.1944."