DOCTORAL DISSERTATION SERIES

PUBLICATION: 7708

AUTHOR: George Stern Quick, Ph. D., 1954
University of Michigan

TITLE: INDUSTRY INTEGRATION COMMITTEES OF THE ARMY ORDNANCE DEPARTMENT: A STUDY OF GOVERNMENT-ENCOURAGED COOPERATION AMONG CERTAIN ARMAMENT MANUFACTURERS IN WORLD WAR II

University Microfilms, Ann Arbor, Michigan

INDUSTRY INTEGRATION COMMITTEES

OF THE ARMY ORDNANCE DEPARTMENT

A study of government-encouraged cooperation among certain armament manufacturers in World War II

by

George Stern Quick

A dissertation submitted in partial fulfillment
of the requirements for the degree of
Doctor of Philosophy in the
University of Michigan
1954

Committee in charge:

Professor William Haber, Chairman
Professor Z. Clark Dickinson
Professor L. C. Hill
Professor I. L. Sharfman
Associate Professor William B. Palmer

INDUSTRY INTEGRATION COMMITTEES

OF THE ARMY ORDNANCE DEPARTMENT

A study of government-encouraged cooperation among certain armament manufacturers in World War II

by George S. Quick

Industrial mobilization of the United States in World War II resulted in the production of munitions sooner and in greater variety and quantity than the intelligence estimates of Germany and Japan considered possible. The methods and organizations through which this result was obtained were many and varied, but one important contributing factor was the Army Ordnance Industry Integration Committee. The purpose of this study is to examine the background, formation and activities of these committees which played so significant a role in building the military strength of the nation.

The industry integration committee provided for the cooperation of manufacturers producing a common item, with the objective of obtaining greater overall production from the industry as a whole. In essence, it required the manufacturers concerned to partially submerge their identities and give up individual perquisites for the common end of a greater production total. The program of cooperation required interchange of technical information, patent rights, raw materials, parts, machine tools, training and other mutual assistance, and was encouraged by the government of the United States. Legal protection from prosecution under the antitrust laws was given to participating manufacturers by federal legislation.

The operations of industry integration committees were based upon a degree of mutual association and cooperation so intimate that many observers feared they would lead to greater concentration of industry, and cause adverse effects upon the activities of "small business". These problems are considered in this study, and data is presented showing the increase in concentration in the industries where the committees were common.

Achievements of the committees were numerous, substantial and significant. An effort has been made to discuss typical examples of all of the many types which were found. In addition, the opinions of participants in committee activities are quoted at some length in an attempt to establish the value and importance of the committees from the point of view of those most closely associated with them.

On the basis of the evidence presented, it can be concluded that integration committees should play an important part in any future mobilization, and that they can also contribute to mobilization planning during peacetime. Certain improvements in their organization and operation are suggested by experience in World War II and in the Korean conflict. These include both changes in actual operating procedures, and in the degree to which the government and its representatives should participate in the activities of the committees.

PREFACE

This study presents a description and evaluation of the industry integration committees organized by the Army Ordnance Department in World War II. It is intended primarily for individuals interested in or concerned with the problem of industrial mobilization of the nation for war, and the desire of the writer is that it may show how significant such committees were and should continue to be in any substantial mobilization program.

Today the United States faces the problem of maintaining indefinitely a high state of readiness for war. The fact that war seriously threatens indicates a need for large stocks of munitions, but to create large stocks of munitions that are not soon used means great loss and waste through obsolescence. Our nation has determined that it will rely upon its ability to quickly produce large supplies of munitions if war comes, rather than bring into existence great stocks which may never be used. Such a policy means reliance upon the ability to very quickly and efficiently shift from the production of peacetime items to those required for warfare. The problems of making such a shift are vast, and in all our wars to date the process has taken a relatively long time.

Means by which the time required to shift from peacetime to wartime production can be reduced are of great importance to the security of the nation. One such means is the employment of the industry integration

committee device, as discussed in this study.

Industry integration committees appeared first in connection with the work of the Army Ordnance Department. This Department, which for more than a century and a half has been a significant employer of manufacturing labor in its arsenals, has a considerable history of important contributions made in the fields of industrial organization and management methods. Among these contributions were advances in apprentice training, union-management cooperation, mass production techniques, and numerous others.

It was my good fortune to participate in the production program of the Army Ordnance Department during the years 1942-1944. As a commissioned officer I worked in close association with both the military and civilian sides of munitions production, first in a sub-office of the Office of the Chief of Ordnance in St. Louis, Missouri, and later in the Office of the Chief of Ordnance in Washington. My direct experience in those years included numerous contacts with members of many of the industry integration committees, and I assisted in the solution of some of the problems that arose in connection with the committee program.

Of necessity, some aspects of committee activity are not dealt with in the following pages. For example, it is quite likely that the relationships established by committee contacts had important bearing on the renegotiation of contracts during and after the war. However, it did not prove possible to obtain data to establish the nature or degree of this influence. It is also probable that military security was often jeopardized and even broken by committee members working on munitions items. Though security clearance by the Federal Bureau of Investigation was always required for contractors working on classified items, it is unlikely that all

members of contractor organizations could be expected to maintain levels of military security that would be considered adequate by normal military standards. Again, however, data on the subject has been unavailable.

In the preparation of this study, the personnel of the Library of the Industrial College of the Armed Forces and the Library of the United States Military Academy were most kind and helpful in procuring materials. The Office of the Chief of Ordnance, particularly the Historical Section, was of great assistance, as was the Office of The Adjutant General. The Office of the Attorney General of the United States supplied information and materials that would have been very difficult to procure otherwise.

Professor Z. Clark Dickinson and Professor William Haber were very helpful and encouraging throughout the years of work which this study represents, and the time spent and the advice given by both is deeply appreciated.

My wife handled five energetic, and toward evening often rather tiring, children for many long months without a normal portion of assistance from me, and unless she had done so this could not have been written.

TABLE OF CONTENTS

INTRODUCTION Page 1

SECTION I. FORMULATION OF INDUSTRY INTEGRATION COMMITTEES 8

Chapter 1. Some Economic Aspects of Industrial Mobilization 9

Need for coordination of industry -- Anti-trust legislation in the United States -- Government encouragement of trade associations -- Conflict regarding proper antitrust policy.

Chapter 2. Development of Industry-Army Ordnance Cooperation 27

Formation of the War Industries Board -- The Army Ordnance Department and mobilization -- General Campbell's Industry-Ordnance team -- Industry-Ordnance cooperation before World War II -- Attitude in England toward industry cooperation -- Control of war industry in Japan -- Some aspects of German industrial mobilization -- Army Ordnance industry integration committees appear.

Chapter 3. The Legal Basis for Integration Committees 46

The Attorney General's statement of April 1941 -- Ordnance requests authority to form committees -- Statutory authority for committees enacted -- Industry continues to worry about legality.

Chapter 4. The Term "Integration" as Applied to Ordnance Committees 56

The "bottleneck" problem in mass production -- A limiting definition of "Industry" -- How production is increased by integration -- Other typical improvements through integration.

Chapter 5. The Formation of Integration Committees 65

Calling the first meeting of an integration committee -- The Small Arms Manufacturers' Production Committees -- Functions of the sub-committees -- Prior experience with Perishable Tool Committee -- Publication of basic integration committee instructions -- Reasons for variation in committee performance -- Significance of the Assistant Chairman's position -- Role of the Ordnance Representative -- The regular industry members.

SECTION II. INDUSTRY INTEGRATION COMMITTEES IN OPERATION 87

Chapter 6. Improvement in the Utilization of Resources 88

The scope of Army Ordnance Responsibility -- Committees help with the tool problem -- Improving the parts and materials situation -- Business relationships of manufacturers increased.

Chapter 7. Improvements in Production Methods and Processes 103

The art of arms production -- Arsenals and mass production -- Committees improve methods and processes -- Mass production and the gage program -- Production woes due to design changes -- Tripling TNT production -- Handling engineering changes -- The problem of inspection standards -- Some typical improvements -- Restrictions on cooperation.

Chapter 8. Adaptation to Fluctuations in Requirements 125

Requirements in a war economy -- Factors affecting requirements -- Assisting with schedule changes -- Apportioning schedule reductions -- Disposal of surplus.

Chapter 9. The Industry-Ordnance Team 137

Early industrial mobilization planning -- Industrial mobilization control and the Military -- Need for a permanent mobilization planning agency -- Manning the permanent agency -- The problem of modifications in design -- Industry must be flexible and adaptable -- Industry responsible for production -- Integration committees needed for effective program.

SECTION III. ECONOMIC ORGANIZATION AND THE INDUSTRY INTEGRATION COMMITTEES 151

Chapter 10. Outlining the Sphere of Action of Committees 152

The Automotive Council for War Production -- Integration committees and the Korean conflict -- A "Business as Usual" war -- Business advisory committees authorized -- Army Ordnance requests integration committees -- Seeking an integration committee formula -- Some characteristics of a proposed committee -- Tighter control of committees by Ordnance.

Chapter 11. Small Business and the Committees 168

Why big contracts go to big business -- Big business relies on small -- Ordnance contracts to small business -- Effects of contracts on small business -- Integration committees and small business data -- Number of contracts not the important factor -- Committees threaten small business -- Size immaterial to beneficial participation.

Chapter 12. Expansion of Ordnance Contractors in World War II 184

Vast industrial expansion in World War II -- New facilities of latest and best type -- Expansion by type of industry -- Most prime contracts to large, established firms -- Army Ordnance contractors among largest -- Expansion in metal products industry -- Expansion in the automobile industry -- Committees in automobile industry -- Difficult to assess committee influence on expansion.

SECTION IV. CONCLUSIONS REGARDING INDUSTRY INTEGRATION COMMITTEES 201

Chapter 13. The Stimulation of Industrial Progress 202

Pressures of war foster improvements -- Improvements resulted from combined action -- Improvements not stimulated in Germany -- Germans handcuffed by lack of cooperation -- Americans stimulated cooperation -- The Science-Industry-Government Team -- The "improvement factor" adds to nation's strength -- Who owns the rights to the improvements?

Chapter 14. Value of Committees as Seen by Participants 217

Some favorable opinions of committee operations -- Manufacturer wishes other services had used committees -- Committee-inspired peacetime relationships.

Chapter 15. Committees as a Permanent Factor in Mobilization Planning 225

The Guns and Butter policy -- Planning for Cold War -- The "quick switch" basis of preparation for war -- Integration committees and the "quick switch" -- Some new rules for committees -- Committees valuable in any mobilization.

APPENDIX. INTEGRATION COMMITTEES ORGANIZED IN WORLD WAR II 239

BIBLIOGRAPHY 248

LIST OF FIGURES AND TABLES

Figure		Page
1.	The Army Ordnance Share of Production	90
2.	United States Munitions Production, 1940-45	91
3.	Total Contracts and Subcontracts for 40 millimeter Bofors Antiaircraft Gun Mount, Firestone Tire and Rubber Company	174
4.	Total Contracts and Subcontracts for 40 millimeter Bofors Antiaircraft Gun Mount, J. I. Case Company	175

Table		
1.	Number and Value of Prime Ordnance Contracts Awarded to Small War Plants, January 1943 to July 1945	173
2.	Facilities Expansion Initiated by Industrial Groups, July 1940 - June 1945	188
3.	Usable Production Facilities Added, 1940-45, 30 Largest Corporations of Fabricated Metal Products Industries	191
4.	Automobile Producers Gross Capital Assets, 1939, and Usable Production Facilities Added, 1940-45, of 11 Largest Corporations	195
5.	Automobile Parts and Equipment Producers Gross Capital Assets, 1939, and Usable Production Facilities Added, 1940-45, for 8 Largest Corporations	196

INTRODUCTION

On the eve of the entry of the United States into World War II the nation's facilities for the production of munitions were rudimentary. Since World War I the making of items for war had been held in low repute by wide sections of the populace, and many of the important industrial producers of that war had spent the two ensuing decades trying to cleanse themselves of their taint as "Merchants of Death".[1]

Between wars there had been some effort to keep alive a potential for industrial mobilization, and certain organizations, such as the Army (now American) Ordnance Association, had steadfastly maintained as a primary objective a program of preparedness. In addition some private individuals, notable among them Mr. Bernard M. Baruch, had actively fostered the idea of industrial preparedness. However, despite such localized activities, little was accomplished. Within the military establishment a limited number of staff officers and engineers concentrated on industrial mobilization planning, and actual programs of a limited nature were formulated on paper.[2] However, significant planning in this field is extremely expensive. In the Twenties and Thirties, when the entire annual military budget often

---

1. William S. Dutton, Du Pont, One Hundred and Forty Years, New York: Charles Scribner's Sons, 1942, Chapter VII, especially p. 252.

2. See, for example, Industrial Mobilization Plan, 1933, Washington; Government Printing Office, 1933; Industrial Mobilization Plan -- Revised, Washington: Government Printing Office, 1936; Industrial Mobilization Plan Revision of 1939, Senate Document No. 134, 2nd Session, Washington: Government Printing Office, 1939.

amounted to only a few hundreds of millions of dollars, there was little money available for such basically important projects as educational orders to industry, plant surveys, or opening of pilot production lines in the plants of potential producers.3/

Within private industry, prior to 1939, facilities for the production of such basic items for war as ammunition, small arms, artillery, tanks and military explosives were almost non-existent. A few companies were equipped for making very limited quantities of military explosives and small arms, and for loading small arms ammunition, but nowhere could facilities for the production of equipment such as tanks and artillery be found under private owndership.

Almost the entire productive capacity of the nation for cannon, military rifles, tanks, gun carriages, fire control instruments, bombs and artillery ammunition was located in the so-called old-line arsenals of the Army.4/ In these, together with an even more limited number of Navy installations, the military establishment attempted to carry forward its programs of research and development in the field of arms, and also to produce to meet its own needs. Yet even the facilities existing in these installations had historically been subject to public antagonism. The earliest, Springfield Armory in Springfield, Massachusetts, within a year of its founding in 1777, had been

---

3. J. W. Swaren, Plant Surveys and Educational Orders, Washington: Industrial College of the Armed Forces, January 1947.

4. Springfield Armory, founded 1777, for small arms; Watervliet Arsenal, founded 1813, for cannon; Frankford Arsenal, founded 1815, for artillery fuzes, optical instruments and small arms ammunition; Watertown Arsenal, founded 1816, for gun carriages; Rock Island Arsenal, founded 1863, for gun mounts and tanks; Picatinny Arsenal, founded 1880, for artillery ammunition, pyrotechnics and explosives. See "The Army Ordnance Department -- Its Mission and Current Operations", Army Ordnance Report No. 3, Washingon: Army Ordnance Association, October 15, 1943, p. 20.

criticized by private industrialists who wanted it closed down so that they could get the contracts for production of rifles for the army.5/ Since that time the arsenals have always had to struggle for existence during years of peace. Only the circumstance that most of the items they produce have no place in the civilian economy has permitted them a hand-to-mouth existence. A cannon tube, requiring as it does extremes of strength to contain the pressures of firing; a piece of armor plate, intended to ward off high-velocity projectiles; or recoil systems for artillery pieces, embodying as they do yield strengths of great magnitude and hydropneumatic braking systems engineered to extremely fine tolerances; are all items highly specialized in design, limited in usage, and costly to develop and produce. Such items offer little attraction to the businessman, especially when there is stigma connected with their manufacture as far as the public is concerned.

Thus the United States faced World War II with an industrial system not equipped for war production, and with few prototype facilities in existence which could be used as patterns for new construction. Entire branches of industry had to be created, starting with the very excavation for the plant. There was much talk of the ease with which the automobile industry, for example, could be converted to tank production, but it was almost completely talk. Except for general purpose machine tools, some items of handling equipment, parts of conveyor systems and a few other items, conversion in practice usually meant shutting down, stripping the plant, moving in new production line equipment and then resuming operations. Mr. Charles E. Wilson, then President

---

5. Springfield Armory -- History from 1777 to 1919, Manuscript in Ordnance Historical Section, Office, Chief of Ordnance, Department of the Army, Washington, pp. 87-91.

of General Motors Corporation, in commenting on the conversion of the automobile industry for World War II declared:

> When you convert one of our factories, you move everything out and start with blank space. Out of a long row of intricate machines on the production line a certain percentage may be used in the manufacture of a war product, depending on what that war product is. But the production line will necessarily consist mainly of new, special-purpose machines along with any of the old machines that can be rebuilt for the new manufacturing process.6/

Let us examine the field of ammunition production, which is basic to warfare, as an example of the problems faced in mobilizing for war. In this field there was almost nothing to start with except some knowledge of small-scale production of military explosives and loading operations. The ammunition challenge was to call into being, in the shortest possible time, facilities for the production of hazardous chemical products in the form of military explosives, and to simultaneously create manufacturing plants in which assembling and loading operations for ammunition could be carried on.

Prewar surveys by defense planners had clearly indicated that the capacity for commercial production of small arms ammunition, smokeless powder, trinitrotoluene (TNT), dinitrotoluene (DNT), ammonia, toluol, dimethylaniline, diphenylamine and other basic chemical products needed in explosives manufacture were entirely inadequate, while plants for the loading of artillery shells, rockets, bombs and fuzes did not exist at all.7/ However, the planning agencies of the

---

6. Donald M. Nelson, Arsenal of Democracy, New York: Harcourt, Brace and Company, 1946, p. 218.

7. Albert J. Engel, "Ordnance Ammunition Production", an address before the U.S. House of Representatives as reprinted in Army Ordnance Report No. 6, Washington: Army Ordnance Association, August, 1944, p.4.

War Department had worked with representatives of the small peacetime powder and explosives industry to formulate plans and specifications for typical powder, explosive, military chemical, shell-loading and powder-bag-loading plants, and some basic plans existed when need for them arose in 1940.[8] These plans envisioned facilities on a scale never before constructed in this country for production of the type contemplated. No yardsticks, patterns or models were available except small-scale, job-lot types of commercial facilities in some of the categories, and the research and development type of installation found in the arsenals. However, the foresight of the planners permitted very speedy creation of explosives capacity once funds were made available for actual construction. The first funds received by the Army Ordnance Department for the construction of plants for the manufacture of powder and explosives were made available in July 1940. By March 1941 smokeless powder was being produced in the Indiana Ordnance Works, Charlestown, Indiana, and in April smokeless powder production began at the Radford Ordnance Works, Radford, Virginia.[9] Plants of the other types opened up in rapid succession. Whereas in 1938 our total capacity for production of powder and explosives was less than 50 million pounds yearly, in 1941 we produced 375 million pounds, in 1942 almost two billion, and in 1943 more than three billion![10]

The speed with which American industry mobilized for war far outstripped the estimates made by enemy planners. The factors which

---

8. Ibid., p. 11.

9. Ibid., p. 11.

10. Ibid., p. 10.

made rapid mobilization possible were not obvious, and in fact were not recognized in advance by either friend or foe. Many of the arrangements and devices which proved highly successful in accelerating industrial mobilization, and increasing the volume of production, originated in the stress of feverish activity, and were launched without careful preplanning. They sprang from circumstance, and the hammering by the forces of later circumstances, the pounding of painful experience, forged highly effective tools which can serve well in any industrial mobilization.

The following study concerns one of the World War II devices for greatly accelerating armament production. The device originated in the Army Ordnance Department, which was that segment of the military establishment having the most extensive responsibilities with regard to munitions production of any single organization. This device, the Ordnance Industry Integration Committee, was sponsored by the Chief of Ordnance, organized by officers of his office, and was peculiarly limited to manufacturers holding contracts with the Army Ordnance Department. The purposes of the committees were

> to provide for the interchange between contractors of information regarding production techniques and processes, to consider and make recommendations with respect to problems of production and supply of materials and components, and to consider and recommend measures for the best integration of the facilities of the several manufacturers so as to attain maximum efficiency in the utilization of such facilities.[11]

---

11. L. H. Campbell, Jr., in letter to Donald M. Nelson, Chairman, War Production Board. Ordnance Procurement Instructions 56, Washington: Office, Chief of Ordnance, 1942, p. 56A1.

The degree to which those purposes were achieved by the Ordnance Industry Integration committees; how the committees functioned; how their operations affected other producers and the industrial economy in general; and how similar committees may be of value in future mobilizations will be considered in this study.

In Section I, five chapters are devoted to the discussion of the economic background, legal basis, formulation and development of the committees. Section II begins with three chapters in which committee operations are described, indicating typical ways in which they contributed to the maximization of production. The fourth chapter of Section II considers some of the great problems of industrial mobilization for war, and indicates the need for a device of the integration committee type to aid in their solution. Section III opens with a chapter describing the areas in which committee action is considered desirable, pointing out significant changes in government policy toward committee activity in the Korean conflict period as compared to World War II. The other two chapters of the section discuss some of the implications of committee activity with regard to their effects on small business and the concentration of industry. Finally, Section IV presents some of the tangible results which were obtained from the activities of the committees, and offers arguments for the inclusion of the integration committee device in future plans for industrial mobilization.

SECTION I

FORMULATION OF INDUSTRY INTEGRATION COMMITTEES

Chapter 1

Some Economic Aspects of Industrial Mobilization

The impact of war, or large-scale preparation for war, on the economic system of a nation is far-reaching and dramatic. To a considerable extent the forces, influences, customs and regulations that govern the operation of the peacetime economy are modified, replaced or disregarded when war comes.

> Unlike peacetime, when relative prices and profits largely determine the allocation of resources, the main criterion in a war or an armament economy is the maximization of armament production. Other objectives, such as minimizing the impact upon civilian industries or the prevention of postwar maladjustments, may also play a role, but they are secondary to the major objective. The customary methods of determining who gets what and when, that is, largely through the market mechanism, are replaced by governmental fiat which allocates resources to a growing degree so that the maximum output of war goods can be attained.12/

The demands of warfare, as they are applied to the economy, quickly cause it to change in radical fashion. If the level of unemployment has been considerable, there is a rapid taking up of the slack and then an appearance of a labor shortage which tends to be aggravated as the months pass. The size and induction policies of

---

12. Jules Backman, Antonin Basch, Solomon Fabricant, Martin Gainsbrugh, and Emanuel Stein, War and Defense Economics, New York: Rinehart and Company, Inc., 1952, p. 3.

the armed forces pose serious problems with regard to the supply of labor, while the duration of the defense effort may be such that extensive measures may be required to assure the maintenance and increase of the supply of engineers, scientists, technical personnel and skilled labor. Great pressure is felt for more effective utilization of available manpower, as the time element which is present in a war production program does not usually permit long-range personnel development projects. Gigantic new industries (such as the ammunition industry) which require highly capable management and a large proportion of technicians and skilled labor must be quickly brought into substantial production. This means that their demands for personnel at all levels must be suddenly superimposed upon those which the economy is already experiencing.

The situation with regard to tools, materials, buildings and other facilities is similar. Suddenly there are new bidders in the market place for all of the factors of production, and these bidders are often armed with an almost unlimited supply of public funds. Simultaneously the producers for the normal peacetime economy are feeling the stimulus of the money and activity which are present in the war preparation atmosphere, and they foresee new profit opportunities for themselves if they can successfully compete for the means of production. In such a situation, the allocation of resources on a price basis would lead to choas, and government customarily imposes controls which are designed to assure a maximization of armament production. The devices used by the government toward this end include establish-

ment of priorities, price control, rationing, foreign exchange control, labor retraining, subsidies, government buying monopolies, measures to stimulate production, stockpiles of strategic materials, compulsory savings, higher taxes, a longer work week, and similar projects.[13] Historically, these devices have been employed on a piecemeal basis and only when the nation was very close to or engaged in war, rather than as a rounded program put into effect as war threatened. The result has been, in our wars so far, a period of great disorganization and confusion in the early stages of industrial mobilization. Mr. Bernard M. Baruch, writing in 1941 of his experiences as Chairman of the War Industries Board in World War I, declared:

> The War Industries Board plan contemplated getting ahead and keeping ahead -- avoiding bottlenecks rather than breaking them. It was arrived at by trial and error -- which are proving in 1940 and 1941 what they proved in 1917 and 1918. It is regrettable that we have to re-travel any of that road.[14]

The War Industries Board plan in World War I was a means for giving positive direction to the economic system through government controls and regulations.[15] The painful gestation period which finally

---

13. Ibid., p. 3.

14. Bernard M. Baruch, American Industry in the War, New York: Prentice-Hall, Inc., 1941, p. v.

15. Ibid., pp. v and vi. Mr. Baruch's summary of his War Industries Board plan indicates how significantly it affected the economic activities of the nation. He wrote:

> A study of the War Industries Board plan will show, among other things:
>
> Protection of civilian needs by the retention of the

led to the birth of this plan was remembered after the war and led to considerable industrial mobilization planning between wars. The intention was that a plan would be immediately available for use if war should come. There was to be no period of confusion and inefficiency while the peacetime controls of the economic system were painfully switched to those necessary for an effective armament program. Despite much planning, however, as World War II approached the same confusion, uncertainty and lack of an implemented program was experienced.[16] Instead of establishing the type of organization

---

highest possible standard of living at the lowest cost.

Organization of demand and supply. This means not alone a mobilization of things but all trades, callings, and professions to which application can be made for the needs that must be met.

Priority.

Price control -- with an increased tax program to pay as much as possible as we go.

Conservation -- to make both ends meet where there are shortages.

Conversion of facilities.

Control of imports and exports with a world-wide economic strategy to insure supplies to our friends and to withhold them from our enemies.

Wise location of plants and new facilities having special reference to housing, transportation, and labor, spreading to all communities the opportunity to take part in defense work.

Regional organization with special emphasis upon subcontracting, using small business for making parts to be assembled in larger units.

16. Thomas D. Perry, "Statutes and Executive Orders on Civilian and Industrial Mobilization", Mobilization Planning and the National Security, 1950 -- 1960, Senate Document No. 204, 81st Congress, 2nd Session, Washington: Government Printing Office, 1950, pp. 182-203.

used in World War I, or which had been developed as the official Industrial Mobilization Plan, the organizational growing pains of 1916-1918 were duplicated.[17] There was no sudden imposition of a carefully worked out, integrated plan for operation of the wartime economy.

The reluctance of the government to impose such a plan is understandable. No matter how carefully the program might have been worked out, in so vast a project serious flaws would be unavoidable. Numerous individuals, groups and organizations would undoubtedly find their interests adversely affected, and there had been no period for educating them concerning the reasons for such possible injury. In fact, the political authorities had not had time to prepare the nation for the burdens and restrictions that would be inherent in an effective wartime economic control policy.

In addition, there was widespread distrust as to the ability of the government to assume such a job. A powerful section of the nation vociferously held the opinion that government regulation was inherently inefficient and incapable. In the opinion of this group, wartime assumption by the government of control over the economic system was a necessary evil to be put off as long as possible. Though the dark day of government domination could not be forever postponed, various devices and expedients could be employed which would avoid a sudden shift away from business as usual.

The economic program for maximizing production in wartime has an urgency about it which is not present in normal peacetime

---

17. Backman, War and Defense Economics, p. 5.

operations. Armament production must be pushed to a high level in as short a time as possible, and the estimates of requirements have little meaning unless the time factor is considered. "Unless a country prepares for all-out war during peace, the greatest shortage confronting a nation becomes time."[18] For many of the items of armament, such as airplanes or heavy artillery, more than two years may be required to get the product from the finished design stage to actual production. This means that every possible method must be used to reduce the time element, and that any plan which will permit available means of production to be employed more effectively, rather than wait for the creation of new ones, is a great advantage.

Thus in moving from a period of peacetime production, when the choices of the market-place tend to control the economic system, to a wartime economy, we find a completely different tempo. During peacetime the market forces are subject to a reasonable degree of understanding and forecasting, and businessmen are able to establish fairly accurate estimates of demand extending into the limited future. Though the marketing relationships are subject to a certain degree of abuse by unscrupulous business men, in general actions in the market reflect planning, forethought and analysis on the part of those dealing there. In the war economy new and limitless demands are imposed upon the production system. Sincere efforts are made to plan carefully, but the uncertainty of requirements, the urgency of the situation, and the impossibility of understanding the effects of the

---

18. Ibid., pp. 3-4.

interactions of the various demands on each other and on the system make effective planning almost hopeless. At the best, the planners are faced with what is probably a superhuman task. At the worst, they are subject to all the frailties of the human being, and sweeping decisions with vast economic consequences may be made on the basis of ignorance, jealousy, greed or ill humor.

While the peacetime tempo is one in which economic activities establish themselves at certain levels fairly sluggishly in response to the stimuli of price and profit, wartime production requires immediate readjustments to meet the estimated situation. The controlling authorities are required to take drastic, positive action to obtain what is needed, and usually the knowledge upon which such action can be based is scanty or lacking.19/ In the absence of a firm basis for action, there is a great temptation to look into the past to see what was done in a similar situation. Thus there is a tendency to fight the preceding war rather than the current one in the armament production field just as on the battlefield. The guidance which can be obtained from previous experience is, of course, of great value, but it must be used in the light of the current situation rather than as it was in the past. Such astute application of knowledge from the past is not always possible in the disorder and haste of a war

---

19. For example, consider the problem faced by Secretary of Defense Charles E. Wilson in attempting to judge the correct level for armament production in view of the international realities of midyear 1953. Writing of the need for information from the Central Intelligence Agency, the editors of Fortune declared: "If Wilson could only be sure of that which is going on behind the iron curtain he could add or subtract billions to and from the military budget as confidently as he used to lay down General Motors production schedules." See "Defense and Strategy", Fortune, July 1953, p. 38.

production program.

Need for Coordination of Industry

Faced as it is in war with the problem of survival as a nation, the government takes drastic steps to protect the national interests. The program of economic controls that is adopted is a collection of such steps, and each of the controls can have significant ramifications. In the effort to maximize production, it is necessary to make the most effective possible utilization of existing facilities and means. Such an objective calls for an accurate understanding of the industrial structure of the nation, and for utilizing that structure as a homogeneous, coordinated entity. It demands a view of the national potential to produce each given military item, rather than the potential of particular plants. For example, if the problem is to maximize the production of brakes for trucks, the national potential would be the production possible if all of the existing brake producing plants were contributing as much as they possibly could to the nation's total output of truck brakes. This might or might not mean a maximum of finished brakes from each plant, because one might be able to produce certain components of the brake faster than other components, and would be held up in the assembly of finished brakes by the component in least supply. However, another plant might be able to produce the short component in excess of its own needs, and by supplying the excess to meet the shortage at the first plant, the finished brake output of the two plants could be made to exceed that of both plants working alone.

The type of cooperation and mutual exchange of information which would permit the result described above is only possible when the interrelationships of manufacturers are very complete and close. Historically, such interrelationships have been viewed with great suspicion by the government, which has seen in them an easy avenue to the establishment of monopolies and of concerted activities in restraint of trade. The remainder of this chapter will be devoted to a brief consideration of the concerted activities of business men in the form of trade associations, and of government attitudes toward such activities.

Antitrust Legislation in the United States

Since the passage of the Sherman Act in 1890, and in accordance with later modifications of that Act as embodied in the Clayton and the Federal Trade Commission Acts of 1914,[20] it has been the policy of the government of the United States to condemn two general categories of business conduct: restraint of trade, and monopoly.[21] The enactment of the Sherman Act actually established a statutory basis for case-law developments over a long period of years. "The legal repression of restraint of trade and monopoly long antedated this legislation, both terms having a common law significance."[22] The Sherman Act did not define what was meant by "restraint of trade", nor did it spell out what constituted a

---

20. The Sherman Act, 26 Stat. 209, 15 U.S.C., sec. 1; The Clayton Act, 38 Stat. 730, 15 U.S.C., Sec. 12; The Federal Trade Commission Act, 38 Stat. 717, 15 U.S.C., Sec. 41.

21. Milton Handler, "A Study of the Construction and Enforcement of the Federal Antitrust Laws", Monograph No. 38, Investigation of Concentration of Economic Power, U. S. Temporary National Economic Committee, Senate Committee Print, 76th Congress, 3d Session, Washington: Government Printing Office, 1941, p. 2.

22. Ibid.

monopoly. In applying the statute, the enforcing officials distinguished between two general types of combination: loose-knit confederations and close-knit integrations. The latter type related to combinations arrived at by merger, consolidation, the holding company device, or through establishment of trusts. The former "involved the elimination of competition among independent business enterprises either by voluntary accord through the fixation of prices, allotment of customers, division of territories, and curtailment of production or to the involuntary exclusion of competitors through boycotts and similar restrictive practices".23/

The Sherman Act condemned every contract, combination, or conspiracy, in the form of a trust or otherwise, in restraint of trade or commerce among the several States. The question was very quickly raised as to whether or not this condemned the familiar covenants not to compete ancillary to the sale and purchase of a going business, and to similar agreements.24/ Under the "rule of reason" which had been established in common law such restraints were considered legal. However, early opinions of the United States Supreme Court held the "rule of reason" inapplicable to proceedings under the Sherman Act. "It was felt that there was no room under the working of the statute for the adoption of common law views of legality."25/

---

23. Ibid.

24. Ibid., p. 3.

25. Ibid., p. 5.

This position was reversed in 1911 by opinions of Chief Justice White, whose examination of the common lawsatisfied him that the standard of reason was applied to all restraints, ancillary and non-ancillary, and that the term restraint of trade was used at common law to signify and indicate an unreasonable restriction of competition. A reasonable restraint of trade was to him a contradiction in terms -- if the restriction was reasonable it was not a restraint of trade; if a restraint of trade, it was by definition unreasonable.[26] The enunciation of this "rule of reason" served to encourage the loose-knit type of confederation referred to above, and there was a rapid growth of such organizations as trade associations after the rule was established as a part of the legislation regulating business competition.[27]

A trade association "may be defined as an organization for mutual benefit, composed of independent business concerns engaged in the same kind of industry or trade, and designed primarily to affect the conduct of that industry or trade".[28] A trade association exists solely to serve its members; it does not itself engage in the production or sale of goods.[29] The activities of trade associations

---

26. Standard Oil Co. of New Jersey v. United States, (1911) 221 U.S. 1, and United States v. American Tobacco Co. (1911) 221 U.S. 106, 179; both as cited in Handler, p. 7.

27. David Lynch, The Concentration of Economic Power, New York: Columbia University Press, 1946, p. 96.

28. Trade Associations: Their Economic and Legal Status, New York: National Industrial Conference Board, Inc., 1925, p. 7.

29. Dewey Anderson, Theodore J. Kreps and Ruth Aull, Final

"might be grouped in two categories: the ostensible, or obvious, and the collusive, or clandestine. In other words, trade association activities might be classed as those making social contributions and those of a monopolistic and predatory nature. The former functions are often publicized, whereas the latter are less tangible and are seldom admitted."30/

Government Encouragement of Trade Associations

The government has often encouraged the formation of trade associations in an effort to obtain the social contributions which such organizations can offer. In 1918 the Webb - Pomerene Export Trade Act was passed in an effort to place American exporters in a position of competitive equality with exporters of European nations, who had long been permitted and even encouraged to combine for mutual action in the export trade. The Webb - Pomerene Act exempted from the provisions of the antitrust laws any associations which were entered into for the purpose of engaging in export trade and actually engaged solely in such trade.31/ The Act provided that if such an association, by agreement or act, artificially or intentionally raises or depresses prices at home, the act's protection was withdrawn. Congress apparently believed that combinations could be organized to impose controls on the foreign market without influencing market supply and prices at home. However,

---

Report of the Executive Secretary to the Temporary National Economic Committee on the Concentration of Economic Power in the U. S., Senate Committee Print, 77th Cong., 1st Sess., Washington: GPO, 1941, p. 85.

30. Lynch, pp. 96-97.

31. Final Report of Executive Secretary, TNEC, p. 101.

"no such cleavage is possible. The domestic market is in fact a part, and in the United States an important part, of the world market."[32] Though presumed by law to impose no controls on the home economy, in practice export associations "implement measures designed both directly and indirectly to restrain competition within the home economy and serve as media for the development of informal programs of restraint."[33]

Another period of government encouragement of trade association activities, this time in the domestic sphere, marked the post World War I economic scene. During the administrations of Presidents Coolidge and Hoover

> trade associations were encouraged; the latter, first as Secretary of Commerce and later as Executive, championed the associations and put the services of his department at their disposal. This was a period which one historian called that of "government alliance with the great trade associations", or, as Mr. Hoover characterized it, "passing from a period of extreme individualistic action into a period of associated activities". The second period of government sponsorship occurred during the days of the NRA (National Recovery Administration), when the associations took the initiative in drafting and presenting the codes. Old associations took on new life, and new ones rose to power and affluence.[34]

An idea of Mr. Hoover's conception of the role of trade associations can be obtained from the statements contained in the report entitled Waste in Industry which was prepared by The Federated American Engineering Societies while Mr. Hoover was President of that Organization.

---

32. Lynch, pp. 234-235.

33. Ibid., p. 238.

34. Ibid., p. 96.

> Trade associations should be formed in those industries lacking comprehensive organizations.....Trade associations should collect and make public trade information, including current data on production, stocks on hand, consumption, the general price levels of essential commodities, and statistics of active and idle plant capacity. Such information would make for stability and elimination of waste.....Trade associations should promote programs for the standardization of cost accounting methods, the introduction of standardized material specifications, the establishment of production standards, the standardization of equipment and the standardization of finished products.[35]

The specific stratas and types of activities in which trade associations engage are too varied to enumerate here. The final report of the Secretary of the Temporary National Economic Committee lists more than fifty different activities engaged in by the trade associations operating in 1938.[36] These can roughly be grouped into major categories as follows: simplification and standardization of procedures and products, industrial research, interchange of patent rights, joint advertising, trade promotion, traffic information, codes of business ethics, settlement of disputes, cooperative insurance, joint representation before government bodies, labor relations activities, interchange of credit information, and collection and distribution of statistical information.[37] It can be seen that these cooperative activities are of a type that could be constructive and generally beneficial. However, it is also readily apparent

---

35. Committee on Elimination of Waste in Industry of the Federated American Engineering Societies, Waste in Industry, New York: McGraw-Hill Book Company, Inc., 1921, p. 30.

36. Final Report of Executive Secretary, TNEC, pp. 86-87.

37. Lynch, p. 97.

that "organizations capable of achieving these objectives are fraught with the potentialities of social abuses".[38] It has been the duty of the government, within the powers of the existing antitrust legislation, to assure the benefits but deny the abuses which are potentially inherent in trade associations. "It is impossible to measure the extent to which members of trade associations are actually engaged in cooperating to serve the public or conspiring against it. The line between cooperation and conspiracy is not an easy one to draw."[39] Further, the attitude of the government[40] toward association activities varies from the encouragement of the Coolidge-Hoover-National Recovery Administration type to the fairly energetic attempts which

---

38. Lynch, p. 97.

39. Final Report of Executive Secretary, TNEC, p. 86.

40. In practice, the "attitude of the government" has been at times difficult to ascertain, because of differences of opinion among various governmental agencies. For example, in 1922 there was a considerable difference between the position of Secretary of Commerce Hoover and that of Attorney General Daugherty:

> "The Secretary of Commerce was somewhat perturbed by the interference of the Department of Justice with his program for organizing American industry and making it articulate in a more representative way in national counsels, but he must have experienced little satisfaction in the Attorney General's tentative and indefinite pronouncements upon the lawful sphere of trade association activity. The chief outcome of the Attorney General's response to the inquiries of the Secretary of Commerce concerning the 'legitimate cooperative activities' of "legitimate trade associations' was to create a sense of uncertainty and distrust in the minds of trade association executives.....
>
> "A sharp and vital divergence of policy has also been disclosed, from time to time, between several of the technical branches of the government service and the legal departments. A number of the federal bureaus have at one time or another made to the industries which they serve suggestions or even

have been made in more recent years to end their activities in restraint of trade in many fields. For example, in 1941 it was possible to write:

> The campaign initiated by the Department of Justice for the enforcement of the antitrust laws in the building trades is well under way. New indictments are being handed down and consent decrees accepted by trade and labor groups during each succeeding week.....The combined effect of the restraints imposed by associations of producers and distributors of materials, by rings of subcontractors, and by trade unions probably has so increased the cost of construction as seriously to limit the volume of building.41/

Conflict Regarding Proper Antitrust Policy

The period of World War II had the effect of generally relaxing the effort to enforce the antitrust laws, as will be noted in the next chapter. However, there is no doubt that two distinct views of the adequacy of existing antitrust legislation are held. Professor Milton Handler, writing on the eve of World War II, reached the conclusion

---

> recommendations quite inconsistent with the general tenor of interpretation of the anti-trust laws, as applied to trade cooperation, adopted by the Department of Justice and the Federal Trade Commission.
>
> "These divergences of opinion and policy have served to keep the trade association movement in an agitated state. On the one hand, the censorious attitude of the Department of Justice has undoubtedly exerted a repressive influence upon the development of trade organization. On the other hand, the encouragement and cooperation held out by the Department of Commerce and the several technical bureaus have quite as certainly stimulated trade organization." Trade Associations, NICB, pp. 28-29.

41. Final Report of Executive Secretary, TNEC, p. 96.

that

> Our study of the antitrust laws and their administration has satisfied us that the objectives of these laws are socially desirable, are economically sound, and are capable of practical attainment. With increases of appropriation and personnel, with moderate changes in the substantive law, and with some modifications of our administrative procedure, these ends could be easily attained. The gains of intelligent, far-sighted, and vigorous enforcement of our antitrust laws greatly outweigh the costs of these recommended changes.42/

On the other hand, Mr. David E. Lilienthal, formerly chairman of the Tennessee Valley Authority and of the Atomic Energy Commission, two of the greatest government enterprises so far known in history, in discussing what he considers the shortcomings of the nation's existing antitrust policies declares:

> The approach I propose is that, by act of Congress, we make our present limited and essentially negative dogma of competition (such as is embodied in our antitrust laws and their current enforcement) clearly subordinate to a broader and more basic proposition. Such a new law should make it explicit that what we want is something positive: productivity for the general welfare and the common defense. The Sherman Act forbids "restraint of trade" -- a double negative. The new law, by contrast, should expressly foster the "development of trade" -- a double affirmative.43/

In conclusion, it can be said that the existing antitrust legislation is such that there is considerable uncertainty as to just what comprises "restraint of trade". The attitude of government toward the enforcement of the antitrust laws has been variable in both intensity and degree. It is not surprising to find, in such circumstances, that the individual business man, in considering his own acts in

---

42. Handler, op. cit., p. 100.

43. David E. Lilienthal, Big Business: A New Era, New York: Harper and Brothers, 1953, p. 185.

relation to the antitrust laws, is not always certain as to just what is legal and what is not. However, the utilization of the nation's productive facilities in such a way as to maximize their output requires that they be viewed as industrial groups rather than as individual plants. With regard to such groups, it will be seen in Chapter 3 below that manufacturers were concerned about the legality of their participation in them even when encouraged to participate by agencies of the federal government.

The effects of mobilization for war upon the industrial structure of the nation are considered below in the three chapters of Section III. The vast increases in plant facilities and equipment which mobilization stimulated are discussed, and the changes in size of the participating corporations are reviewed. By the placing of prime contracts for munitions, and by assigning priorities for materials and equipment which permitted the prime contractors to meet their commitments, the contracting agencies of the government greatly influenced the nature of the industrial structure that emerged from the war. The cooperation of manufacturers among themselves which was encouraged by the government was also without doubt an important influence in this regard. One of the important, and as yet unsolved, problems of future mobilization planning is to determine how full advantage can be taken of the pre-war existing and war-added industrial structures without adverse effects in the sense of increasing the concentration of control of economic power.

Chapter 2

Development of Industry-Army Ordnance Cooperation

In the previous chapter, brief consideration was given to some of the changes in the economic system which accompany large-scale armament production programs. The urgency which normally attends such programs was pointed out, and it was noted that the critical time element made mandatory a policy of getting the greatest production possible out of the facilities already in existence. Because maximizing production of the existing industrial structure means operating it as one great coordinated entity, the problem of organizing industry on such a basis was considered in the historical light of its antitrust implications. The present chapter will examine further the attitudes of government and industry with regard to cooperation in war production, and will trace some of the history of the development of such cooperation in World Wars I and II.

As was noted in the preceding pages, the experience of the United States with industrial mobilization for war in World War I began with a period of great confusion, indecision and inefficiency. It was not until March 4, 1918, when Mr. Baruch became Chairman of the War Industries Board, that the cooperation of government and in-

dustry in the common task of winning the war finally became complete.[44] In the chaos of mobilizing industry in support of the war effort, there was a reluctance on the part of the military supply agencies, which controlled the letting of contracts, to accept the assistance of civilian experts. Though their procurement activities had never before approximated the vast demands resulting from the war situation, they displayed reluctance to accept special advice regarding them.

An early action of great significance in the field of industrial mobilization was the establishing of the Council of National Defense on October 11, 1916. This Council was to consist of the six Secretaries -- War, Navy, Interior, Agriculture, Commerce and Labor. The Council was charged, among other responsibilities, with "the coordination of industries and resources for the national security and welfare".[45] It was also charged with the duty of nominating to the President an advisory commission of not more than seven members "each of whom shall have some special knowledge of some industry, public utility, or the development of some natural resource, or be otherwise qualified".[46] This Advisory Commission was to assist the Council in dealing with five main problem areas: transportation, including shipping; mobilization for defense; how to increase domestic

---

44. James L. Tyson, "The War Industries Board", supplement to Fortune, September, 1940, p. 3.

45. Section 2 of Army Appropriation Act, August 29, 1916, as printed in Baruch, op. cit., p. 305.

46. Ibid.

production; provision of information to producers as to government needs; and the concentration and utilization of all resources in time of need.47/

The Advisory Commission was an obvious attempt to provide the mobilization effort with advice based on wide experience in fields of activity of critical importance to the war effort. The reception of the Advisory Commission idea by the military authorities in charge of procurement was far from enthusiastic. There was a decided reluctance on the part of the majority of army and navy officers to admit that civilian advice could be of any assistance, and they either ignored or were openly contemptuous of suggestions made by the Commission.48/

Formation of the War Industries Board

The fact that the Commission was solely advisory, coupled with the attitude of those who actually had the authority to let supply contracts, largely nullified its usefulness. In an attempt to obtain a more authoritative, centralized control over purchasing, the Council of National Defense set up a Munitions Standards Board, made up of six civilian experts and representatives of the supply agencies of the army and navy. However, this Board had hardly begun operations when war with Germany was formally declared, and the Council determined that a more cohesive, unifying body was needed. Thus five days after the declaration of war a General Munitions Board was formed,

---

47. Tyson, op. cit., p. 3.

48. Ibid., p. 5.

and empowered to coordinate the buying of the several departments, assist in the acquisition of raw materials, and establish precedence of orders.49/ However, authority to enforce decisions was still not within the province of this new board, and it, too, was faced with a lack of cooperation by the military services. Instead of resulting in greater centralization, an opposite tendency manifested itself in a sudden growth of committees, bureaus and councils with little coordination.50/

Until July of 1917, the administrative confusion resulting from lack of centralized control increased, despite a growing awareness on the part of numerous Washington administrators and military officials that something must be done. The first major result of this pressure for improvement was the formation of the War Industries Board of the Council of National Defense on July 28, 1917.51/ This consolidated a great number of the existing committees and agencies under a single head, but it still lacked a vital element -- the power to enforce its decisions. At first this shortcoming was not significant, as the military authorities indicated a willingness to abide by the Board's recommendations on all purchasing.52/ However, in practice this was not done, and by the end of August, 1917, it was apparent that the War and Navy Departments were not routing purchase

---

49. Baruch, American Industry in the War, op. cit., p. 19.

50. Ibid., p. 20.

51. Ibid.

52. Ibid., p. 23.

requests through the Board so that purchases could be made with proper regard to available supplies.

This situation of drifting and indecision in the critical matter of top direction of procurement for war continued until the following March, when President Wilson, in announcing the appointment of Mr. Baruch as Chairman of the War Industries Board on March 4, 1918, indicated that the new powers of the Board included control over all procurement activities of the government. Henceforth strong, centralized authority was to supplant the loose system of industrial cooperation which had been the main aspect of operations before that time. Rather than merely the powers to suggest and recommend, the Board now had the power to coerce.53/

It was never Mr. Baruch's policy to antagonize private industry. Though he was highly successful in getting industry to cooperate, it was done without exercise of his ultimate authority. The great principle of operation which the Board followed was that of "voluntary cooperation with the big stick in the closet".54/ The activities of the Board served to bring industry into willing alliance with the ends of the government, and the degree of cooperation and intense concentration on the great end of winning brought forth a flood of war production far greater than anything the enemy had anticipated.55/

---

53. Ibid., pp. 24-27.

54. Tyson, War Industries Board, op. cit., p. 16.

55. Ibid.

When World War II began, and it became increasingly apparent that the United States would become a belligerent, the history of the indecision and confusion which attended industrial mobilization in World War I was readily available to those interested in the new mobilization problem. It was clear that centralized authority was required, even though it might never be exercised by the agency to which it was granted. The presence of the "big stick in the closet" could serve to inspire a cooperative spirit where without it not any such spirit might exist. Accordingly, an Office of Production Management, with substantial powers, was set up early in our World War II mobilization, being formed on January 7, 1941. The superseding of the Office of Production Management by the War Production Board on January 16, 1942, was attended by an even greater degree of power over the American economy. The War Production Board was to be castigated by industrialists and others, but the great value of its work has not been seriously questioned. However, the War Production Board was a force at a high level, and necessarily dealt in the "big picture" almost exclusively. It, or some comparable type of organization, must always exist as a coordinating agency at the top. Yet there is another important level at which great things in the way of improving war production can be accomplished. This level, much closer to the actual production line, is concerned with the actual employment of productive factors on a relatively small scale -- with planned cooperation among plants making a single item or small group of related items. It deals with particular and narrowly defined production problems, such as specific tools for a given operation, the tolerances required or desired on a parti-

cular part of a given piece, and similar matters. It is this type of problem which must be solved, and solved wisely, if mass production is to be as effective as possible.

The Army Ordnance Department and Mobilization

For many years prior to World War II it had been the policy of the Army Ordnance Department to work in close cooperation with industry. This Department, which was responsible for the procurement of the major share of all munitions used by the military services of the United States, had long been deeply interested in mobilization planning. Some actual industrial mobilization planning had been accomplished between wars in the matter of surveying plant facilities to determine their production potential, but shortage of funds had kept any extensive program of educational orders and model production lines from being undertaken. Despite lack of money, however, contact with industry, and statistics and information regarding the potential of industry, had been systematically maintained by the thirteen Army Ordnance Procurement Districts into which the country had been divided since May, 1922. These Districts were specifically intended to "establish and maintain a close working relationship with Industry and to determine just what potential war production capacity existed in case need for it arose".[56] The relationship between industry and Army Ordnance was intended to be one of mutual understanding and cooperation, so that the capacities and limitations of each would be known to the other. During most of the period between wars the Districts

---

56. Levin H. Campbell, Jr., The Industry-Ordnance Team, New York: Whittlesey House, McGraw-Hill Book Co., Inc., 1946, p. 18.

had little to offer the manufacturers in the way of contracts for actual production. They recorded the manufacturing processes a company employed, listed its equipment, and noted the products it turned out. Not until 1938, when war was very close, did a few millins of dollars become available for Educational Orders, which had been advocated by the Army Ordnance Department as a part of mobilization planning since 1928.57/ For the few companies that could be given such orders, an opportunity for some slight profit was offered, but for the great majority of manufacturers there were only the incentives of patriotism and the desire to make sure of some share of military business should war develop.

Despite lack of actual dollar business, however, the relationships of industry and Army Ordnance were most friendly. A sound basis for cooperative dealing with mutual problems existed because of this friendly spirit, and only the circumstances of war were needed to show the value of the years of planning.

General Campbell's Industry-Ordnance Team

The type of relationship envisioned for the Army Ordnance-Industry team can best be described in a statement of policy drawn up by the Chief of Ordnance and some of his advisers on June 1, 1942, when a new Chief assumed his duties to serve for the balance of the war.

> One of the primary policies of the Ordnance Department will be to secure the utmost cooperation and coordination with the industrialists upon whom we must rely to accomplish our objectives. The following policies, in so far as Industry is concerned, will govern:
>
> Authority has been given by the government for the

---

57. Ibid., p. 22.

> Ordnance Department to take over industrial plants in certain instances. The Ordnance Department will not take over any industrial plants unless ordered to do so by high authority, for the reason that the Ordnance Department does not have an adequate staff of trained officers to assume this responsibility.
>
> The government has authorized the Ordnance Department in certain instances to issue mandatory orders. It will not be the policy of the Ordnance Department to issue mandatory orders. If for any reason a company is unable or unwilling to perform its contract with the Ordnance Department, the contract will be canceled. The Ordnance Department has no time to waste on trying to force people to help win the war.
>
> Every officer in the Ordnance Department will do his utmost to secure the complete cooperation, coordination and effective performance of contracts with Industry, and will recognize that our objective can only be attained by Industry under the guidance of the Ordnance Department. The Ordnance Department cannot do the job alone.[58]

Though not previously stated so specifically, other Chiefs of Army Ordnance had long fostered the idea of close cooperation with industry, and had worked to make it possible. However, it required the fantastically burgeoning munitions requirements of World War II to show how great was the necessity for this close coordination of the two, and to prove how invincible they were when working together.

The policy stated above was that of Lieutenant General Levin H. Campbell, Jr., who had long advocated close cooperation between business and the military establishment. As the Chief of Ordnance after June 1, 1942, he very quickly added impetus to the concept of Industry-Ordnance coordination. His first official act was to establish a personal advisory staff of four outstanding business leaders:

---

58. Ibid., p. 6.

Bernard M. Baruch, Chairman of the War Industries Board in World War I; Lewis H. Brown, President of Johns-Manville Corporation; Benjamin F. Fairless, President of the United States Steel Corporation; and K. T. Keller, President of Chrysler Corporation.[59] At its first meeting (June 1, 1942) this advisory staff drafted a letter which was sent to all corporations having contracts with the Army Ordnance Department, and to many of the subcontractors who were furnishing supplies to those contractors. This letter announced the formation of the advisory committee and outlined its general purposes. In addition, it contained the following declarations:

> It is a simple statement of fact that for a long time Industry has felt that in its dealings with government it has in too few instances been able to deal with executives who both understood business and were sympathetic and appreciative of its accomplishments. Today no business leader could ask for more than is now available in the Ordnance Department.[60]

This attitude of the Army Ordnance Department toward business -- the concept that Industry should do the job and the Ordnance Department should find ways to help it do the job -- flowed downward from the top levels where it was enunciated, and affected every Ordnance officer or civilian who found it necessary to deal with Army Ordnance Department contractors. Individuals who were unsympathetic with the concept could not carry out their responsibilities properly if assigned to work with the industrial side of Ordnance Department activities, and in many cases army officers with excellent records, but

---

59. Ibid., pp. 3-4.

60. Ibid., p. 8.

unable or unwilling to adapt to the policy, had to be transferred to other assignments. Such a policy was far removed from reliance upon coercion to get things done by industry, though authority for coercion existed in law even before war began.

Industry-Ordnance Cooperation Before World War II

Prior to the start of World War II there were instances in which the Army Ordnance Department deliberately encouraged its contractors to cooperate with each other in the interests of the over-all armament production program. A letter from the Office of the Chief of Ordnance written in December, 1940, to the Remington Arms Company stated:

> In order that the program for National Defense may be expedited, you are hereby authorized to engage in a mutual exchange of information with the Western Cartridge Company on those items pertaining to the proposed Lake City and St. Louis Ordnance Plants being built for the United States Government, which can be furnished by either party without inconvenience or delay to the progress of your work.
>
> This will apply to information on: engineering details pertaining to plant construction; personnel requirements for plant operation; sources of supply of raw materials; other matters of general interest.
>
> It is understood, of course, that there may be items pertaining to plant construction or operation of the Lake City Plant which you consider to be confidential and which you will not care to disclose.[61]

This letter was actually a continuation of cooperative efforts stimulated by the Assistant Secretary of War, Mr. Robert P. Patter-

---

61. C. T. Harris, Jr., Brigadier General, Assistant Chief of Ordnance, to Remington Arms Company, Inc., Bridgeport, Conn., December 9, 1940. Letter on file in Industrial Service, Office, Chief of Ordnance, Washington, D.C.

son. In a letter to the same munitions contractor written by Mr. Patterson on October 30, 1940, he had stated:

> (.....) it was decided that the procurement of equipment for the plants which you and the Western Cartridge Company are undertaking to build for the Government would be materially expedited if your company would meet with representatives of the Western Cartridge Company at Frankford Arsenal to determine a procedure to be followed by both companies for the allocation of equipment orders to appropriate machinery suppliers.
>
> We are therefore asking that you proceed along these lines, and when these plans are completed and approved by appropriate Government authority, it is further requested that you arrange to cooperate with the Western Cartridge Company in the placing of your purchase orders in such a manner that all three plants may come into initial and full production at the earliest possible moment.62/

This encouragement by Government of cooperation among manufacturers to expedite the creation of productive capacity, and of productive output, was not peculiarly American. Other nations used a variety of approaches to the problem, as will be noted in a few examples discussed below.

Attitude in England toward Industry Cooperation

The time element for England, in finding means for increasing munitions production, was even more critical than for the United States. With much of her munitions stock lost in the defeat of France and at Dunkerque, and with serious losses being inflicted on her industrial structure by Nazi bombings, it was only to be expected that great efforts would be made to increase the effective-

---

62. Robert P. Patterson, Assistant Secretary of the Army, to Remington Arms Company, Inc., Bridgeport, Conn., October 30, 1940. Letter on file in Industrial Service, Office, Chief of Ordnance, Washington, D.C.

ness of her industry. In discussing this matter of accelerating the munitions program an American war historian states: "In England the problem was effectively met by having experienced manufacturers assume the responsibility for assisting a new producer with engineering and production advice, and with personnel."[63] It was with a knowledge of this English experience in his possession that Mr. Patterson called on the various supply arms and services of the United States military establishment to arrange for cooperation where contractors needed guidance in getting into production or assistance in overcoming difficulties once in operation.[64] Though actively stimulating cooperation among contractors, Secretary Patterson and those under him in the War Department acted always within the areas of coercive power that resided with the Office of Production Management and later the War Production Board. Control by Industry of the war program was never instituted in the United States, although great effort was made to bring out the best production capabilities of the industrialists and their facilities.

Control of War Industry in Japan

It was in Japan that the peculiar phenomenon of control of war production by industry appeared in striking form. In that country the industrialists gained and maintained control of the munitions production program.

---

63. Harry B. Yoshpe, Organization for Production Control in World War II, 1939-1945, Monograph No. 2, Historical Division, Army Industrial College, Washington, D. C., February, 1946, p. 106.

64. Ibid.

An Imperial Ordinance, effective September 1, 1941, authorized the formation of Industry Control Associations to provide unified control and management of designated industries. An association was formed for each major industry, and by joint planning with the Government, it was to establish a national production program for its membership. It was to determine its own production schedules and arrange for its labor, raw material and capital requirements.

A State Minister ordered the formation of a control association and appointed its president, but the appointment could only be made upon the recommendation of the industry representatives. Government might suggest schedules, but could not enforce its decisions. The association determined the apportionment of production among its own members. Companies within an association competed for available labor, materials and capital. There was only voluntary liaison between associations of different industries, and production was not coordinated.65/

Some Aspects of German Industrial Mobilization

It is not difficult to imagine the confusion, factionalism and inequities that developed within the Japanese war economy in the absence of any centralized governmental control. The Germans, in their approach to the problem, appear to have gone to the other extreme.

Under the Weimar Republic the organization of all industrial, commercial and handicraft enterprises was developed to a high degree. As early as 1880, associations were started covering every branch of trade and industry. These were joined together into central associations in 1917. Under Hitler, membership in these associations became mandatory.

The administration of the Nazi war economy was a natural set-up for centralized control. The established chambers and entrepreneurial groups were integrated into the Government agencies which were responsible for the allocation of materials and the control of production. Under the Nazi principle of leadership, these organizations lost their original function as pressure groups for their members and became the administrative agents for the state, serving the interests of their membership only insofar as those interests harmonized

---

65. Notes on the War Economy of Japan, Dept. of Social Sciences, U. S. Military Academy, West Point, New York, 1950, p. 4. The domination of Japan's economy by the great financial-industrial-commercial monopolies known as "Zaibatsu" is one of the peculiar phenomena of modern times. During World War II "the Zaibatsu roundly whipped the 'militarists' on each of the central issues that arose on the economic front." See T. A. Bisson, Japan's War Economy, New York: Macmillan Co., 1945, p. x.

> with the objectives of the state. The enforcement of this principle, "never to act against the wishes of the government of the Reich", was assured by the powers of the national agency which "could erect, dissolve, or merge entrepreneurial bodies at will, or change their constitutions or covenants".[66]

In practice, the German governmental authorities issued their instructions through the chairmen of the national entrepreneurial groups, who passed them down through the organizational hierarchy. Such a procedure gave an outward semblance of self-government on the part of industry to which the Nazis often pointed with pride.[67] The events of early 1942, with the United States actively in the war and the Union of Soviet Socialist Republics holding and striking back with considerable success on many fronts, convinced the Nazis that their chance for a Blitzkrieg was past, and that they must gird for a long war. In February, 1942, Albert Speer became Reich Minister for Armament and War Production, and he was given wider authority over the military and civilian economies than had previously been concentrated in any one office. Speer was able to more than double the industrial production of Germany during the next two years, despite increasing problems caused by bombing attacks directed at industrial installations. His methods were numerous, but one is of particular interest in our examination of the cooperation of manufacturers in time of war.

> The major organizational development effected by Speer was the formation of Rings and Committees, involving the ex-

---

66. Notes on the German War Economy, Department of Social Sciences, United States Military Academy, West Point, New York, 1950, p. 1.

67. Ibid., p. 2.

tension of the so-called principle of "self-responsibility of industry inspired by patriotic devotion".

The Committees were organizations placed in charge of end item programs (guns, tanks, etc.), while the Ring organizations were placed in charge of the production and distribution of component programs (ball-bearings, gears, bolts, etc.). Representatives of the leading tank producers, for example, would constitute the Tank Committee while the Bearing Ring would consist of members of the bearing industry.

The personnel selected to serve on the Rings and Committees were usually the young, aggressive technicians in the industries concerned. The chairmen were usually chosen from the technicians representing the most efficient industries. These Committees and Rings were given wide powers in their respective fields and their energetic efforts contributed largely to the threefold increase in production in 1943 and 1944.[68]

Army Ordnance Industry Integration Committees Appear

It is interesting to note what was taking place in our own War Department at approximately the same time that Albert Speer was organizing his Committees and Rings. Writing of a period some months before his appointment as Chief of Army Ordnance, when he was in charge of creating new facilities for the production of munitions, General Campbell states:

The thirteen Ordnance Districts were doing an excellent job in starting and expediting production, wherever possible, in the hundreds of plants in their respective areas, and this production covered practically every Ordnance item. It was my belief, however, that the demonstrated ability of Industry had not yet been applied in full force to the multi-billion-dollar war production program. It seemed to me that there had to be some kind of organization within Industry itself that would make possible the concerted application of industrial knowhow to the thousands of engineering and production problems that were clamoring for solution twenty-four hours a day. Bottlenecks had to be smashed. Bureaucratic paper work had to be cut to a minimum. The nation's existing productive capacity had to be utilized without delay. The Ord-

---

68. Ibid., p. 2.

> nance Districts were "vertical" organizations, covering all items by area; the Industry Integration Committees, as I visualized them, had to be "horizontal" in nature, covering all areas by item.[69]

The industry integration committees contemplated by General Campbell were soon brought into being. Beginning with the formation of the Mechanical Time Fuze Committee on April 29, 1942, Ordnance Industry Integration Committees were quickly formed for almost every major item. On V-E Day there were 82 committees functioning, covering 162 types of Ordnance equipment and combining the efforts of 1,527 prime contractors and approximately 10,000 subcontract producers.[70]

Details of the composition and functioning of Industry Integration Committees will be discussed in a later chapter, and will not be further developed in this one. At this point, however, a summary of some of the significant aspects of the background of integration committees will be presented.

Experience in World War I had indicated that a modern industrial economy organized for war must have direction by a centralized authority with coercive power. It had also shown, however, that where such coercive authority was in existence, it was possible to accomplish the war production mission best in an atmosphere free from the suggestion of coercion. The period during World War I when the War Industries Board achieved its smoothest and most effective functioning was ex-

---

69. Campbell, Industry-Ordnance Team, p. 119.

70. Ibid., p. 118.

actly the period when the spirit of cooperation between industry and the governmental agencies responsible for war production was most in evidence.

Between wars there was a definite effort made by those interested in industrial mobilization to keep intimate and friendly relationships with industry in existence. Though seriously hampered by lack of funds, the contacts that were established and maintained did much to facilitate conversion to war production when such a conversion became necessary.

We have noted that as World War II came to Great Britain, the governmental officials there encouraged manufacturers to help each other with conversion problems, and requested the older and more experienced manufacturers to give to the newcomers wholeheartedly and without reservation all possible assistance in getting into production quickly.

By late 1940, when to many Americans it became obvious that the United States would soon enter the war, we find various high officials in the War Department actively encouraging cooperation by manufacturers in the defense production program. Soon after war was declared we find the Army Ordnance Department, which is the part of the military establishment having the responsibility for the greatest portion of munitions production, deliberately organizing committees of manufacturers for the specific purpose of cooperation. Meanwhile our major and most powerful enemy, set back in Russia and facing the impact of the entry of the United States into the war, decides to improve

the efficiency of its war production system by deliberately attempting to get greater and more effective cooperation of industrialists among themselves.

Chapter 3

The Legal Basis for Integration Committees

In Chapter 1 some of the economic aspects of war production were considered, and the critical nature of the time element was discussed. It was noted that speedy attainment of a high rate of armament production depended to a great extent on organizing the nation's existing industrial plant on the most effective basis possible. Such organization demanded a degree of mutual cooperation among industrialists so great that it posed serious problems under the antitrust laws of the nation, and those laws were briefly reviewed. In Chapter 2 some of the history of industry-government cooperation in armament production was discussed, and it was noted that in both World War I and World War II it became the policy of the government to actively encourage such cooperation.

The fact that various individuals holding important governmental positions in the defense establishment were convinced that cooperation among manufacturers must be encouraged in the national interest did not of itself free those manufacturers from possible prosecution under the existing antitrust legislation. The Attorney General of the United States was charged with enforcing the antitrust laws, and there was considerable reluctance on the part of manufacturers to participate in conferences which had as their purpose the

allocation of orders, curtailment of civilian-type production to increase defense production, the establishment of priorities, and similar ends unless formal approval of such participation was given by the Attorney General.[71] As they had in the 1920s, manufacturers felt uncertain as to which part of the government they should believe.[72]

The Attorney General's Statement of April 1941

The uncertainty of the situation led to an indication of policy by the Attorney General in a letter written to the General Counsel of the Office of Production Management in April, 1941. This letter specified certain limitations within which cooperation would be tolerated without prosecution under the antitrust laws. Because of its significance, a major portion of this letter is quoted below:

> (.....) it is obvious that in the present emergency acts performed by industry under the direction of public authority, and designed to promote public interest and not to achieve private ends, do not constitute violations of the antitrust laws. In these circumstances, the Department of Justice recognizes that business interests which are asked to comply with public plans for increasing production and preventing inflation are entitled to the cooperation of agencies of the Government in eliminating any uncertainties which may exist as to the application of the antitrust laws to their activities.
>
> Accordingly, this Department has formulated a policy which it proposes to follow in its relations with the Office of Production Management and the Office of Price Administra-

---

71. Small Arms Ammunition: A History of an Industry 1918-1944, Washington: Ammunition Branch, Small Arms Division, Office of the Chief of Ordnance, 1945, I, 350-351.

72. See Footnote 40, p. 23 of this study.

tion and Civilian Supply and with all industries or contractors acting in compliance with the orders or requests of either of these organizations. The important points of this policy are:

Meetings of the industry with the Office of Production Management and the Office of Price Administration and Civilian Supply or their representatives are not illegal. Industrial committees may be formed at the request of the Office of Production Management or the Office of Price Administration and Civilian Supply to work with representatives of such offices on problems involving defense. There will be nothing unlawful in the industry cooperating in the selection of its representatives or in selecting members for committees, or in the activities of such committees provided they are kept within the scope of this letter.

Questions as to whether there is a need for such a committee, and if so, how it shall be chosen, and by whom constituted, shall be the sole responsibility of the Office of Production Management or the Office of Price Administration and Civilian Supply. This Department will not participate in these decisions beyond the suggestion now made that any such committee should be generally representative of the entire industry and satisfactory to the Office of Production Management or the Office of Price Administration and Civilian Supply.

Acts done in compliance with the specific requests made by the Office of Production Management or the Office of Price Administration and Civilian Supply and approved by their General Counsel in accordance with the procedure described in this letter will not be viewed by the Department of Justice as constituting a violation of the antitrust laws and no prosecutions will be instituted for acts performed in good faith and within the fair intendment of the instructions given by the Office of Production Management or the Office of Price Administration and Civilian Supply pursuant to this procedure.73/

It is clear from this letter that almost eight months before the United States entered the war the attitude of the Department of Justice toward cooperation of manufacturers in the national interest was friendly, and that the value of such cooperation to the defense program was

---

73. Small Arms Ammunition: A History, op. cit., II, 366-369.

believed sufficient to permit a relaxation of the antitrust laws. Actually, the Attorney General's letter had the effect of cloaking with legality certain actions already taken, and of encouraging other cooperative activities in the year that followed.

Ordnance Requests Authority to Form Committees

As the mutual exchange of information among manufacturers, and at meetings and conferences of civilian and military governmental officials with manufacturers, increased through the balance of 1941 and into 1942, there grew up a desire for a more definite and clear-cut statement of authority for cooperation. In addition, there was a desire on the part of the Army Ordnance Department for a considerable extension by interpretation of the area of legality with regard to cooperation by manufacturers in the form of specifically organized committees. In accordance with the policy outlined in the Attorney General's letter, this desire was made known in a formal request on April 29, 1942 sent to the Chairman of the War Production Board (which had meanwhile succeeded the Office of Production Management) by General Campbell. Enclosing a copy of the Attorney General's letter of exactly a year before,[74] General Campbell requested authority to form committees made up of manufacturers holding Army Ordnance contracts. Some important extracts from this letter are presented below.

> It is deemed essential by the Ordnance Department in order to attain the maximum production of certain items of Ordnance supplies and materiel from available facilities, to

---

74. See note 73.

set up under my direction and chairmanship a number of committees to be composed of qualified persons, generally representative of the contractors engaged in the manufacture of such Ordnance supplies and materiel.

The purposes of such committees shall be to provide for the interchange between contractors of information regarding production techniques and processes; to consider and make recommendations with respect to problems of production and supply of materials and components; and to consider and recommend measures for the best integration of the facilities of the several manufacturers so as to attain maximum efficiency in the utilization of such facilities. (.....) Generally, the purpose will be to make commonly available to each manufacturer the benefit of the production experience and techniques of all manufacturers in the group, and so to integrate the facilities of the group as to attain maximum production in the shortest possible time.

The contractors' representatives on the committees will act solely under the direction and supervision of the Ordnance Department and will be limited in their functions to the collection, correlation and analysis of information and to the making of recommendations to the chairman of the committee with respect to action to be taken related to the purposes described above. All decisions and directions that action be taken will be made by the Ordnance Department.

(.....) It is urgently requested that you indicate your approval of the creation and operation of such committees or in the event you deem such action to be necessary, you obtain proper clearance of such activities from the Department of Justice.75/

General Campbell's letter was immediately transmitted to the Attorney General by the General Counsel for the War Production Board, with a covering letter summarizing the desire and intent of the Army Ordnance Department. By return letter the Attorney General granted approval of the proposed action:

I approve the general character of the action and assure you that the policy described in the Attorney General's letter to you of April 29, 1941, will in all respects be applicable

---

75. Ordnance Procurement Instructions 56, Washington: Office of the Chief of Ordnance, 1942, p. 56A1.

> to the information and activities of the proposed committees in accordance with the program described in your letter and the accompanying document.[76]

Statutory Authority for Committees Enacted

The statement by the Attorney General that he gave general approval to the committee concept did not satisfy the prospective industry committee members. The contents of the letter did not appear sufficient, in their minds, to protect a committee member in the event that he was charged with an antitrust law violation as a result of his committee activities. Such protection could only be obtained by the passage of new legislation. This was provided on June 11, 1942, when the Small Business Mobilization Act of 1942 was enacted.[77] In Section 12 of that Act Congress established the basis for the legal protection desired by business:

> Whenever the Chairman of the War Production Board shall, after consultation with the Attorney General, find, and so certify to the Attorney General in writing, that the doing of any act or thing, or the omission to do any act or thing, by one or more persons during the period that this section is in effect, in compliance with any request or approval made by the Chairman in writing, is requisite to the prosecution of the war, such act, thing or omission shall be deemed in the public interest and no prosecution or civil action shall be commenced with reference thereto under the antitrust laws of the United States or the Federal Trade Commission Act.[78]

Pursuant to this authority, Mr. Donald M. Nelson, Chairman of the War Production Board, executed a certificate to the effect that he approved the program of the proposed committees, as originally outlined by General Campbell's letter of April 29. His approval

---

76. Ibid., p. 56A2.

77. P. L. 603, 77th Congress.

78. Ibid., Section 12.

included "committees and members thereof already functioning under this program as well as those hereafter established".[79] Upon receipt of Mr. Nelson's favorable certificate the Attorney General, Mr. Francis Biddle, replied by letter dated September 9, 1942, declaring:

> I acknowledge that the findings and certification were made after consultation with me and that I have approved this program for the purposes of Section 12 of Public Law Number 603.[80]

This exchange of official communications by Mr. Nelson and Mr. Biddle, pursuant to the legislation to which they made reference, provided firm legal assurance for committee members that they could participate in committee activities without becoming subject to prosecution under the antitrust laws for their committee activities. In effect, they were assured that, so long as they complied with the rules and procedures established by the Army Ordnance Department for the functioning of the committees, no prosecution or civil action could be commenced under the Sherman Antitrust Act or the Federal Trade Commission Act for acts or omissions of members of Army Ordnance Industry Integration Committees arising out of and in accordance with the program for such committees.[81]

Industry Continues to Worry about Legality

Despite the sweeping protection inherent in the actions taken

---

79. Ordnance Procurement Instructions 56, paragraph 56.218.1.

80. Ibid., paragraph 56,218.2.

81. Ibid., paragraph 56,218.3.

by Congress, the War Production Board and the Attorney General, points of doubt were raised by various manufacturers. For example, at the meeting of the committee for the Bomb Nose Fuze M110 on October 27, 1942, one manufacturer asked that a policy be established for immediate notification of committee members in the event that the War Production Board should withdraw its finding that the committees were necessary to the prosecution of the war. An extract from the committee minutes will serve to indicate this wariness on the part of industry.

> Mr. Errig: Gentlemen, as we all know this meeting was called to order as set forth in Circular 105 by the Office of the Chief of Ordnance. (.....) Is there any question?
>
> Mr. Ammon: Well, I'd like a definite understanding with WPB that if they should withdraw this -- notify the Attorney General of the withdrawal of this situation that we get notice at the same time. Frankly, I'm scared to death of the Attorney General's Office in regard to any business organization and there's no provision in this but what would prevent them -- him -- notifying the Department of Justice that this committee wasn't functioning and if we go ahead without it there's trouble.
>
> Mr. Wittstein: You admit that you can land in jail, anyway, don't you, Ammon.
>
> Mr. Ammon: That's all right, but I dislike not to do it when I can see it in front of me.82/

This tendency on the part of various industrialists to fear possible prosecution was overcome in some degree by the manner in which each committee was made up. For every committee, both the chairman and the deputy chairman were army officers. A so-called "assistant

---

82. Minutes of Meeting of Bomb Nose Fuze M110 Industry Integration Committee, held at Peco Manufacturing Company, Philadelphia, October 27, 1942, p. 1. On file in Historical Section, Office of the Chief of Ordnance.

chairman" was the highest representative of industry on the committee, and he was appointed by an army officer.[83] The chairman of the committee was fully responsible for its actions, and the committee could act only through its army representatives.[84] That this situation was understood and appreciated by the manufacturers can be noted from the following statements which were made at the meeting of the Bomb Nose Fuze Committee cited above:

> Mr. Atherton: I believe it is the general set-up that if anyone goes to jail it is the Ordnance Officer.
>
> Captain Hoffman: Yes, that's right.
>
> Mr. Atherton: In other words, if you get all the official acts handled by somebody in the Army then they can throw him in jail instead of you. I don't know if it works that way or not but I think that is the intent.
>
> Mr. Ammon: Well, I think the intention is good, but the question is, is somebody going to remember it three years from now?[85]

In actual practice, fears that the activities of the committee members might be such as to lead to prosecution under the antitrust laws were not supported by any cases of alleged violation of those laws by committee members. The committees appear to have functioned smoothly within the framework of regulations and instructions established by the Army Ordnance Department, and when need for their activities was no longer justified by the production situation of their particular item,

---

83. Ordnance Procurement Instructions 56, paragraph 56,104.1.

84. Ibid., paragraph 56,104.2.

85. Minutes of Meeting of Bomb Nose Fuze Committee, op. cit., p. 2.

they were placed in an inactive status. As early as 1943 many committees were being placed on an inactive basis because the production situation with regard to their item was no longer critical. Simultaneously new committees were being formed to expedite the production of other items upon which the spotlight of urgent need had suddenly fallen. The general process for terminating committee activities will be further touched upon in a later chapter.

Chapter 4

The Term "Integration" as Applied to Ordnance Committees

In the previous chapters we have considered some of the economic problems arising in an economy embarked upon large-scale armament production, and have discussed the need for organizing the economy in a manner which conflicts with the antitrust legislation of the nation. We have pointed out the reluctance of business men to organize in ways which might be declared objectionable under the antitrust laws, and have observed the manner in which a special relaxation of the laws, within defined limits, was effected in an effort to foster constructive cooperation among manufacturers. In the present chapter we will scrutinize one device employed to stimulate such cooperation -- the Army Ordnance Industry Integration Committee -- and will indicate its place in the industrial program.

The "Bottleneck" Problem in Mass Production

One of the great weaknesses of the mass production process is the fact that a completed item can only be produced when all of its component parts arrive at the assembly point together, or are on hand there. For lack of any one of thousands or tens of thousands of parts, a complicated machine of war such as a tank or an airplane can remain unfinished in the assembly plant, clogging operations and generally unbalancing the long productive chain that has brought it that close to completion. It is the case of the biblical Lost Sheep -- the one

part that is lacking becomes the center of all attention and emphasis. Finding a way to provide the missing part means finding a way to release a flood of production that is otherwise frozen.

This problem was recognized by one observing economist as having serious effects on munitions production during World War I. Writing of the situation, Dr. Harvey A. DeWeerd declares:

> (.....) this lack of balance and control seemed the principal reason for limited production. Tremendous production was achieved on components easy to produce; limited production was reached on the more difficult components; and the total of complete units depended on the component produced by the smallest number. Thus artillery units were generally restricted in the output of carriages and recuperators;[86] shell production, particularly in the high explosive types, was limited by the small production of boosters;[87] The military effectiveness of the machine gun program was limited by the small production of tripods.[88]

It was primarily to improve the over-all total of production by a better distribution of the amounts of component parts produced that led the Army Ordnance Department to organize industry integration committees. One early official answer to the question, "Why integrate?" read as follows:

> Integration of an industry balances the production, with the result that the desired production is obtained with a minimum facility requirement. The skill and knowledge of the large manufacturer is made available to the newcomer or the small manufacturer bringing him into full production in the shortest possible time. There is made available to the Ordnance Department on short notice complete information as to the productive capacity of the industry, its inventory of parts and material, and there is made possible rapid changes in production rates

---

86. "Recuperators" are part of the recoil system of an artillery piece, causing the piece to return to battery or "recuperate".

87. "Boosters" are small charges of explosive more sensitive than the main charge which are employed to set off the main charge.

88. Harvey A. DeWeerd, Production Lag in the American Ordnance Program, 1917-18, PhD dissertation, University of Michigan, c1936, p. 256.

to meet the requirements of the using services.[89]

A Limiting Definition of "Industry"

It will be seen from the above citation that the term "industry" is used in a narrow and restricted sense, referring only to manufacturers producing a single item, or a very small group of closely related items. The entire Ordnance industry integration committee program was based upon this concept of industry, and in no case did an integration committee attempt do deal with the problems of the "ammunition industry" or the "artillery industry" in the broad sense which the word ordinarily connotes. Industry integration committees were formed on this basis from the very first, as exemplified by the organization of the Mechanical Time Fuze Committee on April 29, 1942. This committee, the forerunner of all others, was comprised of seven manufacturers holding prime contracts for the production of this particular artillery fuze.[90] These manufacturing concerns were in no case primarily engaged in the manufacture of artillery fuzes as a normal pursuit, and in almost every instance produced a variety of other products. Their participation in a committee which was limited to consideration of problems related to a single item greatly restricted the significance of that committee's activities insofar as the general policies and operations of the contracting corporations were

---

89. Ordnance Fiscal Circular No. 105, Washington: Office of the Chief of Ordnance, 22 August 1942, p. 1.

90. Eclipse Machine Division of Bendix Corp., Frankford Arsenal, Eastman Kodak Co., Elgin Watch Co., National Cash Register Co., Borg Products Company (of Delavan, Wisconsin). See: H. P. Dawson, Project Supporting Paper No. 14, November, 1945, Mss. in Historical Section, Office of the Chief of Ordnance, p. 14.

concerned. Committee participation on such a basis would tend to focus attention closely on a narrow portion of their productive output, but would in no way concern large segments of their operations. This narrowing of the field of integration committees was deliberate. The regulation governing the appointment of the assistant chairman of a committee (who was the ranking industrial member of it) specifically stated that "the assistant chairman must have production experience with the item to be integrated by the committee".91/ Thus the appointing authority was required to select for the ranking civilian spot on the committee a man who had particular knowledge of a specific item, though he also probably would occupy a fairly important production position in the general activities of his corporation. Such individuals were caused to focus their attention on relatively restricted fields by the committee device, and by this very fact the committees were less open to suspicion as possible abuses of the intent of the antitrust policies of the government.

How Production is Increased by Integration

Bearing in mind that by "industry" we mean only manufacturers engaged in producing a particular item, and that the item may actually be produced in a small portion of the plant of some large manufacturer who was turning out a variety of other civilian and military items, let us see how the integration of industry could be made to result in greater production than we could achieve without it.

---

91. Ordnance Procurement Instructions 56, paragraph 56,104.1.

Let us assume that our "industry" consists of three companies which are all manufacturing a particular finished item which is an assembly of four different parts. We can indicate the daily production capacities of these three producers in tabular form as follows:

Manufacturer	Part 1	Part 2	Part 3	Part 4
Company A	20*	40	26	32
Company B	55	50*	54	60
Company C	37	26*	40	35

From these capacity figures it can readily be seen that in his production of completed items, Company A is limited to a daily total of 20, as he can only turn out 20 of Part 1 each day. Similarly, daily production of finished items by Company B is limited to 50, for he makes only 50 of Part 2, while daily production of Company C is limited to 26, as that is all of Part 2 that the company can produce. The total production of the three manufacturers is the sum of the limiting total of each, or 96 completed items, and each has excess parts which cannot be assembled into finished items because something is lacking for the complete assembly.

If we now consider these three companies as a combined operation, and ship parts that are excess at one plant to another that is experiencing a shortage of that part, we get the following result:

	Part 1	Part 2	Part 3	Part 4
	20	40	26	32
	55	50	54	60
	37	26	40	35
Total Parts	112	116	120	127

Considering the component parts production on a combined basis, we are

now able to turn out a total of 112 completed assemblies each day, as that is our limiting total. Thus without any increase in plant capacity, and with no modifications of any of the production lines, we are able to increase our finished item production by some sixteen percent.92/

Other Typical Improvements through Integration

Such obvious gains from integration as the exchange of parts are only the beginning. Pooled knowledge of materials supplies on hand, improvements in production processes, and technical advice and assistance with specific operating problems were also highly effective methods of increasing production without direct plant expansion, and all were included in the concept of integration. The Remington Arms Company, in reporting on its contribution to the war effort, states that "technical information on all Remington processes, developments, engineering work, designs etc. was made freely available to the Government and all members of the industry".93/

In the case of Remington, one of the old-line manufacturers of small arms ammunition, this meant giving to its traditional competitors, such as the Western Cartridge Company and the Federal Cartridge Company, information which would normally be considered in the category of trade secrets. Further, it meant exposing to new contractors

---

92. The above discussion is primarily based on material in Campbell's Industry-Ordnance Team, op. cit., p. 127.

93. In Abundance and On Time, 1939-1943, Bridgeport: The Remington Arms Company, Inc., 1944, p. 29.

in the small arms ammunition field, such as the Kelly Springfield Tire Company, the entire range of operating knowhow that had been acquired through years of normal operation. The dangers, from the peacetime competitive point of view, of introducing rich and energetic corporations to new fields of production are readily apparent. However, the type of cooperation resulting from committee functioning was such that not only were technical and engineering assistance freely exchanged, but actual training of employees for other producers in the field was undertaken by the more experienced manufacturers on a large scale. For example the Remington Arms Corporation, at government request, trained approximately a thousand supervisory employees for other contractors.94/

The industry integration committee program, from its earliest beginnings, envisioned a very unselfish attitude on the part of manufacturers toward the divulging of their knowhow and trade secrets. The exchange of information as to methods, including specific production operations, technical specifications, and similar basic production matters, was expected of all members, and the older and more experienced producers were particularly responsible for making known to the newcomers in the industry whatever they could that would be of value.

In the case of such basic information as patents, there was no question of the existence of coercive power to assure their use in the national war effort.

> Ever since 1918 the United States Government has had the right to use, or have used for it, any patented invention -- the

---

94. Ibid., p. 27.

> patentee's sole remedy being to sue for reasonable compensation in the Court of Claims.[95]

This granting of the right to use patents was, in practice, often done gracefully. In the case of the Remington Arms Company, the leading small arms ammunition producer both in peacetime and in war, the company "licensed the Government and all manufacturers designated by the Government, without charge, under all Remington patents and know-how".[96]

Not all committee members were enthusiastic about this ready exchange of knowhow in the early days of the committees. The assistant chairman of the M5 Director Committee, in his brief history of that committee, states:

> There was some reluctance on the part of one or two industry representatives to cooperate fully and to freely divulge their methods of manufacture. This gradually disappeared and by the latter part of 1942 the industry representatives seemingly felt free to give and request information from others.[97]

It is highly probable that the willingness of the old and experienced firms to divulge information to the new contractors setting up in their field varied considerably according to the type of experience which the newcomer brought with him. When the Quaker Oats Corporation became operating contractor for a bomb-loading plant, or when the Coca Cola Corporation did likewise for a propellant powder-bag loading

---

95. Roger S. Hoar, "Patents and National Defense", Army Ordnance, September-October 1946, pp. 161-162

96. In Abundance and On Time, op. cit., p. 29.

97. W. A. Davidson, History of the M5 Director Industry Integration Committee, Mss. in Historical Section, Office of the Chief of Ordnance, c1945, p. 4.

plant, it is unlikely that their entry into a new and highly different field of industrial activity was viewed as a likely menace to peacetime competition. Yet when major industrial concerns such as Chrysler, already most familiar with metal fabrication, or United States Rubber Company, which had already manifested an interest in fields outside that of rubber, are given substantial contracts for the production of small arms ammunition, it would be reasonable to suspect some reluctance on the part of the oldtimers in giving up the secrets which they had acquired through the years. However, no evidence of this reluctance has been found in the histories of the committees.

From the experience with industry integration committees in World War II, it appears that almost from the first the industry members embraced the committee idea willingly and in good faith. Though there was doubtless some holding back and distrust, the general effect was one of sincere cooperation toward the end of greater total production. As one manufacturer-member put it:

> In the final analysis, as this was an opportunity for the old manufacturers to get together and discuss their problems, it was also an excellent means for the new manufacturers to get an overall view of the various groups of old manufacturers and their problems, thereby avoiding the necessity of working out problems which previously had caused delays due to time required for development work.[98]

---

98. W. E. Paris, Operating Manager in Charge of Manufacturing, Willys-Overland Motors, Inc., to Brigadier General R. E. Hardy, Office of the Chief of Ordnance, July 9, 1945. Letter on file in Historical Section, Office of the Chief of Ordnance.

Chapter 5

The Formation of Integration Committees

The preceding chapter described the industry integration committee as a device for increasing armament production without expanding plant facilities. The present chapter will discuss some of the background and development of the committee idea, and will describe the main features of committee organization and operation.

As we have indicated previously, the first integration committee to come into formal existence was that for the Mechanical Time Fuze M43. By April 1942 it had become apparent that the requirements for this fuze, which was designed for use on almost all antiaircraft artillery projectiles, were so great that some very effective means of quickly increasing production must be found. General Campbell[99] assigned a civilian expert on fuze production the task of visiting the seven manufacturers holding fuze contracts "to find out if integration was a practical solution of our problems".[100] This expert carried a letter of introduction which stated that his mission was "to secure a better coordination as between various manufacturers of the army mechanical

---

99. In reminiscing about the origin of the integration committee idea during a discussion with the writer in May, 1953, General Campbell said that one morning in April, 1942, he was worrying about the mechanical time fuze problem while shaving. He suddenly asked himself: Why not treat the different manufacturers as if they were all plants under the same head, and shift tools, skills, materials and parts accordingly?

100. Campbell, Industry-Ordnance Team, op. cit., p. 122.

time fuze and to assist them in any way possible in increasing their production".[101]

Calling the First Meeting of an Integration Committee

The report made by the expert as a result of his tour endorsed the idea of integration as a practical means of increasing fuze production. Accordingly, on April 27, 1942, General Campbell wrote to the seven fuze manufacturers as follows:

> With respect to your contract for mechanical time fuzes and contracts for parts or components thereof with other suppliers to the government of mechanical time fuzes, it is desired to increase the overall production of such fuzes without the necessity of increasing the number of manufacturers of fuzes with consequent increase in preparatory costs to the United States, and, of even greater importance, time.
>
> For this reason, acting under full and proper authority, the Ordnance Department desires that your company appoint suitable representatives to a committee, of which I will be chairman, to meet initially at Elmira, New York, at 9:30 a.m., April 29, 1942. The purpose of this committee will be to collect and analyze information and make recommendations in order to integrate all manufacturers of such fuzes and all suppliers of parts and components of such fuzes into an industry for the greater output of fuzes and for a decreased cost to the United States.
>
> (.....) In the integration of the mechanical time fuze industry, parts, material, engineering information, production information, tools, equipment, and, in fact, all elements -- both material and personnel -- will be placed by the chairman of the committee at the disposition of any and all manufacturers in the mechanical time fuze industry without let or hindrance.[102]

Here the major intent of the committees -- to get more production out of the facilities and means already in existence -- is clearly

---

101. Ibid. The expert was Mr. Roy T. Hurley of the Eclipse Machine Division, Bendix Corporation.

102. Ibid., p. 123.

expressed. That in getting more by integration the rates of production must necessarily increase, and that the ultimate result of integration would be a cheaper unit cost, were also stressed. To calm, as much as possible, any fears that might arise in the minds of manufacturers about the possible legal aspects of their proposed cooperation, it was declared that necessary authority for encouraging such cooperation was in existence. As a matter of fact, that authority was officially requested by a letter dated on the day the first integration committee meeting was held -- April 29, 1942.[103] The committee actually was organized and functioning effectively long before any final legal protection of its members was passed.

Formally organized on April 29, the committee met the next day to discuss collective capacities and inventory positions on the 102 component parts of the fuze.[104] Such information was the basic data of integration, and without it nothing could be accomplished. At this first meeting General Campbell acted as chairman, and the members of the committee who came as representatives of their companies were "executives with power to make decisions and manufacturing personnel connected with fuzes".[105] It was intended to be a down-to-earth meeting where practical remedies for production problems could be offered, and the contractors could commit themselves to action. They had been told what type of information to bring with them:

---

103. See citation No. 75, this study.

104. Dawson, Project Supporting Paper No. 14, op. cit., p. 14.

105. Telegram from Industrial Service, Office of the Chief of Ordnance, dated April 21, 1942, to all M43 fuze contractors, reference symbols: SPOIP, TT 93940. On file in Historical Section, Office of the Chief of Ordnance.

> It is requested that a tabulation be prepared and presented at the meeting giving present and projected daily output of each individual fuze part. The primary purpose of the meeting is to put all manufacturers into early assembly by an integration of the industry through a proper interchange of parts and realignment of individual part manufacturing capacities both of prime contractors and suppliers of parts. Please prepare and present tabulation showing numbers of finished parts on hand, raw materials in stock and on order with delivery schedules, list of subcontractors supplying parts with quantities, capacities and schedules.106/

This first industry integration committee meeting was unique in that it was chairmanned by General Campbell, the main force behind the integration committee idea. Within 31 days he was to become the Chief of Army Ordnance, and though his interest in the committees would be enthusiastically maintained, his more demanding position would make such a direct relationship with them impossible. In any event, it is probable that this sort of personal participation by top Ordnance military personnel was only need to get the committee idea into being.

The Small Arms Manufacturers' Production Committees

Some ten weeks after the first meeting, when another committee of the same general type was formed, a fairly definite organizational concept existed. In July 1942 it was proposed that a "small arms manufacturers' production committee" would be formed "to integrate the facilities of the industry in such manner as to attain maximum production in the shortest possible time".107/

---

106. Ibid.

107. Small Arms Ammunition, A History, op. cit., II, 300.

At the organizational meeting of this committee in New York City on July 14, 1942, a fairly detailed description of the organization and its purposes was circulated. According to this document:

> The membership of this committee shall consist of two Ordnance officers to serve as chairman and deputy chairman and one or more representatives from each facility of the particular industry for which the committee is formed. The representatives shall have authority to make decisions for their respective companies. Each facility representative may have as many advisers with him at each meeting as is necessary. The principal representative of the industry will be the Assistant Chairman.[108]

The proposed committee was to function in support of the small arms ammunition production effort, which was a responsibility of the Small Arms Branch, Industrial Service, Office of the Chief of Ordnance. The Chief of the Small Arms Branch was, ex officio, the chairman of the committee, and had the power to appoint the deputy chairman (who must also be an army officer) and the assistant chairman. In addition to this appointing power the chairman was charged with establishing the policies of the committee, coordinating the activities of the committee and its sub-committees, coordinating the Army Ordnance Department's production requirements with the industry's production, and representing the Chief of Ordnance as the Ordnance Department in accepting or rejecting the recommendations of the committee. The deputy chairman was given the power to act with the authority of the chairman in his absence.[109]

Functions of the Sub-Committees

Within the committee, five sub-committees were to function: a Machine Tool Sub-Committee, a Raw Materials Sub-Committee, a General

---

108. Ibid., I, P. 384.

109. Material for this paragraph, and for the following section on functions of sub-committees, was taken primarily from Small Arms Am-

Planning and Scheduling Sub-Committee, an Inspection Sub-Committee, and a Production Engineering Sub-Committee. The scope of intended action of the committee can perhaps best be understood by examining the responsibilities of the chairmen of the sub-committees. It was within the five main functional groupings which these sub-committees represented that direct contact with the problems that affected production would be made. The attainments of these groupings, or of comparable and similar groupings in later committees, were the heart of committee activities. Because of their significance, the duties of the sub-committee chairmen will be enumerated in full.

Machine Tool Sub-Committee

Coordinate and standardize machine tool requirements of the industry with particular assistance to new facilities.

Act in an advisory capacity to all facilities on the procurement of machine tools, jigs and fixtures.

Exchange data concerning machine tool shortages and excesses with special study of the advantages to be gained from shifting (subject to Government approval) excess machine tools from plant to plant.

Investigate the machine tool requirements of the industry for the purpose of substituting available machinery for the desired critical tools.

Coordinate the collective tool room capacity with the industry's current needs.

Standardize cutters wherever possible to facilitate their procurement through combination of the industry's orders. Coordinate the exchange of like cutters in cases of emergency.

Raw Materials Sub-Committee

Standardize the raw material requirements of the industry.

---

munition, A History, op. cit., I, 385-388

Prepare a standardized list of raw material stocks and designate which stocks, and in what quantity, they should be maintained in Metals Reserve Company Warehouse.

Act as consultant to all facilities in matters regarding availability of raw materials.

Initiate requests for any changes that may be necessary or desirable in raw materials specifications.

Exchange data on the raw material stocks of the individual facilities.

Production Engineering Sub-Committee

Maintain active contact with all producers and act as a clearing house for distributing data on manufacturing processes.

Coordinate the individual facilities' drawing and design revision requests so that a consolidated industry request can be presented for approval.

Act to coordinate and standardize manufacturing processes in cooperation with the Machine Tools and Raw Materials Sub-Committees.

Coordinate the solution of problems involving manufacturing processes so as to utilize the engineering ability of the entire industry.

Review proposed design changes to determine the extent of disruption which would be caused by the adoption of a new design.

General Planning and Scheduling Sub-Committee

Coordinate the industry's production with the production requirements of the Ordnance Department.

Contact all producers; study production planning methods; initiate program for improvement and standardization of production planning methods in cooperation with the Small Arms Branch.

Exchange data on sub-contractors.

Inspection Sub-Committee

Coordinate inspection policies of all facilities to achieve interchangeability.

In cooperation with Ordnance inspection, standardize inspection methods to apply to all facilities.

Prior Experience with Perishable Tool Committee

The above listing of the responsibilities of sub-committee chairmen indicates the degree to which the integration concept had been rounded out in the brief period since the formation of the first committee. In ten weeks the experience was sufficient for the formulation of a detailed program that with minor revisions could be applied to almost any munitions item. In addition to the experience gained from the M43 Mechanical Time Fuze Committee, the organizers of the Small Arms Manufacturers' Production Committee had had considerable prior experience with a committee of small arms ammunition manufacturers known as the Small Arms Perishable Tool Committee. This committee, which grew out of the necessity for coordination of the machine tool requirements for the new facilities which were being built, had been organized in October, 1941. The committee, which included representatives of the Federal Cartridge Company, United States Rubber Company, Remington Arms Company, and Western Cartridge Company, was headed by Mr. George J. Heubner of the Office of Production Management, and worked in cooperation with the Army Ordnance Department.[110] According to the minutes of its first meeting, this committee was formed

> to augment the individual efforts of the prime contractors and to coordinate such activities where advisable, in order to expedite production of cartridges. The Tool Committee will act also as a clearing house for the collection and dissemination of information concerning tool procurement.[111]

---

110. Ibid., I, 353-354.

111. Ibid., I, 354.

The Perishable Tool Committee served with considerable success until April, 1942, when it was replaced by an organization of somewhat broader purpose and scope, the Small Arms Ammunition Committee. This committee was to consist of a representative from each of the prime contractors engaged in the manufacture of small arms ammunition, and was to have a full-time executive head with the title of Manager. It was mandatory that an officer of the Army Ordnance Department be present at all meetings, and it was provided that "the officer will promulgate all recommendations, and reports of the committee shall be issued only with his approval".[112] The functions and duties of the Committee were

> to analyze and tabulate information and data, other than that concerning prices, to issue reports thereon to prime contractors covering experience in the procurement and utilization of tools, and to request from the member companies supplementary information where necessary.[113]

The committee could take no action binding on any of its members, but must rely upon recommendations made to the Ordnance Department to be accepted and acted upon with the backing of governmental authority.

> It is understood that the Committee will act only in an advisory capacity and will not be empowered to place orders, to issue directives to individual companies, or to commit any definite executive acts which will have any bearing on the performance by the prime contractors of their responsibilities under their government contracts, as these prime contractors must have freedom of operation in order to comply with the requirements under these contracts.[114]

---

112. Ibid., I, 368.

113. Ibid.

114. Ibid.

Springing as it did from the Small Arms Perishable Tool Committee and the Small Arms Ammunition Committee, it is understandable that the Small Arms Manufacturers' Production Committee could be brought into being with fairly detailed outlining of purposes, organization and responsibilities. It is also understandable that with the knowledge gained from the observed function of the M43 Mechanical Time Fuze Committee the scope of activities of the new committee would be shaped more toward the broad integration committee concept, and would extend far beyond a sole interest in the tool situation.

In the formation of all of the early committees, it was to be expected that emphasis should at first be on the expediting of tools, distribution of available equipment and materials to maximize production while bringing new producers into operation, and training of skeleton cadres for new producers by the old. However, as soon as all producers were operating, emphasis would be expected to shift to production engineering, inspection methods, and planning and scheduling improvements as means of increasing production without further expansion of facilities. This is, in general, what happened.

Publication of Basic Integration Committee Instructions

By August 1942 the industry integration committee had taken sufficient shape for it to be fully described in pamphlet form. This publication described the formation and objectives of integration committees, and gave instructions for their organization and operation. The pamphlet was transmitted by a letter signed by General Campbell, the Chief of Ordnance, who declared:

"There will be no deviations from the basic principles expressed in the attached pamphlet."[115] This publication immediately became the "bible" for all committees, and continued in that status until the publishing on December 1, 1942, of Ordnance Procurement Instructions 56.

The issuance of "OPI 56", as it was known to those who had occasion to deal with committees, provided a detailed body of printed regulations covering all aspects of industry integration committee organization and operation. It was an embodiment and summation of experience with the committees up to that time, and included all of the substance of Ordnance Fiscal Circular No. 105. In addition it added body and detail to the previous concepts and ideas of integration.

The new instructions strove to finally nullify the fears of some manufacturers of prosecution under the antitrust laws by reprinting in full the Ordnance Department's request for approval of the committee idea as made to the War Production Board, and the Attorney General's letter to the War Production Board granting that approval.[116] It also cited Public Law No. 603, and reprinted the certificate of the Chairman of the War Production Board made pursuant to that law, together with the Attorney General's acknowledgement of the certificate.[117] Taken altogether, the documentation indicated an impressive degree of protection for manufacturers who served as committee members.

To further bulwark the position of the industry members, and to clarify the status of the Ordnance officers who headed the committees,

---

115. Ordnance Fiscal Circular No. 105, op. cit., transmittal letter.

116. See citations 75 and 76, this study.

117. See citations 77, 78, 79 and 80, this study.

responsibility for action was clearly spelled out.

> The responsibility for the committee's actions lies with the chairman who is the chief of the branch (of the Office of the Chief of Ordnance). He is fully responsible for the committees actions. The Committee, however, is limited as outlined by the Attorney General's letter of May 1, 1942.[118] The committee has no authority to commit the Ordnance Department. It can collect and correlate information and can make recommendations. The Ordnance Officer attached to the committee and working with the assistant chairman will receive such recommendations and will order the recommendations carried out as an order from the Ordnance Department.[119]

With the publication of Ordnance Procurement Instructions 56, the existence of industry integration committees was properly formalized, and a basis for examining the different committees as organizations operating on a similar pattern was established. Though changes in Ordnance Procurement Instructions 56 were to be made in May and October of 1943, the general provisions remained fixed for the duration of committee activities. Within the framework of these provisions the committees developed according to a variety of influences which included: the nature of the production schedules for the item being integrated, the personality of the military chairman and deputy chairman and their interest in the particular committee, and perhaps most important, the ability and personality of the civilian assistant chairman and his interest in the committee.

Reasons for Variation in Committee Performance

With regard to the production schedules of a particular industry, it must be realized that the committee had no part in the determination

---

118. See citation 76, this study.

119. Ordnance Procurement Instructions 56, op. cit., paragraph 56,104.2.

of actual requirements. An effort was made by the Army Ordnance Department to schedule production for as far ahead as possible, but attempts at forecasting requirements led very frequently to situations where production rates were built up toward projected peaks only to be suddenly reduced by sharp cutbacks. These changes in production schedules, which were actually reflections of changes in the Army Supply Program upon which all requirements were based, could of course undercut without warning the very basis upon which the committee had been formed. If production of an item was no longer considered critical, the committee had little reason for existence.

It was also possible for a committee to "work itself out of a job", and where that situation occurred the committee was placed in an inactive status.

> Integration, as such, is not necessarily a continuous process. For example, the standardization of materials or parts, the establishment of uniform bills of materials, the integration of manufacturing equipment for the attainment of maximum production therefrom, etc., are all activities which, when once effected, may require no further attention from the Committee. (.....) When the need for further active operations of a Committee ceases, the Branch Chief (committee chairman) will notify all interested parties to that effect and include in such notification appropriate instructions relative to the disposition of books and records of the Ordnance Department Representative on the Committee and any Government Property utilized by such representative or the Committee. Thereafter the Committee will be considered in an "inactive status".120/

An inactive committee was considered in a state of suspension of activities, but was not to be disbanded. It was recognized that a requirement which had suddenly been reduced might more suddenly still be re-

---

120. Ibid., paragraph 56,210.4.

established at greater levels than ever, and the committee would again be needed. "Prospective changes from time to time in the Army Supply Program make it highly desirable that the condition of a suspended Committee on 'inactive status' be such that the Committee may be reactivated with the utmost expedition."121/

A second major influence in the manner in which particular committees developed was the attitude of the military chairman, who by regulation was also in every case the head of an operating branch of the Industrial Service, Office of the Chief of Ordnance. For example, Brigadier General R. E. Hardy, who was Chief of the Ammunition Branch of the Industrial Service, was also ex officio the chairman of some 75 industry integration committees organized to increase the production of ammunition items. It is understandable that these branch chiefs would not, in addition to numerous other weighty responsibilities, be able to keep close contact with the integration committees of which they were the responsible chairmen. In certain cases, notably that of the M43 Mechanical Time Fuze Committee, there was for a time close contact maintained by the chairman. Headed as it was by General Campbell, and standing as the first example of integration, this committee received great attention from the highest levels within the Ordnance Department. However, this was not the usual case, and as experience with the committees increased the connection of the chairman with them became increasingly remote.

The deputy chairman, too, was in many cases not close to committee

---

121. Ibid., paragraph 56,211.1.

operation, activities or management. Under the regulations,[122] the chairman could delegate all or part of his authority "to a Deputy Chairman within the Branch or to the Chief of the Ordnance District in which a Committee has its headquarters in any case in which the Chairman, in his discretion, deems such action to be desirable."

A typical example of how authority was exercised in practice is in the operation of the Heavy Tank Gun Committee. This committee was organized at the Oldsmobile Division of General Motors Corporation in Lansing, Michigan on October 8, 1942. At the first meeting one of the important speakers was an officer from the Office of the Chief of Ordnance who had served as an organizer for many of the artillery committees. His remarks are quite revealing.

> This meeting has been called in order to integrate the facilities of manufacturers of heavy tank guns -- that is, the 75mm and 3 inch tank guns. It is General Campbell's belief that integration of this type can best be accomplished by permitting industry to do the job, and so he decided that these committees should be formed with an Ordnance Officer as chairman in order to protect the members of the committee from possible legal action under the antitrust laws.
>
> The purpose of the committee is to permit the interchange of engineering information, to permit the proper utilization of machine tools, and also the exchange of raw materials whenever necessary. The organization of the committee will be as follows: there is a chairman who is the Chief of the Branch in the Office of the Chief of Ordnance concerned with procurement of the items to be covered by the committee. In this case, it will be General Wells. Then there is a deputy chairman who is also an Ordnance officer appointed by General Wells to handle such of the committee work as requires attention in the Office of the Chief of Ordnance. The deputy chairman will be Colonel Martin, the Chief of the Cannon and Aircraft Armament Section. Then there is an assistant chairman selected from industry by the

---

122. Ibid., paragraph 56,211.1.

> chairman, and in this case the assistant chairman will be Mr. Wolfram. (Mr. J. F. Wolfram, Oldsmobile Division, General Motors Corporation.) The assistant chairman really supervises and directs the work of the committee. (Underlining added.) Assigned to the committee on a fulltime basis will be an Ordnance Officer, Lieutenant Norvig, who will have his quarters in Lansing where the headquarters of the committee will be and who will devote his entire time to the committee's work. He will be the man who will put the committee recommendations into effect.123/

From this frank statement it is readily seen that the purpose of the assistant chairman was to run the committee, while the functions of the military chairman and deputy chairman were to hold responsibility for committee action. In practice the assistant chairman ran the committee almost single-handed, though at certain critical meetings the deputy chairman might be present. The committees were recognized as being useful in time of cutbacks as well as when production was expanding. In referring to such a declining situation, the same speaker declared: "We feel that in cases where requirements call for a decrease in production, the committee's recommendations will provide a fair basis for assigning the lowered production rates to the different facilities."124/ Such a situation arose in the operation of the Heavy Tank Gun Committee within a month after its formation. On November 10, 1942, the committee was assembled at the Detroit Ordnance District at the request of the Office of the Chief of Ordnance. The deputy chairman, Colonel Martin, presided, and announced reductions in production schedules which in effect eliminated

---

123. Historical Record, Heavy Tank Gun Integration Committee, Mss. dated 16 April 1945, p. 3. On file in Historical Section, Office of the Chief of Ordnance.

124. Ibid., p. 4.

some of the producers entirely, and greatly curtailed the output of others.[125]

Significance of the Assistant Chairman's Position

Though the deputy chairman might attend important meetings, as mentioned above, the general situation was for the assistant chairman to carry on the committee activities almost entirely as he saw fit. In commenting on the role of the assistant chairman, one observer stated: "Aside from an occasional meeting of the committee members, the function of the whole committee resolves itself down to the activity of the assistant chairman himself, independent of committee action."[126]

As was previously noted, the assistant chairman was appointed from industry by the chairman, who was also the chief of the branch of the Office of the Chief of Ordnance with which all of the manufacturers had contracts for that particular item. In two places Ordnance Procurement Instructions offer guidance as to the type of individual whose appointment is considered proper. He was to be "a broad-gauged man with initiative and drive. No other type of man will be appointed".[127] In addition,

> Members of Industry Integration Committees are and should be the most capable production executives dealing with the Ordnance Department's work performed by the firm which the Committee member represents. The Assistant Chairman, in particular,

---

125. Minutes of Heavy Tank Gun Industry Integration Committee Meeting, Detroit Ordnance District, November 10, 1942, p. 1. Typed copy on file in Ordnance Historical Section, Office, Chief of Ordnance.

126. Historical Record, Heavy Tank Gun Committee, op. cit., p. 25.

127. Ordnance Procurement Instructions 56, paragraph 56,104.1.

> should be an outstanding man in the industry manufacturing the end item for which the Committee is formed.[128]

The assistant chairman, appointed by the pertinent branch chief of the Office of the Chief of Ordnance, was clearly in the position of possessing considerable authority without responsibility. He functioned at the critical point with regard to the allocation of production schedules, and also with regard to the exchange of parts, materials, tools and machines.

> The committee members furnish the assistant chairman with a list of facilities; the rate of production, actual and projected; and an inventory of material on hand, on order and promised delivery. The assistant chairman and the Ordnance Officer attached to the committee compile the production data. By comparing this data to the requirements of the Ordnance Department, a production schedule can be made and, at this time, production capacity, material and facilities commitments beyond the requirements of the Ordnance Department should be released for use on other items. By including the capacity of available sub-contractors, it will be possible to allot sub-contracting capacity to the prime contractors, making possible a further release of facilities for other uses.[129]

Obviously, the assistant chairman who desired to do so was strategically located with regard to giving special treatment to his own company, or to other companies toward which he might feel a special interest. Though referral of such considerations as schedule changes to the committee was expected, the supporting data for such presentations was prepared under the direction of the assistant chairman, and would doubtless offer opportunities for bias in some desired direction if any propensity for such action existed. With regard to actual exchanges

---

128. Ibid., paragraph 56,212.1.

129. Ibid., paragraph 56,105.1.

of various items in the interest of production, Ordnance Procurement Instructions stated that "the Committee recommends via the assistant chairman the interchange of parts, material, skill, tools, machines etc."[130] Here again, if an assistant chairman were so minded, was a ready opportunity to help his own or favored companies.

The extent to which the position of assistant chairman, with its unusual opportunities, may have been abused is uncertain. No specific case can be cited which will furnish an example of abuse in this area, but in at least one instance it was mentioned as a source of uncertainty in the minds of members.

> The assistant chairman appointed from one of the facilities assumes a position in the eyes of the other manufacturers in the group in which he personifies the company by whom he is employed. His decisions, therefore, are likely to be interpreted by other manufacturers as favoring his own employer.[131]

The same commenter went on to state that

> The assistant chairman must rely on the information volunteered by representatives of the different manufacturers making up the committee. It is doubtful that all manufacturers represented on the committee were always willing to give the full facts concerning any given situation to an employee of another manufacturer.[132]

Role of the Ordnance Representative

Aiding the assistant chairman was the Ordnance Representative on the committee, an officer especially designated to handle committee matters. This officer possessed the necessary authority to put recommend-

---

130. Ibid., paragraph 56,105.2.

131. Historical Record, Heavy Tank Gun Committee, op. cit., p. 24.

132. Ibid.

ations of the committee chairman into effect in most instances.

> Subject to such limitations and restrictions as may be imposed by the appropriate Branch Chief, the Ordnance Representative on a Committee, in connection with Committee matters, is authorized to issue instructions and directions by order of the Chief of Ordnance and for the Chief of Ordnance.[133]

Though specifically forbidden to refer to himself as the "Officer in Charge" or any similar designation,[134] this officer, working closely with the committee chairman and at the center of concentration of information on committee activities, was in a position to greatly influence the work of the committee. As the Ordnance officer in closest contact with the committee his view of the activities, and opinion of them, could do much to shape them in one direction or another.

The selection of the Ordnance Representatives was a considerable problem, as the type of officer required was not that which the usual military background would produce. The nature of the position demanded an ability to work closely with civilians employed by private industry, and military contacts were reduced to a minimum. The representative usually had his office in the same location as that of the assistant chairman, which was normally at a plant producing the item being integrated. Reserve army officers with industrial experience were selected where possible, and many had very little previous military experience or training before being called to their positions on the committee. Regulations stated that they should be "experienced in military procedure",[135] but at the time when most committees were

---

133. Ordnance Procurement Instructions 56, op. cit., paragraph 56,211.2.

134. Ibid.

135. Ibid., paragraph 56,104.1.

formed -- the latter half of 1942 -- officers with that qualification were rare, and in great demand in many places.

It can be said of the entire group of such officers that they were engaged in an unique type of activity, without clear precedent, and that on the whole they served very effectively. They occupied a rather delicate position, in that they possessed authority to implement many of the recommendations of the committee. Engaged as they were in a field of activity which was new and without written records or history, with very little guidance of any kind available, they knew at the same time that they were responsible for assisting the committees to function, rather than obstruct activities in any way. Particularly at first they had little upon which they could base their judgments of committee recommendations, yet they knew that whenever they delayed a decision in the hope of getting more knowledge upon which to base it, they might be seriously delaying the very production which it was their business to expedite.

The Regular Industry Members

In addition to the positions described above, there were the regular members of the committees. These, too, were of a select type, supposedly being "the most capable production executives dealing with the Ordnance Department's work performed by the firm which the Committee member represents".[136] These representatives of the contractor "should be qualified and authorized to act for and on behalf of their respective principals in all matters pertaining to Committee activity".[137]

---

136. Ibid., paragraph 56,212.1.

137. Ibid.

These members representing prime contractors would necessarily be key people in the contractor's organization or they would not be able to speak with authority. However, the key people selected for service as committee members were supposed to come only from the manufacturing end of the business, for the instructions provided that "each member should be a production man and not a salesman."[138]

Recognizing that the quality of personnel making up the committees was such that their time should not be wasted, an effort was made to avoid unnecessary demands on that time.

> The time and ability of all contractor's representatives on Committees is of the greatest value to the Ordnance Department when they are working in their own plants, offices and shops. Unnecessary meeting must be discouraged. The bulk of a Committee's business can be handled by telephone and letter.[139]

In actual practice, committees met more frequently in their early days than later on. One aspect of integration was that it became more effective with experience, and once all producers were operating the necessity for many of the activities of the committee ended. The remaining activities, particularly if production schedules were neither sharply increased nor sharply cut back, became routine exchanges of information in the sense of reporting parts and materials on hand, short or excess tools, suggested improvements in production processes, data on specifications or inspection standards, and comparable matters.

---

138. Ibid., paragraph 56,104.1.

139. Ibid., paragraph 56,212.1.

SECTION II

INDUSTRY INTEGRATION COMMITTEES IN OPERATION

Chapter 6

Improvement in the Utilization of Resources

The preceding five chapters were devoted to showing why and how Ordnance industry integration committees were brought into existence. With the time element highly critical, and with peacetime economic processes unsuited to the task of properly guiding industrial mobilization, we found that various expedients and devices are customarily resorted to by nations attempting to quickly increase their rate of munitions production. In the United States, a substantial amount of antitrust legislation exists, and a more or less active antitrust policy has been followed by the government. In World War II some of the methods worked out for increasing production were questionable in the light of such policy, which had to be relaxed if the methods were to be employed. The industry integration committee was a device of this type. In this chapter and the two following ones, some of the methods by which integration committees operated to increase production will be examined, and various cases in which they were effective will be cited.

The Scope of Army Ordnance Responsibility

In World War II the Army Ordnance Department had the responsibility for the design, development, procurement, and maintenance of all weapons, ammunition, fighting vehicles and motor transport ve-

hicles used by the air and ground forces, and for a considerable share of the weapons, ammunition and vehicles used by the Navy and Marine Corps.[140] Because of these vast responsibilities, the "Army Ordnance Share" of the defense production dollar was by far the largest of any branch, bureau or agency of the government. Few people realize that this relatively small and little known part of the Army was the greatest single contracting agency in World War II. During that war Army Ordnance spent approximately one quarter of every dollar appropriated for military production, while the Navy, Air Force, Maritime Service and the other Arms and Services of the Army shared the remainder. A graphical presentation of the Army Ordnance production share, relative to that of others, is shown in Figure 1 on the next page.

A similar analysis, but one in which no attempt is made to distinguish the agency or service responsible for production of the category involved, was prepared by the War Production Board and is reproduced as Figure 2 on page 91. It will be noted that the categories of "Guns and Fire Control", "Ammunition", and "Combat and Motor Vehicles" would be very largely the responsibility of Army Ordnance, while additional Army Ordnance production would be included in the categories of "Communication and Electronic Equipment" and "Other Equipment and Supplies".

The Army Ordnance production problem, briefly, was to transform a billion or more dollars monthly into munitions, and to do this with constant attention to improvement of rates of production, decreases in costs, and reductions in requirements for materials. It also had to be done within the limits of master requirements established by an outside authority, and despite the fact that those requirements

---

140. Army Ordnance Report No. 3, op. cit., p. 3.

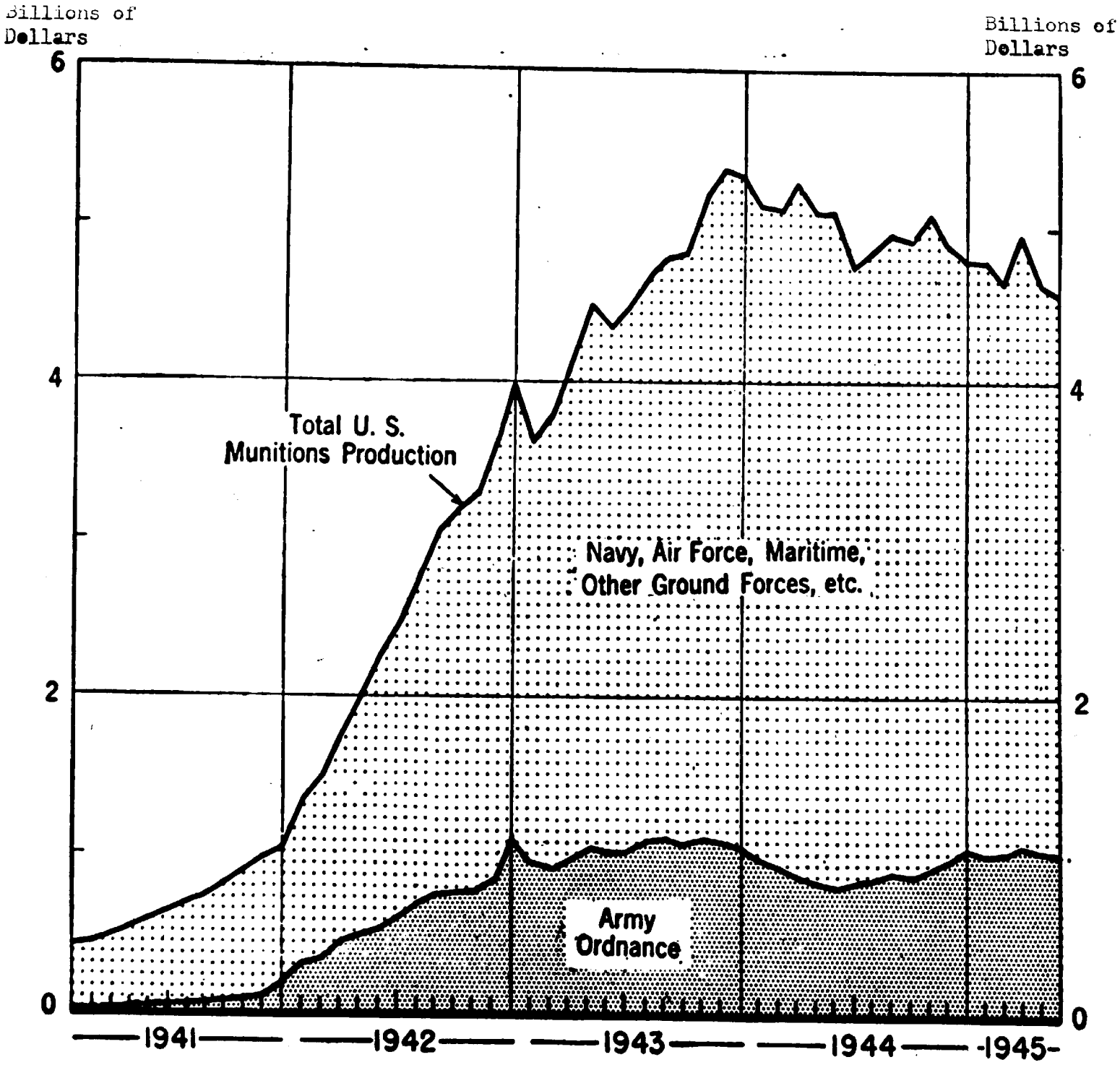


Figure 1. The Army Ordnance Share of Munitions Production

Source: Campbell, Industry-Ordnance Team, op. cit., p. 173.

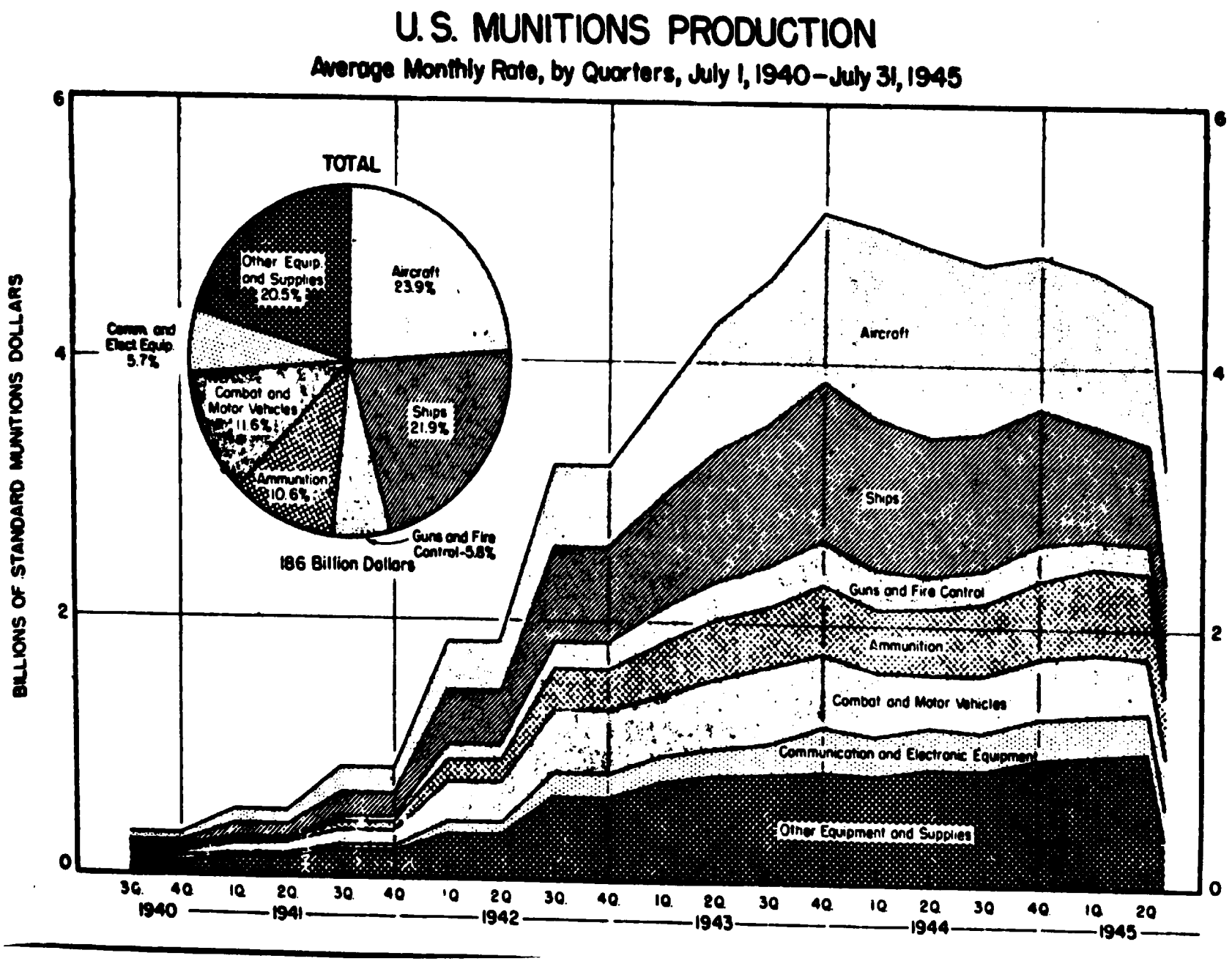


Figure 2. United States Munitions Production, 1940-45

Source: Krug, J. A., Wartime Production Achievements and the Reconversion Outlook, Report of the Chairman, War Production Board, Washington, 1945.

fluctuated widely and in an unpredictable manner.

To keep close contact with the actual producers of munitions, and yet be far enough removed so that there could be no question of undue interference, was the role of the Army Ordnance Department with regard to the integration committee. Organized specifically to augment the rate and quantity of production that could be obtained from a given industrial structure, the committees could be permitted to function with relative freedom within the limits imposed by the Ordnance Procurement Instructions under which they were formed. The government, as represented by Army Ordnance, had to indicate the sphere of action, and provide assistance when the solution to a problem appeared to require something that was outside the control of the committee members or of the Army Ordnance Department.

Committees Help with the Tool Problem

Committee members very frequently found themselves in need of help with regard to the procurement of tools and materials. The tool and materials problem was, basically, the result of the wartime demands made from many directions upon a tool industry and upon materials supplying industries which were geared only to peacetime needs. No manufacturer, or small group of manufacturers such as a committee represented, could alone hope to deal successfully in the maelstrom produced by the concomittant demands for tools and materials, nor could they hope to succeed in pushing through their orders in the face of others without powerful sponsorship. The tendency, of

course, was to call for help.

> The Ordnance Department was literally swamped with expediting requests of all types. The problem, therefore, was to relieve the Ordnance Department in Washington, wherever possible, of the necessity of their approval. All Committee members were, therefore, encouraged to make recommendations and submit all assistance to the Committee headquarters. It should be stated that Committee members were encouraged to act as much as possible on their own, and not assume the attitude -- "Well, if we can't take care of it, the Committee will."141/

When expediting was necessary, the Committee was often able to act in the interests of its members with the full weight of the Army Ordnance Department behind it.

> The important point to notice is that the Committee kept a close personal liaison with the Expediting section of the Artillery Division (of the Industrial Service, Office of the Chief of Ordnance), and either became a direct acting agent of that section, or simply passed on information to it for its action, depending, of course, on what the circumstances of each expediting case were. If time was all-important, correspondence was dispensed with and action was taken by personal contact or telephone conversation; but in every single instance action was taken.142/

Cooperation through the Committee was also a convenient means of reallocating tools within an industry, as exemplified by the experience of the Pistol Committee.

> Analysis of the comparative time study report, revised Production equipment requirements, the introduction of new designs for pistol components, and other factors, made possible the transfer of many machine tools within the industry,

---

141. History of the Intermediate Caliber Antiaircraft Carriage Industry Committee, Mss. prepared by Firestone Tire and Rubber Company, 1945, p. 9. On file in Historical Section, Office of the Chief of Ordnance.

142. Ibid., p. 10.

for the purpose of balancing productive capacity.[143]

There was also an effort made to prevent the ordering of machine tools by discovering excess tools of the type wanted in the possession of some committee member. In the case of the Remote Control Systems Committee, "before a request for a new machine was submitted, Committee members were canvassed to determine whether the required machine could be obtained within the organization."[144]

Tools could also be efficiently transferred from one facility to another, through committee action, in the event of a manufacturer being closed out. Such an occasion was the termination of the American Locomotive Company as a producer of the 155 millimeter gun carriages.

> An excellent example of Committee activity was the transfer of the tools, jigs and fixtures, gages and dies, as well as surplus inventory, at American Locomotive Company for the 155 mm Gun Carriage to Pullman Standard Car Manufacturing Company when American's contract was completed and Pullman was just initiating production.[145]

Improving the Parts and Materials Situation

Committee activity in encouraging the interchange of critical raw materials and component parts was one of the most valuable contributions that the committees made to the production effort. The Field Howitzer Committee had an established procedure for obtaining action

---

143. A. C. Foss, Jr., Project Supporting Paper -- Pistol Industry Integration Committee, 1942-45, Mss. dated 5 October 1945, p. 12. On file in Historical Section, Office of the Chief of Ordnance.

144. History of the Remote Control Systems Committee, 1942-45, West Springfield, Massachusetts: Gilbert and Barker Manufacturing Company, 1945, p. 10. On file in Historical Section, Office, C. of O.

145. J. E. Martin, History of the Heavy Mobile Carriage Committee, 1942-45, Mss. c1945, p. 6. On file in Historical Section, Office, C. of O.

on threatened materials shortages.

> During the first few months much expediting was necessary to overcome material bottlenecks. To alleviate this, a plan was instituted whereby one a month each Howitzer manufacturer submitted to the committee office a list of those materials which he would be out of two months hence if more were not received in the meantime. All pertinent purchase order information was included on these lists.
>
> After editing these lists to make sure only materials threatening to shut down production lines were listed, and correlating this material with actual Howitzer production plans, the lists were consolidated into one report and forwarded to the Deputy Chairman of the Committee in Washington. He then saw that the list was checked against War Production Board materials production schedules. If a material necessary to continued Howitzer production was not on the War Production Board schedules, he attempted to get the material placed into the schedules on the basis of being definitely critical to the Howitzer program. This plan materially reduced the number of emergencies from a manufacturer being out of material and reduced the amount of expediting necessary.146/

Committee meetings served as suitable occasions for statements of policy regarding such problems as the hoarding of materials or machine tools. Such statements might be made by a military official, and have the immediate effect of an order on the policies of a committee. For example, Brigadier General G. M. Wells, the Chief of the Artillery Branch, Industrial Service, Office of the Chief of Ordnance, and ex officio chairman of all artillery and artillery component committees, spoke on this subject at the meeting of the Intermediate Anti-Aircraft Carriage Committee on September 3, 1942. He declared that all contractors must be positive that machine tools and material on order conform with the production rates of their respective Ordnance materiel schedules.

---

146. C. R. Cline, History of the Field Howitzer Industry Integration Committee, July 1942 to May 1945, Mss., c1945, p. 4. On file in Historical Section, Office of the Chief of Ordnance.

He also stated that no "comfortable" factors of safety would be tolerated, and that the objective was to maximize the production of all contractors. Unnecessary hoarding of machine tools and materials by one contractor could seriously hinder another's production.[147]

Frequently the members of a committee found themselves at a disadvantage in obtaining component parts or materials from sub-contractors because their requirement, as a single producer, was not sufficient to interest the sub-contractor in view of other orders which he had on his books. In such cases the committee served as a highly useful agency for pooling requirements with resulting advantage to both the sub-contractor and to the member manufacturers. In the case of the Miscellaneous Cannon Committee, sub-contracted items were pooled in those instances where the quantity appeared too small to justify individual sub-contracting by each prime contractor. "Such pooling would also be possible in the purchasing of small quantities of raw material. Generally speaking, better rolling dates can be obtained at the steel mills when large quantities are ordered."[148]

In the case of the Pistol Committee, one producer was established and in production well in advance of the other committee members.

> This situation made possible integration of the industry by using common sub-contractors and by pooling orders for tooling, gages and raw materials. As a result of the efforts to secure common sub-contractors, which was particularly desirable on screw machine parts, thirty-seven of fifty-three pistol components were

---

147. Report of the Intermediate Anti-Aircraft Carriage Committee Meeting, September 3, 1942, Akron, Ohio, Typed minutes, p. 5. On file in Historical Section, Office of the Chief of Ordnance.

148. Activities of Miscellaneous Cannon Committee, June 1942 to July 1943, Springfield, Massachusetts: Springfield Ordnance District, 25 April 1945, p. 23. On file in Historical Section, Office of C. of O.

> procured from seven sub-contractors supplying Ithaca Gun Company, Remington Rand, and the Union Switch and Signal Company. Pooling of orders for raw materials was made possible through the standardization of raw materials specifications and sizes. General adoption by the three new facilities of the Singer Production Study made possible the pooling of orders for cutting tools, and in some cases gages and other tooling.149/

At times the manufacturers, either alone or through the Committee, did not act to solve the problems resulting from their varied demands on the same suppliers. In such cases the Ordnance Representative on the Committee was able to force action.

> In many cases, manufacturers had common sources for materials such as forgings, castings, steel plates or machined parts. When short supply from a common raw material supplier or sub-contractor began to hold up production, it was necessary in most cases for the Ordnance Representative to step in and allocate deliveries from these sources to the various prime contractors. Manufacturers were unable and unwilling to do this for themselves, and the Ordnance Districts did not have the necessary information.
>
> The Committee, armed with Industry Status Reports, production schedules, a thorough knowledge of production methods in member plants, and a first hand analysis of conditions in the sub-contractors plant, was the only organization equipped to make intelligent allocations of deliveries. Prime contractors and sub-contractors alike, along with Ordnance Districts, were so pleased with the allocation of sub-contractors by the Industry Committee that the Committee had to resist requests for unnecessary expansion of the plan, and had difficulty in retiring from allocation of a particular sub-contractor's deliveries after the crisis was past and there were enough parts for all manufacturers.150/

In some cases it was necessary for the committee to furnish information upon which allocation of the production of a common component material could be based. By proper allocation among committee members the end of maximizing production in a given time period could be obtained. Such

---

149. Foss, Pistol Integration Committee, op. cit., p. 10.

150. C. A. Gerstacker, Historical Record of the Mobile Carriage Recoil Mechanism Integrating Committee, Mss., September 1945, pp. 8-9. On file in Historical Section, Office of the Chief of Ordnance.

a situation arose in the production of field howitzers, and the first action of the Field Howitzer Integration Committee was to attempt to bring some degree of order into the supply of howitzer tube forgings, which were in serious short supply. A system of direct allocation of the output of the forging plants was adopted.

> Near the end of each month, the Integration Committee gathered data from the Cannon Sub-Office as to anticipated tube forging production from all forge plants for the following month and data from the Howitzer manufacturers as to their supplies of forgings on hand and needs for the following month. An allocation of forgings was then made on the basis of distributing the forgings between the Howitzer manufacturers so that they resulted in the greatest number of guns in the shortest time.151/

The very close familiarity of the committee with the needs of its members for particular parts and materials, coupled with the information on production of parts and materials by the suppliers, frequently made possible a "hand-to-mouth" sort of operation which, despite the absence of the usual working stocks of such parts or materials, permitted production to be maintained steadily with a resultant maximizing of finished item output. A good example of this hand-to-mouth operation was found in the Remote Control System Committee.

> In the early period of the Committee, many remote control system products were just one step ahead of requirements. Where a Committee product was used by other manufacturers in equipping or completing an Army fighting unit, a scheduling system was set up to allocate output to actual requirements. For example, Indicator Regulators used in the 90 millimeter and 120 millimeter guns were shipped to the gun mount producers as needed for actual production. By maintaining constant inventories of supplies in the mount manufacturers' plants and keeping in close touch with members' output, it was possible to schedule Indicator Regulators so that each one was used promptly and

---

151. Cline, History of Field Howitzer Committee, op. cit., p. 4.

> without building up excess inventories. Similar methods were used in allocating Oil Gears to manufacturers of 40 millimeter (gun) mounts. Committee action of this type insured maximum production of the end items as no excess unused inventories were permitted to accumulate.[152]

At times the committee served to equalize available stocks of a component part during a period when new capacity was being brought into being. Frequently this could be accomplished without any loss in production of the finished complete items, as in the case of telescopes for armored vehicle fire control equipment.

> The neutralization and elimination of a bottleneck in the supply of rubber eye shields was effected without loss of telescope production. As soon as the danger was detected, stocks at all plants were equalized and the sub-contractor's capacity expanded from 13,000 to 24,000 per month. The cost of expansion was borne by a temporary increase in price of the part. Distribution was closely controlled until production capacity exceeded telescope production and inventories had reached an adequate level.[153]

On some occasions committees were able to initiate constructive action toward the solution of problems only incidently related to their major task of increasing finished item output. Because of the great emphasis on completed items, there was a frequent tendency to neglect stocks of spare parts which were necessary to maintain an item in service after it had once reached the hands of the ultimate users. A critical problem of this nature arose in the field howitzer industry early in the war, and was alleviated by committee action.

> In the rush to get out a large number of howitzers the latter part of 1942, spare parts and deliveries were lagging

---

152. Remote Control Systems Committee, op. cit., p. 10.

153. A Brief History of the Armored Vehicle Fire Control Committee, Mss. , no author or sponsoring agency mentioned, c1945, p. 17.

behind schedule at most facilities. At the same time an increasing number of cannon were being sent into the theater of operations causing a rise in spare parts demand. By March of 1943 there was a serious shortage of many spare parts and a drive was under way to eliminate spare part deficiencies.

During this period the Committee used four different methods to help relieve the shortage. The first method was the usual integration tool of a loan to the facility deficient in his spare parts deliveries. The second method was to conduct careful studies and make arrangements whereby a facility who was in a favorable position with regard to a critical spare part would ship well ahead of schedule on his own contracts counterbalancing a deficiency at another facility.

The third method (.....) was used for extremely urgent demands for small quantities which were needed immediately. The Office of the Chief of Ordnance advised the Committee office what, how many, and how soon certain critical parts were needed. The Committee office then made a quick survey of all its facilities to find the one best able to fill the special demand, called the Office of the Chief of Ordnance and had special shipping instructions issued that facility usually calling for shipment by express to a port of embarkation. The fourth method was used for long range planning to overcome spare parts deficiencies and consisted of working toward the end of having new spare parts orders placed at the facility best able to meet the requirement.154/

Business Relationships of Manufacturers Increased

The interdependence of modern industry and the modern industrial economy, as exemplified by the relationships of manufacturers with those who supply their component parts and materials has long been recognized. Such relationships are often built up through years of mutually profitable business dealings, and represent a valuable asset to the concerns involved. The industry integration committee proved to be a means by which relationships of this type were vastly expanded, exposing the prime manufacturer to a wider range of possible suppliers, and the suppliers to possible new markets for their products in the form of new-

---

154. Cline, History of Field Howitzer Committee, op. cit., pp. 8-9.

comers into the business. In addition the committee served as a means through which all members of an industry were put in possession of numerous facts concerning others in the business. Though the peacetime implications of this knowledge might be serious for the participating manufacturers, it was mandatory that such information be gathered, analysed and disseminated if the committee was to be of assistance in such matters as allocation of available materials, distribution of critical tools, placing of production schedules and similar activities with which it was clearly charged. In addition, the availability of such information was of great value when expansions of plant, or changes in products, were contemplated.

> Through intimate contact of the Committee organization with the member companies, a thorough knowledge was acquired of each concern's equipment and the type of work it was best fitted to manufacture. This information was available to Ordnance when facilities were being sought for new or changed products.155/

From the discussion that has been presented in this chapter, it is readily apparent that committees differed widely in their functioning, depending upon many and varied factors. Some were intensely active, and some relatively inactive. However, for all committees it is probable that the major type of cooperation was in the field of improving the use of available resources, which has been discussed above. Maximizing finished item production within the limits of available productive facilities was the original basis for the formation of industry integration committees. By maintaining adequate information regarding

---

155. Remote Control Systems Committee, op. cit., p. 11.

members and their suppliers, and then using this information as the basis for shifting tools, parts, materials, and for scheduling and planning purposes generally, this objective was approached.

Chapter 7

Improvements in Production Methods and Processes

The preceding chapter dealt with one important area -- the utilization of resources -- in which industry integration committees were able to increase production. Some typical instances of improvements in this area which were attributable to committee action were cited. The present chapter will consider the activities of committees with regard to the improvement of production methods and processes.

The Art of Arms Production

Armament manufacture is in the historical sense a highly specialized art, and since the days of the sword-maker and armorer has tended to be perpetuated by specialists. In the United States, these specialists have traditionally been located primarily in the government owned "old-line arsenals" operated by federal funds. "In time of peace these arsenals keep alive the 'know-how' and technique of arms making so that in time of war industrial America may be taught the all-important art."156/

The role of the arsenals as development agencies is well understood by those who work in them, and many veteran workers take great pride in keeping alive and forwarding armament knowledge. Sometimes this pride, and the awareness of the importance of their mission, has caused these veterans to make painful personal sacrifices. General Campbell mentions

---

156. Army Ordnance Report No. 3, op. cit., p. 19.

an occasion at Rock Island Arsenal in 1923 when a drastic curtailment in Ordnance appropriations necessitated a reduction in the payroll. It was necessary either to discharge the younger workers, or to cut the salaries of the old ones. If the younger workers were separated, the armament making art in America would eventually die out. The old workers were called in and informed of the situation, and agreed to take cuts ranging up to a thousand dollars annually because "They agreed with us that only in this way would it be possible to maintain continuity in our work and to hand down to the next generation the priceless unwritten lore of armament design and manufacture."157/

Arsenals and Mass Production

Engaged primarily in research and development, rather than in regular production, the arsenals were rarely in a position to apply the test of mass production to the items they turned out. Of necessity, their tools and facilities were arranged for the production of sample lots of experimental-type items which could be sent to various testing grounds for study. When an item finally passed all necessary tests, and met the established requirements, its production would be placed in the hands of a civilian manufacturer on a contract basis, providing funds for the production of any sizable quantity existed. Actually, between wars, the amount of such contracting was extremely limited because of budgetary restrictions.

In a few places, such as Frankford Arsenal in Philadelphia, actual mass production lines existed on a limited scale. At Frankford small

---

157. Campbell, Industry-Ordnance Team, op. cit., p. 35.

arms ammunition was produced in sufficient quantity to meet military training requirements, and at other arsenals weapons, tanks, artillery ammunition and such items were turned out in small quantities. However, the scale of production was not sufficient to necessitate production engineering for really large quantity output, and the funds that would have been necessary for the planning and tooling up for large-scale production did not exist.

Thus we find the munitions making know-how of the nation largely in possession of institutions and individuals who were not accustomed to applying it in mass production situations. They were intensely aware of the need for such application, and very willing to cooperate in any program that would lead to it. However, industrial mobilization planning in that sense requires heavy financial backing, and none was forthcoming.

In such a situation, it is not surprising to find the so-called "experts" of the munitions business highly receptive to the suggestions offered by manufacturers who were embarking for the first time upon munitions production. On this subject, which might have been a touchy one, the committee approach proved an ideal method to quickly bring forth and put into effect the ideas of industry as applied to munitions-making problems.

> There has been a reluctance on the part of Ornance engineers to take the stand that their method was the only one possible. In addition it was believed that through competition the best process would evolve. Since such evolution is generally slow and, in its early stages, leads to different

methods of manufacture, the suggestions made by various industry representatives (for standardization of raw materials and production processes and equipment) are easily understood.158/

Committees Improve Methods and Processes

The contributions of industry to the improvement of production methods and processes in munitions manufacture were numerous and varied. They ranged from localized, unsung improvements made at worker or foreman level in individual shop bays where the result might be merely a slight increase in the rate of output of some tiny component part, to such changes as the introduction of the double-nitration process in the trinitrotoluene (TNT) manufacturing industry, which overnight doubled or tripled the capacity of TNT production lines and made half of the TNT facilities surplus as early as 1943.

The greatest value of the committees as a means of improving methods and processes was probably their basic principle of encouraging the cooperation of manufacturers to consider their problems as an industry, and to offer a centralized means for quickly disseminating information concerning worthwhile improvements which were developed. An idea that could withstand the expert appraisal of such a group as the committee, and that could be hammered into a still better form in many instances by that committee, was almost sure to be approved by the Army Ordnance Department and almost sure to give the ultimate results that were expected of it if carried out. A typical manufacturer's reaction to this aspect of committee cooperation was that of the President of the Read Machinery Company, who wrote: "By the interchange of engineering and manufacturing

---

158. Dawson, Project Supporting Paper No. 14, op. cit., pp.105-106.

ideas, we have been able to improve design and methods, resulting in better units and saving numbrous productive manhours and reducing costs."159/

The cooperation at committee level on a particular item was also a very important means of getting greater uniformity of product. The quantities of items required by many production schedules were such that they could only be obtained by enlisting numerous and varied manufacturers in the business. The committees were valuable in introducing and assisting such manufacturers in getting started, and they continued to be useful as agencies for a critical analysis of the industry product. Generally, military items must be highly uniform, and must perform with a high degree of regularity exactly as they are supposed to perform. With a variety of producers turning out the same item, discrepancies were very apt to occur, and deviations from standards and specifications might appear in the finished product. The committee served as an effective means of reducing and forestalling such deviations.

> We have also been able through the Industry Committees to see that all sources are manufacturing to the same standards and that the parts are interchangeable. This has resulted in better production on the total amount of units due to the fact that when some suppliers fell down on deliveries, parts could be borrowed from other manufacturers and complete units shipped on schedule. These advantages are minor compared to the results obtained on the firing front because all parts from all sources are interchangeable, which makes it possible to repair any unit immediately and get it back into action. There is not doubt that the efforts of the Industry Committees have made this possible.160/

Mass Production and the Gage Program

In the mass production of items such as guns, tanks, motor vehicles

---

159. James T. Duffy, Jr., President, Read Machinery Company, Inc., York, Penn., to Captain C. Kramer, Springfield Ordnance District, letter dated April 7, 1945. On file in Historical Section, Office of the Chief of Ordnance.

160. Ibid.

and ammunition it is mandatory that component parts be manufactured to careful tolerances if the finished product is to be serviceable.[160-A/] Producing components that will meet fine tolerances adds greatly to the cost and time of production, and depends upon control methods which are based on measurement by actual gages at various stages during production.

The sets of gages needed to properly check the progress of production of a component are often specialized devices which demand highly skilled labor and expensive tools for their manufacture. The trade of gage-making stands at the very top of the metal-working crafts, and the king among metal craftsmen is the skilled gage-maker. A metal-working craftsman may rise from machinist, to tool and die maker, to gage-maker, and the number who finally qualify for such a position is small.

The position of gages in the production process is crucial, in that finished items cannot be determined to be acceptable without them. Thus one of the most critical aspects of tooling up for a munitions production effort is the availability of the necessary gage sets. The making of gages is a time-consuming process, and it is readily seen that gages can only be produced after the design of an item has been formalized for production. A change in design must mean accompanying changes in gages, and the time-lead in the finished item must include not only the time for tooling up after the design is firm, but also the time for making gage sets.

Integration Committees Ease the Gage Problem

In World War II the gage problem arose in great vigor. All types of metal craftsmen were overnight in great demand, and many of the projects for which they were wanted were not firm. Designs were not form-

---

160-A. The first practical demonstration of parts interchangeability was staged by Eli Whitney in 1800, when he assembled ten muskets from parts selected indiscriminately from various piles of components. He was attempting to win an Army Ordnance contract! See Mass Production - Cornerstone of America's Welfare, Dept. of Ord., USMA, West Point, N.Y., Sept., 1951, p. 2.

malized; production engineering problems were not solved; manufacturers were attempting to produce items with which they were not familiar. With regard to gages, it was recognized that even those which existed for items which had been produced on a limited scale in peace-time might not suffice. For example, in the manufacture of caliber .45 automatic pistols, the gaging methods in effect when war came were those which had been designed for relatively small scale production, and a serious gage problem confronted the industry integration from the start.

> Early in the life of the committee, it became evident that Ordnance gages were not entirely adequate. With the aid of the Key Inspector (of the Army Ordnance Department) and the Colt Company the list of gages was considerably enlarged.161/

Here was an example of the representative of the federal government and the representatives of an old and established pistol manufacturer working closely together to establish a production gage set that would serve adequately for all pistol producers. Through committee action the results of their cooperation could be quickly transmitted to all manufacturers, and a uniform control of components and finished pistols could be quickly achieved.

The requirement for uniformity in gaging standards and practices was basic to any sound system of interchangeability. Again, the problem of numbers of manufacturers of the same complicated item, all embarking at the same time on the production of that item, led to extreme complications. These problems might even be amplified by the fact that the end item was completely foreign to American industry, as in the case of the 57 millimeter

---

161. Foss, Pistol Integration Committee, op. cit., p. 7.

gun. One factory manager whose company was a member of the integration committee for this gun wrote:

> In the start of the 57 millimeter gun program, we were starting under terrific handicaps not having gages coordinated and trying to make this gun so that it would be completely interchangeable with the British model. The only way this gun could be made by us, so as to be interchangeable with the British gun, was through efforts of the Miscellaneous Cannon Committee in conducting the interchangeability meetings, whereby we were able to determine the weaknesses of our gages and manufacturing systems.162/

Production Woes Due to Design Changes

One of the great problems of the munitions production program was the necessity for changing designs of items even though contracts had been let for quantity production of the item. These changes could stem from a variety of causes: perhaps battlefield experience showed that a change was needed to improve performance; sometimes a change could simplify the production process and result in speedier production; often a substitute material or method seemed indicated by the fact that the specified material or method could not be continued because of material shortage or tool scarcity. Whatever the source, the effects of design changes were highly adverse to the establishing and maintaining of a high and steady rate of production.

The change of an established design could result from action by either the government or the manufacturers. Those resulting from government action were often changes which seemed indicated by proving ground or battlefield performance. The desire was to improve the effectiveness of

---

162. William J. Kerr, Factory Manager, Yoder Company, Cleveland, Ohio, to Captain C. Kramer, Springfield Ordnance District, letter dated April 7, 1945. On file in Historical Section, Office of the Chief of Ordnance.

the particular item in accordance with knowledge gained from experience, and there seemed little ground for opposition to such an objective. However, the disrupting effects of constant design changes were very serious from the point of view of the manufacturers, and every effort was made to modify the impact of changes as much as possible. One method of achieving this was to provide the manufacturers with information as to the proposed changes at the earliest possible date.

> In cases where a change was to be made in design, the engineering arsenal often gave the committee advance information, and the facilities were then contacted and advised of the situation so that inventories of parts about to become obsolete could be kept to a minimum.163/

Another method of reducing the number of design changes was that of scrutinizing with great care the suggestions for such changes, and only authorizing those which clearly warranted approval. From the point of view of the individual manufacturer, numerous occasions could arise which would seem to warrant actual changes in design, and the tendency was to ask for approval of such changes.

> Contractors frequently suggested changes in design, usually to facilitate manufacture or to substitute an available material for the unavailable specified material. By screening these requests, the integrating committee considerably reduced the amount that found their way to the engineering agency, and through their knowledge of the materiel were able to build the engineering arsenal's confidence in them to a point where they could render one day service to the contractors on most requests.164/

Tripling TNT Production

Though the impact of design changes on manufacturers was a serious complication in many cases, the net effect was often one of greatly in-

---

163. Gerstacker, Mobile Carriage Recoil Mechanism Committee, op. cit., p. 10.

164. Ibid.

creased rates of production. Perhaps the most publicized change in a production process was that which took place in the manufacture of trinitrotoluene (TNT), one of the most effective military high explosives. Prior to World War II the nitration of toluene into TNT was developed to a point where a pilot production line was able to produce approximately 26,000 pounds of TNT daily. When the construction program for the creation of TNT capacity was begun in 1940, it was estimated that improvements in the pilot line method would bring daily output of the new lines to approximately 33,000 pounds daily. A total of twelve TNT manufacturing works were planned, with each consisting of six or more production lines. The actual number of TNT lines constructed was in excess of 100, so that a daily output of TNT well in excess of 3,000,000 pounds was possible.

Before all of the plants were completed, however, "a new method of making TNT was discovered which increased the production from an estimated 33,000 pounds per line per day to an actual production of 96,000 to 100,000 pounds per day".165/ This dramatic change in process, which could be instituted in existing lines without great complications, tripled the TNT capacity of the country and resulted in surplus facilities for the production of TNT even before all of the lines in actual construction were completed. It is recognized as one of the greatest improvements which resulted from integration committee action.

A less striking example of improving a production process is found in the record of the Frangible Bullet Committee. The frangible bullet manufacturers were producers of special molded bullets which were used

---

165. Engel, Ordnance Ammunition Production, op. cit., p. 6.

in training aircraft pilots in the firing of machine guns. Frangible bullets must be so made that they perform ballistically as do regular bullets over early parts of their trajectory, but disintegrate upon contact with even slight solid resistance. They were used for actual firing against aircraft in training, and they must be made so that they would not damage the aircraft which they hit. The manufacture of such bullets was new and unique, and the manufacturers had to do much of their own development work. The integration committee formed for the manufacture of frangible bullets focused carefully upon the more serious problems confronting the industry, with favorable results.

> An outstanding example of the accomplishments of the (frangible bullet) integration committee was the contribution of the Pal Tool Company to the industry by redesigning original molds. These redesigned molds are capable of producing forty bullets per pound of basic mix, improving the efficiency over original molds by approximately 100 per cent.166/

Handling Engineering Changes

The centralized information possessed by the integration committee, together with the ready availability to it of expert engineering and production minds, made it an ideal agency to examine the suggestions for change offered by the various manufacturers. A suggestion that had been received and studied by a committee, and subsequently was forwarded for formal approval by the Ordnance Department, was only very rarely disapproved. However, because an engineering change would normally affect the basic contract between the individual manufacturer and the Ordnance

---

166. C. E. Herschel, History of the T44 Frangible Bullet Industry Integration Committee, Mss., p. 10. (Dated June 7, 1945). On file in Historical Section, Office of the Chief of Ordnance.

contracting officer, no such change could be considered official until it was transmitted to the individual manufacturer by the contracting officer. Such a formalized procedure could mean a loss of time in effecting a change, and accordingly it was a common practice for committees to furnish their members with advance information to the effect that a proposed change was approved. Such advance information, however, was required to contain the following statement: "This advice is furnished to you at this time only as a matter of information, inasmuch as your contract requires a written change order from your contracting officer".167/ On the basis of this advance information the contractor could act with almost complete safety, as the issuance of a change order by the contracting officer in such circumstances was routine.

At times the whole production process for an item was examined by a committee with the intent of viewing the comparative practices on an industry-wide basis and seeing where possible improvements could be made. For example, in the pistol industry

> A comparative time study list, showing estimated or actual time studies and machine tools used on each operation of ten of the major pistol components at each facility was prepared. This comparative list was of considerable help in reaching maximum efficiency of operation and in studying advantages of re-engineering slow operations.168/

The Problem of Inspection Standards

With different manufacturers scattered throughout the nation manufacturing the same item, and with contracts for the same item being

---

167. Ordnance Procurement Instructions 56, paragraph 56,214.4.

168. Foss, Pistol Integration Committee, op. cit., p. 10.

let through different contracting officers, it was inevitable that great problems would arise concerning the proper standards for acceptance of a given finished product. A complete assembly, such as a 105 millimeter howitzer with its recoil system and carriage, consists of hundreds of parts, a great percentage of which are made to fairly close tolerances and specifications. It was a responsibility of the contracting officer to make certain that the government received what it was paying for, and therefore acceptance of items required very careful final inspection. The Ordnance Districts, as the agencies from which contracts issued, therefore maintained elaborate inspection staffs for the purpose of accepting or rejecting the output of the various contractors. Though there was liaison and cooperation between the various districts, and though there was central direction from Washington, in practice each district had considerable latitude in determining what items would pass as acceptable, and what ones would not. In a production effort so vast and complex, there could be no absolute right and absolute wrong with regard to acceptance of a given item. In fact, "there were many instances where parts accepted and bomb-stamped (i. e. stamped with the Army Ordnance symbol of a flaming bomb) in one District were rejected by an inspector in another District".169/

The variation in inspection requirements set up by the different Ordnance districts posed very serious problems for the manufacturers. Complete interchangeability of parts was expected for finished items, and slight differences in permitted tolerances were often sufficient to defeat interchangeability.

---

169. Cline, History of Field Howitzer Committee, op. cit., p. 14.

> Undoubtedly, the weakest link in the integration chain was that of different inspection standards in different areas. Because of differences of opinion in the various Ordnance Districts as to which deviations from drawings and specifications were of a minor nature and which were major enough to warrant rejection, companies often became tangled up in Ordnance inspection arguments when parts were moved from one area to another, either on a loan basis or on a sale of surplus parts available from contract terminations.170/

When confronted with an instance in which the Ordnance inspectors of different districts had not agreed on the acceptable standards for an item, the individual manufacturer was relatively helpless. However, the existence of the variations in standards did not indicate a lack of coordination on the part of the inspectors so much as it indicated how extremely complex the finished item might be. For example, in the manufacture of parts for artillery pieces, great difficulty arises in attempting to set up rigid standards by which a part may be accepted or rejected.

> A breech block, for example, has so many different machining and heat treating operations that inevitably there are numerous small errors of negligible importance plus some of more important nature occuring in each lot of blocks manufactured. There are so many variables, such as number of errors, degree, and combinations possible that a given inspector generally used his own judgment in rejecting a part or insisting that it be repaired, and only occasionally did he reduce the errors on each part to writing for submission to higher authority.171/

Coupled with the extreme difficulty of establishing fixed standards for intricate, complex assemblies manufactured to close tolerances was the fact that unnecessary rejections of items in process aggravated the already critical munitions production situation. A rejected item re-

---

170. Ibid.

171. Ibid.

presented wasted material, wasted machine tool time, wasted skilled labor time, and made more involved and difficult the meeting of a production schedule for the particular time period involved. If the case for rejection was not obvious, the manufacturer felt himself the victim of government stupidity and red tape, and enough instances of abuses of both types occurred so that he could cite examples of what he believed was happening.

Here was a highly sensitive problem, and though its complexity was so great that no final and complete solution could be found, again the integration committee proved to be a useful device for improving the situation. As a clearing house for its members' manufacturing problems, it very quickly was made aware of apparent shortcomings and inconsistencies in inspection standards. As a centralizing and directing force for the technical knowledge and production engineering skill of the members, it could assemble and present with great effectiveness significant and well supported arguments against alleged abuses and in favor of apparent remedies. In addition, by their very nature, the committees were ideally designed to seek out such things as variations in standards and specifications and to focus their energies upon improving the situation. It was exactly the type of problem for which "industrial know-how" had been enlisted to help the government, and the committees were able to quickly prepare effective cases for submission to the authorities who possessed the power to correct the situation.

At the time the first committees were being formed, the problem of variation in inspection standards was foreseen, and a so-called "key in-

spector" was provided.

> The Ordnance inspectors are furnished to industry by the Districts. When a committee is formed, the best fitted and most experienced inspector for the item covered by the committee should be assigned to the manufacturer at which the committee office is located, and he should be appointed key inspector for the item concerned. Inspection procedure concerning standards of interpretation of drawings, specifications, standards of finish, the use of gages, etc., should be integrated through the key inspector, under the control of the committee Ordnance officer. Inspection problems outside the limits of the drawings and specifications should be handled through the committee Ordnance officer and the District.172/

It is apparent that the committee would first appeal to the Key Inspector in cases where inconsistencies appeared to exist in the standards of inspection. However, the Key Inspector was handicapped by the fact that the resident inspectors at each plant were employees of the Ordnance District in which the plant was located, and the Key Inspector had no direct authority over them. In practice, the recommendation of a Key Inspector to the appropriate Chief Inspector of a District in a case of this kind was almost invariably accepted and put into effect through the resident inspectors. However, the fact that the Key Inspector did not have authority to require technical problems of this type to be referred to him, or have power to dispose of them when they were referred to him in practice, greatly reduced his effectiveness. One of the major integration committees, in reviewing this involved situation and its adverse effects, proposed the following solution:

> A high caliber Key Inspector should be appointed to supervise all resident inspectors from a purely technical standpoint for a given major item such as a 105 millimeter howitzer. Under such a plan, a resident inspector and his staff would be under a Dis-

---

172. Ordnance Procurement Instructions 56, paragraph 56,118.1.

trict Office as before for all administrative functions and routine duties in connection with his job. However, the Key Inspector who had specialized on inspection of the major items concerned would set the standards of inspection to be maintained at each plant for that item and the resident inspectors would submit all technical questions to this specialized Key Inspector for his decision rather than to a Chief Inspector in a District Office. The Key Inspector, rather than a District Office, would, in turn, submit to the Engineering Branch (of the Office of the Chief of Ordnance) those cases which required decision of higher authority.173/

Some Typical Improvements

The mere listing of individual instances in which changes in processes and methods resulting from integration made possible increased production would be a vast endeavor, and would serve only to emphasize the extreme range and versatility of such achievements. However, the listing of a few typical cases is appropriate so that the nature of these changes can be appreciated.

One of the most serious bottlenecks in a program for the expansion of munitions production is the fact that forging capacity is relatively fixed. Investment in the heavy type of forging equipment that is required for certain parts of tanks, gun tubes, breech rings and similar items requiring great strength is not usually undertaken lightly by private industry, and the time-lag in bringing such capacity into existence is great even when it has been determined that the investment will be made. At the beginning of World War II it was very common for Ordnance drawings and specifications to require forged parts because it had been customary, prior to that time, to use forgings where strength was required. The result was a flood of demands for forgings from all directions,

---

173. Cline, History of Field Howitzer Committee, op. cit., p. 14.

and the capacity available had to be very carefully scheduled, and the output allocated with extreme forethought. Even then, however, there were great gaps between the requirements for forgings and the production that was possible.

The Miscellaneous Cannon Committee, facing this problem of scarce forging capacity, attempted to find substitute methods for producing one of the heavy forged parts it required in the production of the 57 millimeter gun -- the breech ring. Experimentation was undertaken by the Ohio Steel Casting Company, the American Type Founders, Inc., and Watervliet Arsenal to determine whether or not it would be possible to produce breech rings by a steel casting process. This effort, stimulated by the integration committee, was successful, and the majority of breech rings for the 57 millimeter gun were made by the casting process as a result of this work.[174] Not only was the demand for forging capacity reduced by this achievement, but the castings were simpler to get in finished form than the forgings, "which resulted in a considerable saving in money due to a reduction in machine hours and the use of fewer machine tools".[175]

With regard to the forging problem, an early change had been to make the tubes for 60 and 81 millimeter mortars from seamless steel tubing, rather than attempt to obtain forgings. However, "by January, 1943, it had become apparent that the entire output of seamless steel tubing would probably be completely allocated to aircraft work",[176] and

---

174. Activities of Miscellaneous Cannon Committee, op. cit., p. 8.

175. Ibid.

176. Ibid., p. 6.

the Office of the Chief of Ordnance instructed the mortar producers, who were members of the Miscellaneous Cannon Committee, to search for a suitable substitute method for making tubes. The result was a successful development of the centrifugal casting method for producing mortar tubes, thus relieving the demand for seamless tubing capacity.177/

An attempt was made by the historian of the Pistol Committee to reduce the work of the committee to a figure showing the additional pistols resulting from committee activities.

> The extent of integration of components, raw materials and production equipment during the period from September 1942 to October 1944 might be summarized as follows:
>
> | Item | Number Exchanged Within Industry |
> |---|---|
> | Finished Components | 1,970,000 |
> | Raw Materials | 1,080,000 pounds |
> | Cutting Tools | 3,710 |
>
> In addition to the above items, a considerable number of gages, semi-finished components, machine tools, fixtures and miscellaneous production aids such as target equipment, packaging supplies, lubricants, etc. were exchanged.
>
> If it is assumed, purely for purposes of analysis, that finished components and raw materials transferred were equally distributed among the components of the pistol, it will be evident that the number of components transferred would permit the assembly of 37,200 pistols, and that the weight of raw materials transferred would permit the manufacture of 85,500 pistols. However, the assumption that transfers were evenly distributed among all components is not valid, thus the effect on total pistol production was much greater than that noted. Many, many times during the life of the Committee, production was maintained at one or more facilities through the timely arrival of sufficient quantities of critically needed components, raw materials or production equipment.178/

---

177. Ibid.

178. Foss, Pistol Integration Committee, op. cit., pp. 13-14.

Restrictions on Cooperation

The type of cooperation which made possible the production increases indicated above, and which was so widely practiced by the committees, was little known in pre-war American industry. This was true because of the tradition of antitrust actions and legislation, and also because of the restrictions imposed on committee activities by the regulations of the Army Ordnance Department. They were permitted to cooperate only within certain limits, and to exchange only certain types of comparative information. The types of information which they were forbidden to exchange were the very types which would be expected to be of primary interest if no restrictions had been imposed. For example, direct discussions of costs were not normally permitted, and the improvements in production methods which resulted in lower costs usually resulted from exchanges of other types of data. In one specific case, "while the committee refrained from any discussions on costs with the various manufacturers, it did compare worker hour data in many instances. Such comparisons were a means of bringing about changes in manufacturing methods which resulted in cost reduction."179/

The probability that certain of the committee members did not cooperate fully and completely in the integration program has been suggested above.180/ However, evidences of any deliberate withholding of information, or of resistance, either active or passive, to the committee program is

---

179. W. A. Davidson, History of the M5 Director Industry Integration Committee, Mss., c1945, p. 5. On file in Historical Section, Office of the Chief of Ordnance.

180. See, for example, citation 132, this study.

apparently very difficult to uncover.

On the other hand, there have been numerous enthusiastic declarations by officials of the participating companies which indicate that both the giving and receiving of assistance was achieved on a wide scale, with resulting great value for the defense production program as a whole. A letter from the Vice President of one of the participating companies reads in part as follows:

> From the standpoint of Scovill Manufacturing Company, there has been no restriction on the interchange of ideas, tool design, bills of material, and the intimate knowledge of knowing how to fabricate successfully a product. All the little secrets and tricks of the trade which have come from an intimate knowledge of fabricating and manufacturing have been given without restraint in the sole interest of expediting the prosecution of the war.181/

Writing in a similar vein, but referring to the participation of all members of a committee, another Vice President declares:

> We know of no better way of conveying to new-comers the "know-how" than that of discussing the various problems with those already in operation and the exchange of invitations for plant visitation which has been done freely in the interest of helping the war effort.
>
> I have also noticed that this spirit has gone even further in that normal trade secrets and confidential developments were tossed on the table and freely exchanged in the interest of going all out to help each other "deliver the goods".182/

An army officer familiar through direct experience with the operation of one of the important cannon committees had this to say regarding

---

181. B. P. Hyde, Vice President, Scovill Manufacturing Company, Waterbury, Conn., to General R. E. Hardy, Office of the Chief of Ordnance, letter dated June 22, 1945. On file in Historical Section, Office of the Chief of Ordnance.

182. W. J. During, Vice President and General Manager, Precision Castings Company, Incl, Syracuse, N. Y., to General R. E. Hardy, The Pentagon, Washington, D. C., letter dated June 27, 1945. On file in Historical Section, Office of the Chief of Ordnance.

their functioning:

> It has brought the member facilities into a more harmonious and homogeneous body where the problems of one were at least appreciated by another and where the "Joe, I need five gears for a few days -- will you send them by Air Express?" spirit became quite prevalent. Needless to say, this resulted in fine teamwork.183/

Commenting on the role of industry integration committees as viewed from the perspective of a study which he made of the Ordnance Districts in Industrial Mobilization, Mr. George F. Robertson paid great tribute to their effectiveness in increasing munitions production. He also observed that through the integration committee system, "free exchange of the hitherto secrets of production was made possible and information on processes and techniques pooled."184/

---

183. S. R. Bartnik, Historical Outline -- Artillery Branch Integration Committee for Light Mobile Artillery Carriages, Mss., 24 April 1945, p. 11. On file in Historical Section, Office of the Chief of Ordnance.

184. George F. Robertson, The Ordnance District in Industrial Mobilization, Masters Thesis, Stanford University, p. 73. Copy on file in Historical Section, Office of the Chief of Ordnance.

Chapter 8

Adaptation to Fluctuations in Requirements

In the two previous chapters of this section, we have examined some of the direct methods used by industry integration committees to increase production. We found that they were highly successful in improving the utilization of productive resources, and in bettering the methods and processes of manufacturing. In the present chapter we will consider committee activities which had as their objective the offsetting of the ill effects upon production of the great and sudden fluctuations in military requirements which are common in war.

Requirements in a War Economy

The problem of producing for war is radically different from that of producing for peace with regard to the accuracy with which demand or "requirements" can be estimated. The private manufacturer or merchandizer, in planning his future level of operation, can take advantage of many time-tested standards, trends and yard-sticks which make possible a fairly accurate estimate of demand in the immediate future. When demand does change, very often the trend toward the change is clearly observable, and it is frequently possible for the affected manufacturer or merchandizer to modify his activities so that he can shift smoothly from one type of operation to another.

The estimation of military requirements is a much more complex

problem. The standards and yard-sticks which have been developed on the basis of past experience often do not meet the test of serving as guides for the future. A simple example can be furnished by considering the consumption of artillery ammunition by American artillerymen in World War II and in the Korean conflict. The firing of artillery ammunition has been an obvious source of demand in time of war for some centuries. Experience with actual daily consumption of artillery ammunition in battle has been the lot of every generation in the history of the United States, and the supply of ammunition has been a primary logistical problem since the advent of the firearm. However, despite the extensive historical record, climaxed by the long and bitter experience of our forces in World War II, and despite the fact that the consumption of ammunition in World War II was exhaustively studied for the specific purpose of obtaining a sounder basis for estimation of future ammunition requirements, it was found that in the Korean action the estimates of ammunition consumption were completely erroneous. As recently as December, 1952, the newspapers were full of an alleged shortage of ammunition, and the visit of President-elect Eisenhower to Korea at that time had the effect of causing a very close scrutiny of ammunition supplies and usage in the Korean fighting. It was shown that the ammunition supply was "rationed" in the sense that only a certain number of rounds could be fired daily per weapon. However, it was also found that rates of utilization were much higher in Korea than they had ever been before in the history of war. The artillerymen were not getting all they <u>wanted</u> to

fire, but they were getting more to fire than any previous artillerymen had received.185/

Factors Affecting Requirements

The great elasticity of demand for many of the items used by the military, in the sense that they often want "all they can get", is only one of the variables in the problem. In discussing the difficulties of estimating military requirements, Professor G. A. Lincoln of the United States Military Academy lists six specific factors which may result in very wide changes in them:

> Degree of mobilization of a potential enemy.
>
> Location and capabilities of a possible aggressor's allies.
>
> Capabilities (military, economic and political) and location of our allies. It is conceivable that increased strength through allies brings potential increase in military requirements, rather than decreases.
>
> Changes in military techniques -- atomic weapons being the obvious, and favorite, example.
>
> Shifts among types of forces because of changes in techniques, allies, for economy of force, or other reasons.
>
> Changes in strategic plan, by which any one of the causes mentioned above should be reflected, preliminary to review and recomputation of requirements. The judgments and shifts in general statements of military strategy can be made in a relatively short time. The consequent shifts in detailed requirements and in such related operations as training, organization, procurement and production are time-consuming and complicated.186/

---

185. C. J. V. Murphy, "The Pentagon and the Korean Shell Shortage", Fortune, March 1953, p. 93.

186. G. A. Lincoln, "Planning Military Requirements", Papers and Proceedings, American Economic Review, May, 1952, pp. 451-452.

The impact of changes resulting from any one of the above factors on the industrial structure supporting the munitions production effort may be readily imagined. Broad changes in a strategic sense -- such as a decision to prepare to fight in a desert or arctic area rather than a temperate one, or to stress air power and deemphasize land power -- can be swiftly made at the top level. However, to a procuring agency dealing with a manufacturer of a particular item the broad change may mean termination or radical modification of a contract, sudden creation of surplus tools and materials, sudden unemployment of a labor force, and similar related problems. In World War II the decision to cancel out the planned use of diesel-powered tanks led to a large-scale cancellation of contracts for diesel tank engines and spare parts in the summer of 1942, at a time when there was a clearly recognized, critical need for tanks.[187] A contract termination at such a time meant confusion and "back-tracking" when all emphasis was toward getting greater tank production more quickly and efficiently.

In commenting on the extreme changes to which Ordnance requirements were subject in World War II, the Chief of Ordnance in that war declares:

> The simple fact was that the war had to be fought in all parts of the world, over all sorts of terrain, in rapidly shifting theaters, and under the most adverse climatic conditions. Technological changes came rapidly and often, and combat experience with weapons, ammunition, tanks, vehicles, and other materi-

---

187. Diesel-powered tanks were not produced by the United States for the use of American troops, apparently because of estimated requirements of the naval vessels for fuel oil -- in any event, oil was earmarked for the Navy and not for the use of tanks. However, the United States did produce some tanks with diesel engines for shipment to Russia. See Campbell, Industry-Ordnance Team, op. cit., p. 224.

al made frequent changes in procurement and production imperative..188/

At best, disruption of one type of production process and the introduction of another must create serious complications at the plant level where the change is made. The best that can be hoped for is a transition with minimum loss of time and expenditure or idleness of resources. Such a transition can only be hoped for where there is extensive and accurate knowledge available regarding the plants producing the affected item -- knowledge of their equipment capabilities, materials supplies, work in process, finished items on hand, and other data that would be pertinent to closing out one type of production and embarking on another. Such a source of centralized information was furnished by the integration committee.

> When changes in production requirements, either an increase or decrease, were contemplated, the Ordnance Office usually obtained from the Ordnance Representative (on the integration committee) advice on application of the changed requirements to production schedules in member plants. The committee was in a position to know which companies could produce how much more, and what effect reduced schedules would have on each manufacturer. The committee headquarters had its hand on the pulse of the industry and usually knew the personal feelings of the industry members about the program.189/

Assisting with Schedule Changes

In addition to acting as a collecting point for industry information, the mutual association of the members as they engaged in committee activities enabled all to gain a better understanding of what their fellows were doing. Changes in production methods, and in schedules, were of vital

---

188. Ibid., p. 398.

189. Gerstacker, Mobile Carriage Recoil Mechanism Committee, op. cit., p. 11.

interest to all concerned, and were discussed accordingly. In many instances, the committees were given an opportunity to discuss proposed actions of the Ordnance Department with regard to future plans and schedules, and could make recommendations concerning them.

> The committee organization increased the manufacturer's confidence in Ordnance Department planning and schedule changes, even when drastic, because all such activities were thrown open to prior discussion among the company representatives. The reasoning behind cutbacks or increases was translated into the vocabulary and thought of the manufacturer and the stigma of government red tape or rumors of haphazard planning avoided.190/

By acting as a central point for information concerning the production of a particular military item, the committee was able to present a current picture of the situation regarding that item on short notice at any time. This meant that production schedules could be apportioned among the various producers with careful regard to the current situation at each plant. Where a producer seemed bogged down with the problem of meeting his present schedule, he could be dropped from consideration for aproposed increase. Where a producer was readily meeting his schedule, an estimate could be prepared very quickly as to how much of an additional load he could be expected to assume. This analysis of capabilities was also useful when reduction in the over-all schedule was necessary. Reductions could be placed with the plant which, for one reason or another, might desire it, or if circumstances were such that no manufacturer was actually interested in curtailing his production, the cutback could be placed where the shift to other production appeared easiest, or where the displacement of labor could be most easily absorbed by other industry in the

---

190. F. O. Chase, Historical Outline of the 37 millimeter Tank and Anti-Tank Gun Industry Integration Committee, Mss. dated July, 1943, p. 11. On file in Historical Section, Office of the Chief of Ordnance.

area. An instance of the working of this system may be noted in the control of scheduling for the howitzer industry.

> Production of howitzers during 1943 was controlled by a system of master scheduling inaugurated late in 1942 whereby schedules for each facility were set at the beginning of each month by the Office, Chief of Ordnance. These schedules were set after receiving recommendations from the committee and District Offices as to production capacity from each facility for the coming month and balancing this against Ordnance requirements considering also the carriage, recoil and fire control predicted deliveries. The howitzer producers were able to plan on fairly definite schedules during this year. Any changes in the requirements were spread over several months so that there was a gradual acceleration or deceleration in production.191/

Where a sudden increase in the production requirement for an item was made as a result of action on the fighting fronts, the desire of the Ordnance Department was, of course, to provide the additional production as soon as possible. Any time lag in such a matter was serious, and all efforts centered on reducing the time lag as much as possible. The usefulness of the integration committee was made evident in a situation of this type which arose toward the end of World War II.

> In the latter part of 1944 when, due to the fortunes of war, it became necessary to substantially accelerate the trench mortar program, the Industry Committee, with its background of experience, demonstrated its real value.
>
> A meeting of the Industry Committee was called in York, Pennsylvania, which was attended by responsible personnel of all trench mortar manufacturers and important subcontractors. (....) The whole problem incident to the accelerated program was discussed and clearly defined, and each manufacturer obligated himself to take his responsibility toward meeting the army needs and in the shortest possible time.
>
> Additional meetings were held at regular intervals to check

---

191. Cline, History of Field Howitzer Committee, op. cit., p. 8.

progress, and the results of these meetings speak for themselves, in that we met the needs of Army Ordnance and on time.192/

Apportioning Schedule Reductions

When a production program changed as a result of a modification in the item produced, the changeover could, in some cases, serve as the occasion for a producer to leave the field. Again, the committee, by possessing accurate knowledge concerning the status and potential of each of its member manufacturers, was able to correctly estimate the scope of operations necessary to meet proposed future requirements, and could discuss the apportioning of schedules in open committee meetings. An example of such a situation occurred in the primer193/ industry in 1943, when it was determined that certain primers would not any longer be made of brass, but that steel would be used instead. At a meeting of the Primer Integration Committee in March, 1943, the assistant chairman announced the impending change in the material of which primers were to be made in the future, and then indicated that member manufacturers would be given an opportunity to express their desires with regard to further participation in the program. He said: "We want to know if you want to change over to steel or just finish up in brass and go out."194/ Each company represented at the meeting was called upon to state its preference in the open meeting, and

---

192. W. J. Fisher, President, A. B. Farquhar Company, York, Penn., to Brig. General G. M. Wells, Office of the Chief of Ordnance, letter dated May 8, 1945. On file in Historical Section, Office of the Chief of Ordnance.

193. A "primer" is the part of the propellant train in an artillery complete round which sets off the main propelling charge.

194. Minutes of Meeting of the Industry Integration Committee on Primers, held at Mellon Institute, Pittsburgh, Pennsylvania, March 15, 1943, pp. 131-132. On file in Historical Section, Office of the Chief of Ordnance.

within a few minutes the entire industry responded, thus furnishing sound data upon which a new apportionment of production schedules could be made.

One of the most upsetting circumstances which any industry could be called upon to meet was a sudden decrease in a production schedule. This was especially true early in the war, when frequently a new contractor had gone to great lengths to recruit a labor force and instill in it the spirit of urgency and patriotism which resulted in high morale and good production records. To tell these people that the item they had been repeatedly urged to produce in greater quantities was suddenly not urgently needed, or was even to be withdrawn from production, was a serious matter.

A typical occasion of this type arose in November, 1942, when requirements for the 75 millimeter M3 tank gun and the 3 inch M7 tank destroyer gun were suddenly reduced because of a reduction in the Army Supply Program. The problem of allocating the new and lower requirements among the various manufacturers was a delicate one, and was approached by calling together the Artillery Branch chiefs of all the Ordnance Districts, and having them consider the problem as a group with the integration committee. In determining the necessary cancellations of contracts, and the new production rates to be established, the group considered the following criteria, as applied to each of the manufacturing facilities:

Minimum use of materials.

Minimum number of manhours as reflected in the unit price of the gun.

The amount of capital the Government had invested in the plant.

The labor supply in the territory surrounding the plant.

The extent of sub-contracting involved in each contract.

Engineering ability of the management.

The possible use of the facility for other war work.

The effect of the program on transportation.

The general all-round ability of the management.195/

It can be seen that by properly applying such criteria, the adverse effects of a cutback could be minimized, and the committee members could feel that they had been granted a reasonable degree of consideration.

Even if no cutback had been imposed upon an industry, it was often asked to review its operations and determine whether or not adequate use was being made of the facilities and equipment which it possessed. It was recognized that in the number of large-scale, rapidly-expanding programs for production of military items which were in progress, there were many opportunities for individual manufacturers to get more of some critical materials or equipment than they needed, or perhaps to have on hand materials or tools used for previous production contracts which had since been completed. Programs for improved utilization of resources could be handled directly with committees, as in the case of a request sent to the assistant chairman of an anti-aircraft gun committee by the Office of the Chief of Ordnance.

> A careful investigation should be made as promptly as possible of the surplus equipment existing in your member plants and recommendations concerning the transfer of equipment of the types and capacity shown should be made to this office as promptly as possible. In making this survey, it should be the intent

---

195. "Minutes of Heavy Tank Gun Industry Integration Committee Meeting at Detroit Ordnance District November 10, 1942," as cited in Historical Record, Heavy Tank Gun Integration Committee, Mss. dated April 16, 1945, Committee Meeting Section.

that no idle machinery, not now required in the production of artillery materiel, should be permitted to remain in a plant when the need for such equipment is critical in other programs.196/

Disposal of Surplus

In addition to assisting in the redistribution of tools and materials made excess by cutbacks, the committees were able to do very valuable work in connection with the disposal of excess parts, materials, tools and equipment resulting from contract terminations. Numbers of letters from committee members testify to the effectiveness of committee programs of this sort. For example, a member of one of the ammunition committees declared:

> We feel that the Integration Committee has done some very valuable work in connection with the disposition of excess parts and material in process involved in terminating contracts and with respect to excesses in the industry due to cutbacks.197/

In similar vein the War Production Historian for Oldsmobile Division, General Motors Corporation, stated that:

> During cutbacks of schedules, and in cases wherein some facilities were being withdrawn from the picture, the Committees were in position to handle excess parts and materials economically through allocation. Such Committee work was also effective during periods of fluctuating schedules.198/

The existence of the committee system also aided in solving problems resulting from excesses because of the close relationships among committee

---

196. Colonel D. J. Martin, Office of the Chief of Ordnance, to Mr. W. J. Squire, Assistant Chairman, 20 mm Anti-Aircraft Gun Committee, Bendix Aviation Corporation, Elmira, New York, letter dated March 17, 1943. On file in Historical Section, Office of the Chief of Ordnance.

197. J. H. Chasmar, Manager, Military Production Division, Remington Arms Company, Inc., Bridgeport, Conn., to General R. E. Hardy, Pentagon Building, Washington, D.C., letter dated July 11, 1945. On file in Historical Section, Office of the Chief of Ordnance.

198. Gordon C. Eldredge, Report Relative to Ammunition Industry Integration Committee, Oldsmobile Division, General Motors Corporation, Lansing, Michigan, June, 1945. On file in Historical Section, Office D. of O.

members which the organization made possible. In commenting on the role of the committees in disposing of excesses, an official of the Dura Division, Detroit Harvester Company, wrote:

> It would be our general feeling that economical disposition of excess parts and materials due to partial terminations has been materially assisted by the committees and in some cases by the better acquaintance of the various contractors with each other.199/

Opinions such as those expressed above indicate clearly that in practice the integration committee was able to offset to some extent the impact of fluctuations in schedules on the operations of member plants. At the same time, the committee was able to provide for the distribution of much surplus equipment and material on a basis which would keep the items in the war production stream. In each instance the committee was, of course, further carrying out the concept of "more and faster production" in the sense that any decrease in degree of seriousness of the effect of cutbacks on the industrial structure as a whole was a gain from the point of view of that structure.

---

199. N. H. Preble, Dura Division, Detroit Harvester Company, Detroit, to Office of the Chief of Ordnance, Washington, D.C., Attention Ammunition Division, letter dated May 31, 1945. On file in Historical Section, Office of the Chief of Ordnance.

Chapter 9

The Industry-Ordnance Team

> Mobilization planning, in its widest sense, is the welding together of broad political, military, economic and psychological factors, both nationally and internationally, based on assumptions as to the most probable time and nature of future war.200/

In the three preceding chapters of this section, we have examined some of the accomplishments of industry integration committees in action. It was found that as a result of their activities substantial increases in munitions production proved possible. In this chapter we will consider some of the difficulties of effective industrial mobilization planning, and will indicate how integration committees can assist in keeping industry sufficiently flexible and adaptable to meet the problems of mobilization.

Early Industrial Mobilization Planning

As was noted in the Introduction and in Chapter 2 of this study, experience in World War I clearly indicated the need for industrial mobilization planning as part of the necessary preparation for possible war. However, it was not until 1931 that the first Industrial Mobilization Plan was published. This was successively revised in 1933, 1936, and 1939. The 1939 version, in its Introduction, contains the following

---

200. Legislative Reference Service of the Library of Congress, Mobilization Planning and the National Security (1950-1960), Senate Document No. 204, 81st Congress, 2d Session, Washington: Government Printing Office, 1950, p. 1.

statement: "Since the actual execution of any industrial mobilization plan must be undertaken by civilian leaders, under conditions which cannot be predicted exactly, the plan must be flexible in its provisions."201/ Though this statement indicates that the earlier mobilization plans contemplated execution by civilian authorities, they were in no case of civilian origin.

> Until the passage of the National Security Act of 1947, mobilization planning was the function of the military. The only officer of the Government specifically charged with this function by law until 1947 was the Assistant Secretary of War--a function actually performed by the career military service.202/

Even though the military staff officers who prepared the mobilization plans before World War II indicated that those plans were to be put into effect through the proper civilian authorities, there was some distrust regarding the extent to which the military would attempt to control the economy if war came. It has long been considered a military characteristic to act quickly, decisively and often drastically when the military official in command determines that action is advisable. The contrast of military methods with those which civilian authorities considered politically expedient was often sharp, and the two positions were not easily reconciled. In fact, "civilian versus military control of any phase of mobilization is a perennial argument and particularly so in the area of mobilization planning".203/ A post-war report of the Bureau of the

---

201. War and Navy Departments, Industrial Mobilization Plan -- Revision of 1939, Senate Document No. 134, 76th Congress, 2d Session, Washington: Government Printing Office, 1939, p. 3.

202. Mobilization Planning and National Security, op. cit., p. 42.

203. Ibid., p. 41.

Budget contains the following comment:

> As shown by the industrial mobilization plan, it was the doctrine of the army that the military should take direct control of all elements of the economy needed for war, once war was declared. Under "total" war, this would include total control of the Nation, its manpower, its facilities, its economy. Starting with this simple and "logical" concept, and being absolutely certain from 1939 on that war was coming, it was natural that the generals and colonels and majors, even those drawn from civilian life, were dissatisfied with the President's slow approach to war mobilization and with his reliance upon civilian personnel in all of the posts which were concerned with labor, industry, public opinion, and the economy.204/

Industrial Mobilization Control and the Military

During mobilization the early tendency for the military to obtain control of important sectors of high power is very marked, even when such authority is not spelled out in law or regulation. The business of the military is war and preparation for war, and the study of past war situations as a basis for intelligent future planning is basic as an area of military interest. When war comes, military minds alone are accustomed to thinking and planning in the highly artificial environment which is suddenly created. In addition, the military man has been trained to seek power and responsibility, not to shun them or to assume them with reluctance. War brings the sudden creation of vastly powerful new agencies, boards and other organizations at the same time that the peacetime economic structure is called upon to undertake immediate and extensive war production responsibilities. The result is a great dearth of executive and administrative talent in almost every field of activity, and the problem

---

204. The United States at War, Bureau of the Budget, Washington: Government Printing Office, 1946, p. 129.

of recruiting suitable personnel becomes critical for even very highly important government positions which are suddenly open. It is not surprising that in these new areas, particularly in the fields concerned with their specialities, it is common to find military personnel gravitating to positions of high power. "Generally, the administration has had to fall back on men in uniform because civilians either could not or would not serve, or serve long enough, to do the job."[205]

Need for a Permanent Mobilization Planning Agency

An important approach to this problem of control of the positions of power in time of war has been that of increasing the mutual understanding of the military and non-military with regard to each other's activities. Since World War II there has been great effort made to keep established many of the bonds that were forged during the heat of war. The recency of that conflict, the vast scale of military production for it with all of the military-civilian relationships such production necessitated, and the high level of military production that has existed since it ended have all served to improve mutual understanding. Various organizations, such as the American Ordnance Association, have continued to foster the maintenance and improvement of such relationships as a raison d'etre, and have actively stimulated intercourse between the two.

Surely, if war were to come in the near future, there would be a much sounder basis for industrial mobilization than the nation has ever before experienced because of this change in attitude and degree of interest. In addition, many of the actual individuals who gained experience in World

---

205. Mobilization Planning and National Security, op. cit., p. 44.

War II would be ready to serve again in a full scale mobilization occurring in the near future. They constitute a great asset, but our mobilization planning must be such that we can have proper forms of organization and selected personnel ready for the mobilization job now and on into the indefinite future. Mr. Baruch states that, "There should be a permanent mobilization agency, composed of civilians, capable of swift expansion in any war emergency."206/ Such an expansion could only be attained by having highly capable individuals actually staffing the mobilization agency, and by having a very important part of their work consist of keeping lines open to other capable executives to fill in around and below them in case of war. A mobilization structure of pre-planned design, with the key spots filled by individuals who knew in general what would be expected of them in time of war, would be a sounder basis on which to build the war production program than that of either World War I or World War II. The non-regular members of the structure -- namely the executives and administrators earmarked for wartime duty from non-governmental fields -- would serve to keep the full-time planners from becoming stale. Their periodic part-time service with the mobilization planning agency would bring the perspective and vitality of their normal activities (as industrialists, educators, etc.) to the mobilization problem with beneficial results.

Manning the Permanent Agency

This problem of maintaining some sort of personnel structure for the mobilization job is serious, and the depth to which individuals can be ear-

---

206. Bernard M. Baruch, "To Prevent War," Reader's Digest, February, 1950.

marked for mobilization service poses serious questions. Perhaps ideally it would be best to have a complete structure, down to the lowest production worker, ready to switch from peacetime to wartime activities. Such being obviously impractical, the question resolves itself into one of, "How far down?" the planning should extend.

> While there are many reasons why it would be desirable to maintain a full corps of skills continuously, keeping them in standby is not economical and the problem becomes one of deciding how the most security is to be obtained from limited expenditures. Without a full staff there is more than ever reason for having the engineering and managerial levels capably staffed with persons who know, plan and are ready to expand. Too much cannot be said about the responsibility that rests on their shoulders.207/

How can the nation mobilize industrially with the greatest speed and efficiency? The planning agencies must solve the problems of personnel, materials, and equipment for the production process, and in addition must assure normal or above normal operation of the services which make modern industrial operations possible -- transportation, banking, etc. In the case of each military item, problems must be subject to quick solution from the top planning level to the actual production line in the plant. To the extent that lack of knowledge exists between levels, the decisions from above may adversely affect the actions of those below, or those below may be working at cross purposes with the intent of those above.

A working system that will forestall such difficulties requires a focussing of attention on all levels of the industrial mobilization pro-

---

207. J. D. Billingsley, E. S. Mathews, and A. H. Sweeney, Jr., The Army Ordnance Arsenal System, thesis submitted for the course in Manufacturing, Harvard Graduate School of Business Administration, September 15, 1947, p. 52.

cess.

> During World War II, skilled workers were in shorter supply than unskilled, engineers were still more scarce and top management leaders were practically non-existent. Would it not, therefore, be wise to develop in peace those skills and talents that we know will be needed and scarce in war, particularly when training of these people will tend to reduce the peak war engineering lead by getting some of it accomplished before war becomes imminent?208/

Any program which envisions the earmarking and training of individuals for service during industrial mobilization, at whatever level, implies that the planning agency understands what is to be produced during that mobilization. In terms of the items of munitions, this is a critically difficult problem in itself, because the development of military items is highly dynamic. Changes in design are the rule, and modifications of accepted designs occur with great rapidity and in great number. When the item is standardized without change for a resonable length of time, the problem of preparing for its production would not be serious.

> If enough really skilled industrial engineers are available and familiar with the product, they can break down the job into semi-skilled and unskilled operations so that almost any man or woman can readily learn to do the majority of the jobs. This means that while it will be possible in peace to avoid carrying many unskilled on the payroll, it will be mandatory that the upper levels be adequately manned.209/

The Problem of Modifications in Design

The usual case for a military item is that its design may be modified or extensively changed with considerable frequency. This is particularly true in the period since 1940, and throughout World War II modifications and changes in design added greatly to the problems of production on both

---

208. Ibid., p. 52.

209. Ibid.

sides. For example, General Heinz Guderian, the "father of the German Armored Force", cites numerous variations which German tank producers were required to make in the late months of 1942.

> In October (1942) tank production suffered further in favor of production of assault guns: Panzer IVs (medium tanks) were diverted to carrying the 75 millimeter L70 cannon and the Panthers (medium-heavy tanks) the long 88 millimeter L71 (gun). Furthermore, 40 to 60 heavy infantry guns were to be built on to Panzer bodies. Hitler also talked of mounting mortars on Panzer IVs; these were to have extra short barrels and be used as mine-throwers. Interesting as all these new designs were, the actual result was simply a decrease in the production of the only useful combat tank available to us at the time, the Panzer IV; and furthermore it was only in this month that the production figures for that tank reached the really very modest total of 100.210/

It is interesting to note that in 1942, when the Germans were having the confusing experience indicated above, the United States produced 10,947 light tanks and 13,746 medium tanks, for a yearly total of 24,693.211/ The American experience indicated that high levels of production were possible despite a certain amount of disruption because of modifications and changes in design. Those in control of Germany apparently were unable to settle on any design for a sufficient time to get substantial production, though the combat situation demanded tanks in quantity. Commenting upon some changes proposed for German tanks as a result of the fighting in and around Stalingrad, Guderian writes:

> There can be no doubt that the tanks available to us at that time were not suitable for street fighting (this in late 1942!); on the other hand the correct solution for the problem was not this constant modification to the design of tanks actually in production, with the resultant creation of countless variations

---

210. Heinz Guderian, Panzer Leader, New York City: E. P. Dutton and Company, 1952, p. 280.

211. Campbell, Industry-Ordnance Team, op. cit., p. 235.

> to the original type, each of which would need innumerable different spare parts. The repair of tanks in the field was being made almost impossible.212/

As a practical matter, it appears that the most complex and difficult items to produce are the ones most subject to change. Though military clothing, food and other such basic items of supply were the subject of intensive research and development, changes in them did not so seriously affect the rate of production as did, for example, changes in designs of tanks or aircraft. Frequently the appearance of an enemy item in battle could suddenly make obsolete all of the same class of equipment with which it was intended to oppose the enemy. The German military establishment, and the designers and industrialists which supported it, faced this situation when the performance of the Russian medium "T34" tank was observed in battle. Guderian writes:

> A group of responsible designers, industrialists and officers of the Army Ordnance Office visited my Panzer Army in November, 1941, with the object of studying at first hand our recent combat experience when fighting the superior Russian tank, the T34, and of deciding what measures should be taken to help us regain technical supremacy over the Russians. The officers at the front were of the opinion that the T34 should simply be copied, since this would be the quickest way of putting to rights the most unhappy situation of the German Panzer troops; but the designers could not agree to this.213/

Industry Must be Flexible and Adaptable

Adaptability and flexibility of the war-supporting industrial system can only be achieved by very close coordination and cooperation between Government and private industry, because in recent times the overwhelming

---

212. Guderian, Panzer Leader, op. cit., p. 280.

213. Ibid., 276.

proportion of munitions has been produced by private manufacturers.

> During every war since 1860 in which the United States has been engaged, American civilian industry has played an ever-increasing role in the manufacture of munitions. This increasingly important role played by industry has been due first to the ability of industry to supply such material by virtue of its state of evolution and growth, and secondly to the increased variety, quantity and requirements of munitions by modern warfare. Government owned arsenals were once the chief supplier of munitions required by our armed forces, but by World War II the requirement was so great that Government owned arsenals were able to produce less than 1% of the total demand. The remainder of the burden fell upon the capable shoulders of American Industry.214/

In practical terms, coordination and cooperation between government and industry in planning for war production must be reflected in tangible contractual relations leading to actual production on an educational order basis, or by making industry responsible for the production of peacetime requirements of the armed forces.

> Industry should carry the bulk of the production load in peacetime as well as in wartime. With regard to research, development, and industrial and production engineering, Industry should carry as much of this load as is practicable from the point of view of their willingness and the reasonableness of cost.215/

Industry Responsible for Production

This concept of industry as the responsible agent for war production was defined in an Order of the Chief of Ordnance dated July 18, 1947, which outlined the mission of an arsenal. This order read in part:

> An arsenal is an Ordnance manufacturing plant where every effort is made to devise ways and means whereby any item assigned to it can be instantly transferred to industry for mass production. An arsenal is not a mass production center; it's a job shop. It must do everything possible to have all necessary production data

---

214. Billingsley, Mathews and Sweeney, Ordnance Arsenal System, op. cit., p. 12.

215. Ibid., p. 75.

> available for the commercial manufacturers who in time of war will mass produce. (.....) In order to accomplish its production mission, each arsenal must work closely with mass producers (industry) and incorporate into its plans and plants the best of industry's ideas.216/

This clear statement of policy to the effect that arsenals were not to be considered as an important source of munitions production was a substantial departure from their historical role. Although in both World Wars, and particularly World War II, the relative importance of their production as compared to civilian industrial production was not great, they had traditionally been considered as important sources of munitions for war. This new announced policy clearly placed upon industry the full responsibility for large-scale munitions production. Under such a policy the role of the Ordnance Corps becomes solely one of planning, guidance and coordination, with the planning and guidance activities based on development work. Upon Ordnance rests the responsibility for intelligently visualizing what is required, preparing a prototype, making the initial production engineering studies required as a basis for mass production of the item, and arranging for tools, gages and materials for its early manufacture. Private industry must operate the actual mass production facilities, improving them as new knowledge is gained, and fulfilling the production schedules allocated by the Ordnance Corps.

In addition, industry can help at various intermediate stages by performing development work under special contracts as subordinate parts of major developmental projects undertaken by Ordnance. For example, in a contemplated new design for a tank industry might be given a contract

---

216. Ibid., p. 99. The citation is from Ordnance Department Order Number 30-47, 18 July 1947, Office of the Chief of Ordnance, Washington, D. C.

for development of a part of the proposed tank system, such as the suspension or traction elements. Research and development projects are quite commonly farmed out in this manner as part of post-World War II procurement, and indicate that industry can normally be expected to participate in both the development and ultimate mass production stages of an item.

Integration Committees Needed for Effective Program

With policy so clearly indicated by stated regulation and by contractual practice, industry's contemplated role in industrial mobilization can be readily visualized. With acceptance of the idea of industrial participation in this manner and on this scale, the problem becomes one of making that participation as effective as possible. The close relationships of industry and government in the process require that devices and procedures for cooperation and liaison be in existence, and in practical operation, for proper effectiveness.

A highly suitable device for the establishment and maintenance of the required relationships would be the retention of the industry integration committee concept into peacetime mobilization planning. The committees, by definition, would interest themselves deeply in a single important military item. They would study its design with the intent of making it more producible; they would lay out production engineering procedures embodying their ideas; they would produce small lots on an educational order basis. Meeting with one another for the specific purpose of maintaining and improving an ability to go into significant production of the item on fairly short notice, they would remain clearly aware of the fact that their responsibility was narrow, clearcut and important in the

sense of actually leading to immediate production of a required military item.

Above the committee, and reaching to the highest levels of power and authority, would necessarily be the structure that established requirements, allocated materials, considered the use of manpower and other resources on a national basis, and generally controlled the pattern of industrial mobilization from the top. The integration committee, with its intensive knowledge of its needs in the tool, raw material, manpower and facilities fields, would be an ideal source of information for the top planning and controlling agencies. Though requirements in the sense of changes in schedules might fluctuate because of factors not under the control of the planning authorities, the ability to interpret changes in requirements in terms of tools, materials, and manpower would be ever-present with the committee system in effect. Committees, organized for production of specific items, and intimately familiar with the production of that item through experience, would be much more sure of their needs than inexperienced producers newly entering a field of production. There would be much less hoarding, and much less over-staffing and over-supplying because there would be much less pressure of uncertainty. The natural tendency to get more than enough, when in ignorance of what a proper amount is, would be greatly modified.

In addition, the association of the government, as represented in this case by Army Ordnance officers dealing with the committees, with industry, as represented by committee members, would of necessity be a live and real relationship. Through the peacetime period the two would work

together on a specific type of problem, and even though the scale was limited when compared to actual wartime production, the association of the two with each other, and with the product, would create a familiarity that would permit an easy and natural transition to a full-scale production basis. The period of adjustment to the problems of war production could be greatly eased and shortened at the actual production level, because those who were actually going to do the job would know what the job entailed, and would be able to judge what would be needed to do it.

SECTION III

ECONOMIC ORGANIZATION AND THE INDUSTRY INTEGRATION COMMITTEES

Chapter 10

Outlining the Sphere of Action of Committees

In the nine chapters of the two preceding sections we have examined the formation of industry integration committees, and noted some of their accomplishments in operation. The present chapter will be devoted to defining the area in which the committees may properly function, as delineated by the various regulations and instructions which grew out of experience in World War II and more recently in the Korean conflict.

The Automotive Council for War Production

The cooperation of manufacturers in the war effort was displayed at various levels in the industrial economy during World War II. The Chairman of the War Production Board emphasizes the significance of such top-level organizations as the Automotive Council for War Production, which was made up of the major manufacturers in the automotive industry, and quotes Mr. Alvan Macauley, Chairman of the Board of the Packard Motor Car Corporation, and President of the Automotive Council for War Production, as follows:

> The Council established a pattern of industrial teamwork for victory. Its purpose was the fostering of complete interchange of mass-production information, time-saving techniques, product improvements, tooling shortcuts and developments.
>
> (.....) Brought together on mutual problems, one-time competitors quickly discovered that they could plan together and work together. And immediately after the first service functions began to operate smoothly, a big step toward even closer

collaboration was taken in the organization of committees through which an actual sharing of productive "know how" could take place.217/

The committees to which Mr. Macauley refers as the ones in which an "active sharing of productive know how" took place were, of course, the Army Ordnance industry integration committees. They were the working level committees where specific things could be done about specific production problems. Though the organizations above them, such as the Automotive Council for War Production, had significant functions to perform with regard to the "big picture", some device such as the industry integration committee was required to highlight, focus upon and solve problems involving specific items at the production line level.

Integration Committees and the Korean Conflict

In Section I above the formulation of the industry integration committees of World War II was discussed. The success of the device in that war was fresh in the minds of many of the individuals -- whether associated with the military, with governmental civilian service, or with civilian industry -- who were confronted with the problem of mobilizing industrially for the problems resulting from the situation in Korea which began in June, 1950.

The Defense Production Act of 1950, as amended by the Defense Production Act Amendments of 1951, furnished a legal basis for the cooperation of manufacturers in the new emergency. This Act provides:

a) The President is authorized to consult with representatives of industry, business, financing, agficulture,

---

217. Nelson, Arsenal of Democracy, op. cit., p. 228.

labor, and other interests, with a view to encouraging the making by such persons, with the approval by the President, of voluntary agreements and programs to further the objectives of this Act.

b) No act or ommission to act pursuant to this Act which occurs while this Act is in effect, if requested by the President pursuant to a voluntary agreement or program approved under subsection (a) and found by the President to be in the public interest as contributing to the national defense shall be construed to be within the prohibition of the antitrust laws or the Federal Trade Commission Act of the United States. A copy of each such request intended to be within the coverage of this section, and any modification or withdrawal thereof, shall be furnished to the Attorney General and the chairman of the Federal Trade Commission when made, and it shall be published in the Federal Register unless publication thereof would, in the opinion of the President, endanger the national security.

c) The authority granted in Subsection (b) shall be delegated only (1) to officials who shall for the purpose of such delegation be required to be appointed by the President by and with advice and consent of the Senate, unless otherwise required to be so appointed, and (2) upon the condition that such officials consult with the Attorney General and with the chairman of the Federal Trade Commission not less than 10 days before making any request or finding thereunder, and (3) upon the condition that such officials obtain the approval of the Attorney General to any request thereunder before making the request. For the purpose of carrying out the objectives of Title I of this Act, the authority granted in Subsection (b) of this section shall not be delegated except to a single official of the Government.218/

The mobilization effort resulting from the Korean situation thus had, after September 8, 1950, when the Act was passed, as strong a basis for industry integration committees as was ever provided in World War II. In fact, the content of the Act of 1950, as amended, upon which integration committees could safely be formulated, "is based on similar provisions of Section 12 of the Small Business Act of 1942, the prin-

---

218. Section 708, Defense Production Act, 1950, as amended, as printed in Backman, War and Defense Economics, op. cit., pp. 437-438.

cipal difference being that, whereas the approval of the Attorney General is required by the Defense Production Act of 1950, only consultation with the Attorney General is required under the Small Business Act".219/

A "Business as Usual" War

In practice, the formulation of integration committees after the Korean incident began was markedly different than in World War II. The policy of the Attorney General was much more stringent and restrictive, and some nine months after the Act was approved and a year after hostilities began one and only one integration committee had received the necessary approval.220/

Basically, the reason why the experience after Korea proved so different is the fact that the urgency and seriousness of the situation never approached that of World War II. From the first, it was almost a "business as usual" war, and the national policy reflected the concept of partial mobilization for an indefinite time.

> The Defense Production Act reflects an awareness on the part of the Congress of the fundamental problem of maintaining competition in a mobilization effort of indeterminate duration.221/
>
> In carrying out the Congressional intent it is apparent that there are fundamental differences between policies appropriate to a long-range defense economy and those of the type with which the country became familiar during World War I and World War II. In a full scale war emergency, an immediate maximum output of war materials is usually essential. On the other

---

219. T. T. Molnar (Colonel) to Colonel Bishop, memorandum dated 5 June 1951, subject: Integration Committees, p. 4. On file in Current Procurement Branch, Office of Assistant Chief of Staff G-4, Department of the Army, Washington, D.C.

220. Ibid., p. 3.

221. Report of the Attorney General of the United States Prepared Pursuant to Section 708(e) of the Defense Production Act of 1950, mimeographed press release, Washington: Office of the Attorney General, December 7, 1950, p. 4.

> hand, during a period of partial mobilization, increase in the productive capacity of the economy may expand the defense potential and thereby afford a long-range measure of national security greater than an immediate increase in military production. The present problem, however, appears to encompass both of these factors, i. e., the immediate necessities and the long-range defense potential.222/

Fear of Increased Economic Concentration

The Defense Production Act of 1950 gave the President authority to promote the national defense

> by meeting, promptly and effectively, the requirements of military programs in support of our national security and foreign policy objectives, and by preventing undue strains and dislocations upon wages, prices and production or distribution of materials for civilian use, within the framework, as far as practicable, of the American system of competitive enterprise.223/

The President had indicated his concern regarding the danger of unnecessarily violating the framework of the American system of competitive enterprise in a memorandum of September 29, 1950, which he sent to those directly concerned with the administration and effects of the Act.224/ The President wrote:

> As I pointed out in my State of the Union Message in January, 1947, during the last war the long-standing tendency toward economic concentration was accelerated. Partial mobilization, in the absence of protective measures, may again expose our economy to this threat and thereby imperil the very system we are seeking to protect. In numerous provisions of the Defense Production Act of 1950, the Congress in-

---

222. Ibid., p. 7.

223. Section 2, Act of 1950 as amended, as printed in Backman, War and Defense Economics, op. cit., p. 404.

224. The Secretaries of Commerce, Interior, Agriculture, Defense, Army, Navy, Air Force and Labor; the Chairmen of the National Security Resources Board, the Board of Governors of the Federal Reserve System, and the Board of Directors, Reconstruction Finance Corporation; the Administrators, of the Housing and Home Finance Agency and of the General Services Administration; the Chairman of the Interstate Commerce Commission.

dicated its concern over this danger to free competitive enterprise.

> In order that this danger may be minimized, it is requested that, in performing those functions delegated to or vested in you by Executive Order 10161, you consult with the Attorney General and the Chairman of the Federal Trade Commission for the purpose of determining and, to the extent consistent with the principal objectives of the Act and without impairing the defense effort, of eliminating any factors which may tend to suppress competition unduly, create or strengthen monopolies, injure small business, or otherwise promote undue concentration of economic power.225/

The Act of 1950 had specifically directed the Attorney General to make, or request the Federal Trade Commission to make for him, "surveys for the purpose of determining any factors which may tend to eliminate competition, create or strengthen monopolies, injure small business, or otherwise promote undue concentration of economic power in the course of the administration of this Act".226/ The Attorney General's first report, which was required within ninety days of the approval of the Act, analyzed the most likely avenues via which the competitive system might be threatened. Under the heading of "Voluntary Agreements and Programs" the following statements were included:

> The use of voluntary agreements and programs to carry out the mobilization program may result in business enterprises, vigorously competitive in normal times, evolving common courses of action to restrict production, retard technical development, limit expansion, reduce quality and raise prices. To the extent that the mobilization program requires joint action by businessmen, opportunities are presented to work out restrictive agreements either within or without the framework of a government-

---

225. Memorandum from President Harry S. Truman dated September 29, 1950, as quoted in Report of Attorney General Pursuant to Section 708(e), December 7, 1950, op. cit., pp. 4-5.

226. Section 708(e), Act of 1950 as amended, as printed in Backman, War and Defense Economics, op. cit., p. 438.

> sponsored program. It is important that the public need shall not become a cloak for concerted action undertaken privately to the public detriment.227/

At the close of the discussion under the heading of Voluntary Agreements and Programs the report stated:

> Finally, it is recognized that activities under voluntary agreements and programs are likely to establish codes of conduct inconsistent with free competition which may continue after the expiration of the authority granted in the Act. It is therefore important that parties to these agreements and programs understand that the immunity provided does not extend to activities beyond the scope of the agreement or continued beyond the duration of the Act. It is likewise important that affirmative steps be taken after the expiration of the Act to restore competition by eliminating institutions and practices fostered by such wartime emergency measures.228/

Business Advisory Committees Authorized

In addition to the general authority for cooperative action contained in Section 708 of the Defense Production Act of 1950, a specific form of cooperation was authorized and established by another section.

> Such business advisory committees shall be appointed as shall be appropriate for purposes of consultation in the formulation of rules, regulations, or orders, or amendments thereto issued under authority of this Act, and their formation shall be fair representation for independent small, for medium, and for large business enterprises, for different geographical areas, for trade association members and nonmembers, and for different segments of the industry.229/

The business advisory committees were of a much more general and inclusive nature than the Army Ordnance industry integration committees, as they tended to deal with broader matters. However, the manner in which

---

227. Report of Attorney General Pursuant to Section 708(e), December 7, 1950, op. cit., pp. 27-28.

228. Ibid., pp. 29-30.

229. Section 701(b)(ii), Act of 1950 as amended, as printed in Backman, War and Defense Economics, op. cit., pp. 432-433.

they were established and functioned was of great significance to the integration committees established after the Korean war began.

As would be expected, both government and industry were interested in some general guidance with regard to the formation of the advisory committees, and such guidance was furnished by the Deputy Attorney General. In a letter dated October 19, 1950, to the agencies charged with defense responsibilities under the Act,[230] he wrote:

> In organizing such (business advisory) committees, there are certain requirements which should be met in order to minimize the possibility of violation of the antitrust laws. Briefly stated these requirements are:
>
> (1) There must be statutory authority for the employment of such committees or there must be an administrative finding that it is necessary to utilize such committees to perform certain statutory duties.
>
> (2) The agenda for such committees and their meetings must be initiated and formulated by the Government.
>
> (3) The meetings to be held must be at the call of and under the chairmanship of full time government officials.
>
> (4) Full and complete minutes of each meeting must be kept.
>
> (5) The functions of such committees must be purely advisory and any determinations of action to be taken must be made solely by government representatives.[231]

Despite this guidance, the Department of Justice received numerous complaints that the business advisory committees, in their formulation and operation, were violating both the letter and the spirit of the program as suggested. These complaints brought forth a second letter

---

230. The agencies enumerated in footnote 224.

231. Peyton Ford, Deputy Attorney General, Department of Justice, to The Secretary of Commerce and others, letter dated October 19, 1950. On file in Office of the Attorney General, Department of Justice.

from the Department of Justice to the same list of addressees. After bringing out the fact that numerous complaints had been received concerning the manner in which the advisory committees were functioning, this letter continued:

> Our attention has been directed to the following improper practices in which such committees have engaged:
>
> (a) Committees have met without the benefit of a government chairman;
>
> (b) Government representatives have lacked proper qualifications;
>
> (c) Agenda have been prepared and meetings have been called by industry rather than by the department or agency concerned;
>
> (d) Subcommittees, panels and other subgroups have not adhered to the requirements established for the full committees;
>
> (e) The requirements with reference to committee representation set forth in Section 701(b)(ii) of the Defense Production Act have not been met; and
>
> (f) Many of the committees, rather than being advisory, have in fact made decisions and exercised functions which properly should reside exclusively in government officials.232/

Army Ordnance Requests Integration Committees

The experience of the advisory committees was observed with great interest by the Army Ordnance Corps, which was anxious to establish a number of integration committees to assist in the post-Korean production program. Without the blanket approval that had existed in World War II, there was considerable question as to how to satisfy the requirements of

---

232. H. G. Morison, Assistant Attorney General, Department of Justice, to The Secretary of Commerce and others, letter dated March 15, 1951. On file in Office of the Attorney General, Department of Justice.

the Attorney General so that approval of a request for a committee could be relatively certain. There was no such spelling out of requirements for the integration committees as there had been for the advisory committees. In discussing this situation a General Staff officer, who was responsible for processing requests for approval of integration committees to The Attorney General, stated: "The requirements of the Department of Justice cannot be formalized."233/ This officer did, however, enumerate five minimum conditions which the Attorney General insisted must be met before there could be any possibility for approval of a committee. These conditions were:

> (a) Approval for integration committees shall be in extreme cases of urgency only.
>
> (b) The Attorney General shall be the judge of the extreme urgency of the request.
>
> (c) Each agreement shall be worked out in itself. There shall be no standard form or procedure.
>
> (d) Integration committees shall not be used where there is any other way out of it.
>
> (e) If requests do not meet Department of Justice requirements, no approval will be given.234/

Seeking an Integration Committee Formula

Faced with the situation of having to carefully justify each case on its own merits, and without a formal pattern for the type of submission desired, it is not surprising that submissions for approval of integration committees were drawn up to meet the requirements for approval of advisory committees, in addition to including other information. A

---

233. Molnar, memorandum on Integration Committees, op. cit., p. 5.

234. Ibid., p. 4.

typical submission is that prepared for the proposed integration committee on Light Gun Tanks and Allied Combat Vehicles, which was sent to the Department of Justice in May, 1951. With regard to the statutory authority for integration committees, the submission referred to Section 708 of the Defense Production Act of 1950, and went on to declare: "The Ordnance Corps, through strict control of its Integration Committee activities, will prohibit any unauthorized and unwarranted use of the committee and will restrict the activities of the committee to the objectives set forth herein".235/

As for the conduct of the committee meetings, the plan specifically provided for meeting the requirements outlined in the Deputy Attorney General's letter of October 19, 1950.236/

> The following requirements for the conduct of meetings shall be observed:
>
> (a) The initiation and formulation of agenda shall be performed by the government;
>
> (b) The meetings to be held shall be at the call of and under the chairmanship of government representatives;
>
> (c) Full and complete minutes shall be kept;
>
> (d) Determinations of action to be taken shall be made solely by government representatives.237/

Some Characteristics of a Proposed Committee

The problem of showing the urgent need for a committee was basic. In the case of the proposed Light Gun Tank and Allied Combat Vehicle Committee, the plan discussed the numerous problems involved in setting up

---

235. Plan and Regulations of Ordnance Corps Governing the Integration Committee on Light Gun Tanks and Allied Combat Vehicles, Washington: Office of the Chief of Ordnance, May, 1951, par. 3. On file in Historical Section, Office of the Chief of Ordnance.

236. See citation number 231.

for production of the items. One important part of the discussion reads:

> The manufacturers of Light Gun Tanks and Allied Combat Vehicles are required to accept designs and specifications for an item foreign to their engineering staffs, to accept and incorporate a continuous series of changes not the result of their own research and development, to establish production lines and manufacture or acquire tools and machines, and to adapt their techniques and processes to the procurement program or to adopt others that are not familiar to them. On the other hand, a peacetime producer develops, through his engineering staff, the designs and specifications for an end item to be made on his production line and incorporates changes to suit his own needs, desires and manufacturing process.238/

The membership was strictly limited to manufacturers engaged in the production of Light Gun Tanks and/or Allied Combat Vehicles. Only seven members were to form the original committee, if approved: Cadillac Division of General Motors Corporation, American Car and Foundry Company, Allis-Chalmers Manufacturing Company, Massey-Harris Company, International Harvester Company, Food Machinery Corporation, and Detroit Tank Arsenal. All of these prospective members held prime contracts for light gun tanks or allied vehicles, and the plan provided that "each new prime contractor under Ordnance Corps contract for the production of Light Gun Tanks and/or Allied Combat Vehicles shall become a member of the committee".239/ The committee was to concern itself only with production problems arising in connection with the production of the items for which the committee was formed.240/ This limitation was considered necessary so that the

---

237. Plan for Light Gun Tank Committee, op. cit.,.par. 5b(1).

238. Ibid., par. 1a.

239. Ibid., par. 5a(5)

240. Ibid., par. 4c.

committee would not be diverted to activities other than those for which it was formed. Definite restrictions on the scope of committee activity were mentioned with regard to procurement. "The Committee shall in no way affect or influence Ordnance Department in the placement of contracts, or in the price, trade, marketing or any other of the incidents of procurement."241/

It has been noted above that the committee plan required that all determinations of action to be taken would be made solely by government representatives. Matters concerning which the committee might make recommendations to the government included the following:

> a) Changes in material and design including standardization of material.
>
> b) The interchange of parts, material, skills, tools, training aids, machines.
>
> c) The allotment of definite production schedules to meet overall scheduled requirements.242/

With regard to all of these types of recommendation, the representatives of the Ordnance Department were required to function in controlling positions. In the proposed committee, as in the World War II committees, the chairman and deputy chairman were Army officers, as was the Ordnance representative. All action was required to be taken by them.

> The contractor-members furnish the Chairman or Deputy Chairman with a list of facilities; the rate of production, actual or projected; an inventory of finished parts; an inventory of material on hand, on order and promised delivery. The Ordnance Officer attached to the Committee compiles the production data. By comparing this data to the requirements

---

241. Ibid., par. 3.

242. Ibid., par. 6.

of the Ordnance Corps, a production schedule can be made by the Ordnance Corps. On the basis of this comparison, the Ordnance Corps will be enabled to determine whether the production capacity, material, and facilities requirements for present and future commitments are met.243/

The Ordnance Officer attached to the Committee will maintain such production, performance and control records and material inventories as are necessary. Based on these records the Committee will be in a position to advise the Ordnance Corps of the most economical method of adjusting production to meet requirements and leading schedules.244/

Tighter Control of Committees by Ordnance

The meetings of the Committee, and the official communications of it, were to be closely controlled by the representatives of the government.

Committee meetings shall be called by the Chairman, Deputy Chairman, or the Ordnance officer attached to the Committee. The agenda shall be prepared by the Chairman or Deputy Chairman. Invitations to attend will include a copy of the agenda of the meeting in order to facilitate proper representation at the meeting.

The Chairman, Deputy Chairman, or Ordnance officer attached to the Committee shall preside at all meetings, which shall be held at offices assigned to or under the control of the Ordnance Corps. The Secretary of the Committee shall maintain and keep minutes of committee meetings.245/

A great tightening of the supervisory role of the Ordnance Corps in this type of committee, as compared to the World War II committee, is apparent. Under the proposed rules and regulations, meetings were to be directly controlled by an Ordnance Corps representative. Meetings could take place only at offices specifically controlled by, or assigned to,

---

243. Ibid., par. 6a.

244. Ibid., par. 6d.

245. Ibid., par. 5b(2), (3).

the Ordnance Corps, and full and complete minutes must be maintained. This is in sharp contrast to the policy on minutes in World War II which reads: "Ordnance representatives on committees or other Ordnance personnel will not require or request committees to maintain minutes of committee meetings."246/ Whereas in World War II the committee, through its assistant chairman (an industry civilian) was able to call a meeting, now only a military official could do so. The secretary of the committee, who was required to be an Ordnance officer designated by the chairman or deputy chairman,247/ must maintain and keep minutes of meetings, in addition to performing other administrative work for the committee.

It is quite obvious that the sphere of action proposed for industry integration committees formed after the beginning of the Korean war represents a substantial departure from that of World War II. In almost every phase, there is a modification of the role of the industry assistant chairman, and an increase in the authority and direction furnished by the government. This change is, to some extent, traceable to the different nature of the Korean war, and to the much slower tempo of defense production to meet its needs. However, it is also an obvious result of the belief that committee activities in World War II were responsible in some degree for the changes in economic concentration which took place during that war in the sense discussed in Chapters 11 and 12 below. It is a reflection of the firm belief that the dominating positions of certain of the great corporations were greatly strengthened

---

246. Ordnance Procurement Instructions 56, op. cit., par. 56,212.5.

247. Plan for Light Gun Tank Committee, op. cit., par. 6b.

by the war production program in World War II. This position had been clearly stated by the President of the United States in his State of the Union Message in January, 1947.

> During the war, this long-standing tendency toward economic concentration was accelerated. As a consequence, we now find that to a greater extent than ever before, whole industries are dominated by one or a few large organizations which can restrict production in the interest of higher profits and thus reduce employment and purchasing power.248/

---

248. Report of Attorney General Pursuant to Section 708(e), December 7, 1950, op. cit., p. 10. It seems evident that the position of the federal government, as indicated by the President and the Attorney General, reflected the distrust of "big business" which was widely prevalent at the beginning of the Forties. The findings of Berle and Means (See A. A. Berle and G. C. Means, The Modern Corporation and Private Property, New York: Macmillan, 1933) and the reports of the Temporary National Economic Committee (1941) did much to create this atmosphere. For the other extreme see David Lilienthal's recent book entitled Big Business which is cited in footnote 43.

Chapter 11

Small Business and the Committees

In the preceding chapter we observed that the organization and methods of operation proposed for integration committees formed to support the production program for the Korean war differed considerably from the experience with committees in World War II. The changes, which were inspired primarily by opinions of the Attorney General, appeared to stem from one major source -- a conviction on the part of the government that the tendency toward economic concentration was greatly accelerated by events of World War II. In the present chapter we will consider some of the industrial experience in World War II as related to the problems of small business.

Why Big Contracts Go to Big Business

The announced policy of the government of the United States in World War II was to encourage the participation of "small business" in the war production effort. Manifestations of this policy in action included such agencies as the Smaller War Plants Corporation, and special organizational entities in each of the military procurement agencies to implement the national policy.

There are numerous difficulties in the Ordnance production field with regard to the maximizing of the role of small business in that field. Ordnance is known as a "typically big-business industry".[249] When a

---

249. J. M. Blair, H. F. Houghton and M. Rose, with assistance of B. Goldwasser, W. S. Johnson and M. J. Ulmer, Economic Concentration and World War II, Senate Document 206, 79th Congress, 2d. Session, Washington: Government Printing Office, 1946, p. 24.

sizable prime contract was negotiated for a complete tank, or a complete truck, or a complete artillery piece, it was not feasible to negotiate with small manufacturers. Such items are the intricate products of large industrial aggregations, and cannot be properly and efficiently produced on a job-lot, piecemeal basis. It would be illogical to attempt to produce complicated items on a mass production basis in other than large, mass production plants. It would be peculiar, indeed, to give to a corporation with a total capitalization of, say, $2,000,000 a prime contract for $50,000,000 or $100,000,000 worth of tanks or trucks. It was assumed that the most likely people to deal with large-scale production were those who had been engaged in it to some degree. There appeared to be no great resistance to this position, as the attitude of the government was that small business could be permitted to participate in the production program in the subcontracting role. Writing of the manner in which the great bulk of war contracts was placed during 1940-41, the Chairman of the War Production Board states:

> In those days, time was the greatest of all scarcities; furthermore, we had to deal with facts, not theories; to do the best we could with real rather than theoretical situations. So the great bulk of the orders went to the giants of industry, then to the sub-giants, and on down the line until finally they began to fan out among the relatively small concerns. This situation made us none too happy; we should have preferred to call in all American industrialists, large, medium, and small, and distribute orders equitably among them. But, as I have pointed out elsewhere, the Armed Forces did the actual placing of orders, and were far more wedded than OPM (Office of Production Management) or WPB (War Production Board) to the principle of using the well-coordinated facilities of big business.
>
> I have heard some criticism of this practice -- and, beyond doubt, it was occasionally and perhaps frequently overworked -- but at the time our concern was not the preservation of small or

> large business as such, rather it was the doing of everything in our power to preserve this country of ours where both kinds of business had been permitted to exist side by side, and the margin between preservation and extinction was, for several months, very slim indeed.250/

This experience in the early part of World War II was duplicated in the early phases of the Korean conflict. Speaking in February, 1951, when the war in Korea was some seven months old, Mr. James L. Kelly, Acting Director of the Office of Small Business, National Production Authority, Department of Commerce, declared:

> When we move into a defense program, or a war production program, invariably we make an assumption that this is going to be a big program, this is a big undertaking, or it is a big war; therefore, the orders are going to be big and they must be placed with big business. The whole thing revolves around the basic concept for a while. It did so during World War II and it is commencing to operate that same way today.
>
> Of course, you cannot go to a small manufacturer to build battleships or B-36's or tanks. They have to be put into the production system and production line of big, well-organized business. But there are many things that drift into the big section of business which could well be done, and perhaps better done, in the smaller plants.251/

Big Business Relies on Small

Though big contracts may logically be awarded to big business, it has long been customary for big business in its turn to have much of its work done for it in the plants of others. For example, International Harvester Corporation has some 26,000 suppliers, and approximately 6,000 dealers.252/ Such a pattern is familiar throughout the manufacturing

---

250. Nelson, Arsenal of Democracy, op. cit., p. 277.

251. James L. Kelly, The Utilization of Smaller Plants in War Production, address before the Industrial College of the Armed Forces, February 6, 1951, Washington: Industrial College of the Armed Forces, 1951, p. 3.

252. Ibid., p. 15.

industry. The problem of small business is not to see how it can get a contract out of proportion to its size, but rather how it can maintain or reasonably increase its scope of operations in the war economy. It is also important that, while maintaining a suitable level of operations, the small manufacturer is careful not to become so narrowly centered on his war production job that he is unable to switch back to some sort of peacetime production when such a switch proves possible.

In considering the proportion of total Ordnance production that was the work of small manufacturers, it is first necessary to define what is meant by "Small Business".

> The War Powers Act in World War II defined small business as any firm employing 500 or less people. The Selective Service Act and the Armed Services Procurement Act of today (1951) define small business as any independent business employing less than 500 people.253/

Though there are some shortcomings in defining a term so rigidly, for statistical purposes it has been customary to define a small business as one employing less than 500 employees. Most of the available data have been collected with this figure as an upper limit, and accordingly it will be used in this study.

Ordnance Contracts to Small Business

Small business participated in the Ordnance production effort in two distinct, though often inclusive, roles. During the period from January, 1943, through July, 1945, a total of 40,221 prime contracts were awarded by Army Ordnance, with a combined value of $24.5 billions of dollars. Of

---

253. Ibid., p. 2.

these, a total of 17,943, or approximately 44.5%, were awarded to small war plants. The value of the contracts awarded to small business amounted to some $3.5 billions, or 14.3% of the total value awarded. Table 1 on the following page indicates the distribution of these contracts by month.

Though the volume of prime contracts given to small business was substantial, it was only a part of the story. It is probable that the greatest dollar volume of Army Ordnance business went to small business in the form of subcontracts. Ordnance prime contractors were not required to report the extent of their subcontracting, as it was considered an unnecessary additional load on already heavily burdened clerical forces.[254] However, though no complete figures on the total extent of subcontracting by Army Ordnance prime contractors were assembled, "from a number of spot checks it appears that at least 50 percent of the subcontractors were small plants and that their contracts aggregated at least 25 percent of the prime contract value"[255] This would make the dollar value of small business subcontracts approximate $10 billions for World War II, on the basis of an overall Army Ordnance program of forty billions.

If the small business share of Army Ordnance contracts was approximately as indicated above -- some $3.5 billions in prime contracts and $10 billions in subcontracts -- it was about in line with the estimates made for World War II war procurement as a whole. A survey of the prime

---

254. . Campbell, Industry-Ordnance Team, op. cit., p. 86.

255. Ibid., p. 87. See also Figures 3 and 4 on the following pages. These represent value and distribution of subcontracts for two of the prime contractors manufacturing 40 millimeter gun mounts.

NUMBER AND VALUE OF PRIME ORDNANCE CONTRACTS AWARDED TO SMALL WAR PLANTS, (LESS THAN 500 EMPLOYEES) JANUARY, 1943, TO JULY, 1945

Month	Number of prime contracts awarded			Value of contracts		
	Total	To SWP	Per-centage	Total	To SWP	Per-centage
1943						
January	1980	915	46.2	$ 437,202,000	$ 78,169,000	17.9
February	1793	944	52.6	587,328,000	145,108,000	24.7
March	1134	530	46.7	511,586,000	89,492,000	17.5
April	1242	594	47.8	581,072,000	87,838,000	15.1
May	1224	540	44.1	601,657,000	73,042,000	12.1
June	1196	511	42.7	820,349,000	101,290,000	12.3
July	1399	654	46.7	900,132,000	104,354,000	11.6
August	1408	637	45.2	1,268,358,000	124,497,000	9.8
September	1374	741	53.9	993,481,000	125,326,000	12.6
October	1327	618	46.6	1,322,235,000	121,712,000	9.2
November	1256	604	48.1	1,011,299,000	87,401,000	8.6
December	1183	568	48.0	543,305,000	71,079,000	13.1
	16516	7856				
1944						
January	1139	545	47.8	724,045,000	79,929,000	11.0
February	835	327	39.2	540,815,000	70,573,000	13.0
March	1097	508	46.3	686,706,000	113,627,000	16.5
April	946	396	41.9	493,961,000	101,057,000	20.5
May	1131	501	44.3	565,597,000	118,329,000	20.9
June	1458	644	44.2	1,191,231,000	157,048,000	13.2
July	1075	523	48.7	656,890,000	133,060,000	20.3
August	1380	584	42.3	627,761,000	121,891,000	19.4
September	1187	515	43.4	432,200,000	96,999,000	22.4
October	1038	450	43.4	718,945,000	81,350,000	11.3
November	1027	421	41.0	480,898,000	82,652,000	17.2
December	1230	539	43.8	790,999,000	118,485,000	15.0
	30069	13809				
1945						
January	1905	753	39.5	1,454,147,000	210,753,000	14.5
February	1747	715	40.9	1,435,198,000	204,441,000	14.2
March	1820	750	41.2	1,134,784,000	208,176,000	18.3
April	1627	701	43.1	1,132,182,000	169,526,000	15.0
May	1311	562	42.9	862,576,000	120,540,000	14.0
June	993	350	35.2	614,519,000	70,686,000	11.5
July	759	303	39.9	393,458,000	57,716,000	14.7
Total	40221	17943	44.5	$24,519,916,000	$3,526,146,000	14.3

Table 1. (Source: Campbell, Industry-Ordnance Team, op. cit., p. 87.)

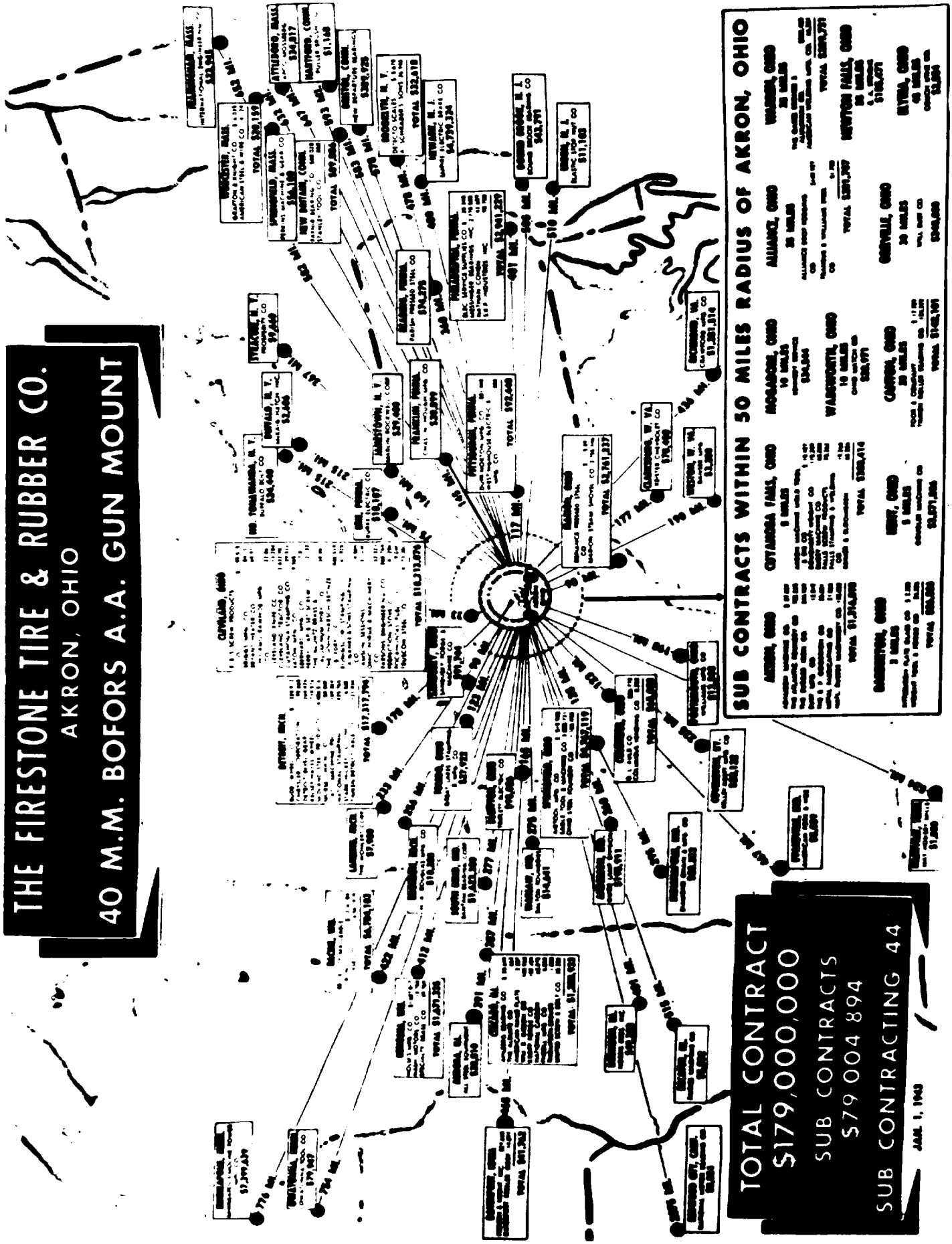


Figure 2. (Source: P. N. Stanton, History of Intermediate Caliber Anti-aircraft Carriage Industry Integration Committee, Mss., 1945, Appendix 7. On file in Historical Section, Off. Ch. of Ord.)

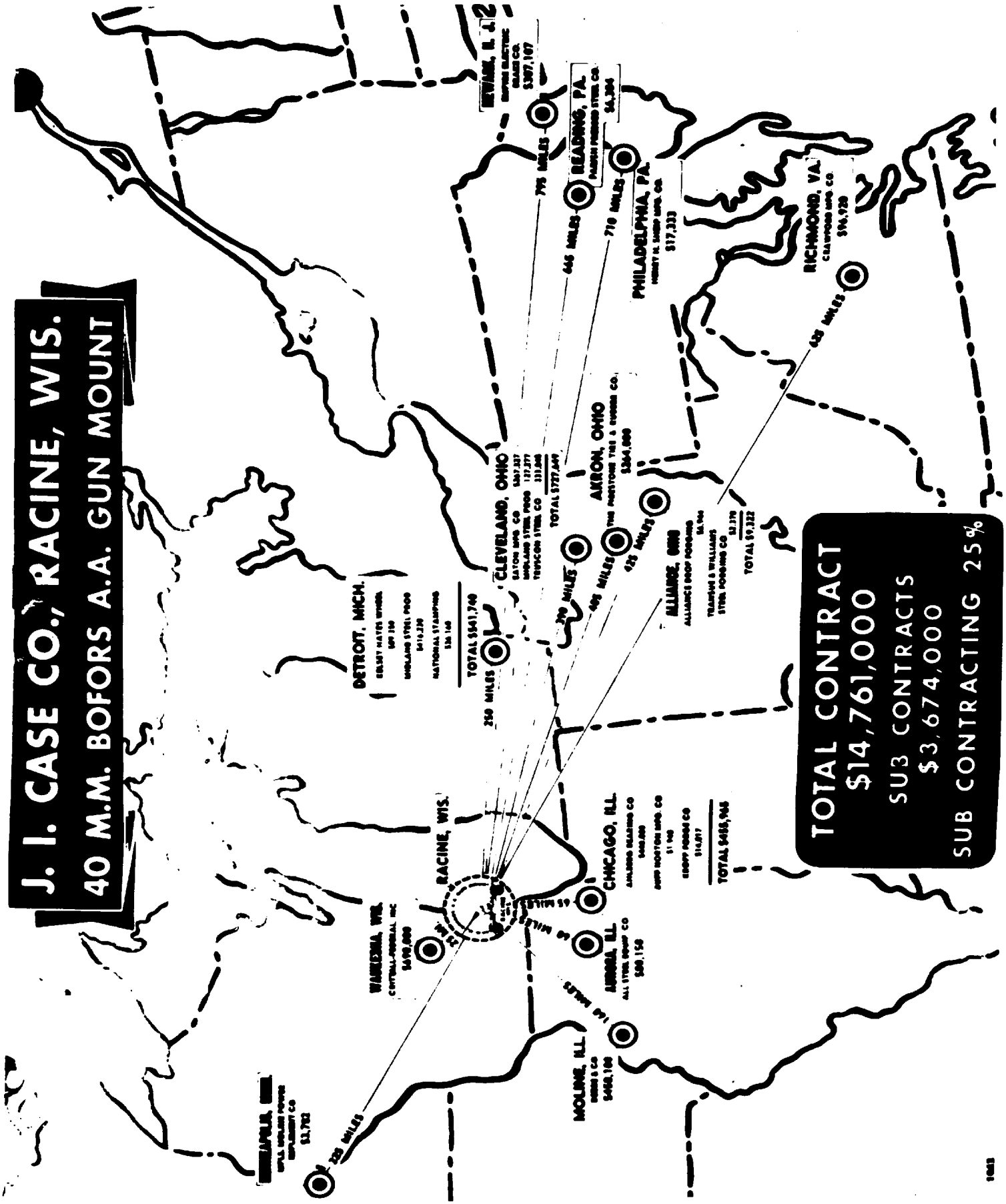


Figure 4. (Source: P. N. Stanton, History of the Intermediate Caliber Antiaircraft Carriage Committee, op. cit., Appendix 7.

and subcontracting records of 252 of the nation's largest corporations was prepared by the Smaller War Plants Corporation in 1943. These 252 companies received the great bulk of all prime contracts awarded during the war, and the percentage passed along to small business in the form of subcontracts amounted to 29.76 percent.256/

Effects of Contracts on Small Business

There was both potential good and potential evil inherent in subcontracts accepted by small business. On the one hand, a contract might mean operation at relatively full scale for a considerable time during a period when business other than war business was very difficult to get. The relationships established with the prime contractor, often a large and rapidly expanding corporation, might be such that they could continue during the postwar period with mutual profit in the field of peacetime production. However, a small enterprise often, in accepting a sizeable subcontract from a large prime contractor, might find itself in the position of putting all its effort into the production of a single product for a single customer. With all output taken by contract, there was no selling problem, and the sales and promotion forces of the small producer might be dispersed or diverted to other work. In addition, the prime contractor was in the position of a supplier of materials and supplies for his subcontractors, or at the least might arrange that proper allocations might be made to the subcontractor by the War Production Board. Without the normal selling and purchasing problems of an independent business, the small subcontractor might often lose his personnel, and his experience,

---

256. Economic Concentration and World War II, op. cit., pp. 32-33.

in both fields, and be at a serious disadvantage if he ever left his status as a captive subcontractor and once more attempted to compete as a regular independent interprise.257/

Integration Committees and Small Business Data

It was Army Ordnance policy to encourage prime contractors to subcontract extensively, and from time to time a distinct effort was made to obtain a picture of what was actually being done. For example, all members of the Field Howitzer Committee were asked to supply the Office of the Chief of Ordnance with actual charts showing the extent of subcontracting which each had done.258/ However, though various localized attempts were made to assemble information on the extent of subcontracting, no complete study resulted. There is no particular evidence to suggest that the total participation of small business in the Ordnance production effort was any greater than 30 percent. If we consider the Army Ordnance total production for the war to approximate 40 billions of dollars, the small business share, including both prime contracts totalling $3.5 billions and subcontracts totalling $10 billions, would, on a percentage basis, amount to some 29.6 percent.

Number of Contracts Not the Important Factor

There is often a tendency to examine the volume of business done by small producers on the basis of number of contracts and subcontracts only. How erroneous this type of analysis can be is proved by the figures pre-

---

257. Ibid., p. 33.

258. J. E. Martin, Office of the Chief of Ordnance, to Mr. John Brown, Chain Belt Company, Milwaukee, Wisconsin, letter dated January 13, 1943. On file in Historical Section, Office of the Chief of Ordnance.

sented in Table 1, page 173 above, where the number and value of Ordnance contracts awarded to small business is listed. It will be noted that while the small business share of the total number of contracts awarded amounted to 44.5 percent of all prime contracts, their value amounted to only 14.5 percent.

An example of confusion in this regard was contained in a speech made by the President of E. I. du Pont de Nemours and Company in January, 1951. Speaking of the use of subcontractors in the building of the Oklahoma Ordnance Works, a du Pont operated, government-owned explosives plant, this official stated:

> Du Pont, a large company, was chosen to undertake the project because it had available the organization and the experience to do the job with all possible speed.
>
> There were 62 smaller firms that came into the project as major subcontractors, ranging from steel riggers to air-conditioning experts. Each of these, in turn, subcontracted some phases of its work to subcontractors of its own, in addition to which there were hundreds of additional firms from whom purchases of materials and services were made. Du Pont alone placed 25,000 purchase orders for this job.259/

Such a listing of numbers of contracts awarded to small business, without indicating the relative value of the contracts, gives little indication of the actual extent of participation of small business in the overall project. The same speech contained a fairly concise statement of the position which the Du Pont Corporation occupies with relation to small business, and is probably representative of the position of big business as a whole.

> It is true that 75 percent of the World War II prime contracts went to the 100 largest companies despite the fact that the government made a determined effort to channel war orders into the hands of small business. But it is not true that this condemned the small businessman to sit on the side-lines and watch the show.

---

259. Henry B. du Pont, If I Were a Communist Spy, a speech by the

> The facts are that the military authorities do not place the major responsibilities for defense contracts on the large corporations because they have any particular affection for big business, or any lack of confidence in small business. Their objective is simply to get big jobs done quickly and efficiently by whatever business unit is best fitted to do the job. They know, and the critics apparently ignore the fact, that when a contract is placed with such companies as General Motors, or General Electric, or Du Pont, it really activates an entire chain of operations in which companies of all sizes and all descriptions participate.
>
> The large company is selected to handle big jobs because it has the resources and organizational experience to muster and direct manpower and technology from hundreds of different sources and funnel them all into the project. It organizes the work, delegates responsibility down the line and procures services and materials as they are needed.
>
> For every large company that participated in the military program of World War II, there were hundreds who shared the assignment through subcontracts and sub-subcontracts and through supplying goods all up the line.
>
> In our own case, the Du Pont Company did about a billion dollars worth of military construction during World War II. Of this amount, 56 percent went to pay the cost of materials and services supplied by thousands of firms all over the country.260/

That the practice of the Du Pont Corporation in World War II with regard to subcontracting is not limited only to that period is evident from the following extract from a Du Pont Supervisory News Letter published in July, 1951.

> Extent to which small business shares in defense contracts awarded to big companies is highlighted in Du Pont's largest government project, construction of the Savannah River project for the Atomic Energy Commission.
>
> During the first few months of the project, Du Pont placed

Vice President, E. I. du Pont de Nemours and Company before the Annual Banquet, Chamber of Commerce, Tulsa, Oklahoma, January 11, 1951, p. 7. On file in Historical Section, Office of the Chief of Ordnance.

260. Ibid., pp. 5-6.

> some 2,900 plant site purchase orders with 821 suppliers. Three-quarters (74.5 percent) of the orders went to small business suppliers, and only one-quarter (25.5 percent) to big business. A supplier was classified as small businesss only if it employed less than 500 persons, was independently owned and operated, and was not dominant in its field. This last requirement excluded a number of companies which were small in all other respects, since the nature of the project calls for services in some specialized fields where small companies are likely to be dominant.
>
> Du Pont plans to subcontract about 40 percent of the total labor requirements for the Savannah River job. It will use small sub-contractors on many types of construction such as excavating, grading, piping, electrical work, on through to exacting instrument controls and electronic devices.261/

Despite the fact that the declared attitude of big business toward small is one of cooperation and sharing, the relative amount of production attributed to small business remains about the same since World War II as it was during that war. "As a group, small plants produce thirty-one percent of the total national output and employ about thirty percent of all persons engaged in manufacturing in the United States."262/

Committees Threaten Small Business

That the operation of committees of manufacturers in World War II might operate to the disadvantage of small business had been recognized early in the production effort for that war.

> Though agreeing in principle with the committee arrangement and prepared to instruct the supply services to make full use of it, the Director of the Procurement and Distribution Division (of the Services of Supply of the Army) saw some disadvantages in it. Unless closely supervised, it tended toward a concentration

---

261. Supervisory News Letter, Vol. 5, No., 7, E. I. du Pont de Nemours and Company, Wilmington, Delaware, July, 1951, p. 3.

262. James L. Kelly, "A Bigger Job for Smaller Plants", Ordnance, July-August, 1951, p. 84.

> of contracts with "well-known firms", whose members on these committees were given "advance information on the procurement and production plans". It was proposed to give the matter careful study, and in the event it was decided to form new committees, caution would be observed in their composition to insure representation of not only the larger producers but also the smaller ones.263/

Though small business may not have gained, and may have lost, in relative importance with respect to big business during the war years, there is some evidence that the biggest firms did not in general increase in the greatest proportion. Mr. Henry du Pont makes this point in his previously cited speech:

> Furthermore, the larger firms, who had the lion's share of the responsibility, did not by any means come away with the lion's portion of the benefits. A study by the Federal Reserve Board, covering the wartime activities of nearly 3000 companies, showed that small and middlesized firms showed a decidedly greater increase in sales, profits and assets than did the larger companies.
>
> The United States Department of Commerce, in a survey of the 1000 largest manufacturing companies, got the same answer. This survey showed that the 200 largest concerns at the tope of this list fell well behind the 300 smaller firms in their rate of growth through the war years. This held true by every yardstick of measurement -- and the most striking difference was in the case of profits.264/

The industry integration committee, by virtue of the extensive interchange of information which it made possible, was an effective means by which the customary suppliers and subcontractors for the various members in their peacetime production activities could be introduced to new producers. When problems arose within the industry committee with regard

---

263. Yoshpe, Organization for Production Control in World War II, op. cit., pp. 108-109.

264. Du Pont, If I Were a Communist Spy, op. cit., p. 8.

to the supply of a particular material or component, the suppliers of the item to all members could be quickly reviewed, and additional quantities of the short material or component subcontracted to those who appeared able to increase output. In a sense, the concept of integration could be passed on to the subcontracting level with considerable success, and this undoubtedly happened in many cases.

Size Immaterial to Beneficial Participation

It was also true that size, of itself, was not normally a requirement for committee membership or participation. Many committees had members of widely varying size, and those that did not often could not for technological reasons. For example, the members of the TNT Committee were all very large producers simply because TNT production in the government-owned facilities which had been erected was in every instance large-scale production. The small producer was sometimes at an advantage because of his status as a committee member, and found himself able to attain objectives that would have proved impossible otherwise.

> The committee organization gave the little fellow, or the manufacturer in the poorer operating position, a court of appeal, an official expediter, and the chance to obtain critical materials which would never have been relinquished by other facilities in a purely competitive arrangement.265/

In the final analysis it appears that small businesses dealing with prime contractors who were members of integration committees were at least as well off as small businesses that had to deal with prime contractors who were not so organized. The committees knew the pattern of subcontractors

---

265. F. O. Chase, Historical Outline of the 37mm Tank and Anti-Tank Gun Industry Integration Committee, Mss., July, 1943, p. 12. On file in Historical Section, Office of the Chief of Ordnance.

for their industry, and could deal intelligently with many of the sub-contractors' problems from a higher level. In addition, various factors arising from the nature of the association of small businesses with committee members suggest that they were greatly helped, during the war period, in their production engineering efforts by their relationships with committee members, and many of the relationships so established could reasonably be expected to bear further valuable fruit in the form of desirable post-war arrangements.

Chapter 12

Expansion of Ordnance Contractors in World War II

In the first chapter of this section it was noted that integration committee organization and operating principles changed considerably from World War II to the Korean war. This change appeared to result from a fear on the part of the government that committee activity had increased the tendency toward economic concentration. The second chapter of the section considered some of the problems of small business, as it operated in the presence of widely organized integration committees. In this chapter the extent of growth of Ordnance contractors in World War II will be examined, and some aspects of integration committee activities as related to that growth will be considered.

Vast Industrial Expansion in World War II

The expansion of the productive facilities of American industry which took place during World War II is unique in the world's history. In six year's time the productive base of American industry was enlarged by more than 60 percent. "The nation's manufacturing facilities in existence in 1939 had cost about 40 billion dollars to build. To this capacity there was added by June 1945 about 26 billion dollars of new plant and equipment."266/ Expansion on such a scale was the result of investment by both the federal government and private industry, with the government supplying

---

266. Economic Concentration and World War II, op. cit., p. 37.

approximately two-thirds of the amount invested. An estimated 10.5 billions of dollars were spent for plant construction, with about 15.5 billions going for equipment. The wartime investment took the form of building and equipping new plants, expansion of existing ones, and converting and re-equipping existing facilities for war production. Approximately 14 billions were spent for new plants, 4.2 billions for expansion of pre-war plants, and 7.8 billions for conversion of pre-war plants to military production.[267]

Figures of such magnitude indicate sweeping and radical changes in the size and nature of manufacturing establishments. Within a period of six years vast new industrial concerns appeared, and great additions to and expansions of already existing establishments were created. The question of who was to own and control these facilities -- government, new manufacturers or old manufacturers -- became of critical interest with regard to the concentration of control of industry.

New Facilities of Latest and Best Type

Before examining the manner in which ownership and control of this new investment was decided, it is significant to note some facts concerning its nature. In general, the quality of the new plants and equipment was very high. Very few of them were built as temporary structures, and most of them were built of the best materials, having been authorized before the War Production Board restrictions on materials became effective. They were built with the most advanced concepts of modern factory layout, and their lighting, power installations, water facilities, and similar items were of the latest and finest types.[268]

---

267. Ibid.

268. Ibid.

The equipment for the new facilities was also of the latest and the best. In 1940 there were in place approximately 827,000 machine tools of varying ages and degrees of efficiency.[269] An estimated three-fourths of these were more than ten years old, and a large proportion were more than thirty years old. The war-inspired expansion of industry beginning in 1939 resulted in the manufacture and installation of 747,000 new machine tools. In general, the new tools were faster, more accurate, more efficient, and more productive than the older tools in existence. Among other advantages, many of the new machines were designed for use with tungsten-carbide cutting tools, which permit high-speed operation and consequently greater production per man and per machine.[270]

Though not all of the new industrial capacity could be used for peacetime production, a very high proportion could be so used with little or no problem of changeover. It was estimated that as much as 20 billions of the war-time investment could be used for peacetime production either immediately after the war, or after minor reconversion. This estimate was borne out to a considerable extent by a report of the War Production Board which indicated that 74 percent of the wartime outlay for manufacturing facilities, both public and private, was expended for facilities to manufacture the same products which the operator was producing before the war. An additional 24 percent was spent on facilities to produce items closely related to the prewar production of the operator, while only two percent was spent on facilities to make items unrelated to the

---

269. Ibid.

270. Ibid., pp. 37-38.

operator's prewar product.[271]

Expansion by Type of Industry

How was this gigantic expansion of capacity divided as to type of industry? Of the total, approximately 15.2 billions of dollars represented investment in the metals and metal-products industries.[272] These are the industries overwhelmingly of interest with regard to the production of Army Ordnance items. An analysis of the total expansion, as prepared by the War Production Board, is presented in Table 2 on the following page.

Two of the items in Table 2 are almost exclusively made up of production facilities operating under Army Ordnance contracts, and can serve as an indication of the manner in which investment expanded in fields of interest to Army Ordnance. Under the heading, "Combat Vehicles, Automobile, Trucks and Other", it will be noted that during the period July 1940 to June 1945 a total expansion of $986 millions was initiated, approximately two-thirds of the total representing investment by the federal government. This investment of approximately one billion dollars in a five year period compared with a net property account for the industry in 1939 of slightly over one billion dollars. In the category "Not classified as to industry" it will be noted that $1,093 millions represents investment in ammunition production facilities, all but $3 millions representing federal investment. This industry did not exist in 1939, and is exclusively an Army Ordnance industry.

Both of these categories of industry were almost completely engaged

---

271. Characteristics of Manufacturing Facilities Authorized, July 1940 to May 1944, War Production Board, January, 1945, as cited in Economic Concentration and World War II, op. cit., p. 39.

272. Economic Concentration and World War II, op. cit., p. 38.

Table 2. Facilities expansion initiated, July 1940-June 1945, and property account and capital outlays in 1939, by industrial groups

(Millions)

Industrial Groups	Property account 1939		Facilities expansion inititated - July 1940-June 1945		
	Gross	Net	Total	Federally financed	Privately financed
Total Manufacturing	$39,588	$21,304	$25,792	$17,169	$8,623
Metals and metal products industries	13,334	7,100	15,239	12,162	3,077
Iron, steel and products	6,349	3,439	3,912	2,866	1,046
Nonferrous metals & products	979	499	2,292	1,884	408
Fabricating industries	6,006	3,162	9,035	7,412	1,623
Machinery, except transportation equipment & electrical	2,337	1,201	986	493	493
Electrical machinery and equipment	845	411	643	343	300
Transportation equipment	2,824	1,550	7,406	6,576	830
Railroads & railway equipment	554	337	30	3	27
Aircraft and parts	114	88	3,791	3,474	317
Ship and boat building	162	80	2,599	2,474	125
Combat vehicles, automobiles, trucks and other	1,994	1,045	986	625	361
Selected chemicals and allied products	2,180	1,189	3,772	2,980	792
Petroleum and coal products	7,565	3,838	1,439	537	902
Other manufacturing[1]	16,509	9,177	3,854	390	3,464
Not classified as to industry[2]			1,488	1,100	388

1. Paints, varnishes, soap, glycerin, drugs, toilet prepartations and animal and vegetable oils included in "Other manufacturing".
2. Included $1,093,000,000 (Federal $1,090,000,000 and non-Federal $3,000,000) of ammunition-loading facilities; the balance represents projects costing less than $25,000, for manufacturing groups excepting "Other manufacturing".

Source: War Production Board

(Source: War Production Board, as cited in Economic Concentration and World War II, op. cit., p. 38.)

in production of items for the Army Ordnance Corps, and the manufacturers were organized into appropriate industry integration committees. The expansion within these industries represented either extensions and additions to the facilities of older producers, or the setting up of new producers within the fields involved.

Most Prime Contracts to Large, Established Firms

The manner in which prime contracts were awarded did not cause any significant amount of production to be awarded to new and independent producers.

> The increases in concentration which took place during the war were due largely to the distribution of the great bulk of the war contracts to a small number of great firms. It was the distribution of the nearly 200 billion dollars of prime supply contracts which was the key to the control of productive resources during the war.
>
> Companies obtaining prime contracts secured thereby the instruments of economic power. They received money in the form of substantial profits for the production of goods, the sale of which was assured. They obtained materials and supplies, since naturally, they were granted priorities and allotments for needed materials, parts, components, etc. And, further than this, they were granted the power of determining how much of these priorities and allotments should be passed down to subcontractors, who and how many the subcontractors should be, and how much of the allocations each should receive.
>
> In addition, the receipt of a substantial prime contract generally gave to a company the right, if it desired to use it, of expanding its own facilities under the extremely favorable amortization and carry-back provisions provided by the tax laws. Companies holding large prime contracts experienced little difficulty in obtaining "certificates of necessity" which allowed them to take advantage of the special amortization tax provisions.
>
> Also, it was the companies that were the principal recipients of prime contracts which operated most of the Govern-

ment owned facilities built during the war, and these companies generally obtained options to buy the plants after the war.273/

Army Ordnance Contractors Among Largest

Dollar-wise, how were the prime contracts for war goods distributed? Of a total of $175 billions in contracts awarded from June, 1940 through September, 1944, approximately two-thirds or $117 billions went to the 100 largest corporations in the nation. Thirty percent of the total contracts awarded went to ten great corporations. Among those ten corporations receiving the greatest volume of prime war-supply contracts, five were important Army Ordnance contractors (General Motors, Ford, Bethlehem Steel, Chrysler, and General Electric), while the other five were aircraft manufacturing facilities. Of the remaining ninety top companies approximately half had large Army Ordnance contracts, with the other half made up principally of aircraft and ship-building companies.274/

With Army Ordnance contractors so liberally represented among the group getting the greatest proportion of contracts, it is only reasonable to assume that they expanded accordingly, through both federal and private investment. An indication of the degree of this expansion can be gained from the table below, which shows the facilities added to the thirty largest corporations in the Fabricated Metal Products Industries during the period 1940-45 (See Table 3 on following page). With very few exceptions these companies were all highly important holders of prime Army Ordnance contracts.

---

273. Ibid., p. 27.

274. Ibid., p. 29-30.

Fabricated metal products industries, other than aircraft and shipbuilding, gross capital assets, 1939, and usable production facilities added, 1940-45, of 30 largest corporations.

(Thousands of dollars)

Corporation	Gross capital assets, 1939	Facilities added, 1940-45			Total usable facilities,
		Privately financed	Publicly financed	Total	
1. General Motors Corp.	769,417	93,626	802.926	896,552	1,665,969
2. Ford Motor Co.	500,000[2]	16,184	355,473	371,657	871,657[2]
3. General Electric Co.	252,686	85,012	206,120	291,132	543,818
4. Chrysler Corp.	115,357	9,055	304,238	313,293	428,650
5. Westinghouse Electric & Mfg. Co.	136,364	37,446	123,367	160,813	297,177
6. International Harverster Co.	207,582	9,646	38,150	47,796	255,378
7. American Telephone & Tel. Co.	134,606	21,142	9,728	30,870	165,476
8. Packard Motor Car Co.	38,291	5.439	102,658	108,097	146,388
9. Bendix Aviation Corp.	18,233	10,766	110.554	121.320	139,553
10. General American Transportation Co.	124,275	6,956	1.394	8,350	132,625
11. Studebaker Corp.	19 976	720	92.933	93,653	113,629
12. Continental Motors Corp.	.484	3,935	96.747	100,732	108,216
13. Allis-Chalmers Mfg. Co.	54,063	,756	41.442	50,198	104,261
14. Radio Corporation of America.	82,884	5,479	15,812	21,291	104,175
15. A. O. Smith Corp.	33,727	5,859	60,327	66,216	99.943
16. Nash-Kelvinator Corp.	25,079	615	72,726	73,341	98,420
17. Pullman, Inc.[3]	77,303	1.891	19,584	21,475	98,778
18. American Car and Foundry Co.	74,682	15,271	8,054	23,325	98,007
19. Caterpillar Tractor Co.	33,170	13,157	50,150	63,307	96.477
20. Sperry Corp.	.356	12 475	72,638	85,073	91.629
21. United Engineering & Foundry	9,351	1.919	75.656	78,171	87.522
22. Baldwin Locomotive Works	64,837	6,962	7.376	14,338	79,177
23. Remington Rand, Inc.	28,175	4,276	44,142	48,718	76,893
24. International Business Machine Corp.	58,179	8,024	9,189	17,213	75,392
25. Briggs Manufacturing Co.	41,848	6.667	19.107	25,774	67,622
26. American Locomotive Co.	45,957	7.353	13,965	20,958	66,915
27. American Steel Foundries	31,081	7,444	26,045	33.489	64,507
28. Timken Roller Bearing Co.	39,476	10,000	12,111	22,111	61,567
29. Hudson Motor Car Co.	46,867	——	13,370	13,370	60,237
30. Edward G. Budd Mfg. Co.	22,775	6,229	28,628	34,857	57,632
Total	$3,100,200	$422,240	$2,835,250	$3,257,490	$6,357,690

1. Excludes those publicly owned facilities which are estimated to be unusable for postwar production
2. Estimated
3. Includes only manufacturing facilities.

Table 3. (Source: Economic Concentration and World War II, op. cit., p. 116.

Expansion in Metal Products Industry

The metal products industry, which produced the bulk of Army Ordnance items, showed a substantial increase in the size of producers, and in the degree of concentration. While the 100 largest corporations in the industry owned only 60 percent of the productive facilities in 1939, they operated 89 percent of all new privately operated facilities created in this field during the war, and, at the end of the war, owned or held purchase options on 80 percent of all facilities, old and new, in this field, which were usable for peacetime production.[275] Some appreciation of the change in concentration in this industry can be obtained from noting the fact that in 1939 only 0.3 percent of the concerns in it had more than 2500 employees, and these employed 18.6 percent of the wage-earners in the industry to produce 21.2 percent of the industry's production; while in 1945 firms employing 2500 or more amounted to 1.6 percent of the total, accounting for 48.8 percent of the wage-earners and turning out 53 percent of the total production.[276] This change compares with a doubling of the production facilities of the industry during the wartime period. It is estimated that the prewar plant of the fabricated metal products industries amounted to about 6 billions of dollars, while the new, usable-in-peacetime facilities added by wartime expansion amounted to 6.3 billions.[277] By comparing these figures with those immediately above pertaining to concentration in the industry, it may be observed that the relative increase represented by the figures on concentration is considerably greater than

---

275. Ibid., p. 114.

276. Ibid., p. 114.

277. Ibid.

the doubling of the overall total of facilities of the industry. This is another way of stating that the relative increase of the big manufacturers was greater than that of the smaller ones. This fact is further illustrated by the distribution of employment by size of company when compared to the situation before the war and near its end. In September 1939, 35.4 percent of the workers in the industry worked in plants employing less than 499 wage-earners, 34.4 percent in plants employing from 500 to 9,999 wage-earners, and 30.2 percent in plants employing 10,000 or more. By December 1944 only 16.1 percent of the wage-earners in the industry worked in plants employing 499 or less, while 27.5 percent worked in plants employing 500 to 9,999 and 56.4 percent worked in plants employing 10,000 or more wage-earners.278/

Expansion in the Automobile Industry

The single industry which produced the greatest dollar value of Ordnance materiel is the automobile industry. Products of the industry included tanks, guns, military transport vehicles, ammunition, and a wide range of other Army Ordnance items, as well as aircraft and other war production. Even before the war the automobile industry was noted for the high degree of concentration found within it.

> Giant corporations are typical of the automobile industry. Almost 70 percent of the volume of business in 1939 was done by corporations with more than $50,000,000 assets, and another 16 percent by corporations of $10,000,000 to $49,000,000 assets.279/

Production of automobiles and trucks is more concentrated than is production in any other major manufacturing industry. In 1935, 87.3 percent

---

278. Ibid.

279. Ibid., p. 146.

of all production was turned out by the four largest corporations, while the top eight produced a total of 94.2 percent. Concentration in the production of motor vehicle bodies and automotive parts was almost as great, with the four largest producers turning out 69.4 percent of the total, and the top eight producing 76.8 percent.[280]

The expansion of the facilities of automobile manufacturers during the war was dramatic. The greatest aggregate expansion of any manufacturer during the war was that of General Motors Corporation. This leader in the automotive field added $93,600,000 worth of privately financed facilities to its holdings during the period 1940-45, and operated federally financed facilities totaling $802,900,000. By the end of the war, General Motors was operating facilities of more than twice the value of its pre-war plant.[281] Table 4 on the following page summarizes plant expansion of the eleven leading producers in the automotive field.

In addition to the automobile manufacturing companies, the producers of automobile parts and equipment were also important holders of prime Army Ordnance contracts. In this industry, also, the amount of addition to facilities as a result of war contracts was dramatic, in one case bringing the post-war value of facilities to a total 15 times as great as the pre-war assets of the company. Table 5 on page 196 summarizes the expansion of this industry during the war period.

Though all of the facilities produced during the wartime expansion were not adaptable to peacetime production, the portions financed privately

---

280. Ibid.

281. Ibid., p. 150.

Table 4. Automobile producers gross capital assets, 1939, and usable production facilities added 1940-45, of 11 largest corporations.

(Thousands of dollars)

Companies	Gross Capital assets 1939	Facilities added, 1940-45			Facilities added as percent of 1939		
		Privately financed	Publicly financed[1]	Total facilities added[1]	Privately financed	Publicly financed	Total facilities added
General Motors Corp.	769,417[2]	93,626	802,926	896,552	12.2	104.4	116.5
Ford Motor Co.	500,000	16,184	355,473	371,657	3.2	71.1	74.3
Chrysler Corp.	115,357	9,055	304,238	313,293	7.8	263.7	271.6
Hudson Motor Car Co.	46,867	—	13,370	13,370	—	28.5	28.5
Packard Motor Card Co.	38,291	5,439	102,658	108,097	14.2	268.1	282.3
Nash-Kelvinator Corp.	25,079	615	72,726	73,341	2.5	290.0	292.4
Studebaker Corp.	19,976	720	92,933	93,653	3.6	465.2	468.8
Willys-Overland Motors, Inc.	11,555	1,523	17,524	19,047	13.2	151.7	164.8
Hupp Motor Car Co.	8,031	—	—	—	—	—	—
Graham-Paige Co.	8,002	394	5,819	6,213	4.9	72.7	77.6
Crosley Corp.	4,636	444	2,861	3,305	9.6	61.7	71.3
Largest 11 companies	$1,547,211	$128,000	$1,770,528	$1,898,528	8.3	114.4	122.7

1. Excludes thos publicly owned facilities which are estimated to be unusable for postwar production.
2. Estimate

Source: Moody's; War Production Board

(Source: Moody's and War Production Board, as reproduced in Economic Concentration and World War II, op. cit., p. 150.

Table 5.

Automotive parts and equipment producers' gross capital assets, 1939, and usable production facilities added 1940-45, for 8 largest corporations.

(Thousands of dollars)

Companies	Gross Capital assets, 1939	Facilities added, 1940-45			Facilities added as percent of 1939		
		Privately financed	Publicly financed[1]	Total facilities added[1]	Privately financed	Publicly financed	Total facilities added
Briggs Manufacturing Co.	41,848	6.667	19 107	25.774	15.9	45.7	61.6
A.O. Smith Corp.	33,727	5,889	60,327	66,216	17.5	178.9	196.3
Borg-Warner Corp.	26,766	5,871	7.486	13.357	21.9	28.0	49.9
Electric Auto-Lite Co.	26,494	3,734	8.270	12,004	14.1	31.2	45.3
Bendix Aviation Corp.	18,233	10,766	110.554	121 320	59.0	606.3	665.4
Eaton Manufacturing Co.	13,002	2,137	25,952	28,089	16.4	199.6	216.0
Houdaille-Hershey Corp.	12,706	1,209	27,670	28,879	9.5	217.8	227.3
Standard Steel Spring Co.	2,943	1,843	45,057	46,900	62.6	1,531.0	1593.6
Total	$175,719	$38,116	$304,423	$342,539	21.7	173.2	194.9

1. Excludes those publicly owned facilities which are estimated to be unusable for postwar production.

Source: Moody's; War Production Board

(Source: Moody's and War Production Board, as reproduced in Economic Concentration and World War II, op. cit., p. 153.)

can be assumed to be completely adaptable to ordinary civilian production. In addition, it is reasonable to conclude that the prime contractors operating government-financed facilities would have a clear understanding as to what parts of such facilities they might want, and also have the first chance at obtaining them. In general, the war-constructed capacity would tend to remain in the hands of automotive producers because of the opportunities open to them for retaining them, and because as a group they were more likely to be able to provide the necessary capital than many other groups. In 1946 the following comment was made regarding the probable disposition of the war-constructed facilities in use by the automobile industry.

> The facilities in the automotive industry are readily convertible, possess efficient assembly-line facilities, represent a hugh public investment, and can be used to produce a variety of consumers' durable goods, of which automobiles are only one possibility. The major automobile companies can afford to buy or lease them. (.....) The possibility of other "outsiders" taking over similar facilities is, in part, limited by the amount of capital required.282/

Committees in Automobile Industry

The automobile manufacturers, and the producers of automotive parts and equipment, were members of the various industry integration committees in accordance with the particular items for which they contracted. The narrow definition of the term "industry" as used with regard to the committees (see page 58 above) resulted in a situation wherein a single manufacturer might be a member of numerous integration committees. However, committee activity was carried on by those corporation personnel who were

---

282. Ibid., p. 153.

directly concerned with the item integrated, thus placing it on a commodity rather than a functional basis. The result of such participation, however, was the building up of a fund of knowledge concerning the facilities, both pre-war and wartime, of competitors and potential competitors in the fields of primary interest to the participating manufacturers. There was ample opportunity and information for the manufacturers holding Army Ordnance contracts to compare their facilities with those of others, and to apply this knowledge to their plans for the post-war period.

Difficult to Assess Committee Influence on Expansion

The fact that industry integration committees were organized around the production of one item, or a very limited group of closely related items, makes the problem of identifying their exact role with regard to the expansion of industry very difficult. In a great number of cases a single corporation held a variety of contracts, each requiring membership on a separate integration committee. In others, though the corporation might have contracted for only a single item, that item was of a wartime nature only, and the corporation's postwar planning would include the necessary shifting from the wartime to a peacetime item. Though the information, relationships, and experience obtained from participation in integration committee activities would be basic to the formulation of their postwar programs, these corporations actually expanded around and above the facilities with which they worked during World War II. Their planning was necessarily on a broader and more inclusive basis than that delineated by integration committee experience, and their postwar expansion, though doubtless owing much to information obtained from committee participation, can

not be properly viewed as resulting primarily from such participation.

In general, contractors in the fields of primary Army Ordnance interest, such as the metals fabricating industry, were marked by a dramatic degree of wartime expansion. Varying but substantial percentages of the facilities created in this wartime expansion were adaptable to peacetime production, and the tendency was for the contractor most directly concerned with that particular facility to take it over. Often ownership of government-financed facilities was obtained under highly favorable terms.

Certain facilities, such as those built specifically for the production of explosives, and for the loading of ammunition, were strictly of a war production nature. Plants built to make TNT or smokeless powder cannot generally be modified by practical means to produce peacetime products. The same is true of assembly plants built for the assembling and loading of ammunition. However, some of the tools and equipment of such plants are of the general purpose type. In the disposal of surplus government material after the war, many of the machine tools, vehicles, and other such non-specialized equipment of the explosives works and loading plants were sold, and the prime contractor who had operated the plant in which they were used was in a position to know better than anyone else the value of such equipment, and to know when, where and on what terms it was being offered.

The prime contractors, and the larger manufacturers in general, were also most likely to be called upon to maintain the facilities which the government decided to retain in a "standby" condition. It became a policy for the Army Ordnance authorities to contract with some private manufacturer to maintain the buildings and equipment of the reserve plants in such con-

dition that the plants could be placed in production on relatively short notice. This required a considerable organization at many of the plants, as the plants frequently represented investments of more than a hundred million dollars per plant, and often consisted of hundreds of buildings located on tracts many thousands of acres in extent. When wartime prime contractors accepted a standby maintenance contract of this type, they were in effect expanding their operations as compared to their prewar scope. In addition, they could be certain that their presence in the plant to carry out the maintenance job would be an excellent entree into the role of prime contractor to operate the plant on a full-scale basis should the need for reopening the plant ever again arise.

SECTION IV

CONCLUSIONS REGARDING INDUSTRY INTEGRATION COMMITTEES

Chapter 13

The Stimulation of Industrial Progress

We have examined various aspects of the background, formation, history and performance of industry integration committees in the twelve chapters of the three previous sections, and have considered their relationship to small business and to the apparent tendency toward increasing economic concentration. In the present section we will place the committee in a broad relationship to the economy as one of the tools for stimulating industrial progress. We will examine the opinions of some important participants in the committee program in an attempt to gain a general understanding of their value to the nation, and in a final chapter we will discuss the committee device as a permanent factor in the industrial mobilization planning of the nation.

Pressures of War Foster Improvements

It has long been recognized that warfare is not wholly negative. When large portions of the London slums were destroyed by German bombs, the rebuilding tended to consist of a better type housing than that destroyed, and probably little short of war could have caused the razing of many such areas. War is likewise recognized as a stimulus to improvement in many other fields -- medical, agricultural, mining, manufacturing and almost every branch of economic and social activity feels its spur. In some, the impetus comes from patriotic feeling, or a desire to help a particular

cause. But in most fields of activity, the stimulus which war gives is the stimulus of money, and of what money means in terms of manpower, equipment and facilities.

The history of almost any item of military equipment in World War II is a history of improvement in the item, and in the processes for making it. During peacetime, when military items were produced in small quantities for relatively non-critical uses there was no great pressure to improve them, and few critical eyes of industrial experts from private industry examining them with the idea of improvement. With the coming of war, requirements for military items assumed astronomical proportions, and private industry had the responsibility for producing the major share of them. Though private industry had been consulted in some degree during the industrial mobilization planning of the 1920s and 1930s, the actual degree of cooperation on specific production problems had not been great. Only educational orders, or pilot line activities involving actual production engineering, could approximate the conditions of mass production, and the money expended for this practical type of preparation for war production had been very limited.

From 1939 on, private industry was exposed at an increasing rate to the requirements for production of military items, and the problems involved. Money became available in rapidly increasing amounts, and when war finally was declared, the floodgates opened. In speaking of the sudden availability of funds to one sector of manufacturing -- the automobile industry -- Mr. Nelson declares: "The Armed Services, which had been picking gingerly at this industrial colossus, prior to Pearl Harbor, completely

enveloped it, and in only a few weeks its orders totaled about $11,000,000,000."[283]

If we use the automobile industry as an example of American industry as a whole, and in the field of Army Ordnance production it is certainly the most significant on both a dollar and a volume basis, we find it a logical source for improvement in the design and in the production methods for making almost any metal fabricated item. "The industry has undoubtedly the greatest reservoir of technical and mechanical talent, the greatest pool of inventive skills, ever assembled."[284] Here was a closely knit industry, to a considerable extent concentrated geographically, which was accustomed to solving design and production problems in a competitive industry.

> There were several good reasons why the motor magnates and the scientific sorcerers who work for them were able to outproduce the Germans and the Japs:
>
> The first is a technical reason, mass production and standardization, refined here beyond anything conceivable in the rest of the world.
>
> The second is that they learned how to cooperate, exchange patents, and get along in friendly fashion, despite the hot competition which always existed.
>
> The third is the competition itself, which went on in spite of the association type of fraternalism. The companies' competitive instinct was so great that when war business came along and the firms were no longer competing with one another for the favor of the public, they continued to compete in their efforts to set production records, and in the excellence of their products.
>
> The fourth is the unbelievable skill of their corps

---

283. Nelson, Arsenal of Democracy, op. cit., p. 217.

284. Ibid., p. 212.

> of technicians, to whom a problem was exciting in itself, whether it involved new automobile gadgets or a new principle in the construction of guns or shells or plane parts or marine engines. Probably the world has never witnessed such a powerhouse of technical brilliance, training and inspiration.285/

Improvements Resulted from Combined Action

It is not difficult to cite numerous instances of improvements in design, manufacturing short-cuts, substitutions of more available materials or simpler processes, and similar benefits which the automobile industry was able to contribute to improve war production whenever it was given a job to do in World War II. When the scientific and engineering knowledge of the industry was focussed, by means of money and competitive spirit and patriotism, on a particular requirement, the result was almost always a quick and effective solution of the problems involved. Mr. Nelson cites a few of the progressive ideas which were produced by members of the Aircraft Engine Committee of the Automotive Council for War Production:

> Centrifugal casting of cylinder barrels as a replacement of forging, a method which, pioneered and perfected by one automotive company, has been offered to all companies as a means of speeding production, conserving scarce steel, and releasing hard-to-get forging equipment to other war tasks.
>
> A general sharing of aluminum foundry techniques which, developed by one company, have widened a serious bottleneck in the casting of an air-cooled engine cylinder head by reducing foundry scrap losses from a former average of 50 percent to the present average of less than six percent.
>
> The development of a coolant method which, used in grinding outside diameters of pistons, improved surface finish 100 percent and extended grinding wheel life 1,000 percent.286/

---

285. Ibid., p. 213.

286. Ibid., p. 229.

Our war effort was marked by thousands upon thousands of achievements such as these -- some, of slight importance to the overall war effort, others of great importance. Speaking before the Industrial College of the Armed Forces in November, 1948, General Brehon Somervell, who headed the overall Army procurement program in World War II, stressed the great significance of invention and improvement made during the war by the manufacturers who were actually engaged in production on the very items they were improving.[287] To General Somervell and many others the ability to constantly improve production efficiency was one of the great industrial achievements of the war.

Improvements Not Stimulated in Germany

The medium within which American industry worked, and which was so favorable to the growth of new ideas and to progressive developments in the fields of munitions production, was a different one from that in which the German scientific and industrial effort was being nurtured. Actually, the Germans had a considerable head start on the rest of the other nations, "for the Nazi state harnessed its energies to the preparations for war long before our nation awoke from its daydreams of eternal peace".[288] As a result of the concentration on preparation for a coming war, the Germans made great progress in the development of new ideas. The number and variety of the projects which they undertook is astounding to those who study them now. For example, in 1944 the German scientists were working on

---

287. Brehon Somervell, Concurrent Planning by Industry, Washington: Industrial College of the Armed Forces, November, 1948, p. 15.

288. Hanson W. Baldwin, The Price of Power, New York: Harper and Brothers, 1948, p. 221.

eleven different principles for the proximity sensing system of a proximity fuze for artillery projectiles and bombs, and more than 35 separate fuzes of this type were being developed.289/ This variety and volume is typical of other items on which intensive development work was being carried forward. "In nearly every field of the application of science to the battlefield -- that is, in research and development applied to weapons -- the Germans, in the last war, were well ahead of us."290/

Fortunately for the allied world, the abilities of German scientists and engineers were almost completely frustrated by those who controlled them. The contrast between conditions under which the Germans worked, and those which existed in our country, can be clearly noted by examining the record of the development of the atomic bomb.

> The atomic bomb, it is too easy to forget, represented chiefly a triumph of American organizational talent and production know-how; the scientific synthesis which had to precede the engineering and development work was in large measure the product of the minds of foreign-born scientists.291/

In describing the American effort to produce the atomic bomb, Dr. Vannevar Bush, referring to the manner in which the various organizations concerned with the development of the weapon functioned, writes:

> If certain physicists thought the organization was functioning badly in certain respects, they could walk in on the civilian who headed that aspect of the effort and tell him so in no uncertain terms. They not only could, they most certainly did; and the point is that there was no rancor, and old friendships were not destroyed in the process. If civilians and military disagreed, as they often did, there were tables about which

---

289. German Proximity Fuze Development, Department of Ordnance, U. S. Military Academy, West Point, New York, 1950, p. 1.

290. Leslie E. Simon, German Research in World War II, New York: John Wiley & Sons, 1947, as cited in Baldwin, The Price of Power, op. cit., p. 221.

291. Baldwin, The Price of Power, op. cit., p. 221.

> they could gather and argue it out. Punches did not need to be pulled, and no one kept glancing over his shoulder. (.....) If a young scientist had an idea he did not have to pass it through a dozen formal echelons and wait a year; he could talk it over with his fellows and with superiors of accepted eminence in his own field and be sure it would be weighed with unbiased judgment by men of competence.292/

This approach to the serious business of producing the atomic bomb, or of other weapons of war, proved its effectiveness as history shows. Cooperation, informality, tolerance, an attempt to understand the point of view of another, are significant aspects of the unified program which gave us such truly decisive weapons as the atomic bomb and the proximity fuze. Yet the Germans, who started far ahead of us in both the atomic weapon and proximity fuze fields, never approached having either item ready for battle use.

Germans Handcuffed by Lack of Cooperation

The German failure to progress rapidly was not attributable to bomb damage or to shortages of materials or personnel. It was not a result of lack of interest, for the obsession of Hitler with the concept of a decisive secret weapon was known internationally. The failure resulted from the absence of the very elements which were bringing success to the Allied cause. The scientists and engineers engaged in the German development programs were faced with a lack of understanding by the people above them, and with a lack of effort on the part of those people to understand. They were denied cooperation. They were subjected to rigid and senseless formality. They were frustrated by ignorance and intolerance. In describing

---

292. Vannevar Bush, Modern Arms and Free Men, New York: Simon and Schuster, 1949, p. 206.

the reasons for the failure of the German scientists and engineers to make more progress in their efforts to develop an atomic weapon, Dr. Bush writes:

> A perusal of the account of German war organization shows the reason. That organization was an abortion and a caricature. Parallel agencies were given overlapping power, stole one another's materials and men, and jockeyed for position by all the arts of palace intrigue. Nincompoops with chests full of medals, adept at those arts, presided over organizations concerning whose affairs they were morons. Communications between scientists and the military were highly formal, at arm's length, at the highest echelons only, and scientists were banned from all real military knowledge and participation. Undoubtedly the young physicist who penetrated to the august presence of the Herr Doktor Geheimrat Professor said ja emphatically and bowed himself out, if he did not actually suck air through his teeth. The whole affair was shot through with suspicion, intrigue, arbitrary power, formalism, as will be all systems that depend for their form and functioning upon the nod of a dictator. It did not get them to first base in the attempt to make an atomic bomb.293/

Americans Stimulated Cooperation

The American concept of industry-government cooperation, as exemplified by the Army Ordnance industry integration committees, provided the effective pattern for development and production of military items that was missing in Germany. As was previously noted (see pages 41-42 above) the Germans were not all unaware of their errors, and Albert Speer tried to remedy the situation with some success. Yet the overall aspect of the German development and production effort was marked by the unfavorable system described by Dr. Bush. Even in the American war effort, not all producers had been properly organized for effective cooperation in the overall production effort. Commenting on the effectiveness of the military services as the executing agencies of economic mobilization, Mr.

---

293. Ibid., pp. 207-208. See also Leslie E. Simon, German Research in World War II, New York: John Wiley & Sons, 1947, Chapter V.

Baldwin writes:

> The Army, particularly Army Ordnance, which is the real "father" of modern industrial mobilization, has learned its lesson well, and the surface navy also has learned through bitter experience. Both are well organized to take advantage of the talent and ability of industry (.....) But the U. S. Air Force in particular and the Navy's air arm have lent chiefly lip service to economic mobilization.294/

In the above citation, Mr. Baldwin was discussing the situation after World War II, when integration committees were no longer authorized, but the industrial mobilization planning of the Army and the surface Navy continued to stress friendly and cooperative relationships with industry as a basic requirement for intelligent expansion in time of war. This cooperative approach contrasted sharply with that of the air services, who "have been jealous of too much civilian influence".295/ Mr. Baldwin goes on to quote Mr. H. H. Rosenheim, former director of the Industrial Preparedness Staff of the Air Materiel Command, in testimony given in late 1947 before the President's Air Policy Commission:

> Not a single industrial advisory committee has been created by the Air Force for the tremendous job of mobilizing one third of this nation's industrial capacity (the estimated amount needed to support our air forces in war), nor is one single representative of industry now on duty in a responsible capacity either at Air Force Headquarters or at the Command responsible for industrial mobilization -- Air Materiel Command at Wright Field.296/

This non-cooperative attitude of the air services was doubtless more marked at the particular period between World War II and the Korean conflict than at any other time, and is cited here only as an example of the ease with which an attitude of non-cooperation can grow up. For such an

---

294. Baldwin, The Price of Power, op. cit., p. 249.

295. Ibid., p. 245.

296. Ibid.

attitude to become the accepted relationship between the military services and industry would be disasterous to economic mobilization planning.

> Civilian, not military, control must guide economic mobilization in war and in peace. This does not mean the exclusion of the military from economic mobilization; no plan that does not include the military and give great weight to their programs, policies and opinions will work. The military must have a big voice in the "What, when and where" of the program; the civilian must decide the "how". In the strictest sense economic mobilization is the product of civilian and military teamwork. But in the final analysis the civilian must predominate.297/

The Science-Industry-Government Team

The teamwork of science, industry and government which was a characteristic of World War II made possible the Allied victory. "The big factories, rather than the big battalions were the principal architects of victory in World War II,"298/ and the big factories were the fruit of scientific research and engineering development applied intelligently to the output of war materiel. The constant improvements in methods, techniques, and in the items themselves were an additional fruit of this cooperating group. It is highly questionable if the U.S.S.R. has anything that can approach the developmental and productive ability that has shown itself to be characteristic of the American system at war.

> The type of pyramidal totalitarian regime that the Communists have centered in Moscow is an exceedingly powerful agency for cold war. It is capable of holding great masses of people in subjugation, indoctrinating them in its tenets, and marshaling them against the free world. It can force its people to enormous sacrifice and thus build great quantities of materials of war. It can educate large numbers of men and women in science and engineering, construct far-flung institutes, mechanize agriculture, and ultimately create mass production of the manifold things it needs. But it is not adapted for effective per-

---

297. Ibid., p. 239.

298. Ibid., p. 233.

> formance in pioneering fields, either in basic science or in involved and novel applications. It has many of the faults of the German dictatorship, magnified to the nth degree. Hence it is likely to produce great mistakes and great abortions.299/

The genius of the United States for "production engineering" is an internationally recognized phenomenon. Two famous examples from the experience in World War II are often cited to exemplify this characteristic. In the case of both the proximity fuze and the atomic bomb, various other nations were known to have had the basic knowledge required for production of the item, but they were unable to produce it as a military weapon. In the case of the radio proximity fuze for artillery ammunition, the fuze, which is less than three inches in diameter at its widest part, and less than nine inches long, must contain a miniature radio transmitting and receiving station, in addition to many other complicated mechanisms. The production of radio tubes small enough to be used in this system, and still strong enough to withstand the gigantic forces which are engendered when the fuze is fired as part of an artillery projectile, was one of the great triumphs of American design and production engineering. "An indication of the significance of this achievement is obtained from the record of the German attempts to build proximity fuzes. So insurmountable did they consider the problems of designing a radio tube which could be fired from a gun that they decided the outlook was hopeless and never tried it, although they attempted all sorts of other proximity devices which ultimately proved inadequate."300/ Such dramatic accomplishments made possible

---

299. Bush, Modern Arms and Free Men, op. cit., p. 209.

300. Chester H. Page and Allen V. Astin, "Survey of Proximity Fuze Development", American Journal of Physics, March-April 1947, p. 99.

the really great "secret weapons" of World War II, and they were repeated at all levels and in varying degrees of importance with regard to thousands of other items of military equipment in that war.

The "Improvement Factor" Adds to Nation's Strength

The factor demonstrated by American scientists and engineers to do the impossible, or to do the possible quicker, and in greater quantity, is one of the great assets of the nation in any mobilization effort. It is a tangible factor, but not so tangible that it can be measured. However, any carefully drawn estimate of productive output could safely contain a plus allowance for the contribution of this improvement or "ingenuity" factor to the ultimate result. For example, if in military production planning for an item of ammunition, the planners conclude that with known tools, equipment and methods they could turn out 100,000 units monthly, it can safely be assumed that if actual production schedules were let for such an item, and production started, then very soon the rate would be 100,000 units monthly plus some additional ones. The added production would result from the improvements made when the technicians and engineers began to examine the performance of equipment and effectiveness of methods in an actual mass production situation. This was almost invariably the experience in World War II, and rare, indeed, was the situation in which production rates set on a reasonable basis were not quickly exceeded as a result of such progress. This plus factor became so great in the TNT industry, as mentioned previously, that from 1943 on there was extensive overcapacity in existence in that industry. It is probable that a plus factor of 10 percent could be safely allowed for almost all types of production which, under mobilization, would

suddenly be brought under the powerful focus of the talents of the engineers, technicians and production experts.

The perpetuation of this characteristic is of great importance. In time of actual industrial mobilization, the integration committee affords an ideal agency for its encouragement and development. Within the committee the experts of industry are brought into direct contact with the problems pertaining to a particular item. If the solution is possible within themselves, they can discover it and make it available to all others in the program. If they require help from outside, and perhaps from above through agencies of the government, the Army Ordnance representatives on the committee stand ready to carry the matter to those agencies.

Who Owns the Rights to the Improvements?

With regard to the new developments and advances made during a mobilization or war production effort, there is the serious question of who shall obtain the proprietary rights in the new technology.

> The rapid expansion of industrial production to meet mobilization demands requires the employment of the best available technologies by all producers. Where technology is subject to the proprietary rights of the government, no serious difficulties are encountered in opening it to the widest possible use. However, since much of the technology is the property of private corporations, others may be excluded from employing it.301/

During World War II, the Department of Justice attempted to make available to manufacturers participating in the mobilization effort as much as possible of the privately-owned technology and patent interests which were pertinent to the items that were being produced for the government. There was some

---

301. Report of Attorney General Pursuant to Section 708(e), Act of 1950, December 7, 1950, op. cit., p. 15.

success in obtaining and using this information during the war, but of course the non-proprietary users of the patents could produce under them only for government orders.

There is reason to believe that to some degree the manner in which government support was given to research and development activities during the war increased the concentration of important patents in the hands of the larger corporations. With almost 2,000 industrial organizations receiving contracts for research, the ten largest corporations received 37 percent of the funds alloted, and the sixty largest received 65 percent of the total.302/

> The larger companies, supported by government funds, were able to expand their research organizations, maintain their laboratories, and prepare for a strong program of industrial research after the war. Moreover, many of the contracts under which the research was conducted permitted the new technologies to become the property of the contractor, subject only to the government's right to a royalty-free license to use the invention or to have it used by those supplying the government with the product. It has been estimated that during World War II more than 90 percent of the contracts made between government agencies and private firms for scientific research and development gave the ownership of any resulting patents to the contractor.303/

The problem indicated above was the subject of concern by the Attorney General, who made the following comment regarding the matter in a report to the President.

> Where patentable inventions are made in the course of performing a Government-financed contract for research and development, the public interest requires that all rights to such inventions be assigned to the Government and not left to the pri-

---

302. Economic Concentration and World War II, op. cit., p. 52.

303. Report of Attorney General Pursuant to Section 708(e), Act of 1950, December 7, 1950, op. cit., pp. 16-17.

> vate ownership of the contractor. Public control will assure free and equal availability of the inventions to American industry and science; will eliminate any competitive advantage to the contractor chosen to perform the research work; will avoid undue concentration of economic power in the hands of a few large corporations; will tend to increase and diversify available research facilities within the United States to the advantage of the Government and of the national economy; and will thus strengthen our American system of free, competitive enterprise.304/

Some such provision is doubtless necessary to assure distribution of the fruits of wartime development to industry as a whole. However, it should be recognized that too extreme a policy in this direction might take some of the incentive for development away from industry, and result in serious detrimental effects on a mobilization effort. A policy that adversely affected the "ingenuity factor" might be a very expensive one in terms of the national security.

---

304. United States Department of Justice, Investigation of Government Patent Practices and Policies, Final Report, Vol. 1, May, 1947, p. 4., as cited in Report of Attorney General Pursuant to Section 708(e), Act of 1950, December 7, 1950, op. cit., p. 17.

Chapter 14

Value of Committees as Seen by Participants

In the previous chapter we noted the fact that war tends to stimulate technological progress. In comparing the government-industry cooperation stimulated by our policies with the lack of it found in Germany, we noted a sharp contrast in the progress made under the two different systems. Our system appears to result in a definite "improvement" or "ingenuity" factor upon which we can rely as long as our policy of stimulation continues, and a suitable device for accomplishing this was seen to be the integration committee. In the present chapter, we will examine a number of opinions of committee operation, as presented by individuals actually participating in committee activities.

Some Favorable Opinions of Committee Operations

The value of industry integration committees as devices for increasing the effectiveness of the industrial plant in mobilization for World War II has been commented on by a great many individuals who participated in the program. These comments are so overwhelmingly favorable that only a few typical examples will be cited here. General Campbell, who championed the idea from its conception, writes:

> It would be difficult to estimate how much additional production was won at a very critical time and how many hundreds of millions of dollars were saved by various industrial groups through integration. (.....) Ordnance could not have met its constantly changing and fluctuating requirements without the

extreme flexibility afforded by this grouping of contractors. Specifically, the various integration committees made it possible to turn out thousands of units above and beyond individually rated plant capacities.305/

In commenting on the value of the 105 millimeter Shell Committee, one shell manufacturing plant manager made the following points:

1. Through performance and capacity data compiled by the Committee maximum production with minimum facility requirements was accomplished.

2. Committee recommendations for schedule increases and decreases resulted in a proper balance of component part production as required by the Service Forces with a minimum of manpower and equipment turnover.

3. Through the Committee skill and knowledge of experienced manufacturers was made available to new manufacturers.

4. Up-to-date material and equipment inventory records, as maintained by the Committee, made possible drastic and rapid changes in production rates.

5. The committee's correlation of facility recommendations and requirements accelerated Ordnance Department disposition of such requests.

6. Committee recommendations of possible subcontractor sources of supply often resulted in "ahead of schedule" pilot lots of new components.

7. Committee standardization of materials permitted a higher production rate, as well as a more flexible market for procured components.

8. The Committee, through its members, made available to the Ordnance Department the skill and experience of the entire industry permitting a fast and accurate solution to many production, procurement and engineering problems.

9. An exchange of experience and knowledge within the Committee and between the Committee and the Ordnance Department provided a better understanding of requirements and pro-

---

305. Campbell, Industry-Ordnance Team, op. cit., pp. 117-118.

blems of the entire Ordnance program.

10. Advance notice of engineering changes as furnished facilities by the Committee Ordnance Representatives were helpful.

11. The raw material and procured component allocation activity of the Committee Ordnance Officer materially assisted in our supply program.306/

Another Division of General Motors Corporation offered the following comment on its experience:

> As a result of working with Industry Integration Committees, Oldsmobile believes that the Committee functions have played an important part in keeping all facilities producing to best advantage. Through standardization of materials and the allocation of materials they have helped maintain an even flow of production. When programs have fluctuated, due to changing needs, they have helped preserve an even balance. When new facilities have been brought in, to augment the work of facilities already in production, the Committees have enabled the new manufacturers to reach volume output more quickly.307/

In writing about the experience of the Bulova Watch Company with integration committees covering the manufacture of ammunition fuzes, a company official declared:

> I am certain that 80 to 90 percent of prime contractors would never have met their production commitments had it not been for the efforts of the Industry Integration Committees. Invariably, two or three companies manufacturing a specific item "lead the parade" and become the source of information for the remaining prime contractors.308/

Another important prime contractor considered the committee device

---

306. M. W. Howe, Plant Manager, Chevrolet Shell Division, General Motors Corporation, St. Louis, to General R. E. Hardy, Office of the Chief of Ordnance, Washington, D.C., letter dated June 22, 1945. On file in Historical Section, Office of the Chief of Ordnance.

307. Eldredge, Report Relative to Ammunition Committees, op. cit., p. 3.

308. A. Shayne, Chief Engineer and General Manager, Bulova Watch Co., Philadelphia, to General R. E. Hardy, Office of the Chief of Ordnance, letter dated June 8, 1945. On file in Historical Section, Office of Ch. of Ord.

a means toward more effective munitions production primarily because of its ability to save time.

> In my experience, the formation and operation of the Industry Integration Committees have been very helpful to industry in the tremendous task of supplying the neeessary material for our armed forces. It is my opinion that some of the things handled by the committees would have been accomplished in time by industry, because the task was one of mutual responsibility. However, the time saved by the committees in arriving at satisfactory production results was astounding in some cases. The committees brought together all the "doers" of industry. The free exchange of ideas together with plant visitations put all time-and-money-saving thoughts into almost immediate operation.309/

Manufacturer Wishes Other Services had Used Committees

The fact that integration committee organization was peculiar to the Army Ordnance Department made it possible for manufacturers who held contracts with both Army Ordnance and other military services to contrast their relative effectiveness. An official of General Electric X-Ray Corporation, which had such contracts, made the following pertinent comment:

> We like to believe that we did our job well but we have never been slow about admitting and will always be ready to concede that the job was made easy for us by the assistance which we received from the Remote Control Systems Committee.
>
> We have also built power tubes for Navy, Signal Corps, and some of the other services and to do this, had to enlarge our vacuum tube facilities considerably. During the early stages of the development and manufacture of these tubes, we often wished that the other services had organized committees similar to the Remote Control Systems Committee which had been organized by the Army Ordnance. It would have helped us to get under way sooner than we did.310/

---

309. L. R. Jensen, General Superintendent, George D. Roper Corp., Rockford, Illinois to General R. E. Hardy, Office of the Chief of Ordnance, letter dated June 13, 1945. On file in Historical Section, Office of Ch. of Ord.

310. F. E. Scheven, Factory Manager, General Electric X-Ray Corp., to S. C. Hope, Assistant Chairman, Remote Control Systems Committee, letter dated June 2, 1945. On file in Historical Section, Office of Ch. of Ord.

Committee-Inspired Peacetime Relationships

Many of the participants in the Industry-Ordnance teamwork which was exemplified by the integration committees were impressed by the possibilities which relationships of a similar sort during peacetime could offer for the improvement of industrial efficiency. The unique opportunities which were afforded for manufacturers to obtain information about each other which was normally not available, and the atmosphere of mutual assistance and cooperation which grew up, caused many to advocate a continuation of such relationships under a peacetime situation. Though the legal basis for such cooperation ended with the war, a general desire for a peacetime counter-part was frequently expressed. In discussing the operations of the Mobile Carriage and Recoil Mechanism Committee, the historian for the committee states:

> All the industry members gained by the association. They learned better production methods, made new industrial friends, and discovered their own weaknesses. Whether the wholehearted cooperation will continue into peacetime production is problematical, but industry as a whole has been temporarily, at least, brought near the level of the best in the land.311/

That there was an actual tendency for the committee-type relationships to continue was indicated by the experience after the inactivation of the Miscellaneous Cannon Committee. After summing up the significant activities of that committee in improving the production situation, the historian of the committee writes:

> The permanent value of this Industry-Ordnance teamwork is further attested to by the fact that even in cases where an Industry Integration Committee is no longer active, the friendly relationship developed among the manufacturers during the life of

---

311. Gerstacker, Mobile Carriage & Recoil Mechanism Committee, op. cit., p. 15.

> the Committee still exists; and furthermore is being maintained by the former Committee member firms through the exchange of raw material, finished parts and other helpful information.312/

One manufacturer brought to the attention of the Army Ordnance Department the fact that there was an active interest in applying the integration committee principles on the part of trade associations with which his firm was connected.

> You may be interested in knowing that in the past month, in connection with two industries with which we are associated, during discussions of post war trade association activities, the application of Army Ordnance Integration Committee principles to post war industry activities has been discussed.
>
> In both cases, it was pointed out that the interchange of production information, problems and methods on a scale not practiced before the war should be practiced after the war in view of the results you obtained during the emergency period.313/

The restraint of trade and monopoly implications of committee activities in peacetime are such that they are not consistent with the present antitrust legislation of the country. However, it is only reasonable to assume that there will continue to be a closer contact and association among the manufacturers who participated in a joint effort to produce an item of war equipment than existed before they had met and worked on such common ground. The friendships and acquaintanceships which were formed, and the knowledge of each other's facilities which was obtained, cannot help but result in closer cooperation. The historian of the Heavy Mobile Carriage Committee enumerated a number of peacetime benefits which industry

---

312. Activities of Miscellaneous Cannon Committee, op. cit., pp. 12-13.

313. Frank E. Shumann, President, Lehigh Foundries, Inc., Easton, Penn., to Office of the Chief of Ordnance. Letter dated May 12, 1945.

gained as a result of the wartime participation in integration committees.

> Industry has derived some benefits from Committee activities which will be helpful to them long after the production of Artillery has ceased to be its number one problem. The Industry Committee has gotten manufacturers together and has taught them the value of the interchange of knowledge on manufacturing and engineering techniques, which result in the improvement of the Industry as a whole. Some examples of the value of this type of cooperation are as follows:
>
> a. The adoption of uniform standards of finish;
>
> b. The adoption of uniform procedures relating to drawings and specifications;
>
> c. The dissemination of knowledge on manufacturing techniques, such as improvement in cutting tools, improved design of holding fixtures and jigs, the creation of new and more powerful machine tools for the utilization of improved cutters;
>
> d. The dissemination of knowledge relating to production control systems made necessary by the exacting Ordnance Department requirement for meeting schedules.
>
> In effect, the Industry Committee has made it possible to take the best thinking from Ordnance and from each of the individual contractors and make this knowledge available to all. This has resulted in a vast improvement in the Industry-Ordnance teamwork and will result in a higher level of industry efficiency and cooperation throughout the peace period.[314]

It is apparent that, through their committee experiences, manufacturers were exposed to important educational influences which will have permanent effects on their methods and operations. Just as an individual who finishes a period of enforced military service may find that much that he learned and experienced proves of value in later life, so the manufacturer who worked with other manufacturers and with the government to produce war materiel will find his future operations permanently affected by his experience. The spread of knowledge in such a way is in general a leveling

---

314. Martin, Heavy Mobile Carriage Committee, op. cit., p. 17.

upward toward more efficiency of the average producer who, it may be assumed, learned something from the more effective producers which could improve his competitive position in relation to them. To the extent that such a result occurs, the cooperation of industry in the war effort can be said to decrease, rather than increase, the competitive advantages which one producer may enjoy relative to others.

If the experiences of industrialists in cooperating with one another are such that the result is an improvement in the competitive situation, both industry and the economy which relies on regulation through competition must benefit. In such a situation, a device which makes cooperation as extensive and effective as possible is a device working in the public interest. As demonstrated in World War II the industry integration committee proved to be such a device, and no other comparable organization approached it in the effectiveness with which it served its purpose.

Chapter 15

Committees as a Permanent Factor in Mobilization Planning

In the previous chapters of this study we have examined the industry integration device as to its origin, functioning and general significance. We have noted that the use of integration committees poses certain problems with regard to the antitrust laws, the concentration of industry, and the relative position of small business in the economy. We have observed that the committees were of great value in World War II for getting a greater amount of production from the existing industrial structure, and found that most of the individuals who participated in the committee system were warm in its praise. In the present chapter we will consider the role of committees as a permanent factor in our future mobilization planning as a nation.

> What we are able or not able to do within the first 60 days of another war will be decisive in its determination of our ability to carry the war to a successful conclusion.315/

The Guns and Butter Policy

At present the economy of the United States is at its most productive point in history. National income is at an all-time peak, and the general standard of living has been climbing for almost two decades. Though the

---

315. Dwight D. Eisenhower, Final Report of Chief of Staff, United States Army, to Secretary of the Army, February 7, 1946, p. 17, as cited in Mobilization Planning & the National Security, op. cit., p. 2.

Korean crisis, and its result in terms of military production, have diverted great segments of the productive system to the manufacture of war materiel, production of goods for civilian consumption also continues at a generally high level. The simultaneous high rates of production for both civilian and military goods indicate that as a nation we are having considerable success with a policy which gives us both guns and butter. In discussing the production policy of the United States government as it became manifest after the stimulation of the Korean outbreak, Mr. F. G. Morison of the Department of Justice declared: "It is clear (.....) that the Congress and the executive department have erected the framework for a procurement program which will both build our military strength and preserve the health of our economy."[316]

The "guns and butter" policy stands between the extremists on one side who advocate full-scale preparation for war on an all-out basis, and others who believe that the immediate threat of large-scale war is not great, and that the best defense in the long run is a healthy and expanding free economy.[317] The present policy is an attempt to have greater military power in being than the latter course would permit, while not requiring such a complete diversion of resources and extensive production of war items which might never be used as would be required under the former. Among the important elements which make up the "guns and butter" approach are the following:

---

316. Statement of F. G. Morison, Department of Justice, before the Subcommittee on the Study of Monopoly Power, Committee on the Judiciary, House of Representatives, June 11, 1951, p. 5. Mimeograph supplied by Department of Justice.

317. Mobilization Planning and the National Security, op. cit., p. 6.

1. Planning for mobilization by well-matured (more than one more year) "problems and methods" studies by the civilian agency (National Security Resources Board).

2. Building up stockpiles of strategic and critical materials on a long-range program, but with some limited acceleration for the most important items, through the Munitions Board and the Bureau of Federal Supply.

3. Limited procurement and educational orders placed through the Munitions Board, along with working out of types of controls that could be immediately set up on the outbreak of war, given a good prospect then for swift passage of necessary powers by Congress.31/

Planning for Cold War

The points listed above were enumerated prior to the outbreak of hostilities in Korea. However, the limited warfare which began in June, 1950 and has continued to this date (June, 1953) was carried on without radical departure from the policy which they indicate. The situation was viewed as a phase of the "cold war", and national policy was aimed at meeting military needs while maintaining civilian production at a very high level. Writing in June, 1951 a committee of the Industrial College of the Armed Forces declared:

> Unless all-out war occurs, it is expected that the present requirement of partial mobilization may continue for a number of years. To reduce the adverse effect on our economy and our standard of living, it is planned to increase the national production by approximately 20 percent to permit a balanced program of "guns and butter". It is further planned to arrange this mobilization production capacity so that it can be quickly expanded to meet the requirements of an all-out war. This is to be done by providing stand-by production lines and facilities which are over-

---

31. Ibid., p. 7.

> ating only part time or not at all. These facilities are to be established by educational orders and maintained by contracts for small quantities.319/

Another committee report submitted at the same time arrived at a similar conclusion regarding the type of program which the nation must support into the indefinite future.

> It is considered that this country must:
>
> 1. Maintain productive capacity after the build-up to the 1953 readiness goal. This must be done without bankrupting the country in the meantime or over-producing end items which become obsolete. This by itself might be a serious yet futile economic drain. Considered opinion agrees that the problem can be whipped by the intelligent stockpiling of productive capacity rather than stockpiling end items beyond the quantities required to outfit and maintain the armed forces necessary to support national policies and commitments.
>
> 2. Provide for increases in production for both civilian and military requirements rather than transfer the civilian economy totally to the support of war. The atrophy which could result from over-control of the civilian economy might vitiate the very economy for which this Nation is fighting.320/

The "Quick Switch" Basis of Preparation for War

Our present national policy is clearly one in which we will rely for security upon our ability to switch quickly to full-scale war production in the event that war comes, or the international situation deteriorates so markedly that full-scale preparation for war seems indicated. The basis from which this switch is to be made is a healthy civilian peacetime economy into which has been built a basis for quick expansion.

---

319. Report of Student Committee No. 62, Mobilization of the Economy for National Security, Washington: Industrial College of the Armed Forces, 13 June 1951, p. 63.

320. Report of Student Committee No. 63, Mobilization of the Economy for National Security, Washington: Industrial College of the Armed Forces, 13 June 1951, p. 96.

The physical plant which can support a very sudden increase in the production of war materiel must be in existence, rather than in the blueprint state. If the 60 day period which General Eisenhower considered in 1948 to be critical to survival of the nation is to result in any great change in the output or readiness for output of war items, then facilities, tools, materials, labor, and some actual experience in manufacture must be available for application to the production of those items at any time. To a degree standby plants, civilian type plants which have been given actual educational orders, and government arsenals can ease this problem. Another highly significant device would be the "dual-purpose" plant which has been strongly advocated by Mr. C. E. Wilson, former President of General Motors Corporation and now Secretary of Defense. Speaking before the American Ordnance Association in October, 1951, Mr. Wilson said:

> I am proposing that manufacturers who are expected to assume responsibility for the production of the larger and highly technical military items be prepared to operate dual-purpose plants which can be used in three ways: for combined production, for total war production, or for total civilian production.
>
> New plants now being constructed as part of the defense and essential civilian program should be constructed with this objective, and existing facilities, as they are partly changed to defense production, should be organized so that they are flexible for these same three purposes.
>
> Definite agreements and understandings should be worked out by the Government, through its defense agencies, with these manufacturers for preserving the possibility of this type of dual operation for at least ten years and for renewing such agreements for several generations if necessary.321/

---

321. C. E. Wilson, "Blueprint for Preparedness", an address delivered before the American Ordnance Association 33rd Annual Meeting, Netherland-Plaza Hotel, Cincinnati, Ohio, Oct. 4, 1951, as reprinted in Ordnance, January-February 1952, p. 596.

The fact that Mr. Wilson has, since making this speech, become Secretary of Defense, may mean that the "dual-purpose" plant will be given added consideration as a mobilization device.

Integration Committees and the "Quick Switch"

With the emphasis so persistently and powerfully on the need for very quick attainment of a high degree of war production, starting from a very high level of peacetime production, the industry integration committee concept offers greater possibilities than ever before. There is a much clearer realization of the fact that industry must know in advance what it is expected to do, and that it must make extensive plans as to how to do it. The problem is one of formulating requirements on the one hand, and of preparing to fulfill those requirements on the other. The role of government, through the military services, is to formulate the requirements both as to type and quantity of an item. Industry, then, must break down the requirements into terms of facilities, materials, tools, labor and the other elements involved. That the two roles will be intermixed is unavoidable, and not particularly undesirable. It is reasonable for expert production engineers from civilian industry to be available to military development workers when a new item is being made ready for trial production -- the presence of the production man from industry at such a point may avoid the inclusion of some unnecessarily high tolerance, or some unduly rigid specification, which would make the final production job slower, more expensive and more complicated. It is also reasonable for government experts to make available to industry the benefit of their experience and knowledge in the fields of military science and development.

The integration committee is an organization in which the manufacturers engaged in the production of a specific item can seek solutions to the problems involved in producing those items by focussing upon them the best talent of the industry, augmented by that of the military services. The possibility that such cooperation often might prove valuable during peacetime was foreseen by those who worked with integration committees in World War II.

> The foundation laid by the Committee might well be utilized after the war in building up a technical group of consultants from the staffs of member companies. Such a group could meet from time to time with Army Ordnance engineers for the purpose of making available their fund of knowledge acquired in gun manufacturing which should assist the designing engineers in any development of new Ordnance materiel which might again have to be put into mass production. Such a plan would also serve to keep Industry abreast of the latest developments in the field of Ordnance.322/

Writing in 1945, the author could not visualize the extent to which the nation would again be interested in mass production of war materiel some eight years later. However, the present need for close cooperation of government and industry in both peace and war is greater than ever before because of the significant changes which have taken place in types of weapons and the speed with which they are able to be brought to bear over great distances.

> The U. S. A. authorities point out that industrial mobilization took 1½ to 2 years to get into gear in 1940-42. Owing to the probabilities of new weapons, no such period of grace will be given again; companies should know now what is expected of them, what to make, how much and for whom, before the dreadful Day (Mobilization day) arrives.323/

---

322. Cline, History of Field Howitzer Committee, op. cit., p. 11.

323. Lt. General Sir Ronald M. Weeks, Organization and Equipment for War, Cambridge (England): University Press, 1950, p. 130. In this connection see also Chapter 9 above, especially pp. 145-150.

For a manufacturer to "know what to make" involves a great deal of planning and expense. In the case of a tank, for example, excluding the armament and the sighting control system, a manufacturer who is to try to turn out the tank would have to have thousands of drawings covering thousands of parts, tools and pieces of equipment; he must be familiar with hundreds of specifications as to materials; he must know which of his prime and subcontractors he can rely on and which may have their capacity diverted elsewhere in the event of full mobilization; and he must have the answers to a wide range of similar management problems. Some of these answers will have to be supplied by higher authority -- the allocation of subcontractor capacity, for example, cannot be made at the industry level. However, information which will assist the higher authority in making a decision must be a considerable output coming from industry. In the case of allocation of subcontractor capacity, an agency such as an integration committee, furnishing complete information as to its subcontractor pattern and its subcontractor requirements in event of mobilization, would be invaluable to the higher planning agencies.

Some New Rules for Committees

At its level, the integration committee appears to be a highly effective and vitally necessary device for facilitating the speed and smoothness with which industry can be switched to war production. Its value as a center of intelligence, to understand better its own problems and to permit those above it to better understand the problems of that industry in relation to others, was clearly shown in World War II.

That there must be a somewhat tighter control over integration committee

activities than was attempted in World War II is suggested by the experience in that war. One of the great difficulties in understanding the operations of World War II committees stems from the fact that they were not required to keep Minutes, so that the Minutes available are very incomplete. The policy under which integration committees have been operating since they again began to be formed after the outbreak of the Korean fighting requires that "Full and complete minutes of all meetings shall be kept",324/ while the new Ordnance Procurement Instructions which have been published since that time provide that "The secretary of the committee (Ordnance representative) will maintain and keep minutes of committee meetings."325/ The great interest of the Department of the Army in the minutes of integration committees is evidenced by the fact that the Assistant Chief of Staff for Logistics requires seven copies of all minutes promptly upon preparation.326/

The experience with integration committees since the Korean conflict began is quite different than that of World War II. This is understandable when the present "guns and butter" policy is compared with the all-out effort of that war. Then, the preservation of the nation was the immediate issue, and the pressure for the expansion of munitions production was much greater. The result, in terms of legislation, was a blanket authority under which the formation and operation of integration committees could be

---

324. Statement of Policy for the Formation, Functioning, and Dissolution of Integration Committees, Office of Assistant Chief of Staff, G-4, Logistics, Department of the Army, Washington, D. C., 19 October 1951, paragraph 2b, p. 6.

325. Ordnance Procurement Instructions 22, 1 February 1951, par. 22-113. Washington: Office of the Chief of Ordnance.

326. Amendment No. 1 to Statement of Policy Regarding Integration Committees, memorandum dated 27 June 1952 from Office of Assistant Chief of Staff, G-4, to Chief of Ordnance and others.

carried on without fear of prosecution under the antitrust laws.[327] No such blanket authority was granted in the Defense Production Act of 1950 and its subsequent modifications, and today a formal request for the establishment of each committee is required. This request, which must contain detailed technical information justifying the need for the committee, is prepared by the procurement service involved (for example, Army Ordnance) and submitted to the Office of the Assistant Chief of Staff, G-4. The function of G-4 is to work with the technical service involved, and the Judge Advocate General's Office, to get the request "in such form and in such manner as will be appropriate in presenting the request to DPA (Defense Production Administration), the Department of Justice and the Federal Trade Commission".[328] The actual transmittal to the latter three agencies is accomplished by the Judge Advocate General's Office. If the proposed committee is approved by the Attorney General, "The committee may commence functioning as soon as the members thereof have been officially invited by the Administrator of DPA to participate in the committee and any member has accepted in writing".[329] With regard to the protection of any specific member from prosecution under the antitrust laws, however, a formal acceptance of membership in the committee is required.

> It is the view of the Department of Justice that the immunity provided in Section 708 of the Defense Production Act of 1950, as amended, does not become operative until the member accepts the

---

327. Section 12, Public Law 603, 77th Congress. (This is the Small Business Mobilization Act of 1942.)

328. Statement of Policy for Formation, Functioning and Dissolution of Integration Committees, op. cit., paragraphs 14 and 15, p. 4.

329. Ibid., paragraph 19, p. 5.

invitation of the Administrator of DPA in writing.330/

This formal and multi-step procedure is a far cry from the blanket authority for the formation of committees which was obtained in World War II. However, it is an understandable manifestation of the attempt by the government to avoid any unnecessary injury to the competitive structure through the results of defense mobilization as undertaken in the current situation. The President of the United States expressed the overall objective of the policy as follows:

> While our paramount goal must be to strengthen the national defense both rapidly and effectively, we have also a responsibility to protect and preserve competitive enterprise in the structure of our economy. It is most important (.....) that we should avoid, insofar as possible, measures which may impair the vigor of free competitive enterprise by suppressing competition, creating or strengthening monopolies, injuring small business, or otherwise promoting undue concentration.331/

Committees Valuable in Any Mobilization

If the necessity for full mobilization arises in the near future, it is probable that many of the formalities and restrictions on the formation of committees would be removed. Of course, the fact that there are committees in being at the present time would obviate the problem in some industries, but the number and nature of committees at present is very small relative to the number utilized in World War II. For example, in March, 1953, when the Korean fighting was three years old, there were only twelve integration committees in the entire field of ammunition, as compared to

---

330. Ibid., paragraph 20, p. 5.

331. Memorandum of the President dated December 20, 1950, as quoted in Second Report of the Attorney General of the United States under Section 708(e), Defense Production Act of 1950, Washington: Department of Justice, April 30, 1951, p. 13.

some ten times that many during World War II.[332]

These recent committees, though they have proved to be "a vital factor in overcoming many of the obstacles and in bringing about the cooperation which is so essential to balanced production",[333] have operated in a considerably different milieu than that of World War II. The emergency powers and controls, and the more serious international situation, of World War II, together with the fact that a much higher proportion of the production structure was devoted to munitions output, makes a proper comparison of the committees of that time with those of today very difficult. However, it is only reasonable to conclude that the committees would play an increasingly significant role if a substantially greater output of munitions were to be demanded. And it appears likely that the role would be played without many of the present restrictions on organization.

This device of integration, which has worked well in one great emergency, should certainly be employed in an economy preparing for all-out war, or a high state of readiness for war. It should be used with more restrictions than in World War II -- for example, it is only proper that minutes be required, that the government exercise actual rather than nominal control of meetings and activities, and that the government's representatives not feel that they are controlled by the committee assistant chairman from industry. In World War II many instances of abuses of this type were suspected, though difficult to prove. Conversely, however, the government would defeat the purpose of the committees if it attempted to any extent

---

332. Bulletin No. 142, The Common Defense, March, 1953. Washington: American Ordnance Association.

333. Ibid.

to dominate their operations. The role of the government should be to outline the area of activity of the committee, and to be present to see what goes on in that area. All actions of the committee should be by and in the name of the government, with the committee members providing their digested efforts in the form of a recommendation to the government which the government may or may not act upon favorably. In defining the scope of activity, the government should make certain that the area defined is narrow and pertinent only to problems directly relating to production.

The objective of integration committees, as originally organized, was to obtain greater production from a given amount of plant by considering all producers of an item or closely allied items as an integrated organization striving for a common goal of maximizing combined output. The integration process is essentially one of balancing facilities and components in such a way that any unused capacity or materials are put into effective use by some member of the committee. The process of centralizing information which is required to attain this objective is such that it places the committee headquarters in possession of a wide range of factual information that can be used for a variety of purposes, and often for purposes outside the scope of committee activity. Thus the data that is available as to work in process, materials on hand, excesses or shortages of tools, and similar matters can be of great use to planning authorities in production scheduling, contracting and planning for increased capacity.

A nation facing the need to mobilize in the face of great peril must get the most out of what it has if it is to attain that objective. The industry integration committee, by encouraging manufacturers to solve

the problems which arise in an armament expansion program by means of mutual assistance and cooperation can do much to help attain that goal.

The following listing of Army Ordnance Industry Integration Committees was taken from Project Supporting Paper Number 14, a manuscript by Howard P. Jones, which has been previously cited in this study. It cannot be considered a complete listing, but is probably the most complete that it is possible to prepare in view of the lack of centralization of the administrative and records of the integration committees in World War II.

Name of Committee	Number of Member Manufacturers	Date Formed
Ammunition Integration Committees		
Bomb, Fragmentation, 4#	20	Jan 43
Bomb, Fragmentation, 20 - 23#	25	Mar 43
Bomb, Fragmentation, 90, 260 - 220#	13	Jan 43
Bomb, G.P., Small	33	Dec 42
Bomb, A.P., 1100#	11	Apr 44
Bomb, A.P., 2000#	10	Mar 43
Bomb, Chemical, 100#	13	Mar 43
Bomb, Practice, 100#, M38A2	12	Jan 43
Bomb, Practice, 100#, M30	20	Aug 44
Bombs, Large	24	Aug 42
Bomb, G.P., 500#	12	Apr 44
Bomb, Chemical, 1000#	2	Apr 44
Bomb, H.E., Mk V (British), 4000#	2	Apr 44

Adapter Cluster, M3A1	22	Feb 43
Adapter Cluster, M12	6	Aug 44
Adapter Cluster, M13	3	Apr 44
Adapter Cluster, M14	2	Aug 44
Fin Assembly, 20# Frag Bomb	14	Apr 44
Metal Crate for 100# Frag Bomb	7	Nov 44
Shipping Band Assembly for Cluster	6	May 44
Mine, Anti-tank, M1A1	35	Mar 43
Mine, M4	10	Mar 43
Mine, Heavy, M6	19	Feb 43
Mine, A.P., M2A1	9	Feb 43
Mine, A.P., M3	6	Mar 43
Mine, M7, Light	3	Dec 43
Mine, Non-metallic	17	Jun 43
Mine Crate, Metal, for M6	21	Apr 44
Mine Activator, M1	3	May 44
Rocket, 2.36"	10	Sep 42
Rocket, 4.5"	32	Feb 44
Projectile, Ball, 20mm	15	Nov 42
Projectile, A.P., 155mm	3	Mar 43
Shell, HEI, 20mm, MK 1	35	Sep 42
Shell, HE, 37mm	27	Sep 42
Shell, HE, 40mm, MK II	39	Nov 42
Shell, HEAT, 57mm, T20E2	3	Jan 45
Shell, HEAT, 57mm, M86	1	Oct 42
Shell, HE, 60mm	21	Dec 42
Shell, Illuminating, 60mm	3	Aug 43

Shell, HE, 75mm	37	Aug 42
Shell, Chemical, 75mm	6	Aug 42
Shell, HEAT, 75mm	2	Nov 44
Shell, Smoke, 75mm and 3"	7	Feb 43
Shell, HE, 3"	23	Aug 42
Shell, Chemical, 3"	1	Nov 44
Shell, 81mm, M43A1	17	Nov 43
Shell, 81mm, M56 and M57	3	Dec 42
Shell, Chemical, 90mm	1	Nov 44
Shell, HE, 90mm	13	Nov 42
Shell, HE, 105mm M1, Chemical, HEAT, and Smoke	16	Sep 42
Shell, HE, 155mm	57	Oct 42
Shell, HE, 8" and 240mm	27	Mar 44
Shot, AP, 20mm, M75	29	Nov 42
Shot, AP, 37mm	20	Aug 42
Shot, AP, 40mm	9	Nov 42
Shot, APC, 57mm, M86	13	Nov 42
Shot, AP and APC, 75mm and 3"	38	Aug 42
Shot, HVAP, 76mm and 90mm	6	Jul 45
Fuze, M43, Mechanical Time	3	Apr 43
Fuze, M43-51	61	Oct 42
Fuze, Dummy, M50	17	May 43
Fuze, M52 and M53, P.D.	20	Aug 42
Fuze, M54 and M55, Time Train Ring	29	Feb 42
Fuze, M56, P.D.	13	Sep 42
Fuze, M62A1, P.D.	6	Nov 42
Fuze, M61A2, P.D.	25	Oct 42

Fuze, M66A1, B. D.	53	Oct 42
Fuze, M74, P.D.	5	Dec 43
Fuze, M77, Time and Superquick	13	Oct 44
Fuze, Mark 253	20	Dec 42
Fuzes, Bomb, M100 Series	13	Sep 42
Fuzes, Bomb, Nose, M103 and M104	20	Oct 42
Fuze, Bomb, Nose, M104	4	Jan 43
Fuzes, Bomb, Nose, M110 and M126	21	Sep 42
Fuze, Flare, M111	4	Jul 42
Fuzes, Bomb, M112 and M115 Series	7	Nov 44
Fuze, Bomb, Nose, M120	14	Jul 43
Fuze, Bomb, M130	5	Feb 44
Fuze, Bomb, M131	8	Feb 44
Fuze, Hand Grenade	16	Feb 43
Fuze, Mine, Combination	5	Mar 44
Fuze, Mine, M1A2	29	Feb 43
Fuze, Rocket, M4A2	13	Feb 44
Fuzes, VT (Variable Time)	4	Jul 45
Fuze Seat Liner	8	Jan 43
Adapter Booster M102	19	Oct 42
Adapter Booster M115A1	19	Dec 42
Boosters	36	Oct 42
Burster Casings	12	May 44
Bursters, M7 and M10	3	Jan 43
Bullet Case	11	Jun 42
Cartridge, Drill, 90m	5	Nov 42

Clad Metal	11	Apr 43
Fin Assembly for Mortar Shell	31	Feb 43
Frangible Bullet Th4	14	Oct 44
Fuze Well Cups	15	May 44
Grenades M1, Projection Adapter	39	Dec 43
Hand Grenade Body	17	Jun 45
Helmet	5	Mar 44
Metallic Belt Link	32	May 42
Primers	100	Sep 42
Primer-Detonators M1 and M16A1	1	Apr 44
Rifle Clip, M1	11	Sep 42
Tracer and Igniter, 4Cm	31	Jan 43

Committees in Government-Owned, Contractor-Operated Plants
(All formed in 1942 and early part of year 1943)

Ammonia	7
Ammonium Picrate	2
Bag Loading	11
Fiber Containers for Ammunition	4
Miscellaneous	11
NDI-T.T	16
Shell and Bomb Loading	11
Shell and Components Loading	2
Smokeless Powder	7

Pyrotechnics

Aircraft Smoke Signals	4	Apr 44
Flare, M26	19	Sep 42

Ground Signals	15	Sep 43
Spotting Charges	6	Dec 44
Trip Flares	3	May 44

Containers

Cartridge Storage Cases	49	Feb 44
Containers, Metal, Ammunition	45	Mar 44
Container, M139A1 and M139, Mortar Ammo	19	Apr 45
Container, M173A2 for Mortar Ammo	33	Apr 45
Smokeless Powder Bones	5	Dec 42

Weapons and Fire Control Materiel

Armored Vehicle Fire Control	37	May 43
Artillery, Heavy, Antiaircraft	6	Sep 42
Bayonet	5	May 42
Carbine, Caliber 30, M1	11	Sep 42
Carriage, Heavy Mobile Artillery	14	Jun 42
Carriage, Intermediate Calibre, AA	15	Jun 42
Carriage, Light Mobile Artillery	23	Jun 42
Director M5	5	May 42
Gun, 20mm	16	Dec 42
Gun, Tank and Antitank, 37mm	17	May 42
Gun, Tank, Heavy	3	Oct 42
Gun Mounts, Heavy	12	Feb 43
Gun Mounts, Light	40	Feb 43
Field Howitzer	12	Jul 43
Machine Guns	11	May 42

Machine Gun Mounts	12	May 42
Major Caliber Antiaircraft Carriage	13	Jun 42
Miscellaneous Cannon	3	Jun 42
Mobile Carriage Recoil Mechanism	16	Jun 42
Mortars, 60mm and 81mm	1	Sep 44
Optical Instruments	21	Jul 42
Pistol, Caliber .45	7	May 42
Remote Control Systems	21	Jun 42
Rifle, M1903	6	Apr 42
Trench Knife	3	Apr 43

Vehicles and Allied Items

Armored Cars	4	Feb 43
Half Tracks	1	Sep 42
Tanks, Light	5	Sep 42
Tanks, Medium	11	Feb 43
Tracked Prime Movers	4	Feb 43
Tractors, Commercial	4	Jan 43
Trailers, Combat	11	Feb 43
Trailers, Heavy	34	Mar 43
Trailers, Light	32	Mar 43
Trailers, General	62	Mar 44
Trucks, Heavy	13	Mar 43
Trucks, Light	5	Mar 43
Trucks, Medium	4	Mar 43
Armor Castings	30	Aug 42

Armor Plate, Rolled	31	Jul 42
Axles	33	Mar 43
Band Tracks	3	Feb 43
Clutches	10	Apr 43
Electric Starters	4	Dec 42
Engines	15	Feb 43
Tracks, Tank	11	Jun 42
Transmissions, Tank	12	Jul 42
Transmissions, Vehicle	13	Mar 43
Winches	7	Mar 43
Wood Cargo Bodies	16	Apr 43

Committees in the Korean Conflict

As has been noted in the body of this study (see Chapter 10) the employment of integration committees to help meet the Korean crisis was an urgent desire of the Army Ordnance authorities. However, the restrictions on the formation of committees were such that only some twenty committees were authorized. Of these, twelve were formed in the field of ammunition production, with the others being organized in the fields of fire control instruments, automotive equipment, artillery and small arms. (See Bulletin No. 149, The Common Defense, American Ordnance Association, Washington, D.C., March, 1953.)

BIBLIOGRAPHY

This bibliography is divided into two parts, the first containing those materials to which reference is made in the text, and the second containing those examined but not cited. In both parts it will be noted that there are listed letters, historical accounts in unpublished form, minutes of meetings and similar documents not readily available to the public.

It is a policy of the Department of the Army to permit research workers to utilize documents and files which are not of a classified nature. The custodian of old files is The Adjutant General, and to the extent possible his office will assist the student in locating desired materials. However, the vast number of old records, coupled with budgetary and space limitations, does not permit the type of centralization and classification of them which is desired by the student.

The researcher wishing to utilize records of the Department of the Army should request permission to do so from The Adjutant General, Department of the Army, Washington, D.C. The Adjutant General's Office, in granting approval, will ordinarily be able to indicate in which of several storage points the desired type of records can be located. The student must proceed there and, depending upon the local situation with regard to personnel and facilities, can expect more or less help in locating his materials.

The Historical Section of the Office of the Chief of Ordnance

retains in its files certain old records which it considers of particular importance. For a researcher working in the field of Army Ordnance, early contact with that section is desirable. In general, because of the smaller number of records involved, specific items are more readily located there if they have been retained.

It should be realized that few governmental records are truly "permanent". A constant screening and disposal process takes place, and records utilized in research today may be destroyed in the future because of the pressing requirements for space, limited personnel, the general cost of maintaining old records in storage, or because of a change in policy regarding what should be retained.

As of today, most World War II records of the Department of the Army are available to interested civilian students. Certain areas may be encountered in which no access to all records is now possible, but the policy is to make available everything that does not clearly relate to current and classified material.

Part I. Bibliography Cited

Committee of Miscellaneous Common Carriers, June 1942 to July, 1944. Springfield, Massachusetts: Springfield Ordnance District, 25 April 1945. (On file in Historical Section, Office of the Chief of Ordnance. All following references to files in this there will be indicated by note, "Hist. Sec., WDO".)

Anderson, Dewey, Kreps, Theodore J. and Hall, Ruth, Final Report of the Executive Secretary to the Temporary National Economic Committee on the Concentration of Economic Power in the U.S., Senate Committee Print, 77th Cong., 1st Sess., Washington: Government Printing Office, 1941.

Army Ordnance Department -- "Establishment of Current Operations", Army Ordnance Report No. 3, Washington: Army Ordnance Association, October 1, 1943.

Mach[illegible], J. Lee; Rose[illegible], Anto[illegible]; Fabricant, Solomon; Kel[illegible]r, arti[illegible]; and Stein, Emanuel; War and Defense Economics, New York: Rinehart and Company, Inc., 19[illegible].

Baldwin, Hanson W., The Price of Power, New York: Harper and Brothers, 19[illegible].

Barenis, P. N., Historical Outline -- Artillery Branch Integration Committee for Light Mobile Artillery Carriages, Manuscript, 2[illegible] April 19[illegible]. (Hist. Sec., OCO)

Barnett, Bernard M., American Industry in the War, New York: Prentice-Hall, Inc., 19[illegible].

_____ "To Prevent War", Reader's Digest, February, 1940.

Billingsley, J. D., Mathews, E. S., and Sweeney, A. W. Jr., The Army Ordnance Arsenal System, thesis submitted for the degree of Master of Industrial Management, Harvard Graduate School of Business Administration, September 1[illegible], 19[illegible].

Bolté, C. G., Coupleux, L. F., and Rose, H., with assistance of Goldwasser, [illegible]., Johnson, H. B., and Olmen, M.J., Decisions of Concentration and World War II, Senate Document 206, 78th Congress, 2d. Session, Washington: Government Printing Office, 19[illegible].

Bush, Vannevar, Modern Arms and Free Men, New York: Simon and Schuster, 19[illegible].

Campbell, Levin H. Jr., The Industry-Brigade Team, New York: Whittlesey House, McGraw-Hill Book Company, Inc., 19[illegible].

Chase, [illegible]. J., Historical Outline of the 37 millimeter Tank and Anti-Tank Gun Industry Integration Committee, Manuscript, July, 1943. (Hist. Sec., OCO)

Clayton Act, 38 Stat. 730, 15 U. S. C., Sec. 12.

Cline, [illegible]. R., History of the Field Howitzer Industry Integration Committee, July 1940 to May 1942, Manuscript, c1942. (Hist. Sec., OCO)

Bulletin No. 1[illegible], The Common Defense, March, 1943. Washington: American Ordnance Association.

Davidson, W. A., History of the [illegible] Director Industry Integration Committee, Manuscript, c1942. (Hist. Sec., OCO)

Dawson, . P., Project Supporting Paper No. 1, Manuscript, November, 19[illegible]. (Hist. Sec., OCO)

"Defense and Strategy", Fortune, July, 1950.

Defense Production Act of 1950, Public Law 774, 80th Congress.

DeVore, Harvey A., Production Lag in the American Ordnance Program, 1917-18, PhD Dissertation, University of Michigan, c1936.

Du Pont, Henry B., If I Were a Communist, Speech by Vice President, E. I. du Pont de Nemours and Company before [illegible] Chamber of Commerce, Tulsa, Oklahoma, January 11, 1951. (Hist. Sec., OCO)

[illegible], William F., Du Pont, One Hundred and Forty Years, New York: Charles Scribner's Sons, 1942.

Eisenhower, Dwight D., Final Report of Chief of Staff, U.S. Army, United States Army, to Secretary of the Army, Washington: Government Printing Office, 1948.

Harrod, Gordon C., Report Relative to Ammunition Industry Integration Committee, Ordnance Division, General Motors Corporation, Lansing, Michigan, June, 1941. (Hist. Sec., OCO)

Hall, Albert J., "Ordnance Ammunition Production", Testimony before the U.S. House of Representatives as reprinted in Army Ordnance Report No. 4, Washington: Army Ordnance Association, April, 1921.

Federal Trade Commission Act, 38 Stat. 717, 15 U.S.C., Sec. 41.

Foss, A. L. Jr., Project Supporting Paper -- Mobile Industry Integration Committee, 1940-45, Manuscript, 1 October 1945. (Hist. Sec., OCO)

Army Proximity Fuze Development, Department of Ordnance, U.S. Military Academy, West Point, New York, 1950.

Hornbarger, C. A., Historical Record of the Mobile Carriage Accessories Integration Committee, Manuscript, September 1945. (Hist. Sec., OCO)

Huberich, John, Famous Lawyers, New York City: E. R. Hutton and Company, 1952.

Handler, Milton, "A Study of the Construction and Enforcement of the Federal Anti-trust Laws", Monograph No. 38, Investigation of Concentration of Economic Power, U.S. Temporary National Economic Committee, Senate Committee Print, 76th Congress, 3d. Session, Washington: Government Printing Office, 1941.

Herschel, C. E., History of the .50 Frangible Bullet Industry Integration Committee, Manuscript, 7 June 1945. (Hist. Sec., OCO)

Historical Record, Heavy Tank Gun Integration Committee, Manuscript, 16 April 1945. (Hist. Sec., OCO)

History of the Armored Vehicle Fire Control Committee, Manuscript, c1945. (Hist. Sec., OCO)

History of the Intermediate Caliber Antiaircraft Carriage Industry Committee, Manuscript prepared by Firestone Tire and Rubber Company, 1945. (Hist. Sec., OCO)

History of the Remote Control Systems Committee, 1942-45, West Springfield, Massachusetts: Gilbert and Barker Manufacturing Company, 1945. (Hist. Sec., OCO)

Hoar, Roger S., "Patents and National Defense", Army Ordnance, September-October 1946.

In Abundance and In Time, 1939-1943, Bridgeport: The Remington Arms Company, Inc., 1944.

Industrial Mobilization Plan, 1933, Washington: Government Printing Office, 1933.

_____ Revised, Washington: Government Printing Office, 1936.

_____ Revision of 1939, Washington: Government Printing Office, 1939. Published as Senate Document No. 134, 2d. Session.

Investigation of Government Patent Practices and Policies, Final Report, Vol. 1, Mar, 1947.

Kelly, James L., "A Bigger Job for Smaller Plants", Ordnance, July-August, 1951.

_____ The Utilization of Smaller Plants in War Production, Washington: Industrial College of the Armed Forces, 1951.

Lilienthal, David E., Big Business: A New Era, New York: Harper and Brothers, 1953.

Lincoln, G. A., "Planning Military Requirements", Papers and Proceedings, American Economic Review, May, 1952.

Lynch, David, The Concentration of Economic Power, New York: Columbia University Press, 1946.

Martin, J. E., History of the Heavy Mobile Carriage Committee, 1942-1945, Manuscript, c1945. (Hist. Sec., OCO)

Mass Production -- Cornerstone of America's Welfare, Department of Ordnance, U. S. Military Academy, West Point, Sept. 1951.

Minutes of Meeting of Bomb Nose Fuze M110 Industry Integration Committee, held at Peco Manufacturing Co., Philadelphia, October 27, 1942. (Hist. Sec., OCO)

Minutes of Heavy Tank Gun Industry Integration Committee Meeting, Detroit Ordnance District, November 17, 1942. (Hist. Sec., OCO)

Minutes of Meeting of the Industry Integration Committee on Primers, Mellon Institute, Pittsburgh, March 25, 1943. (Hist. Sec., OCO)

Mobilization of the Economy for National Security, Report of Student Committee No. 62, Washington: Industrial College of the Armed Forces, 13 June 1951.

_____ Report of Student Committee No. 62, Washington: Industrial College of the Armed Forces, 13 June 1951.

Mobilization Planning and the National Security (1940-1948), Legislative Reference Service of the Library of Congress, Senate Document No. 208, 81st Cong., 2d Session, Washington: Government Printing Office, 1950.

Murray, C.J.V., "The Ponts and the Korean Shell Shortage", Fortune, March, 1953.

Nelson, Donald M., Arsenal of Democracy, New York: Harcourt, Brace and Company, 1946.

Notes on the German War Economy, Department of Social Sciences, U. S. Military Academy, West Point, New York, 1950.

Notes on the War Economy of Japan, Department of Social Sciences, U.S. Military Academy, West Point, New York, 1950.

Ordnance Department Order No. 30-17, 15 July 1947, Office of the Chief of Ordnance, Washington, D.C.

Ordnance Fiscal Circular No. 107, Washington: Office of the Chief of Ordnance, 26 Aug 42.

Ordnance Procurement Instructions 22, 1 February 1951, Washington, Office of the Chief of Ordnance, 1951.

Ordnance Procurement Instructions 56, Washington: Office of the Chief of Ordnance, 1942.

Page, Chester H. and Astin, Allen V., "Survey of Proximity Fuse Development", American Journal of Physics, March-April 1947.

Perry, Thomas D., "Statutes and Executive Orders on Civilian and Industrial Mobilization", Appendix to Senate Document No. 208, 81st Cong., 2d Session, Washington: [illegible], 1950.

Plan and Regulations of Ordnance Corps Governing the International Committee on Light Gun Tanks and Allied Combat Vehicles, Washington: Office of the Chief of Ordnance, May, 1941. (Hist. Sec., [illegible])

Report of the Attorney General of the United States Pursuant to Section 708 (c) of the Defense Production Act of 1950, Washington: Office of the Attorney General, December 7, 1950.

[illegible] Report of the Attorney General to the President and Statement under Section 708 (c), Defense Production Act of 1950, Washington: Department of Justice, [illegible].

Report of the Inter-Allied Anti-Aircraft Committee [illegible], September 3, 1918, author, [illegible]. (Hist. Sec., [illegible])

Selective Service Act, 26 Stat. 2[illegible], [illegible] U.S.C., Sec. 1.

Stanton, George H., The Ordnance Department in Time of War, [illegible], Stanford University. (Hist. Sec., [illegible])

Wilson, Leslie E., Ordnance Research in World War II, New York: John Wiley and Sons, 1947.

Small Arms Ammunition: A History of Its Development, 1941-1945, Washington: Ammunition Branch, Small Arms Division, Office of the Chief of Ordnance, 1947. (Hist. Sec., [illegible])

Small Business Mobilization Act of 1942, P. L. 603, 77th Cong.

Somervell, Brehon, Concurrent Planning by Industry, Washington: Industrial College of the Armed Forces, November, 1948.

Springfield Armory -- History from 1777 to 1941, Manuscript in Hist. Sec., [illegible].

Stanton, H. H., History of Intermediate Caliber Anti-Aircraft Committee, Appendix 1, manuscript, 1919. (Hist. Sec., [illegible])

Statement of H. J. Horlick, Department of Justice, before the Subcommittee on the Study of Monopoly Power, Committee on the Judiciary, House of Representatives, June 11, 1951. Washington: Department of Justice, June, 1951.

Statement of Policy for the Formation, Functioning, and Dissolution of Integration Committees, Office of Assistant Chief of Staff, G-4, Logistics, Department of the Army, Washington, D. C., 19 October 1951.

_____ Amendment No. 1, 27 June 1952.

Supervisory News Letter, Volume 5, No. 7, E. I. du Pont de Nemours Company, Wilmington, Delaware, July, 1951.

Warren, J. M., Plant Surveys and Educational Orders, Washington: Industrial College of the Armed Forces, January, 1947.

Trade Associations: Their Economic and Legal Status, New York: National Industrial Conference Board, Inc., 1925.

Tyson, James L., "The War Industries Board", supplement to Fortune, September, 1940.

The United States at War, Bureau of the Budget, Washington: Government Printing Office, 1946.

Waste in Industry, Committee on Elimination of Waste in Industry of the Federated American Engineering Societies, New York: McGraw-Hill Book Co., Inc., 1921.

Weeks, Ronald M., Organization and Direction of War, Cambridge (England): University Press, 1940.

Wilson, C. E., "Blueprint for Preparedness", Ordnance, January-February 1952.

Yoshpe, Harry B., Organization for Production Control in World War II, 1939-1945, Monograph No. 2, Historical Division, Army Industrial College, Washington, February, 1947.

Letters Cited

J. L. Chasmar, Manager, Military Production Division, Remington Arms Company, Bridgeport, to General E. E. Landy, Pentagon, Washington, July 11, 1945.

James L. Duffy, Jr., President, Head Machinery Co., Inc., York, Penn., to Captain C. Kramer, Springfield Ordnance District, Springfield, Mass., April 7, 1945.

W. J. Daring, Vice President and General Manager, Precision Castings Company, Inc., Syracuse, N. Y. to General R. E. Hardy, Pentagon, Washington, June 27, 1945.

J. J. Fisher, President, A. L. Farquhar Co., York, Penn., to General G. M. Wells, Office of Chief of Ordnance, Washington, May 8, 1945.

Peyton Ford, Deputy Attorney General, Department of Justice, to The Secretary of Commerce and others, October 19, 1940.

General C. T. Harris, Jr., Assistant Chief of Ordnance, to Remington Arms Company, Inc., December 2, 1940.

W. H. Howe, Plant Manager, Chemical Shell Division, General Motors Corporation, St. Louis, to General R. E. Hardy, Pentagon, Washington, June 22, 1945.

W. A. Hyde, Vice President, Scovill Manufacturing Company, Waterbury, Conn., to General R. E. Hardy, Pentagon, Washington, June 22, 1945.

L. P. Jensen, General Superintendent, George D. Roper Corp., Rockford, Illinois, to General R. E. Hardy, Pentagon, Washington, June 13, 1945.

W. J. Kerr, Factory Manager, Motor Company, Cleveland, to Captain C. Fraser, Springfield Ordnance District, April 7, 1945.

T. J. Martin, Office of Chief of Ordnance, to F. W. J. Squires, Assistant Chairman, 20th Anti-Aircraft Gun Committee, Curtiss-Wright Aviation Corp., Elmira, New York, March 17, 1943.

J. E. Martin, Office of Chief of Ordnance, to Mr. John Brown, Chain Belt Company, Milwaukee, January 13, 1943.

T. F. Molnar (Colonel) to Colonel Bishop, memorandum dated 7 June 1951, subject: Integration Committees. (On file in Current Procurement Branch, Office of Assistant Chief of Staff, G-4, Dept. of the Army, Washington.)

R. B. Nordson, Assistant Attorney General, Department of Justice, to the Secretary of Commerce and others, March 14, 1941.

W. E. Parish, Operating Manager in Charge of Manufacturing, Willys-Overland Motors, Inc., to General R. E. Hardy, Pentagon, Washington, July 9, 1945.

Robert P. Patterson, Assistant Secretary of the Army, to Remington Arms Company, Inc., Bridgeport, October 30, 1940.

F. E. Scheven, Factory Manager, General Electric X-Ray Corp., to S. C. Hope, Assistant Chairman, Remote Control Systems Committee, June 2, 1945.

A. Shayne, Chief Engineer and General Manager, Bulova Watch Co., Philadelphia, to General H. L. Hardy, Pentagon, Washington, June [illegible], 1945.

F. E. Ehrmann, President, Lehigh Foundries, Inc., Easton, Penn., to Office of the Chief of Ordnance, May 12, 1945.

Office of Chief of Ordnance to all M3 Fuze Contractors, telegram dated April 21, 1942, file SPGI.

Part 2. References Examined

Andrews, Mark, Cost Plus Fixed Fee Contracts and Variants, Washington, Industrial College of the Armed Forces, February, 1948.

Applied Military Economics -- A Case Study of the American War Economy, Technical Liaison Staff, Industrial College of the Armed Forces, Washington, July, 1947.

Barnes, J. M., "Armament Engineering -- The Ordnance Research and Advisory Committees", Army Ordnance, July-August, 1941.

Nelson, D. M., Japan's War Economy, New York: Macmillan Co., 1945.

Nolan, J. E., "Organization of Special Ordnance Plants", Army Ordnance Report No. 4, Washington: American Ordnance Association, March, 1942.

Odell, L. A., Functions of the American Ordnance Association in Industrial Mobilization Planning, Washington: Industrial College of the Armed Forces, 1946.

_____ Industrial Mobilization: Achievements and Deficiencies, Washington: Industrial College of the Armed Forces, 1946.

Committees, Boards and Commissions Related to Industrial Mobilization - Reference List, Washington: Industrial College of the Armed Forces, May, 1947.

Connery, R. H., The Navy and Industrial Mobilization in World War II, Princeton: University Press, 1951.

Devan, C. A., Planning National Defense -- 1950 to 1970, Public Affairs Bulletin No. 75, Library of Congress Legislative Reference Service, Washington: Government Printing Office, 1949.

Eliot, George Fielding, "Pass the Ammunition", AntiAircraft Journal, January-February 1953.

Engelbrecht, H. C. and Hanighen, F. C., Merchants of Death, New York: Dodd, Mead and Company, 1934.

Fascism in Action, Legislative Reference Service of the Library of Congress, House Document No. 401, 80th Congress, 1st Session, Washington: Government Printing Office, 1947.

Finney, Burnham, Arsenal of Democracy -- How Industry Builds Our Defense, New York: Whittlesey House, McGraw-Hill Book Company, Inc., 1941.

First, Edythe W., Industry and Labor Advisory Committees in the National Defense Advisory Commission and the Office of Production Management, May 1940 to January 1942, Historical reports on War Administration: War Production Board Study No. 24, Washington: Government Printing Office, 1946.

Galbraith, J. Kenneth, "Germany was Badly Run", Fortune, December 1945.

Herd, Charles H., Ordnance Production Theory, New York: Industrial Press, 1951.

History of Hill Climb Industry Integration Committee, Manuscript, c1945, (Hist. Sect., OCO)

History of the Optical Committee, Manuscript, c1944. (Hist. Sec, OCO)

History of the Ammunition Industry Integration Committee, Manuscript, c1945. (Hist. Sec., OCO)

Johnson, Melvin M. and Haven, Charles T., For Permanent Victory, New York: William Morrow Company, 1942.

Jolner, Paul, History of the Small Arms Clad Metal Industry Integration Committee, Manuscript, Pittsburgh Ordnance District, c1945. (Hist. Sec., OCO)

Keller, K. T., Problems of Tank Production, Washington: Industrial College of the Armed Forces, March, 1947.

Lenna, H. A., History of Central Project Integrating Committee, Manuscript, 31 August 1945. (Hist. Sec., OCO)

Maverick, Maury, The Place of the Smaller War Plants in the Present Industrial Mobilization, Washington: Industrial College of the Armed Forces, March, 1945.

Metcalfe, Henry, The Cost of Manufactures and the Administration of Workshops, Public and Private, New York: John Wiley and Sons, 1907.

Minutes of the Industry Integration Committee Meeting Held at the Book-Cadillac Hotel, Detroit, August 14, 1942, Typed minutes covering meeting of M52 Fuse Committee, 1942. (Hist. Sec., OCO)

Minutes of Industry Integration Committee Meeting at Regina Corporation, Rahway, New Jersey, 11 May 1944, Typed minutes covering meeting of A-1103 Fuse Committee, 1944. (Hist. Sec., OCO)

[illegible], A. L., "War Planning and Industrial Mobilization", Harvard Business Review, October 1930.

Seltzer, Lee; Shaw, Edward; and Lansdale, Lorie; Mobilizing Resources for War -- An Economic Alternatives, New York: McGraw-Hill, 1951.

Shaw, [illegible], Priorities and Allocations of Materials, Washington: Industrial College of the Armed Forces, March 1949.

Slezak, John, Problems Confronting Industry in Planning for War Production, Washington: Industrial College of the Armed Forces, [illegible], 1948.

Wilson, [illegible] C., Controlling Materials in Emergency, Washington: Industrial College of the Armed Forces, December, 1946.