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IN COMMEMORATION OF THE WORK OF
THE EIGHT THOUSAND YALE MEN
WHO TOOK PART IN THE WORLD WAR
1914-1918

HOW AMERICA WENT TO WAR

· ·

THE GIANT HAND

THE ROAD TO FRANCE I.

THE ROAD TO FRANCE II.

THE ARMIES OF INDUSTRY I.

THE ARMIES OF INDUSTRY II.

DEMOBILIZATION

HOW AMERICA WENT
TO WAR

AN ACCOUNT FROM OFFICIAL SOURCES OF
THE NATION'S WAR ACTIVITIES

1917-1920



*War Buildings in Washington
From a photograph by Underwood and Underwood*

THE GIANT HAND

OUR MOBILIZATION AND CONTROL OF
INDUSTRY AND NATURAL RESOURCES
1917-1918

BY BENEDICT CROWELL
THE ASSISTANT SECRETARY OF WAR AND
DIRECTOR OF MUNITIONS 1917-1920

AND ROBERT FORREST WILSON
FORMERLY CAPTAIN, UNITED STATES ARMY

*ILLUSTRATED WITH PHOTOGRAPHS FROM THE
COLLECTIONS OF THE WAR AND NAVY DEPARTMENTS*



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THE "WAR CABINET"

Back row, left to right: Herbert C. Hoover, U. S. Food Administrator; Edward N. Hurley, Chairman, U. S. Shipping Board; Vance C. McCormick, Chairman, War Trade Board; Harry A. Garfield, U. S. Fuel Administrator

Front row, left to right: Benedict Crowell, Acting Secretary of War; William G. McAdoo, Secretary of the Treasury, Director-General of Railways; Woodrow Wilson, President of the United States; Josephus Daniels, Secretary of the Navy; Bernard M. Baruch, Chairman, War Industries Board

AUTHORS' FOREWORD

THERE is no need here to plead for the importance of war industry, either that of the recent war or that of wars to come, as far as we can see into the future. Warfare since 1914 has undergone a tremendous evolution—the change from the mail and harquebuses of the Spanish conquest of the Americas to the ordnance known in the Civil War was not greater. The labor-saving machine has come into warfare, to the immense multiplication of the power of the individual soldier. Soldiers have become machine operatives.

Machinery—what a range of it was called into existence in those memorable four years! Nor was it all the machinery of killing and destruction. Besides the machine guns, the co-ordination of battery fire for the barrages, the tanks, the trench mortars, the linked-up projectors for hurling at one discharge clouds of tumbling missiles filled with poison-gas, the long-range railroad guns—besides these, purely the machinery of killing, there were machines for magnifying the power of the individual soldier in many field activities. Machines moved the artillery and brought up the supplies. Machines navigated the air. Machines built the roads and restored the bridges. Machines delivered the messages. Machines put the commander in instant touch with every element of his forces, even though they held a battle front many miles in extent. Even that romantic figure of the past, the military spy, yielded his place to machinery, as human ingenuity invented devices that “listened in” on the enemy’s wire and wireless communications, detected his mining operations, betrayed the movements of his armies, recorded the footfalls of his nocturnal raiding parties, and automatically spotted the positions of his artillery.

Hence when we entered the struggle it was upon America's magnificent industrial fabric, her shops, her shipyards, and her railroads, that the Allies looked with the greater hope, rather than upon her well-nigh limitless resources of men. We, too, regarded that structure as a talisman of victory, as something which would, in some marvelous, hazily understood way, take the limitless supplies of America's raw materials and turn them into war machines in such quantities as to leave no question of the outcome of the war. America felt secure. It is only necessary to recount that in many quarters, both in the United States and abroad, it was first thought that America's chief contribution would be a vast aërial force. Washington would touch a button, and forth from the doors of American factories would issue a cloud of airplanes, with which America in brilliant fashion would preëempt the new field, and in the air win a victory which it had not been possible for the Allies to win on the ground.

What must have been the disillusion of the members of the military missions which the principal Allies sent to America in the spring of 1917 to begin making the arrangements for the coöperation of America in the war! They, in common with the rest of Europe, shared with the masses of the American public an implicit belief in the invincibility of American industry, out of which they had seen come such prodigies as the Panama Canal, the range of modern labor-saving machinery, and that standardization and serial coördination of specialized effort which we know as quantity production. It was not too much to expect of that industry that, properly organized and directed, it would indeed produce the marvels for which Europe was waiting and would break the military deadlock which the war industry of Europe had not been able to affect.

Yet when these foreigners reached Washington, what did they find? A complete absence of effective industrial preparation for the ordeal ahead. Nothing done. Industry trying to coördinate itself into a single war machine, but groping ahead painfully in a fog of ignorance and misapprehension, without plans, looking for direction to an organization in Washington

tragically inefficient and ill-adapted to the effort to come. Those who had arrived fresh from the theatre of war, who were familiar with the progress that had been made in the development of war machinery, but who knew by bitter experience what evolution the organization of a nation for war must undergo before reaching efficiency, must have seen at once that no miracles were to be expected of American war industry for many, many months. Before a war industry could produce, it had to exist—it had to come forth as an organized entity from the heterogeneous assemblage of American factories; and the pangs of that parturition were bound to be protracted and painful. America had failed to profit by what had been going on in Europe for almost three years.

Our military guests courteously refrained then and thereafter from any expressions of disappointment; but it is significant that they began immediately to lay stress upon the necessity of our participation in the war with troops, a concept which at that time fell strangely upon our ears. Up to that moment we had counted on making our participation chiefly industrial in character—by supplying a tremendous amount of machinery with which the Allies, aided by a small force of our own, could win.

Yet we had made no preparation for participation of that sort. For three years America had stood insecurely on the brink of war and had not made the first move toward providing herself with the machinery that could save her if she fell in. Of the danger itself that America might be drawn into the struggle there was no question. The Administration in 1916 was returned to power because for the two years preceding the election it had been able to keep America out of the war—an event which was in itself a confession of the universal realization of our danger. Yet there was no assurance that the policy which had been successful in keeping America neutral up to the fall of 1916 would continue its successes thereafter. The President continually told his audiences that the world was on fire, the sparks falling everywhere, and no one knew where the next blaze might be kindled. It was evident that at

any time might arise the situation which would make our further neutrality impossible. Against that contingency it would have been only common sense to prepare.

Nor can it be pleaded that the country then would not have followed any leadership, even leadership as magnetic as the President's then was, into a program of war production during a time of peace, with all that such a program implied in the issue of bonds and the dislocation of normal industry. It is probably true that before the actual declaration of war the public would have been unwilling to mortgage itself for the billions which would have had to be spent to prepare America with an adequate armament; and true also that anything less than an adequate armament would scarcely have been worth the trouble. It is not contended here that the Administration should have attempted the actual production of war materials on a war scale. It is contended that an immense amount of preliminary work in industrial preparedness might have been accomplished, and at a trifling cost. A word of warning from those to whom the public looked for its military protection, a statement of the necessities, and Congress, with the approval of the people, would have voted the few millions which the War Department would have required in financing a scientific and minute study of conditions in Europe and a remodeling of our own military and industrial plans and organization in conformity with the lessons which the Allies had learned.

Instead of the attitude of prudence which we might have expected of Washington in those days, we find an official indifference to the future that is not to be explained. The authorities could not righteously plead ignorance of the advancement of the science of warfare. Almost from the outbreak of the war in August, 1914, we had succeeded in placing observers with the various armies in the field. The reports of these observers were filled with data showing the deficiencies of our own military organization for war on the modern scale and the obsolescence of most of our *matériel*. On these reports might have been based a complete rejuvenation of our designs and methods, but what actually happened was that the reports

were filed away in the archives of the War College to gather the dust of official neglect.

Yet this preliminary and relatively inexpensive preparation might have made a tremendous difference to the accomplishments of our war industry. Think what it might have done for our aircraft program! If the first two years of the war in Europe demonstrated anything, they demonstrated that an entirely new arm of service had come into existence. The Powers in Europe were rapidly raising their air services to the independence and dignity enjoyed by their land and naval forces. But what was the place of aviation in the American military organization? Far from being a separate service, it did not exist even on a parity with the function of providing food and clothing for the Army. Aviation existed in the American Army until May 20, 1918, as a subfunction of the Signal Corps. With aviation occupying such a status in this country, it is not surprising that we entered the war in 1917 almost as ignorant of the science of military aviation as any tribe of South Sea islanders.

In June, 1917, two months or more after the declaration of war, we sent to Europe a commission of engineers to begin, at that late date, the study of aviation which should have been started at least a year earlier, and which better might have been started two years earlier—for as early as 1915 the importance of aviation in warfare was beginning to assert itself.

As with aircraft, so with many other branches; with the result that, when the armistice came, those whose attention had been absorbed for many months in the production of military supplies discovered with dismay that their efforts were quite generally regarded in the country as a failure. They knew not quite what to make of this attitude nor whence it sprang, since they themselves were only aware of the tremendous accomplishments in the very thing thus discounted and condemned.

In time there arose two extreme opinions as to the value of our war industrial effort. The one, voiced prominently by such figures as Senator Lodge, branded the supply program of the

Army a failure, principally because it failed to deliver to the American Expeditionary Forces in time to be used at the front any American-built artillery or service airplanes, or at least any appreciable quantities of them. And if this were thought to be a partisan and prejudiced attack, then one could go to the official records of the A. E. F. and find similar statements in General Pershing's own reports.

The opposite opinion was that the industrial program, as a whole, was a success. This was essentially the opinion of industry itself, of the men who gave their best to the enterprise. These men, having shared in the wonderful response which American industry made to the tocsin of war, and having lived amid the expansion which, before the war ended, built up a tremendous capacity for the production of military supplies, saw in our industrial enterprise something wholly to the credit and glory of the United States.

Here, then, was a contradiction which, apparently, was not to be reconciled. On the one side an attack, based on indisputable facts, against the enduring fame of our war industry in the World War: on the other, a defense of that record equally vehement and backed by authority equally unimpeachable. Such contrariety of official statement could result in nothing but confusion in the mind of the public. Out of such confusion are born legends eventually to find their way into history, to the eternal suppression of truth. It is important, then, that these two extreme positions be reconciled, if possible—and it should be possible to reconcile them, because one truth cannot actually be out of harmony with another. What we must find is the measuring rod to evaluate the work of the country correctly.

Either one of the extreme opinions as to the creditableness of our munitions production was, perhaps, tenable; but neither one alone was quite the truth. The clue may be found in the story of the would-be traveler who, bag in hand, dashed through the railroad station of a country town and then on down the track in a vain effort to overtake a passenger train which had just pulled out. As he returned, crestfallen, a

lounger said to him: "Well, you didn't run fast enough, did you?" "Yes," he replied, "I ran fast enough. The trouble is, I didn't start soon enough."

And that was just the trouble with our war industry: when it got fairly started, it became something entirely creditable to the greatness of American industry; and the world had never seen progress so rapid, on a scale of such splendor:—but it started at least half a year too late!

The lack of foresight in the administration of the War Department during the critical prewar months can scarcely be overemphasized. There seems to have been an utter disregard of the danger of America's position, an unconcern for the future that seems incredible. The direction of effort seems not to have viewed actual war, on the modern scale, as among the possibilities for America. We have noted the lamentable ignorance of the science of aviation in the Army in 1917; but for that there was at least the excuse that the science was entirely new, having been developed almost exclusively within the war zone in Europe. What, though, can be said for an almost equal ignorance of the business of supplying to a modern army such things as uniforms, food, rifles, and ammunition—things which American troops had used and consumed since America was a nation at all? The War in Europe had scrapped and rendered valueless all previous experience in the consumption of such supplies by armies, for war had entered a new era of destructiveness. Yet our War College, the body upon which the nation relied for its study of warfare, evidently came right up to the declaration of war without having received any instructions to procure the indispensable information about the consumption of the commoner supplies by large bodies of troops—the very information upon which manufacturing programs had to be based. When Mr. Frank A. Scott in April, 1917, immediately after the declaration of war, organized the General Munitions Board, one of his first acts was to send to the General Staff for its studies in supply problems. In return he received a few pamphlets of no practical value whatsoever.

All of this preliminary work, which is an essential part of preparedness and a time-consuming part of it, should have been done before we entered the war. It would have cost effort rather than money, and the country was entitled to that much insurance. Of course, after we entered the war, this same preliminary work had to be done before the manufacturing program could make any proper headway.

Be that as it may, we declared war against Germany; and was there then to be observed among those responsible a realization of the time already wasted and a determination to make amends by jumping in and laying the foundation for a scientific war industry without further temporizing? Not at all. Although there was a tremendous bustle and activity in Washington, and although in some branches of warfare great achievements were written, in the branch which dealt with the production of the war supplies a nightmare of indecision and lethargy seemed to grip the war department administration. Let us look at one or two instances of official dilatoriness.

In one of the volumes of this series* is told the story of our manufacture of the Browning machine guns, and a dramatic story it was—one of the great achievements of our war industry. Here was a concrete illustration of what American industry could do—after it got started. But when did it start? The facts are these:

The evolution of warfare in Europe, bringing into play, as it did, a greater number of machine guns to the tactical unit than troops had ever used before, focused attention upon the machine gun equipment of our own Army. For many years the Ordnance Bureau had been studying the machine gun problem. By 1916 the developments in Europe had left our Army's machine gun progress dangerously far back in the rear. Not only was the Army's equipment scant, in comparison to what had come to be regarded as adequate machine gun equipment for troops, but the guns our Army was using were obsolete in design. The Lewis machine gun, an American invention, had won a spectacular triumph in Europe. Although machine guns

* The Armies of Industry: I.

had been in existence for a long time it took the World War to demonstrate their tactical importance in the field. Here was a modern development, then, that demanded consideration.

The Secretary of War appointed a special machine gun board, consisting of seven army, navy, and marine officers and two civilians, to investigate the whole question. The board deliberated in the fall of 1916, but it then found itself unable to fix definitely upon types and designs of guns to be adopted—for reasons too technical to be described here, the Lewis gun did not then meet with the board's approval—and so it announced that beginning with the first day of the following May (1917) it would conduct competitive tests of machine guns at the Springfield Armory at Springfield, Massachusetts. This was fair notice to the inventors and manufacturers to enable them to perfect their models in readiness for the demonstration. It is probable that in making this deferment the board was aware of the progress then being made by John M. Browning, the inventor, and that the date for the tests was set far enough ahead to enable him to be present with working models.

At any rate, on May 1, three weeks after America became a belligerent, the machine gun tests began. Ten days later—although under the published conditions the tests still had far to go, and many thousands of rounds of ammunition remained yet to be fired—two of the members of the board left Springfield and hurried to Washington. They carried with them a preliminary report, concurred in unanimously by the board, to the effect that Colonel Browning had invented a weapon—his heavy machine gun—which was in advance of anything the world knew, both in effectiveness as a weapon and in its adaptability to rapid production. The report urged the immediate adoption and procurement of the gun by the War Department.

We were already in the war; every day's delay inferentially cost lives and prolonged the national peril; and the machine gun board was unwilling to risk any delay, either in the mails, or in the usual routine of the War Department. And so it took this extraordinary course of anticipating its own certain formal report by two weeks by sending on these two officers to Wash-

ington to tell the War Department about the Browning gun, so that the Ordnance Bureau might set about its manufacture immediately. The preliminary report was delivered to the Adjutant General on May 11. Next day the two officers met the Secretary of War and told him about the report. Then they went back to Springfield.

A week or so later the board received an official letter in this tenor: "Don't be in a hurry. Don't get excited. Go shoot the gun some more." For all the mission to Washington had accomplished, the officers might just as well have stayed in Springfield. There was no immediate action in the War Department. With America having actually clashed with the foe at sea, with hundreds of thousands of young Americans enlisting and thus actually stepping out on the road that led eventually to the European slaughter pens, the War Department took no effective steps to provide the new troops with Browning machine guns. True, in July the Department let contracts for the production of 22,000 Browning guns by the Colt's Patent Firearms Manufacturing Company, the holder of the Browning patents; but the Colt's Company was so loaded with other machine gun contracts that it was in no position to start making Brownings until it had provided itself with completely new facilities. In fact, these first orders placed with the Colt's Company may be disregarded almost altogether, since neither of them resulted in production until after production had started under the later contracts, and, moreover, the production of Brownings by the Colt's Company was always small and negligible compared with that of the other producers.

It was not until September and October, 1917, that our Browning machine gun program really began, when contracts were placed for the manufacture of 65,000 guns. At the most favorable calculation, four months—four of the most vital months of our history—had elapsed since the head of the War Department had been apprised of the great value of the weapons. As a result of this delay our first divisional machine gun companies trained with obsolete Benét-Merciés, 1904-

model Maxims, and old-fashioned Colts. In France our troops fought chiefly with Hotchkiss heavy machine guns and Chauchat automatic rifles. Fortunately, the well-developed munitions industries of the Allies were able to supply these.

Yet when industry was permitted to start the manufacture of Browning guns, what a record it made! It began producing the guns in quantity in May, 1918. This could just as well have been January, except for the delay in the War Department. The industry produced nearly 100,000 Browning guns before the armistice, reaching the production rate of 30,000 guns a month. It sent enough Browning guns of both sorts to France to arm the A. E. F. completely, but the A. E. F. was so busy fighting in the Argonne that it had no time to exchange its French weapons for the American guns. After July 1, 1918, all the American divisions sailed completely equipped with Browning guns. Had the manufacturing program been inaugurated when it was possible to inaugurate it, there would have been Browning guns enough to arm all American divisions embarking after March 1, 1918. Three-fourths of the A. E. F. embarked after that date. A little more initiative in Washington, and the Allies might have been relieved almost completely of one of their great burdens of A. E. F. supply.

Think not that we are selecting an isolated example. If the authorities in Washington knew anything, they must have known at the beginning of our participation in the war that the forthcoming American armies would have to depend for their powder and explosives almost entirely upon new and specially created manufacturing facilities. The American powder-making industry, in the two years and eight months between the outbreak of the war in Europe and our declaration of war against Germany, had expanded in producing capacity three thousand per cent—thirty times. This was almost entirely in response to war orders placed in the United States by the Allies. It is therefore evident that there could have been no excess producing capacity within the United States not engaged in turning out propellants and high explosives for the Allies. It was equally evident that it would be a fatal step to disturb this

supply upon which the Allies were basing their operations. Therefore we had to build up what amounted to an entirely new powder industry in this country in order to satisfy our own tremendous war needs.

It was obviously an efficient thing to do, instead of creating a multitude of small smokeless-powder plants, to erect and establish one huge Betelgeuse of a powder plant, strategically and safely located behind the mountains, to which we could look chiefly for the powder that would keep our field guns vocal. This, at any rate, was the opinion of the experts, civilian and military, who were studying the problem; and it may be assumed that such a vital project was one of the first war measures to be instituted by the War Department after the declaration of war.

Such an assumption, however, would be wrong. It was months before the Secretary of War seriously took up the project for consideration. In the fall of 1917 he was personally negotiating with the DuPonts for the erection by them of a great powder plant. For weeks these negotiations dragged along, the Government finding itself unable to make satisfactory terms with the DuPonts. Then, late in the fall, came the Interallied Ordnance Agreement, placing upon the United States the obligation to furnish to the Allies an immensely increased supply of powder, in addition to what they were already securing on their American orders; and it was evident that we should need another new powder plant at least as large as the one in contemplation.

Not until December 17, 1917, did the War Department take the step it should have taken long before—namely, it called upon an expert industrial executive, Mr. D. C. Jackling, to take charge of the whole construction enterprise. Mr. Jackling justified this course by coming to a quick decision as to what his program would be. As Director of United States Government Explosives Plants, he himself built the plant at Nitro, West Virginia, engaging the constructing contractors on January 18, 1918, a few days after he took up his duties; and he reached an early agreement with the DuPont Engi-

neering Company to build the other great plant, that at Nashville. Thereafter the progress was amazing. The Nashville plant actually began turning out powder on July 1, 1918, and the two plants before the armistice reached a combined production average of more than 500,000 pounds of powder daily, or about one-third of their combined projected capacity. The point is, however, that the construction of these plants, the need for at least one of which was evident in the spring of 1917, did not begin until after February 1, 1918; and then we had been at war nearly ten months!

Now these and other distressing delays which could be named were not due to the failure of the human factor—not directly, that is. There was no lack of vigor in Washington, no disagreement as to the necessity for swift action, and no lack of technical ability about which we can complain. The explanation lay in a more subtle thing, in the grouping and arrangement of powers and duties which we know as organization. The War Department was trying to function with an organization so absurd and antiquated, from the standpoint of a modern business man, that real progress was practically impossible. The lack of good organization was too complete to deserve any detailed description.

The chief weakness in the organization as it then existed was its lack of an efficient overhead control. In the material side of warfare, the Department existed as a collection of semi-independent purchasing and operating bureaus, each regarding all the others as natural competitors, and each determined to put through its own projects, if necessary, at the expense of the others. The impossibility of that system had been notoriously demonstrated during the Spanish-American War, when the army supply system broke down almost completely. Yet on the same old plan the War Department had existed during the nineteen years which had intervened up to the declaration of war in 1917.

The Navy had seen the light, and it had consolidated its procurement of supplies some time before we engaged in the

war. A comparison of the early procurement activities of the Army and Navy conveys a plain lesson.

The Navy changed its organization in time. The War Department approached the brink of war, and stepped over into it, without having made the first attempt to correct its faulty organization; and since that organization itself was responsible for most of the delay in the manufacturing program which occurred later, those who either did not recognize the deficiencies of the organization, or else lacked the ability to change it, must now themselves bear the responsibility for the shortcomings in the production and delivery of supplies. Certainly American industry cannot be blamed because its chief war customer, the War Department, was unable for months to set its own house in order.

When the independent bureaus of the War Department went on a war footing in April, 1917, they began their work with an energy for which there is here nothing but commendation. Their energy itself, however, soon got them into trouble. It was not so much that the energy was misdirected as that it was undirected, and presently the result was confusion worse confounded. There was no harmony among the various industrial projects, no equitable division of manufacturing facilities and materials, no uniformity in contracts or in treatment of labor and industry, no care to prevent the overloading of individual factories with war work or to guard against the congestion of manufacturing districts; and presently war industry approached a condition resembling chaos. Even the transportation congestion which almost paralyzed the railroads and led to their seizure by the Government on December 28, 1917, was due largely to the uncoördinated and undirected shipment of war materials.

In January, 1918, the Hon. George E. Chamberlain, then the chairman of the United States Senate Committee on Military Affairs, addressing the National Security League in New York, made the statement that "the Military Establishment of America has . . . almost stopped functioning." This address confirmed the general public suspicion that the supply program

was not going well; and, coming as the first severe attack upon the War Government, it created a sensation. The high officials immediately responsible for the condition of war industry did not take the attack in good spirit. The White House lightnings descended upon Senator Chamberlain's head, when the President issued a statement which began with the sentence: "Senator Chamberlain's statement as to the present inaction and ineffectiveness of the Government is an astonishing and absolutely unjustifiable distortion of the truth."

In extenuation of the President's intemperateness of expression and the method of his attack, it should be remembered that this verbal passage occurred at a time when the Administration was laboring under great stress. A certain irritability perhaps could be excused. The Senator in his address had not been careful of his terminology and had spoken loosely of the Government and the Military Establishment when he meant the much narrower administration of the production of army supplies. Still, nobody could have heard or read his speech and mistaken his meaning. The War Government generally was accomplishing great things, and there could have been no severe criticism of the way in which the Military Establishment was building up its human power and conducting many other important operations of war. The President, however, chose to take Senator Chamberlain literally and therefore was able to deliver an attack to which there could be no convincing rejoinder.

It was the natural instinct of the Administration at that time to defend itself vigorously against criticism, an instinct happily at the moment strengthened by the fact that brighter days were apparently at hand. The War Department in its supply activities had indeed almost ceased to function, as Senator Chamberlain charged; but what he did not mention, if indeed he knew of it at all, was that already the reorganization had begun which was to bring order out of chaos in the production of supplies. The plans for reorganization had already been formulated, and the first steps were being taken to put them into effect. Senator Chamberlain's speech accomplished the beneficial result of speeding the reorganization,

which nevertheless had to proceed gradually, because it was also necessary to keep the War Department's business going and therefore impossible to stop dead while conducting a reorganization.

As the new organization evolved from the old, and expanded, and strengthened its authority and control over the situation, the war industry responded as a parched country responds to a drought-breaking rain. The development of facilities in the ten war months of 1918, the growth of plans and programs, and even the records of actual production, were an inspiration—a thing truly worthy of the industrial greatness of America, a thing beyond comparison with any other national public work. American war industry, finally unshackled, demonstrated that within itself it possessed the power of miracles for which Europe was looking. It did not fail—far from it—and those who assert the contrary do not see the whole truth; they lack the measuring rod. Our tremendous manufacturing enterprises of 1918 undoubtedly had great moral effect in bringing the war to an early conclusion, for those enterprises were being developed on a scale which the enemy had no hope of equaling, as he was well aware. That their physical effect in the field was not greater was due to the conditions under which the war industry labored at the outset, conditions due to no failure of industry itself, or to no failure of individual officers, but to a failure of an obsolete, unworkable organization at the top. And it is necessary to add that behind this failure was the failure of those responsible to recognize and correct the organizational defects patent to so many both inside and outside the War Department.

This criticism is here set down, not for its own sake, not in any captious or vindictive spirit, but for the sake of truth and the enduring fame of our war industry. The war is over, and we are now far enough away from it to see some of its verities. The volumes to which these paragraphs are prefatory have been written in the hope that they will prove to be a useful contribution to the literature of military preparedness. They have not been written to justify any man or any insti-

tution, or to blame any individual or any system, but to show the truth as nearly as the authors could approximate it in dealing with a subject so vast as that of our war industry. Only by having access to the truth can those of the future avoid our mistakes. Former wars left us no such records on which to base our industrial plans in 1917. The mobilization of industry for war was *terra incognita* to the Government and, it should be added, to the producers also. For the weal of America it is important that in the future, when the memories of the World War are dim, but when some other emergency may demand the employment of our whole resources for war, there be no repetition of the painful exploration and experiment of 1917. In the hope, therefore, that they are providing an aid not only for the military student but for the industrial producer also, to show them what a great war means to the industry of a nation such as ours and to enable them both to avoid past mistakes and to build solidly and well, the authors have done their work.

B. C. & R. F. W.

Washington, February, 1921.

PREFACE

THE period of greatest effectiveness on the part of the War Industries Board roughly coincides with the period of greatest progress in the production of military munitions. This was no accident: the one was cause, the other effect. The direction and control of all war industry by a single authority was found by hard experience to be a condition precedent to the efficient employment of that industry in the production of military supplies. The War Department, being only one of the official customers of that industry, was in no better position to apply the control than the Navy was, or the United States Shipping Board, or the Purchasing Commission for the Allies. It remained for some outside and superior agency to assume such powers; and such an agency was found in the War Industries Board, the saving force which, coming into war industry in 1918, enabled it to accomplish what it did accomplish.

All the volumes of this series, except this volume, are concerned primarily with activities most of which fell within the administrative province of the Assistant Secretary of War and Director of Munitions. But no record of the conduct and achievements of the industrial effort of the War Department is complete unless it tells something about the administration of industry as a whole. As long as industry itself was confused, the War Department's own material enterprises could not hope to escape the confusion. The inclusion, therefore, of this annal of the work of the War Industries Board in a series of volumes otherwise almost entirely devoted to intra-departmental affairs of the War Department, is to be regarded as an acknowledgment of the War Department's debt to the War Industries Board.

The thanks of the authors are due to those members of the

War Industries Board who so freely contributed their time in connection with the preparation of this volume and who gave the benefit of their advice in its final revision. Special acknowledgment is due to Mr. C. H. Claudy, who literally spent months of his time in collecting and arranging the material.

THE GIANT HAND

CHAPTER I

THE CONTROL OF WAR INDUSTRY

WAR industry in 1917-1919 was something more than war department industry. War industry was the whole: war department industry but a part, albeit much the largest of the parts. In a real sense the whole enormous activity of shipbuilding was war industry. The Navy also prosecuted a large war industry. Its contracts brought forth destroyers, submarine chasers, guns, powder and shell, depth charges, mines, airplanes, as well as food and clothing for the hundreds of thousands of American boys who wore the blue uniform. A fourth branch of American war industry was that conducted by the Allies, represented in America by purchasing commissions. For them the windows of dozens of American factories blazed through the nights, and thousands of American workmen toiled until the armistice came to halt all such enterprises. But we went even farther back into fundamentals, and by encouragement and control made war industry of such basic pursuits as the mining of coal and the production of food.

Truth to tell, all American industry in 1918, when the great war program was well advanced, was war industry. Not all of it was producing the things used in war; but even that fraction of it which still retained some semblance of its normal aspect led such a rationed and controlled existence that it may verily be considered as part of the war machine.

Now the War Department, with whose industrial efforts this series of narratives is principally concerned, bore to the great industrial structure of America the relationship of customer—the largest customer. The war industries of the United

States Shipping Board, the Navy Department, and the Allies in America, lumped together, would not have equaled in quantity the commitments of the War Department alone. For the War Department more workmen toiled than for all the others combined; greater and more numerous were the problems which arose; more the materials involved, and more the money. But the Navy, the Shipping Board, and the others were customers, too, and important ones. All had to be served, if the whole effort were not to come to disaster; and there was not sufficient industrial capacity within the United States to take care of all the customers' demands. Therefore, if the best organized and most efficient of the customers were not to serve themselves to the war materials first, at the expense of the others (who were equally vital in the strategy of the nation), there had to be a manager of the plant—someone who would see to it that all the customers had equitable access to the facilities, and who would at the same time look to the development and expansion of facilities, so that the resources of the United States might do their utmost toward satisfying all the war needs. And since the plant was the whole sum of American industry, with its diverse ownership and management, this supercontrol had to be Government itself, which in its branches was itself the customer.

It is with this control and the agency of control, the War Industries Board, with the development of its power until it became the single most powerful administrative agency in our Government, if not in any government, and with the acts which demonstrated that power—acts which mobilized the resources of the United States for war—that the narrative in this volume deals.

Preparedness? Who in America before 1914, and for a long time after that, thought of it in terms of materials? Preparedness, we Americans thought, was a matter of men and their training as soldiers. Who in those days supposed that the training of troops was but the minor and less difficult side of preparation for war and that the crux of the struggle for battle power was not soldiers, but the materials of warfare—

not the mobilization of men, but the mobilization of ores and fuels, the muster of mechanics and machine tools? Certainly the people of the United States are not to be blamed for their lack of understanding of the problem of modern warfare; for the people's own experts in warfare, the pick of the West Point graduates, who made special studies of the subject at the Army War College, failed to make, in their multifold calculations of strategy, provision for the mobilization of war industry. The war broke out in Europe; and still, as the German inundation overwhelmed Belgium and swept onward into France, it seemed that soldiers were the thing, as they had always been in the past.

Then something happened. The opposing forces struck equilibrium, deadlocked, dug in; trench warfare began. And now a new element made itself felt: the insensate power of materials. A feverish invention in Europe began to apply the principle of the labor-saving machine to warfare; and it became more and more evident (with still and always something to be said for superiority in numbers of troops) that victory was likely to rest with the side that could mobilize the greater weight of materials.

This realization was not with us—not then. We were three thousand miles away from the war and observers of only the superficial aspects of it—the inconsequential gains and losses of salients, the individual exploits, the suffering of civilian populations. The first inklings of what was toward occurred when the principal Allies, having in their plans exhausted their own productive resources, turned to the resources of America with money to purchase their mobilization. The first American munitions factories sprang up, the beginnings of war industry were to be seen in the United States, the war-bride corporation wrote unbelievable quotations upon the ticker tape, the public gossip rolled upon its tongue the glittering romances of the stock exchange. After some months of this a few long-visioned Americans—engineers for the most part, men who knew something about American industry—began to understand what would be our difficulty if we were drawn

into the struggle as a belligerent. The travail in Europe, as the Allies attempted the mobilization of their industrial resources, was patent in the downfall of statesmen and ministries, in the extraordinary powers usurped by government there. Compared with ours, their individual problems were almost elementary. What would be the result if we were forced suddenly, on the moment, to mobilize our industry for war, as war had now come to be—to mobilize our vastly greater, more diverse and complex, less homogeneous, and more widely scattered industry?

Some few Americans appreciated the problem and the necessity of its solution as a measure in preparedness. Certain thoughtful leaders of industry knew it. As early as 1915 the Chamber of Commerce of the United States formed its Committee on National Defense, which had for its purpose the surveying and lining up of the factories of America into a potential war industry. As to the American public, it relied upon the Government to keep out of Europe's war altogether, and as a body it was impatient of the calamity howlers. Alas, nowhere in the various branches of the Government was there a leadership which saw the necessity of making industrial preparation a major official activity, if merely as insurance against the failure of a precarious foreign policy. The handful of clear-sighted men succeeded in gaining some sort of concession from the Government. Congress appropriated a few thousands—gave the alarmists a dessert spoon with which to shovel down Pike's Peak—and thereafter (it was the autumn of 1916) was to be observed the spectacle of Howard E. Coffin, pioneer of American industrial preparedness, and a handful of assistants trying, if not to mobilize, at any rate to take an inventory of, the facilities we should have to work with if the need came. A brave and pathetic sight, a pinch of star dust amid the serene planets and dead worlds that swam the Washington cosmos.

It may be said with truth that Washington never clearly envisaged the magnitude of the problem of mobilizing our war industry until we had been for several months a belligerent.



Photo by Harris & Ewing

HOWARD E. COFFIN

The first conception of our part in the war was that we were to give financial and industrial aid to the Allies, and for the rest to form a sort of cheering section on the side lines. Later it was borne in upon American understanding that we should have to send men to fight; but still, though the supply problem was now rearing its terrifying head in the confused bureaus in Washington, there was no general understanding of the fact that the war was for us, not only an affair of men in uniform, but also and above all an affair of business and industry, of forests and mines and oil wells, of cotton fields and hay fields, of cows and hides, of huge mushrooming factories, of designs and specifications, of machine tools, dies, jigs and gauges, of mechanics and laborers, of ships, electric wires, shoe leather, needles, and thread. Not until the summer of 1917 did the Government come to realize the supreme difficulty of welding our industry into a single ordered unit and the supreme necessity of government control of it. Up to that time the mobilization had been in the hands of a large, rapidly expanding, and increasingly important, but nevertheless volunteer, organization, the powers of which were only advisory. Then at last were taken the steps toward complete governmental control of industry. Even then, that control did not emerge completely from the flux of organization until the spring of 1918, when our war was a year old!

Nevertheless, it did emerge. Industry came under complete control. The germ in the office of those precursors in 1916, feebly trying with their questionnaires to align the munitions-making facilities of the United States into a unit organization, grew, evolved, and flowered into the power that was the War Industries Board, from whose authority no man, however obscurely connected with the great fabric called industry, was exempt. With the possible exception of Germany, America became, of all nations at war, the most thoroughly ordered and controlled.

In this there is a paradox. America believes herself the freest of nations. She pictures the European immigrant as figuratively kissing her free soil as he sets foot on it. Whether

we have a greater degree of liberty than the more advanced of the European nations is beside the point; the belief is all that counts; and, Americans believing as they do, it might have been expected that it would be surpassingly difficult to wrest from them their individual liberties, even to the end that we might win a victory in war. Free speech, a free press, personal rights—these are American institutions. With us, as in England, every man's house is his castle. Every man's business is his own affair. Interferences with individual businesses are fiercely resisted, whether those interferences be governmental or private. The various anti-trust acts are monuments to the American determination that there shall be no interference with individualistic effort. Business, which had won an empire from a wilderness and had brought luxury within the reach of all, was protected.

Yet, once we were in the war, the liberties speedily disappeared, and there was little or no opposition to their going. The rights of the individual were first to vanish. With the passage of the Selective Service Act, American manhood surrendered its freedom. After that law was in effect, no man within the draft age was any longer a free agent. He could not come or go without permission from Government, and he was required to hold himself ready to perform whatsoever service the Government chose to exact of him. After that in quick succession disappeared freedom of speech and freedom of the press, the latter more or less voluntarily. Contrast this quick conscription of the population with the struggle that ensued in England before compulsory military service became a fact there. Last to disappear were the liberties of American industry. Although it is probably true that in America any invasion of property rights is more doggedly combated than an invasion of human rights (because property is more powerfully organized than humanity), yet this delay in the conscription of business was due, not to the resistance of business itself, but to the disorganization in Washington and the lack of governmental machinery which could exercise control.

American adaptability, American submissiveness to wise

leadership—in the last analysis, American intelligence and a proud patriotism—made possible these sacrifices of liberty which so vastly strengthened the arm of the Government in the war. What Americans granted by a sort of common consent was won by the governments of other lands from their peoples only after hard struggles; yet no other country at war with the Central Powers came so thoroughly under centralized control as free, individualistic America.

As to the control of American business, it became absolute. There was no freedom of individual enterprise. The control was autocratic, as powerful as any which ever reigned in the Russia of the Romanoffs or in Prussia when her junkers drank to *Der Tag*. Indeed, the control of industry did not end at the confines of America, but toward the close of the war was reaching out in the attempt to dominate the industrial strategy everywhere behind the Allied lines, as General Foch dominated the strategy on the lines.

Incredible? It was true. Half a dozen men in Washington—assistant Presidents they were in reality, for they administered the practically limitless powers granted to the President by Congress—sat with their hands on the levers which absolutely controlled every factory, plant, mine, oil well, and railroad in all America. One of these men, Bernard M. Baruch, a civilian, guided the destinies of the War Industries Board, clothed with a power the limits of which were never clearly defined, and which therefore, because they were never questioned, extended as far in every direction as he found it necessary to extend them. True, in his acts he was responsible to his commander-in-chief and, more fundamentally, to Congress, the source of the power. But Congress was backing the President almost without reservation; and as to President Wilson, once he picked a man for a high place and reposed confidence in him, he trusted him unreservedly and interfered with him almost never.

The control extended by the War Industries Board, when it had thoroughly organized itself for the effort, was absolute. In a business way, men lived or died at a word from Washing-

ton; and the casualty lists were sometimes heavy. Factories rose or fell, prospered or perished, as the War Industries Board commanded. Labor moved and worked in response to the wishes of the Government. Prices no longer followed the law of supply and demand: they advanced, retreated, or stood still, on fiat from Washington. To its own laws, the laws preventing combinations and business interferences, the Government paid no more attention than to so many scraps of paper. Did the power actually exist in law to justify the more drastic of these acts? Those wielding the power assumed that it was implied in the broad general authority given to the President to win the war by whatsoever measures his judgment recommended to him; and those affected by the War Industries Board's fiat never questioned the authority—there was not the rush into courts for interpretations that is the normal sequel when Business deems itself constrained.

The need of the Government was great, its appeal strong, the powers it assumed were enormous; and the response of Business in supplying the men to wield the powers was correspondingly fine. Men came to Washington to argue and protest, but they remained to labor with enthusiasm. Men whose services could not have been procured for any salaries within the Government's command, if the enterprise had been conducted on the dollar basis, slaved away without thought of strength or health, for a dollar a twelvemonth, and counted it a privilege.

And indeed it was a privilege. Waste no tears upon the sacrifices of the dollar-a-year men—ecstasies enough have already been poured forth in their praise. America deludes herself with a false reputation for materialism, as she has certainly succeeded in deluding Europe. At heart she preserves a childlike and superb idealism. It is not the goal of dollars that keeps the national chase at frantic pitch, but the game itself of getting there; and the dollars at the end represent not a miser's hoard, but power, applause, celebrity—but mostly power. Conceive of the most ruthless, materialistic American imaginable, well on his triumphant way toward conquering some important

branch of industry. Go to him in the prime of his life and ask him to step out of the struggle and accept the Presidency of the United States; and see how long he hesitates. The crass exhibitions of materialism in this country which so shock our idealists—the domination of Business over education, current literature, art, the stage, social intercourse—are but the expressions of an ideal of upward struggle and power which we inherit directly from the pioneers who with axe and rifle blazed the first trails. There is no denying America's youthfulness still, and youth is crude. America's youthfulness finds expression in the fact that the road to wealth in the United States is one of the great highroads to power, toward which all men, feebly or with might, make their struggle.

Moralists during the recent war were fond of alluding to the thinness of the veneer of civilization which the centuries of organized society had deposited upon man's innate savagery. Analogously, it needed only the scratch of war to reveal the implicit idealism of America. Americans, practically as a body, could do because of their ideals the things which had to be coerced by law from the populations of other belligerents. The two million Americans who fought in France went there in the spirit of Galahad, crusading to end wars forever. And when the real test of national motives came—at the Peace Conference—what was the one nation that disdained all material gain from the common victory? If in the settlement the American delegates had sought to aggrandize America with lands and spheres of influence, such an act would have raised in the United States a whirlwind of indignant repudiation.

And so the dollar-a-year men were but another refutation of the lie that America has the soul of a trafficker. With them, no doubt, the idea of their material sacrifice was uppermost; for how otherwise could they gain the assurance, so necessary to so many conscientious non-combatants, that they on this side were to some extent balancing the greater sacrifice of the dollar-a-day men in France? Yet there were great compensations for service in the War Government, even at a dollar a year. In the first place there was power—greater power, as a

rule, than most of those who served could ever hope to wield in private life. Above all they tasted the joy of being important players in the game of subduing a terrible force that had defied the rest of the world for three years. Was that worth nothing? Was it all sacrifice on their part, all acceptance and no giving on the part of the Government? There was scarcely one of them who would not have paid handsomely for serving where he did, and not one who was not the envy of every outsider who camped in Washington and pleaded and demanded that he, too, be placed in the war machine.

Once these men took the oath of office, they became no longer business men with private interests but agents of the Government, capable of regarding all business, their own included, with the impartial eyes of outsiders. If the delicately poised structure of business practice in any industry needed to be dragged down before the Government's need, their shoulders were stoutly thrust against the supporting columns, even though they themselves had helped to erect them in the first place.

Business itself, at first suspicious and even unwilling to change its mode at the behest of the Government, at length came around to the other point of view and willingly enlisted itself as government industry. This was a remarkable thing—it might so easily have been otherwise. Government with us rests upon the consent of the governed; but, although business was not consulted in the arrangements which led to its control, it consented to the control, even coöperated to make the control more effective, once it had seen the light. Had it resisted, a different story might have been told. It was this coöperation which enabled the war industry to accomplish the wonders with which it is to be credited.

It was evident after a brief trial that all the mines, forests, mills, factories, and other businesses of America, acting as independent units, could not supply the needs of America at war. This was a revelation. Those who believed, with one eminent political figure, that a million American men, if danger threatened, could spring to arms overnight, evidently believed that



Photo from Morgan Engineering Company

A WAR ORDNANCE FACTORY



Photo from Bethlehem Steel Company

MACHINING 3-INCH SHELL

the arms and other supplies which the million would need could be materialized with equal dispatch. Yet that was not to be, as hard experience showed. We took four million young men for the Army and Navy. Those four million were not only removed from the industrial field as producers, the burden of their support now lapsing upon those still left on the farms and in the factories, but they commenced to consume the products of industry at four times the normal rate of consumption.

The soldier wears out socks and shoes and shirts and coats much faster than his civilian brother does, and he loses and destroys much more. Moreover, the supply conduit was three thousand miles long—three thousand miles of railway cars, warehouses, ocean terminal bases, the holds of vessels, and on the other side more ocean terminals, more warehouses, more freight cars, railheads, depots, and dumps—and this supply conduit had to be filled before the supplies could flow steadily to the troops at the front: another element which explains the enormous consumption of supplies by a mobilizing army. The creation of the Army was the equivalent of adding sixteen million people to the population of America and expecting the industry of the country to support the excess load.

Perhaps the industry, even though weakened by the withdrawal of four million of its workers, might with its own individual efforts have succeeded in meeting this demand, except for one cogent fact: the implements of peace are not those of war. These sixteen million (in the equivalent) began consuming a range of supplies entirely different from what American industry knew. War even wrote changed specifications for such universal commodities as food and fuel and clothing; and outside these came the entire range of battle machinery, much of which had been developed since the summer of 1914. French guns with hydropneumatic recuperators, nose-fuse shell, airplanes, airplane machine guns, field radio sets, trench mortars and their ammunition, grenades, gas masks, and poisonous chemicals—these were a few of the thousands of modern munitions which were new and strange to

our industry. Not only did we not know how to make them, but we did not have the machinery and other facilities for the work. We had to learn to make them, and we had first to build the tools with which to make them.

Everyone wanted to help the Government in its purpose; but everyone, following his own uncontrolled, individualistic notions, succeeded only in adding to the confusion. If a hundred automobile factories all tried to manufacture shell at once, and a hundred others simultaneously tried to build airplane engines, while a third set scrambled to turn out quarter-master trucks, one of the three programs was bound to suffer, and probably all of them would, simply because the raw materials would not go around. If the shipbuilding industry got to the steel industry first for its ship plates, there would be little steel left for the other war industrial enterprises. A piano factory was of no war use if it continued to build pianos, but it might have great use as a builder of airplane wings; yet how was the piano maker to know this, and who was to look him up and see to it that his manufacturing capacity was put to useful work? The whole effort had to have unity of direction, control with absolute power behind it. Request, plea, and prayer were in vain—advisory control was a failure—because without authority to say, if necessary, what had to be done, the individual preferences both of purchasers within the Government and producers outside it were bound to assert themselves and upset the advisory arrangements for the orderly conduct of war industry.

Once American industry thoroughly understood the need of control, and after the agency of control, with the authority behind it, came into existence, it seldom became necessary for that agency to exercise any summary powers. The War Industries Board did nine-tenths of its controlling through the enthusiastic coöperation of those eager to accept direction. There was indeed within the War Industries Board a giant hand of power and might gloved in velvet, but the hand was seldom raised. "Show us how we can help. Never mind the question whether you have authority. Tell us what to do,

and we'll do it." That was the spirit of American industry in its contact with the War Industries Board. Once in a while, of course, the occasional hot-head, the unusual but existent selfish desire, raised protest; but even then the War Industries Board found no need to assert the eminent domain which belonged to it by grant of the nation. Industry itself exerted a force that was irresistible. If forty-eight manufacturers of kitchen stoves agreed to suspend the making of seventy per cent of their product during the war, and two defied the ukase of the rest, the rest compelled the two by the mere weight of numbers and the scorn of the world of kitchen stoves. The power of the Government was imminent and potential rather than active. Only from such a spirit of industry could come the maximum of productive effort. You cannot compel men to do their best: you can compel them to do only something.

No other land is provided better than America with natural resources. With the exception of nitrates, rubber, and tin, and a few less important ones, the country possessed all the materials with which to wage any kind of war for any length of time which could be imagined. Nor was there any question that we had within ourselves the fabricating ability to make from our materials any and all war supplies needed. America felt secure. She rested so confidently upon her natural supplies that she had never taken the trouble to find out exactly what she did have in the way of material resources that might be devoted to the waging of war. Hence, when the emergency came, and we were suddenly called upon to mobilize our materials and factories for war, the mobilizing effort was halted at the outset by the disconcerting fact that, while we undoubtedly possessed everything, we did not know how much we had or where it was to be found. The lack of an inventory and catalogue of American resources—the same sort of inventory which Coffin and the other preparedness pioneers had tried to make back there in 1916—was the most serious lack which the war industrial program faced at the beginning, and the factor of most delay.

The census? True, the United States takes a census every

ten years, and utilizes most of the interval between enumerations in tabulating and publishing the statistics secured. The figures, when they become known, no longer represent current conditions. The federal decennial census is a valuable thing as a milestone of American progress and as the basis for many important governmental acts; but as a source of data on which to base an industrial mobilization for war it was practically valueless, and would not have gained value even had it been taken annually and the statistics published forthwith. The census information was not the sort needed. The census merely enumerates and generalizes. The mobilizers of war industry needed particulars. They had to know, not how many machine shops there were in America, but such facts as these: Where are the machine shops that can make shell? Where are those that can make guns? How many skilled employees have they got? What are their shop facilities? Can the facilities be easily expanded? How soon can they get on a war basis? The census told us to an acre how much cultivated farm land we had, but it took the war to show us how intensively those acres could concentrate upon the production of wheat, potatoes, or castor beans. The various industrial associations gathered statistics within their respective industries, but even these figures did not contain all the information which the Government needed. There was never time during the war to make a complete industrial inventory, and as a result we had to base upon insufficient knowledge calculations involving the expenditure of hundreds of millions of dollars, the government control of industry altering plans and rectifying programs as errors were discovered in the calculations. Adequate preparation in the future will compile and maintain currently the catalogue of American manufacturing resources adaptable to war use.

The War Industries Board as an institution was the result partly of evolution and partly of fresh creation. In commissioning Mr. Baruch as chairman of the Board, the President had given him virtually a white card. The one limitation upon him was that he was "to let alone what was being successfully



Photo from Navy Department

IN AN AIRPLANE FACTORY



Photo from Navy Department

LIBERTY ENGINES AT TESTING SHEDS

done." Otherwise, he was to step in and take charge wherever he saw any part of the industrial program faltering. With duties but vaguely defined, it was impossible to sketch an organization with cameo outlines. The organization expanded and developed as its duties and usefulness increased. Moreover, it had to take hold immediately; it had to function even as it was being built, because time was the important element; and so there was no opportunity to sit down and plot out a theoretically perfect instrumentality before filling it in with *personnel*. Like most of the organization of the War Government, it materialized in response to needs as the needs arose and were recognized.

The War Industries Board mobilized and developed the supplies of raw materials, established and enforced a priority system which gave the war activities a regulated access to these materials, distributed materials and labor equitably among the projects which gained the priorities, fixed prices for many of the more important commodities, conserved materials, and did these and many other things successfully because, in the first place, of the caliber of the men to whom Baruch delegated the high powers given him by the President. These men possessed the advantage of coming directly from industry, and hence were unhampered by the traditions of bureaucracy or the tripping strings of departmental practice. They dealt, moreover, with an industry which not only did not resist control, but was eager for its extension. They functioned in an organization flexible, loosely knit, and therefore adaptable to shifting conditions, an organization of direct lines—the only sort of organization, in short, which could deal effectively with a situation as fluid and inconstant as that of war industry.

The task of the organization was to find out first what we had with which to fight, then to discover what we needed with which to fight (for at the outset there was not the knowledge within the Government requisite to fix manufacturing programs whose products would be neither inadequate to the manpower program nor overabundant), to make what was scarce

go round, to develop new facilities of supply, to keep prices from running away with the nation's cash and credit, and to correlate and bring together in a single machine such elements as mines, forests, labor, machinery, and military and civilian ideas, all to the end that the resources of America might have the chance to exert their crushing weight—surely a task comparable in importance to any other major military operation. How some of these projects were carried out it will be the purpose of the following chapters to show.

CHAPTER II

THE CREATION OF THE WAR INDUSTRIES BOARD

THE organization within which Howard E. Coffin and the others began the mobilization of war industry was called the Council of National Defense. As a branch of the Government, duly set up by act of Congress (on August 29, 1916), it was a compromise between the essentially pacifistic spirit of the country at large and the views of the thorough preparationists. Congress looked at the events in Europe and uneasily agreed that something had to be done about our own unreadiness for war, although the majority in Congress and the majority in the country really believed that we should never be drawn in as a belligerent. Something had to be done about it; but Congress was unwilling to fasten upon the country that favorite banshee of the hustings, a military caste, which the opponents of preparedness professed to believe would result from any genuine effort to mobilize the military power of the nation. The result of the middle course was the Council of National Defense, which was neither fish, flesh, fowl, nor good red herring. Its mandate was the "coördination of industries and resources for the national security and welfare," and to accomplish this broad mission it was endowed with the magnificent sum of \$200,000!

The Council proper consisted of six cabinet officers, the Secretaries respectively of the executive departments of War, the Navy, the Interior, Agriculture, Commerce, and Labor. This was nothing new in the Government. These officials already existed in an organization whenever they came together at the cabinet meetings. The milk in the cocoanut, or

rather the appendage which had to wag the dog, if the Council of National Defense were ever to get anywhere, was the so-called Advisory Commission of the Council, a group of business and industrial experts nominated by the Council (the cabinet officers) and appointed by the President.

During the first year of its existence the Advisory Commission consisted of Messrs. Daniel Willard, Howard E. Coffin, Julius Rosenwald, Bernard M. Baruch, Dr. Hollis Godfrey, Samuel Gompers, and Dr. Franklin Martin. It is evident that these gentlemen possessed, in the aggregate, special knowledge of a wide range of American affairs. Willard was the transportation expert. He was president of the Baltimore & Ohio Railroad. Coffin, eminent engineer and vice-president of the Hudson Motor Company, knew shop and general industrial conditions in the field. Rosenwald was the merchant. Once, on an official visit to France, he wore a brigadier-general's uniform to facilitate his investigations. In an assemblage of high military officials of America and the Allies, when the conversation was thickly punctuated with vocatives of General This and General That, he suggested that his proper title should be General Merchandise. As the president of the great merchandizing firm of Sears, Roebuck & Company, he was an eminent representative of general merchandise, which thus in him took its place in the high councils of the War Government. He brought a special knowledge of matters relating to many supply problems, particularly those of quartermaster supplies. Baruch was a Wall Street operator, a man who played a lone and spectacular hand. He had his detractors, his enemies, and his last-ditch friends—no negative character, his. Of the original seven commissioners, he was the one of destiny. That concentration of capital which the country calls Wall Street deals on its most magnificent scale with raw materials—oil, coal, copper, steel—and it was toward Baruch, with his first-hand knowledge of the control of resources, that the questions of raw materials gravitated. Dr. Godfrey, as president of Drexel Institute, was in touch with industrial science, of which so much use was to be made by war industry. Samuel



Photo from Air Service

DE HAVILAND AIRPLANES READY FOR SHIPMENT
FROM FACTORY



Photo from Sperry Gyroscope Company

ROCKING TEST FOR GYROSCOPE COMPASSES

Gompers, president of the American Federation of Labor, became the contact point with labor. Dr. Martin, secretary-general of the American College of Surgeons, brought a narrower specialty, a knowledge of medical supplies.

The Advisory Commission, as it was charted on paper, possessed in theory no executive powers. It could only advise; and the Council of National Defense proper (the individual cabinet officers) was free to accept the advice or reject it, as it chose. And even if the members of the Council did accept it, there was no assurance that the purchasing bureaus in their departments would follow it, for the control of the periodical civilian Secretaries over such entrenched bureaus as those of the War Department was less absolute than an outsider would think. But, even though the law had carefully withheld from the mobilizing organization any authoritative voice in the Government, a new element arose to give it in fact an unexpected, but real, authority. This element was an aroused public opinion. America was beginning to wake up. As the press gave publicity to the work of the Council of National Defense (it was in reality the work of the Advisory Commission), the people began to see the importance of what was going on—particularly people in the eastern part of the United States, whose spokesmen, the eastern newspapers and magazines, had greatest influence in Washington. Thus the Council of National Defense was enabled to do a valuable preliminary work in the mobilization of war industry—planning and coördinating, taking up concrete problems and creating organizations to deal with them, and leaving it to existing authority to enforce the plans perfected.

All this work began in a small way, and for a considerable time did not make much progress in a country which, enraptured by the success of the Administration in keeping out of war, placed war among the remote contingencies. But before the winter of 1916-1917 had reached its median, Germany's proclamation of unrestricted submarine warfare had put a different complexion upon things. War was now seen to be inevitable, and there was at once universal recognition of the

value of the services of the Council of National Defense. More might have been done, but what the Council had accomplished represented just that much ground gained in the mobilization of the nation for war. We must think of the Council of National Defense, in this period from the middle of January, 1917, up to and beyond the declaration of war in April, as growing tremendously in size and in the scope of its enterprises. Where, but a few months or even weeks before, it had been a small, if not an obscure, organization, it now numbered hundreds of employees, occupied practically the whole of one of the largest office buildings in Washington, and never saw the day that did not add appreciably to its size and prestige.

It was the fate of this advisory body, the Council of National Defense, that while it never received authority itself, as soon as one of its branches developed an importance that demanded authority for its acts that branch parted from the parent stem and took root as a new entity. Again and again this occurred. Originally there were committees within the Council for investigations respectively in the national food supply, the national fuel supply, and in the railroad transportation situation. These organizations were the antecedents respectively of the United States Food Administration, the United States Fuel Administration, and the United States Railroad Administration. Shorn of its most important functions, the Council of National Defense declined in the final months of the war to the inconspicuous position of an agency which mobilized volunteer war assistance in the communities of America, while its numerous progeny flourished in the exercise of super-departmental powers.

Now, there developed within the Council of National Defense another of those branches destined in time to become an independent organization; a branch presently to develop into the body with which we are chiefly concerned, the War Industries Board. Three days after the declaration of war there was formed, under the Council of National Defense, the General Munitions Board. This Board collected within itself all the Council's activities relating to the production of supplies

for the War and Navy Departments. It was not primarily concerned then with any other war industrial activities, except as it came in contact with them in arranging precedence for the supply orders of the War and Navy Departments, bearing in mind the necessities of the Shipping Board and of the purchasing agencies of the Allies. In this effort it began working out the first principles of priority, the administration of which was later to become such an important branch of the War Industries Board's work. The chief task of the General Munitions Board was to coordinate army and navy purchases and end, if possible, competitive buying by different branches of the Government. One of its greatest achievements was the mobilization of contractors and of the vast quantities of building materials used in the construction of the national army cantonments. Beyond this it attempted to be an auxiliary of the executive departments in the procurement of materials in which there were shortages. Machine guns, shell, gauges (those small prerequisite appliances without which there could be no war manufacture), hospital supplies, wood for army vehicles, car shortages (vexatious questions then referred to the Railway War Board, the organization with which the railroads of the country attempted to attain unified operation)—these were matters, among others, over which the General Munitions Board labored mightily. From a rising industrial chaos, which resulted when all the governmental purchasing agencies began simultaneously to buy heavily in a competitive market that, even under direction, would not have been able to supply everything requisitioned, the General Munitions Board tried, but tried unsuccessfully, to bring order.

The General Munitions Board consisted of twenty-four members, seventeen of them uniformed representatives of the War and Navy Departments, the other seven civilians. One of the latter, Mr. Frank A. Scott, was chairman. Scott later became a war casualty, as truly as if he had been gassed or shot in France; and he was only one of several who fell in the Battle of Washington, which bore more resemblance to an actual battle than one might suppose. Men forgot the

limitations of their physical strength in their anxiety to give their utmost to the Government; and some of them died, and some faced the future with broken health. Scott brought to Washington a background of unusual success for so young a man. His combination of winning personality and ability first attracted attention when he was secretary of the Cleveland Chamber of Commerce. From that post he stepped across into industry, and when the war broke out he was general manager of the firm of Warner & Swasey, of Cleveland, widely known as builders of mountings for great telescopes and, in American industry generally, celebrated for their principal product—machine tools of precision. In addition he possessed the special qualification of having been for years an amateur student of war tactics and campaigns.

As chairman of the General Munitions Board, Scott flung himself at a confused cordillera of work that seemed to rise superior to human powers. He knew no hours. He was at his desk at eight o'clock in the morning, not to quit it until midnight, with even his meal hours given over to conference and decision. When well-wishers remonstrated with him, his reply was that it was the job only which counted and the supreme necessity of getting things done in the briefest possible time, that there was only one war to prosecute, but many men to prosecute it, and that if some fell, others would step into their places—the work would still go on. He was right. The day came when Frank Scott was invalided home, and for a long time his physicians did not know if he would live or die; but the work went on just the same. America is to-day the better, the stronger, the more a power, for the work he did back there in the pioneering, pathfinding, beginning days of the war.

The General Munitions Board was short-lived. Even its creators regarded it as only a stop-gap organization which could function until something better was worked out. It failed to make headway against the industrial demoralization which, in the spring and early summer of 1917, was threatening to wreck the whole war-supply program and was, indeed, greatly delaying the most important procurement activities.



Photo by Frank Moore

FRANK A. SCOTT

In the hothouse atmosphere of war the Board grew rankly, out of proportion, ill articulated, top-heavy with dignitaries, aides, assistants, committees, boards, divisions, and branches, their work uncoördinated and often overlapping. Nothing about it was clearly defined. Its chief lack, however, was the fundamental one of authority. It possessed no rights of initiation. Its province was merely to review and coördinate such purchasing activities as were voluntarily brought to its consideration by the departmental bureaus. The bureaus naturally resented any outside restrictions upon their freedom; and since there was no compulsion upon them to seek the good offices of the General Munitions Board, they did not call upon it to any great extent, but placed far more contracts independently than they did with the assistance of the Board. Industry staggered under the uncontrolled rush of competitive buying. The confusion became steadily worse. The chief value of the General Munitions Board was that its experiences pointed the way to absolute control, the one factor that could save the war enterprise. On July 28, 1917, after less than four months of existence, the General Munitions Board gave way and was succeeded by the War Industries Board.

This procedure constituted in reality a reorganization of the General Munitions Board. Mr. Scott, even then fighting against exhaustion of brain and nerve, was made chairman of the new War Industries Board, which still continued to be part of the Council of National Defense, although its importance was so great that it quite overshadowed the parent organization. It still possessed no legal authority over the executive departments, but from the date of its formation its actual authority began to grow. As a controlling organization it became efficient, and efficiency was a thing which the federal departments sorely needed. The departmental heads gradually enforced the coöperation of the unexecutive War Industries Board upon the procurement bureaus.

This was not accomplished in a hurry. For several months after the formation of the Board, the confusion in industry continued. In fact, American war industry did not cross the

divide until the late autumn of 1917. After that the control gained on the disorganization, becoming absolute about four months later.

The efficiency of the War Industries Board, as formed from the General Munitions Board, was due to the efficiency of its organization. For the first time complete activities in industrial control were brought together in single branches of the Board and placed under the direction of single executives. And now emerge from the mass of organization some names destined to be better known later on. All the activities relating to what became known as priority were brought together in a single department directed by Judge Robert S. Lovett, the eminent railroad executive. Matters relating to the procurement of finished products went *in toto* under the direction of Mr. Robert S. Brookings, who before joining the War Government was president of the board of trustees of Washington University at St. Louis. Mr. Hugh Frayne, a general organizer of the American Federation of Labor, went to the head of all board work relating to the human side of war industry; and the raw materials of war manufacture—the development and control of them—went to Mr. Baruch.

It was the dawn of a new day, a new era, distinct from the old in many ways, but in no way more than in the creation of the so-called commodity sections, so famous afterwards in industry when they were fifty-seven in number, although at the outset they were neither famous nor fifty-seven. The commodity sections first sprang from the Committee on Raw Materials. It was early recognized that the crucial point in the struggle for war supplies would be the development of the raw materials for manufacture. That was Baruch's work from the outset, for he served in the General Munitions Board as chairman of the Committee on Raw Materials. That committee, without change in name or in chairman, continued to exist throughout the war, being first transferred bodily to the War Industries Board, the subsidiary to the Council of National Defense, and later carried over into the new organization of the War Industries Board, when it was made independent and

endowed with supreme powers. And although the committee's chairman became director of the whole enterprise, he never surrendered his place at the head of the committee.

The commodity sections at first dealt solely in raw materials, each section having a specific material under its jurisdiction. But as the war progressed, other shortages beside those in raw materials asserted their importance; and commodity sections were created to deal with finished products as well. The commodity sections became the vitals of the ultimate War Industries Board.

Each commodity section had a chief, whose qualifications were dual—he had to know the material with which his section dealt, yet he could have no business interest in the material. It was not always easy to find such men. The first action of the section chief, once he had organized his section for the work ahead, was to organize the branch of industry which produced the commodity in question in such a way that it could deal with the section as a unit. Here the War Industries Board appealed to the Chamber of Commerce of the United States, which assembled representatives of the various industries and had them appoint manufacturers' committees, each committee qualified to speak for its branch of industry. Thus, if the woolen knit goods section desired to curtail the civilian consumption of knit goods or change the specifications of any of the Army's knit goods, it had to take up these matters, not with all the wool knitters, but merely with a committee which represented them all. In general, each commodity section dealt with questions of what to purchase, where to purchase, and what price to pay.

It will be noted that the decisions in these questions were not left to industry itself, but remained with the chief of the commodity section of the War Industries Board—an important distinction. The Government did not allow its suppliers to determine prices, but reserved that right to itself. On the other hand, by consulting industry in this way, by giving it a voice in matters affecting its own welfare, the Government

secured the hearty coöperation of industry, without which no control could have attained a maximum of effectiveness.

In time, the commodity sections also eliminated competitive buying on the part of the governmental bureaus. In each section were represented all the official agencies which purchased the particular commodity administered by the section. These officers, therefore, came in touch with the particular problems of each branch of industry and thus were able to coördinate the purchasing activities of their several bureaus.

This was a new way for the Government to do business. In the old days the Government and its contractors were antagonists. Most business men regarded the Government as an undesirable customer. The Government was slow to make up its mind what to buy, fussy about specifications, apt to change plans in the middle of a manufacturing operation, and slow to pay the bill after the supplies were delivered. The firms which dealt with the Government made a specialty of that sort of work. Many expected the old order to continue after the war broke out; and it did continue for some time, the steadily rising scale of prices attracting to Washington crowds of contractors' agents. But the commodity sections changed all that, and the Government and the producers became co-partners in the enterprise of winning the war.

"Look here," said the commodity sections, in effect, "we need your help. We expect to pay well and promptly, but we don't want any more of this *caveat-emptor* stuff in the supply situation. We don't want American soldiers to shiver because of shoddy uniforms or to be killed by defective powder. No embalmed beef in this man's war. This is likely to be a long struggle, and we are all Americans together—none of us wants half of America starving to enrich the other half. Let's forget our selfish interests on both sides. You tell us what you can do and what you think is fair for us to do; and we'll go ahead and do it."

Such an attitude had a marked effect upon the Government's business. The sealed, impersonal bid vanished, as did the contractor who relied upon "influence" to land business for



Photo by Moffett

DANIEL WILLARD

him. Orders were placed according to the capacity of industry to absorb them, and there was work to keep all facilities busy on equal terms. Above all, in Washington, directing the enterprise, were business men, industry's own kind of men, each knowing his own industry, and all dealing with industry in a manner frank and aboveboard.

Mr. Daniel Willard succeeded Mr. Scott as chairman of the War Industries Board. In December, 1917, the Government seized the railroads. Rail transportation in America nearly broke down altogether in the first weeks of that winter. One of the most important railroad arteries in the East was the Baltimore & Ohio, of which Mr. Willard was president. He resigned as chairman of the War Industries Board in January in order to go back to his railroad to help it out of the tangle into which traffic had wound itself. Until March the War Industries Board went chairmanless. Then Congress passed the Overman Act, which gave the President authority to reorganize the Government as he chose for greater war efficiency. On March 4, 1918, the President asked Mr. Baruch to take the chairmanship of the Board, which he was thereupon to expand, and which was to be vested with plenary powers.

Bernard M. Baruch, fifty in actual years, but nearer twenty-five in physical vigor, spirit, enthusiasms, and all that is youth, had in his previous work in the War Industries Board shown himself to be a man whose talents fitted him to become general manager of American war industry. President Wilson sometimes made unlooked-for selections of men for important offices in the War Government; yet, surprisingly often, his choices turned out to be well made. When the coal crisis came and there had to be an official to manage the whole coal business as a unit, who but President Wilson would have picked out for the place, not some commander of industry, but a college president? Yet Dr. Garfield in the United States Fuel Administration, although with his heatless Mondays and his strictures upon the industry he made himself for the time about the best-hated man in America, did manage the Fuel

Administration successfully and saved the coal situation at a time when it seemed that it must fail war industry. So with Baruch. This is not saying that some great industrial figure like Charles M. Schwab or E. H. Gary might not, each in his own way, have made a good job of managing war industry. It is merely saying that Baruch did make a good job of it—in fact, he was a great success in one of the most difficult rôles into which the Government ever thrust a man. And so it is with Bernard M. Baruch, with his qualifications, and with the secret of his success—if we can bring that into focus—that we are here concerned.

Baruch was a Wall Street man—a gambler, as his detractors would call him; a speculator, as he sometimes called himself. Therefore he had dealt with industry from the top, and his was not the restricted point of view of one versed in but a single specialty in industry. When he referred to himself as a speculator, Mr. Baruch belittled his own career. As a speculator he was popularly known—that was his newspaper reputation—but the insiders know him as an extensive and particularly bold industrial operator, his main interests being in raw materials of one sort or another, but principally minerals. More than one important commodity to-day pays tribute to Baruch's foresight and imagination. His eyes have continually searched the industrial field for opportunities for investment and development.

Wall Street is the world's roughest arena. There are few rules there this side of the written statutes, and sportsmanship and consideration for the weak virtually do not exist. In that pit Baruch, always conducting a single-handed enterprise, went up to the top. It is only rarely that such figures arise in Wall Street. Most of those who become powerful have the advantage of important industrial connections which give them *ex-officio* standing in the first place, or else they are in control of the funds in banks or in insurance companies. Baruch played a lone hand. He made it a guiding principle for himself to steer away from the cliques, syndicates, and combinations which conduct most of the big operations in the

Street. He instinctively shunned situations in which he could not act upon his own initiative. With that system he had succeeded, had gone to the top above the reach of the financial cabals and coalitions which are always seeking to drag down the insecure. And this method, this experience of his, had an important bearing upon what we have here under consideration. Baruch was the thousandth man; he had seen the nine hundred and ninety-nine go down where he had negotiated the climb. Therefore he was invested with a sublime confidence in his own judgments. He had backed his judgments so often, and they had won for him with such unflinching regularity over so many years, that he regarded them as infallible.

This characteristic was one of his chief assets when he came to undertake the administration of war industry. As a rule Baruch insisted that his subordinates in the War Industries Board should resolve their own difficulties, but once in a while he consented to give his opinion as to what ought to be done in some emergency. During the early part of the meeting all would be indecision, uncertainty, arguments this way and that, timidity; and then the boss of the establishment, after he had heard both sides, would make up his mind and deliver his judgment; and at once the clouds of doubt rolled away, and the sunshine of certainty flooded the conference. The subordinates might, and probably often did, know more about the subject than Baruch did; and yet they never thought of questioning his decision. The man's own confidence in his judgment was so perfect that it begat the same sort of confidence in others.

Another characteristic of Baruch's in the conduct of his own affairs was his treatment of the subordinates whom he gathered about himself. When he had acquired a property, he found a man to run it, but the man was not to run it always with reference to what Baruch would think about it. Baruch's confidence in his judgment of men was not less complete than in his other judgments. When he found the man he wanted, he placed him in complete charge, and told him to stand on his own feet and not bother Baruch with details. The financier

would look only at results and would not scrutinize methods. Years of activities of this sort had not only given him a wide acquaintance with the men who guide the industries of the United States, but had refined his judgment of men. It is doubtful if the endowment of judging men correctly is ever an acquired talent—it is probably born in a man to size up his fellows accurately—but Baruch's innate gift for it had been developed and perfected by his business experience. There is no questioning his superlative ability in this direction. Baruch's knowledge of men was practically infallible; he never made mistakes.

Baruch has said that the men of the War Industries Board were "hand-picked" by himself, assisted by his associates. As a rule, to direct the principal activities of the Board he selected men who were not widely known in the United States; but you may be sure that Baruch knew them in advance, had come in contact with them more than once in his private operations, and before he ever appointed them knew that they were big enough for the jobs. They in turn selected their own subordinates, and so on down; and the whole organization was good because the men at the top were the right sort.

Then, having selected his aides, Baruch took them completely into his confidence, a thing that some executives find it hard to do. He continually put them forward before the public rather than himself, so that each man felt that he should secure recognition for his services. Finally—and in this more than in any other thing lay the secret of his success—Baruch possessed the heaven-sent ability to unload his executive responsibilities upon the shoulders of subordinates. As in his own business, so in the War Industries Board he picked his men and then told them to go ahead and run their own departments without troubling him with their problems or requiring him to certify their decisions.

And this is one of the most difficult of all things to do—for a man responsible for results to delegate his powers to others and then allow the others to work without interference. Usually the more ability a man attains in any field, the more



Photo by Harris & Ewing

BERNARD M. BARUCH

distrustful he becomes of the merits of others' work in that same field. If he is responsible for the work, then he must have the work done precisely as he would do it; and since no others can work as he does, he must burden himself with the details of it all. For that reason only a few men of specialized ability are good executives. It is only the rare man who combines with ability a broad tolerance of the abilities of others, and who is not bound to his own methods. The war broke executives who could not get their heads above details: Baruch came out of it twenty pounds heavier than when he went in.

One thing should be said about Baruch to explain his peculiar position of influence in the War Government—he had the ear and the confidence of the President, an advantage which few of the executive heads in Washington could claim. The confidence of the President gave him a *de facto* power which no mere written delegation of authority could convey. His position enabled him to cut corners and employ direct methods, in contrast to the involved official procedure, without much regard for the feelings of governmental dignities. With his keen knowledge of men he soon discovered in the departments and administrations those officials whose minds went along with his; and, whether they were the heads of their institutions or not, it was his habit to deal with these men directly, wasting no time in following up the tedious official channels of communication.

The success of Bernard M. Baruch, to sum up, was due to his power of brushing aside all nonessentials and to his direct and simple habit of thought, which resulted in his reaching prompt and decisive conclusions; to his confidence in his own judgment; to his infallible judgment of men; to his policy of transferring his authority to his subordinates; to his courage; to his calmness in times of great stress; to the confidence which he inspired in subordinates and others with whom he came in contact; to his modesty—he always avoided publicity and attempted to give credit to others—and finally to his organizing ability.

The charter of the War Industries Board was in the letter

from President Wilson which conferred the chairmanship upon Mr. Baruch and proclaimed a new dispensation. This document is reprinted here in full:

The White House,
Washington, March 4, 1918.

DEAR MR. BARUCH:

I am writing to ask if you will not accept appointment as Chairman of the War Industries Board, and I am going to take the liberty at the same time of outlining the functions, the constitution, and action of the Board as I think they should now be established.

The functions of the new Board should be—

(1) The creation of new facilities and the disclosing and, if necessary, the opening up of new or additional sources of supply;

(2) The conversion of existing facilities, where necessary, to new uses;

(3) The studious conversion of resources and facilities by scientific, commercial, and industrial economies;

(4) Advice to the several purchasing agencies of the Government with regard to the prices to be paid;

(5) The determination, wherever necessary, of production and of delivery and of the proportions of any given article to be made immediately accessible to the several purchasing agencies when the supply of that article is insufficient, either temporarily or permanently;

(6) The making of purchases for the Allies.

The Board should be constituted as at present and should retain, so far as necessary and so far as consistent with the character and purpose of the reorganization, its present advisory agencies; but the ultimate decision of all questions, except the determination of prices, should rest always with the chairman, the other members acting in a coöperative and advisory capacity. The further organization of advice I will indicate below.

In the determination of priorities of production when it is not possible to have full supply of any article that is needed procured at once, the chairman should be assisted and, so far as practicable, guided by the present priorities organization or its equivalent.

In the determination of priorities of delivery, when they must be determined, he should be assisted when necessary, in addition to the present priorities organization, by the advice and coöperation of a committee constituted for the purpose and consisting of official representatives of the Food Administration, the Fuel Administration, the Railway Administration, the Shipping Board, and the War Trade Board, in

order that when a priority of delivery has been determined there may be common, consistent, and concerted action to carry it into effect.

In the determination of prices the chairman should be governed by the advice of a committee consisting, besides himself, of the members of the Board immediately charged with the study of raw materials and of manufactured products, of the labor member of the Board, of the chairman of the Federal Trade Commission, the chairman of the Tariff Commission, and the Fuel Administrator.

The chairman should be constantly and systematically informed of all contracts, purchases, and deliveries, in order that he may have always before him a schematized analysis of the progress of business in the several supply divisions of the Government in all departments.

The duties of the chairman are—

(1) To act for the joint and several benefits of all of the supply departments of the Government;

(2) To let alone what is being successfully done and interfere as little as possible with the present normal processes of purchase and delivery in the several departments;

(3) To guide and assist wherever the need for guidance and assistance may be revealed; for example, in the allocation of contracts, in obtaining access to materials in any way preëmpted, or in disclosure of sources of supply;

(4) To determine what is to be done when there is any competitive or other conflict of interest between departments in the matter of supplies; for example, when there is not a sufficient immediate supply for all and there must be a decision as to priority of needs or delivery, or when there is a competition for the same source of manufacture or supply, or when contracts have not been placed in such a way as to get advantage of the full productive capacity of the country;

(5) To see that contracts and deliveries are followed up to where such assistance as is indicated under (3) and (4) above has proved to be necessary;

(6) To anticipate the prospective needs of the several supply departments of the Government and their feasible adjustment to the industry of the country as far in advance as possible, in order that as definite an outlook and opportunity for planning as possible may be afforded the business men of the country.

In brief, he should act as the general eye of all supply departments in the field of industry.

Cordially and sincerely, yours,

WOODROW WILSON.

HON. BERNARD M. BARUCH.

It was typical of Mr. Baruch that on the very day he received this letter from the President he wrote to Mr. Alexander Legge, his chief assistant in the War Industries Board, investing him with this same authority. Legge, who was vice-president and general manager of the International Harvester Company, served to the end as assistant chief of the War Industries Board. A perusal of the President's letter will show one how easily Baruch might have set himself up personally as the dictator over war industry, how easily he could have insisted that the War Industries Board function exclusively through himself. Perhaps, indeed, that was the natural thing to do. There was plenty of precedent for it among the other emergency war organizations which the Government had set up, and the President's letter expressly stated that the decision of all questions, except the one of prices, was to rest with the chairman alone, even exempting the other members of the Board from the exercise of powers; but that was not the Baruch way. Technically, perhaps, he alone possessed the power: in practice every functionary of the Board wielded whatever powers he needed.

For a brief time after it received its grant of power, the War Industries Board continued to exist as a body nominally within and subordinate to the Council of National Defense. But its position there was anomalous. It possessed all power over industry: the Council possessed no executive authority whatsoever. The Board soon discovered that it was cramped by this limitation; and by executive order of May 28, 1918, it was formally separated from the Council and made an independent organization. It was independent, yet closely interknit with all the other producing and administrative agencies of the War Government. It was the unifying organization for industry. The Food Administration depended upon it for tin for food containers, for fertilizers and tools for the farms, and for machinery for the food-packing establishments. The Fuel Administration looked to it for mining machinery and for priorities upon which it delivered coal. The Railroad Administration was guided by its traffic priority decisions, and



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THE WAR INDUSTRIES BOARD

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| Admiral F. F. Fletcher | Hugh Frayne | Colonel Palmer E. Pierce | H. P. Ingels, Secretary |
| Daniel Willard | Robert S. Brookings | Robert S. Lovett | Bernard M. Baruch |

also depended upon it for steel and for rails, locomotives, and rolling stock. The War and Navy Departments leaned heavily upon it in the tremendous production of munitions; and industry as a whole found in it the agency that at last brought about coördination of the entire effort in war materials. The effective duration of the Board's existence was only six months; but they were six of the most crowded, momentous, and vital months in American history.

CHAPTER III

PRIORITY

PETROLEUM in the United States used to mean principally kerosene. Kerosene illuminated the houses of the nation, except the minority in the larger towns and cities. Gasoline melted lead for plumbers, lit circus tents at night and the street shows of itinerant corn doctors, and provided cool kitchen stoves for progressive housewives in summer. These uses for two products of crude oil, with something to be said for axle grease and paraffine candles, virtually defined the consumption of petroleum in the United States. Since whole sections of our *terra firma* fairly floated upon subterranean lakes of oil, the national consumption could not begin to equal the supply in sight or easily tapped, and the price of petroleum and its products fell low.

Then science and invention began discovering almost innumerable uses for the products of petroleum—uses in medicines, in perfumes, in dyes, in explosives, for surfacing country roads, as material for city pavements, as lubricants for machinery, but above all as the fuel for internal-combustion engines, either the oil-burning engines of ships or the gasoline-burning engines of automobiles and airplanes. From an obscure and even derided product less than a century ago, petroleum became king of the earth's minerals. The diversity of its employment resulted in an enormously increased *per capita* consumption.

For a long time the exploitation of the oil fields kept pace with the increase in the use of petroleum, and the prices remained correspondingly low. But inevitably the motorization of all sorts of vehicles outstripped the well drillers, and—more

important—the end of the supposedly unlimited American supply of flowing oil came in sight; and then the users of petroleum, no longer secure in the existence of oil enough for all, began, consciously or unconsciously, to bid against each other for what amounted to preferential treatment; to bid for first access to the now insufficient supply of petroleum—in short, to bid for priority. One result of that competition is reflected in the present high prices which motorists pay for gas.

This is, to be sure, but another recrudescence of our ancient economic friend, the law of supply and demand; but priority, that new, that life-saving word of the World War, sometimes cuts no figure in matters of supply and demand. If the available supply of a commodity exceeds the demand, then there is no question of priority involved in that supply: priority enters as a factor only when the supply is limited. Sometimes a heavy demand has the eventual result of diminishing the priority factor and consequently of reducing prices. The demand for the Ford automobile made it cheap by enabling the producer to expand his plant and employ the methods of mass production. The demand for kerosene oil in the first place reduced its price to a low mark by stimulating the development of new oil fields. It is only when supplies cannot be readily expanded and demand is heavy that priority enters as an element and prices go up. In paying such an increased price—in paying the excess above normal—one pays for preferred access to the supplies—for priority. And wherever you find enhanced prices you find the factor of priority. The man who eats Christmas strawberries pays for them the June price plus (with a considerable allowance for increased shipping charges) the charge for his priority, since at Christmas there are not enough strawberries for all. Preferred stock is usually worth more than common stock, because the preferred has first call upon the corporation's earnings.

Now it is evident that the exercise of priority is one of the most fundamental rights in American business, and hence one of the fundamental American liberties. Any interference with

this right is a flagrant invasion of liberty as we know it to-day. And yet when the Government undertook the control of industry during the war, one of its first acts was to take charge of this right of priority, to control it, and to direct and administer it. It was equivalent to a declaration of martial law in industry, and liberty fled from American mines and workshops before the Government's assertion of eminent domain.

No war necessity was more exigent than this control. In normal times and until the events following 1914 interfered with its development, American industry kept half a step ahead of the increase in population and the consuming power of the nation. Indeed, this slight excess of facilities and materials above domestic needs was charged by some with responsibility for the periodic depressions which fell upon American industry, and hence arose great argument for the expansion of American foreign trade to consume, and an American merchant marine to carry away, the surplus of American products. Agreed, rejoined the free traders; but how are you going to maintain a merchant marine and a protective tariff simultaneously? Your shipping companies will fail if their vessels can carry loads only one way. Reduce the tariff, answered the protectionists, and you flood America with cheap foreign goods and thus destroy the thing you pretend to be protecting. And so raged the most interminable and inconclusive of American political debates—the tariff question. The tariff occurs as an issue only in countries which have these producing excesses; in countries in which questions of priority are not imperative, because there are producing facilities enough for all.

After April 6, 1917, what had been at least a national adequacy became an acute national shortage. War enormously increased the demand upon practically all materials and all manufacturing facilities. If the demand was not for the thing made, it was for the materials from which things are made. Thus, the demand for pianos did not rise greatly during the war; but pianos increased in price, because labor, wood, wire, iron, felt, ivory, and all the other materials which enter into

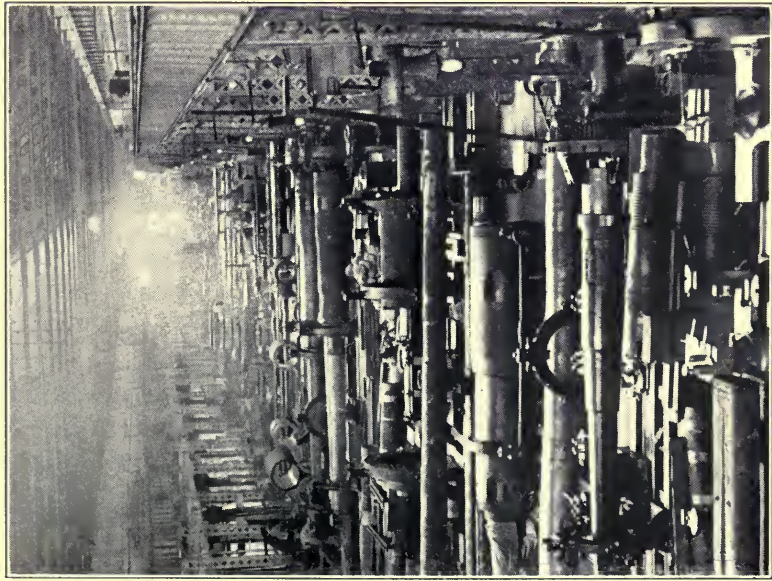


Photo from Ordnance Department

IN A BIG GUN PLANT

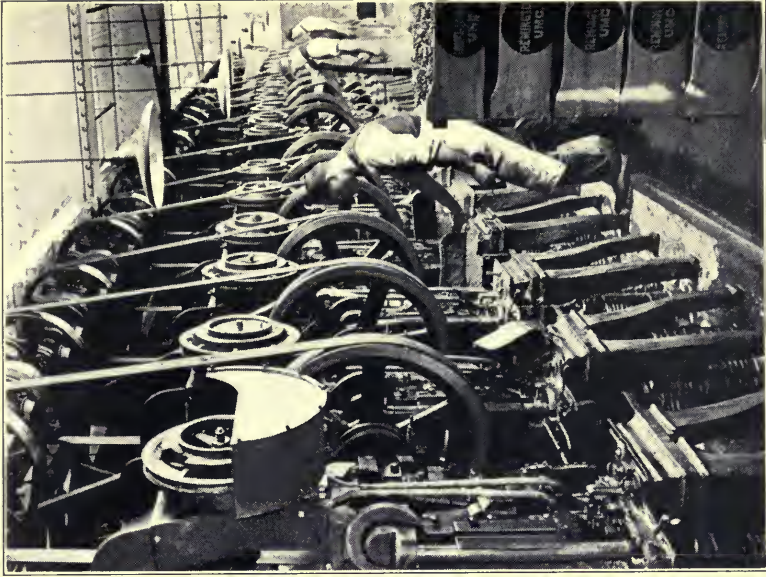


Photo from Remington Arms-U. M. C. Company

MAKING RIFLE CARTRIDGES

piano manufacture, were in demand for the making of other articles which had direct relationship to the war.

It would not have been so bad, had the demand all come from a single source; but the Government was not a single source of demand. Politically the United States was a unit: as a war buyer of the products of industry, it became a hundred units, all competing with each other. The Army, the Navy, the Railroad Administration, the Shipping Board, the Food and Fuel Administrations, and the Red Cross were all part of the Government, but all were buyers; and most of them had jealous and semi-independent purchasing bureaus, which in turn had their district offices. If they were not all trying to secure the same finished products, they were at least competing for the same raw materials which went into the products and the same machinery for turning them out. Half a dozen of the Allies, represented in America by purchasing bureaus, were competing for these same materials and facilities. Everyone wanted everything right away, and money was no object, since every official purchaser apparently had unlimited supplies of money and was willing to spend it to gain first access to the facilities of industry.

These facilities were not enough to go around. There was not enough iron ore available, not enough copper, not enough timber, not enough furnaces and smelters and converters, not enough factory space, not enough machinery, not enough transportation, not enough labor, to satisfy all the demands. The official purchasing agencies began bidding against each other for the facilities, and the cost of priority was registered in the toplofty prices to which almost all commodities went.

There were three ways by which to control the situation. One was to regulate the demand—but a nation's war demands do not admit of argument. "We have got to have ten million shell and ten thousand guns and all the shoes in the world," say the troops, between shots and stabs. The war demand of a country is everything it can get, and it must supply its needs to its maximum capacity or go under. A second way was to increase supply—but, while it was understood that every

effort would be made to increase supply, it was clear that this would take time and that the increase would never equal the demand, particularly as labor was steadily to be weakened by the withdrawal of men for the Army and Navy. The most practical and immediately beneficial thing to do was to put the essential war interests on rations by dictating their priority of access to the limited facilities, and also by controlling the priorities of the essential civilian demands; and this third course was the one which the Government chose.

Incidentally, but only incidentally, the control of priorities had a bearing upon the stabilizing of prices, of which more will be said later. Prices, however, were not generally of surpassing importance in the business of procuring war supplies. Reduced to its lowest terms, the supply question was just this—America possessed resources in sufficient quantities to win the war, and she was not going to be deterred from using them by any prices, however fantastic, even if steel went to a thousand dollars a ton and wool to a hundred dollars a pound. As long as the Government had plenty of printing presses and orators, it could turn out Liberty Bonds, and sell them, too; for on the upward climb wages and salaries were bound to trail along behind prices. Inflated prices, however, if allowed to go too far, would have vastly complicated the Government's business arrangements, and would have resulted in an inflated currency, which in turn would have brought disproportionate costs to America and a train of other evils, from which, according to the degree of their severity, the nation might have been years in recovering, or which might even have brought the country's economic structure down with a crash. Therefore the War Industries Board fixed the chief prices, as we shall see; and the control of industrial priorities was of great assistance in that effort. The minute you remove competition from among the purchasers and institute it among the producers, that moment you remove from the producers the power to control prices. If an independent oil producer can sell his oil only to the Standard Oil Company, he must accept what the Standard chooses to pay or else close down.

The control of priorities gave a purchasing monopoly to each official bureau upon the facilities assigned to it, and the producers thus assigned were forbidden to turn elsewhere for a customer, or to refuse to produce for the lone customer, upon pain of having their properties commandeered. The result was that, after priority was under control, prices of commodities tended to be based more upon production costs.

But, after all, the fundamental consideration was the materials and facilities themselves, and not the prices paid for the products. The Government had to take it into its own hands to see that every essential need secured access to the ministrations of industry, and that not one was left out. This meant that not one principal war demand was completely supplied, but that all were partially supplied, each in proportion to its relative importance. There had to be some superior agency to determine the questions of relative importance, for the government supply bureaus were themselves unable to determine them.

Men are invariably, and quite naturally, prejudiced in favor of their own work. In war, the more you can convince a soldier or sailor that his is the one big, vital, dominating job, the failure of which will mean defeat, the quicker the war is won. And apparently every last man in the service of Uncle Sam learned that lesson—that his was the one big job. Consequently, his was the one big need, and he was going to see that need filled if he could, though the heavens fell. The manufacturer of optical instruments, who was told that the Navy could not fight without range finders, naturally believed that he needed brass worse than anyone else. But the fuse maker had been told that the Army could not fight without shell fuses; and he as confidently believed that his need of brass transcended any and every other need for it. What did he know about range finders? Meanwhile the Shipping Board had told someone else that without compasses and sextants none of the new ships could go across; and of course the man who made compasses and sextants decided that no other demand for brass

was as important as his. What did he know about range finders or fuses?

Left without direction, the war industry might have built up on the Atlantic seaboard an enormous supply of field artillery, only to find that there were no ships to take the artillery to France. Or it might have built the ships and had nothing to load into them. It might have built ships and guns and shell at the expense of wire, only to find that its artillery was helpless until the industry could produce the wire that would put the field batteries in communication with headquarters. Every war supply was important; but there had to be some superior agency with power to distinguish the merely important from the more and the most important, and to enforce its decrees; someone to devise a system whereby the various supplies could assert their relative importance more or less automatically; someone to see to it that the wire was braided as the field gun was produced, and that both mariners and airplane observers were equipped with optical instruments. That someone was the priorities commissioner of the War Industries Board, Judge Edwin B. Parker.

Much of the industrial priorities system was devised, and most of it administered, by Judge Parker. He was a typical Baruch appointment. The judge (his title was honorary; although an eminent lawyer, a member of a leading Texas legal firm, he had never served on the bench) was essentially a diplomat; and he had to be one. His job was to throw monkey wrenches into the machinery of normal business and at the same time to encourage its operators to keep the machinery running even more smoothly and swiftly than before. To do that required tact and adaptability to the natures of men, and Judge Parker had those qualities. Priority decrees were tremendous interferences with individual freedom, and it was not unusual for one of these orders to stir up an immense amount of anger and passion. Judge Parker alone stood between the governmental purchasers and the industrial producers and cheerfully bore the brunt of the wrath of both. He could endure it cheerfully because he was that sort of a



Photo by Harris & Ewing

EDWIN B. PARKER

man—exactly the peg to fit that particular hole. Urbanity, a temper as hard to ruffle as his sense of humor was easy to stir, deliberate and measured speech, moderation in phrase and nicety in enunciation, courteousness toward another man's ideas even though they conflicted with his own—in sum, a personality disarming to the angry, encouraging to the timid, soothing to the ruffled, and confidence-inspiring to the distrustful—and, above all, a supreme belief in the integrity and necessity of his own work—these were the endowments of the priorities commissioner.

It was Judge Parker's practice, as far as he could follow it, to keep the key turned in the door of the closet which concealed the spectre of absolute power, and to win his way with reason; and he was usually successful. If it were possible to compile a composite of dozens of interviews that occurred in his office, the conversation would run about as follows:

We will say that the complainant is a manufacturer of steam radiators for heating dwellings. A priority order has cut off some of his supplies of pig iron. He has come to Washington with blood in his eye, all set to tell the theorists who are running the War Government something about the practical side of modern business. He wastes no time getting about it.

"Look here, Judge Parker," he storms, "this new order of yours—do you realize what it's going to do to *me*? Don't you know that people have to keep warm, even if there is a war? What do you want us to do—freeze?"

"Why, no; of course not," concedes Judge Parker, looking impressed.

The manufacturer is somewhat mollified, but still severe. "Well, that's just what your order is going to do to us. And look where it leaves me. I can't get along with the iron you've given me. If you're doing this right through, how do you expect business to live? How are we manufacturers to pay taxes and buy bonds and make war contributions, if we can't get materials to work with? I regard this whole thing as an outrageous interference with business. And don't get me

wrong—I'm for winning the war all right; but what's the use of winning, if all business is going to pot in the meantime?"

"Not much use, that's sure," agrees the commissioner.

"There! I knew you would listen to reason," declares the visitor, rapidly cooling off. "When you see the practical side of these things, it's different, isn't it? Now I can get along with about twice as much iron as you've given me. Suppose you sign a new order to that effect."

"What do you want all that iron for?" inquires Judge Parker.

"Just as I've told you—to make radiators with, to keep business going, to—to—"

The explosion is over, and there is no fight.

"Well, before we make up our minds," begins the priorities commissioner, taking the floor, "let's look at the other side, too. Now here we are in a war—with a million men in France and another on the way. We've got to win, but we can't win without making sacrifices. Pershing is calling for more ships, and more motor trucks, and more guns, and more shell. We can't make enough of anything to satisfy him. And the boys over there have got to have food and clothing, and they can't get them unless there are railroad cars to haul them. If we win this war, we will win it mainly with steel. Steel has a share in everything—if it doesn't go into the supplies themselves, it takes the supplies where they will do the most good.

"And there isn't enough steel to go round—not nearly enough—not enough, if we turned every bit of it purely to war purposes. Why, we could develop our ore mines for the next fifty years and still not get producing capacity that would satisfy us for the next few months alone. Let me tell you how bad it is. Right here in America women are at work in the iron mines to make production go faster. They have sons and husbands and brothers in the A. E. F., and they know that the only way for them to get their men back again is to send them plenty of steel. Man, I wish I had a million tons of iron to give you, but I haven't. So I am going to leave this thing to you, and I will abide by your honest judgment. Which do you

think is the more important: to give the Army and Navy that much more steel, or to provide a few civilians here in this country with new radiators; to indulge our own comfort here, or to add to the comfort and safety and power of the boys in France? Isn't this what you really want—to cut down your own production of radiators so that some of your men can go into the munitions factories to make, with the steel you give up, a few more tons of steel that can be shot across into the German lines? What about it?"

"By George, Judge, you're right!" exclaims the manufacturer. "I expect I have made a holy show of myself. But out in the country we don't understand these things—we don't realize how serious the situation is. I'm mighty glad I had this talk with you—it has opened my eyes. We'll leave things just as they were, and I'm going back to my shop to get along with what you give me, and you can count on me after this."

The machine which administered the priorities system consisted of a Priorities Board and a Priorities Committee, the former to determine broad plans and policies, the latter to carry them out. One of the first acts of the Priorities Board was to publish its *Preference List No. 1*, a list of forty-five classes of industries, the operation of which was deemed to be of exceptional importance to the Government, and which were automatically to be accorded priority in the obtaining of materials and machinery. A few weeks later (in September, 1918) the Board issued *Preference List No. 2*. This was more specific. It named over 7,000 individual manufacturing plants in seventy-three branches of industry, the plants being rated either higher or lower in war importance than their respective branches of industry. These lists gave the Priorities Committee its general rules and specific directions. Industrial work was embraced within five ratings or classes, called Class AA, Class A, Class B, Class C, and Class D, Class AA being of greatest importance and Class D of least.

Industry was at first aghast that any outside agency, governmental or other, should presume to dictate the order of processes within its plants. As one irate manufacturer put it:

“I’ll go out of business before I’ll let them come into my shop and run it and tell me what to make when, and when to make what. What does the Government know about factory work schedules?”

The answer was, “Nothing”; and the priorities commissioner was not trying to mix in with shop details. What he was doing was administering a system in which contracts and orders were segregated into classes, and demanding of industry that it give precedence to Class-A orders over Class-B orders in their deliveries of finished supplies, to Class-B orders over Class-C, and so on. With reference only to their deliveries, mind you. Suppose there was a wooden-wheel factory engaged upon contracts for the production of artillery wheels, wagon wheels, and pushcart wheels. In the preference list the artillery wheels would have A rating, the wagon wheels B rating, and the pushcart wheels C rating. It was entirely possible for that factory to abide by the priority regulations and still manufacture its C wheels first, its B wheels second, and its A wheels last—provided that the priority delivery dates were met. Judge Parker was not concerned with factory processes, so long as the artillery wheels were delivered on time, followed by the wagon wheels on time, followed finally by the pushcart wheels. But if anything happened in the factory—any difficulties in getting labor or materials, for instance—then the manufacturer had to concentrate upon and give preference to the artillery wheels at the expense of the other two sorts, favoring, too, the wagon wheels above the pushcart wheels. If the manufacturer would not follow the priority, or if he maintained that he could not, then he found himself unable to get materials.

What compulsion was upon manufacturers to observe the priority schedules? Judge Parker (and you may be sure the grave eyes twinkled brightly as he spoke) maintained stoutly that “We never used any compulsion. Of course, if a man didn’t like the priority schedule and didn’t want to play with us, he found he couldn’t get any fuel or any railroad cars or any materials or any labor or anything; but *we never used any*



Photo from Standard Forgings Company

MACHINING BIG GUN FORGINGS



Photo from Ordnance Department

FINISHING BIG GUNS FOR U. S. FORCES

compulsion. The man was a free agent." The control of all these facilities was in the hands of the Government. Yet it was seldom necessary to apply punitive orders. Most men in industry welcomed the application of controlled priority as an effective war measure; and many of those who at first objected to it, later gave their willing adherence to the system, once they understood that the system did not mean interference with manufacturing processes, but was only to be guidance for the producers in what the Government had to have first. Let it be repeated that it was this willingness on the part of manufacturers that made the control of war industry a success. Had the producers resisted, it might have been difficult to apply war powers which were not explicitly stated in written law.

During the war much idle talk was to be heard about essential and nonessential industries, and there were zealots who urged that businesses not necessary to the prosecution of the war should be closed up entirely in order to allow all effort to flow in purely martial channels. The War Industries Board adopted no such point of view. It regarded all going concerns as essential—the fact that they could exist being proof that they were necessary to the well-being of people. They were essential to their employees, if to no one else. A man skilled only in the making of flutes or the growing of flowers was as much entitled to his means of livelihood as any other man, war or no war. What the War Industries Board attempted to do was to determine the essentiality of industries relatively to the prosecution of the war. The Board found it necessary to curtail the labor and materials of the less essential; but whenever such curtailment was ordered, the manufacturer was given, if possible, opportunity to take up more essential war work, and on such terms that he could preserve a skeletal organization for his own proper work in order to be able to resume it easily after the advent of peace.

Here was where the direction of priorities entered—in curtailing the less essential manufacturer's use of labor and materials. And in this arose delicate questions, for it was not always

easy to determine relative essentiality. Which was more essential, a gun factory or a watch factory? We had to have the guns, but we also had to have accurate timepieces for the controlled eruptions of men over the top, following a rolling barrage. Obviously a powder factory was Class AA in its priorities, but what about a needle factory? Without certain important textiles in his equipment, a soldier could not be an efficient soldier; yet it required needles to make these textiles, and there was an American shortage of needles throughout the war. War industry performed extraordinary exploits in securing needles from Norway and Japan. The priorities organization had to know such circumstances and to make such distinctions. If there had been but a few industries and a few plants, the task would have been easy, but there were scores of classes of industries and thousands of factories, besides thousands of war needs, and it was necessary to rate them all.

The system of control, to be successful, had to enlist under its banner the unreserved support of all the governmental agencies controlling the necessities of industrial life. It availed nothing to give a favored industry its fuel if the control failed to give it also its materials, labor, and transportation facilities. Moreover, the control system had to be absolute in its power or go down as a failure. Before the War Industries Board secured its power, the various production bureaus of the War and Navy Departments exerted the undoubted right of the Government to commandeer factories or their outputs whenever such action became necessary. To have continued that course after the War Industries Board began dictating priorities would have invited chaos in industry. With anything less than supreme power in the War Industries Board, if a production bureau of the War Department did not approve an order giving the Navy or Shipping Board priority in a plant, it might commandeer the plant outright and thus circumvent the order altogether. Caught between two such powers, industry would not have known which way to turn. It was to prevent such a state of affairs that the President, shortly after commissioning the Board as a plenipotentiary

body, passed the order down through the War Administration that thereafter no federal bureau, department, or administration was to commandeer anything except upon the approval of the chairman of the War Industries Board. This order placed in the Board's hands the whole direction of industry, removed from the War and Navy Departments their hold upon the factories of the nation, and, since the bureaus which formerly had power to commandeer were all represented before the War Industries Board, brought about an approximation of justice to all engaged in war industry as either purchasers or producers.

Priorities were under control, not only in war industry itself, but in all nonwar industry as well. It is obvious that this had to be. All plants engaged in war work had their ratings according to the importance of their work. The less essential ones had to wait for their materials until the more essential were satisfied. Yet what an injustice it would have been to the less essential munitions producer to deny him anything while his next-door neighbor, not engaged in war production at all, had full competitive access to whatever he needed! Curtailment and economy were necessary everywhere.

It was an interference with nonwar industry which raised in Congress the only question ever debated there regarding the activities of the War Industries Board. Judge Parker had issued his *Circular No. 21*, which virtually put an end to all nonwar building construction in the United States. This did not mean that the Board intended to wipe out temporarily the great building-construction industry of the United States. The Government itself, in its needs for ships and shipyards and for war buildings for Army and Navy, offered more work to be done than the entire building industry of the country could accomplish. The order simply diverted all this effort to purely war purposes. The cleverness of the order was in the exceptions it made—it allowed all nonwar construction projects to go forward if they received the approval of the local councils of defense. The local councils were inclined to be more severe in their judgments than the organization in

Washington, and precious little nonwar building construction got past these neighborhood censors. The local councils referred their decisions to the Nonwar Construction Section of the War Industries Board, the chief of which, Mr. Donald R. McLennan, adopted them and gave them the authority of law.

To get back to the building-construction circular: Its publication was met by a tremendous protest from the lumber industry, the cement producers, the brickmakers, the jobbers and retailers of building materials, and the building trades-unions. Senator Calder of New York introduced a resolution in the Senate calling upon the War Industries Board to explain why the order was issued and by what authority. In support of his resolution, Senator Calder said: "I introduce this resolution because articles appearing in the newspapers within the last day or two indicate that the War Industries Board has promulgated orders which, in effect, will completely destroy the building industry of the country. The building-material industry of the country has an investment of \$4,000,000,000 in their business, and the new buildings constructed in the nation in the last prewar year, 1916, totaled \$1,800,000,000. As I understand these orders, they prevent the construction of a barn, a silo, or even a private dwelling house, or of any building of a private character, without the permission of the Federal Government. If it is necessary in order to win the war to destroy this great wealth- and tax-producing industry, than which it seems to me there can be few more essential, we ought to know it and the reason for it; and the people must adjust themselves to it; but if this great business can be saved, at least in part, some way should be found to do so." The Senate adopted the resolution.

The order was indeed a drastic one. It was against the private interests of a large share of the population. The farmer who wanted to build a new barn, the bank that desired new quarters, the railroad which wished to erect a new terminal, the county which planned a new courthouse, all suffered from the order, as did the people who produced and distributed

building supplies. But they did not suffer in silence. They descended upon Washington in droves, either bodily or through the medium of wires and mails; and throughout the tempest Judge Parker sat steadfast and yielded not one inch. It was the liveliest commotion raised by the War Industries Board during the war. For the moment it drew the national spotlight to the Board and gave Chairman Baruch the chance to tell the country, while it was paying attention, something about what the War Industries Board was trying to accomplish, an opportunity which he was not slow to embrace. His reply to the Senate resolution was as follows:

September 19, 1918.

To the Honorable the President
and Senate of the United States,
Washington, D. C.

GENTLEMEN:

On behalf of the War Industries Board, I beg to comply with Senate Resolution 304, passed September 13, 1918, and transmitted to me the same day.

1. The only order promulgated by the War Industries Board "relative to construction and alteration of public or private buildings," is contained in *Circular No. 21*, issued September 3, 1918, and supplemented under date of September 10, 1918. Copies of the order and the supplement are attached hereto.

2. Said orders were issued under the authority conferred upon the War Industries Board and its chairman by the President of the United States in a communication to the chairman, dated March 4, 1918, and confirmed by executive order dated May 28, 1918, whereby the War Industries Board was created a separate administrative agency of the President, with the powers, duties, and functions set forth in the said communication from the President of March 4, 1918. Copies of said communication and of said executive order are attached hereto.

I beg to call particular attention to the following powers and duties thus specifically conferred by the President upon the Board and its chairman:

a. "The studious conservation of resources and facilities by scientific, commercial, and industrial economies";

b. "The determination, wherever necessary, of priorities of production and of delivery and of the proportions of any given article to

be made immediately accessible to the several purchasing agencies when the supply of that article is insufficient, either temporarily or permanently”;

c. The Chairman's duty to guide and assist “in obtaining access to materials in any way preëmpted,” and “to anticipate the prospective needs of the several supply departments of the Government and their feasible adjustment to the industry of the country as far in advance as possible, in order that as definite an outlook and opportunity for planning as possible may be afforded the business men of the country.”

I refer also to the act of Congress of August 10, 1917, known as the Priority of Shipment Act.

3. In further response to Senate Resolution 304, permit me to add:

Statement of Situation

In carrying out the duties with which we were thus charged by the President, the War Industries Board and its chairman found the following situation to exist with respect to building and construction facilities and supplies:

a. Iron and steel are a necessary part of every completed building. They are necessary for plumbing, heating, ventilating, piping, hardware, and mechanical equipment. The direct and indirect war needs of this country and of our Allies for the last six months of the current year already exceed 21,000,000 tons, and the country's total output for the first six months was less than 17,000,000 tons. The unavoidable result is that iron and steel can not be used for nonwar or less essential purposes.

b. The United States Fuel Administration, finding that the production of building materials consumed upwards of 30,000,000 tons of fuel per annum, and that there was a shortage in the fuel necessary for our war program, curtailed very materially the fuel allowed for building materials. The continued production of building materials for nonwar and less essential projects would now necessarily be at the expense of production which our war program requires.

c. The Railroad Administration finds that 25 per cent of the total tonnage moved by the railroads is building material. It is absolutely essential that the portion of this tonnage which represents materials not needed for war or essential purposes should be displaced by tonnage which is.

Shortage of Labor

d. The United States Employment Service finds that there is an acute shortage in the labor needed for the war program. It is absolutely essential that labor which may now be idle, or which may be engaged



Photo from Maritime Manufacturing Corporation, St. John, N. B.

ROUGH FORGINGS FOR 9.2-INCH SHELL



Photo by Signal Corps

STEEL BILLETS AT MUNITIONS PLANT

on nonwar or less essential work, should be employed upon work which will contribute toward winning the war.

It is therefore evident that the building and construction field furnishes an instance calling imperatively for the exercise by the War Industries Board of the duty, with which the President charged it, of conserving the resources and facilities of the country for war purposes, of determining necessary priorities in production and in delivery, of obtaining access to materials in any way preëmpted, and of anticipating prospective war needs.

It is clear that there is not enough iron, steel, transportation facilities, fuel, and labor to supply the direct and indirect war needs of the country, and the nonwar needs also, and that the resources and facilities used in nonwar and less essential building projects can only be applied thereto by taking them from the war needs.

Would Postpone End of War

The inevitable result of this would be failure to supply the war requirements of the country as they are needed. It would mean that nonwar and less essential needs would be satisfied at the sacrifice of war needs, with the consequent postponement of the day when the war will end and when American lives will be freed from the hazards of battle.

The attached orders were promulgated by the War Industries Board as a necessary means of avoiding this unhappy result.

These orders were only issued after the nearly six months' warning given by the resolution of March 21, 1918, which is quoted at length in *Circular No. 21*.

Attention is also called to the fact that before *Circular No. 21* was issued numerous conferences were held between the Board and the manufacturers of the principal building materials. The latter appreciated fully the situation as briefly outlined above, and heartily agreed to coöperate with the Board in carrying into effect the spirit of the resolution of March 21, 1918, and, to that end, to enter into the pledge set forth in *Circular No. 21*.

Manufacturers in Doubt

The manufacturers, however, felt that, not having the country's war program before them, it was impossible for them to determine what building projects were essential and what were less essential. They felt that the War Industries Board should determine this question as definitely as possible, and should pass upon doubtful cases for them.

Accordingly, the Board did determine what were essential projects,

defining them in paragraphs numbered 1 to 5, inclusive, of *Circular No. 21*, and projects of this character may proceed as therein explained. Other building projects are not prohibited, but may likewise proceed if the local council of national defense, which is primarily the body best fitted to judge, finds them in the public interest or essential; and, if this finding is approved by the War Industries Board, building projects which do not measure up to these standards must be deferred until the war program is fulfilled. If they are not, the due fulfillment of the war program will be impossible.

The orders referred to are very much in the interest of the public, because they will prevent the public, including the trade, from planning or undertaking building projects, and then, after plans or commitments have been made, finding that the war program makes it impossible to secure the materials necessary to complete them.

Moreover, the trade itself will find that because of the enormous housing and other construction work which the Government itself is undertaking, a large part of the trade's facilities will simply be transferred to new lines of building activity.

Will Further Curtail Nonwar Work

Finally the operation of the Selective Service Acts will, much more than has already been the case, directly affect the amount of labor available for the building trade and for other industries. Even with increased efficiency and female labor, the natural outcome of this condition must be to curtail and reduce the volume of any given business not connected with the war program. As far as it is possible to do so, the less essential industries are being converted to more essential activities, but there will be a certain percentage of these industries which can not be so converted. Therefore, the volume of business in the less essentials will be reduced, and with this reduction there will come a corresponding reduction in taxability.

It is not only the policy, it is the clear and simple duty of the War Industries Board to see that the war program of the country is met, and this program must be met now, when its needs are upon us. This duty must be fulfilled, even if its fulfillment entails industrial loss in this country, as it does human loss abroad.

I have the honor to remain,

BERNARD M. BARUCH,

Chairman War Industries Board.

The building-construction order gave the hunters for flaws in the War Administration the opportunity to charge that the

War Industries Board was godless and that it regarded religion as nonessential—an indictment based on the circumstance that the order did not exempt churches from the list of interdicted nonwar construction. Few religious leaders, however, took part in this criticism, for they recognized that true religion is not a matter of brick and stone and architecture, but of faith and good works. No less a figure than the Reverend William A. Sunday, the evangelist, was adversely affected by the order, which forbade him to build the well-known “tabernacles” in which he holds his meetings. Naturally Mr. Sunday wanted to know why an exception could not be made for him; and Judge Parker told him, in much the same language which Mr. Baruch had used in his reply to the Senate. In answer to his explanation Mr. Parker received the following telegram from Mr. Sunday:

Winona Lake, Ind.
1918, Sept. 17, P.M. 10:20.

Edwin B. Parker,
War Industries Priorities Committee,
Washington, D. C.

Your kind letter received. I thoroughly understand and sympathize with you in your position. I gladly comply with your wishes regarding building of tabernacles, and will carefully explain, so there will be no misunderstanding on the part of the public that you are not in sympathy.

W. A. SUNDAY.

Billy Sunday was the idol of a large personal following in the United States. His acquiescence in the edict of the Board was widely published, and it was of genuine assistance to the Board and to the priorities commissioner.

To the control of industrial priorities is due much of the credit for the enormous strides which shipbuilding and the fabrication of munitions for the Army and Navy were able to make in 1918—a period, too, which was notable not so much for what it actually produced as for what it prepared to produce in 1919 and 1920. To determine who should have

prior access to the resources of America and to see that the favored ones actually secured the access, to carry out such a system in an industrial country as large as the United States, combating prejudice and misunderstanding on one side and assaying the importunities of the Government's own departments on the other—that was a great work. There was no other function of the War Industries Board more important.



Photo by Signal Corps

HAMMERING STEEL FOR GUN SHIELDS

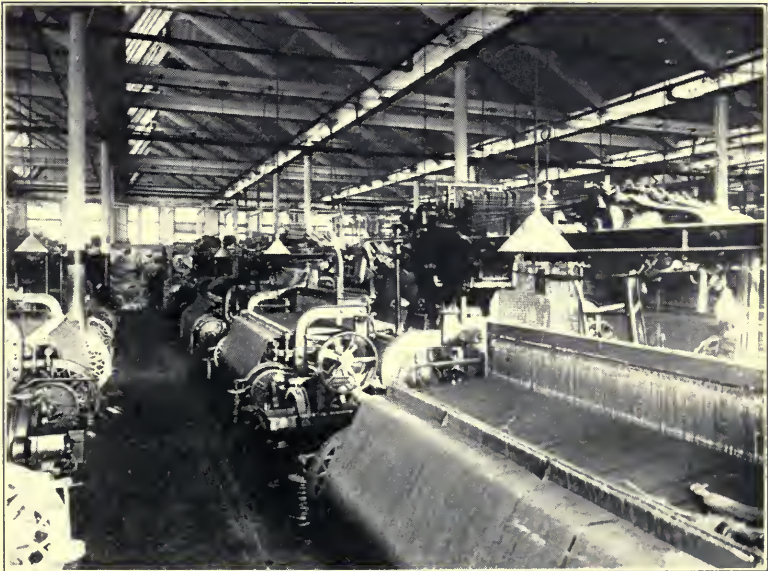


Photo from Quartermaster Department

VIEW IN ARMY TEXTILE MILL

CHAPTER IV

INDUSTRIAL CONVERSION AND CONSERVATION

OUR commercial and economic structure, the whole business world, is like a tree. From a small beginning it grew, putting out branch after branch, twig after twig, leaf after leaf, until it became an intricate whole. There are two ways of looking at a tree—from the æsthetic point of view, and from the practical. The artist sees in a tree purely a thing of beauty—the sturdy trunk as a focal point for the attention, the graceful ramification of the branches, the tracery of the twigs against a winter's twilight, or the depths of shading in the summer foliage. The lumberman views it as a trunk only, containing so many board feet of clear timber; and when utility triumphs over art, the branches and twigs are lopped off for the cordwood pile and the brush heap, and the trunk alone goes to the sawmill.

War, the apotheosis of all things practical and utilitarian, approached our business tree with an intensely practical eye. It was soon evident that we should have to do a terrific amount of lopping off before the lumber could be made most useful for war purposes.

Apparently, in the times of peace we had not made one useless or unnecessary thing; yet when the war came we found out that we were making more useless and unnecessary things, if anything, than we did useful ones—useless, that is, to the program of war. Nor did it take long to find out this truth. There were not men or materials or factories enough to continue the essentially peace-time activities of industry and at the same time to make all the necessary things which the Great God War demanded.

The problem of trimming the industrial tree was twofold—

first, to find the facilities which could be converted to the making of war materials, and second, to find the curtailments in enterprise which could be accomplished without altering the peace-time tree so materially that it no longer resembled a tree, or without (and here was danger) killing the tree altogether. This double problem was one of the vital issues with which the War Industries Board was confronted. It tackled it from the two sides and by means of two machines, called respectively the Resources and Conversion Section and the Conservation Division.

The thing sounds a good deal easier than it really was. It seems so simple to sit in an office and say: "Mr. Manufacturer of Pianos, how would you like to limit your production of instruments which, no matter how valuable and well made they may be, are scarcely suited to damaging Germans across a strip of No Man's Land, and make, let us say, mounts for big guns?" To the closet theorist it seems so entirely probable that the piano manufacturer will immediately throw in the scrap heap all his piano-making machinery and substitute forthwith the necessary tools for making gun mounts. It may also seem credible that the chap whose life has been spent in attaining skill in covering wooden hammers with felt can be metamorphosed overnight into an expert riveter or a lathe tender, and the one whose ear has by practice been attuned to the tonal subtleties of stretched metal strings can learn between dark and dawn to make machine threads upon gun screws.

But the problem of war industrial conversion was not simple at all. A factory is not just a building filled with machinery, although that is the common idea. It is an organization of trained *personnel*. When the great Edison works at Orange, New Jersey, burned to the ground a few years ago, the creation anew of the plant was only a question of architects, of cement, brick, and structural steel. The workmen of the factory were not damaged; the intelligence which fabricated the Edison products was untouched. When the war reached into this and a thousand other factories and plucked therefrom some of the best of the workmen, the factories were seriously

crippled—some so seriously that they did not recover for months after the armistice.

As between taking workmen away from a factory and not replacing them, and changing the whole product of a factory, there is little to choose, as far as damage is concerned, unless the new thing made is in kind of materials used and in manufacturing process allied to the thing which the factory has been making. No change in method, materials, or organization was necessary when Nordyke & Marmon, makers of automobiles, began to manufacture Liberty engines. When Henry Ford undertook the job of making cylinders for gasoline engines for the War Department he built a new plant; but he built what he had built before and his workmen worked at a thing they understood. To ask a piano factory to make gun mounts would be on a parity with asking a seamstress to dig post holes. But the piano factory could make the frames of airplane wings, even as the seamstress could sew on gas masks as well as on party dresses. The piano factory had fine wood-working machinery and skilled cabinetmakers. The organization which could carry a piano from frame to finished article could also function in the production of airplane wings. Finding these factories which could change their jobs with a minimum loss of skill and efficiency, and which could economically continue in existence as a part of the war machine—such was the problem of war industrial conversion.

It would not be particularly difficult, for instance, to alter a factory engaged in making office desks into one which produces dining-room tables. It is not impossible to conceive of a sewing-machine factory transformed into a plant for producing lawn mowers. We can easily understand that a rolling mill for making bridge members might as well make structural beams for railroad cars, or *vice versa*. The demands of war, however, were not primarily for these familiar things of peace, but for engines new and strange—for things we had never made before; or, if we had made them at all, for things which had been produced in but small quantity and in few places.

The thousands of factories of a peaceful nation are engaged in turning out the myriad articles of peace-time demand. On a day, that nation goes to war and faces an immediate, an instant, need of guns, shell, automotive transport, wire, fireworks, bombs, high explosives, time fuses, trench mortars, gas masks, new and strange chemicals designed to poison whole armies, airplanes, submarines, new forms and kinds of optical instruments, and a hundred thousand other things, many of which it has never made. To select in America the peace-time factories which could be converted with the least damage and the least loss of time, and to get them started on the new program, was a herculean task.

Why not be done with it and build and equip new factories for the manufacture of the new things? That might have been practicable, had there been only one new thing to make; and indeed we did build new plants to make some of the more difficult supplies. But to make all the new things in new factories would have been ruinously wasteful of materials and effort, and the nation's energies would have been spent merely in preparing to manufacture. The conservative and efficient, and the only possible, thing to do was to take the facilities at hand and convert them into a war plant.

It was highly important that shortages in manufactured articles be eliminated, as well as shortages in raw materials. So complicated is modern warfare that a whole great project may be held in check for lack of some one manufactured thing. The Chemical Warfare Service might make its gas, manufacturers might produce the cylinders to contain it, the railroads might be ready to haul it, and the soldiers trained to use it; and yet if the man who made the tool which ground the valve seat of the valve which fitted in the cylinder was behindhand, the whole chemical warfare work would be held up. Wireless played a vital part in the communication on the battle field. Modern wireless depends upon the audion bulb. The audion bulb depends on tungsten wire; and the making of tungsten wire depends, among other things, on a small quantity of a special and highly divided form of graphite. A

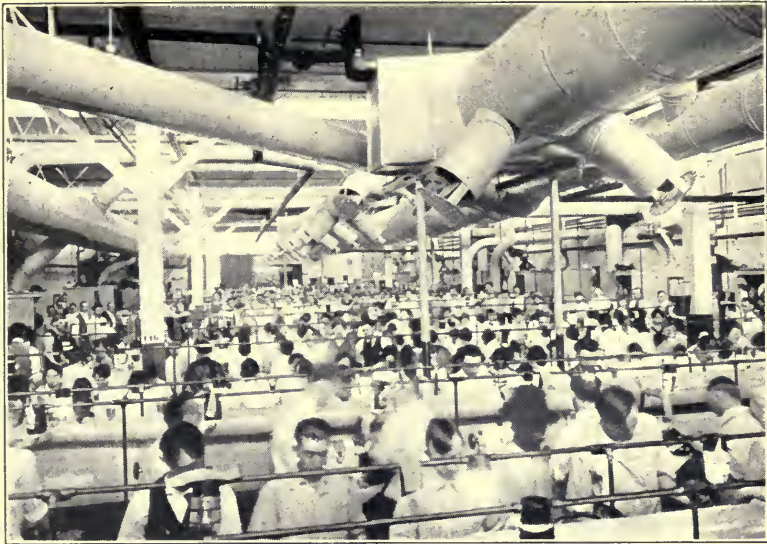


Photo from Recording & Computing Machine Company

**ASSEMBLING SHELL FUSES IN FORMER COMPUTING-
MACHINE FACTORY**



Photo from American Multigraph Sales Company

**FORMER PRINTING-MACHINERY FACTORY MAKING
SHELL FUSES**

failure in the supply of graphite might mean the failure of such an operation as that at St. Mihiel. The net weight of the hairsprings used in making time fuses for our big shell could have been only a few ounces; yet without these few ounces of fine steel the whole work of shell maker, high-explosive manufacturer, and gun producer might have gone for nothing. We had never made our own optical glass, and when we entered the war we faced a real problem in supplying it for our telescopes, our range finders, our photographic lenses, and our sextants. Germany and Austria had been our sources of it; now we were fighting them. The problem was solved, and we won independence of Europe in the war supply of optical glass; but someone had to develop the resources which did it.

We had to train new men to do new things. Training a man to do anything in the first place is a question of picking the right man to train. You can not produce a gunmaker out of a silk salesman as easily as you can out of a man who has spent his life making tools in a machine shop. It is far easier to take men who have worked on phonographs, electric motors, or automobiles, and train them to make machine guns, than it is to train brakemen, bank clerks, or candy makers to the use of the metal-working lathe and the gauge. Here again the War Industries Board had its problem to face: to find not only the building and the organization which could be altered to war uses, but the factory and the organization which had *personnel* capable of being diverted to the new work in the minimum of time and with the least loss of efficiency.

Finally, the War Industries Board would have functioned poorly and ill served the President and the country to which it owed allegiance, if its labors had resulted in filling the war demand at the cost of commercial demoralization, stagnation, and ruin after the war. Some new plants had to be built; but they were kept as few as possible, because the reconversion of a plant equipped strictly for the production of some specific war commodity is a hard, if not impossible, task. Such plants become largely excess baggage when the war ends. The fewer the new facilities provided and the more numerous the exist-

ing facilities converted and used, the less difficult the process of industrial reconstruction after the war. This point the Board had to bear constantly in mind; and here, indeed, was where the trained business vision and the broad knowledge of industry possessed by the executives of the Board stood the United States in good stead.

Before industry could be managed as war industry, an integral whole, it had to be explored and catalogued; and in that process business in the United States suffered from a plague of questionnaires, like unto that of the locusts in Egypt. And many and loud were the protests. In trying to find out who made what, and where he made it and how, and how many men he had, and what he could make, and how fast he could make it, paper after paper was sent to manufacturer after manufacturer, with endless blanks to be filled in, endless questions to answer. The various bureaus did the best they could; but, with all of them addressing questionnaires to industry, there was much duplication and much unnecessary annoyance to business. Yet these same questionnaires, if a bother, brought results and made possible the conversion of industry and the conservation of materials and effort without the accompaniment of a train of evil effects after the war.

The Resources and Conversion Section accomplished some factory transformations which would seem almost impossible, especially when one considers the brevity of the time at its disposal. But never let it be forgotten that American industry stood solidly behind the War Industries Board. The problem was not to persuade the manufacturer to change his plant overnight, but to keep him from changing it to the wrong thing. Silk manufacturers would have cheerfully gone to making horseshoes, or producers of iron pipe to making optical instruments, had they been permitted. The problem was to find the right man, the right factory, and the right organization to do any certain job. Having found them, it was no task at all to set them to work.

“What can I do to help?” asked the carpet manufacturer. “I

know you don't want carpets for the trenches, but I have a factory. . . ."

"Blankets," was the answer. "Blankets and duck—we need a lot, and we need it to come fast."

"My business is making household refrigerators. I don't suppose you equip dugouts with refrigerators, but I have twelve hundred men and a big plant filled with woodworking machinery; and I am at your service. . . ."

"Field hospital tables—we have to have a great many. The Navy needs filing cases, special pattern."

"Can you use a blacksmith? We make horseshoes for the trade."

"Most of our horses are shod with rubber, and it takes four tires for one of them. But we need trench picks, not by ones and twos, but by the hundred thousand. A trench pick is made of iron, and it is forged. . . ."

"Hand us over your order, and we'll go to it." And they did.

"My business is making toys. They say every factory in the country can do some war work, and that those not engaged in manufacture of articles essential to war activities or civilian existence have got to be discontinued or curtailed. I have 250 men, a fine modern building and I want to help. . . ."

"How about packing boxes? We have ten thousand different kinds of things to ship three thousand miles, and many of them must be packed carefully. Our present packing-case industry isn't big enough by half. . . ." And the toy men turned to and made packing cases for everything from small telescopes to automobiles.

Plants which ordinarily made vacuum cleaners ceased to promote cleanliness and made small parts for Liberty engines. Why not? A vacuum-cleaner factory is a place devoted to the manufacture of finely machined small parts for small machines. A Liberty engine is a large mechanism, but it has a multitude of small parts. Not one factory made Liberty engines, but many. The parts were made in many factories and merely assembled in the few main plants.

What would you say a fishing-rod manufacturer could do to help to win the war? The Signal Corps needed jointed staffs for all sorts of purposes, from small flagstaffs to portable wireless masts: the workmen, the machinery, the stock on hand, even the varnish used for fishing rods, fitted the new products as if produced originally for them. Someone had to think that out and bring together the need and the supply.

There were a number of shirt factories in the country which, because of their small size and their remoteness from cloth centers, or for other reasons, could not be employed on government clothing contracts as efficiently as upon other work. The Conversion Section had an answer for them, too, and set some of them to making mosquito nets. If a stove man came in fired with a desire to supply kitchen ranges to officers' quarters at the front, he was set to work making hand grenades and trench bombs. A stove factory is nine-tenths foundry for small, well-finished castings, and hand grenades are castings of that sort.

The fellow whose job in life was making corsets didn't propose to be left out. He besieged Washington with his offers to help. And some shortsighted officers rather laughed at the idea that one whose business it was to make laced casings for the female form could add anything to the progress of the war industry of the land. Not so Resources and Conversion. That section had imagination and knowledge, and soon found that a corset factory could make medical corps belts and fencing masks as well as corsets. Gear plants made gun sights; pipe-organ factories did woodwork and metal work for Army and Navy; rubber and canvas artificers produced gas masks; ladies' waist factories made signal flags. The conversions were startling in the smaller organizations, and they were notable and momentous in the larger; as when radiator manufacturers became makers of big guns, automobile-body builders made airplanes, and automobile factories made tanks and navy destroyers.

While the factories were being changed, the problems of industrial conservation were being solved. Even to outline



Photo from Crown Cork & Seal Company

BOTTLE-CAP FACTORY MAKING MACHINE-GUN TRIPODS



Photo from Michigan Stove Company

STOVE WORKS CASTING TRENCH-MORTAR SHELL

the full story of conservation, pages would be necessary, where paragraphs are now to be spared. Conservation had so many ramifications and touched so many lives in so many ways that a volume could be devoted to it.

The general public felt the effects of industrial conservation in the limitations upon the use of coal, food, and other common commodities; but these savings were matched by other economies, unadvertised, but actually accomplished in special ways and by special means. Industrial conservation was eminently war industries board work. The War Industries Board, itself formed out of bodies originally created within the Council of National Defense, received from its parent the Council's Commercial Economy Board, which it made into the Conservation Division. The Conservation Division, under the direction and chairmanship of Mr. A. W. Shaw, the Chicago publisher, proceeded to do certain things which industry at first called disorganizing and later acclaimed as life-saving.

Conservation of our industrial assets was necessary in order to make the national supply of materials, labor, and transportation go around among all the war needs and essential civilian needs. The available materials, labor, and transportation were none too much even to supply normal demand in flush times. The war machine, infinitely greedier and more wasteful than the normal organization of the country, could not be expected to thrive unless the normal organization were starved down. The theory under which the conservation schedules were drawn was not complicated. It amounted to a reduction in styles, varieties, sizes, color, and finishes wherever possible, to the end that stocks of raw materials might be reduced, labor released, and transportation saved. Certain unessential products, such as materials for personal adornment, as distinguished from those for use, were prohibited altogether. The transportation burden was lightened both by the elimination of packages of small size and by an increase in the number of units to the standard large packages. The Conservation Division established sharply limited standards of size, weight, length, width, and thickness.

It is probable that not even Mr. Shaw, before he got well into his work, had any idea of the lengths to which conservation could go in the elimination of sizes, kinds, and styles in almost everything manufactured. Certainly the public was never aware of the extent to which duplication of common varieties of manufactured goods had been carried. As an instance, consider the front and rear gears of farm wagons. For a hundred years wagon manufacturers had been adding to their assortments, inventing and devising new styles, kinds, and varieties. One kind is popular in one locality; in another the farmer will have none of it, but demands something entirely different. It's a big country, and it has a thousand local conditions, prejudices, likes, and dislikes; and the manufacturer, during times of peace, finds it profitable to cater to local taste and opinion. Along comes a Conservation Division of a War Industries Board and says: "Stop the useless duplication. The railroads can't carry so much. Eliminate—reduce—curtail!" Result, to give a single instance, one wagon manufacturer reduces his varieties of front and rear gears from 1,736 to 16.

Carry this out through the industry, and imagine the saving in raw materials, in money tied up in stock, in catalogue space, in salesmen's time, in shipping and packing. Yet the farmer was amply taken care of: he found that the gear which he wouldn't have, because he had never used it, was really just as good as the one he had been using. Oklahoma used the kind familiar in Maine, and Montana made shift with what had been supplied to Georgia, and no one was a whit the worse off.

Let no one imagine that Mr. Shaw and his Conservation Division went into industries unfamiliar to them, took the catalogues, and ruthlessly lopped off items, forbidding this, that, and the other. The real wonder of war industrial conservation was not so much what was done as how it was done—as the teamwork which brought it about. Industries were asked, through trade journals and organizations, to appoint what were called "war-service committees." Each war-service com-

mittee was representative of the best thought of the given industry as a whole. The committees met individually with the Conservation Division, the officers of which explained the need for conservation in the various products. If any committee were not persuaded by the mere statement of the fact, it was speedily shown to it in concrete figures that there were just so many cars in the country and just so many train miles possible in a given time; it was shown in tons what the boys in France had to have—what had to be moved—and it needed no further demonstration to show that shipping space had to be saved. When this argument was repeated in terms of labor, of materials, and of machinery, the war-service committee stopped asking any question other than "What can we do?"

"This is what you can do," answered Mr. Shaw. "You can go carefully over your practice and tell me what you can eliminate without absolutely crippling your industry and working actual hardship to the public. Disregard what people want merely because they want it. Tell me what they have to have and what they can get along without. We must take for strictly war purposes so much of the materials you ordinarily use. You can have so much only. Now get me up a curtailment schedule which you think will meet the situation."

The war-service committee went into executive session and did as it was told. The result, with some necessary modifications, became the conservation schedule of that industry. It went to every manufacturer in the trade and to all wholesalers and retailers connected with the distribution of that particular product. Thus the industry itself virtually prescribed its own curtailments, and the spirit of coöperation within the industry made the conservation schedules effective without any display of force by the War Industries Board. The occasional manufacturer who objected was taken care of by his own industry and by its opinion and fiat.

An example or two may serve to show how vitally important was the work in conservation. It was hardly less than revolutionary to force the women members of the buying

public to contribute willy-nilly to the winning of the war by denying them their age-old privilege of dressing as they pleased. Yet, by limiting the women's garment industry to the production of models which were economical in yardage, the Conservation Division effected a saving of cloth which totaled nearly twenty-five per cent of what would have been consumed by the unrestricted range of models.

Mr. Shaw had not only a broad vision for the execution of large plans, but an ability to see the small details of a campaign as well. It might not appear at a casual glance that ordinary thread offered much of an opportunity for the application of measures in conservation; but Mr. Shaw was no casual observer. "Thread," he argued, "is wrapped on spools; and spools are made of wood and are round; and wood is valuable; and, moreover, round objects pack uneconomically. The fewer the spools, the greater the saving. How much thread is on a spool, anyway?"

Someone told him the answer. The old length was 200 yards. With only their own business in mind, thread makers had reduced the commercial spool-length to 150 yards and were about to reduce it to 100 yards, in order to keep the unit selling price (which it was not good business to disturb) the same, and still get more for their thread. Mr. Shaw fixed the standard length of thread to be wound on a spool at 200 yards, and to his satisfaction promptly figured out an annual shipping-space saving equivalent to more than 600 freight carloads. Six hundred cars can carry supplies enough to maintain a regiment and a half in the field for one year!

Our domestic resources supplied everything needed for war, with a few important exceptions, one of which was rubber. Therefore it was essential to conserve rubber; for war is an insatiable consumer of it; and the war in 1918 demanded of us that we use all the shipping we could muster, without wasting any of it to bring in rubber for unnecessary rubber articles. Odd sizes of tires for old automobiles of obsolete models were regularly made and carried in stock by almost all the tire companies, with the result that much rubber and money were



Photo from Kissel Motor Car Company

ORDNANCE TRUCKS READY FOR SHIPMENT



Photo from Durham Hosiery Mills

KNITTING SOCKS FOR AMERICAN SOLDIERS

tied up in stock. The rubber industries and Mr. Shaw's division worked out schedules which reduced 287 styles and sizes of automobile tires down to 9, the reduction to be effected gradually through two years. Conservation in the rubber-tire industry alone released more than enough rubber for all war purposes, especially since it was supported by conservation measures in other branches of rubber manufacture. As instances, 272 styles and sizes of rubber raincoats were discontinued altogether, and 5,500 kinds of rubber footwear fell under the conservation axe.

The need of saving steel was equaled only by the importance of releasing from unnecessary manufacturing enterprises men skilled in the working of steel. Steel so permeates our entire life that almost every one of the conservation schedules touched it somewhere. Special instances of the war conservation of steel were to be found in the agricultural implement trade, in which the sizes and styles of steel plows became 75 in number instead of 312, planters and drills declined to 29 from 784, disc harrows to 38 from 588, while one model of a buggy axle substituted for a former 100. These were but typical of what went on all through the implement trade. The hardware trade was able to cut in half its multiplicity of styles and designs.

The conservation schedules invaded all of America's manufacturing life. As fast as the Division could function, as rapidly as trade bodies could be gathered together, with whatever speed the emergency could engender, the reductions were made and carried out. It was a surgical procedure—a major operation, with patriotism the only anæsthetic. A complete list of industrial products to which the principles of conservation were applied would cover many pages. Here are the names of just a few items: Road-making machinery, chains, metal ware, bicycles, motor cycles, children's vehicles, clocks, pens, pencils, talking machines, motion-picture projectors, burial goods, furniture, beds, vacuum cleaners, washing machines, household wringers, refrigerators, mackinaws, stoves and ranges, furnaces, oil stoves, enameled goods, galvanized ware,

cameras, hand stamps and marking devices, adding machines, autographic registers, sales check books, typewriters, cash registers, tabulating machines, time records, fire-prevention and fire-fighting apparatus, trace chains, corsets, pocket cutlery, hosiery and underwear, hats, felt shoes, gloves and mittens, harness and saddlery, trunks and traveling goods, overalls, book cloths, typewriter ribbons, upholstery batts, bedding, woodenware, nails, bolts, rivets, bottles, chinaware, crockery, bed davenports, and paints and varnishes.

It was important work, this conservation in war industry. It was done quickly, because it was aided by the loyal coöperation of the manufacturers most affected. It was done bravely, in that it took courage and determination to carry through these unprecedented interferences with business. It was dramatic as a spectacle of civilians, outsiders, laying profane hands upon industry and to all intents and purposes telling it what it could and could not do. And it was work done well: undoubtedly it maimed industry but it did not kill it—the indispensable amount of surgery was accomplished with such clean, swift strokes that the wounds healed after the war and left no scars.

CHAPTER V

PRICE FIXING

WHEN two masters of the game of chess play a match, the result is usually decided by the fact that at some stage of the proceedings one of the players is able to see farther into the future than the other. In any game as exact and scientific as chess, a move produces not only its immediate result, but a series of future results.

“If I move that knight, I uncover the bishop. But if the bishop be attacked, there is the pawn to move up in support. However, if I move the pawn I may subject myself to a check by the hostile queen. In that event I have a rook which could be interposed; but moving the rook will weaken the flank of my otherwise protected pawns. If they be left unguarded, will not my opponent direct an attack on them? On the other hand, if I leave the knight where it is, it will probably get into severe difficulties; and the positional advantage I should gain could not win, unless I could force the game to a conclusion before my opponent could bring into play his reserve pawns. . . .” And so on, sometimes for hours of deliberation.

No part of the war game more nearly resembled chess, in the far-reaching results of any move made in it, than that department which dealt with price fixing.

Government price fixing—the very words are hateful to American business as we know it. Our whole business structure is predicated upon individualism, upon the right of each to do as he chooses within the limits of statutory law, unhindered by outer authority meddling in affairs. America believes in competition as being the life of trade, and has given concrete manifestations of this belief in various regulatory laws and in laws forbidding too much concentration of interest into one

set of hands—all of this for the protection of the sacred individual. And one of the individual's inalienable rights is his right to fix his own prices for what he sells. In this exercise he contends only against the economic law of supply and demand.

When the war came many of the fundamental concepts of American business liberty went by the board. The Government discarded its own protective laws and abridged individual liberties as it saw fit, for the sake of national unified efficiency. And it went further—it set its artificial mandate in the path of the natural law of supply and demand. And then it was discovered that, while the Government's will was an immovable body, the law of supply and demand was by no means an irresistible force. In that collision the law of supply and demand went to smash. The Government successfully kept prices down, although supply was inadequate and demand virtually unlimited.

No act of the War Government was more necessary, yet more daring, than its manipulation of prices. It is always dangerous to fool with a natural law, as the Australian farmers discovered some years after they had imported the ancestral pairs of rabbits. The trouble with interfering with natural law is that you can never foresee the entire train of consequences. Fix the price of wheat, and you may gain the immediate end of an increased crop of it, only to find that the acreage of sugar beets has been sacrificed, giving you another problem to handle as puzzling as that of the shortage in flour. Increase the beet acreage by a fixed price, and you may find the corn crop diminished, with a consequent sacrifice of hogs. And so it goes throughout the industrial organization of the country. The Government went into price fixing with its eyes open, well aware that the price-fixing organizations must be flexible, able to change rules and policies on the instant, in order to deal with the complications as they arose.

And yet no war act was more necessary. A short peanut crop makes high peanut prices. Translate the peanut shortage into a shortage of steel, copper, wool, transportation, labor, fuel,

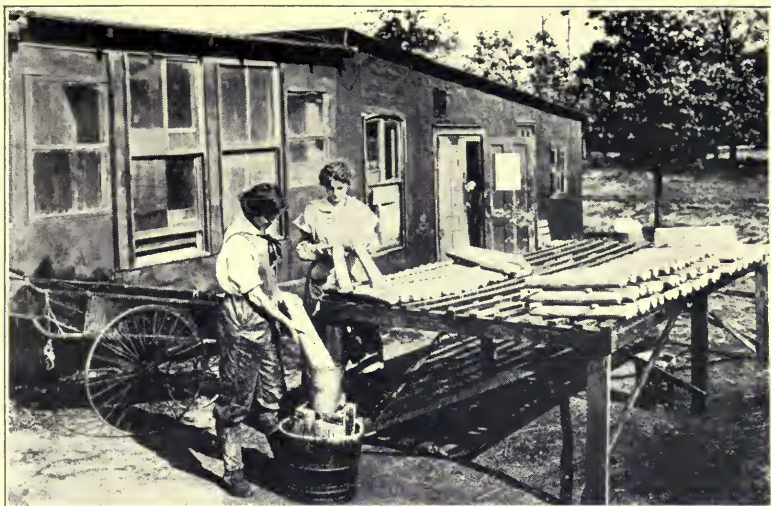


Photo from Pain's U. S. Government Signal Factory

WATERPROOFING TRENCH SIGNAL ROCKETS



Photo by Signal Corps

AN ARMY UNIFORM FACTORY



Photo from Harrisburg Pipe & Pipe Bending Company

TEN THOUSAND FINISHED CYLINDERS FOR
MANY WAR USES

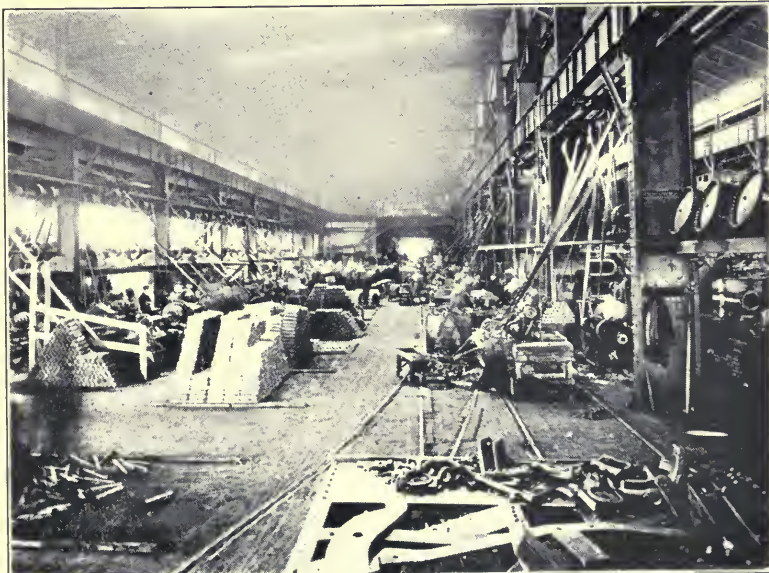


Photo from Canadian Allis-Chalmers, Ltd.

MANUFACTURING SHELL FOR THE 75'S

guns, shoes, clothing, barbed wire—in fact, a shortage in everything; introduce into the situation a hydra-headed monster called war, its insatiable mouths consuming and destroying wealth at four or five times the normal rate of civilian consumption; and add the complication that everything demanded is needed not next year or next week, but to-day; and straightway you hear from industry a refrain of this sort: "Demand is great and supplies short. We must charge more for this order than the last, and the next will be more yet." Had such a system continued without control, prices would have reached fantastic heights, depreciating the currency and bequeathing to the future a legacy of debt that might have been intolerable, even to so rich and populous a country as America.

Nor could industry itself keep down its own prices by voluntary act. Patriotism had nothing to do with it. The Government is an impersonality, huge, remote. No matter how much each producer individually might wish to contribute to the success of America in the war, he was helpless before the onward sweep of the economic law. His cost prices rose, and he charged more—he charged what the trade charged; and sentiment cut no figure in the situation. The Allied buying in this country had skyrocketed many prices, but our own participation in the war seemed likely to make the former price records seem tame and low indeed.

Hence the creation of the Price Fixing Committee of the War Industries Board. It was, and was not, a part of the Board. At no time during their existence was either Board or Committee quite certain in just what relation one stood to the other. Not wholly independent of the War Industries Board, the Price Fixing Committee could hardly be called subsidiary to it, because the President, and not the Board, named the members of the Committee, which thus considered itself responsible to the President, and not to the Board. It was the President, and not the Board, who approved the prices fixed and made them official. The chairman of the War Industries Board, who had had a hand in the creation of the Price Fixing

Committee, believed that this was a wiser course than allowing the War Industries Board to fix prices. The authority of the War Industries Board was vested in its chairman alone: the authority of the Price Fixing Committee rested in the Committee as a body. The Price Fixing Committee came into being largely because Mr. Baruch saw the need for it and fought for the creation of an agency to fill the need. Price announcements went forth as from the "Price Fixing Committee of the War Industries Board"; and Mr. Brookings, its chairman, functioned in close communion with the Board. The arrangement was anomalous; yet it worked out.

Perhaps no single factor contributed more to the successful labors of the Price Fixing Committee than the interrogative mind which its chairman possessed. Mr. Robert S. Brookings, capitalist and philanthropist of St. Louis, was a human question mark. His friends averred that he could ask more questions in a given space of time, and think up more angles of a subject about which to frame inquiries, than any other living man. When it came to the absorption of facts, Mr. Brookings was a human sponge. And it was just this quality which made him so valuable to an organization which had to meddle with a hundred and one industries and make determinations which gravely affected them. The investigations of the accountants, statisticians, and other employees of the Price Fixing Committee Mr. Brookings supplemented with his own rapid-fire of questions and with personal research which gave him great insight into the affairs under discussion.

Of course, they damned him up hill and down dale, did the executives of big business—for one reason, because they found him constitutionally unable to let someone else make up his mind for him. Yet the greatest of the testimonials to the work he did came from these same business executives, who, after the arguments and discussion and question-answering were all over, turned to and carried out the mandates of the Price Fixing Committee faithfully and even with enthusiasm.

At one time before the war Brookings was interested in a plan to erect in his native city one of the finest hospitals of

its kind in the world. His architect and his expert on the arrangement of hospitals came to a clash on a question of building design. There was no composing the difficulty: each man was entirely sure he was right.

"We'll adjourn the matter for three months," decided Mr. Brookings. "We'll let it alone for a while."

Whereupon Mr. Brookings himself took up the question for study. He got books on architecture and read them. He traveled about and visited the hospitals of many cities. He asked questions of builders and architects, of doctors, nurses, and hospital superintendents. At the end of three months he knew more about hospitals, from the standpoint of the question at issue, than did either his architect or his hospital expert. He settled the difficulty by deciding that both were wrong, and then went ahead with what turned out to be a model building of its kind.

It was this same thirst for information, this same determination to know what he was doing before he did it, that made Mr. Brookings go into minute details in his work on the Price Fixing Committee. He loaded his office with exhibits and samples and examples—it became a veritable museum of war supplies. His detractors called him fussy; but the same fussiness which was satisfied with nothing less than all the information there was to be had, put behind the mandates of the Price Fixing Committee an authority which they might not otherwise have achieved.

Of all the affairs of the War Industries Board, nothing transcended price fixing in importance. The Board itself laid down the policy upon which the Price Fixing Committee acted. Two courses were possible—two extreme courses—with middle ground between. First, low prices as a policy. Low prices kept down war profits and conserved governmental expenditures. On the other hand low prices were discouraging to war industry, and the Government wished to avoid such discouragement. At the other extreme were prices fixed high, high enough to permit large and even swollen profits. Such prices stimulated production, which was precisely what the War Industries

Board wished to do. And if the Government paid much for its supplies, it also recovered much of what it paid by means of the income tax and the excess profits tax.

The War Industries Board did not hesitate: to it there seemed to be only one answer to the question. Industry had to be considered first—we could not win the war by following any pinch-penny policy. Prices should be fixed primarily to secure maximum production at the mills, and that could come about only by allowing reasonable profits. If such prices allowed the more efficient producers to make large profits, their profits would be largely taxed away from them anyhow. To fix low prices might save money; but it would probably cut down production, and it might lose the war.

There was a fundamental difference between the price-fixing activities of the Price Fixing Committee and those of other great control agencies, such as the Food Administration and Fuel Administration. The latter derived their authority from congressional enactments, and they took the initiative in fixing prices. The Price Fixing Committee had no such authority from Congress, save as it obtained it through the broad war powers granted to the President. Moreover, the Price Fixing Committee fixed prices only when the agencies of the Government requested it, or, in rarer instances, when the Government was using so much of any commodity that it became obviously necessary to control the price.

Digging into the affairs of the War Industries Board, one discovers a continual cropping out of the curious fact that democratic America submitted uncomplainingly to an autocratic control of about everything save its right to breathe. But this autocratic control, under the decentralizing policy of Mr. Baruch, reposed in various hands. Baruch had a high example of the policy of decentralization in the person of the President, who had delegated many of his vast powers to administrators—Hoover in the Food Administration, Garfield in the Fuel Administration, McAdoo in the Railroad Administration, and Baruch himself in control of war industry. Mr. Baruch decentralized his power throughout his Board, and

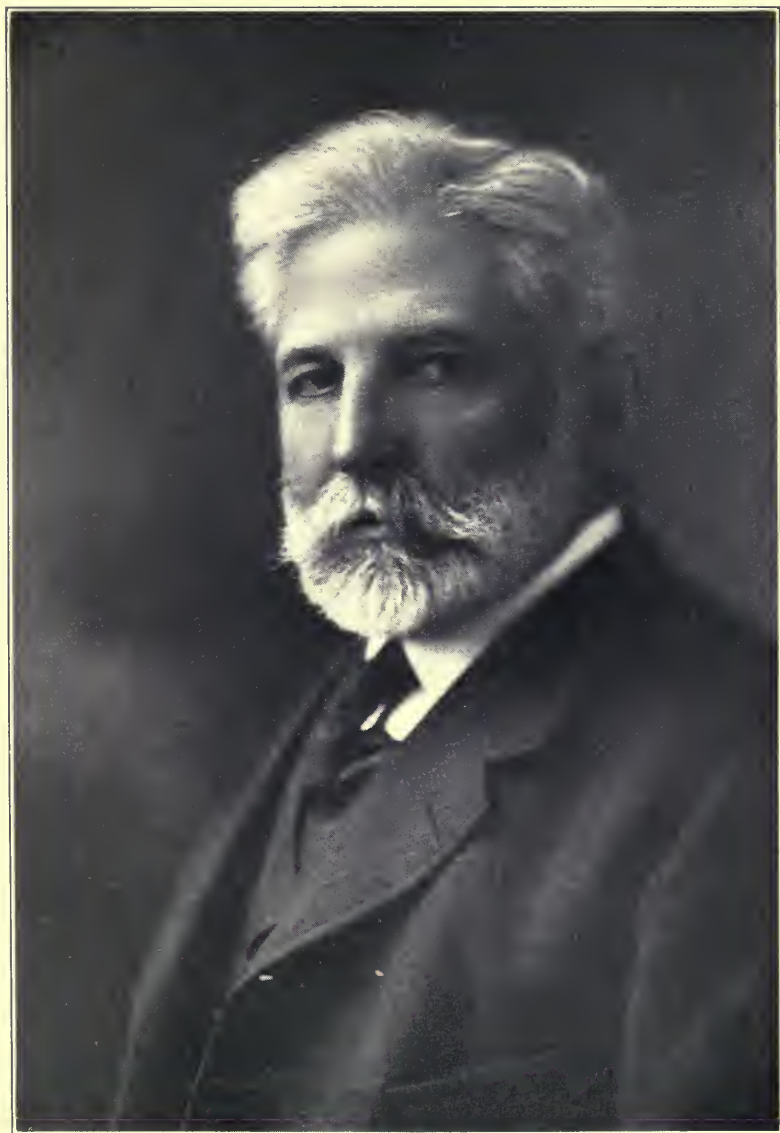


Photo by Kajiwara

ROBERT S. BROOKINGS

handed over his authority to men whom he first chose with care, then instructed with minute detail, and finally turned loose with a figurative slap on the shoulder and a "Now go at it!" If one asked him, "What authority have I?" he answered: "All that is necessary. The President has it from Congress; he gave it to me; I give it to you. I back you in everything you do. Don't bother me with details—do the job!" And they did it.

Mr. Brookings, too, possessed such authority. The President had wisely made it plain to the country that he personally was interested in, and directly concerned with, the labors of the Price Fixing Committee; and that when an authority never before seen in Government stepped into an industry and said, "You will sell your product for so and so much, neither more nor less," the President had known of this mandate and had approved it beforehand. The President felt confident in giving his approval, because all governmental agencies interested in a fixed price had had a hand in fixing it—an important fact. Of course, President Wilson did not review or pass upon every activity of the Price Fixing Committee. He did, however, personally receive all their reports; and he advised with them in difficult decisions. Probably as much because of this as for any other reason, the Price Fixing Committee met little if any opposition, and had to show its teeth but seldom.

Yet it possessed teeth. It could smile and still reveal the grim threat to commandeer, the mere possibility of drastic action being amply sufficient to bring any recalcitrant into line. And besides, behind the Committee was always the chairman of the War Industries Board, possessing unplumbed powers and ready to use them fearlessly. On one or two occasions, when manufacturers were obdurate, he did use them; but generally the smile without the threat was sufficient. The Committee placed far more reliance upon a policy of coöperation than upon compulsion.

Note that, although the Price Fixing Committee fixed prices, it did not execute its decisions. The administration of fixed prices was in the hands of the fifty-seven commodity sections

of the War Industries Board. Later on we shall tell something about the more important of the great war commodity sections.

To show how prices were fixed, let us take steel as an instance. In 1917 steel plates were selling for sixteen cents a pound. The United States as a government needed every pound of steel the country could make. Literally, it could spare none for the general public; and it is history that no rails, no bridges, no buildings, nor anything else that took steel, were made for civilian consumption during the war except by permission of the Government—and also except products which could be made from steel of grades not needed by the vital ships and guns and shell. Therefore, since the Government expected to consume practically the entire national output of steel, for it to pay a great profit to the steel makers was a great hurt to the United States.

The Federal Trade Commission made an investigation and declared that three and a quarter cents a pound was enough for steel, this price including a fair profit. Three and a quarter cents—or sixteen cents? Which?

The Price Fixing Committee did not adopt the lower price summarily and say: "Thus shall you do!" It consulted the trade. It called the steel men to Washington and laid the matter before them. "We know you can sell for three and a quarter cents. We want all the steel you have. We need all the money we have for other things. Three and a quarter cents will let you live and function. It will not make you a fortune; but if we don't win this war, your fortunes will be worthless, anyhow. We haven't any intention of quoting any law to you—we are not commanding, but offering you an opportunity. The Government asks you, gentlemen, to give us your steel at this one price. Will you do it?" Of course, they did; and not with the feeling that they were victims of coercion.

This, generally, was the way price fixing proceeded. Dr. F. W. Taussig, the economist, who was a member of the Price Fixing Committee, said of its labors: "The prices fixed were in all cases reached by agreement with representatives of the several industries. In strictness, they were agreed prices rather

than fixed prices. The agreements were usually reached in cordial coöperation with the producers concerned, and thus were in reality voluntary. There were cases, however, in which they were agreements only in name. The representatives of some industries, though they accepted them, did so virtually under duress. In these cases the Committee to all intents and purposes decreed prices and was enabled to impose them under the form of agreement, by a more or less veiled threat of commandeering and also by the certainty that public opinion would condemn those who failed to accede."

When Uncle Sam sets up commissions and other bodies to administer parts of his business, they are often unwieldy with *personnel* and slow to move through the sheer inertia of their great size. But this particular agency of control, the Price Fixing Committee, which handled the very roots of American industry, was a small and compact body. Its rôle was that of a watchdog for the Government. It labored only when asked to labor by other parts of the governmental machinery; and first and last it was an engine designed to protect the purchasing power of the United States from being exploited by the law of supply and demand. The Price Fixing Committee included representatives of the Army and Navy, who kept it informed of their contemplated purchases and their price problems. Its membership included also representatives of the War Industries Board, who were personally familiar with the available raw materials in various industries and with the supply of labor. It included a representative of the Fuel Administration, which body could control the supply of fuel for manufacturers; and also representatives of the Tariff Commission and Federal Trade Commission sat with it, to supply technical data showing how contemplated prices might affect production. Toward the end of the war a representative of the agricultural interests was added to the Committee. The Price Fixing Committee was thus more truly representative of Government and industry than any of the other civilian control agencies, because of the wide diversity of activities repre-

sented in it. The purchasing public and the retail and wholesale trade never had direct representation in the Committee.

Besides the determination of policy there were a hundred and one details to consider in relation to the fixing of prices: activities which differentiated the labors of the price fixers from those of any other controlling body in the War Government, even though some of the others had much to do with prices. It was an early and a wise decision that American industry controlled should be a one-price institution—that the Government would not fix one price for itself, another for the Allies, and still a third for the general public. True, the purchasing public could not buy at the fixed price merely because the price was fixed. Telling John Smith, who made safety razors, that fine steel could be bought for three and a quarter cents a pound, didn't get John any steel. At this point the control of priority stepped in and said: "Mr. Smith, we realize that it is necessary for the general public to be shaved, because America is a dapper nation and doesn't want to look like a tramp. But as between being shaved with old blades re-sharpened and with new ones in comfort, there is a little matter of a war going on, and it must be the deciding factor. First access to the steel goes to the Army and Navy. Then come the railroads and the shipbuilders, and after them a lot of other caterers to strictly war needs; and by-and-by you come in. However, if you are ever allowed to have any steel for the purpose of making a luxury, you can have it at the same price we pay for it." All of which was hard on the razor manufacturer and the faces of the to-be-shaved, but it was good sense.

It would have been folly not to allow the purchases of the Allies to be made at the same price we paid. We were lending most if not all of the money with which the Allies paid their bills here. Not to have given them every advantage we possessed in our own markets would simply have meant lending them more money, raising that money with more bonds and taxes, and going through all the complication of getting the swollen profits back again through the machinery of income and excess profits taxes.



Photo from Whitaker-Glessner Company

**FORGINGS FOR 155-MILLIMETER SHELL SPACED
OUT FOR COOLING**

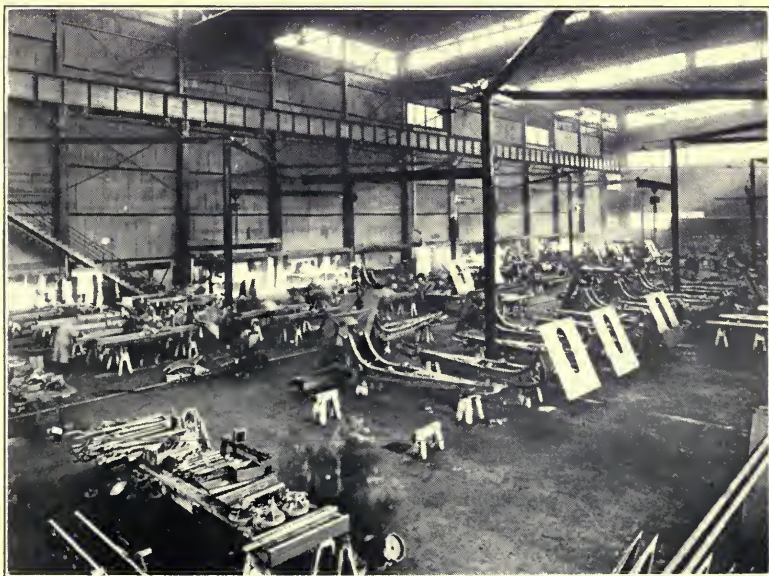


Photo from Osgood-Bradley Car Company

MAKING 155-MILLIMETER HOWITZER CARRIAGES

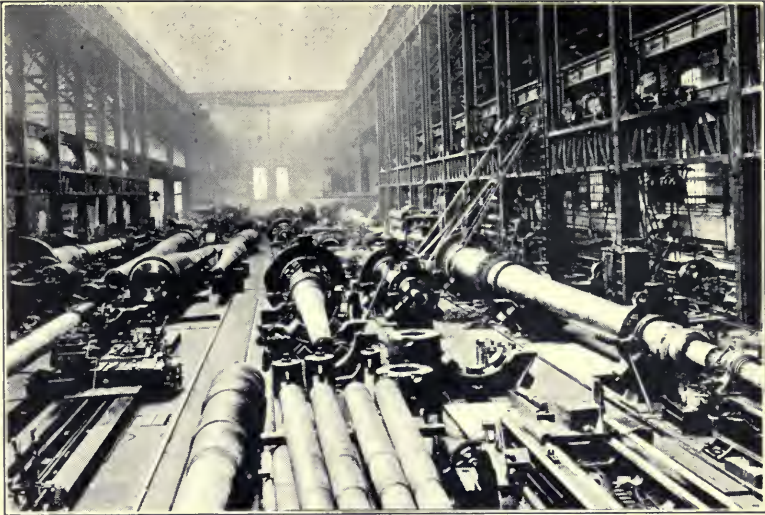


Photo from Bethlehem Steel Company

RIFLING 12-INCH AND 14-INCH GUNS

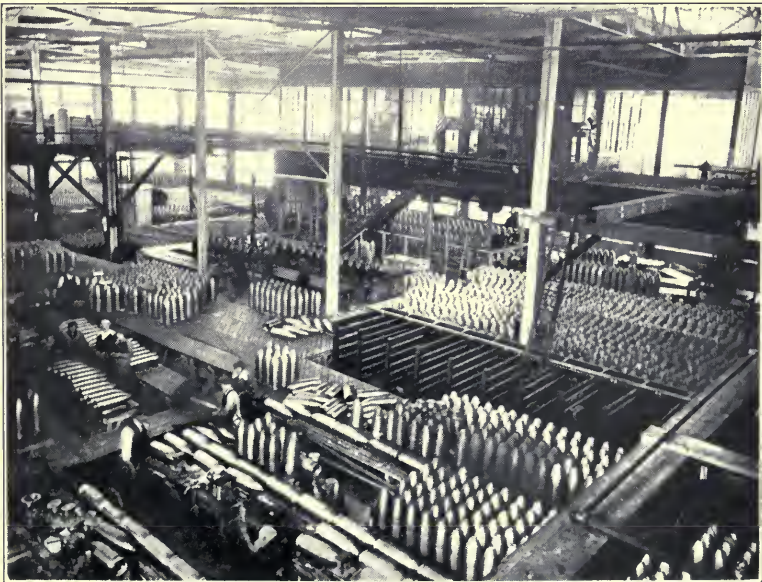


Photo from Maritime Manufacturing Corporation, St. John, N. B.

AMERICAN ARMY SHELL MADE IN CANADA

Prices, when fixed, were maximum prices. If anything was sold for less than the maximum price, that was an affair between buyer and seller, and sometimes a result of individual desire to keep prices down and thus help win the war. More than one manufacturer of a fixed-price commodity said, "I can't take all that money"; and an impersonal and therefore ingrate Government accepted the amendment and took the goods at the lower price. The rule, however, was that the maximum price was accepted without question by buying Government and selling individual.

The Committee arrived at the maximum price to be fixed through investigation, conference, and careful consideration of the needs of the moment. To say that the Committee indulged itself in an opportunist policy might be unjust, but it certainly did temper the wind to the shorn lamb, and it changed its opinions and ideas as rapidly as the situation changed. And situations were always changing. Mr. Brookings was far too alert and vigorous-minded to get himself into a rut; and if the procedure which fixed prices for one thing was not applicable to another, or if the principles which underlay one decision did not apply well to the next, he formulated a new set of principles and proceeded on a new course, with a placid disregard of his own precedents. This had to be, if price fixing was to succeed. A rigid, ossified system might have been disastrous.

The underlying theory was to fix a price which would secure a maximum output of supplies for the war machine. To that level prices were kept down in order to save money and prevent extortion. American industry, however, is made up of all sorts of producers with all sorts of plants, and of all sorts of organizations of all varieties of efficiency. Consequently, any fixed price was bound to work some injustice somewhere. The high-cost producer was likely to suffer, and he might even be forced out of business altogether. The low-cost producer, on the other hand, the efficient producer whose costs were under the average in his industry, was likely to make so much money that he would think it a shame to take it. The in-between man,

the average in efficiency, would make merely a legitimate profit. This was a condition which had to be faced, and it was faced. The Government had to be considerate of the less efficient in order to keep all capacity in operation. And since American industry is full of efficient concerns, the Government's fixed prices developed roaring business in almost all industries. The war millionaires resulting from this policy gave up through excess profits taxes much of what they took in.

Having fixed a price for a commodity, the Price Fixing Committee's labors pertaining to that commodity ended. Here was one of the great differences between it and other price-controlling members of the Government. When the Fuel Administration fixed a price for coal, it also administered the application of that price—bossed the job, saw to it that the industry did as it was told. The Railroad Administration would have been unable to function if it had not possessed the power to administer its own prices for transportation. The Food Administration would have been ineffective if it had merely declared a price and then left it to voluntary act or federal police power to enforce its ukase.

The Price Fixing Committee did not need to be an administrative agency. The War Industries Board, with which it was affiliated, possessed the necessary administrators of fixed prices in its commodity sections. Each of these sections dealt with some specific thing or group of things, and each was made up of men who thoroughly understood their specialties. For the Committee to have administered its fixed prices would have been duplicating work of the commodity sections. It was Mr. Baruch's idea to have as little duplication of effort in the War Industries Board as possible. Baruch, a business man, seeing a Government run with a hundred duplications of effort of all kinds, naturally reacted from so wasteful a plan in his own organization. And he knew, too, as did Mr. Brookings, the extraordinary value of minutes in the great campaign America was making to turn itself from a peaceful nation of business, industry, and agriculture into a hundred million units thinking, breathing, working, and striving only for war.

What we were to do had to be done speedily. The Government was not advertising the desperateness of the situation in early 1918, but the extremity was patent to all who read. The Allies were merely holding until we could get in and win. The recital of our preparations for 1919 and 1920 is convincing evidence that the hope of the world was in us. Every day counted. Every day increased the destruction and prolonged the danger. Speed was the first consideration in all our governmental activities. The Price Fixing Committee, like the life guard who plunges in after a drowning man, had to work fast, or else it might as well never have worked at all. Hence its prices were turned over to those expert and efficient agencies, the commodity sections, for their administration.

But why all this elaborate machinery? Why, if the need was so sore, did not the United States seize everything it had to have, commandeer all the mines, oil wells, plants and corporations, fix low prices and low wages, and compel us all to do what was necessary to win the war? Price fixing and the control of industry constituted the alternative to just that. To have seized, czared it over industry, applied government ownership and operation everywhere, would indeed have produced the results; but along with such a course would have gone the destruction of those institutions and principles of government which America most jealously guards. The Government held no commission from the people to destroy the institutions of America, even temporarily, or even for so necessary a thing as victory in the war; and moreover it is doubtful, if the Government had engaged in a policy of seizure, whether the prewar conditions could ever have been restored. Price fixing and the control of industry accomplished the same end, but left the life of the nation to function normally when peace came. The industries which give America its character are still alive and going; yet the demands of the war were met, and the Government was saved from the embarrassments resulting from the operation of a runaway law of supply and demand.

CHAPTER VI

ALLIED PURCHASES, CLEARANCES, AND LABOR

SHORTLY after the fire broke out in Europe, we discovered that a conflagration in a neighbor's house might not be an unprofitable affair for us, especially when, in the endeavor to put out the fire, every one concerned was busily engaged in feeding the flames. As there was not half enough material for good firewood in all Europe, all Europe naturally turned to the great supply house which is the United States and commenced buying, buying, buying.

Theoretically, during our period of neutrality we sold to the Central Powers and to the British-French-Italian combination equally and without prejudice: practically, we sold little to Germany and her allies, because of the difficulty, not to say the impossibility, of delivering what we sold, or even of putting it where Germany could come and get it. If the submarine made Allied transport precarious, it by no means cleared the seas of Allied shipping; whereas the Allied navies, and the British Navy in particular, soon expunged German surface ships from the face of the salt waters. Germany did, indeed, try the experiment of sending a submarine freighter to America, one such trip being made successfully; and the *Deutschland* returned safely to Germany with a valuable cargo of nickel, rubber, and other essentials. The probabilities are that Germany tried this experiment for political rather than for commercial reasons. At any rate, the second trip of the *Deutschland* ended in disaster.

Thus, even before we entered the war, practically all our war business was with powers with which we were eventually to become associated as co-belligerents. At the outset the several Allies, like our own war bureaus when we entered the



Photo from Bethlehem Steel Company

FOURTEEN-INCH GUN LOADED FOR SHIPMENT



Photo from Bethlehem Steel Company

MANUFACTURING 3.3-INCH GUNS

struggle later on, bid against each other for the American supplies; and our shell makers, powder makers, automobile makers, and railroad-equipment makers, not to mention gun manufacturers and clothing and provision houses, began to enjoy unexampled prosperity. The "war baby," as the suddenly prosperous munitions corporation was called, jumped in value faster than the stock ticker could print the quotations of the prices paid for its securities. Europe was then rich in money, but mighty poor in time and war materials. Price was not an object: speed was. Many a man with a few thousand dollars went into the stock market in the morning and brought out a competence at night. The runaway stock market was but a reflection of runaway conditions in industry. It was a situation too uncontrolled to endure; and the purchasing powers speedily saw that, by such competition among themselves, nothing was served except the bank accounts of a few Americans.

Then we came into the war and were no longer a commercial neighbor industriously feathering our own nest from the needs of those fighting just beyond our front yard. We were one of the combatants, a partner; and we now needed for ourselves everything that we had been making for the Allies. We might then have said to England, France, and Italy: "Here, you can't buy those shell and that powder and this trainload of rubber tires which you have contracted for. If we are going to come over and fight, we need it ourselves." That might have been good politics, if it had enabled the Government to make a strong showing with the production of supplies for the Army at the outset; but it would have been poor strategy. We had agreed commercially, if not governmentally (our Government, remember, was strictly neutral up to the date of declaring war), to help the Allies. To have withdrawn that help because of our own needs would simply have armed untrained Americans by withholding arms from trained English, French, Italian, and Belgian soldiers. We had to supply ourselves and at the same time keep on supplying Europe—there was no other sane course to follow.

There were hot-heads who demanded an immediate embargo upon the outgo of everything that we needed for war. The disinterestedness of such advice was questionable. The United States is the most self-sufficient industrially of all nations; but there are several important commodities that we do not grow or mine or otherwise produce. And some of the most important materials of modern warfare, such as battle airplanes and nose-fuse shell and certain kinds of artillery, we did not even know how to make. We faced a period of industrial schooling before we could begin to produce them at all. Yet these materials our Army had to have. Consequently, even if the unwise policy of cutting off the Allies to supply ourselves had been seriously contemplated, the principle of reciprocity—of you scratch my back, and I'll scratch yours—would have prevented the adoption of it.

It was soon seen that (1) the influx of buying orders from abroad must not be discouraged because we had entered the war, that (2) we could not afford to become competitors of the Allies and allow price considerations to be the determining factor in the question of whether they bought the supplies or we bought them, and that (3) we had to reach some agreement as to what materials we could do without in order that they might be supplied, and also as to what we did not mean to make for ourselves at first because the Allies could themselves supply us.

It is doubtful if anyone abroad realized what America could do in the war. Certainly we ourselves did not know until we tried. The early conferences between the highly accredited representatives of France and England, which countries at once sent us their best men to offer advice and to correlate our war activities with theirs, gave our officials their first breath-taking glimpse of what a fully developed war industrial program in America might be. We had no such program outlined then—the Administration waited until we were actually at war before laying its plans for a war program. Even these early conferences developed no balanced and thought-out program, but they did lay the foundation on

which the eventual American program rested. For one thing they brought a mutual understanding as to what the Allies should buy here and what we should buy abroad. Thereupon the Allies ceased to be competitors of ours in the domestic markets. No longer did they even decide what and where they should buy; rather they became partners and sharers with us in the main enterprise of turning American resources into supplies of war. Prices were no longer an important factor in determining who secured the supplies, because we adopted at once the policy of charging the Allies no more and no less than we charged ourselves for the same commodities.

To take care of the needs of the Allies under this arrangement and to determine the relative importance of their demands, there had to be a central governmental agency in Washington. This agency was known as the Purchasing Commission for the Allies. It began its work on August 27, 1917, and it then consisted of Messrs. Baruch, Lovett, and Brookings. The work of this Commission was essentially similar to the work which the War Industries Board later undertook to perform for all of the Government's consuming agencies; and consequently the President, in his letter chartering the War Industries Board, included among its functions the supervision of purchases for the Allies. From March 4, 1918, the work of the Commission came under the authority of the chairman of the Board; and Mr. Alexander Legge, the vice chairman of the War Industries Board, was made "business manager" for the Commission, a position which he held for only a short interval, until the press of other duties compelled him to give it up. Mr. James A. Carr took his place.

The name of the Purchasing Commission was not exactly descriptive of the body, because the Purchasing Commission made no actual purchases. Indeed, it should be emphasized here that no part of the War Industries Board, at any period of its history, ever entered into contracts or ever spent money, in the sense that it became a buyer to whom delivery was made and from whom payment was expected. The War Industries Board was a controlling and all-powerful directing body,

which planned and decided and was obeyed, but which no more made contracts, no more accepted deliveries or made payments for war supplies, than did President Wilson himself, from whose authority the Board sprang. In like manner the Purchasing Commission for the Allies neither prepared nor signed contracts, nor did it supervise their execution or determine technical details or inspect materials or products. These things were the business of the buyers, the agents of the Allies. The business of the Commission was to see that the Allies bought what they had to have and not more, that they received the same treatment as to price and delivery that we did, and that the various belligerents did not buy outside the authority of the Commission.

It is not to be supposed that in creating the Purchasing Commission we were in any way doing a favor to the Allies, or that the function which the Commission performed was not a vitally necessary part of our own war machinery. It was highly important that we know what the Allies wanted to buy in order to adjust our own demands. Once we knew the total demand upon industry and had estimated the total facilities of supply, then, when the Allies approached us with some project in conflict with ours, we could allocate the supply—we could say, “Yes, there is enough; you and we can both have what we want”; or else, “No, there is not enough; you and we must both curtail our projects and reconcile them.” The Allies, for instance, asked for many more Liberty engines than they actually received. Had they been business competitors of the American Government, they might have secured many more than they did—at the expense of our own air program. The Commission knew definitely how many engines could be delivered within certain specified dates and rationed the engines to the Allies.

The mechanism of the Purchasing Commission was simple enough. It held its meetings frequently, often daily. At these sessions the representatives of the Allied Governments met with heads of commodity sections of the War Industries Board, and with representatives of the priorities organization, the



Photo by Gessford

ROBERT S. LOVETT

Treasury, and the War Trade Board. The business manager of the Commission presided. The meetings took up what we both needed and what we could both have.

During one year Belgium bought through the Commission goods worth upwards of \$13,000,000; Great Britain, in round numbers, \$414,000,000; France, \$352,000,000; Italy, \$143,000,000; and Russia, \$19,000,000—a total of almost a billion dollars. This sum represents only the controlled buying for one year. Count in the existing contracts made by the Allies before the creation of the Commission, and also the contracts made by the Allied Governments directly with the United States Government itself, and the total amount of Allied purchasing in the United States would be seen to have been substantially greater. At the time of the organization of the Purchasing Commission each Allied Government held contracts in the United States for a large amount of materials; and also many large Allied contracts existed with governmental bureaus for such things as explosives and chemicals. The bureaus included these purchases within their own requisitions, so that no specific knowledge of them came to the War Industries Board.

Imagine what dumping a billion dollars of demand would have done to an uncontrolled war market! The Commission, besides seeing to it that this vast influx of money did nothing to prices, saved in many related ways. The Allies secured the benefit of the American controlled prices, and we the benefit of not having to lend the Allies excess sums with which to pay inflated bills. Moreover, the Commission put the Allies in touch with original sources of supply; and the middleman and the jobber and agent were left (where they belong in war) on the outside.

The extreme need of supplying the Allies as well as ourselves with the impedimenta of war may not be evident at first glance. We Americans are so accustomed to buying of ourselves and so little used to seeing "Made in U. S. A." upon anything we buy—because practically everything we buy is

so made—that we have, as a people, little comprehension of the delicate balance of trade against trade that exists abroad. England, of course, imports much more food than she grows. She exports coal and finished products; but to keep her industries going she must import cotton, wool, and iron. France has certain resources of coal and iron, but not enough. Her skill in making many things keeps her exports constantly flowing. We import largely, it is true; but, with a few vital exceptions, we do not have to import to live. An enemy could blockade us in, and the normal processes of domestic trade and industry could go on indefinitely.

When the war came to Europe it took from her industries her best workmen. The war took some of ours, too; but our 4,000,000 soldiers from 110,000,000 people were few when compared to the proportion of men taken from the industries of France and England. With industries dependent upon diminished imports and further weakened by the loss of workmen, they had to have what we made, or go under. Germany would have gone down long before she did, had she not been laying up war supplies for forty years. Her foresight had extended to such policies as a governmental encouragement of the use of copper in roofs and cooking utensils by the German people, in order that Germany, in the day of need, might have an adequate supply of that vital war metal.

And so we listened to the war demands of the Allies, and we heard not a polite request, but a cry of despair, that held for us the same sinister implication that it did for England and Belgium and France. We heard the cry and heeded it. To heed it we had to increase our production, conserve our materials, curtail their nonessential use, substitute the plentiful material for the scarce, and regulate imports and exports.

The War Industries Board was considered by some to lack an essential power in that it held no direct control over exports and imports. But it no more required that power than it did authority to command troops, or to control railroad operation, or the ability to dictate the number of sugar lumps on a hotel table. These and other necessary powers all resided in the

Government, and they were all interlocked. In April, May, and June, 1918, much new governmental machinery was created and taken over by some of the best brains in this country. These new officials were business men, men to whom the red tape of bureaucracy and the jealousy of small minds regarding precedent and official encroachments were alien in thought and unknown in practice. These men readily brought about coördination of the war powers.

The War Trade Board, through the Espionage Act and the Trading with the Enemy Act, had absolute power to license and do what it would with imports and exports. The Shipping Board procured and operated the ocean tonnage. For several months it managed it, too; but in 1918 a new organization, known as the Shipping Control Committee, took charge of our merchant marine. Ships thereafter sailed or stayed in port at the behest of the Shipping Control Committee.

From these and other official agencies of control, whatever coöperation the War Industries Board needed it readily secured. It did not desire and could not have exercised the great powers of its sister organizations; but when for its own ends it did need the exercise of one or another of these collateral war powers, it had no trouble in obtaining it. The heads of the emergency war agencies worked in close coöperation.

Much is said in this book about control. We controlled this and controlled that—we managed business and industry and civilian life in many of its contacts. It was control in the sense that the power was there, but the power was seldom needed. The real factor of control was the volunteer spirit among those whom the control touched. The acts of the war agencies also had behind them a wholesome fear of public opinion on the part of those who might otherwise have resisted.

One recalcitrant lumber-mill owner sat unmoved through the deliberations of a committee of the War Industries Board. When the meeting was over he announced himself as follows: "I am a free American citizen and my mill is my own. I won't make your product for you at any such price. I am in

business to make money; and if you people are going to run a war, you are going to pay me for my share in it—I didn't ask to go into the war. I'll shut up the shop and lock the doors before I will submit to your dictation. . . ."

"Oh, no, you won't," he was told. "Think it over—what it would mean for you. Suppose we have to take over your plant. Everybody would know about it. Your home-town newspapers would print the story. All your workmen would know why they were working for the Government instead of for you. The fathers of all the boys who have gone to France from your town would have it in for you. The people in your church might not want you in the building, and maybe you couldn't find any merchants willing to sell you any food or clothing. You would become a pariah in your own community. You may not want to do this thing, and we can't seem to move you to see that it has to be done; but we won't have to appeal to anything except public opinion in your town to see that it is done." And the man had to give in. He might have stood up against a government institution, but he could not withstand the power of public opinion.

The War Industries Board was an evolution, rather than a creation; hence it is not strange to find that certain of its branches were found not to be well adapted to the functions they were supposed to perform. Certain branches were cut off when they seemed to be of no more use. The Board was constructed by human beings, and therefore it sometimes made mistakes. It tried, however, to profit by its errors and to build the more strongly from the wreckage of mistaken building. It is not possible here to tell the whole story of what the War Industries Board did. We can but take up its chief activities and touch lightly upon a few of its more obscure miscellaneous enterprises. No account of its work, however, would be adequate, if it did not mention the subject of "clearance."

Clearance in war industry was a war tool invented to fill a certain need. Industrial clearances were administered at first by a Clearance Committee, which failed to function well. The underlying idea, however, was too valuable to drop; and to



Photo from Kissel Motor Car Company

CHASSIS OF ORDNANCE TRUCKS



Photo from Winslow Brothers Company

WOMEN MUNITIONS WORKERS QUENCHING SHELL FORGINGS AFTER HEAT TREATMENT

the end the Board kept the control of clearances as a factor in war production, although the form of its administration changed.

Offhand it may be a bit difficult to distinguish clearance from priority; but there was a difference, as we shall see. To understand it, consider, in the first place, how imperfect was the information on which we were to base an intelligent war program. We did not know what we had or what we needed or where we were going to get anything. Our first problem was to determine what we had to produce. We did not know what we could ship, because of the uncertainties of the tonnage situation. We knew neither how big an Army we were going to raise nor what that Army would consume after we had raised it. Our military authorities had never contemplated consumption in terms of millions of men. Moreover, our military leaders in France were constantly changing the standards of army requirements.

We had an Army, a Navy, an Emergency Fleet Corporation, and an Allied Purchasing Commission, not to speak of the Red Cross, all of them prodigious demanders of the products of industry. Nor were they simply four or five individual consumers—the problem would have been easier if they had been. The trouble was that the Army bought through five, and later through eight, separate purchasing agencies, all trying to buy essentially the same things at the same time, and each bidding furiously against the others. Each one, moreover, was working on its own program; each had its own conception of how much of anything to buy; and the confusion in industry became indescribable. Sources of supply were overloaded, deliveries postponed to the remote future, the more important and accessible manufacturing districts congested with work, and any coherent supply plan was rendered impossible.

The Munitions Board in the first place promptly saw that this wouldn't do. It formed the Clearance Committee, which in turn prepared a clearance list of articles and materials the supplies of which were short. Thereafter, any bureau which wanted to buy any of the short supplies had to get clearance

from the Committee before the order could be placed. The committee quarters became a meeting ground for the purchasing officers of all the big buying agencies. But this was only a temporary expedient, and it was ineffective, because the representative of one purchasing department, himself perhaps placing thousands of orders, could not keep track of competing orders merely by memory after he heard them read from the list. The War Industries Board reorganized the Committee in May, 1918; and thereafter, since the Committee then functioned only with reference to immediate orders, as distinguished from future requirements, the manipulation of clearances worked better. Two months later, however, in July, the whole system was jettisoned. The Committee was unwieldy. Every section of the War Industries Board had representation on the Committee, and there had now come to be many sections in the Board. Moreover, the commodity sections were now getting into their stride, and each found that it could control clearances of orders in its own particular field without the aid of the Committee.

So the Clearance Committee gave way to a Clearance Office, and the difficulties were ironed out. The Clearance Office undertook to tell each and every purchasing agency what all the others were trying to buy, to collect all purchasing plans, and to pool them. When a requirement had ripened to a full-grown order, it would be placed, not with a manufacturer, but with the Clearance Office. The Clearance Office alone knew if the order could be filled; and if it could, it was referred to the proper commodity section. The commodity section might receive notice of a dozen similar prospective purchases from a dozen agencies, and the result was a sheet of paper holding the total current need for any particular supply. Knowing this need, the section could lay plans to make the available supply of most use to the Government. The system also made it possible to distribute the several orders throughout the country and not congest them all in one or two districts; and generally it "made ready the field of supply against the invasion of immediate orders," as the official report puts it.

A clearance, when issued, might carry with it a restriction as to the area in which the order could be placed. In such an instance the commodity section would be avoiding freight, power, or transportation congestion. A clearance might only forbid the placing of the order in certain plants, or it might be coupled with an inhibition which read, "No new facilities to be created to fill this order." The clearance might definitely allocate the order to one and only one source of supply; but whatever the restriction, the clearance controlled the issuing of the buying order so that too much pressure was not put upon the factory, district, power system, or distribution system, or too much demand made upon one source of raw material.

The clearance system never was perfect; it never did function as it ought to have functioned; but it was getting more and more effective as it passed more and more into the hands of the commodity sections. Like other war industries board changes, the change in the administration of clearance, from a function of a separate organization to one of the commodity sections, had to be made gradually, while the steady flow of work went on. Any adequate plan for war preparation in the future will include a clearance office as part of its organization. Experience in 1918 showed the need of it. One department of the Government handled almost 28,000 clearances in four months in 1918. The Clearance Office worked swiftly. It seldom took more than forty-eight hours to issue a clearance, and often only a day.

The War Industries Board dealt with iron and timber and bloodless incorporate organizations, but it also had its human side and its human contacts. Indeed, as an institution it was far more warm-blooded than are most governmental agencies. It had to be, by the very nature of its work—dealing as it did with questions of life-and-death importance to the business structure of the country and assuming authority not specifically written into law. It was human, with human frailties and human strengths. It had a chairman who looked not on tape when it was red, who could cut across lots and leap over the

fences of bureaucratic tradition. Being agile and alive, it could function even while it was rearing the structure of its organization. General Hugh S. Johnson, the assistant chief of the Division of Purchase, Storage, and Traffic, said of the War Industries Board that its simultaneous formation and functioning was like the spectacle of an old railroad bridge being replaced with a new structure while all the time the express trains were running across.

One of the Board's human contacts was with labor. The share of labor in the war has been celebrated justly. Without the whole-hearted coöperation of the men who dug, shoveled, switched cars, drove engines, built, and produced, we could have done little in the war. The spirit of labor throughout the war was the true spirit of victory—to make the thing and get it done, to beat the record driving rivets or cutting spruce, to move the cars though it took twenty hours' duty out of the twenty-four, to keep the soldier brother and son supplied—to win, without undue thought for wages, hours, and all that labor fights for.

One of the strong influences leading to this attitude on the part of labor was Mr. Hugh Frayne, the labor member of the War Industries Board and head of the Labor Division of that organization. He had much to do with making labor contented with conditions in the war industries. Mr. Frayne was a labor man in upbringing and point of view, and the traditions and ideals of labor were strong within him. He had the broad vision of the man who sees beyond the little horizon of to-day. Mr. Frayne met with the Board daily throughout its existence. He knew its *personnel*. He was in close and intimate touch with all its members. He sat in the councils and knew its decisions and the reasons for them. If those decisions were such as would hurt labor—and many of its decisions were such, because the needs of the war program were greater than any other needs—Mr. Frayne, at any rate, had a voice in the decisions, understood why they were made, and afterwards made labor understand why. He carried to labor the enthusiasm and prescience of Mr. Baruch, the judicial atti-



Photo by Harris & Ewing

HUGH FRAYNE

tude of Judge Parker, the fighting spirit of Mr. McLennan, the calm, ironclad logic of Mr. Legge, the thoroughness of Mr. Brookings, and the qualities of the others, all of which made up the composite spirit of the War Industries Board.

Mr. Frayne worked by personal contact whenever possible. During his service he had upwards of 250 conferences with labor representatives from all over the country; and in these meetings he spent himself without stint to make the labor people see and carry back to those who sent them the spirit of the Board and of the Government. He held more than 550 conferences with employers, industrial and governmental; and he made them see that even though a war was being fought, the victory would be a sorry one if the labor backbone of industry were damaged. A mobile army of over 125,000 war laborers of all kinds flocked to Frayne's banner at his call; and these cohorts he shifted here, there, and elsewhere the country over, as labor needs arose in war industry.

He also settled strikes and composed grievances. Those there be who hold that any strike in time of war is a crime. If so, it sometimes occurs because of a greater crime which has preceded it. The profiteer, the grasping factory owner, the unheeding corporation we had with us always; and some of them lost sight of the fact that the war was not being conducted for their private benefit. They saw in the war emergency their opportunity to make headway in the eternal struggle with labor. Mr. Frayne and his Division composed many such conflicts, conciliated the manufacturers, toned up labor's willingness to sacrifice, and, in one way or another, kept the wheels turning.

The Labor Division was responsible for a number of achievements other than keeping labor in touch with the plans of the War Industries Board and enlisting labor's cooperation in those plans. It brought to the Price Fixing Committee the attitude of labor, so that a fixed price carried adequate compensation to labor. It worked out a plan to issue a distinctive service button to laborers in munitions plants, though the armistice cut short this project. The war training and dilution of labor

were largely planned in the Labor Division, although these activities were administered by the War Labor Policies Board. Mr. Frayne organized within the War Industries Board the War Prison Labor Section, which arranged opportunities for prisoners in penitentiaries and jails to do work for their country; and also the Natural Waste Reclamation Section, which studied methods of reclaiming waste products. The Army's salvage system, of which so much has been said and written, had its inception in these studies.

The Division helped the Army in its plans to find useful places for men unfit for active combat. It also aided in formulating the compulsory work regulations. The famous work-or-fight orders of General Crowder, the provost marshal general, were largely predicated upon studies of this Division; and the Division also disseminated the orders throughout the country.

All in all, the Labor Division was one of the most important parts of the War Industries Board. There was no officer of the Board who gave himself more loyally or produced more vital and important results than Hugh Frayne.

CHAPTER VII

COMMODITY SECTIONS—STEEL

MR. BARUCH and the well-known manufacturer of table relishes had a similar fondness for the mystic number fifty-seven; at least, one of them produced that number of varieties of pickles, and the other created the same number of commodity sections within the War Industries Board. We are now considering the very vitals of the War Industries Board; for that is what the commodity sections were. They were the collectors of industrial information, the agents which carried out the behests of the Board, and the wires which connected the Board intimately with the forests, mines, and workshops of the land.

American industry plugged in on the War Industries Board through these fifty-seven sections. Industry, in its various branches, put forth its own wires to complete the circuit of centralized control. These industrial wires were called war-service committees, and they were formed by the United States Chamber of Commerce. The whole scheme of coöperation between the government control, functioning through the commodity sections, and industry, represented by its war-service committees, was the brain-child of the chairman of the War Industries Board. A marvel of simplicity and efficiency, the plan was Mr. Baruch's chief contribution to the organization of the Government for war. There were many war-service committees in existence at the time of the armistice, each representing some major phase of business or industry. They all advised with the commodity sections to which they were related, bringing to the sections information, and taking to their respective provinces of war enterprise the plans of the Board as a whole.

Here was organization at once both centralized and decentralized. The individual factory, the association of related factories, the war-service committees represented the associations, and the appropriate commodity sections—each of the last performing a special function for the Board—lay spread out under the eye of the chairman, who in turn represented the President. Authority could easily exert itself under this plan. Yet each war-service committee and its related commodity section together formed a little administrative world unto themselves. Leather, steel, copper, nitrates, wool, optical instruments, and half a hundred other commodities, each represented on the industrial side by a war-service committee and on the governmental side by a commodity section, by this arrangement came under centralized control with a minimum of interferences.

The commodity sections stood between the purchasing bureaus of the Government and the producing industries. It was important, then, that the bureaus have a voice in affairs; and consequently each commodity section included in its membership a representative of each purchasing bureau which used that particular commodity. It was also important that each section chief know what was going on in the whole Board. Therefore Mr. Baruch called weekly Monday meetings of all section chiefs, at which meetings the chairman put the chiefs in touch with all the activities of the whole great machine.

Each commodity section was a grouping of experts. Naturally such organizations did not materialize overnight by any magic process. They were in many instances developments of pioneer committees and branches of the Council of National Defense and General Munitions Board. Thus they brought with them and embodied in themselves the fruit of Mr. Baruch's labors in those predecessors of the Board; for raw materials, it will be remembered, were Baruch's particular charge before he became head of the Board. Indeed, as early as 1916 and purely as an interested civilian, Baruch had begun studying our national raw materials and their possible use in war, little dreaming of the part he was to play in their actual

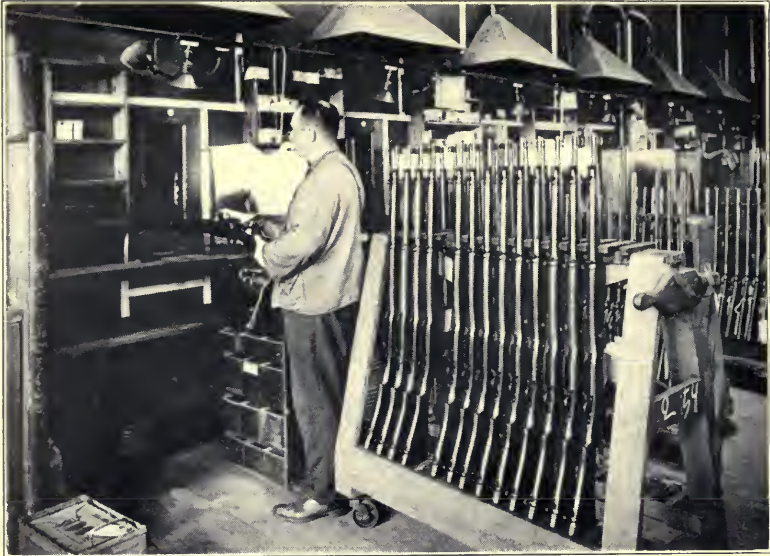


Photo from Winchester Repeating Arms Company

TESTING ARMY RIFLES

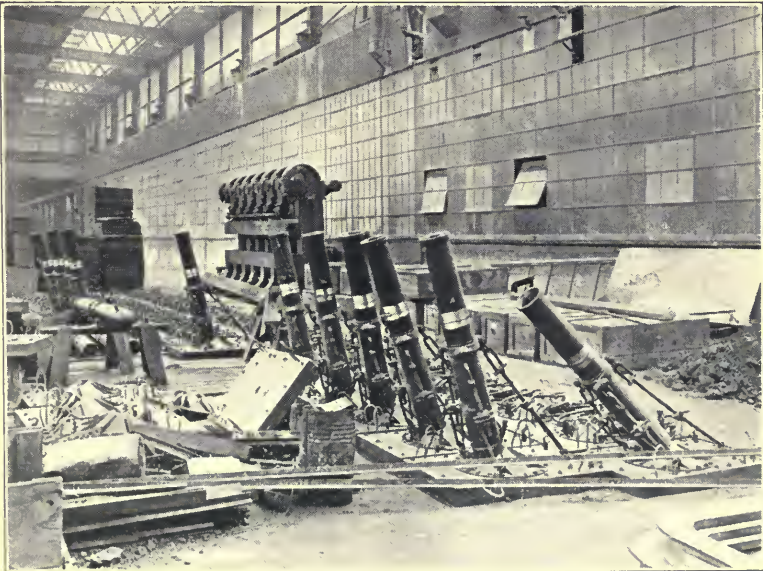


Photo from David Lufton's Sons Company

COMPLETED 6-INCH TRENCH MORTARS

employment. The Committee on Supplies and the Committee on Raw Materials of the Council of National Defense called into service expert after expert, as need for them arose, and many of these specialists later on became chiefs of commodity sections of the War Industries Board.

It was the business of a commodity section to gather and systematize information, to learn all there was to be learned about existing production and the possibilities of future production in its own field, and then to put into effect such plans as might be needed to make the possible production equal to the probable demand. To this end many questionnaires were sent out and complete surveys made of whole industries. In the development of maximum production numerous high-minded concerns exhibited a fine spirit of self-sacrifice for the common end by surrendering, for free use by their peace-time competitors, their most jealously cherished factory secrets. Only war could have brought that about.

The underlying policy of the Board was based on coöperation rather than force. The Board could commandeer plants, but it could not commandeer good will. In place of commandeering, a commodity section, facing an unusual or critical condition, called upon its war-service committee, laid the difficulty before the membership of that committee, asked for its help and suggestions, and thus learned the point of view of the industry. The plan finally adopted was one which would best serve both the United States and industry; and the industry usually responded to its capacity when its war-service committee sent out the word: "We, acting for you, have agreed with the commodity section acting for the War Industries Board that thus-and-such is to be done."

In the first creation of the commodity sections a mistake was made—a mistake of organization. In the beginning Mr. Baruch delegated his authority to the section chiefs and not to the sections themselves. This immediately created an awkward condition. Section chiefs virtually represented Supply, since that was what they dealt with primarily. But within the sections themselves, as part of them, were the representatives

of the purchasing departments of the Government—Demand. Demand therefore had no authority; and naturally it could not join heartily in an undertaking in which it had no real voice. When the authority was vested in the whole section, as it soon was, and not in its chief alone, there was a new face on the situation. Thereafter the sections worked effectively. The purchasers and producers fought out their differences over the conference tables and settled them. The chairman of the Board almost invariably refused to act as umpire. Only twice did he break the rule and consent to decide questions on which sections were unable to agree. Mr. Baruch made the responsibility of his subordinates as absolute as their authority.

Nor did the chairman restrict the freedom of the sections with such rigid regulations and specific instructions as would limit their activities. Broad policies there had to be, and were; but these commodity sections dealt with fifty-seven different kinds of commodities, every one of which presented its own problems. The rules that might do for one kind would only embarrass a section dealing with another.

Under the surface in Washington all was not always harmonious. During that first war year Washington was one large mass of confusion; and in fact the pulling at cross-purposes in the War Government never altogether ceased. Duplications of work existed throughout the war period, jealousies smoldered, incompetents entrenched themselves in high position, and able men were wrongly placed in the organization. To the War Industries Board, one group of arch-irritants caused more trouble than any other. This group comprised the officer hide-bound to departmental tradition, the slave to formal procedure, the stiff-necked innovator whose innovations were impracticable or inefficient, the misguided designer of materials, unwilling, in his eagerness to produce something better and to show the Europeans how American industrial genius could transcend their best efforts, to accept what the experience of the Allies had demonstrated to be of value. The class was familiar. The ultimate embodiment of it was the man in authority unable to understand that time was more impor-

tant than perfection, that deliveries were infinitely more vital than prices, that the emergency was one of the immediate Now, and that plans and programs could not be left to the calm deliberation and leisurely decision of less hurried times.

Yet the War Industries Board managed to deal even with such, and its record is not marred by failure to deliver any ordered materials on time. For that record it could thank its commodity sections. And if, in the process of driving the manufacturing projects through to completion, the obstructionists were removed; if certain dignitaries found themselves, on representations made by the Board, gently but firmly eased out of their swivel chairs and transferred to honorary, but less important, fields of endeavor; and, finally, if these outraged personages thereafter had only harsh words for the War Industries Board and particularly for its chairman—that, too, was part of the day's work, and a thing which had to be accepted.

A fact which has already been mentioned briefly, and the importance of which should not be overlooked, is that the fifty-seven commodity sections worked in close relationship with each other. In the large weekly meetings each section chief gained a general idea about what was going on in the whole Board. But there was a day-to-day intimacy of even greater practical value. By the nature of things the sections could not be independent of each other, because each represented a branch of industry, and the branches of industry are not independent. Nearly every manufacturer, for instance, has to have coal. One can not make glass out of air—one must have sand, chemicals, and other things. The instrument maker needs raw materials from the metal industries; iron means coke and limestone as well as ore; and all industries have to have tools. Then, too, the commodity sections helped to fix prices, and they administered the prices thus fixed; and in that they had to work together, because seldom could a price be fixed for any one commodity without the necessity of fixing the prices of other commodities which entered into the production of the first. The commodity sections were, then, fifty-seven cog wheels, no one of which turned without turning others with it.

And what a range of human work their activities covered: nothing less than the entire sum of industry, whether directly or indirectly related to war! To show how war industry was divided up into a group of controls, the full list of the commodity sections is here set down, not by their official names, but in terms of the commodities with which they dealt.

Iron and steel	Medical supplies
Copper and zinc	Tobacco
Brass	Lumber
Ferro-alloys	Building materials
Tin	Wood products (not including wood chemicals)
Aluminum and pyrites	Pulp and paper
Acids and heavy chemicals	Cotton goods
Alkalies and chlorine	Woolen knit goods
Ethyl alcohol	Felt
Cotton linters	Silk
Explosives	Flax products
Artificial dyes and intermediates	Jute
Industrial gas and gas products, including toluol	Hemp and cordage
Saccharine	Hides
Acetylene and oxygen	Leather and leather goods
Creosote	Rubber and rubber goods
Tanning materials and natural dyes	Machine tools
Paints and pigments	Forgings
Wood chemicals	Ordnance
Miscellaneous chemicals	Small arms and small-arms ammunition
Refractories	Hardware and hand tools
Ceramics	Cranes
Electrodes and abrasives	Chains
Chemical glass and stone-ware	Military optical glass and instruments
Asbestos and magnesia	Automotive products
Mica	Railway equipment and supplies



Photo from Navy Department

**CONSTRUCTION OF EAGLE BOAT
AT FORD PLANT, DETROIT**

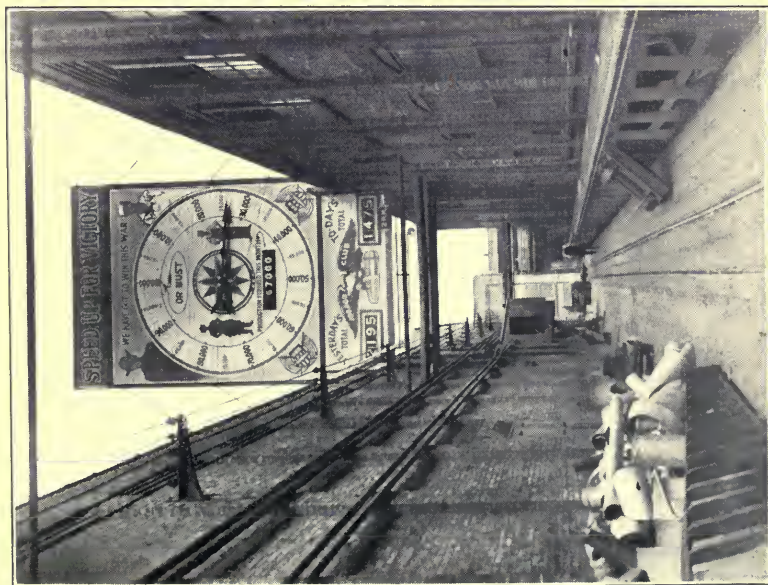


Photo from Winslow Brothers Company

**PRODUCTION CLOCK AT
SHELL FACTORY**

Power	Boilers
Electrical and power equip- ment	Condensers and similar equipment
Steam turbines	

The reader notes that some of the commodity sections dealt with raw materials, some with semi-finished materials, and others with finished products. Each of these sections represented a war industrial problem. Sometimes a problem of supply existed in raw materials, sometimes only in finished products. But whenever the Government began to experience difficulty in securing enough of a commodity, whether the commodity was a raw mineral or some highly finished mechanism, a commodity section was created to deal with that difficulty and smooth it out if possible. Obviously it was difficult to find men qualified to act as chiefs of these diverse sections, because of the Board's rule that a section chief could not be financially interested in the production of the commodity which he controlled. It was not hard to find men who understood the commodities themselves; but where would the Government look to find, for instance, a man who knew all about the manufacture of chains, but who was not himself a chain manufacturer? Yet the Board procured experts qualified to fill all these positions. This was in itself one of the notable feats of those who built up the organization.

It would be impossible to rate the sections according to their importance. What is the most important part of a motor car? It can not run without wheels, nor yet without an engine. It can not be driven without a steering wheel. It must also have a gasoline tank. Under the hood, in the timer, is a tiny, moving member with a minute platinum- or tungsten-tipped contact point, and without that breaker the whole automobile is as dead as a last week's newspaper. It is not possible, then, to say that any one part of an automobile is the most important part. It has a hundred parts equally important, since the whole will fail for lack of any of them.

So with the materials for a war machine. Obviously, sol-

diers can not fight without guns and ammunition, but that fact does not make guns and ammunition the most important tools of war. Neither can men fight unless they can live, and to live they must have clothing and shoes, among other things; yet these they can not have unless there be leather, cotton, wool, thread, needles, and buttons. Our armies fought three thousand miles from home, which meant that everything they received from home had to go to them in ships. We could not have made ships without rivets and riveters and wood and steel. Does that fact make wood and steel the two most important materials for the war machine? And all the ships in the world would have done us no good, had we had no powder for the guns. Armies can not function nowadays without electrical communication, which in turn depends upon supplies of copper, lead, and glass. To be sure, for some of the materials controlled by commodity sections there were substitutes. The war ended before we had to seek many substitutes, but Germany managed to get through the war with little or no rubber and mighty little copper. Certain other commodities which we controlled might perhaps be counted of less importance because the quantities required were small. But in truth there was no most important war material. All were necessary, if any were to be of use.

There was no substitute for steel, and no other material entered so largely into the making of war supplies. Steel is the basic metal of war. Many of the indispensable tools of war are built of steel, and all war supplies depend on steel for either their fabrication or their transportation and nearly always for both. Months before we entered the war, back in the early days of the Council of National Defense, Mr. Baruch, when he became chairman of the Committee on Raw Materials, began to plan what should be done if war should come and the demand for steel should go beyond any ever before known. Not at first was it understood what our steel industry meant to us in war—what a part it would play. The war came, and the first estimate of the experts was that our war production would require not more than seventeen per cent of America's

then annual output of 40,000,000 tons of iron and steel. Today this estimate reads like a joke. Seventeen per cent? To protect itself later on, the Government had to assume control of the whole steel industry, stimulating production, fixing prices, rationing and curtailing all essential uses of it, cutting off civilian consumption almost altogether; and still, notwithstanding the augmented output, the total supply of American steel never came within hailing distance of the American war demand for it.

The business of producing steel is one of the most intricate and highly organized of industries, as well as one of the largest; and it was inevitable that fixed prices for steel should work some injustices. Just as mill efficiency and, more important, the cost of assembling raw materials were bound to vary in an industry as extensive as that of steel, so any fixed price was likely to mean prosperity for some and hard times for others, if the price were set with regard to average industrial conditions. Moreover, fixed prices had to prevail all the way through, from the iron ore and pig iron to the finished rods, rails, and plates. Yet it was highly important that steel prices be fixed. The beginning of the war in Europe in 1914 saw a slump in steel prices here, but in 1915 they came back to the prewar norm, and after that they began to mount. Buying on the part of the Allies, plus the usual domestic demand, combined with the rising costs of everything that entered into the making of steel to lift steel prices skyward. Prices soared, even though the production increased enormously. Up to 1916 the industry had increased the production of pig iron 70 per cent and that of steel ingots 85 per cent; yet the end of 1916 saw steel prices 240 per cent above the prewar norm. Then came our entry into the war, and the previous rises began to look small. Three months after April 6, 1917, we faced steel prices 370 per cent above the old level. Connellsville coke jumped in price from \$1.67 a ton, as of September, 1915, to \$12.25 a ton in July, 1917. In the same time pig iron went from \$12.59 a ton to \$52.50. Bessemer billets, which had cost \$19.50 a ton, reached \$95; and steel shapes, which sold for

\$.012 a pound in January, 1915, mounted to \$.062 a pound by July, 1917.

Steel led the procession of American industries into the corral of government control. The activities of the official agencies in dealing with the steel people created the precedents for the control of many other commodities. At first there was no interference with the industry worth mention. There was some unimportant talk of commandeering and even of augmenting the output by the construction of government steel plants, but such projects never received serious official consideration. Each large governmental purchaser dealt independently and competitively with the industry on the best terms it could obtain, and for six months the market simply ran wild. There was not the usual economic brake on prices. Usually, when steel prices rise abnormally, the market stops buying, and the reduced demand brings down the prices. The official buyers in 1917, however, could not hold off for lower prices. They had to have all the steel at any cost. The quotations reflected their desperation. The President issued to the steel industry the solemn warning that "those who do not respond [to the Government's plea for lower prices] in the spirit of those who have gone to give their lives for us on bloody fields far away, may safely be left to be dealt with by opinion and the law; for the law must, of course, command these things."

The great steel contention came sharply to public attention when a controversy arose between the chairman of the Shipping Board and the manager of the Emergency Fleet Corporation. The manager had agreed provisionally to pay \$3.75 a hundred pounds for structural shapes of steel and \$4.25 a hundred for ship plates. The chairman of the Shipping Board protested that these prices amounted to \$30 a ton more than the Navy was paying for the same materials, and he refused to sign the contract. The public was aroused by the discrepancy in prices charged to the Government, and a storm impended. The steel makers, seeing on the horizon the menacing cloud of government control, if not of outright seizure, hastened to cut the price of ship plates to \$2.50 a hundred pounds.



Photo by Harris & Ewing

COLONEL PALMER E. PIERCE

War Department Representative on War Industries Board

The Federal Trade Commission instituted an enquiry into the costs of producing steel. The industry was demoralized, prices dropping and uncertainty prevailing; and after a few weeks of this confusion the magnates, who only a little while before had been condemning the paternalistic attitude of the War Government, now began to wonder if perhaps federal control would not be the best thing for all concerned. By late September, 1917, they were anxious to discuss regulation. To reach this frame of mind they had been assisted by the earnest efforts of Mr. Leonard Replogle, who had been summoned to Washington to become chief of the Steel Division of the War Industries Board, and also by Messrs. Summers and Legge, of the Board.

But with both sides ready to talk business it was one thing to contemplate government control and another to work out a practicable plan and apply it. There were no precedents at this time. The War Industries Board had to feel its way. The great danger was adoption of an unwise policy which might depress production. Then, too, the consequences of control stretched away beyond human foresight. If the price lid were to be clamped down on top, then the Government would also have to control the basic costs of fuel, labor, and transportation, lest they rise and crush the industry against the prices fixed for its products. And there were many other questions to be considered. Should the contemplated fixed prices apply only to government purchases, or to all alike—Allies and civilian buyers? Flat prices, or prices made up of cost of production plus a fixed profit? By this time the government agencies had contracted for steel to the value of hundreds of millions, and the greater part of this steel had not yet been delivered or even produced. Should the fixed prices be retroactive and include deliveries on these contracts? In its ramifications it was a tremendous problem.

Mr. Replogle was convinced that these questions could best be settled in conference with the steel industry itself. The War Industries Board held a meeting of its Steel Committee and adopted a tentative policy toward steel. Then the Board

invited the directors and managers of the industry to come to Washington, and on September 21, 1917, sixty-five of the leading steel producers of the country met with the prospective controllers of steel in the War Industries Board.

American industry never participated in a more momentous conference. The visitors represented a property worth more than a billion dollars. On steel rested America's industrial wealth and greatness—it was the aristocrat among industries, and these sixty-five delegates were its ambassadors plenipotentiary in a situation profoundly affecting its independent existence. Think not, however, that because of the gravity of the issues the convention was one of impassioned oratory and historic utterance. Those who guide the destinies of great business undertakings in America are not fond of extended debate. They are commonly what they are because of their quickness in judgment and decision, and they approach and settle great problems with the professional casualness which is a mark of caste. So it was in this historic steel conference—an almost informal gathering of suave and cordial gentlemen discussing the most important change ever proposed for the steel industry with no more excitement than if it had been an interesting golf match which they had witnessed.

The steel people did not need to be convinced of the necessity for government control. They listened to the statement of government policy and of the tentative plan of control, and decided briefly that it was a practicable plan and that the prospective controllers were not new, inimical potentates lusting to exert their power regardless of consequences, but men who knew their business. They went into executive session among themselves for a few hours, appointed special committees to deal separately with ore, coke, and pig iron, drifted out of Washington—and the whole affair was settled.

The fixed prices made effective until the first of the year 1918 ranged from \$2.90 a hundred pounds for bars to \$3.25 for plates; and with these prices went the agreement that there should be no reduction in the wage scales, that the prices were for all alike, and that the steel group would endeavor to the

utmost to keep production up to the maximum so long as the war should last. Furthermore, the industry agreed to distribute its products according to the priority orders of the War Industries Board.

Steel was so important that its control was administered, not by a commodity section, but by the Steel Division, a major branch of the War Industries Board. The American Iron and Steel Institute served as the accredited war-service committee for the steel industry in its contact with the Board. The Institute formed numerous subcommittees to cooperate with the Board in its subsequent activities in fixing prices, in devising means of control and methods of distribution, in settling questions of priority, and so on. The Board primarily fixed prices for only the basic steel products. The prices for other standard steel products, known as differentials—a long list of them—the industry itself later determined, subject to the approval of Mr. Replogle and the Steel Division. This Division was an amalgamation and development of the old Iron and Steel Committees of the Council of National Defense. The differential prices could be determined almost automatically after the basic prices were fixed. The differentials were reviewed by the Steel Division, which did not hesitate to revise prices which it could not justify. Thus in no sense, not even for the most obscure steel products, did the industry fix its own prices.

The pioneer work of the War Industries Board in assuming control of the steel industry was of immense value to the Government later on when, through its Price Fixing Committee, it undertook to dictate prices to almost the whole of industry. When the Price Fixing Committee was created it found fixed iron and steel prices already in existence. The Committee, while perhaps technically independent of the War Industries Board, nevertheless found largely in this early experience the guiding principles for its work.

The control of steel did not end with the fixing of its prices. There were still great problems of administration. There was the question of what buyers should be permitted to have access to steel. This question came within the province of the priori-

ties organization. There was not enough steel for all the favored buyers. Therefore rationing was necessary. It was policy to allow numerous kinds of manufacture to continue solely for civilian consumption, though with a reduced output; and the War Industries Board approached few questions more delicate than determining the curtailments of steel supplies to such industries.

The questions were finally all settled in a long series of conferences with the affected industries. Most of the manufacturers were represented in the conferences by war-service committees, but they often attended as individuals. Judge Parker, the priorities commissioner, or his assistant, Mr. Rhodes S. Baker, presided at the conferences, to which came the chairman of the Conservation Division, the chief of the Labor Section, and the chiefs of the interested commodity sections. Whenever such a conference reached a decision (which, it may be noted, was seldom to the entire satisfaction of the rationed industry), it referred its report for ratification to the Industrial Adjustment Committee of the Priorities Board, which included in its membership representatives of all the principal war organizations of the Government. Once ratified, the rationing of the steel was administered, not by the Steel Division, but by the commodity section in control of the industry affected by the rationing order.

The curtailment of steel to the nonwar industries affected the public in that it cut down the normal supplies of many commonly used articles. The more important of these were as follows:

Automobiles	Metal beds
Pianos	Boilers
Cutlery	Radiators
Coal stoves	Baby carriages
Metal ware	Gas stoves
Refrigerators	Tin plates
Clothes wringers	Phonographs
Corsets	Agricultural implements



Photo by Harris & Ewing

J. LEONARD REPLOGLE

Farm tractors	Pottery
Bicycles	Padlocks
Electric heating apparatus	Builders' hardware
Oil stoves	Scales and balances
Watches	Sporting arms
Sewing machines	Cash registers
Metal stamps	Rat and other animal traps
Electric fans	Ice cream freezers
Safes and vaults	Vacuum cleaners
Lawn mowers	Road-making machinery

The control of iron and steel was the most radical and important step hitherto taken by the War Industries Board. It was the precursor of the control of all American industry. The control of steel gave the Government a powerful lever, if it had ever needed one, with which to move other industries into subjugation; for, in addition to fuel and transportation, the War Industries Board was in a position to withhold steel from an obdurate manufacturer, if it chose. Finally, the attitude of the steel industry in acceding willingly to federal control was an example and an inspiration to other producers. Doubtless, mistakes were made. Perhaps fixed prices at times worked injustices on both sides of the ledger. But the great central purpose was accomplished, and there can be no questioning the wisdom or effectiveness of the policy adopted.

CHAPTER VIII

NITRATES—GLASS—DYES—CHEMICALS

THE war brought us to a sharp realization that the American character is prone to an easy-going neglect of the future, so long as the present seems to be well cared for. This realization was brought home to us when we awoke to the fact that we had no artificial dye industry. It was brought home even more poignantly when we discovered that our forces would be without telescopes, field glasses, gun sights, and cameras, unless we learned how to make optical glass. It was again brought sharply home to us when we found out that wealth could not take the place of experience in the production of aircraft. But the most painful awakening of all was to the fact that America, the leading industrial nation of the world, not only had no nitrogen-fixation plants in which the essential element could be extracted from the boundless supply of air, but that it could not, during the period of the war, build enough nitrate plants of sufficient size to make us independent of the natural nitrate deposits of Chile.

Practically every explosive requires nitrogen, either in its actual composition or in the manufacturing processes which produce it. Without nitrates, and plenty of them, we could have no powder industry. Mighty guns, large armies, and tremendous shell production would alike be futile in war without nitrates, and nitrates in quantity. Had Germany not possessed adequate nitrogen-fixation plants within her own borders, she would never have dared to start the war; for, outside the mechanical fixation processes and the production from by-product coke ovens, the only available supply of nitrogen on earth exists in the saltpeter beds on the rainless desert of northern Chile.

The Allies, too, had been backward in developing artificial fixation; and throughout the war the only great supply market was Chile. Normally, we import something less than a million tons of Chilean nitrate a year,—in 1913 the figure was 625,000 tons,—of which more than sixty per cent is used in fertilizers rather than in industrial processes. By 1916 we were importing a million and a quarter tons and using the larger part of the imports in the manufacture of explosives, principally to satisfy the orders of European nations buying from us. At the same time the Allies were buying nitrates in Chile for their own powder mills. One result was that the price of natural sodium nitrate was forced up and up.

Conditions in Chile fostered the rise in price. The market there was narrow, centralized in a few hands. The buying was large and highly competitive. The Chileans took full advantage of the demand for their greatest natural resource, until it became evident that, unless something were done about it, Chile was going to absorb a tremendous and undue amount of wealth at the expense of most of the warring nations of the world.

Early in 1917 the War Industries Board began making plans to end this situation. It promulgated an announcement (by many criticized at the time as ill-advised and premature) that munitions manufacturers making war contracts with the United States need no longer cover with options their prospective commitments for nitrates to meet their contract obligations, since the Government itself would guarantee the supply at four and a half cents a pound. To-day it may be stated frankly that when the Board made this announcement it had no definite idea of how it was going to make its guarantee good. Yet the market was nervous and in need of a sedative, and the nitrate guarantee was the bromide selected.

There is no substitute for nitrogen in powder making. It is nitrogen or no powder. To build fixation plants and develop processes it takes months and years. Bleached cotton linters, nitrated in a bath of nitric and sulphuric acids, produce nitrocellulose (smokeless) powder. Toluol is nitrated to produce

trinitrotoluol (T. N. T.). Phenol is nitrated to produce picric acid, another important war explosive. There is no substitute for nitrogen in any of these processes. If one lacks enough spruce, one can use oak or pine or aluminum. When Germany lacked rubber for tires she used rope, and her truck wheels turned. If there is not enough copper to make brass, industry can get along without brass for most purposes. The latest German submarines had absolutely no brass in them, except in their bearings. But if a nation lacks nitrates, it does not make any high explosives, and without high explosives it is helpless in a modern war.

Shortly after the War Industries Board guaranteed the price of nitrates and faced a heavy governmental loss in supplying the commodity at the guaranteed price, a most unexpected and dramatic occurrence came to its rescue. The Navy Intelligence Service picked up an enemy cable dispatch which, being decoded, divulged that the gold reserve of the Republic of Chile was held on deposit in Berlin. Chile, facing the depreciation of her paper currency as a consequence, which in turn might discount her advantage in holding the nitrate monopoly, was making a strong effort to secure her gold. Germany probably would have been unable to send the gold to Chile, even if she had been willing to do so; but she was not willing and even declined to enter into negotiations with the Chilean Ambassador in Berlin.

This fact was most important to us. The War Industries Board at once entered into negotiations with the President of Chile. Out of the conferences came an agreement that the United States would restore Chile's gold reserve to her, delivering the gold in Chile. In return Chile agreed to confiscate the German-owned nitrate in Chile and sell it to the United States. The chief advantage to us was the immense price concession. England was then paying seventeen shillings for the Chilean standard unit selling quantity of sodium nitrate, and facing the prospect of twenty-five shillings in the near future. Under the agreement we secured the same quantity for ten shillings and sixpence.



Photo by Signal Corps

**FINISHING PROCESS IN MANUFACTURE
OF BIG GUNS**



Photo from Ordnance Department

LIQUID AIR DEPARTMENT, U. S. NITRATES PLANT NO. 2

This agreement brought us 235,000 tons of nitrate. Not all of it went to the United States, because we agreed to apportion some of it among the Allies, provided that they would keep out of the Chilean market pending our further negotiations for nitrates.

It would be difficult to overestimate the importance of this incident. It not only gave us the sorely needed nitrate, but it stabilized the market and reduced the price; and finally it led to the formation of the first of the international executives, important agencies in international war industry about which something is to be said later on. The International Executive in Nitrates was a pool of the interests of the nitrate buyers—the Allies and America. Fathered by the War Industries Board, and actively pushed both by its chairman and by Mr. Charles D. McDowell, then chief of the Nitrate Section and later director of the Chemicals Division of the War Industries Board, the plans for pooled buying were initiated in October, 1917, when prices were at their peak; and by January, 1918, the mechanism of the pool was in running order. The International Nitrate Executive was installed in London, headed by Mr. Herbert Gibbs, of the firm of Antony Gibbs & Sons. Mr. Robert P. Skinner, the United States consul general at London, was the American representative with the Executive. It was the first plan to have the Executive itself do the united buying in Chile, afterward reselling the commodity to the contracting countries; but such a plan took the regular buyers out of the market and bereft them of their business. This was a thing to be avoided. Accordingly the Board arranged for the regular American buyers to continue in business, but to buy only a fixed percentage of the total quantity allotted to the United States by the international pool, and at the pooled price. Four large nitrate importers were the sole purchasing agents for the United States.

Headquarters for the Nitrate Committee of the War Industries Board were established in New York with Mr. H. Ray Paige as manager. The other members of the committee were two representatives from each of the four buying concerns.

The Nitrate Committee bought its allotment of nitrates and shipped it to the United States, where it was delivered according to allocations made by the War Industries Board at prices fixed by the Board. The Government itself bought at cost, plus the expenses of delivery. Other consumers, when they could get any nitrates at all, paid the cost, plus a two and a half per cent commission or profit. The Shipping Board supplied the tonnage which freighted the commodity from Chile.

It was the object of the War Industries Board here, as everywhere in its mighty control of American industry, to preserve peace industries and starve as little as possible the nonwar businesses. But when there was not enough nitrate for both peace and war, peace had to suffer first. One of the early acts of the War Industries Board was to arrange with the DuPont Company to supply 109,000 long tons of nitrate to the Department of Agriculture, which expected to distribute it to farmers in the spring of 1918 as fertilizer. But the company was able to deliver only a little more than half of this quantity. The shortage of ships, losses of nitrate cargoes at sea, and the fact that the American powder factories had less than a six weeks' supply of nitrate on hand in the spring of 1918, curtailed the supply of the commodity to the farms in order to feed the munitions plants.

Little coal in Chile, less oil there, no bags for sacking the nitrates, and a run-down and depreciated railroad equipment in the nitrate fields afflicted the supply. Chile does not produce any of these accessories to nitrate production, yet she can produce no nitrate without bags in which to pack it or cars and rails on which to haul it. Accordingly when the Chilean Government offered Uncle Sam 680,000 gross tons of nitrate in return for supplies, Uncle Sam snatched at the chance, even though it meant the employment of sorely needed ships and the overloading of an already congested steel market. We had to have the nitrate.

The War Industries Board justly regarded its handling of the nitrate situation as a good job well done. It was a complicated job, including many diverse elements. As a participant

in the pool, we had to deal with European nations on the one hand; and as a direct buyer, we had to deal with Chile. We had to keep American industry supplied at a carefully controlled price, while still allowing American importers to retain their buying and shipping organizations, that they might not have to rebuild their trade associations after the war. Our arrangement meant keeping the London Executive informed as to the condition of our nitrate stocks, requirements, shipments, and consumption. It implied a close liaison with the Shipping Board and with the Shipping Control Committee for the adequate allocation of tonnage to the importers. It meant seeing to it that Army did not starve Navy or Navy play hog with Army; looking out for every nitric acid and powder plant to see that it was never short; trying to help the farmer; and carrying information to and getting assistance from the priorities organization in the work of obtaining railroad supplies, bags, oil, and other materials for the nitrate fields. Altogether, it was a complicated work. But it was done; and the most successful phase of the munitions program in America, the production of powder and high explosives, owed its amazing success to these fundamental activities.

It is quite a mental jump from a nitrate bed in Chile to a glass crucible in Pittsburg. Such jumps the War Industries Board had to make daily and hourly. While war materials can not justly be graded in importance, something after all is to be said for the surpassing importance of optical glass. One can, indeed, fire a big gun without looking through a telescope, but one can not make it hit a target. The importance, to the Army and the Navy, of enough lenses to make all the needed telescopic sights, range finders, sextants, telescopes, field glasses, and cameras is not to be measured by the \$50,000,000 we spent for optical instruments during the war. These instruments and others were the eyes of the land and sea forces—and you don't value eyesight in money.

To the average person, glass may be just glass and nothing more, but to the expert in optics one sort of glass is no more like another than oak is like pine. Optical glass differs from

window glass as radically as steel for a razor blade differs from iron for a frying pan. Optical glass is glass which, by reason of various admixtures of chemicals in its composition, is produced in different densities and therefore possesses different refractive powers. Some densities are able to bend or refract light rays more than others. Upon the accuracy and efficiency of lenses depend the performance of a submarine, the percentage of hits scored by a fighting ship, and the accuracy of a map made by an airman with a camera.

We had practically no optical glass of our own. We had bought our supply in Germany and Austria, home of the world's optical industry. (The birthplace of optical glass was Jena.) The war cut off our imports in 1914; our entry as a belligerent in 1917 instantly multiplied our demand beyond anything ever known; and then the country was treated to the spectacle of the Government appealing to the amateur photographers of the country to sell their camera lenses to the Signal Corps, and of the Navy Department begging all and sundry who had telescopes, field glasses, and prism binoculars, to lend them to the Navy. The amateurs did so. They responded nobly, and children brought their toy instruments, even as grandfather brought his old and battered spyglass. These contributions helped a great deal. But to whom was the Government to appeal for range finders, submarine periscopes, prisms, and lenses of larger and different caliber? To none other than the War Industries Board.

There was nothing in the making of optical glass which we could not understand or accomplish, even though our commercial glass makers knew practically nothing of the formulæ for optical glass. All we had to do was discover these formulæ, train glass makers and glass workers in the art, and go to work. But someone had to direct the enterprise, and that someone was the War Industries Board. As the result of the effort, America developed an optical glass industry and an optical instrument industry much larger than the normal consumption of the country could possibly maintain.

While numerous agencies of the Government participated

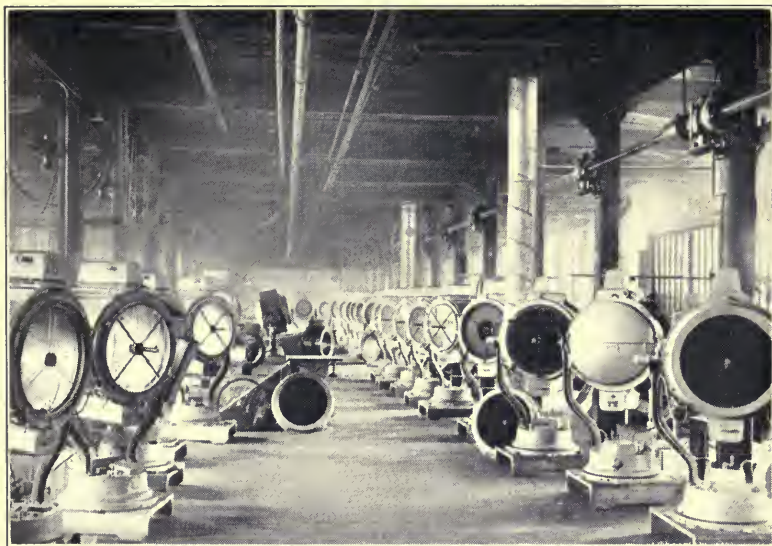


Photo from Arma Engineering Company, Inc.

TWENTY-FOUR-INCH SEARCHLIGHTS

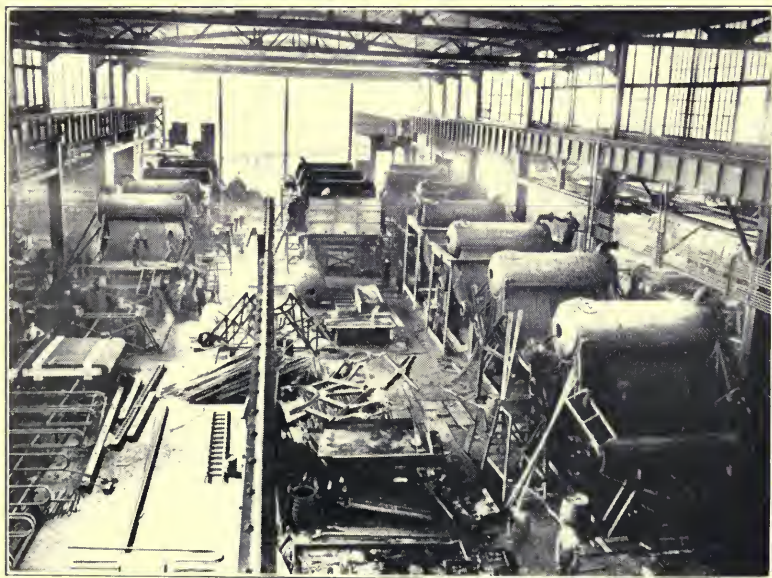


Photo from Babcock & Wilcox

BOILERS FOR DESTROYERS



Photo from Quartermaster Department

MAKING OVERSEAS CAPS



Photo from Quartermaster Department

WING OF A WAR FACTORY

in the extraordinary campaign to build up the optical glass industry in America, the War Industries Board took direction of it. The Board proceeded to establish a school for optical glass workers at Rochester as part of the Mechanics Institute. The Geophysical Laboratory of the Carnegie Institution sent part of its staff to the plant of Bausch & Lomb, the great optical manufacturing firm in Rochester, in which city the glass problem was largely solved. The pot in which optical glass could be melted—a hard problem, this—was developed by the Bureau of Standards. The Pittsburg Plate Glass Company became, under government supervision, the largest producer of optical glass. The Spencer Lens Company, of Buffalo, erected a new plant to care for the government contracts; and in this plant, through the efforts of Dr. Morey of the Geophysical Laboratory, was discovered a process which almost cut in two the time required for making certain glasses. The Mt. Wilson Observatory in California, with aid from the Ordnance Department, began to grind precision lenses. Keuffel & Esser, makers of fine instruments, built a special plant at Hoboken.

The man under whom most of this was done was George E. Chatillon, Chief of the Optical Glass Section. In behalf of the War Industries Board he took over bodily the entire glass industry in this country, and thereafter no orders were to be accepted without the Board's approval. Labor was prevented from shifting. Prices were controlled by purchasers, instead of sellers, and also by a miniature priorities system of the Section's own, whereby permits had to be taken out before glass could be secured. The Section controlled the distribution of the new product to the favored manufacturers, the latter being, of course, all who could aid in the production of lenses and instruments. Raw materials, including the needed steel and brass, received their priority ratings after review by this Section. The War Trade Board took the advice of the Section in granting export and import licenses for materials which the new industry needed. It seemed almost as if the whole governmental machinery were concerned, in one way or another, with the production of optical glass and optical instruments;

yet outside of those who were working at the subject, few persons in Washington, and fewer in the country, knew what was happening. After all, the total amount of optical glass made was not great in bulk or weight, but it was mighty important in the whole war plan.

The manufacture of optical glass in the United States was an invasion of an old German monopoly. Another invasion of another former German monopoly was our development of an artificial dye industry. Dyes were of exceeding importance in the war program. Not that the civilian population had to have fine colors for its clothing, for it did not; but there were many other reasons for the encouragement given to the domestic dye industry. The manufacture of synthetic dyes is closely related to the manufacture of all sorts of explosives, and moreover the dyes themselves are absolutely essential to the production of certain indispensable war supplies, as, for instance, olive-drab cloth, certain medicines produced from dye chemicals, and stains used in photographic processes.

When coal tar is fractionally distilled, a great many different products result. Some of these derivatives are known to the trade as "intermediates." Certain intermediates are essential to the manufacture of both synthetic dyes and explosives. Before 1914 we imported sufficient dyes to supply our market, and also most of the intermediates used in our powder industry. Cutting off the influx of dyes meant cutting off the influx of intermediates, and intermediates we had to have. And so we made them.

We began with the knowledge that, except nitrates, we had in this country every raw material needed for making any and all explosives. The thing was to learn how to use the raw materials. We did not know much about making dyes or intermediates. Once before, when we had tried to start a dye industry, Germany had flooded our markets with dyes so inexpensive that our budding infant starved to death for lack of custom. Dye-making was a national asset to Germany. Who can tell how many of the jealously guarded secrets of that industry were held also to be war secrets, or how much of Germany's

objection to our making dyes was commercial and how much military and strategic?

In 1914 our dye trade with Germany broke off. By 1915 we were paying for dyes 1,500 per cent more than in 1913. Part of this increase was due to the shortage in dyes, part to speculation in the dye market, and part to the fact that a dye is so small an item of expense in textiles that a mill will pay almost any price for it rather than shut down. At this point our people began to find out what they could do for themselves, and they made progress. In 1914 American industry produced scarcely any dyes at all. Three years later, 118 American dye manufacturers received, in twelve months, \$104,000,000 for 287,000,000 pounds of 134 different kinds of products.

From bituminous coal we get coke, ammonia, gas, and coal tar. From coal tar are distilled about 150 different chemicals. Among these are certain substances called "crudes," which, redistilled, give up intermediates; and among these are refined toluol and phenol, both of which are widely used in making high explosives. One of the reasons why we had always been backward in dye-making and the production of intermediates was the existence of German patents registered in America. The Trading with the Enemy Act broke that control; and this law, together with protection in high duties granted by the dyestuff tariff law, attracted American capital into the dye-making field.

The Chemical Division of the Council of National Defense had taken cognizance of the dye industry almost from the start. The Artificial Dye and Intermediate Section of the War Industries Board—Mr. J. F. Schoellkopf, Jr., was chief of it until he entered the Army, when he was succeeded by Mr. V. L. King—continued the work of the former Chemical Division and eventually extended its control over the industry, being especially concerned with toluol, phenol, acetic acid, wood alcohol, and caustic soda. The Section had to exercise care in calculating the needs of the growing dye industry, and in keeping it supplied with what it needed for the production of dyes; and at the same time it had to heed the constant appeal

by the explosive manufacturers for more and more intermediates.

Olive-drab cloth became widely popular during the war. Civilians wanted it; women wanted it; the Boy Scouts and Girl Scouts wanted it; tent makers wanted it; everyone wanted olive-drab. Few could understand why they could not have it. Was not the Government making millions and millions of yards of it? The reason why there was not unlimited olive-drab cloth was that the country was in a shortage of sulphide of soda, used in making dyes. There was not enough to supply the whole demand, and therefore the public had to repress its passion for olive-drab.

The story of toluol is not entirely a war industries board story—indeed, inasmuch as the War Industries Board never made a contract, never bought a dollar's worth of goods, and never paid a dollar for any product, the story of anything with which it dealt is not exclusively its own. But toluol was essentially and particularly a military problem, an ordnance problem. It was to the Ordnance Department of the Army that the Board looked for money with which to build new toluol plants, and it was the Ordnance Department which actually built them. Through the War Industries Board, the Government took over the entire production of toluol in February, 1918, and fixed a price of \$1.50 a gallon for it, a price later confirmed by the Price Fixing Committee. The Government so built up and stimulated the industry that by the time of the armistice America was producing 25,000,000 gallons of toluol yearly, and the rate of expansion would have added another 10,000,000 gallons to this quantity in 1919. The normal consumption of toluol in the United States is only slightly in excess of 1,000,000 gallons a year.

The War Industries Board concerned itself with most of the purely industrial chemicals and every one of the war chemicals. Every one offered its special problems; but in each commodity section which dealt with these chemicals the procedure was essentially the same. In each the problem was to find the need, to locate the available supply, to lay plans to increase the

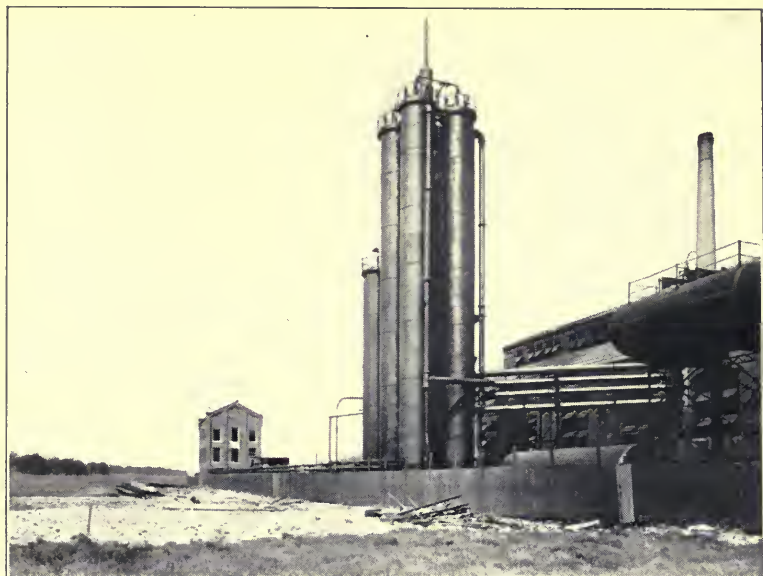


Photo from Wilputte Coke Oven Corporation

AN ARMY TOLUOL RECOVERY PLANT

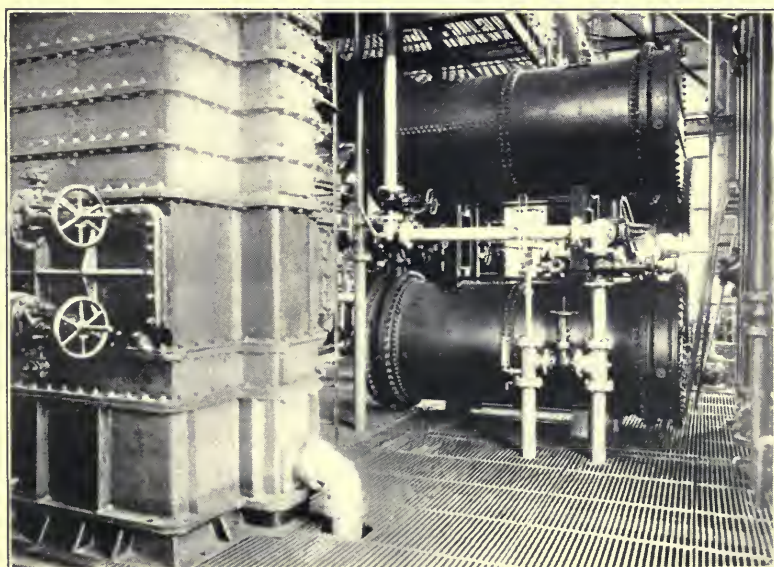


Photo from Metropolitan Gas Company, Brooklyn, N. Y.

DISTILLING TOLUOL FROM MUNICIPAL GAS

supply, to curtail the use when the greatest supply did not equal the need, to allocate to peace industries enough of their materials to keep them alive, and to suggest substitutes, or discover substitutes if none existed.

In all the commodity sections the questionnaire was at once a tool, a weapon, and a block with which to build. The Board could not go to a hundred chemical manufacturers individually and ask them questions—at any rate, not to a thousand of them. But it could and did have hundreds of clerks address thousands of printed forms, and another force digest and tabulate the statistics from the forms when they came back again. And when it had its statistics and thus could survey the industry, it could say to the proper war-service committee: "We need a hundred million pounds more than the United States has of this or that. How much capital do you need? Who will build new plants? How can you help get the trained men? When can you get to work? What can we count on?" And the war-service committee would hold a meeting and report, and the commodity section would agree or disagree, and the matter would be fought out to a finish, until everyone was satisfied; after which the word would go forth; and the industry would turn itself upside down and inside out and produce the chemical needed.

When the War Industries Board had dealings with the Railroad Administration or Shipping Board, it was usually to further the ends of the War Industries Board; but sometimes it was the other way around, as when the Shipping Board and Railroad Administration came to the War Industries Board for creosote. Creosote is a wood preservative. There was not enough creosote for the railroads, the Emergency Fleet Corporation, the Army, the Navy, and the government-controlled telephone and telegraph companies, to say nothing of the private consumers. The rancher who sets a fifty-mile fence is as anxious to creosote his post ends as is the telegraph company which sets poles across a continent, or a railroad which lays ties from Port Huron to New Orleans.

The Creosote Section conquered the problem of stretching

out an insufficient supply over every essential use by allocating creosote, by enforcing the practice of economy in its use, by importing a million gallons or so from Japan, and finally by encouraging to some extent the creation of new sources of supply. Here the War Industries Board directly served the great arms of the Government which so often directly served it; and at the time of the armistice the Board's methods were meeting the situation and providing creosote, although in somewhat small quantities. Still, better enough creosote to go around even sparingly, than some important interest left out in the cold, all uncreosoted.

Another interesting branch of industrial control concerned itself with paints and pigments. There was never a shortage of paints in America during the war. Americans are normally heavy users of paint. Abroad, where they build so much of stone and brick and so little of wood, the paint industry is relatively small. In America most of the houses are of wood, and wood must be painted or it will deteriorate. The domestic paint industry has grown to huge size, and the Paint and Pigment Section did not have to stimulate production; but there were other war problems for it. It had to keep in close touch with the paint people in order to be able to advise government purchasers in drawing their specifications, so that they would not specify unusual sorts, hard to produce. This section also assisted in conservation measures in the paint industry, looking to economy in the use of valuable resources. By abolishing several sizes of paint cans, it saved tin. By prohibiting the manufacture of certain shades of paint, it saved precious ship space which would otherwise have had to be devoted to importing the required pigments. It released men for war work by substituting women for men in paint factories. It saved additional ship space by curtailing the importation of shellac and gums.

One more example of activities in the chemical field, and this glimpse of the chemical family of the commodity sections will end. There may seem to be little connection between the distillation of hardwood and an airman hurling bombs at a

trench, but the connotation is there. From distilled hardwood comes acetate of lime, from which, in turn, comes acetic acid and acetone, both of them essential to the production of filler for airplane wings—the so-called “dope”—without which the planes could not have flown. We started several new plants for the production of acetate of lime both for ourselves and for the Allies, one of whom, England, used acetone in the production of the explosive, cordite. To conserve acetone for war use we stopped the use of it in the manufacture of chloroform, putting alcohol in its place. We developed several new ways of producing acetone—one, the Weisman process, obtaining it from fermenting, sour, low-grade corn. Had the war lasted another year, we should have astonished the world with a production of acetone secured without ever heating a stick of hardwood. We should have taken it from corn and also from seaweed. The commodity sections had to lay heavy hands on the dye factories, the tanning extract factories, the chrome-yellow pigment producers, and on those who made insecticides, to force them to cut down their use of acetic acid. The Board arbitrarily curtailed the nonwar use of the acid fifty per cent by its allocations, thus forcing the use of substitutes, among which are vinegar, lactic acid, formic acid, and certain salts.

Thus, and in examples which might be extended indefinitely, the commodity sections did their work. Every section was headed by an expert—a man who knew his business through and through, but who sold a lifetime of experience to his Government for a dollar a year. Every industry was represented by a war-service committee, which served without even the dollar, but yet gave its best to the Government.

CHAPTER IX

COPPER AND EXPLOSIVES

IF Hans and Gretchen and several million other German peasants had not for a generation cooked their sauerkraut in copper kettles, the war might have ended months before it did. Adopting many policies solely for their usefulness in possible war, Germany for many years consciously encouraged her population in the use of copper. Copper kettles, copper roofs, copper statues, copper, copper, copper, everywhere in Germany—because the red metal is indispensable in war, and Germany possesses no natural supply of copper.

The United States, having within its borders the greater part of the world's supply of copper, naturally anticipated no difficulty in filling its own needs during the war; but then, the country anticipated little difficulty in many other matters which proved to be exceedingly difficult. Copper was no exception. The supply of copper was one of our greatest war problems.

A war needs copper for many purposes. It is one of the principal constituents of brass, and brass is the only practicable metal for cartridge cases for small arms and field guns. Copper goes into almost every piece of electrical apparatus. Copper wires are the nerve filaments along which the members of the army-body flash their signals to the brains at headquarters. Brass tubing, especially for the condenser pipes of steam engines, makes a heavy demand for copper, and brass rodding of a hundred sizes is needed in a score of war materials. Copper rotating rings for shell—to "take" the rifling of the barrel—are indispensable, and numerous other war uses call for tons and tons of the same soft, ductile, strong material.

The name associated with copper back there in those early

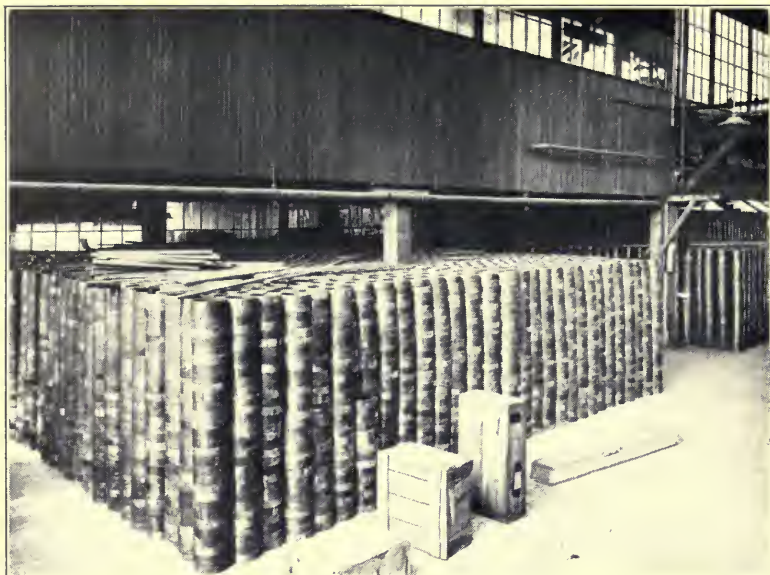


Photo from Maritime Manufacturing Corporation, St. John, N. B.

COPPER BANDS FOR SHELL



Photo from Canadian Allis-Chalmers, Ltd.

THREE-INCH BRASS CARTRIDGE CASES

war days was that of Bernard M. Baruch. On the Council of National Defense, in charge of the development of the raw materials of war, Mr. Baruch clearly foresaw the disastrous consequences of a copper shortage in our impending belligerency and the almost equally disastrous results of a copper price soaring unchecked; and he was most active in negotiations with the copper producers, and incidentally was roundly criticized for interfering with business and insisting upon prices which the critics thought would injure business. Baruch was determined to keep the copper prices down. He was execrated as a marplot and a foe to good business—"the man who demands lowering prices." Later these very critics came to realize that Baruch had pursued the only course calculated both to conserve the copper resources and to prevent chaotic conditions in the industry after the war.

In October, 1914, one could buy copper for 11.4 cents a pound. By March, 1917, it was selling for 35.74 cents a pound, and the United States had not yet become a belligerent. Soliloquized the man who was to buy our first war copper: "If demand during thirty months has lifted the price to three times its normal, what is going to happen when we go into the war? If demand is now running away ahead of supply, and if something isn't done right away to curb the price and increase the production, America may find her whole war program halted by a miserable metal." One of two things could be done. Either the price could go unchecked, on the theory that only by such forbearance could the Government encourage the maximum production, or else the Government could check the price and trust to other factors to increase the supply. It was the familiar dilemma of the war price fixer; but in that day it was a new problem, for the policy of general price control was still of the distant future.

Baruch's mind characteristically went straight to the heart of the situation, and he was able to visualize the embarrassment to the nation if it were compelled to buy copper by billions of pounds at a price, say, of a dollar a pound. To him the way ahead was plain. It was price control in copper, with

production stimulated by means other than swollen profits to the producers.

His decision he translated into action. Two weeks before we declared war he called a meeting of the heads of the larger copper companies. For a week this conference debated the problem, and every producer came from the discussion with a quickened realization of the part copper was to play in the forthcoming struggle. In the conference, voluntarily,—the suggestion came from two of the largest producers, Messrs. John D. Ryan and Daniel Guggenheim,—the operators agreed to allow the Army and Navy to purchase 45,500,000 pounds of copper at the price of 16.6739 cents per pound, this being the average selling price of copper over the preceding period of ten years. Since the market price of copper at the time was almost 36 cents a pound, the purchase represented the tidy saving of more than \$8,500,000.

And it represented much more than a mere saving of money. Psychologically the copper bargain was of immeasurable importance. This occurred in the United States, where the hand of the outsider had never before violated the sacrosanct prerogative of business to charge what it chose for its products. And here came a man whose career was pitched behind the stanchest bulwarks of property rights, in Wall Street, and made the arrangement whereby property rights retreated before the transcending right of the United States to use its own resources for its own vital purposes. These negotiations plainly opened the door to the regulation of resources and of industry that was to come later on. The historical importance of the episode was out of all proportion to the mere quantities and values involved.

The sixteen-cent price existed only for the Army and the Navy. In no sense was it a "fixed price," as we came to understand that term later. The Allies and the commercial buyers still had to deal with the open copper market. We were not yet at war, and the hand of authority had not yet grasped the lever of full control. The quantity of copper over which this first price obtained was trivial in comparison to the weight of

copper which the war was to consume. Forty-five million pounds seems much, but in 1917 the total American copper production was almost two and a half *billion* pounds; and even this quantity, it was soon seen,—even if the rate of production were continued in 1918,—was not going to be enough. Hence throughout the war the War Industries Board conducted an incessant campaign to increase the production of copper.

At the outset there was much uncertainty as to what the permanent copper price should be. The ideal price was one high enough to produce booming industry at every mine and smelter, and no higher. The sixteen-cent price of the famous Baruch bargain was far too low to create such activity—only the most extensive, lowest-cost producers could have supplied even that relatively small quantity at that figure. The very next army-navy purchase was for sixty million pounds at 25 cents, the market then standing at 32.57 cents. This was a tentative price, to be revised in either direction after the Federal Trade Commission, which meanwhile had instituted an enquiry into the costs of producing copper, should make its report.

These reduced prices began to create havoc in the copper industry. The copper miners were paid on a sliding wage scale, adjusted to the price of copper. Labor, therefore, spoke out in protest, since any reduction in the market price meant a corresponding reduction in wages, in the face of living costs going steadily up. The miners threatened to strike if copper sold below thirty cents; and strike they did. The Navy was paying in cash only seventy-five per cent of the 25-cent price,—18.75 cents,—leaving the balance for future adjustment; yet the copper people were unable to bill their product at this rate, because their labor would not agree to it. Meanwhile the Government's debt to the industry was rising and cramping the producers for funds, strikes were frequent, the refiners were running short of blister copper from the smelters, and general demoralization took charge.

Among the official purchasing agencies there was a like

confusion with regard to prices for copper. Each bureau was as yet making its own bargains: the War Industries Board was as yet only an advisory body. The Board, however, recognized the unwisdom of the Navy's tentative price of 18.75 cents a pound for copper and advised a price of 22.5 cents, with the remaining 2.5 cents of the Government's 25-cent price left to future adjustment. Still, this decision was followed by an official offer of 20 cents for copper, together with the threat to commandeer if the copper were not forthcoming at that figure. The Board kept insisting on the higher offer, however, and eventually had its way; for on August 8, 1917, the purchasers confirmed the tentative price of 22.5 cents, and commandeering receded as a possibility. At 22.5 cents the Board purchased 77,000,000 pounds of copper for the Allies.

This 22.5-cent price, be it remembered, was not final. It was merely the figure which the Government confessed itself obligated to pay in any event, and to which the disbursing officers were authorized to go in their payments to the copper people. The producers contended that the Government, after a full and fair investigation, would be convinced that the price was too low and would fix a higher one, making it retroactive to cover the previous purchases at the disputed tentative price. Then came the report of the Federal Trade Commission, which declared 22 cents to be enough for copper—a half cent under the disputed tentative price! The report was a bombshell in the copper camp, and the producers responded with a barrage of their own.

Like other industries, the copper industry presented its own peculiar problem; and fundamentally the copper problem lay in the fact that the ore is not produced exclusively by a few great properties, such as the Calumet & Hecla mine, but by scores and even hundreds of small mining operations as well. The costs of the small producer are apt to be high, so that the price which brings profits rolling into the big, low-cost company may mean losses and shutdowns for scores of the little, high-cost developments. Under the special conditions of war the Government could therefore not safely consider the aver-



Photo from Recording & Computing Machine Company

PACKING SHELL FUSES



Photo from Ordnance Department

BOILING TUBS FOR SMOKELESS POWDER

age conditions in the industry, in any attempt to fix the price. To base a fixed price on the average cost of production would be to shut out and close down dozens of producers whose costs were higher than average, but whose product the Government had to have for its war purposes. A war price had to be high enough to keep the whole industry at work—with a reasonable limitation, of course; for even the War Government could not afford to pay too great a price for the protection of the ultra-high-cost copper producer.

This argument the industry put forward in reply to the report of the Federal Trade Commission. The big, low-cost producers agreed frankly that the Commission's 22-cent price let them out nicely, but they contended that the price would be disastrous to the high-cost men. They pointed out the impracticability, if not the impossibility, of the Government's commandeering and operating a multitude of small copper mines. Moreover, they reminded the War Industries Board that the mine workers had a direct interest in the copper price, and voiced their opinion that the Commission's 22-cent price meant certain labor troubles, even in the low-cost mines, with a resultant falling off in production. The industry proposed an alternative price of 25 cents. The War Industries Board was impressed by the argument and agreed to halve the difference between the Commission's price (22 cents) and the industry's price (25 cents), making the price 23.5 cents. This price was to be subject to a possible revision upward at the end of four months, provided that increasing production costs then justified it. In this arrangement the industry concurred, promising moreover to keep production at top pitch. The President of the United States approved the figure, and it was officially fixed. It applied not only to government purchases, but to purchases by the Allies and by private consumers as well—it stood as the market price for all. The industry agreed further to keep copper out of the hands of the speculators. Wages, moreover, were not to be reduced because the price was under the general market price at the time.

Thus came about the stabilization of the war copper indus-

try; and copper thus shares with steel the honor of having led all of American industry under federal control during the war. One thing should be stated emphatically. In all these negotiations leading up to the adoption of a fixed price, the Government's two largest consumers of copper, the Army and the Navy, always took part. Critics of the War Industries Board have maintained the contrary—that the Board gave the earth to the copper people without consulting the chief governmental users of the metal. That charge, however, was unjustified. The representatives of the Army and the Navy took part in all of the conferences, and their voices were heard and considered. The Board consulted them before taking any final action, and they themselves approved the final action before it was promulgated to the industry.

In July, 1918, the Price Fixing Committee being then in charge of all price fixing, the fixed price of copper was raised to 26 cents a pound. This measure was taken upon the representations of fifteen small, high-cost producers (their aggregate output was 75,000,000 pounds of copper *per annum*) that the rising freight rates and wage scales had made the old price unprofitable to them. At 26 cents the price remained until federal control ceased. By the summer of 1918, so great had grown the war industrial program that the Government was taking ninety-three per cent of the total copper production of the United States, though it turned over to the Allies nearly half of its copper purchases.

Besides fixing the copper prices, the War Industries Board had the great responsibility of administering them, and otherwise controlling the industry. This work was the charge of the Nonferrous Metals Section of the Board, which watched over production, encouraged the small producers, guarded against speculation, coöperated with the Copper Producers' War-Service Committee, and allocated and distributed the copper. Mr. Eugene Meyer, Jr., was the first chief of the Nonferrous Metals Section, serving from October, 1917, to March, 1918, after which he was succeeded by Mr. Pope Yeatman, who remained in charge until the end.

This was the answer to the threatened copper shortage—the Government secured enough copper, the stimulated industry increasing its rate of production fifty per cent, and the industry itself survived the experience and was ready to go ahead in the normal way after the control ceased. To be sure, price fixing worked hardship to a few of the highest-cost properties; but in war industry, as in war, some blood must be shed. The larger vision sees the dominant fact that the program of munitions manufacture, either here or in the countries of the Allies, did not halt because of any break in the red stream flowing from American copper mines, smelters, and refineries.

The critical ocean-shipping situation bore directly upon one of the principal activities of the War Industries Board—namely, its work in building up the American explosives industry. Because of the deficit in tonnage it was necessary to give most careful consideration to the form in which munitions crossed the ocean. Leaving aside the fact that the Allies had developed munitions manufacturing capacity beyond their own needs, for shipping reasons it was good economy and good strategy for us to buy a great deal of our battle machinery from the Allies over there, sending them the raw and semi-finished materials from which to produce the machinery, rather than to do the manufacturing ourselves and then ship the finished machinery across the ocean. For instance, a field gun crated and stowed aboard a ship occupies a space that can hold raw materials enough to build seven guns. In the space occupied by a crated airplane nine airplanes can travel in their raw materials. Similarly disproportionate ratios hold for many other implements of war. But when you come to explosives, the ratio swings over in just the opposite direction—the finished explosive products occupy only from one-twentieth to one-tenth as much ship space as their raw materials.

It may be surmised that this fact had a profound influence upon the development of munitions manufacture in the United States. From Chaumont General Pershing continually urged that America buy as many of her heavy ordnance and aircraft

supplies as possible in Europe, shipping the raw materials in compensation to the Allies. The tendency to such a procedure was purely a voluntary one on our part until the autumn of 1917, when the Supreme War Council in Paris, planning scientifically for America's coöperation in the war, issued the edict known as the Interallied Ordnance Agreement, which, while providing that the American Expeditionary Forces should procure most of their field ordnance and service airplanes from England and France during the first year of the agreement's existence (it was evident that the war industry of America could not produce these things in quantity, anyhow, before the expiration of another year), placed upon the United States the obligation to supply all powder and high explosives, not only to her own forces, but to half the French Army as well.

This was a tremendous responsibility, and no one in America accepted it in more deadly earnest or felt its weight more heavily upon his shoulders than did Bernard M. Baruch. Others might at times forget, in the press of great affairs, the surpassing importance of the American explosives industry; but not Baruch. He felt, and justly so, that America might fail in any other part of her war program and still manage somehow to struggle along through; but if she failed in this one specific responsibility which the hard-pressed Allies had placed upon her, that would be tantamount to failure in the whole program, and she would lose prestige and honor and probably the victory itself. Whatever the magnitude of the other official activities in which he engaged, he consistently regarded them all as subordinate to the *force majeure*, the iron necessity for America to produce powder and high explosives. Powder was his passion, his impelling thought by day and his uneasy dream at night. He fought for ships, even as against the Army's necessity to maintain its transatlantic supply line, to bring the nitrate from Chile; he put all his power behind the air-nitrates project at home; he looked out for sulphur and linters; for him illuminating gas lost all importance except as it was a source of toluol; he initiated and supported projects to multiply the



Photo by Boy'e

D. C. JACKLING

Director of U. S. Government Explosives Plants

American equipment of by-product coke ovens, to take tar intermediates from crude oil, to build powder plants that were industrial cities in themselves; and his hand was felt in the dozen other ramifications of powder manufacture throughout industry.

The result of these activities—and this is detracting nothing from the magnificent achievements of the Army's own Ordnance Department, which looked after the more concrete details of building the factories and turning out the explosives—may be read in the utterly astounding figures of American explosives production during the war. In little more than a year—in less than a year, dating the period from the Inter-allied Ordnance Agreement—America developed an industry which was turning out smokeless powder nearly half again as fast as the industries of France and England combined, and which had nearly reached the combined French and English rate of producing high explosives. This was the response of American war industry to its one greatest test. You could wipe from the record all else that the War Industries Board did, and its activities in expanding the American explosives industry would alone justify its place in the War Government.

Developing the powder industry was a case of building from the ground up, and building, too, an industry to be both owned and operated by the Government. The existing powder companies were naturally unwilling to invest in colossal new plants that would have only junk value when the fighting ended. Nor was it a question of commandeering or even of price fixing. For the War Industries Board it was a matter of correlating all efforts to the single end, linking up the existing producers in the general scheme, and developing the new production centers and the men to operate them.

The name of Mr. L. L. Summers comes into the record. He was technical adviser to the War Industries Board. His assistant was Mr. Charles D. McDowell. These two were industrial experts on whom the Board leaned heavily in planning the creation of the explosives industry. Then there was the Board's Explosives Division—not a commodity section, be it

noted, but a major branch of the Board itself. Mr. M. F. Chase was chief of the Division. He was called to this position from important work in the erection of the great powder plant at Nitro, West Virginia. The Explosives Division made statistical studies of existing plants and potential facilities, of sites and plant organizations, and worked out plans for training the new forces of powder makers and for improving the efficiency of the new plants. In this development it was necessary to preserve and even increase the normal manufacture of commercial explosives for the sake of other branches of war industry which needed them. In the manufacture of some of the most extensively used products it was necessary to adopt new and improved processes, worked out by the Allies during their long struggle with Germany. The development in powder making had to be quite outside the facilities existing in the United States when war was declared. The explosives business had expanded considerably between 1914 and 1917. Several large plants had been built in America for the Allies. The Allies had paid a dollar a pound for their American smokeless powder, half of each dollar applying to the amortization of the factories erected especially for them. Our war explosives industry had to be reared without disturbance to this going enterprise.

When Uncle Sam really starts out to do anything big, he is prone to make that thing the biggest in the world. It was so with the Hog Island shipbuilding project, with the Panama Canal, with the western land reclamation scheme, and with railroad and telephone systems. When the United States Government began building powder plants it built them big enough to be seen from the moon. The Old Hickory plant at Nashville, costing \$90,000,000, had an area of nearly eight square miles. It was seventy times the size of the biggest powder plant of prewar days. This and the Nitro plant were in 1919 to have supplied the powder which would have propelled more than half of all the shell sent against the enemy.

The reader will note that the War Industries Board made no contracts, either in this enterprise or in any other of its

activities. In developing the explosives program its function was to recommend, in consultation with the War Department, the erection of plants, and, after contracts were placed, to see that the contractors secured materials, labor, power, and other necessary facilities. The Army itself selected sites, signed the contracts, and superintended production in the completed plants.

One interesting branch of the War Industries Board's work in explosives was that concerned with the supply of cotton linters. It has been said that the Chicago meat-packing establishments utilize all of a pig except the squeal. Cotton linters are the squeal of cotton. At one time they were an utter waste; now they have become of practically indispensable value in the production of powder. When cotton goes through the gin, the seed comes out covered with a fine cotton fiber sticking to the rough surfaces of the seed. Removed at the cottonseed crushing plants by an arrangement of revolving saw blades, this fine fiber, known as cotton linters, is used in times of peace for stuffing mattresses, pads, and horse collars. It is also used in the manufacture of felts, absorbent cotton, and other similar products where a long-fiber cotton is not necessary. Another common product of which cotton linters may be a constituent is celluloid, the most extensive use of which to-day is, perhaps, in motion picture films.

Now celluloid is the quiet and inoffensive brother of the more truculent guncotton and smokeless powder. All three are members of the cellulose family. Guncotton is one form of nitrocellulose (an inexact term for cellulose nitrate), and smokeless powder is guncotton specially prepared. Cotton linters contain cellulose in ideal form for nitrating. It is evident, then, that our boundless powder program called for linters in boundless quantities.

It was necessary for the War Industries Board to take charge of the supply of cotton linters, for the reason that the average annual production of linters at the seed mills for the five years prior to the war had been less than half the estimated quantity which we were going to require in 1919 alone. The

Cotton Linters Commodity Section (under Mr. George R. James) had to work on the familiar conservation-substitution plan, since it was not practicable to encourage a largely increased cotton crop merely to get more linters. The section accordingly added its own particular swarm to the locust plague of questionnaires which was then fretting American industry, and elicited the fact that cotton linters were really not absolutely essential to many of the departments of industry which used them extensively. For instance, horse collars and mattresses could be stuffed with hay or feathers or something else quite as well as with linters. The Ordnance Department, foreseeing a linters shortage, was experimenting to see if hull fiber and wood pulp would not furnish cellulose as usable as that of cotton; but the Cotton Linters Section did not wait for the outcome of the experiments. It called a meeting of the cottonseed crushers and with them reached an agreement that after May 2, 1918, all the mills would sell their entire production to the powder plants exclusively. The producers agreed to recover at least 145 pounds of linters from each ton of cottonseed, while the Government for its part agreed to take the entire output until July 31, 1919, paying \$4.67 a hundred pounds.

This was constructive work. It relieved the seed crushers of any and all marketing difficulties, stabilized the industry by a fixed price, prevented profiteering, and produced for the powder factories, if not all the linters they wanted, at least all that existed. The American factories, however, were not to have the whole supply thus made available for purely war use. France, England, Italy, Belgium, and Canada all had to have American linters, as did also our own makers of medical supplies, particularly those who supplied absorbent cotton to the Army. Hence there was formed a cotton linters pool, in which all the essential interests were represented. The Ordnance Department acted as general manager and financier for the pool, working, however, in coöperation with the Cotton Linters Section of the War Industries Board.

The partition of work in the pool exemplified the way in



Photo from Nitro Powder Company

T. N. T. COOLING AND CRYSTALLIZING



Photo from Canadian Explosives, Ltd.

A T. N. T. PLANT

which the Board avoided duplication of effort and the friction inseparable from any conflict of authority. Before the pool began its operation, a strict agreement was reached between the Ordnance Department and the Cotton Linters Section as to what part each should play. The Ordnance Department was to handle questions of production and of the stimulation of supply; it was to commandeer any seed plants that could not be brought to time in any other way; and it was to supply the funds for the pool, settle disputes with the producers, and, finally, to make the purchases of linters. This last function the Ordnance Department chose to delegate to the DuPont American Industries, Inc., one of the numerous DuPont corporations. There were literally thousands of small seed plants producing linters; and to turn over to a concern acquainted with the business the work of purchasing the linters was thought to be far better than for the Government itself to attempt so intricate a job with its unskilled hands. The Cotton Linters Section, on the other hand, was to allocate the linters to the various consumers, store the bales when the production from the seed plants exceeded the storage capacity at the powder mills, write the specifications for cutting and baling, compile periodic reports showing past and estimated future production and stock on hand, and finally to keep the records of the pool. During its life the pool handled about 500,000 bales of linters.

With this glimpse of the Cotton Linters Section we must close the present record of the work of the commodity sections of the War Industries Board. We have been able to take up but a dozen or so of the fifty-seven, leaving it to the imagination of the reader to fill in the other details of the picture of activity that was the War Industries Board in those busy days of 1918. In all the others there was the same play of ingenuity, the same grasp of the subject, the same inexorable pursuit of the common end. The commodity sections were the Board's line organization, its combat regiments in the field. As a device in organization, they were the creation of the chairman of the War Industries Board; and whenever Mr. Baruch paused in

his own work to observe the working of this mechanism, he must have glowed with satisfaction at the jarless, competent manner in which it took several thousand unrelated shops, mills, and factories and knit them together into a single stupendous arsenal.

CHAPTER X

FOREIGN ACTIVITIES

A SHADOW is an inconsequential sort of thing. But, once in a lifetime or so, it happens to be the shadow of the moon; and as the sun blinks out, savages beat tom-toms, and the superstitious fall on their knees and pray, and even some of the best-balanced feel glad when that particular shadow has moved on. The War Industries Board had a shadow, too. In an eastwardly direction its tangible authority ended at the three-mile limit. But it found itself able to project its shadow over the war industries of the various Allies, to insert its opaque disc between the Allies and the life-giving sun of American resources and American gold; and then ministries fell to their knees in submission, and the shadow of the Board's authority in Europe became almost as real and effective as if it had been transmuted into substance by British Orders in Council and French parliamentary edict.

The authority thus projected was used—rather late, it is true, but with results which would have been of inestimable importance had the war continued another year—to force the war industries of the Allies under the same sort of governmental control which we were applying to American industry, and—even more important—to synchronize and coördinate the entire industrial effort of the nations at war with Germany, even as General Foch and the Supreme Command were coördinating the combined forces in the field. It was a tremendous ambition, but one toward the fulfillment of which great strides had been made when the war came to its abrupt end. It remained for America and the War Industries Board to initiate the project and to insist upon it and take a hand in its fulfillment; for the Allies were only lukewarm in their

support of it, and the strongest one of them in particular—England—was at first strongly averse to it. What else could they do, however, but follow the wishes of the War Industries Board, since that body at any time could cause the treasury purse strings to be tightened?

The agency which exerted this power abroad was the Foreign Mission of the War Industries Board, with whose enterprises this chapter is chiefly concerned. The Mission worked merely as the representative of the United States in industrial conferences which affected the United States. It possessed no legal power, and was advisory only in status; but actually it held the terrific power of boycott. Armed with this, it had its way wherever it chose to insist upon it. Its deeds were little known to the people of the United States at the time and have been uncelebrated since; but it is submitted that no other work of the War Industries Board was more interesting or historically so altogether notable and important.

Some mention has already been made of the formation, in the fall of 1917, of the International Nitrates Executive in London, a pooling arrangement in which the Allies and America dealt, as a single purchasing agency, with the Chilean industry. This was the first of several such international executives formed to purchase other war commodities for international purposes; and, since it was the forerunner, it is worth while further to examine its workings. It was rather a difficult undertaking to establish this first Executive. In most of the participants, national pride had to be submerged, national foreign trade protected, and national selfishness subordinated to the common good. The Executive was supreme in the purchase of nitrates from Chile—the entire market for the Chilean producers had become monopolized. The War Industries Board acted in America as the agent of the Executive. No American interests were permitted to purchase Chilean nitrate except through the Board. The Board took the American requisitions for nitrates and forwarded them to the American representative on the Executive in London. To the Executive came also the requisitions from all other countries which had access to

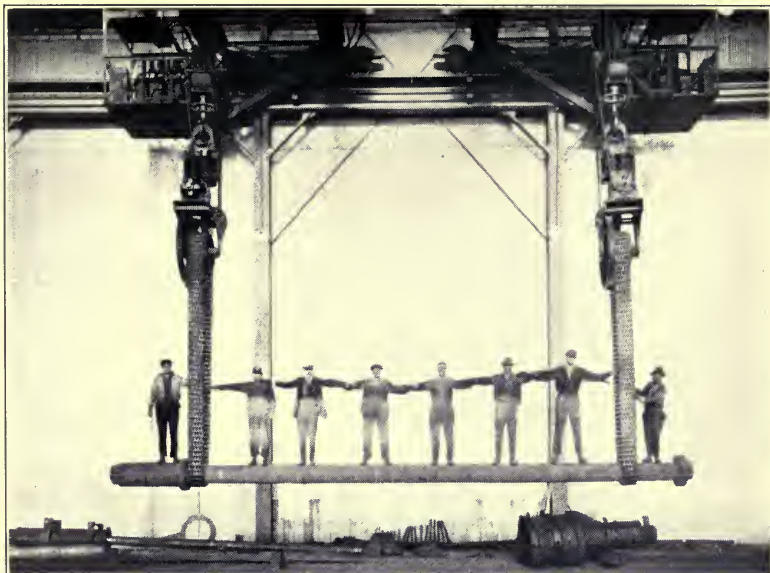


Photo from Pollack Steel Company

SHAFT FOR U. S. DESTROYER

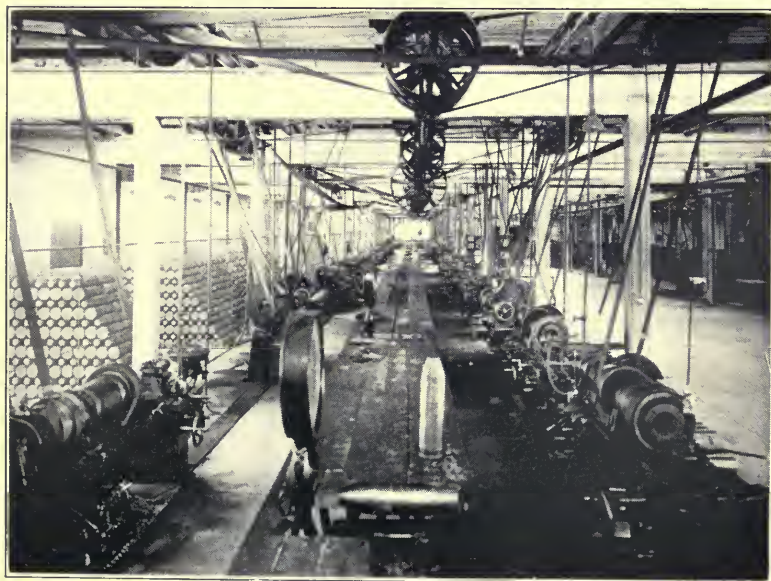


Photo from Caron Brothers, Montreal

BATTERY OF SHELL MACHINES

the nitrate. Thus the Executive could allocate the nitrates equitably. If the American requisitions were approved, the Executive authenticated the orders and authorized the Chilean market to honor the American orders at the pool's price.

Note, however, that the Executive did not itself actually purchase the nitrates for the American interests. Such a policy would have removed from business the American concerns whose business it was to deal in Chilean nitrates. Instead, the Executive merely supervised the transaction. The actual purchases were made by the American agencies authorized by the War Industries Board to buy nitrates. Had the Executive itself bought the nitrate, it is quite possible that the end of the war would have found English trade interests in possession of an ironclad monopoly of the Chilean nitrate trade. The purchasing director of the Nitrates Executive was Mr. Herbert Gibbs, a former director of the Bank of England and head of the firm of Antony Gibbs & Sons, a British importing house heavily interested in Chilean nitrates. He was merely the director of purchases, however, and not a purchasing agent: the rules of the Executive required him to make the American purchases exclusively through American firms.

The agency as thus constituted protected the American trade, but at the same time it gave America and every other participant the advantage of dealing with the Chilean industry as a unit. The Executive was able to keep down the prices, incidentally causing heavy losses to the Chilean speculators in nitrate, but saving a vast amount of money to the belligerent nations.

Curiously enough, the very fact that Chile's monopoly of sodium nitrate was insufficient to meet the war demand for the commodity acted as a deterrent upon high prices. Chile was aware that extensive programs for the construction of plants for the fixation of atmospheric nitrogen had been instituted in both France and England as well as in the United States. The higher and more embarrassing the price of natural nitrates became, the more these programs would be expanded and the more zealously would they be pushed. A fixation plant is no

ephemeral war plant: it must be built to stay; and it was quite possible that undue prices in Chile would have the effect of creating fixation industries of such size that England, France, and the United States would find themselves forever free of the Chilean monopoly. The Latin-American Republic showed a commendable fear of killing the European and North American geese that had laid so many golden eggs for her and would continue to lay them, if kindly treated. Chile, in fact, was under the impression that our fixation project was further advanced than it really was—a notion of which our canny purchasers forbore to disabuse the Chilean mind. Throughout the episode we took all the nitrate we could get, whether there were immediate need for it or not, lest one or both of two possibilities occur. The enemy submarines might cut the line of supply, and the Chilean producers might take it into their heads to bleed the belligerents white in increased nitrates prices. In consequence the armistice found us with a considerable surplus, which then could be turned over to agriculture and the arts.

So effectively did the Nitrates Executive work, so harmonious were the international relations under it, that the War Industries Board desired to extend the plan to the purchase of other materials that were giving trouble. The Board also wished to have a first-hand look at what uses the Allies were making of the steel and other commodities which we were sending them in such quantities. We were starving our own nonwar manufacture to create these export excesses, and the Board did not propose to have nonessential industry in Europe fed with materials at the expense of our own rationed producers. To that end the Board sent Mr. Leland L. Summers, the technical adviser of the Board, to be the European outpost of American industrial control and the head of its so-called Foreign Mission.

Why was it left for the War Industries Board of America to initiate international industrial coöperation in war, to insist upon it and demand it, when such a plan was going to save money for all? Why had not England, France, and Italy

started something like this themselves long before the War Industries Board became a factor in the war? The answer was plain. Nationally it would have been a good thing for all the Allies. But industrially they had nothing to gain by it. The war industries of the Allies were far less whole-heartedly for victory at the cost of individual gain than our own war industry was; moreover, their industries were far more powerful in the councils of government. We on the other hand had an interest other than industrial—with our loans to the Allies we were largely financing their war programs; and it was of vital importance to us that they pare down their industrial profits. It is a pregnant fact that Mr. Summers took with him a commission to advise the Treasury in Washington as to loans to be made to the Allies.

Mr. Baruch took up with the British Ambassador here and, through Mr. Summers, with Mr. J. Austen Chamberlain in London, the matter of controlled prices in English war industry. We were advancing money to England. We were giving the British the privilege of buying our materials at our own fixed prices—serving them as we served ourselves. But England was not, at that time, selling to us at her own controlled prices. Indeed, England was not then controlling many industrial prices at all. The English averred as much, protesting that for most English products we had as fair a chance to bid as anyone else. Mr. Baruch then served what amounted to an ultimatum to the British Government. England, if she expected further financial aid from the United States, must not only serve us with her own controlled prices, but she must also take under governmental control certain British commodities then not so controlled and fix prices for those commodities.

Among the commodities which we asserted our right to buy at a controlled price, paying no more and no less than England herself paid, was jute. England had a ready answer: jute was controlled by the Indian Government, which, while it was a part of Great Britain, nevertheless was supreme in such affairs. England, apparently, could not do anything to make India reduce the price of jute—although, of course, jute

was sold to England at a nice, natural, normal, mother-country price.

"All right," said Mr. Baruch, in effect. "Sorry. Didn't know that. We have been executing British Treasury orders for silver for India, assuming that the Indian Government was under the British Imperial Government, and that the British Treasury was acting for the whole Empire. If the Indian Government is not under the British Imperial Government in these affairs, then we will no longer execute British Treasury orders for silver for India. We will simply assail Indian rupees in the open market and buy our jute in depreciated currency."

Mr. Chamberlain was properly worried.

"Why," he said, "that would close the stock exchanges in Calcutta and Bombay."

"Let them close," answered Mr. Baruch.

"Wait a minute," said Mr. Chamberlain. "Wait forty-eight hours."

Mr. Baruch waited forty-eight hours. Then he was told that the British Cabinet had reconsidered its action, had revoked its previous decision, and had forced into its own hands the control of the price of jute. It asked the United States to send a representative to sit upon a special board to determine what the international price of jute should be.

As the result of Mr. Summers's efforts in London an international executive in tin was established. Also an arrangement was struck by which the English Government sold wool to our Army at the same price as to the British Army; in other words, at the British military price instead of at the British civilian prices—a considerable difference. On one wool contract, which at the time was about to be closed, the new price saved the United States \$45,000,000.

It is easy to say that Mr. Summers established an international executive in tin. It was quite another thing actually to establish it, for the difficulties were well-nigh insuperable. Briefly, the situation in England was this: The British War Government was a coalition government, with all important



Photo from Quartermaster Department

MAKING ROPE FOR ARMY



Photo from Bartlett-Hayward Company

SHELL STEEL BEING CUT INTO BILLETS

political elements represented in it, commercial interests, however, holding the greatest power. Mr. Summers had to batter his way through business interests, through rank after rank of money-making corporations, in order to reach the political heads of the Government. When his representations forwarded through diplomatic channels had availed nothing, Mr. Summers swung an ax with plenty of war industries board muscle behind it: and then he got results.

English war industry was at that time under the direction of various committees. The committees were interested primarily in making production come up to war demand, with nothing said about prices. At least there was no such price control as we knew in this country. And why should there have been? The British committees were not primarily committees of the British public as represented by its Government. They were essentially committees of British industry itself. Our War Industries Board was never guilty of that heresy. Meticulously it adhered to the policy that the men whom it invested with control over industry should not be financially interested in the industrial branches which they controlled. It was just the other way with the British committees. They represented the British industries themselves. And when we, as a large customer of those industries, asked the pseudo-governmental committees to fix prices—hence to reduce and limit their own profits—naturally they refused.

Their refusal had not been unanticipated by the War Industries Board, whose Foreign Mission had instructions what to do in just that circumstance. The British Government had expected that the industrial coöperation to be afforded by our Foreign Mission would take the form of participation in the deliberations of the British committees. This very thing the members of the Mission refused to do. They asserted for themselves a governmental or ambassadorial status in England and declined to meet with bodies that were not governmental, but industrial. They appealed to the British Cabinet to bring these committees under governmental control and make them represent, not a collection of special interests, but the common weal.

It was an appeal which Downing Street was in no position to deny. The Government acted and drew the committees in under the jurisdiction of the Ministry. Mr. J. Austen Chamberlain was then a minister without portfolio. To him was assigned direction over the industrial committees. Thereupon the American representatives consented to join the committees, and thereafter the Foreign Mission attacked the international industrial problems through the committees.

One of these problems was the supply of tin. Here our people trod on thin ice, for tin is a commodity in which British interests have what approaches a world monopoly. Tin is about the only important metal of which the United States has no adequate native supply. The great tin mines of the world are in Cornwall, in Bolivia, and in the East Indies. The British, of course, own the Cornish deposits, the British tin concessions in the East Indies are great ones, and British concerns are heavily interested in Bolivian tin mines. We had to have tin for numerous war purposes—mainly for the plating of cans in which to pack food for the A. E. F. Hence we were a heavy buyer of British tin, if not the heaviest buyer; and for us coolly to propose to the British the formation of an international executive to control the price of this essentially British product, was to hit certain powerful British interests where they were most exposed.

Yet for some time the British Government, taking the larger view of the situation, had desired the control of tin and also that of rubber, another tremendous British enterprise, but had never quite dared to draw the issue with the two industries. They were almost impregably entrenched in their position in the British Board of Trade, which ranks virtually as a department of the British Government. The war supply of British tin and rubber was in charge of a committee of the Board of Trade, and this committee was really a committee of the two industries. They were prepared to give the unsupported British Ministry a hard battle at any time.

The American position gave the coalition Government a weapon to use against these vested interests. Before our repre-

sentatives were to be permitted to sit on the tin and rubber committee, the United States demanded, first, that tin and rubber be separated and considered as individual entities; and secondly, that both commodities be brought under full governmental control. Even had the British Government wished to dispute this demand, which it did not, it would scarcely have dared do so; because America was the source of a few international war commodities herself—steel and copper and others—and was in a position to retaliate if British prices were not held within reason. Thus Mr. Summers was able to force a divorce between British rubber and British tin, and to bring British tin under control.

This he could not have done without the complete backing of the Government in Washington. The President and Secretary McAdoo of the Treasury stood stanchly behind Mr. Baruch in his foreign negotiations, and he in turn supported Mr. Summers and the Foreign Mission without reservation. The British Government had no appeal to higher authority; and as for the tin interests, they could hardly go to the British public and protest in effect: "Look here; Uncle Sam is making us do without our profits in order to establish the International Tin Executive, which will indeed save money and keep down taxes, but which will keep us from making as much money as we expected." Hardly.

The War Industries Board did not make contracts or purchases anywhere, but in the tin development it became necessary for it to assume charge of these concrete details. For our participation in the tin pool we needed ready cash, and plenty of it. The Board itself had no funds for such purposes, and none of the purchasing bureaus in Washington had money to be spared from other projects. It looked as if a special act of Congress appropriating the money would be necessary. But the War Industries Board was an impatient crew. It hated to go around a field if it could cut through; and it now arranged with the United States Steel Products Company to handle the tin deal. That concern put up several million dollars, bought all the tin allocated to America by the Executive, distributed

it according to the dictates of the Board, and charged not a penny for commissions or profits. The American consumers secured it at the international price.

The establishment of international executives was by no means all of the accomplishment of the Foreign Mission. Indeed, it did many things which found no place in official reports, which resulted in the establishment of no great executive bodies, which went unheralded then and thereafter, but which were often of far-reaching importance. The Mission was the reconnoitering patrol of behind-the-line industrial strategy; and because it was a small, compact body of experts, backed by a tremendous power, it was able to work wonders with great speed.

The Foreign Mission consisted of a dozen experts and two secretaries, all under the direction of Mr. Summers. Of these twelve, Mr. Chandler P. Anderson should first be mentioned. Mr. Summers described him as "both the motive power and the lubricant which kept the Foreign Mission wheels turning." Having been a counselor of the State Department and an arbitrator in several international questions, and possessing a wide acquaintance among both French and British government officials, he brought to the Mission an exceedingly useful knowledge of international law, procedure, and methods. Mr. George N. Armsby, a member of the Priorities Committee of the War Industries Board, and chief of its Tin Section, had charge of the negotiations leading to the formation of the International Tin Executive. Mr. Albert M. Patterson, president of the Textile Alliance and chief of the Board's Foreign Wool Section, was in command of the Mission's dealings in textiles. Mr. Paul Mackall, of the Bethlehem Steel Company, was the steel expert, and Mr. Henry W. Boyd, president of the Armour Leather Company, the hides and leather expert. Mr. Whiteside, president of the National Credit Company, was the group's statistician, and Mr. Edward A. Pierce, of A. A. Housman & Company, its business manager. Mr. Ordway, of the Crane-Ordway Company of Minneapolis, represented the Mission on the Interallied Munitions Council. Mr. John



Photo by Gessford

L. L. SUMMERS

Hughes, vice-president of the American Sheet and Tin Plate Company, aided Mr. Armsby in his campaign for the control of tin. Mr. Nixon was associated with Mr. Patterson in his work in textiles; and Dr. Lincoln Hutchinson, of Leland Stanford Junior University, looked after the Mission's interests in nonferrous metals. These men sailed for Europe in July, 1918. After the formation of the Tin Executive, Messrs. Armsby and Hughes returned to the United States, but the rest remained abroad until after the armistice.

After the Nitrates and Tin Executives had demonstrated their usefulness, the British Government took kindly to the general application of the principle of international executives, wherever it was of advantage to have them exist. However, the British assumed that all the executives would be set up with London as headquarters and that all of them would have English directors at the head. This was an untenable position, but it required tact and courtesy on the part of the Mission, combined with firmness, to demonstrate it. For instance, it was desirable to form an international executive in hides and leather; and there was never any question in the minds of Mr. Summers and his associates that, when formed, this executive should be run from Washington, because the greater part of the hides and leather to be controlled by it would come from America. The British Government finally agreed to this plan.

At the time of the armistice the two governments were contemplating the formation of international executives in tungsten, manganese, platinum, and flaxseed.

Steel, its allocation and use, was another subject for international consideration, the steel questions being decided by an international steel committee. It was upon Mr. Summers's insistence that an American was made chairman of this committee. This important but amusing episode occurred, in Mr. Summers's own words, as follows:

"We had not been invited into conferences in regard to the chairmanships of the several committees then formed and sitting in London. They were not executive committees, but

general committees under the Interallied Munitions Council. We felt some delicacy about raising the question of chairmanships and waited to be invited to attend conferences to consider it. Such conferences, however, did not take place, and yet we discovered that the committees were being organized.

“There was some delay while we were awaiting the Italian representatives who were to sit on the Steel Committee, and business with that committee proceeded informally under a temporary chairman. The day the permanent organization for the committee was to be adopted—there not yet having been any conferences in regard to the chairmanship—I simply preempted the chair at the meeting and stated that it had been called for the purpose of selecting a permanent chairman and perfecting a permanent organization; that inasmuch as America was supplying a greater amount of steel than the entire production of the rest of the Allies, it seemed only proper to suggest that an American chairman be appointed; and that, if there was no objection, I would nominate Mr. Paul Mackall as permanent chairman. This was so unexpected, and it so upset all arrangements, that no effective opposition existed. The Italians and the French were glad to see an American chairman. I then stated that, if there were no objections, Mr. Mackall would be declared permanent chairman; and, there being no objection, I announced that Mr. Mackall *was* permanent chairman, and would he kindly take the chair; and then I retired.

“That evening Mr. Winston Churchill’s private secretary called on me and asked that we meet and discuss the question of permanent chairmen for all committees to be formed under the Munitions Council, saying that they would be very glad to coöperate with the Americans in selecting chairmen.”

The question of the chairmanship of the International Steel Committee was no light one for us. In America the steel industry was completely under federal control. We allocated steel to the essential war needs and deprived our nonessential industries of it, but we had no adequate measure of the extent to which the foreign governments were depriving their non-

essential industries of steel. Knowing how easy it would be for England to utilize her purchases of American steel for war and at the same time to allow her own steel to flow into commerce in anticipation of the post-bellum trade revival, the Foreign Mission carefully studied the English production of steel.

Mr. Summers and Mr. Mackall visited the various steel works in both France and England. They found much opposition at first to their getting a detailed statement of where and how the steel was being allocated, but they finally obtained the facts they sought. Incidentally they uncovered an interesting transaction. The British had contracted to supply the Italians with 100,000 tons of steel. When they had delivered a few thousand tons on this order, they notified the Italians that England would expect Italy to replace this quantity of steel with American steel. Had the transaction gone through as the British expected, Italy would have placed an order in the United States for 100,000 tons of steel to be shipped to England; and the United States would have had no knowledge of what the original 100,000 tons of steel supplied to Italy by England had been used for. In the light of these facts, but without raising any question as to whether the Italians had used the steel for war purposes, the War Industries Board refused the Italian order on the ground that we had no knowledge to what use the steel had been put and had not been a party to the original contract.

The War Industries Board did not propose to starve our own steel-using nonwar industries with one hand, while scattering American steel to the ends of the earth with the other, without knowing something about what was happening to the export steel.

The great Allied Offensive started in July, 1918, and developed in extent, power, and success far beyond the original anticipations. By August it was evident that the combined use of French shell by both the American and French armies was dangerously depleting the French ammunition reserves. The chief shortage was in 75-millimeter shell. When the drive

started there had been 30,000,000 shell of this size in reserve. When the number had dwindled to 13,000,000, the French Minister of Munitions called for help. Mr. Summers and Mr. Mackall investigated at once and ascertained that, in the face of the shortage, the French shell plants were working only part time. The reason was that they had run out of shell steel. Mr. Baruch was advised of the extreme urgency of the situation, and he had Mr. Replogle, of the Steel Division, issue special instructions to the Lackawanna and Carnegie Steel companies to put on 75-millimeter steel in quantity. The effect was immediate. Within eighteen days—even before all the formalities of making out the order in Paris were completed—the American 75-millimeter shell steel began arriving in France; and the French machining factories stepped up to twenty-four hours' work a day. Not only were the French factories thereafter able to keep pace with a consumption of shell greater than any known before in the World War, but they actually succeeded, in those historic six weeks, in building the 75-millimeter shell reserves up to 19,000,000! Such was the value of the American Foreign Mission, representing a flexible control at home that could instantly concentrate upon the manufacture of some important war commodity.

Then there was the episode of the mules and the ammonia—strange association, but one which again demonstrated the usefulness of the War Industries Board and its Foreign Mission. The story begins with the roads of France—those beyond the railheads. They were so badly cut up by the heavy army trucks that it became impossible to move artillery on them with mechanical power. The A. E. F. had to have more mules and horses to move artillery and its supplies. We were sending all we could transport, but they were not enough. The agents of the A. E. F. scoured neutral Europe for animals. They uncovered a supply of mules in Spain, but Spain would not let them go. Spain needed them herself. But Spain also had a profitable munitions industry, which was languishing for ammonium sulphate. This it could not buy, because ammonium sulphate is used in large quantities in the manufacture of amatol, the



Photo from Sullers Steel Company

SHELL INGOTS FRESH FROM POURING FLOOR

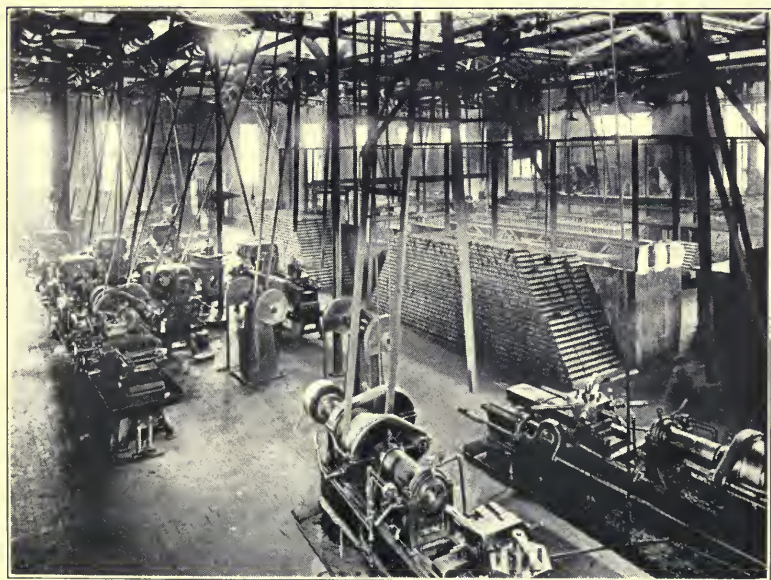


Photo from Spencer Engineering Company

BORING SHELL FOR 75'S

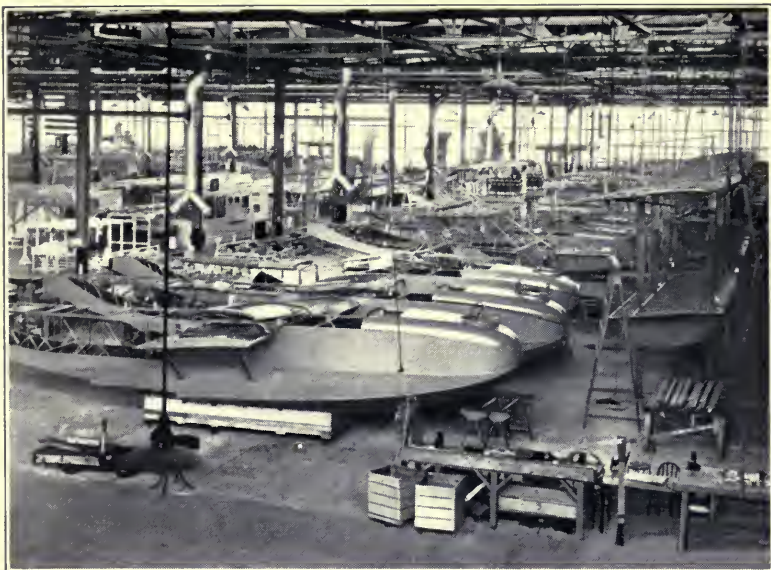


Photo from Curtiss Aeroplane & Motor Corporation

ASSEMBLING FLYING BOATS FOR NAVY



Photo from Quartermaster Department

CANNING VEGETABLES IN TINS FOR ARMY

high explosive. To conserve our own supply of ammonia, we had embargoed its export and had even shut off its use by non-war industries. Here, then, was a chance. Spain needed mules more than gold, but ammonium sulphate more than either.

The authorities of the Navy and of the Department of Agriculture (for ammonia is a fertilizer, too) and of the Food Administration all set their faces against any proposition to lift the embargo and trade American ammonia for Spanish mules. In vain the War Industries Board argued. Each of these authorities saw ammonia as his especial problem, and not as a part of the whole problem. But the War Department knew that the A. E. F. would be greatly handicapped if the mobility of the artillery were impaired.

“Baruch,” said the army heads, “unless we have those mules, the American Army in France will cease to move.”

“All right,” answered Mr. Baruch, “you get your mules.”

And get them they did. In the face of a united protest, he scaled down the essential domestic demands for ammonium sulphate, exported quantities of it to Spain, and bought mules there; and the artillery wheels turned.

That could not and would not have been done, had there not been a Foreign Mission to see and report. The chairman of the War Industries Board never refused any demand which came to him from the Foreign Mission. Having sent this Mission to be his eyes and ears abroad, Mr. Baruch heeded the information it brought him. Incidentally, it should be added that Mr. Baruch not only officially, but literally, “sent” the Foreign Mission abroad, paying its expenses (some \$68,000) out of his own pocket.

During the war the prices of leather reached a height never before imagined. When prices were at their highest, the American Army placed an order in England for 2,000,000 pairs of shoes for the A. E. F. It did this because, while the English price was higher than the American, the A. E. F. needed the shoes in a hurry, and the quartermaster officers abroad believed that the English factories could deliver them in the shortest possible time. Soon it became evident to the American mem-

bers of the International Hides and Leather Committee that the English shoe industry was having no easy time with the A. E. F. order. It kept asking for undue allocations of leather and for certain other preferences in treatment, and the Foreign Mission decided to investigate. It found that the British shoe factories could not possibly deliver the A. E. F. shoes in season and that the A. E. F. could save time and money and secure a superior product by ordering the shoes from America. Mr. Boyd crossed the Channel to France and proved this contention to the A. E. F.'s purchasing agency. The purchasing officers accepted the analysis and gave Mr. Boyd power to cancel the British order in writing. He waited until the British shoemakers again raised the question of special consideration by the Hides and Leather Committee, and then stated that he recognized how much England was sacrificing to handle this order; and that, because it was proving to be so great a hardship upon the industry, he had been able to get the American Army to cancel the order. And he handed the cancellation to the chairman of the committee.

It was also due to the Foreign Mission—and, specifically, to Mr. Legge and Mr. Summers—that scarcely had the armistice been signed when those ears and eyes of the War Industries Board were rapidly going through the devastated areas, sometimes even ahead of the retreating Germans, in order to obtain an accurate impression of the actual conditions. This was done in recognition of the fact that demands would soon be made upon America for materials to be used in reconstruction. To get a real idea of those demands, the flying squadron of the Foreign Mission, in automobiles, covered Belgium and Alsace-Lorraine, as well as the Rhine provinces; and the representatives were able to give to Colonel E. M. House some accurate statements about the situation, statements which led Colonel House to take up with the President the question of forming an organization to estimate the damage done to the invaded regions. The President authorized this plan; General Pershing appointed General McKinstry to take charge of it; and a representative of the War Industries Board served with General

McKinstry in estimating the total damage in the devastated regions.

Such was the work of the Foreign Mission. That our great industrial control organization would ever have power beyond the borders of its own country was something not to be foreseen; but, even so, the armistice found the War Industries Board activating a movement which was rapidly bringing about the unified control of industrial strategy behind the lines. The temptation recurs to compare this movement with the one which led to the supreme command of the Interallied Armies. Mr. Baruch was in no sense supreme commander of the international industrial situation—not the Foch of war industry. Nevertheless, through his Foreign Mission and backed by the powerful position of the United States, he managed to impose his will upon many foreign industries in affairs of the greatest moment—to bring them within the control of their own governments, and then to swing the governments into a co-ordination of effort which avoided waste of energy, made for speed, saved money, and proved its effectiveness as a war measure.

CHAPTER XI

ORGANIZATION AND PERSONNEL

THIS account has not thus far attempted to give a picture of the whole War Industries Board. It has contented itself with selecting certain of the Board's activities which, because of their obvious importance or novelty or picturesqueness in government, have been deemed to be of general interest; but in so doing it has passed by numerous offices and branches and divisions which were necessary to the smooth and ordered conduct of the Board's work, essential to its organization, but the interests of which lay in administrative and routine provinces. Yet it is unfair to dismiss these supporting organizations without mention, merely because they were not always on the battle front of war industry. And if the preceding pages have succeeded in conveying a just estimate of the eminence of the War Industries Board in the War Government, it is hoped that they will lend interest to what now follows.

However, it is impossible to give a complete picture of the War Industries Board and date the picture. One can not truthfully present a list of divisions, branches, and officials and say, "That was the War Industries Board." This emergency organization was constantly changing as its experience grew and its work expanded. Some officials left it for new fields; others took their places. Whole divisions were found to be out of key with the general scheme, and were lopped off. At one time there was a Finished Products Division, the duties of which, as its name indicates, were multifold. At that time the pioneer commodity sections dealt almost exclusively in raw materials. Later, however, the shortages in finished products asserted their need for separate consideration; and one after



Photo from Sperry Gyroscope Company

**PRECISION MACHINERY FOR MAKING NAVY
GYRO-COMPASSES**



Photo from Air Service

THOMAS-MORSE FUSELAGES READY TO BE COVERED

another the Finished Products Division passed over its specific duties to freshly created, small, compact, expert, sharp-cutting commodity sections.

There was an even profounder change in the organization of the Board. It will be remembered that for several months the Board existed only as an advisory body, virtually subordinate to the advisory Council of National Defense. Then descended upon it the mantle of supreme power, and it became a new force in Government. The War Industries Board of 1917 was not that of the final months of the war, although its *personnel* was largely the same. Yet this earlier period is not to be disregarded, for then was laid the foundation of much that was to follow. Obviously, the attempt here must be to present a composite which will represent the War Industries Board throughout its existence. The tendency, however, will be to show the organization as it existed during the Board's last days.

The general plan of the Board, then, placed Mr. Baruch at the top of it, delegating presidential powers, according to his plan of decentralization, to those men whom he gathered around him to carry on the work. Mr. Baruch was aided by four assistants: Mr. Herbert B. Swope (who was also an associate member of the Board), Mr. A. C. Ritchie (who acted as the Board's general counsel), Mr. Clarence Dillon, and Mr. Harrison Williams. Next in the organization chain came Judge E. B. Parker, the priorities commissioner, heading both the Priorities Commission and the Priorities Board. Mr. G. N. Peek, the commissioner of finished products, held in his executive domain the Textile and Rubber Divisions (Mr. John W. Scott was director of both) and the Facilities Division (headed by Mr. Samuel P. Bush). Mr. Peek had three assistant commissioners, Messrs. W. M. Ritter, E. L. Crawford, and W. Robbins, each in charge of questions relating to various finished products, in the aggregate ranging from trucks and automobiles to tobacco. On an official plane with Mr. Baruch, or under his orders, as you please, came Mr. R. S. Brookings and his Price Fixing Committee. Rear Admiral F. F. Fletcher represented the Navy upon the Board, and

Major General George W. Goethals the Army. Their positions were advisory: neither had direct charge of any executive function of the War Industries Board. Mr. Baruch received direct reports from and kept in close contact with the steel industry through Mr. J. L. Replogle, head of the Steel Division; knew labor conditions through Mr. Hugh Frayne; and kept an eye on explosives and chemicals through Mr. L. L. Summers. He kept in touch with the work of the Conservation Division through Mr. A. W. Shaw and with that of the Division of Planning and Statistics through Mr. E. F. Gay, watched the Board's regional advisers through the eyes of Mr. Charles A. Otis, and, finally, maintained a general supervision over everything he could not see for himself through the catholic vision of his vice chairman, Mr. Alexander Legge.

These names were names well known to American industry during the war, if they did not become well known to the American public. Indeed, some may wonder why Mr. Baruch, with all power behind him and all industrial and business life upon which to draw, did not select and place at the heads of the chief activities of the Board more men of national reputation for great things accomplished. The answer, of course, lay in Baruch himself, in his broad acquaintance among the men of industry, in his reliance upon his own judgments—in short, in his own characteristic way of doing things. Perhaps he might have done differently and fared as well, but no one who knows the record will quarrel with his methods. For the most part he picked up-and-coming men, men who were doing things in the world but whose careers and ambitions lay ahead of them rather than behind—men of the managing, planning, constructive type. You may be sure that Baruch tried no experiments in those ticklish days. He knew his people and was sure of them, and he made no mistakes.

Consider Alexander Legge as an example. He filled the position next in importance to the chairmanship itself. Yet Legge, who was an active officer of the International Harvester Company, had no more than a local reputation outside his own branch of industry. Baruch knew him, and all

American industry came to know him; and the statement is ventured here that if the Board's chairman had raked the country from Maine to California, he could not have made a happier choice. Legge possessed evenness of mind in combination with a tremendous store of energy and initiative. He could plan or execute his chief's plans equally well. A tower of strength in the War Industries Board—that was Legge.

These men came to Washington at the chairman's call, and for their dollar a year considered not hours or health or anything except the work ahead. Themselves untried and new, they teamed together in a new and untried machine and made it perform as well as if its bearings had been worn smooth by tradition, as well as if they themselves had grown up in the work. We have named but a few of them, those who filled the outstanding positions; but there were many others called to places of responsibility—scores upon scores. The reader is privileged to cast his eye down the third column of the subjoined list of the heads of various parts of the Board, that he may see for himself the kind of men who did the work.

<i>Name</i>	<i>Position in War Industries Board</i>	<i>Former Business</i>
Abbott, Arthur J.	Chief, Questionnaire Section	Member law firm, Evans, Abbott & Pearce, Los Angeles, California
Adams, H. J.	Chief, Mica Section, March to May, 1918; succeeded by J. W. Paxton	District sales manager, The Garford Motor Truck Company, Lima, Ohio
Aldrich, Truman H.	Chief Regional Adviser, Region No. 13, Resources and Conversion Section	Mining engineer, Birmingham, Alabama
Anderson, Chandler P.	Special Counsel, Vice Chairman's Office	Law firm, Anderson & Anderson, New York City
Armsby, George N.	Member, Priorities Committee; Chief, Tin Section	Vice president, California Packing Corporation, San Francisco, California
Atwood, Lewis R.	Chief, Paint and Pigment Section; succeeding R. S. Hubbard	President, Peaslee, Gaulbert Company, Louisville, Kentucky
Baker, Rhodes S.	Assistant Priorities Commissioner	Law firm, Thompson, Knight, Baker & Harris, Dallas, Texas
Barclay, J. Searle Barlow, DeWitt D.	Chief, Permit Section, Steel Division Associate Chief, Dredging Section	Trustee of an estate, New York City Vice president, Atlantic, Gulf & Pacific Company, New York City
Baruch, Bernard M. Blanchard, Isaac H.	Chairman, War Industries Board Chief, Paper Economics Section, Pulp & Paper Division	President, Isaac H. Blanchard Company, New York City
Bolton, Lieut. Col. C. C.	Secretary and Assistant to Chairman, General Munitions Board, and Chairman of Clearance Committee, May, 1917-May, 1918	Secretary, Bourne-Fuller Company, Cleveland, Ohio
Booth, George W.	Associate Chief, Fire Prevention Section	Chief engineer, National Board of Fire Underwriters, New York City
Boyd, Henry W.	Chief, Sole Leather Section	President, Armour Leather Company, Chicago, Illinois
Brand, Charles J.	Chairman, Committee on Cotton Distribution, affiliated with War Industries Board	Chief, Bureau of Markets, Department of Agriculture, Washington, D. C.
Brookings, Robert S.	Chairman, Price Fixing Committee	President, Board of Trustees, Washington University, St. Louis, Missouri

ALEXANDER LEGGE

Photo by Moffett



<i>Name</i>	<i>Position in War Industries Board</i>	<i>Former Business</i>
Brown, Alexander C.	Chief, Crane Section; Assistant to Commissioner of Finished Products	President, Brown Hoisting Machinery Company, Cleveland, Ohio
Brunker, Albert R.	Chief, Acids and Heavy Chemicals Section	President, Liquid Carbonic Company, Chicago & Atlantic Steel Casting Company, Chester, Pennsylvania
Bulkley, Robert J.	Chief, Legal Section, resigned August 31, 1918; succeeded by H. M. Channing	Law firm, Bulkley, Hauxhurst, Saeger & Jamieson, Cleveland, Ohio
Bush, Samuel P.	Director, Facilities Division; Chief, Forgings, Guns, and Small Arms Section	President, Buckeye Steel Castings Company, Columbus, Ohio
Carr, James A.	Business Manager, Allied Purchasing Commission	President, American Seeding Machine Company, Inc., Springfield, Ohio
Carrell, Horace G.	Chief, Alkali and Chlorine Section	Manager, Technical Service Department, Solvay Process Company, Syracuse, New York
Case, Mills E.	Chief, Contract Section, Division of Planning and Statistics	Statistician, New York City
Catlett, Charles	Chief, Refractories Section	Economic geologist and chemist, examiner of mineral properties; residence, Staunton, Virginia
Channing, Henry M.	Chief, Legal Section, August-December, 1918; succeeding R. J. Bulkley	Law firm, Channing & Frothingham, Boston, Massachusetts.
Chase, March F.	Director, Explosives Division	140 Nassau Street, New York City. Formerly vice president, Commercial Acid Company, St. Louis, Missouri.
Chatillon, George E.	Chief, Military Optical Glass and Instrument Section	President, John Chatillon & Sons, New York City
Chavannes, Frank S.	Chief Regional Adviser, Region No. 11, Resources and Conversion Section	President, Chesapeake Iron Works, Baltimore, Maryland
Clapp, Augustus W.	Chief, Labor Section, Priorities Division	Attorney, St. Paul, Minnesota
Clark, Harold T.	Assistant to Chairman	Attorney, member of firm of Squire, Sanders & Dempsey, Cleveland, Ohio

<i>Name</i>	<i>Position in War Industries Board</i>	<i>Former Business</i>
Clark, Leroy	Chief, Electric Wire and Cable Section	President, Safety Insulated Wire & Cable Company, New York City
Conner, Charles H.	Chief, Platinum Section, Wood Chemicals Section, and Gold and Silver Section	New York City. Associated with Kissel, Kinnicut & Company, New York City
Cotton, Donald R.	Chief Regional Adviser, Region No. 16, Resources and Conversion Section	District Sales Manager, Illinois Steel Company, St. Paul, Minnesota
Cover, Thomas, Jr.	Chief, Sole and Belting Leather Section	Partner, Cover & Company, Sole Leather, Philadelphia, Pennsylvania
Crabbs, Franklin D.	Chief Regional Adviser, Region No. 14, Resources and Conversion Section	Owner, Union Bank Note Company, Kansas City, Missouri
Crawford, Everett L.	Assistant Commissioner of Finished Products Division	Member firm of Crawford, Patton & Cannon, Bankers, New York City
Cromwell, Lincoln	Chief, Knit Goods Section	Member firm of William Iselin & Company, New York City
Darling, Ira C.	Chief, Creosote Section	President, Bartholomay & Darling Company, Chicago, Illinois
Darlington, Frederick Daugherty, Paul R.	Chief, Power Section Chief, Contract Section	Consulting engineer, New York City Employment expert, State Department of Labor, Philadelphia, Pennsylvania
De Nike, George E.	Associate Chief, Platinum Section	Graves, Manbert, George & Company, Buffalo, New York
Dillon, Clarence	Assistant to the Chairman	Member firm of Reed & Company, Bankers, New York City
Donnelley, Thomas E.	Director, Pulp and Paper Division	President, R. R. Donnelley Sons Company, Chicago, Illinois
Downman, R. H.	Chief, Lumber Section, April, 1917-July, 1918; succeeded by C. Edgar	Cypress, New Orleans, Louisiana
Du Bois, Capt. Henry C.	Chief, Electrodes and Abrasives Section	Assistant Secretary, E. J. Levino & Company, Philadelphia, Pennsylvania

<i>Name</i>	<i>Position in War Industries Board</i>	<i>Former Business</i>
Dunn, Harry T.	Chief, Rubber Section	President, Fisk Rubber Company, Chicopee Falls, Massachusetts, and Federal Rubber Company of Illinois, Cudahy, Wisconsin
Edgar, Charles	Director, Lumber Section, July-December, 1918; succeeding R. H. Downman	Retired, Essex Fells, New Jersey
Eisendrath, William B.	Chief, Upper, Harness, Bag, and Strap Leather Section	Secretary, Monarch Leather Company, Chicago, Illinois
Ellsworth, E. K.	Disbursing Officer, May 28-November 10, 1918, and March 4-June 30, 1919	Chief clerk and disbursing officer, Council of National Defense
Esberg, Alfred I.	Chief, Tobacco Section	Retired, Mountain View, California
Etherington, Burton	Chief, Yarn Section	Member firm of William d'Olier & Company, Philadelphia, Pennsylvania
Evans, Henry	Chairman, Advisory Committee, Fire Prevention Section	President, Continental Insurance Company, New York City
Felt, Dorr E.	Chief Regional Adviser, Region No. 9, Resources and Conversion Section	President, Felt & Tarrant Manufacturing Company, Chicago, Illinois
Fisher, Frank E.	Chief, Bureau of Applications and Issue, Priorities Division	Manufacturer, Detroit, Michigan
Flannery, Lt. Col. J. R.	Chief, Railroad Equipment and Supplies Section	President, Flannery Bolt Company, Pittsburg, Pennsylvania
Fletcher, Esten A.	Chief Regional Adviser, Region No. 6, Resources and Conversion Section	Member firm of Phelps & Fletcher, Rochester, New York
Fletcher, Admiral F. F.	Chairman, Clearance Committee, May-July, 1918	Washington, D. C.
Foster, Charles K.	Vice Chairman, Priorities Committee	Vice president, American Radiator Company, Chicago, Illinois
Foster, Mortimer B.	Chief, Miscellaneous Commodities Section	Treasurer and director, Shield Electric Company, New York City, and Southern Export Corporation, New York City
Frayne, Hugh	Chairman, Labor Division	General organizer, American Federation of Labor, New York City

<i>Name</i>	<i>Position in War Industries Board</i>	<i>Former Business</i>
Gay, Edwin F.	Chairman, Central Bureau of Planning and Statistics	Dean of Graduate School of Business Administration, Harvard University
Gibbs, Edwin C.	Chief Regional Adviser, Region No. 10, Resources and Conversion Section	Retired, Cincinnati, Ohio
Grothaus, Leo W.	In charge of Turbine Department, Electric and Power Equipment Section	Sales engineer, Allis-Chalmers Manufacturing Company, Milwaukee, Wisconsin
Guffey, Joseph F.	Chief, Petroleum Section	Pittsburg, Pennsylvania
Haley, Edwin J.	Chief, Tanning Materials and Natural Dye Section	President, Haley-Hammond Company, New York City
Hamilton, C. D. P.	Chief, Boot and Shoe Section	Vice president, International Shoe Company, St. Louis, Missouri
Hanch, Charles C.	Chief, Automotive Products Section; succeeded by H. L. Horning	Treasurer, The Studebaker Corporation, South Bend, Indiana
Hatfield, Henry R.	Director, Division of Planning and Statistics	Dean and Professor of Accounting, University of California
Hayward, Nathan	Associate Chief, Dredging Section	President, American Dredging Company, Philadelphia, Pennsylvania
Heidrich, Edward C., Jr.	Chief, Jute, Hemp, and Cordage Section	Vice president and manager, Peoria Cordage Company, Peoria, Illinois
Horning, Harry L.	Chief, Automotive Products Section, September, 1917-June, 1918; succeeded by C. C. Hanch	General manager, Waukesha Motor Company, Waukesha, Wisconsin
Howe, Owen C.	Chief, Foreign Skins and Hides Section	Partner, Sands & Lockie, Boston, Massachusetts
Hubbard, Russell S. (Deceased)	Chief, Paint and Pigment Section	Philadelphia, Pennsylvania
Humphrey, Richard L.	Director, Building Materials Division	Consulting engineer, Philadelphia, Pennsylvania
Huyck, Edmund M.	Chief, Papermakers' Felt Department	Member firm of F. C. Huyck & Sons, Albany, New York
Ingels, Howard P.	Secretary, War Industries Board	Second vice president, Realty Guarantee & Trust Company, Youngstown, Ohio



Photo by Harris & Ewing

GEORGE N. PEEK

<i>Name</i>	<i>Position in War Industries Board</i>	<i>Former Business</i>
Ingles, James	Chairman, Storage Committee; Chairman, Employment Management Courses; in charge Cotton Compression	President, American Blower Company, Detroit, Michigan
Inman, Edward H.	Chief Regional Adviser, Region No. 12, Resources and Conversion Section	Member, Inman, Howard & Inman, Atlanta, Georgia
Jackson, Lewis B.	Chief, Domestic Skins and Hides Section	Chief, hide department, W. H. McElwain Company, shoe manufacturers, Boston, Massachusetts
James, George R.	Chief, Cotton and Cotton Linters Section	President, Wm. R. Moore Dry Goods Company, Memphis, Tennessee
Johnson, Jackson	Chief Regional Adviser, Region No. 15, Resources and Conversion Section	Retired, St. Louis, Missouri
Jones, W. Clyde	Counsel, Nonwar Construction Section	Law firm, Jones, Addington, Ames & Seibold, Chicago, Illinois
Kean, David L.	Chief, Surgical Instruments and Hospital Equipment Section	General manager, Chas. Lentz & Sons, Philadelphia, Pennsylvania
King, Victor L.	Chief, Artificial Dyes and Intermediates Section	Consulting chemical engineer, Woods Ridge, New Jersey
Knight, Thomas S.	In charge of Electrical Department, Electrical and Power Equipment Section	Head of switchboard department, General Electric Company, Boston, Massachusetts
Knobel, John Esher	Director, Division of Business Administration	Manager, personal estate, Chicago, Illinois
Koster, Frederick J.	Chief Regional Adviser, Region No. 19, Resources and Conversion Section	President, California Barrel Company, San Francisco, California
Kratz, John A.	Assistant to Vice Chairman, in charge of cable-grams	Attorney, Washington, D. C.
Legge, Alexander	Vice Chairman, War Industries Board; Chairman, Requirements Division	Vice president and general manager, International Harvester Company, Chicago, Illinois
Leith, Charles K.	Chief, Mica Section, June-December, 1918; succeeding J. W. Paxton	Professor of Geology, University of Wisconsin

<i>Name</i>	<i>Position in War Industries Board</i>	<i>Former Business</i>
Lipsitz, Louis	Chief Regional Adviser, Region No. 18, Resources and Conversion Section	Business man, Dallas, Texas
Louis, Harry J.	Chief, Gloves and Leather Clothing Section	Manager, Bachner-Moses-Louis Company, Gloversville, New York
Lovett, Robert S.	Priorities Commissioner, September 25, 1917-March 4, 1918; succeeded by Judge E. B. Parker	Chairman Executive Committee, Union Pacific Railway System
Lundoff, C. W.	Chairman, Emergency Construction Committee, April-May, 1917; succeeded by Col. W. A. Starratt	President, Crowell-Lundoff-Little Co., Cleveland, Ohio
McAllister, W. B.	Chief Regional Adviser, Region No. 7, Resources and Conversion Section	President, W. B. McAllister Company, Cleveland, Ohio
McCutcheon, Thomas P.	Associate, Technical and Consulting Section, Chemical Division	Professor of Chemistry, University of Pennsylvania
McDowell, Charles D.	Director, Chemicals Division	President, Armour Fertilizer Works, Chicago, Illinois
McLaughlan, Jay C.	Chief, Pig Iron Section	Member firm of Pickands, Mather & Company, Cleveland, Ohio
McLennan, Donald R.	Chief, Nonwar Construction Section	Marsh & McLennan, Chicago, Illinois
Macpherson, Frank H.	Chief, Bureau of Applications and Issue, Priorities Division	President and treasurer, Detroit Sulphite Pulp & Paper Company, Detroit, Michigan
Manss, Wm. H.	Director, War-Service Committees	United States Chamber of Commerce, Washington, D. C.
Martin, Willard B.	Chief Clerk, War Industries Board	Private secretary, Central Railroad of New Jersey, Plainfield, New Jersey
Mercury, Chester C.	In charge of Reception Room, Priorities Division	South American representative, Geo. D. Emery Company, lumber, New York City
Merrill, William H.	Chief, Fire Prevention Section	President, Underwriters' Laboratories, Chicago, Illinois
Merryweather, George E.	Chief, Machine Tool Section	President, Motch & Merryweather Machinery Company, Cleveland, Ohio

<i>Name</i>	<i>Position in War Industries Board</i>	<i>Former Business</i>
Minnick, Arthur	War Industries Board Representative, Joint Office on Chemical Statistics	First Assistant Examiner, United States Patent Office
Mitchell, Dr. Wesley C.	Chief, Price Section	Professor of Economics, Columbia University, New York City
Montgomery, Fletcher H.	Chief, Hatters' Felt Department	President, Knox Hat Company, New York City
Moody, Herbert R.	Associate, Technical and Consulting Section, Chemical Division	Professor of Industrial Chemistry, College of the City of New York
Morehead, Maj. John M.	Chief, Coal and Gas Products Section	Consulting engineer, Union Carbide & Carbon Corporation, and People's Gas Company, Chicago, Illinois
Morgan, Wm. Fellowes	Chief Regional Adviser, Region No. 3, Resources and Conversion Section	Attorney, New York City
Morss, Everett	Chief, Brass Section, and Member, Priorities Committee	President, Morss & Whyte Company, Simplex Wire & Cable Company, Simplex Heating Company, Boston, Massachusetts
Musser, James C.	Secretary in charge of Clearance Office, Requirements Division	Law firm, Musser, Kimber, Huffman & Musser, Akron, Ohio
Newton, Mary E.	Chief, Bureau of Personnel, Division of Business Administration	Appointment Division, Census Bureau, Washington, D. C.
Nichols, Harold W.	Chief, Fiber Board and Container Section, Pulp and Paper Division	President, Fox Paper Company, and Chesapeake Pulp & Paper Company, Cincinnati, Ohio
Oliver, George S.	Chief Regional Adviser, Region No. 5, Resources and Conversion Section	President, Newspaper Printing Company, Philadelphia, Pennsylvania
Otis, Charles A.	Chief, Resources and Conversion Section	Member of firm, Otis & Company, Cleveland, Ohio
Palmer, G. J.	Chief, Newspaper Section, Pulp and Paper Division	Acting vice president, The Houston Post, Houston, Texas
Parker, Judge Edwin B.	Priorities Commissioner	Law firm, Baker, Botts, Parker & Garwood, Houston, Texas

<i>Name</i>	<i>Position in War Industries Board</i>	<i>Former Business</i>
Parsonage, Edward E.	Chief, Agricultural Implements, Vehicles and Wood Products Section	Secretary and manager, John Deere Wagon Company, Moline, Illinois
Patterson, Albert M.	Chief, Foreign Wool Section	President, Textile Alliance, New York City; Waterloo Woolen Manufacturing Company, Waterloo, New York
Paxton, Jesse W.	Chief, Mica Section, May-June, 1918; succeeding H. J. Adams	President, Highland Glass Company, Washington, Pennsylvania
Peabody, Herbert E.	Chief, Woolen Section	Sales agent, Shelbourne Mills, Philadelphia, Pennsylvania
Peck, George N.	Commissioner, Finished Products	Vice president, Deere & Company, Moline, Illinois
Penwell, Lewis	Chief, Domestic Wool Section	Lewis Penwell Company, Helena, Montana
Phillips, W. Vernon	Chief, Iron and Steel Scrap Section	President, F. R. Phillips & Sons Company, Philadelphia, Pennsylvania
Pierce, Bradford D., Jr.	Chief Regional Adviser, Region No. 2, Resources and Conversion Section	Director, Bridgeport Trust Company, Bridgeport, Connecticut
Pierce, Edward Allen	General Business Executive, Foreign Mission	Member of firm, A. A. Housman & Company, New York City
Pinci, Anthony R.	Chief, <i>Personnel</i> Division	Writer, Washington, D. C.
Powell, Thomas C.	Chief, Inland Traffic Section	Vice president, Southern Railway Company, Cincinnati, Ohio
Replogle, J. Leonard	Director, Steel Division	President, American Vanadium Company, New York City
Ritchie, Albert C.	General Counsel, War Industries Board	Attorney General of Maryland, Baltimore, Maryland
Robbins, Walter	Chief, Electric Power and Equipment Section	Vice president, Underwriters' Laboratories, Chicago, Illinois
Rogers, Charles A.	Chief, Harness and Personal Equipment Section	Retired, Hartford, Connecticut
Root, Charles T.	Chief, Periodical Section, Pulp and Paper Division	Director, United Publishers Company, New York City

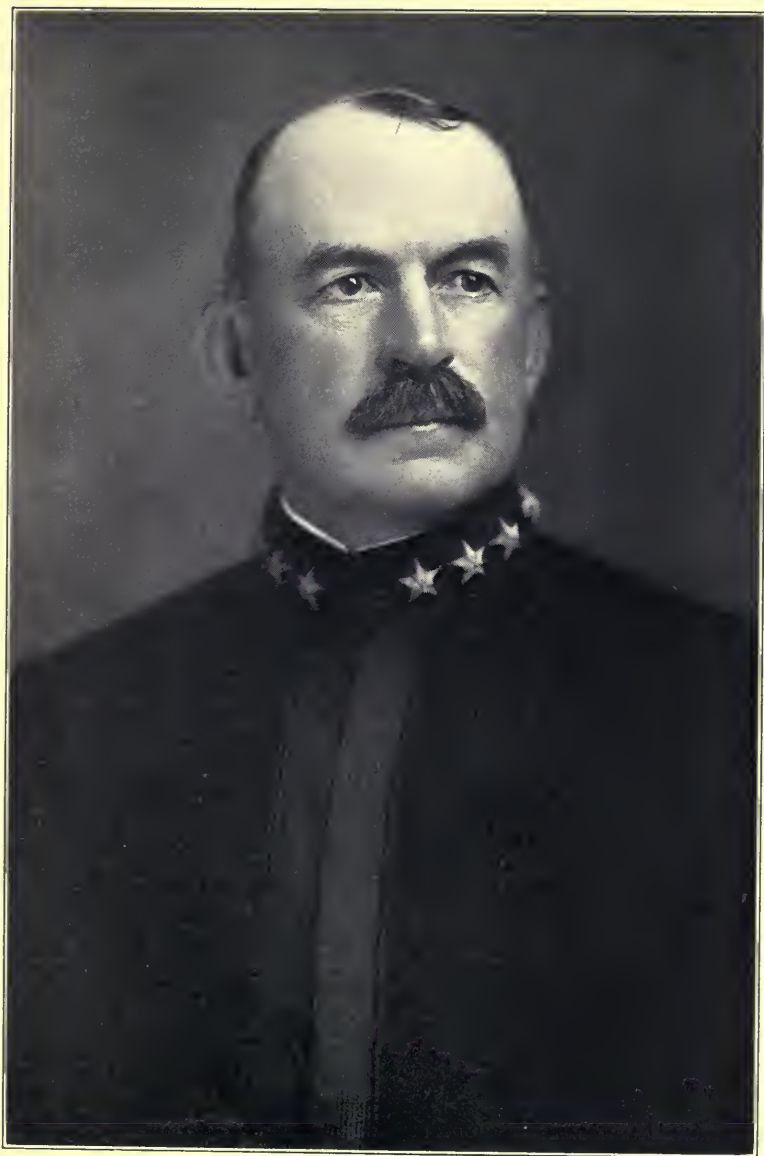


Photo by Pach Brothers

ADMIRAL F. F. FLETCHER

Navy Department Representative on War Industries Board

<i>Name</i>	<i>Position in War Industries Board</i>	<i>Former Business</i>
Rosengarten, Adolph G.	Chief, Fine Chemicals Section	Vice president and treasurer, Powers-Weightman-Rosengarten Company, Philadelphia, Pennsylvania
Rowbotham, George B.	Chief, Belting Section	President, Bay State Belting Company, Boston, Massachusetts; Southern Belting Company, Atlanta, Georgia
Sanford, Hugh W.	Chief, Ferro-alloys Section	Treasurer and general manager, Sanford-Day Iron Works, Knoxville, Tennessee
Sargent, Murray	Chief, Hardware and Hand Tool Sections	Secretary, Sargent & Company, New Haven, Connecticut
Sawyer, Capt. Daniel E.	Chief, Projectile Steel, Rails, etc., Section	Salesman, Block, Maloney & Company, Chicago, Illinois
Schmidt, John C.	Chief, Chain Section	President, Schmidt & Ault Paper Company, York, Pennsylvania
Schoellkopf, J. F., Jr.	Chief, Artificial and Vegetable Dye Section	Vice president, National Aniline & Chemical Company, Buffalo, New York
Scott, Frank A.	Chairman, General Munitions Board; Chairman, War Industries Board, August 1-November 1, 1917	Treasurer, Warner & Swasey, Cleveland, Ohio
Scott, John W.	Director, Textile and Rubber Division	Carson, Pirie, Scott & Company, Chicago, Illinois
Scott, W. G.	Disbursing Officer, November 11, 1918-March 3, 1919; succeeding E. K. Ellsworth	War Department, Washington, D. C.
Shaw, A. W.	Chairman, Conservation Division	President, A. W. Shaw Company, Chicago, Illinois
Shotwell, Edward C.	Chief, Glove Leather Section	Member of firm, S. H. Shotwell & Sons, Gloversville, New York
Simpson, Lt. Col. F. F.	Chief, Medical Section	Surgeon, Pittsburgh, Pennsylvania
Skinner, William	Chief, Silk Section	President, Wm. Skinner & Sons, Holyoke, Massachusetts

<i>Name</i>	<i>Position in War Industries Board</i>	<i>Former Business</i>
Smith, Charles Henry	Associate Chief, Fire Prevention Section	Vice president, Blackstone Mutual Fire Insurance Company, Providence, Rhode Island
Smith, George	Chief, Flax Products Section	President, Smith & Dove Manufacturing Company, Andover, Massachusetts
Sowers, W. J.	Southern Lumber Administrator	Secretary and treasurer, Major-Sowers Saw Mill Company, Epley, Mississippi
Starrett, Col. W. A.	Chairman, Emergency Construction Committee, May, 1917-December, 1918; succeeding C. W. Lundoff	Starrett & Van Vleet, architects, New York
Stout, C. Frederick C.	Director, Hide, Leather, and Leather Goods Division	Partner, John R. Evans & Company, Philadelphia, Pennsylvania
Stroock, Sylvan I.	Chief, Felt Section	Member firm of S. Stroock & Company, New York City
Summers, Leland L.	Technical Adviser, War Industries Board	L. L. Summers & Company, New York City
Swope, Herbert B.	Associate Member, War Industries Board	City Editor, New York <i>World</i>
Templeton, Allan A.	Chief Regional Adviser, Region No. 8, Resources and Conversion Section	Manufacturer, Detroit, Michigan
Thompson, Frank E.	Chief, Steel Products Section	Superintendent, Order Department, Cambria Steel Company, Johnstown, Pennsylvania
Torrence, Robert M.	Chief, Chemical Glass and Stoneware Section	Secretary, Highland Glass Company, Chicago, Illinois
Trigg, Ernest T.	Chief Regional Adviser, Region No. 4, Resources and Conversion Section	Vice president, John Lucas & Company, Philadelphia, Pennsylvania
Turner, Spencer	Chief, Cotton Goods Section	Vice president, Turner-Halsey Company, New York City
Vanduzer, H. B.	Pacific Coast Lumber Administrator	Chairman, Fir Production Board, Portland, Oregon
Vauclain, Samuel M.	Chairman, Special Advisory Committee on Plants and Munitions	Senior vice president, Baldwin Locomotive Works, Philadelphia, Pennsylvania
Vogel, August H.	Chief Regional Adviser, Region No. 17, Resources and Conversion Section	Vice president, Pfister & Vogel Leather Company, Milwaukee, Wisconsin

<i>Name</i>	<i>Position in War Industries Board</i>	<i>Former Business</i>
Vogel, Fred A.	Chief, Upper Leather Section	General manager, Pfister & Vogel Leather Company, Milwaukee, Wisconsin
Waterman, John H.	Chief, Machine Department, Electrical and Power Equipment Section	Engineer, Allis-Chalmers Manufacturing Company, Milwaukee, Wisconsin
Webb, Stuart W.	Chief Regional Adviser, Region No. 1, Resources and Conversion Section	President, Clinton Wire Cloth Company, Worcester, Massachusetts
Weidlein, Edward R.	Associate, Technical and Consulting Section, Chemical Division	Acting director, Mellon Institute, Pittsburgh, Pennsylvania
Wheeler, Andrew	Chief, Warehouse Section, Steel Division	Senior partner, Morris Wheeler & Company, Philadelphia, Pennsylvania
Whitmore, Brewer G.	Dean of Students, Employment Management Courses	Professor of English and Government, Harvard University
Wilkins, John F.	Chief, Stored Materials Section	Treasurer, Wilkins Securities Corporation, Washington, D. C.
Wilson, Sidney L.	Chief, Manufacturing Section, Pulp and Paper Division	Vice president, Graham Paper Company, St. Louis, Missouri
Wingquist, Raymond W.	Chief Reporter, War Industries Board	Stenotypist, Navy Department, residence, Rockford, Illinois
Witherspoon, Herbert	Chief Regional Adviser, Region No. 20, Resources and Conversion Section	Vice president, Spokane & Eastern Trust Co., Spokane, Washington
Woolfolk, William G.	Chief, Sulphur and Pyrites Section and Ethyl Alcohol Section	Sanderson & Porter, engineers and contractors, Chicago, Illinois
Yeatman, Pope	Chief, Nonferrous Metals Section	Consulting engineer, New York City

Now, a few words about the division of effort in the Board, the scheme of its organization, and the interrelation of its various parts. The work of the War Industries Board was essentially that of stimulating the production of war materials and of curtailing the production of nonwar materials, always with thought for the welfare of the whole industrial structure when the war should end. This was accomplished by regulation of the basic economic elements: facilities, materials, fuel, transportation, and capital. In such regulation the administration of priorities proved to be the master key to industrial control.

The hopper of the mill was the Requirements Division. In theory, to the Requirements Division came all the demands for all commodities, which demands the Division assembled and passed on to the chairman to enable him intelligently to direct the work of the commodity-section chiefs, who were in charge of supply and the allocation of products. The Requirements Division weighed the necessity or urgency of various demands, considered ways and means of stimulating supply when it was inadequate, and also took up questions of whether industrial curtailment and conservation could be exercised without killing the nonwar industries affected. This Division was in constant contact with the principal departments, administrations, and bureaus of the War Government. Many of the plans originated by this Division were carried out by the commodity sections, but the Clearance Office also played a leading rôle in securing urgently needed supplies for Army and Navy.

Much of the work of the Requirements Division had to do with the conversion of nonwar factories into munitions plants. In this work it found occasion to use a great deal of first-hand information from the field. To secure general industrial intelligence the Board introduced its system of "regional advisers." The country was divided into twenty districts, or regions, for this purpose, with a regional adviser, an appointee of the Board, in each. He worked with chambers of commerce and other business associations to secure pertinent information about local conditions—about plants available for conversion,

labor conditions, capital available for the financing of industrial changes, transportation facilities, and so on. Without such intimate knowledge in Washington of conditions in the field, there would always have been danger that war contracts involving factory conversions would be loaded upon plants already engaged in essential work, with no resulting net gain of product.

Akin to the work of converting factories was that of providing entirely new war plants. This was in the domain of the Facilities Division, which studied new projects, advised in the selection of building materials in order to avoid long railroad hauls, compiled lists of contractors, builders, and architects, kept records of the existing government construction work, so that new work would be allocated to concerns not already burdened with contracts, prevented the creation of new facilities where old and existing ones could be made to serve, coordinated the efforts of all government departments so as to prevent duplication of work, and saw to it that when contractors were ready for building materials, the materials were ready, too.

In a way the Priorities Division was the pivot on which the whole Board swung, since to direct the priority of access of facilities was the simplest, most direct, and quickest method of obtaining compliance with the War Industries Board's wishes. The Priorities Division considered priorities in transportation and administered priorities in production and in the use of power and of labor. Necessity forced the Division to create its Nonwar Construction Section which, because it inhibited nearly all civilian construction work during the war, became the target for most of the criticism leveled at the War Industries Board.

The Industrial Adjustment Committee was able to divert a good deal of this usually unmerited and frequently unjust criticism. This committee afforded an opportunity for disaffected concerns to be heard in plea and argument before any drastic rulings and decisions were put into effect. The Adjust-

ment Committee was the outlet through which nonwar manufacturing could pass to become essential war industry.

The Price Fixing Committee determined maximum commodity prices, but acted only when the Government took so much of any supply that the price tended to rise. As an example, the Government took the total supply of wool, first fixing the prices and then buying all the wool at the prices fixed; but the Government did not fix the price of cotton, because its purchases of cotton were not large enough to affect cotton prices. The Committee's prices were maintained alike to all purchasers: its function was to protect all. That it was able to perform most of its work through agreements with war-service committees of industries, rather than through harsh regulation and police enforcement, is testimony to the fine attitude of American business during the war.

The Commodity Sections controlled certain industries absolutely; certain others they advised, stimulated, and aided only. At one time or another the production and use of chlorine, copper, cotton duck, cotton linters, felts, hides and skins, manganese and chrome, optical glass, nitrate of soda, platinum, steel and iron, sulphur, toluol, turbines, wood chemicals, and wool were entirely controlled by the War Industries Board—either by agreement, as with steel, or by actually purchasing and taking over the entire supply, as with wool.

The Purchasing Commission for the Allies assured our foreign friends of the lowest prices and swiftest deliveries and brought together the foreign requisitions *en bloc* to reconcile them with our own, to the end that no one country should have to wait while the others were served.

The Labor Division dealt with all labor questions which came before the War Industries Board. The work of the Division included activities in the reclamation of manpower and waste materials, utilization of the work of prisoners, the education and vocational training of crippled soldiers, sailors, and industrial workers, the standardization of industry in penal institutions, road work for prisoners, and work for discharged or paroled prisoners.



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VALEDICTORY

*Judge Parker Presenting Loving Cup to Chairman Baruch as
War Industries Board Dissolves*

Industrial conservation was an element in almost every act of the War Industries Board. Most of the executive units of the Board initiated or enforced projects in conservation, but the Conservation Division itself had general supervision of this work. Briefly, industrial conservation was the elimination of waste and lost motion in industry, whether of power, labor, materials, or methods.

In this great organization there was one startling defect, one glaring omission—the War Industries Board maintained no publicity department. How it ever managed to struggle along through without this modern adjunct to executive performance must be left for other analysts to discover. Having failed, however, to provide himself with specialized spokesmanship, Mr. Baruch was forced to rely upon the volunteer offices of the regular press correspondents of Washington in order to let the country know what the Board was doing. Mr. Baruch made himself accessible, and his subordinates had his permission to “talk” at any time. The Board received a steady flow of news publicity; and the correspondents seemed to take kindly to the arrangement, for, when the curtain was rung down and the chairman ended his work, they presented to him a gold penknife as a token of their esteem.

Such was the War Industries Board. Crystallizing amid the nebulae of previous mistakes, it flashed forth in the governmental firmament as a radiant new star, to shine for a brief day and then to die. Of all the war administrations in Washington, this one, which had exerted more power than any of the others, was the first to disintegrate. Its people held active places in the workaday world; and when the armistice came, they swallowed their disappointment that American war industry had not had time to throw its full weight against the foe and hastened back to help set the industrial world to rights. They scarcely paused to write down the record of what they had done. They had given America her first and only experience with governmental industrial control. And they left behind them a legacy to future America—a great lesson learned. It is this: In any important war of the future, American industry must be as thor-

oughly disciplined and controlled as America's Army on land and America's Navy at sea. And by the very nature of future war—because, for all we can now see, war will become more and more mechanical, more and more an affair of machinery—the control of the industry which supplies the machinery must inevitably become a power superior to the powers which maneuver the forces on land and sea.

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