INDUSTRIAL MOBILIZATION OF THE UNITED KINGDOM

IN WORLD WAR II

21 April 1947

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THE INDUSTRIAL COLLEGE OF THE ARMED FORCES

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GENERAL McKINLEY: Gentlemen, this is a rather unique honor, having a speaker in the College from across the seas. I think it is a great gesture and I am very happy about the whole thing.

We have with us this morning Lieutenant General F. G. Wrisberg, whom I had the privilege of meeting in Italy when I was on duty over there. He came to Italy with a Supply Mission, trying to see what Italy could make for the war in the Far East. Unfortunately, it folded up before we could get much done.

General Wrisberg is the Controller of Supplies in the Ministry of Supply. (The title has parentheses around "Munitions"; I am not sure what that means.) He is a graduate of Oxford University. In 1915 he was appointed Second Lieutenant and promoted, finally, to Lieutenant General in 1946.

During his service in the War Office, he was mainly concerned with antiaircraft artillery and the air defense of Great Britain. He was appointed Deputy Director-General of Weapon and Instrument Production in January, 1942; Director-General in July, 1943 and Director-General of Armament Production in November of 1945. He has been the Controller of Supplies (Munitions) since February, 1946.

This morning General Wrisberg will speak to us on "Industrial Mobilization of the United Kingdom in World War II." I take great pleasure, indeed, in introducing to you Lieutenant General F. G. Wrisberg.

(Applause)

LIEUT. GENERAL WRISBERG: Gentlemen: I want, in the course of this lecture, to explain to you the mechanism and processes by which the United Kingdom turned over from peace to war in World War II and, at the same time, kept some measure of resources for its civil population.

Before I say anything at all about the planning which, of course, was primarily on behalf of the fighting services, I think I ought to give you some idea of those Government Departments which, of necessity, had to take part in that work. Our system is rather different from yours. Following a General Election, the leader of the majority party is invited by His Majesty, the King, to form a government. The leader

of the party generally becomes Prime Minister. He selects members of his party who are appointed to the various Government Departments as Ministers. From them he forms a cabinet. The whole system depends upon Ministerial responsibility to the cabinet, and on to Parliament.

The Departments with which we are going to be concerned in making this review are the Admiralty, the War Office and the Air Ministry, controlling the fighting services.

The Ministry of Supply, concerning whose functions I shall talk at greater length a little later.

The Board of Trade, responsible for the general well-being of Industry and for such things as the import and export policy.

The Home Office, who deal with internal security and during the war had the problem of air-raid precautions.

The Ministry of Labour, dealing with all questions of manpower and industrial relationships.

I would like to bring out one point: In each case the Minister is responsible directly to the cabinet and directly to Parliament for the conduct of his own Department.

With this rather general background, I would like to start by giving you some idea of the prewar organisation.

Between the wars (the period 1919 and 1939), it was the duty of the Committee of Imperial Defence to evolve plans against the eventuality of Great Britain being involved in war. In making these preparations there were four main questions which had to be considered. The first was, What would be the estimated growth of the three services during the opening phases of the war? What supplies would be required to meet their needs? What labour and manufacturing capacity would be involved? What supplies of raw material would be needed and what steps would have to be taken to safeguard this material in time of war? That was the duty of one of the sections of the Committee of Imperial Defence in the prewar period.

To advise this Committee and to coordinate the War Supply arrangements for the three services, a subcommittee known as the Principal Supply Officers Committee was set up. The members of the Principal Supply Officers Committee were the senior Supply Officers of the three services, with representation from the Board of Trade, the Home Office, the Ministry of Labour and the Department of Scientific and Industrial Research.

The Supply Board that was set up under this arrangement worked through a series of committees and subcommittees. Each one was responsible for a definite category of equipment. They would have the whole range of war needs for the three services. They also dealt with the big problem of civil defence.

During the years 1927 to 1939 this Committee was completely hamstrung by the lack of strategical guidance. They had no idea what the relative composition and relative build-up of the services was. They asked two simple questions and got no answer to either one of them. Those questions were: What sort of war are we going to fight? When are we going to fight it? They got no answer at all. Their work was completely hamstrung indirect efficiency as a result.

The main work they undertook was the compilation of a register of British firms and an assessment of each firm's capacity to make the particular piece of war equipment. They made lists of balancing plants required for the manufacture of the stores of her own particular section. They drew up process manuals. By "process manuals" I mean a detail of how a firm, new to a product, should undertake its production.

This Committee had no finances at its disposal, so it was unable to acquire any of the balancing plant. It was unable to place any educational orders. They could enter into no firm commitments with individual firms. They could not build up the reserve stocks of vital materials which they knew would be wanted in war. But nevertheless they got a good plan on paper.

The year 1936 saw a completely new outlook. It was started by what we came to know as "Mussolini's African adventure." It really scared the United Kingdom into a measure of rearmament. We started to make new Government ordnance factories. The Admiralty extended their dockyards and the Air Ministry started shadow factories for the aircraft industry.

During this period the first steps were taken for the institution of the controls. Controls were designed for the distribution of the basic raw materials the industry must have in order to meet the new war economy.

There were a number of problems which had to be tackled. The first one was the purchase, sale and use of the material. The second was the requisitioning of material for Government needs. A lot of work was done on substitutes; their problem was to find out how substitutes could be brought into operation. Other problems were price control; restriction of exports; precautions against air-raid damage.

The Control Organisation started, in about 1936, to tackle those problems. So we can say at this point, although we had no real industrial mobilization the background had been filled in. We had at least marked out what we wanted to do.

During this period it became very clear that under the conditions of modern war the concentration of control in London for all the complex arrangements for the conduct of a war was a risk which we could not possible accept. Apart from bombing, there was a very serious possibility of invasion. If the invasion were successful, there would be loss or isolation of sections of the country.

The Supply Committee of the Committee of Imperial Defence and the other committees of that body paid really serious attention to this centralization. The beginning of decentralization came in the setting up of what we called a Regional Organization. The country was divided into nine (9) main regions, each in charge of a Regional Commissioner. The Regional Commissioners functioned through a Regional Board, on which there were representatives of all the Supply organizations in the country: Ministry of Labour, Board of Trade, and the Home Office. A very large measure of responsibility was delegated to the regions. The various Ministry representatives were kept completely informed of the production programs and the details of orders placed in their regions. The regions, therefore, in this way, were able to act independently in any emergency, with a full knowledge as to what the Government intended to do and a full knowledge of what their own Department had planned.

I think a good thing to do now is to see what practical facilities existed in the U.K. at the outbreak of war. In doing so, I think we should consider the Government Departments under three main headings: Ordering Departments, the Purchasing Departments, and the Supervising Departments. And, in order to keep a sequence in our heads, I think we should confine our attention to the three Service Ministries because their demands on the country represented a very large proportion of the problem.

The three Service Departments were The Admiralty, the War Office, and the Air Ministry. For the purpose of supply, each of them could be looked on as possessing a General Staff section, responsible for the military conduct of the war and defining the size and build-up of the forces; a provision section which developed the plan into actual equipment details and programs; and a production section, responsible for ordering and delivery to meet those programs.

The Admiralty had under its control the Government dockyards. It had its own propellant factories and its own torpedo factories.

The War Office controlled the Government arsenals.

The Air Ministry had the nucleus of aircraft shadow factories which were designed to supplement the very inadequate home civilian aircraft industry. There were one or two private armament firms, chief of which was Vickers Armstrong.

With war completely imminent, the Secretary of State for War took a big decision. He decided that the problem of research, design, development, and production of Army equipment was putting too big a strain on the War Office. He, therefore, proposed in the early Summer of 1939 that a Ministry of Supply should be set up. The Ministry of Supply came into being early in June, 1939, with the sole object of providing, from General Staff specifications, delivery to ordnance depots in the field, the whole of the equipment of the Army.

In 1940, the Air Ministry took the same decision. The Ministry of Aircraft Production was set up.

The Admiralty, throughout the whole war, maintained its original formation. Under its own Controller, it kept its own supply organization.

Therefore, throughout the war, we had three main Purchasing Departments: The Admiralty, the Ministry of Supply and the Ministry of Aircraft Production. Before the war, the problem was simply one of purchase by open tender or by direct ordering on the Government arsenals. There was little or no planning and no progressing by any qualified engineering staff in the three Services.

It became necessary to build up that type of staff at great speed. It had been a problem never tackled, so much so that these Purchasing Departments had to set up a production organization. The Purchasing Ministries were, therefore, divided into Production Directorates with a technical staff, either drawn from the Government factories or from qualified technical officers of the Services, but in very large measure from industry. These Production Directorates were responsible for the development of capacity and for the allocation of orders and their progressing. It was, therefore, to them that the firms in the country looked to make the contact between industry and the Supervising Departments. They were the Departments which were exercising control over materials.

But there is one point I would like to bring out. The Ministry of Supply was not only a Production Department but, in other of its sections, it was the biggest controller of material in the country. The Ministry of Supply operated the controls for iron and steel, nonferrous metals, machine tools, timber, chemicals, wool and cotton, among a large number of other things.

The Ministry of Aircraft Production held the controls for light alloys and other special materials particularly wanted for aircraft.

The Board of Trade held the controls for civilian necessities, mainly clothing and textiles.

The Ministry of Food controlled the food of the country.

The Ministry of Labour controlled the whole of the labour organization.

The Controls were responsible for prices. They were responsible for the level of production in their own fields. They were responsible for the financing of facilities; also for the import and export policy. They also had the job of implementing the Government policy by allocating materials to fall in with the Production Ministry's war requirements and civilian necessities.

The Ministry of Supply operated those controls through a Raw Materials Department. The way it functioned was something like this: The Production Directorate estimated the needs of its own section and put it into the Raw Materials Department who finally got a view of the whole of the material requirements for a given year, broken into quotas for the whole production problem of the country. It then gave allocations in relation to output of that particular material. For example, if the Production Director knew he had asked for ten thousand tons, say, of steel and he had been given only eight thousand, he could draw his own checks against that eight thousand in favor of his own firms. The system worked well because the Production Director thus was able to deliver material in relation to the performance of a firm. It stopped stockpiling by the inefficient firm.

These Controls were, in the main, staffed by personnel from the trade associations connected with the particular product. The iron and steel control was staffed by the Iron and Steel Federation, and so on. We regarded that as absolutely essential. We wanted industry to have confidence in the organization. It was absolutely vital that the men dealing with steel should be men who knew what steel was.

As the war developed and both capacity and manpower became increasingly difficult, a coordinating ministry was set up. It was known as the Ministry of Production. Its functions were really over-all planning and, in conjunction with the Ministry of Labour, to advise on the location of new factories and the placing of fresh orders in relation to the manpower available. It vanished at the conclusion of hostilities.

So far we have seen that the Supply Officers Committee carried out a survey of existing capacity and planned balancing plant in relation to specific stores. I would now like you to see how the Production Department dealt with the expansions of capacity, both in private industry and in its own Government factories.

The expansion in private industry was effected in three main ways: by capital-assistance schemes, as we called them; by the creation of agency factories; and by shadow factories.

Under the capital-assistance scheme the Production Directorate of the Purchasing Ministry agreed with the firm on the additional capacity required, drew up a building scheme and a plant list and operating through the controls for licenses and the Regional Organization for facilities provided for the extension at Government expense. These schemes were drawn up under a contract arrangement. Most of them contained a clause giving the firm certain preemptive rights at the end of the war. The firm then operated the plant normally because, in the main, the plant had been put in to balance its existing facilities. They operated that plant as if it belonged to them. These schemes varied from the installation of one or two machine tools to schemes running into half a million pounds.

In the case of agency factories, the Production Departments entered into an agreement with a firm to build and equip a factory to meet a program. The firm provided the management, recruited the labour and managed the factory at a set fee. In this case, the factory and its equipment remained Government property.

The Air Ministry went in very extensively for a system of shadow factories. The prewar aircraft industry was not capable of assimilating anything like the load which we had to put on it during the war. There did not exist in the industry either the plants or the buildings suitable for the manufacture of aircraft in quantity. Factories were, therefore, built and equipped before the war for the specific purpose of aircraft production. They were put under the control of certain manufacturing groups. The motor-car industry, in particular, managed these factories for the Ministry of Aircraft Production.

The hard core of munitions production, both before and during the war, was centered in the Royal Ordnance Factories. The Royal Ordnance Factories are Government arsenals controlled and operated by the State. The whole of the working people are, in the over-all term, civil servants.

In the early Thirties we had Woolwich Arsenal, which has to be seen to be believed; the Royal Small Arms Factory at Enfield; and the Royal Gunpowder Factory at Waltham Abbey. They were all slightly out-of-date, although we had produced workmen of skill, I think, unequalled anywhere else in the world. But their plant, their layout, and their general facilities were very much out-of-date.

We had a filling factory at Hereford, which had been in the state of care and maintenance since the 1914-1919 war; also a cartridge-case factory in the northern part of England. At that time the total payroll of the operatives in the Government arsenals was round about nine thousand.

When the 1936 Rearmament Program was initiated, one of the first steps we took was to remove the filling factory from Woolwich. It was a strategically unsound site. We built three new filling factories. We built some new factories at Nottingham. By September, 1939, our three out-of-date ordnance factories had been replaced by fourteen modern ordnance factories, all of which were in production. At the peak of the war we had forty-five Government factories in production. We had a payroll of something like 350,000 people.

I think all of us appreciate that industry in the United Kingdom is not marked by a large number of firms with a large payroll but, in the main, they are small firms with operatives of about five hundred, or less. We, therefore, found it very difficult indeed to place orders with firms of that type for complete equipment; or to adjust plants or facilities to make it possible for them to deal with complete equipment.

An interesting system, which came to be known as the Group System of Operating, was therefore started. It was nothing more or less than a system of rationalized production. The Production Directorate broke down the equipment into its component parts and brought the firms together under the chairmanship of one of their number. We selected one or two assembly firms. The member firms, with the technical staff of the Production Branch, planned the job. They drew up a standard-material schedule; a jig, fixture and gauge schedule and a production program.

The material was ordered by the Production Department. We held monthly progress meetings. The system worked extremely well. As an example, we had some sixty or so small firms in the south of England, in the Kent area, none of which had a staff of more than thirty or forty people. Throughout the war they made one hundred six-pounder gun-carriages per month out of their own resources.

I think one of the most interesting things is that this group has carried over its wartime associations into peace. Its practical advantage to us came in the heavy air-raids: it is almost impossible to knock out production which is based on that type of system.

So far, we have considered very generally the planning and the methods adopted to provide the physical facilities for the war effort. But we have said nothing about the manpower problem, with which we were faced on mobilization. In order to see what the manpower problem was, I think we ought to look at the method of recruitment of the Army before the war.

The British Army was based on a voluntary system. A man undertook, in the main, a 12-years' obligation, of which something like three years, or upwards, according to his choice, was served with the Colors and the balance with the Reserve. During his Reserve service, he was virtually a civilian with a minor obligation for training, annually. The system

gave us a very considerable Reserve of trained men taken against the size of the Regular Army, although the Regular Army itself, of course, was nothing like large enough.

The Royal Navy and the Royal Air Force operated systems basically similar.

Behind the Regular Army and the Reserve was the Territorial Army. This, again, was a voluntary organization made up of young men, through all walks of life, who undertook training in peace and assumed responsibility for service in war.

Our labour problem was that with an insufficient population a balance had to be struck between the needs of the fighting services, the needs of industry in order to equip the fighting services, the needs of civil defense, and the needs of the balance of the population in terms of social services and the distributive trades.

This problem, although it had been appreciated, had never been dealt with in peace. It was aggravated at once, on the outbreak of war, by the calling up of the Reserve and the calling up of the Territorial Army. That obligation to serve in war overrode every other consideration, chiefly, I think, because attention had not been paid to its implications. So the task of the Ministry of Labour, in conjunction with the heads of the fighting services, throughout the war, was to effect that balance between men to fight and men to equip the soldiers, sailors, or airmen to fight.

The first labour problem we had was to recruit and train new labour not only to make new work but also to replace the men and women who had gone into the Services.

The Ministry of Labour, in addition, had to negotiate with the trade unions with regard to the preservation of the rights and conditions which applied to the services of labour in industry and which applied, in particular, to the skilled trades. I think it is a noteworthy fact that, in the main, there was no difficulty at all with the trade unions and the Ministry of Labour meeting a <u>modus vivendi</u>.

By reaching wartime agreements in this way, it was possible to bring in men who had been trained by Ministry of Labour training schemes or by factory training schemes, or by upgrading into the skilled ranges. The principle was to present a man to the trade union for a classification of his skill. With the agreement of the union he was rated as a skilled man for the rest of the war. It was an integral part of the agreement that that scheme should be abandoned completely at the end of the war and that men so upgraded should be the first to go when reductions came.

A similar scheme was adopted, too, with regard to the training of women and the use of women on skilled work. In the case of women, in addition to the nomination and registration with the unions, there was the big problem of the classification of the skilled work which could be undertaken by women. Here, again, there was no difficulty in getting agreement. There was no difficulty in seeing that the agreements were honored. The unions and the Ministry of Labour were very successful in avoiding any disputes arising out of this problem.

The employment of women in industry also brought in its train a series of wage negotiations, especially in the trades where women had not been employed previously. The agreements were reached very early in the war and remained substantially unaltered throughout the emergency.

There were further negotiations, vital to the successful carrying on of the war, between the Ministry of Labour and the unions. That was in regard to the hours of work. The need we had was for the maximum number of hours to be worked. We went in for double-shifts and treble-shifts. They were agreed on almost at the beginning of the war. Double-shifting meant 12 hours a day with shifts joining and work stopping at seven o'clock Saturday night. This meant a 66-hour week.

In 1942 came the biggest piece of labour legislation of the war. That was the National Service Act and the Essential Works Order, which gave the Ministry of Labour complete control and full direction of labour. These two pieces of legislation provided the Ministry of Labour with the mechanism required to operate the national manpower to its fullest advantage. The magnitude of the task performed by the Ministry of Labour can be seen from a few figures I would like to give you.

Between June 1939 and June 1944 the total number of men between 14 and 64 and of women between 14 and 59 in the Services or in industrial employment rose from 18-1/2 million to 22 million. You should also note that something like 57 per cent of all men between 18 and 40 served in the Armed Forces during the war. By the middle of 1944, out of 16 million women in the country between the ages of 14 and 59, seven million were wholly engaged in the Forces or on full-time or direct war work; another million and a quarter were engaged on part-time work. The whole of that was arranged by cooperation between the Ministry of Labour and the unions of the country.

The war brought no radical changes in the wage structure in industry. We had two main systems in operation, what we call straight day work and straight piece work. They were modified by a variety of methods of bonus payments. At the beginning of the war, the average payment of a skilled man was about forty-six shillings a week on straight day work. This was increased through additions, in the way of war bonus or industrial bonus. The standard in industry finally came to about seventy shillings a week for a forty-seven hour week.

These basic earnings, of course, increased by piece work balances of bonus payments, which increased that seventy shillings by anything up to, say, 200 per cent.

There has been a good deal of uninformed criticism in the United Kingdom on wages earned in war; but when they were related to hours and output, in the main, they were far from excessive. Most of our new factories, when they were built, were built outside the normal population centers. We, therefore, had a tremendous problem on the welfare side. The use of the double and three-shift systems made life very difficult for the workers. The blackout, bombing, rationing of food, and all the rest, made it necessary that we should do everything to improve general conditions. Every factory having over a certain number of workers had, by law, to provide a canteen where food at economic prices could be obtained. We also provided medical services, dental facilities, and the whole gamut of welfare work.

One of the most successful things which kept the workers interested and helped increase output was visits to and lectures in the factories by the members of the Services who had used the equipment and who came back to thank the workers and to talk to them about it.

Another very useful thing which we did a good deal of was to arrange field demonstrations by troops for the factories engaged in making certain equipment.

Before we leave the labour problem, I would like to say something about the machinery which had been developed before the start of the last war, and which was elaborated during the progress of the war, for the avoidance of disputes between the employers and the work people. I think if we take the engineering industry as typical we can see what principles were brought into effect, and which are still in operation.

The first agreement in this field was made in June of 1922 between the big Amalgamated Engineering Union and the Employers Federation. It is the basis of a number of successive agreements and is founded on three big principles: The first one is that the employers have the right to manage their factories; second, the trade unions have the right to act in the exercise of their trade union functions; and the third one is there can never be any question of the creation of a specially-favored class of work people.

These basic principles accepted, the questions arising come under three headings: the general alteration in wages; the alteration in working conditions, which have already been the subject of operative agreements; and the alterations in the length of the general working week. It has been agreed that where disputes arise, no changes under these headings should be put into effect until the agreed procedure of conciliation between the Employers Federation and the trade union has been brought into operation and exhausted.

The provisions for the avoiding of disputes operates something like this: When a question coming within the terms arises, an effort must be made between the management and the work people concerned to settle the dispute in the Works. If this fails, deputations of the work people, accompanied by their organizer, meet the employers, with a representative of the Employers Federation. If no solution is reached, a local conference is called between the local Employers Federation and the local representatives of the trade unions.

If there is failure to agree there, either party is competent to bring the dispute to what is known as the Central Conference. The Central Conference consists of a joint meeting of members of the Federation of Employers and of the Executive of the trade union. Neither the representatives of the management nor the Work people engaged in the dispute are able to sit on the Central Conference, although they can provide their evidence and be present with witnesses.

The Central Conference is called the "Central Conference" because it is held in the Central Station Hotel at York. That is a convenient center for all of the industrial interests. All parties stay there. I think it is true to say that the fact they are living in the hotel has a good deal to do with the smooth working of the Central Conference.

If they should fail to agree there, either party then is free to take what action it pleases. Under the war conditions, either lockout or strike action was definitely forbidden by law. The dispute went to the National Arbitration Tribunal. Even now, arbitration is resorted to. The employers have always reserved the right to put into effect their views in disputes where the matters lay outside the three main classes of subjects which we have discussed; that is, wages, agreed working conditions, and agreed hours of work. This conciliation mechanism has worked reasonably well. Of course, the agreements reached are intended to be binding, and are binding, on both sides.

I think in order to complete this labour picture, you ought to realize the position of shop stewards. When the avoiding-of-disputes procedure was laid down, provisions were agreed to by the employers and the unions with regard to shop stewards. Shop stewards are appointed in a Works by the trade union, but the trade union must notify to the management the names of the men appointed.

In addition to the shop stewards, a Works Committee is often appointed. This committee consists of seven, or so, representatives of the shop stewards and of the management. The shop stewards are elected annually by the Work people. The shop steward organization forms the basis of the initial approach between the Work people and Management when a dispute arises.

I would now like to say something about the method of placing contracts, fixing prices, and profit standards during the war.

The normal peacetime procedure, which satisfied the requirements of the fighting services, was the method of competitive tendering. Competitive tendering was regarded as necessary for the protection of the taxpayer and in order to enable as many firms as possible to come in on Government-term requirements.

Competitive tendering, of course, results in contracts being placed on a fixed-price basis. When the war came and the volume of orders, the time factor, the controls on labor and materials, the multitude of modifications which always come from the fighting services were taken into account, competitive tendering became hopeless.

So, in the United Kingdom, we started a system known as the system of Instructions to Proceed. Under this arrangement, the requirements for a particular store for varying periods ahead were programmed by the Production Department, who allotted a part of the program to each firm with a letter known as an "I.T.P.," or Instruction to Proceed.

Price was not discussed at this stage since production in the shortest time from the capacity earmarked was the only thing we were worried about. On the instruction of the Production Department, the Contracts Department then carried on its Instruction-to-Proceed procedure with the firms. The Instruction-to-Proceed was a legally-binding document and the firm would start working on it.

Fixed prices under war conditions were very difficult to obtain, especially when the production cycle was more than a few months and the method adopted was to agree that the final price should be assessed after a costings investigation. This took two forms: Either a technical costs investigation before or during production, after which the parties agreed on a fixed price; or the firm quoted an over-riding maximum price for the job, their actual recorded costs being investigated after completion of the contract and the actual ascertained cost plus profit then being accepted as the price.

To reduce subcontracting and to provide for the inclusion in an equipment of approved specified components, a system of Free Issues was developed. Under this system of Free Issues the components which were to be free-issued were detailed in a contract document and were obtained by the Production Department by direct contract under normal contractual methods. There were arguments for and against this Free-Issues system. But I think, in the main, it was a good system because it allowed bulk ordering, proper programming, and proper delivery in relation to the requirements of assembly firms.

An important element of any article of cost is the profit allowed to the contractor. Profit-margin was a very thorny subject in Great Britain because there were two sides of it: There was the need of preventing excess profits being made on war orders; and, secondly, there was the need of encouraging efficiency in production. Of course, throughout the whole war we had the Excess-Profits tax, but this operated after the profits had been made. It was incumbent on the Production and Contracts Departments, in fixing prices, to disregard the subsequent effect of taxation on a firm's profits as a whole.

As between a profit-rate applied to cost of production and one applied to the value of the capital employed, the decision was in favor of the latter. There was a good deal of argument as to what the rate should be. In the main, it was somewhere in the order of seven and seven and a half per cent. The method of placing contracts and of assessing profit applies to all orders placed with industry. We did employ, in addition, Government-owned factories, which were laid out for the production of specific equipment. These factories were operated at cost by the Government.

There is one further point which I should like to expand on, on the industrial mobilization side, and that is the part played by the Dominions and India. Before the war, a certain amount of planning had been done on a Commonwealth basis, but it had never been pushed to a proper conclusion. The Dominions and India were, of course, aware of the policy decisions of the Committee of Imperial Defence; they knew all about the Supply Officer's Committee; they knew what work was being done.

By 1937 the Dominions and India, influenced by the trend of international events in much the same way as the United Kingdom had been at the Imperial Conference, were prepared to consider certain preparatory measures, including the planning of supply. This work, although it was not adequate, did permit of a measure of integration of supply policy throughout the Commonwealth when war came.

There had been no conscious planning in the Commonwealth during the years between the World Wars on industrial matters, but the national industrial development in the countries had improved the over-all Empire position in the supply field enormously. For instance, Australia, South Africa and India had undertaken steel production in a serious way. Canada had developed a very highly organized engineering industry.

Canada was the only one of the Empire countries capable of manufacturing motor vehicles. The other Empire countries were simply assemblers of somebody else's production. I think it was one of the outstanding facts of the war that the motor-car industry came to the assistance of the Services in practically every field where heavy and serious production was necessary. Each of the Dominions had small but effective Government arsenals capable of making munitions of one sort or another.

I would like to stress one fact and that is in the opening phases of the war immediate resources, like the small-arms factory we had in New Zealand, are worth pages and pages of paper-planning. The result of the 1937 Imperial Conference was to strengthen and expand the resources and to enable us to place educational orders in civilian industry. Canada began to tune-up three factories for war production. One of them was actually in production when war broke out.

All members of the Commonwealth have representatives in London. They all have, and did have, supply officers in the capital. Arrangements were made in 1939 for two Supply Missions: one to Canada and the second one to cover South Africa, Australia, India, and New Zealand. The Canadian Mission sailed a few days before war broke out and operated in Canada throughout the war. Sir Alexander Rogers took a mission to the East. This developed into an Eastern Group Supply Council, through which all orders from the U. K. were placed in those theaters.

The effect of Empire contributions against the background of air-attacks at home, manpower shortage, U-Boat and air-attack at sea, cannot be overestimated. Since the war, serious efforts have been made, by a number of discussions with each of the Empire countries, to maintain a measure of war potential and to insure that close contact is kept on matters of a defense nature so that combined action can be taken in a rational way in any future emergency.

There are a very large number of other questions which had to be tackled; matters like shipbuilding; transport by sea and by land; expansion of research and design facilities; expansion of proof and testing organizations. But I don't think we can possibly hope to look at them in a short review of this type. I should, however, like to survey the field of war reserves and war potential as I see it, personally.

I think that the first thing required is an over-all strategical policy, laid down by the General Staff. This strategical policy must indicate very broadly the type of war likely to be fought; the conditions under which it is likely to be fought; and the time available for preparation. From this over-all direction, the operations staff must then deduce the rate of build-up of the forces the size of the Reserves to be held in peace and the points in time at which re-equipment with modernized material must be undertaken.

From this same guidance the research and design authorities must balance their program of basic and applied research against the development of designs and prototypes. Here, a definition of "time available" is absolutely essential. The supply authorities, in conjunction with the operations staff, have then got the problem of assessing what immediate production must be held available to meet the over-all planning in direct relation to the reserves held and the rate at which available capacity must be expanded to match the growth of the forces.

It is quite clear that it is impossible to insure completely in peace against the risk of war. The premium to be paid must be settled as a matter of Government policy. It is vital, in my view, that all the authorities interested in the question of preparedness for war must be closely integrated into some central organization. If any risk is taken over this field, it must be taken as a matter of policy and not as a matter of chance.

This review, which I have been through very quickly, of necessity has been rather sketchy. I hope, in any subsequent question period, I shall be able to give you fuller information on any points you may like to raise.

Thank you.

(Applause)

GENERAL McKINLEY: Gentlemen, General Wrisberg has been kind enough to submit to a question period, which will start at two o'clock. Therefore, I want to confine this period to any, shall we say, minor questions concerning some statement he may have made, or some point you want to clear up at this time. I would rather you think about what he has said and prepare yourself for the question period this afternoon.

Are there any minor questions? (No response)

Thank you very much, General Wrisberg.

(Applause)

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