DETERMINATION OF NAVY REQUIREMENTS
22 January 1946.

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CAPTAIN HENNING:

In introducing John Small I trust I am correct in using what is perhaps the safer title these days of "Mr." and not "Commodore." Last November by act of Congress he became a commodore.

Mr. Small has had a diversified career. Graduating from the Naval Academy in 1915, he served with the Navy until 1926, when he resigned as a lieutenant commander. During part of that time he was in aviation, commanding the First Observation Squadron attached to the Atlantic Fleet. He also served under Admiral King as engineering officer of the Atlantic submarines, and later was attached to the Pacific Fleet. From 1926 to 1942 he was in private business, serving as executive vice-president of the Dry Ice Corporation of America, and later as western manager of Publishers, Incorporated.

During World War II he was recalled to the Navy Department as Deputy Director of the Army and Navy Munitions Board. Under the Office of Procurement and Material in the Navy Department he was in charge of systematizing and consolidating Navy material requirements. Later he served as Materials Control Officer and Landing Craft Coordinator. Demonstrating that he was no swivel chair administrator, when his landing craft hit the Normandy beachhead on M-day, Captain John Small was one of the first ashore.

Returning to the United States, his next assignment was Deputy to Mr. Krug, head of the War Production Board. When that agency was superseded by the Civilian Production Administration, Mr. Small was named its head. I think you will agree that it is no hollow phrase when I say we are honored to have Mr. Small address the Army Industrial College on the determination of Navy requirements. Mr. Small.

MR. SMALL:

Captain Henning and gentlemen, I am delighted to be here. I have a very great interest in the work this organization is continuing and the benefits that are going to be derived from it, not only to the Armed Services, but for the economy of our country.

There is a tremendous amount that has been learned during this war period. I have been very much afraid that a great deal of it would be lost. I believe that you gentlemen and others who are working on it will conserve the lessons we have learned and conserve the experiences we have gained, so that when the next emergency comes, as I am sure it will, we can embark upon it with a great deal more immediate effectiveness than we were able to achieve during this last war.

We all have a very human feeling that "The war is over. Let us get back to our current jobs" and all of this great mass of knowledge and

technique and experience of how to get things done is lost, except in the minds and memories of a few people who were concerned with individual phases.

Our economy is a very complex mechanism. It is one for which there is no simple rule, no standard formula that will work. We have to adjust ourselves to a multitude of complexities if we are to get the maximum use of it.

As I conceive it from Captain Henning, what you want me to do here today is to sketch for you some of the background of what we encountered from the Navy's side as we entered the war and what we did as we went through the war period. Also give you some concept of the problems that were met, how they were met, how we overcame the obstacles that were encountered, and some suggestions as to what we should do for the future.

It is a pretty broad subject. I have been mixed up in it intimately from shortly after Pearl Harbor. Having sweat blood over these things, I could probably talk for hours if you had the patience to listen. I am sure that the gentlemen who have been in contact with individual phases of the problem are far more conversant than I with those individual phases. I am going to try to outline to you some of the broader generalities of the problems that we met.

The job of the War Production Board and its predecessor civilian agencies was, stated in simplest terms, one to produce the things that the Army, the Navy, Maritime and the Air Forces needed; to produce them in the quantity in which they needed them and at the time they needed them, and at the same time keep our economy running.

We had the idea at the beginning of the war--I think most people had the idea--that our resources were inexhaustible; that we had a reservoir of resources that would take care of anything of which we could possibly conceive. That was not true. The resources of this country have a definite ceiling. We plummeted along that ceiling, as you probably remember, during 1944. We were getting up to that ceiling and were having to cut back.

There were a number of areas where we could have cut back still further on some projects without hardship to the people, or with hardships that could have been taken. I know of no one, with some exceptions, or very few people, who really suffered any hardships during this war. However, on the basic things, things that we have to have--steel, copper, lumber--we were hitting the ceilings.

There is a limit to the resources of this country. There is a limit to the proportion of those resources, those basic, fundamental resources, that can be devoted to war if we are to keep the basic essential economy running. By "essential economy" I am not talking about comforts in the home. I am talking about the railroads, the transportation systems, transportation for the workers, food, utilities, and the other essential activities of our country.

We certainly learned very quickly, during this last emergency, that those things must be taken care of. The railroads are as much a part of the Army and of the Navy as the ships or the tanks. The public utilities that furnish power to the war plants are just as much a part of the Armed Services as anything within the Armed Services if we are to produce the munitions that are needed.

Therefore the job of the civilian agency resolved itself into two parts: first, to build up the production, and, second, where production could not be built up rapidly enough, to allocate what we had among the claimants.

In the effort to build up production there were three basic problems with which the Government struggled continuously from the beginning until the end. First, we had to provide the materials from which to fabricate our military and our essential civilian production. Second, we had to provide the plant and the equipment to process those materials. Third, we had to staff the plant and to staff the essential activities. There never was a time during the war when those three basic factors were in doubt.

In the early days our main shortage was in plant, in machinery, in equipment to manufacture the things that we needed. As we overcame that and produced machine tools in tremendous quantity, built the plant, expanded some, built others new, we found that we were running into shortages of raw material. As we overcame those shortages of raw material in the latter part of the war, we began increasingly to run into shortages of manpower. So all the way through the war period there was something that was a controlling ceiling on the amount of munitions that we could put out and still maintain the economy healthy.

One of the difficult problems that we had in World War II--it would be still more difficult in a coming emergency that might arise--was the question for what production goals should we aim? We had very little idea at the beginning of this war for what production goals we should aim. The production goals we actually made up were those that corresponded with the amount of money that had been appropriated. That was based, of course, on the demands on Congress by the Services. Congress appropriated the money and the Services went out to buy, and buy as quickly as they possibly could, without regard to the timing, without any knowledge of the availability of the components, of the availability of materials, of the availability of plants. We went into the market blind.

Fortunately, in this war we had little or none of the price competition problems that we had in World War I. Had that complexity been added to our problem, we would not have done by any manner of means as much as we did do.

We had to start out from scratch and determine what our production goals were in order to accomplish our purposes or the purposes indicated by the joint chiefs and bureau heads of our fighting services, translate those into items of munitions, find out whether or not we could produce those items of munitions in the volume that the Services said they needed

them at the times they said they needed them, and still maintain the essential services of the Nation.

With the lack of knowledge, and the inability that we had in the Services and in the essential civilian economy to write down precisely what we needed, it is perfectly amazing that we were able to accomplish the production job that we did accomplish. It could have been done only by complete, sincere cooperation between the Services and industry and the Government. All of us were willing to look at things realistically and face the facts, to forget about our own very human desire to have our own program go over regardless of anything else, to accept fair and equitable treatment, and on the basis then of a spreading out as best we could judge it among the very sincere claimants, to get the job done. As a matter of fact, I think the record shows we did that in the vast majority of cases; that we were able, by cooperative action, by flexibility and handling things with good humor, with some measure of understanding, to take care of the needs of all.

In the beginning, in 1940 and 1941, the Services were procuring munitions in an economy that was also running at full speed on civilian production. The Services, as I said before, took the money that was available and tried to procure at the first possible moment regardless of the fact of whether such procurement was feasible or not. There were many places where production of the exact thing we wanted was impossible, and we began to take things off the shelf. We would take anything that was even near the specifications that we ourselves wanted. But we had to get something and we had to get it quickly.

This resulted in a drain on the products of the country. It resulted back in 1942 in having a multitude of things partially completed--ships without propellers, planes without engines--all sorts of things that were partially completed. Obviously that did not bring us into the production of munitions that we had to have. That led us into the necessity of going into controls.

Back in the early days before Pearl Harbor the Army and Navy Munitions Board, which had been in existence for a considerable period of time, had worked out a plan for industrial mobilization--which I might say was excellent. Once we got into the war we threw it into the waste basket and there it reposed for a considerable period of time. But if you look back and take the old industrial plan and read it with the thought in mind, "How does this compare with what we actually came to?" you will find an amazing similarity between the two. A perfectly splendid job was done in that industrial mobilization plan in the years long preceding the war.

In the beginning we had in the Army and Navy Munitions Board a few people who were trying to figure out what the Navy needed in the way of so-called critical materials. They did not have very much on which to work. They used what judgment they could bring to bear. Many of them were industrial specialists who had been brought in for the purpose and who knew industry. They went to the bureaus to get their best estimates; and the Army and Navy representatives together on the Army and Navy

Munitions Board working with first the OPM and then SPAB and then the War Production Board, tried to indicate to those organizations what we thought from the angle of the Services would be needed. It was all pretty rough, pretty much hit and miss; but at least it was better than the complete lack of information that we had.

We set up during that period of time, during 1941, in the Navy Department an organization called the Office of Budget and Reports, to handle all the development of programs, the end-item requirements, scheduling procedures, and methods of calculating material requirements. It was anticipated at that time that that office would act as a staff, if you like, for the Navy representatives on the Army and Navy Munitions Board. It was a very small organization. They had a difficult job to do. The definitions were unclear. The methods of calculation were pretty loose. The stated requirements of the Navy were guesses without much science in them, but with a lot of common sense on the part of those in the individual bureaus who knew what they might expect.

During this period the Navy attempted what was then known as the three-echelon system. Echelon I presented a production requirement, as a number of airplanes, battleships, ammunition, and so on, which were in balance with the objectives that had been sent down by the Joint Chiefs of Staff through the Chief of Naval Operations. Echelon II broke down the item required by Echelon I into major components. That is, a battleship was broken down into engines, hull, communications and so on. Echelon III was a very rough attempt to break down the end items of Echelon I and the major components of Echelon II into terms of the raw materials that would be required, the basic materials that would be required, to do the job.

This task of trying to divide the thing into echelons involved an enormous amount of paper work, detailed knowledge, careful translation, and rough judgment. We did get a lot of bills of material at that time, but those bills of material included some things that we later found we should not have included.

The bills of material in some instances included all of the material required by the component. Well, on the end product in some cases we had no clear definition. We had no clear, simple, understandable system of handling that. But within the Navy everyone had a growing realization that we had to get down more and more to brass tacks on the thing and get action and see what could be done with it.

Then on 28 January 1942 there was a reconstitution of the ANMB, with the Under Secretary of War, the Under Secretary of the Navy, and a civilian at the head of it as chairman; approved by the President 21 February 1942. Their job was to bring this whole problem into a focus and tie it into the operations of the civilian agency, then the War Production Board.

That system worked out very well, except that the ANMB people, the staff of ANMB, who were then put into the War Production Board, into the individual divisions of the War Production Board, that is, the Steel Division, the Copper Division, the General Industrial Equipment Division,

and so on, were not tied closely into the individual operations within the procuring bureaus.

These ANMB people who were put into the War Production Board divisions were able and did a very effective job of protecting the interests of the Army and the Navy against the civilian pressure at that time that was operating at the early part of the war. You remember how they wanted to keep this civilian production going and to superimpose this whole war load on top of it, a thing that would be manifestly impractical.

Then in the Navy in January 1942 we had the Office of Procurement and Material, the OP&M, with similar functions to the Office of Budget and Reports. This Office of Procurement and Material was in effect a chief of staff to the Under Secretary. It was the central head of the Navy procurement, the materiel end of the Navy, to get the Navy what it needed. Since that time the OP&M has become the Material Division of the Office of the Assistant Secretary and now reports direct to him.

Later OP&M was changed by a general order of the Secretary of the Navy to become the coordinator of material procurement activities of the Navy. This in effect gave OP&M four major fields of responsibility, namely, internal procurement coordination, external liaison, contracting policy, and readjustment policy.

These duties were specifically assigned by the Secretary of the Navy to the Under Secretary of the Navy, to whom OP&M reported. That responsibility of OP&M is one relating to internal procurement coordination and external liaison. OP&M received from the Office of the Chief of Naval Operations copies of directives to the various bureaus setting forth the over-all requirements which the Navy needed to carry out its strategic plans. The bureaus received those same directives, each within its own sphere. It was the job of OP&M to correlate the bureaus' work with the over-all plans. OP&M served as a coordinating group for priorities. Then later, as we went through the development of a control system with PRP, and still later with CMP and others, various timing schedules were developed to handle scarce war materials and channel them into first things.

OP&M was charged with the duty of assembling the Navy's requirements not only for raw materials, but for all products that became in short supply; of coordinating those requirements; checking them for delivery; investigating them for delivery and the fact that they were really the minimal needs to accomplish our real purpose; and then taking those requirements to the War Production Board and fighting the Navy's battle and seeing that we got our share to permit us to carry out the plan.

OP&M also compiled an over-all schedule of products and raw materials needed. We called them Monthly Status Reports. The document set forth the Navy's monthly need for ships, planes, guns, ammunition and other end items, and also for the principal components going into these, such as boilers, pumps and armor plate. That Monthly Status Report was the Navy's industrial strategic plan. It was a great help, I might add,

to the War Production Board in determining what we had to do on the industrial plans. The Army had an industrial plan, with which you probably are all familiar.

Through OP&M we had a central liaison. Instead of having every bureau represented on every one of these structural committees within the Government, we had one person who sat on the committee and represented the viewpoint of the Navy. Obviously he had to really represent the viewpoint of the Navy and not his own peculiar predilection. He had to make sure that his viewpoint, his representation for the Navy, took care of the ships, of ordnance, of S&A, of all of the individual bureaus. If there were conflicts within the individual interests of the individual bureaus, it was necessary that that individual purporting to represent the Navy's viewpoint must have resolved those conflicts within the Navy before he went over and took a stand, wherever that might be--the FEA, the War Production Board, or any of the other war agencies. There is no point in going over the various activities in which we all took part in this liaison function.

We had another function in OP&M. OP&M followed up the production schedules and it helped to insure that industry was in fact complying with the rules and regulations laid down with respect to priorities and material controls. If the priorities and material controls did not work, the Navy was going to suffer. Therefore it was up to us to do our best to see that those controls were really working out through industry.

We did this through two organizations, one called the Production Branch and one called the Inspection and Administrative Branch, which included the inspectors that we had in various plants supplying the Navy. They were the personnel through whom the Navy reached down to the grass roots of industrial production. These were technically skilled men, pretty able people, pretty high quality people, that we had in the plants. Some were officers. A great many of them were civilians. They acted as field representatives to keep the Navy's production running and moving ahead.

They developed into a sort of godfather to the plant in which they were located. They handled all sorts of problems for them, problems not necessarily having anything to do with the Navy. Where they needed help and did not understand something, the Navy's inspector would step up and fight for the plant and help it not only in working out the government regulations, forms and so on, but in helping with engineering advice, packaging, shipping, financing and so on.

The Production Branch tried to find new sources of production. It worked on ways and means of conserving scarce materials. It was particularly helpful in anticipating potential bottlenecks or snarls in the Navy's production program. I could go on and recite to you quite a number of things that that particular organization did, but time does not permit it this morning.

The Office of Procurement and Material, as I said before, was designated as the chief of staff, if you like, the industrial chief of staff,

to the Under Secretary. The Navy's traditional bureau system is a group of vertical organizations. In each of these bureaus there was policy, planning, buying, supervision, inventory control, and all of those things involved within the individual vertical organizations. It was individualized, and, I think, rightly so; and, because of the competition, was decidedly helpful to the whole effort.

OP&M tried to put horizontal lines between the bureaus so that the activities at every level within the bureaus would follow the same policy at the working levels as we went down. Integration at the policy level only was not enough. Integration at the working levels was an essential; and it worked out extremely well.

It worked out through flexibility, as I said before. We had between the Government and the procuring agencies and industry, and we had between the bureaus and OP&M, understandings, good humor, some flexibility, and give and take. That in every activity of life, certainly in every industrial activity, is absolutely essential.

If we had in our economy today the same good humor and understanding and flexibility that we had during the war years, these industrial troubles that we are facing today could be cleaned up in very short order. Unfortunately, people seem to have gone from tolerance to intolerance, from flexibility to stubbornness. Unless we can have a common meeting ground, these problems which are so difficult and basic today will continue. I am confident that a common meeting ground can be found. There must be one.

Through OP&M, an operating and coordinating agency at the top level, working coordination and cooperation down to the working levels, we had a procurement organization which was decentralized at the operating level, but which was centralized at the policy-making level. That definitely has proven, and was proven, to be sound during the war years if our Navy experience is any criterion.

This top coordination is obviously a full-time job. We had it before the war. I did not come back into the Service until just after Pearl Harbor. As I understand it, we had coordination at the top level, a complete exchange of information and consultation at the top level within the bureaus. But we did not have this coordination at the working level, which turned out to be so successful later.

Back in the spring of 1942 we found that priorities were beginning to balloon. We started off with a system of A1, A2, A3 and so forth. First A1 was for the military only, then under direct controls. Then we put some other essential things into it. We soon found that everything was ballooning up into A1. So we broke it down into a system of A-1-a, A-1-b, A-1-c, all the way down the line. That looked like it was going to solve the problem for a while. Everybody spent a lot of time and effort on it. But before we knew it, everything was getting up into A-1-a, everything was of top essentiality. So we got from there finally into a double A system, and stabilized it pretty well and stopped the ballooning pretty well.

But back in the early part of 1942 the War Production Board came to the Navy and asked if we would really go after an essential analysis of what our requirements really were, what we really needed in terms of time periods. The Navy put a lot of effort into that. We went after our requirements on things like steel, lead, tin, antimony, copper, aluminum and so on.

We took into account in that accumulation of data the lead time. But the whole thing was pretty rough. It gave us some measure of what we were after, but it was pretty rough. But it did give us pretty good figures with which to go into the PRP and later CMP.

The basic controls, of course, as I said, were the priorities system. Then WPB, realizing that it had to take firm action to bring demand within supply--it was beginning to bulge at the seams all over the place--started in with a series of restrictive orders of one kind or another, such as conservation orders, limitation orders and so on. Before we got through we had tied up this economy of ours in a bow knot. We had over 650 restrictive orders out. We could not do anything without getting so tied up in red tape that we did not quite know what to do. But we had to do it, and I guess the end justifies the means, because we got the war production that we needed. But we certainly went into a most complex system, as anybody who has ever known any of these restrictive orders can testify.

Then in addition to that, with the ballooning of priorities and the mixture of priorities at plant level, we found we had to do something else. So we decided on PRP. I believe this organization is going to have a talk on PRP; so there is no need of my going into the details of PRP now.

PRP operated horizontally at the plant level. In other words, every plant using steel, aluminum, copper and so on would say, "These are the things that I am making." But it was not known how much of that steel was going into a particular program. We did not know how much of that steel was of a kind that was in inventory and would support continued production of a particular component or a particular production, and how much was not essential to the Services. Many of these plants were making part civilian products and part war products.

Therefore this system of handling this material horizontally did not cure the problems of airplanes without propellers, of ships without engines, and so forth. It got materials to plants; but, because we had to use some kind of rough equities and cut everybody, we could not cut individual plants. We had to cut the whole production of highly essential things. We could not cut some plants and let other plants go ahead with the production of a lot of things that were not essential.

PRP looked like a simple, workable thing. It did not turn out that way. It was not effective.

We went from there to CMP. CMP, the Controlled Materials Plan, really turned out to be the thing that did the job. CMP was the thing

that brought our program within pretty close accuracy. Under PRP when we would give the Services an allocation, it did not mean a thing. They could go out and buy anything they wanted. It was not tied into that allocation at all. Under CMP, where the Services were given so much steel, so much copper, so much aluminum, they had to live within that budget. They passed the tickets down the line. They soon found that they were short or they would come back and say they were long and they would then return part of that to the general pot.

It soon worked into a pretty good measure of what was feasible and what could be cut down. As I say, back in 1944 we were beginning to hit production ceilings. If we had not had CMP, I do not know where we would have gone. We had probably the most effective industrial control through CMP that has ever been developed, far better than the Germans. I am sure of that. I am also convinced that it was far better than the English system.

It took an enormous amount of paper work on the part of industry to do it; but industry accepted it. It cried; so did the Services cry. In the beginning they cried to high heaven; but soon they got into the swing of it. The thing worked; it worked effectively. The headaches that were crowding in on us before this disappeared like a mist. It was remarkable what an effect it had on the whole picture during 1944. In 1943 we had our troubles, but in 1944 they were beginning to smooth out. I think you are going to have a discussion of CMP in detail; so I will not go into that.

One thing that we found under CMP which was of very great importance was a little gadget called a cushion. In other words, if we said that we needed so many tons of steel to do our job, and let us assume that we were right, that that was actually what we really needed in tons of steel with which to do the job; under the allotting system that would not have been enough. We would have needed some extra checks to pass out, because some of the checks inevitably were not cashed and could not be cashed.

That is extremely true in a system of key production, where some stuff goes horizontally and small matters and what not go direct. And so we put this cushion into our working capital if you like to call it that.

In any estimate of material requirements in any succeeding emergency that cushion factor certainly should not be forgotten. I sweated blood over that one, trying to convince the War Production Board that it was a very real and very necessary thing that the Navy and the Army services have in their bank some checks that they could cash and pass out. While we knew that some of the checks were never going to be presented at the steel mill, we did not know what checks were not going to be presented. We only knew that a certain percentage of them would not be presented. Therefore we could over-allocate above our realistic supply and do it safely, without invalidating our checks. The checks were good even though we passed out more than we had money in the bank to cover. That cushion factor is one that, I say, is essential to any workable method of allocation.

Inventory control I will not go into other than to say that inventory control in an extended emergency, where materials are short, where we are definitely up against it to take care of competing claims for short items, is essential. It is one of the most important things that the Services have to bear in mind as requirements start going up, as they did during World War II. If we put aside into unused inventory materials that we do not actually need at the time, or put them aside earlier than we need them, inevitably we are preventing ourselves from getting something else that we need that we could have gotten; something that we needed at the time and could have gotten if we had not put too much too early into some inventory. So inventory control is one of the most important factors in our industrial production problem.

Critical and common components. We set up in the War Production Board, with the help of all the agencies, a method of trying to schedule some things; but by the operation of priorities or by the operation of allotments we still did not get the necessary bottleneck items--a certain kind of valve or a certain kind of pump or any one of a number of other things--a certain kind of ball bearings, if you like. There were not enough to go around if everybody flowed his allocations, his allotments, and his priorities down to these plants producing the bottleneck items. There were not enough to go around.

Therefore we set up scheduling order M-293 and were able to go into the individual plant and schedule the date of production. We would call Bill up and have him review his order board to determine between whether one agency that might be heavy and another agency that might be light, whether there was not enough flexibility in it for one agency to give away and permit the other one, that had a more urgent immediate need in terms of time, to get that production.

It worked out excellently. It never did get down to accuracy, if you like; but there was a meeting ground there where the competing agencies for a particular product--it might have been a high-pressure valve--could say, "There is the bottleneck which is holding up these things which we badly need. What can you do to help out on that emergency?" By cooperation among the agencies--the Petroleum Administration for War, if you like--the Army and the Navy were always able to give a little, enough to permit that emergency to be settled without disrupting a lot of other production lines.

I want to go back for a minute to CMP. In the operation of CMP within the Navy we soon decided that there was no one with God-given intelligence who was able to solve all the problems just like that (snapping fingers). I have found no one yet who can do it. So we set up--but first let me tell you a story:

One of the men over in the War Production Board came to me early in 1942 and said, "Jack, we are going to put into effect an order restricting the use of steel. We are going to say, 'You can't use steel to produce a whole long list of things, civilian items'" and he said, "Have you any objection to that?"

I said, "I certainly have."

"What is your objection?"

"I don't know, but I want the bureaus to take a look at it."

"Well," he said, "now, listen. Run down this list. You know there are some things there that you don't care whether we stop immediately or not. We want to get the maximum." He said, "Look at this--B.B. shot and cocktail sets and bird cages. You certainly know you have no objection to stopping those."

I said, "I certainly do have."

He said, "Why?"

I said, "I don't know what the bureaus think about it. How am I to know what the bureaus need or don't need?"

So we sent out this piece of paper with a long list of things that had to be stopped and called for a response in four or five days. Lo and behold, the first three objections that came in were for cocktail sets and bird cages and B.B. shots.

I said, "For God's sake, what is going on here? What are your objections?"

Well, the Marine Corps used B.B. shot in gunnery training. They had to have it. The Air Corps wanted metal bird cages in their planes for carrier pigeons which they used. On the cocktail sets--this was one that I did not think of their having any real reason--it was the Medical Corps. They used them in hospitals on board ships for making milk shake sundaes. They were admirable mixers. So I think they had a pretty good reason for not having the military share at least in those things to be stopped.

That proved to me right in the beginning that there was no one who knew enough to be able to speak for the Services or for the bureaus of the Navy. They had to have at least an opportunity to speak for themselves.

So we set up within the Navy the Material Control Officers Group. We got a good, strong man from each of the bureaus who was authorized to speak on behalf of the bureau by his bureau chief, able to speak with authority and to make decisions, to study this CMP and find out what it was all about and really be a working member of the team.

They did that. These people did work together. They did a sincere job of work. They came in with their competing claims. Some would be sky-high. Others would have just a little cushion. But they would come in and I would add them all up and I would say, "My God, you will never be able to get anything like that. This is what I think we can get." We would sit down and try to hammer these things down.

We would finally come up with something that the Navy could take over to the War Production Board and fight about with the Requirements Committee.

Then we would get our allocations and bring them back and sit down with the same group of fellows and try to divide them among the bureaus. Each one of them would want to have its own interests taken care of. The Air Corps had to have this and that. The whole Bureau of Ships was going to be sunk if it did not get something it wanted. The Ordnance had to have this. We would squabble about the thing for three or four hours and finally come up with a rough-justice decision that "We don't like it, but it is all right, I guess."

Never once in the course of the operation of CMP did we have to go above that working level up to the bureau chiefs or up to the Chief of OP&M or the Chief of Naval Operations and have one of them decide it. In other words, good humoredly, with reasonableness, sensibleness and flexibility we were able to adjust it at that working level and come up with something that could make the Navy get what it needed.

I have a lot of comments here on individual items, but I do not think our time will permit me to go into them.

As individuals we went through in the Navy a long and tedious process of learning the techniques of translating military programs into material resource requirements. We learned a lot of things. But a good many of them are already dreams forgotten. The people who know most about them are disappearing and going other places. It is up to us in the Services and in the civilian organizations to put the continuing touch on that, and to get prepared, not in broad, general language, as we were with the industrial mobilization plan, but to keep prepared and be ready to take prompt, quick action when the next emergency comes, to know what we are going to need and how much we need for whatever the plan of action is. There is an awful lot of work to be prepared for the various eventualities and know what it means in terms of men and materials. But it is work that I am sure has to be done. Otherwise we will have to go through the same thing that we did in World War II.

In winding up our work in the Civilian Production Administration, particularly our Military Divisions, we are attempting to make a record of some part of that knowledge that they had over there. We are making it available in a volume which we are going to call the "Munitions Handbook." I have a couple of batches of sample sheets from that Munitions Handbook here today, which Captain Henning will let you have after I finish. It attempts to be a compendium of some of the statistical factors which the War Production Board found useful in calculating and in appraising the validity of military requirements on the resources of the country.

We will probably complete this book through the first half of this year. I do not think this agency will last much longer than that; I hope not. But we want to complete that handbook and give it to you.

Of course that is a record of the past. It contains a lot of experience which we have learned. But every advance in weapons, like the

atomic bomb and jet propulsion and all the rest of these things that are happening, will change the over-all total of what we had to have in the last war considerably from what we will have to have for the next emergency, whatever that may be. But it gives you a pattern on which to work.

If we could have ready at all times a pretty good idea of what we have to have in terms of resources of plants, tools, materials and men, by time periods, quarter by quarter, as we go ahead through this prophesied emergency, if that prophesied emergency ever comes, it would enable industrial America to be kept geared up and to get rolling in a very short period of time. If we do not maintain such a study, it will take us many months longer than it would take if we do have such a study up-to-date--kept up-to-date by you people who know most about it in the Services. Thank you very much.

CAPTAIN HENNING:

We will probably have some questions from the floor.

A STUDENT:

Commodore Small, you said the production peak was not reached until 1944. Was that delay mainly due to lack of plant facilities, lack of raw materials, or was it due to lack of manpower?

MR. SMALL:

A combination of all three. Taking individual items, during 1944 it was mainly due to a lack of materials--on anything containing tin it was probably due to a lack of materials. On others it was due to lack of facilities. The great majority of it was due to lack of manpower in the component plants.

Now, I suppose we must forecast a comparable lack of manpower at any comparable period of the next emergency. During the production peak we are probably going to lack manpower.

A STUDENT:

I would like to comment on your statement about the way CMP worked. I was out in the field at that time. I think it is a fair statement to say that it was a generally accepted fact that we were going to accept fifty percent of what we asked for as our requirements regardless of the amount we requested. I have always understood that before this CMP system came along and the estimates went to the WPB, the Inventory Control Plan brought thousands of pounds of raw stock out of hiding. If that is true, I would like to know why it was that that Inventory Control Plan was rejected.

MR. SMALL:

The Inventory Control Plan was not rejected by the WPB. It was rejected by the Services, that did not want to be held down on their

inventories. WPB has had inventory regulation in effect a long, long time. On the other hand, I assume you are talking about the pyramiding of requirements.

The Services did pyramid their requirements. There was no way to tell who was pyramiding and who was not. But this plan which broke it down by products, pyramiding could be detected. There had to be some way to break it down.

There is a production code, we will say, for sewing machines. In 1943 part of the sewing machine plants had been converted into direct war needs. We knew all of them. But they would come in with requirements and inevitably we could not help cutting them down. I would say, "We can't give you all this for sewing machines. We need it for guns, ships and tanks." So we would take it away from sewing machines. Actually a good part of it was not for sewing machines. It was for other things that went into guns, ships and tanks.

On a plant basis, unless there was a perfectly terrific administrative statistical setup of breaking every individual plant down by the products that it made, there was no possible way to give that plant exactly what was required for everything that it needed and still keep the demand within the supply.

Nor was it possible, when we had to give horizontal cuts that arbitrarily went across the board, to see to it that every element that went into a program got what it needed. After going through a great deal of this sweating, I am convinced that the vertical system of allocations, following the program down to the bottom, is the only one that is feasible. I do not know of anything that works as well once industry and the Services become accustomed to it. But it is a tough one to get used to.

A STUDENT:

You spoke of raw materials planning and how well it worked out. You also brought in the scheduling of critical components. But you did not mention directly the requirements studies made for the critical components and also what good was done by such study. Would you deal with that just for a moment?

MR. SMALL:

When we got into the critical common components, we found that there was not enough to go around. We had no way of knowing really, except by the symbols and orders that would flow into the order boards of the critical component plants, whether by authorizing so many tons of steel we were authorizing a program that was going to hit right into this critical common component; and whether we were just wasting a lot of material, making a lot of things on these particular common components that were going to slow down this particular battleship.

So we asked the Services for figures on critical components. We asked them for comparable figures on a lot of B products of which at the

start we had about 104 of them. We finally got that number to about 22 where we had the Services accumulate figures.

The figures in the beginning were very rough. As we went along quarter by quarter, they got down pretty close to what this really was. We found that there was inevitably water in the statistical approach and that we could cut that out by the experience at the plant level.

As I say, we never got our critical common components defined in any way near like we did the controlled materials by the CMP. I suppose if the war had kept going a couple of years longer, we would have been able to do it. But it involves a great many complexities that are not involved in straight allocation.

Fortunately, it has worked out pretty well. We did not run into too great difficulties there. We were generally able to give and take enough to take care of the work. It was particularly troublesome when Manhattan came and took all the valves away from the Navy.

A STUDENT:

For many companies it was certainly one of the things in this war that needed to be worked out. We had to wait until the thing got hopelessly snarled up before it was brought into play. My question is, How soon do you think that that plan could be brought into play? That is, where in the limited emergency period or in the war period do you think that thing should get started?

MR. SMALL:

In the next emergency, whatever it may be, the Services are going to have certain requirements. I do not know what those requirements are going to be. I recommend that the Services keep up-to-date on what their requirements are for immediate procurement, month by month. I am talking of the future requirements.

If those requirements indicate that CMP should be instituted immediately and that 650 red tape, complicated restrictive orders, like the WPB sent out, should be sent out, we should do that right away. If they indicate that an immediate reinstitution of CMP is desirable, we should do that over-all, no matter whether that emergency occurs ten years from now or today.

The form and volume and the portion of each service's requirements in that future emergency will determine how many of these controls and the types of controls should be put into effect. I think that in the event of a threatened war we should put CMP into effect even if we did not put in a lot of restrictive, limitation orders--no refrigerators, no automobiles. Even though we delayed a lot of that, we should put CMP into effect and get people right now acquainted with it.

DR. HUNTER:

If we had thought that CMP was necessary back in 1940, it would hardly have been feasible. Do you think it would have been accepted at that time?

MR. SMALL:

I do not believe it would. In other words, back in 1940 and 1941 I do not think that the psychology of the Services would have allowed them to accept that and go ahead with it. They would have thought it revolutionary. But we have gone through this once. Everybody has learned that it will work. In the next emergency, if it is not too long delayed, they will remember that lesson, and I think they will take it like a shot of medicine, and be glad to have it, because it is the thing on which you can best plan production. We were able to do that during late 1943 and in 1944 and 1945.

CAPTAIN HENNING:

Any other questions?

MR. SMALL:

Thank you again. It has been a pleasure to be here with you.

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