ORDNANCE PRODUCTION PROBLEMS

25 March 1949

CONTENTS

Publication No. L49-110

THE INDUSTRIAL COLLEGE OF THE ARMED FORCES

Washington, D. C.

ORDNANCE PRODUCTION PROBLEMS

25 March 1949

GENERAL HOLMAN: The Ordnance Department of the Army maintains the closest ties with its sister services--the Navy and the Air Force. This is necessary because of the many types of weapons, ammunition, and equipment that it furnishes to the other services. The Department also maintains close contact with science and industry. If it is to furnish efficient weapons, it must keep abreast at all times with technological progress, with new production processes, and with new materials which may have application in the military fields.

It has therefore become a yearly tradition here at the Industrial College to invite the Chief of Ordnance to speak from this platform and bring us up to date on the planning and production problems which confront the Ordnance Department. We are highly honored today in having with us Major General Everett S. Hughes, who has been an Ordnance officer since 1911 and Chief of Ordnance for the past three years. General Hughes.

GENERAL HUGHES: General Holman says I am down here for the purpose of bringing you up to date. I want you to skip that, because I am not up to date myself. Things are changing so rapidly these days that what is agreed upon at nine o'clock in the morning is frequently upset by nine thirty. That reminds me of the fact that when I am invited to speak to a gathering of this kind on some concrete problem such as production or procurement, I always think that there is something more fundamental than that which should be discussed and should be understood by everybody.

I was talking just now with some of your instructors while having some good hot coffee. Every problem that they raised and every statement that they made can be traced right back to some question of organization, some question of how men deal with one another to get a job of work done. I am not going to preach to you this morning, but I just want to start off by saying that no matter what concrete problem you have, back of that is the question of organization, the question of individual responsibility, and the question of experience and knowledge in the field in which the officer is operating.

Another thought that occurred to me while I was sitting there talking with these officers was the fact that there have to be in the Army men who know both the combat side and the industrial side, within certain limits. One of the chief problems that bothers me as Chief of Ordnance, and that bothers the Ordnance Department, is the fact that we are constantly subjected to inquiries as to requirements for study and requirements for work, which come from the minds of men who have not had

sufficient knowledge of, or sufficient association with, the large job of getting billions of dollars worth of equipment manufactured and into the hands of troops. I have never been a student of the Army Industrial College. I have, however, spent a lot of time at service schools. But to my mind you people have the greatest opportunity in the world to become those balanced people whom we need not only in the Army, but in the Air Force and the Navy; people who can talk both languages, who can interpret these requirements of the combat man into the requirements of the producer, the industrial man.

It is more evident every day, since all of these superagencies have been established in Washington, that we do not have enough men in the Services wearing the uniform who understand that great distinction and that transition stage from the military characteristics of the equipment on one side and the question of machine tools and tolerances and specifications on the other side. That is all I am going to talk about from the standpoint of organization, although I shall be tempted many times this morning to stop and call attention to the requirement that I have set up here--a knowledge of organization and how to get the job done.

The mission of the Ordnance Department is, I think, familiar to all of you. I will show you a chart, to review briefly for you the purpose and organization of the Ordnance Department for getting this job of procurement done. (Chart was not reproduced.)

The chart is weighted with colors. It shows you the 89 units in our field establishment, which are organized for the specific purposes of manufacture, procurement, and supply. We start with our seven manufacturing arsenals, which at the present time do all of our procurem We have next the district offices, 14 in number, located all over the United States in industrial centers. The district offices, working with the arsenals, process the procurement orders which come out of the Ordnance Office. Then our depots are the places to which the supplies ar shipped and from which they are distributed to troops.

In addition to those plants that I have mentioned, which are shown on the chart, we have a number of stand-by plants. During the war they made specific items of ordnance which are not, as you know, commercial items. We are keeping those plants in stand-by condition for any immedia emergency. Most of those plants require a lot of money to maintain. We are spending as little as we have to on them for the purpose of maintaining the machinery. We are going to let the roads, the railroads, and the buildings go to pieces if we can't get the money to keep them up.

The Ordnance Department is organized on the basis of the greatest possible decentralization. We visualize the next war as being one in which aerial destruction will be the order of the day. We feel that fro

the cave into which we are going to have to retire when the bombing gets a little heavy, it will not be possible to control to the extent that we have in the past all of the various activities of the Department. So we are fighting every day the questions which come to us from the field. We are insisting that the commanding officers of those establishments use their brains, their initiative, and their experience, and stop asking us to solve all the problems which are bothering them.

My theory has been for a great many years that the accumulated error, the accumulation of small errors, made by commanding officers in the field is never so great as the one or two errors committed by some centralized authority. I think that it is being proven that, while commanding officers are making mistakes, they have never yet made a mistake which disturbed the whole Department.

I am against government by CAF-5's. There has been too much of it in the past; unless we watch our step, there is going to be too much of it in the future. It is impossible--and I am talking, of course, only for the Ordnance Department--for us to spend wisely all our procurement funds from Washington. For the fiscal year 1949 we have 1.3 billion dollars. A part of that, 680 million dollars, came out of our appropriation for last year, under the heading of "OSASA," "Ordnance Stores and Supplies, Army." We have out of the total fund of 1.3 billion dollars about 500 million dollars for actual procurement. I take the attitude that we haven't the ability in Washington to do all of the thinking, make all the decisions, get all the reports, and do all of the work that is required to efficiently procure 500 million dollars worth of equipment. It has been proven during the last three years, much to my satisfaction, that by getting everybody into the game and giving them a feeling of responsibility for their portion of the job, we get everybody interested and there is less government by CAF-5's.

In addition to utilizing the services of the Ordnance officers and Ordnance civilian personnel in the Department, we are utilizing to a very great extent the services of World War II contractors--industrialists and manufacturers. We are doing that through the organization known as the American Ordnance Association, formerly known as the Army Ordnance Association. (It unified too when the Unification Bill was passed.) Regardless of its name, it has done a very fine job, inasmuch as it has set up a series of technical committees. Under the leadership of high-ranking, well-qualified civilians, there are committees which are dealing with ammunition, fire control, and artillery. To those committees we can refer at any time any technical problem which has from any point of view an aspect of mass production.

I am a little radical about this. I have become so from the standpoint that, as General Holman said, I have been around the Ordnance Department a long time. It occurred to me when I was a youngster that we did not have in the Department any Ordnance officers and engineers who

knew mass production. We had a lot who thought they did. Some officer, after manufacturing 10 or 15 tanks at Rock Island Arsenal, became a "tank expert." Somebody else, after manufacturing 10,000 rounds of ammunition at Picatinny Arsenal, became an "ammunition expert."

That is no longer true. The whole procedure of the Department now is to secure from industry a mass-production job. By a mass-production job I mean millions of rounds of ammunition and thousands of tanks and thousands of guns and thousands of trucks. When you get into a mass-production problem, the only people who are qualified to deal with that problem from a mass-production point of view are people who have been engaged in the practice of mass-producing something. There are tricks in all trades, and the only people who can help us to manufacture at a rapid rate are the people who have been accustomed to manufacturing something else at a rapid rate.

So let us take, for example, the question of a new item of equipment for the Ordnance Department. It is probably very similar, or may be very similar, to something that was made during World War II. In that case there are some men in the United States who have made that particular item, but who during World War II were never permitted to exercise their own ingenuity on it. They didn't have the time to stop and redesign the item of equipment at the beginning of the war. They were forced under the circumstances prevailing at that time to manufacture that particular item as fast as they could. The drawings and specifications, however, contained many things which were not appropriate for mass production. These men are being given an opportunity now to help us design these items and get the drawings and specifications for them in such shape that they can be mass produced at a rapid rate. We are getting, in my opinion, unparalleled support on that from everybody who is engaged in ordnance production now, or who may be interested in ordnance mass production later.

That work starts in the research and development field. Heretofore some Ordnance engineer or Ordnance officer has sat behind a desk or a drawing board devising things--a fuze is one example--without any regard to the type of machine tools which will be required for the production of that fuze. It may so happen that by drawing a curved line instead of a straight one, he may make it necessary to have a special tool to make that curved surface. But if we submit that fuze design to the man who is going to have to produce it, who is going to have to find all the machine tools required to produce it, we get an entirely different point of view on the thing. We may get a fuze that will operate just as well and is easier to manufacture than the other one that was designed purely from a theoretical point of view.

The next important item from a procurement point of view ties in very definitely with the mobilization planning requirements. There is a Public Law 413, which I suppose most of you are familiar with. In

general, that law requires procurement by advertising. But the law also contains 15, 16, or 17 exceptions to the general requirement. It permits the placement of an order with industry without advertising if by so doing industrial mobilization can be promoted, or if a manufacturing facility can be kept in operation--one that made a fuze during the war. We see a requirement for a large number of those fuzes now or in the future, so under the law we are permitted to place an order under the exception to Public Law 413 in order to keep that manufacturer up to date on the know-how of producing that particular fuze.

In my opinion that is a perfectly satisfactory law. The only difference of opinion that ever develops between those of us in the Ordnance Department and the people who are under the law required to O. K. these exceptions is that occasionally we think that an order should be placed under an exception to Public Law 413, but the Office of the Assistant Secretary says, "Advertise." Then somebody will quote us on the order for about a third of the price that we expected to pay; so we are completely thrown off base for another six months because while we were trying to do one thing we saved some money. Then we get into the question of whether or not it is advisable to spend that extra money for the purpose of maintaining that know-how or save the money because of our limited budget. And when I talk about our 1.3 billion dollar budget, that doesn't mean that we are not limited as to or don't worry about the budget.

Now, so far as industrial mobilization planning is concerned, our purpose is to keep our planning and our current production hand in hand. All too frequently in the past in all services--I make no exception to this--there has been a planning division off in the corner of the office some place where men are calmly, without any feeling of rush or immediacy, planning to do something. There is a man right on down the hall who is actively engaged in doing something. As a consequence, just before every war we find our safe filled with mimeographed plans. Sometimes when war comes, those safes are not even opened. Usually they are opened, and somebody looks at these plans and throws them in the waste basket, and the people continue to do what they have been doing all through the years.

In the Ordnance Department we are trying to avoid that particular situation. The planners and the current operating people are trying as best they can to work along the same lines. In other words, if current procurement can be conducted in such a fashion as to promote industrial mobilization, we do it that way. For that reason I have no planning division in the Department. I have two or three officers who are my alter egos on planning, whose job it is to keep me reminded or other people in the office reminded of the fact that planning is still a very important part of the game, because we very frequently forget the future in attempting to solve the nine o'clock problem.

But I think that planning is a very important aspect of procurement. The one great thing that makes the Industrial College worth while is th fact that you men have for an appreciable period of time--several months an opportunity to sit on the side lines and become thoroughly acquainted with what is going on, without having to be worried by current work. So at least the theory of procurement is becoming second nature to you, and that will put you a great step forward when you actually get into curren work.

We buy what we are told to buy. The usual way in which we are told to buy something is by someone running some quantity collected from the Tables of Organization and Equipment on IBM machines. They look at the total and we are told to buy that quantity.

During the war we bought ammunition to such an extent that we now have in general somewhere between 30 and 50 percent of that ammunition left on hand. There are various reasons why that happened. The first and principal reason is the fact that no combat commander would ever go into battle until he is certain that he has everything completely under his control. He doesn't want to rely on the convoy system, he doesn't want to trust the Air Force and he doesn't want to trust his superiors in the rear. So, in order to fill these pipe lines that everybody talks about, we produce enormous quantities of items.

At the other end of the pipe lines these things come out in meager quantities, so meager at times that when a combat officer listens to us discussing the matter of reducing the manufacturing requirements for World War II, he says: "We can't go along with you on that, because in Italy we ran out of 105-millimeter ammunition. In Sicily we ran out of something else." It may be that they did temporarily run out of someth but there was plenty of ammunition in the world. It just didn't happen to be at that particular spot where they wanted it at that particular t so the general allegation is that we didn't make enough.

Our theory is that the combat soldier has been badly spoiled. We h a case in point now. We are working on a seven-pound rifle. I don't k what the present rifle weighs, but it is probably about 10 pounds. We going to save three pounds. But I am just as sure as I am of anything the world that, if a soldier is equipped with a seven-pound rifle, thre pounds of other gadgets will be hung on him, because that is what the procurement planners want. So that problem is receiving a lot of discu sion these days.

The theory of the Ordnance Department is that the production capaci of the United States will not be so large for the possible next war as was for World War II. If our thinking is all correct, there will be temporary stoppages as a result of bridges down, roads out, buildings a plants partially destroyed. There will be delays. Our theory, therefor

is that we must start with the minimum load, that we must get down to bedrock, and not have on the airplane or on the battleship or on the man in the field anything but the essential items. We know full well that after war has been declared conditions will change and there will be a lot of unforeseen demands coming up.

I am positive that, no matter what crystal ball we look into, we are not going to have the same United States production that we had before. Therefore we must start with the minimum and provide for these contingencies that are bound to occur. So we are starting first with the Tables of Organization and Equipment, which are easily prepared but very, very difficult of fulfillment from a production point of view.

So far as some of our special problems are concerned, I want to discuss here a few specific examples which give us a lot of worry and cause a lot of discussion in the Department.

One is the sedan problem. There seems to be an idea that the Air Force, the Navy, and the Army do not need sedans. Therefore if you talk about a sedan, everybody who has anything to do with appropriations says: "You don't have to have it." Consequently we use jeeps. But jeeps cost more to buy and they cost more to run. We could save a lot of money if we could just get around that word "sedan." I don't know what to call it, but it is a sort of obstacle that we can't get over very well.

Then there is the question of trucks. We have in the Army--and I speak now only for the Army--an actual requirement of 93,000 trucks. At the rate we are going, the Army will soon be on its uppers. We just won't have those particular items of equipment which did so much for mobility during the war and which were praised so highly by every commanding general all the way from the top down. Trucks enabled the field forces to get from point A to point B rapidly and in order. The trucks that we have were bought principally during the years 1942, 1943, and 1944. They are already overage. We are spending an enormous amount of money in their repair and rehabilitation. We are sending them all over the world--to Greece and Turkey and other points--and the problem is not only one of difficulty in maintaining these trucks, but one of extreme difficulty in maintaining mobility in the Armed Forces.

Here is another little example of the difficulties of procurement. Not long ago it came to my attention that we are erecting at Frankford Arsenal an assembly line for the production of jewel bearings for watches. I throw this example out because it illustrates the difficulties that we sometimes experience with industry. The three big watch companies of the United States--Waltham, Elgin, and Hamilton--are now buying their jewel bearings from Switzerland, but they know as well as we do that in the event of war that supply of jewel bearings will probably be cut off. So they want us to set up a line for research and development in and production of jewel bearings.

We have taken the point of view that jewel bearings are a commercial product, and that the industry, if it has any patriotism whatever, should take steps to invest some of its own money in the solution of this problem in the manufacture of these bearings. It may be that after the Air Force, the Army, and the Navy have gotten together, which they haven't as yet, they may subsidize the industry to a certain extent by giving them 15 or 20 or 25 percent of the total cost of going into the manufacture of jewel bearings in order to promote industrial mobilization.

Then we have the problem of manufacturing steel cartridge cases. I give this as an example of a procurement possibility in time of war from a mass production point of view, whereby you may get something that doesn't contain strategic materials. We feel that if we can develop the steel cartridge case to the point where it can supplant the brass cartridge case we will have done something for industrial mobilization.

Now, I have talked long enough. I could summarize it by saying that I have given you some specific examples, I have talked about concrete things, and I want to close, as I started, by saying that all these things go back to understanding, they go back to experience. They go back to willingness on the part of the men in the Uniformed Services to work together to help solve one another's problems. I think--and I speak again for the Ordnance Department--that we have through the years maintained the closest liaison possible with the Navy from an ordnance point of view, not only in research and development but in procurement as well. I think the same thing is going on now from the standpoint of the Air Force.

I think that there is too great a tendency, due to ignorance of what is actually going on and what has been going on for years, to take over from the topside and try to set up unified control and standardization of procedures which, after all, depend upon men. You can't standardize men under any circumstances.

I will be glad to answer any questions.

QUESTION: General Hughes, in planning for industrial mobilization how is the Ordnance Department kept posted on the manufacturers' potentialities? By that I mean, how are you kept informed on technical advances in the machines and changes in the capability of manufacturers due to business and other conditions, with respect to things that they made in World War II and that they may not wish to make in another emergency?

GENERAL HUGHES: Answering that first facetiously, due to this semi-depression, we are more fully informed now than we were six months ago. We are getting calls from everybody in Washington and from all over the country telling us about their industrial capacity. We are getting a lot of information that we were never able to secure before through our best sources of information.

But we insist that these companies, before informing us here in Washington, keep our district offices informed. We won't tolerate a manufacturer coming to Washington and trying to explain to us here about his industrial capacity. Ours is a system of operation by delegation, and our 14 districts are in very close liaison with the industries in their areas.

There is a system, with the details of which I am not entirely familiar, operating under the Munitions Board, whereby the result of a plant survey is made known to the Munitions Board through us; so we have fairly good information as to plant capacity.

Our main reliance is upon the people who made certain items during World War II. We are not advocating plant surveys. I have never seen any sense in sending a man, no matter how experienced, into a plant to count the number of lathes, shapers, and grinding machines, or the number of tool makers, that a manufacturer has and then using that survey to try to determine whether he can make a crankshaft for a 155-millimeter gun. It is surprising the ability that can be displayed by any manufacturer, whether large or small, in making something if you want him to make it.

Through these technical committees of the AOA we are keeping possible fuze manufacturers informed of our requirements for fuzes and our specifications for fuzes. We are keeping the powder manufacturers informed the same way, and the fire control men the same way. Every time there is an advance in any procedure involving mass production, we hear about it, because some fellow in that industry says at one of these committee meetings, "I don't want to make it that way" or "I don't want to make it of that material. I don't want to make it with that tolerance." So we let him set his own standard on the thing; if it still works, we adopt that method. I don't think there is any great lack of information either way.

QUESTION: What is your method of preventing this government by CAF-5's that you mentioned? I know you mentioned decentralization, but I also know from experience that a fellow out in the field will often write in and want a piece of information, not a directive; but, a CAF-5 or somebody on that level will send back in the name of the commanding general a directive. Pretty soon you don't have this decentralization that you want. I was wondering what provision you have to stop that sort of thing.

GENERAL HUGHES: There are lots of ways to do it. One way is to walk down to the mail and record room in the morning, look at the incoming mail, and put a red pencil on all such things saying, "Return to sender." That happens very frequently.

Another way is to make it hard on a superior when he comes in to me with a problem on which he has not thoroughly learned this lesson. I can put him through a little cross examination as to whether this is a CAF-5 recommendation or a recommendation from higher authority.

I don't know if there is any answer to the thing. As a matter of fact, I know there isn't any answer to it. So let us just pass to the next question.

QUESTION: Does the American Ordnance Association conduct any surveys as to the capacity of its members to manufacture your articles?

GENERAL HUGHES: We don't do that through the AOA. What we have done is to ask the people who actually ran those plants during the war to go back into some of their stand-by plants that they operated and survey them for us. For example, we have down in Houston the Dixon Gun Plant, costing 50 or 60 million dollars, which was erected during the war for the construction of centrifugally cast guns. The man who operated that plant has recently gone through the plant and given us his view as to whether or not it is ready for operation. We have done that with Procter and Gamble on some of the loading plants that they operated. In other words, we are still counting on the people who ran those during World War II to go back and make that survey regardless of whether they are members of the AOA or not.

QUESTION: General, in reference to the jewel-bearing problem, was there any effort made in connection with the government's financing of Waltham to pressure that company into jewel-bearing manufacture?

GENERAL HUGHES: No.

QUESTION: In connection with your depending upon your old sources of supply, is there any confusion arising through the Munitions Board's action in allocating manufacturers?

GENERAL HUGHES: The answer is, yes.

QUESTION: General, I am interested in your attitude toward the pipe lines. We have heard quite a bit about them. It seems as though pipe lines are rather essential from many people's point of view, but I think probably you think they may be unnecessary and wasteful. I wonder if you would say more about that.

GENERAL HUGHES: I didn't say for a moment that pipe lines are not necessary. Take caliber 30 small arms ammunition as an example, where we made about 35 billion rounds of ammunition and had over a third left after the war. Now, why did we make so much? First of all, we manufactu a month for the zone of interior requirements, then we manufacture two months for transit requirements, then we manufacture two months for overseas requirements. Then we manufacture some more, until we get up to the point where we have an eight-month supply in the pipe line.

Let me illustrate this a little better, because this question runs into production capacity, it runs into strategic materials, it runs into tool makers, and it runs into everything in the world. It should be thoroughly discussed and understood.

When I went to North Africa in the spring of 1943, my first query was: "How many days' supply of food do we have on hand in North Africa?" Nobody knew. After about two weeks I asked again, and still nobody knew. They said they couldn't answer that question, because there were 105 different components in the ration and they couldn't find out how much pepper, salt, olives, and so forth they had around. So I said, "Take 17 of the most important items of the ration--flour, sugar, beans, bacon, and so forth--and equip yourselves with some flashlights and go out and count those particular 17 items." After they counted them, they said, "We have enough for 105 days' rations in North Africa." At that particular time the United States civilian population was depriving itself of all of these 17 items that it could possibly spare, and then some. As a consequence we had in the heat and dust of North Africa 105 days' supply.

This was all based upon the theory that the convoy system wasn't working, that the Navy didn't have any battleships, that the railroads were not working in the United States, and that the railroad and truck service in Africa was incompetent; so somebody had to get 105 days' supply to satisfy himself that he had plenty. In other words, the whole theory of this pipe-line business is based upon getting too much too far forward and a complete disregard of the ability of the men who are handling the distribution service to do their job.

We have a battle on right now to try to determine what the requirement for small arms ammunition is. Somebody has assumed that every rifleman is going to fire X rounds each day. They multiply X rounds by the number of rifles, and then they say, "We are going to have two months of that in the theater." It totals up to eight months. I can't conceive of any situation even under aerial bombardment, where you can't get small arms ammunition to the fighting men without having eight months' supply of it in the pipe line. I can't conceive of any type of ammunition being water-bound or plant-bound to the point where you can't get it up to the fighting men. And I am looking at this thing from the standpoint of the production capacity of the United States and our ability to make the items that are required, not the items that somebody would like to have.

In the advance across the Normandy beaches I had quite an argument with G-4 of the First Army over the fact that it didn't have enough ammunition on hand to justify telling General Bradley that the First Army was ready to attack. Well, there was plenty of ammunition in England, and the Navy was running a very excellent convoy system over to the far shores. Boats were running regularly. I didn't see any reason why the build-up in

Normandy could not take consideration of the fact that the boats were still on top of the water and operating. Antwerp was filled with supplies. I will quote just one example. Two tremendous warehouses there were filled with gold metal cots, more gold metal cots than were necessary. The idea was that they had to have a 90-day supply. I don't know who was using cots over there, but they certainly had plenty of them.

But I think that is a very serious problem. I think it must be thoroughly understood by everybody, because it all goes back to what we are going to have to make. The more you have that pipe line clogged up with stuff just to play safe, the less chance you have of getting made in this country the things you need.

QUESTION: These technical committees of the Ordnance Association sound to me like a pretty good device to keep the military informed on industry's technical standards. Do you think that some of the rest of us should take a leaf out of your book on the use of that device?

GENERAL HUGHES: They have already done it. If you go to one of these technical committee meetings, you will find Navy technicians with their problems sitting around a table with Ordnance technicians from the Army, and the contractors right out in front. A Navy man will present his problem and the chairman of the committee says: "Who will take that one?" Sam Jones, representing such-and-such company, says: "I will take that." It doesn't make any difference whether it is an Army problem or a Navy problem.

I don't want to get into the question of unification here, but I think that gradually the method which has been adopted by the ACA will be adopted by not only the Navy League but by the Air Force civilian component. I don't know what the name of it is.

I suppose that method is the ideal one for keeping the people who are going to have to make these items during a war familiar with what is going on. Furthermore, it gives them a clue as to where to go to get an order these days, which is a very fundamental help to them.

QUESTION: What plans are being made to take care of the one-third excess of small arms ammunition that is now stocked? I think it would be a help in training to use that up.

GENERAL HUGHES: First of all, we haven't had the troops to use it up to a great extent. The Army has only recently been increased. The Air Force isn't up to the 70-group program yet. So far as the enormous amounts of ammunition that we have on hand are concerned, I don't think any training program has been held up because of not being able to get ammunition. There is plenty of ammunition, and the Military Forces are using it.

COLONEL HOEFFER: General Hughes, I think that you have answered all the questions. We certainly enjoyed your being back with us again this year. Thank you very much.

(28 April 1949--450)S.