

CONSTRUCTION FOR WAR PRODUCTION FACILITIES

25 April 1950

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Mr. Richard H. Tatlow III graduated from the University of Colorado and is a member of principal engineering societies. Prior to the last war, he was a partner of the late John Lyle Harrington, with a large nationwide practice. When war preparations started, he organized the Architectural and Engineering Design Branch of the Army's Construction Division and became one of the five members of the War Department's Construction Advisory Board. As a Colonel, General Staff Corps, for the last three years of the war he had staff supervision of new industrial facilities and inspection of material, including installation of statistical quality control. At war's end, he joined the firm of Abbott, Merkt & Company, who, for 25 years, have been designing department store facilities, including suburban stores, warehouses, delivery and service buildings, and customer parking garages. Extracurricular activities include membership in the Construction Industry Advisory Council of U. S. Chamber of Commerce, representing the American Institute of Consulting Engineers. He contributed to the establishment of the new Building Research Advisory Board, a part of the National Academy of Sciences. Mr. Tatlow's present position is President, of Abbott, Merkt & Company.

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MR. SWAREN: An interested observer in Washington during the late thirties could have felt the scend of public feeling that was soon to flood the Nation with a spate of construction projects the like of which neither this Nation nor any other nation has ever experienced.

The War Department realized fully that ordinary methods would not administer such a program. When Congress, in 1940, finally opened the appropriation floodgates, one of the first new administrative bodies encountered by the inrush of a fasting construction industry was the advisory boards. These were comprised of high-ranking officers, both active and retired returned to duty.

But on one, by some work of fate, a young engineer was given a seat. His energy, his tact, his skill in dealing with engineers and contractors--men of independent thoughts, at least--soon marked him as the spark plug of this system for assuring that the best-fitted man received each negotiated contract.

That man is our speaker today. I consider it a privilege to introduce Colonel Richard Tatlow, a tower of strength in our industrial reserve. Mr. Tatlow.

MR. TATLOW: Mr. Swaren, thank you for a nice introduction. I am a little alarmed, because it is too generous.

General, gentlemen: I am very happy to have the opportunity of speaking to you, although I am embarassed to see a few friends who, I am sure, know more about this than I do. They also saw it from beginning to end.

I read the speech that Mr. Requardt gave, and that Mr. Seider will give. Both of these and other papers placed before you are full of pertinent information. I hope I will not repeat too many things that you have already heard.

Unfortunately, I have not followed too closely the planning that has been done since the close of the war. My comments are those of an engineer who was brought in at the very beginning of the last

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war, who had some interesting experiences, and an opportunity to observe a good part of the industrial construction program from a desk in Washington.

Purpose

As I understand it, your purpose is to learn as much as you can as a basis for future planning. One of the places to which you must turn is the past. You may study and plan, but, if you are to do a good job, the first thing to do is analyze carefully what has already happened. We have just finished a colossal war with a huge procurement program. Having seen it in operation I may be able to stimulate your planning by briefly telling you of my experience.

We made mistakes, and we made "good" ones. You are going to do the same in the event of another emergency.

Prewar Planning

When I first came into the War Department, we expected the results of previous public utterances with respect to M-day. Many of you probably remember that the M-day planning was in every newspaper long before there was a so-called emergency. Like many others, I thought the planning meant that you would push a button and everything would fall in its proper place for war. Perhaps we never found the right button, but the planning certainly had a long way to go when we started in the summer of 1940.

At that time, construction was under the Quartermaster General's Office, which had an excellent staff of architects and engineers. Those men were busy designing a few camps, standard buildings, barracks, hospitals, and industrial plant expansions. We had, as a start, in the so-called Construction Division that was established by the Quartermaster General, an office about 20 by 20 feet in size, in which seven of us were put. We were told, "This is where you are going to work. Build up an effective organization and plan to handle a huge program. There are 600 or 700 technicians who are working on typical plans, but their number is inadequate, and there must be a great number of outside engineering and construction firms brought in."

A group comprised of representatives of the American Institute of Architects, the American Society of Civil Engineers, the Associated General Contractors and perhaps others had met and helped the "topside" plan what was to be done in this emergency. They had already decided that there would be firms of consulting engineers and architects employed as they are in private life; that the work would not be done by the normal government staff and procedures; and that construction contracts,

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in order to meet time elements, would be on a cost-plus basis. They had also established fees for construction contractors and outlined the form of contract. We had the problem of deciding on fees and contract forms for engineering architectural services.

Incidentally, the term "architect-engineer" coined at that time has become pretty popular with everybody, even in private life. Today we talk about architect-engineering services. That term is a hybrid and its origin is interesting. The architects wanted to do the work and of course the engineers also wanted to do it; so we thought it would be a good idea if we could put both names together and have one title that neither could fight about.

The fees were worked to approach reasonable compensation, and avoid so far as possible large war profits. We had a great many arguments about it, but the fee schedule, I believe, was fair. A comprehensive report on this subject was later made jointly by the War Production Board and the Army.

There was established, to augment these plans, the Construction Advisory Board to the Under Secretary of War, which established policies and practices pertaining to the selection of architect-engineer and construction firms.

Everybody wanted a job. They sent in brochures telling how good they were. We tried to establish a system that would permit us to analyze any one firm and find out, in addition to what the firm claimed, how many people of what type it had, how much work it had done within the last five years, and what sort of ability it actually had in its staff. We could not accept at face value what these firms said they would like to do, because some of their imaginations ran wild in the brochures.

Upon request of the engineering or construction branches of the Construction Division, the Construction Advisory Board would examine its files, interview firms, and recommend three firms to the branch. Three firms were almost always represented. One of the three was selected, and negotiations were started.

At that time site selections had usually been made. I think you know something of the problems involved in site selection. There are many things that enter into the choice of a site just as in private business today. Comment on that could go quite far and serve no useful purpose.

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The camps and cantonments, we were told, were to be built in 90 days. That included the selection of the architect-engineers and the contractors. Everybody was to rush toward an end result that, at the moment, seemed quite impossible. Some of the projects were nearly built within that limit, in spite of the confusion, because competent contractors accepted the responsibility of working without an advance of funds and without well-established processing for vouchers. Payments to these contractors sometimes dragged on for several months at the very beginning of the program and drastic action was required to correct the situation.

In respect to industrial plants, we had as little as four months' time in which to complete plant expansions, and people really hoped to do that. It was not possible and it just added to the confusion, but the pressure was so great that some very unusual things were done in the interest of progress.

Buildings for industrial purposes included equipment, machine tools, and all that went with them. They originated after the sites were selected by site boards in the using services--Ordnance, Signal Corps, and so forth.

The manufacturer who was to operate a plant was selected. Frequently the manufacturer had ideas as to the firm he would like to design and build his plant. They would come before the Construction Advisory Board, qualifications and work loads would be reviewed, several firms would be investigated, negotiations would take place, and finally authorization was given to proceed.

In the negotiation of fees we had only the preliminary project cost estimates, based on figures which had come from the established War Department construction program in the preceding peacetime, and they were not good. They were not purposely bad as some people thought. No one fully realized just what happened when you turned a contractor loose the day before the engineer got on the job and then you tried hard to "high pressure" the work. You wasted a lot of effort, and that waste meant tremendously increased costs. Fortunately for contractors and architect-engineers, they were reimbursed for all expenditures and given an allowance for both overhead and profit in the form of the fixed fee. The low estimate meant low fees and subsequent hardships to those with early contracts.

We had some ideas of the amount of lumber that would be required, and purchases were going on to provide some of it, but the prices were going up, and our estimates were just about as poor as they could be. Later they were made much better.

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In this planning, we had the supervision of the National Defense Advisory Commission, with the Army and Navy Munitions Board. Although the two had some different ideas at the beginning, the supervision appeared to be very good.

One interesting comment on that relates to their anxiety about the living facilities at cantonments and at industrial plants. They wanted to see that they were made as comfortable as possible. They wanted roads and streets layed out in accordance with good site planning, rather than by taking a rule and a map and drawing straight lines, then hoping that the thing was going to be usable on the contours when they got through. A great deal was done in that direction. Their advice was helpful and their broad policies were useful.

War

The coming of the war about 8 or 10 months later put real impetus behind the appropriations from Congress and the speed and urgency with which we were all acting at that time.

Agencies Building War Plants

You would be surprised how many agencies were building plants for the war effort. I think everybody had a hand in it somewhere. The Army had its construction through the Corps of Engineers. We had several types of appropriations from the Under Secretary of War for expediting production. The Navy had its operations and a financing arrangement similar to that of the Army. The Defense Plant Corporation came into being to loan money, and it loaned money against sponsorship of the services, of the War Production Board when it was created, and of the National Defense Advisory Commission before that. There were a few plants built under funds from production contracts, and there were many built under "tax amortization" agreements issued by various Army and Navy officials.

All of these financing methods meant that everybody had a hand in starting plant construction. Not one was drawn together or coordinated in any one spot, each being operated independently.

Supervision

In addition to the various agencies mentioned above, we had the supervision that grew out of "requirements" established by the headquarters. Believe me, they shifted, and without any apparent good reason. One day there would be a requirement for three times as much TNT as the next day. Of course it just did not happen overnight, it was a progressive thing, but up until the night before,

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all plans were pushed toward the first requirement regardless of what it was and regardless of the reason. No one dared cut back a program because he had heard rumors that somebody might drop requirements. To do so would lead him into some problems with Congress, who also did a little supervising.

We had to make reports, especially for a major cutback, which usually had to be justified to Congress. If we increased it, we had to tell Congress why we increased it. Congress was very nice about it, but there was a lot of work that had to be done.

The individual services supervised their own programs. However, in most cases they were after production, and very few of the services, paid any attention at all to the scheduling of construction or the scheduling of the tools. They did a better job in scheduling tools--which was primarily their responsibility--than they did in following the construction that lagged. They had the benefit of the Corps of Engineers for construction, and that helped on those particular projects, but, remember, that was only one group of projects.

The Defense Plant Corporation had its program. It financed the contractor that was going to build or operate the plant. The contractor followed normal procedure, employed a construction contractor, architect-engineer, or whomever he wanted, and built the plant.

If you asked the Defense Plant Corporation about progress, the reply generally was, "It's not our problem to find out when it is going to be completed. You ask the Army about that." The Army said, "It's not our problem. Somebody must complete it. We have the Defense Plant Corporation looking after it."

That is an impossible situation when you are planning to get certain production. It took the Under Secretary's Office, which stepped in about that time, to say, "One of you is going to be responsible." As a result both became more active and there was an improvement. The Defense Plant Corporation followed it, and the Army followed the Defense Plant Corporation.

Then came the Production Division of the Headquarters of the Army Service Forces, so far as the Army was concerned. I don't know much about the Navy, so I cannot help on that side of it. The Production Division served as a control point in the supervision of these new plants. It had a check against requirements and was in charge of the processing of all new facilities, including those that were merely expansions.

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If a company needed to build a plant for war production through the Defense Plant Corporation, the request came through the Ordnance or other service to the Production Division, which, in turn, acted for the Under Secretary's Office in getting approval of so-called expediting production funds and clearance of all other organizations. These were turned over to the Defense Plant Corporation which agency authorized the job. Construction followed from that authorization, under the direct control of the defense plant.

There was supervision of the War Production Board, which helped out by forming the Facilities Committee to review all proposed construction (war or otherwise) and machine tool projects. That committee at first reviewed just labor, materials, location, housing, transportation, and later became interested in requirements.

When that committee got into requirements, it was somewhat lost, but it asked some very embarrassing questions. The worries of the committee on that score led to some readjustments in programs, both up and down. It did some pretty good work.

Design Control

As the war's construction program stepped up, materials and equipment shortages appeared. This brought a War Production Board design control and the "stripping of materials."

There was much chaos because forms were not ready and personnel lacked experience. We recognized design was being done in the field without any control over the uses of critical materials, certain machine tools, and other equipment for which there could be substitutions. The Under Secretary's Office recognized the chaos and asked that something be done to straighten out some of the major war plants construction.

A group was formed that actually served most effectively for a time on the control of designs in the field. The work was done by going into the field, reviewing plans and specifications prepared by the private engineering firms, and asking for changes in the interest of saving materials. This had an auxiliary benefit for saving materials meant quicker plant completion.

The owners wanted the plants built with materials that would best serve their later needs. A few of them did not have in mind the end object of private ownership of the plants, but a good many of them did; we ran into some difficult problems on that account. We could see that the planning was just a part of their normal plant expansion-- at least they hoped it could be. But, by and large, design control resulted in better speed and lesser use of critical materials.

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A good example was the large Dodge plant in Chicago. It had been designed in steel, and we just could not get the steel without upsetting all priorities. There was much discussion, and two or three of us argued that it had better be done in concrete rather than in structural steel.

You always compromise with the Government about as you do with your wife; you agree after a while.

It took as much as a week to reach an agreement on the Dodge plant. Usually we had to come up with ideas on the design of those plants in order to accomplish the results desired. We could not just say, "Make it out of this or that material," but we had to demonstrate the benefits of using less critical material. A few owners can think of more reasons why you cannot do something!

This design operation served only at the beginning to straighten out the chaos in processing and stripping of critical materials. Later it was all turned over to the War Production Board, with a little control retained in the War Department, as well as in the Navy, for approvals of projects. At the time projects were approved, we had to know about how they would be designed; for example, whether they were to be designed in concrete, structural steel, or timber; whether their power would be generated or purchased. Where possible the materials were set aside in the planning.

One important thing to bear in mind is the fact that we had control only of prime war plants. We did not have a thing to do with those highly important subcontractors whose plants also played a key part in the eventual operation of the prime facilities. These would come in under a tax amortization plan, and the papers were probably never fully processed until the plant expansion was built. They would fail to get the approvals of the War Production Board for uses of materials, or they would not identify the project as having any war relationship and would be turned down. That was a silly performance, in my opinion, but it actually happened repeatedly.

Comments

A few general comments may be helpful. I will tell you first a little more about the M-day production planning:

When I moved to the Pentagon—I think it was on about the day it was opened—I was told, "You have that office, and these are your files." Just outside the office was about an acre or two of files. I was told, "Those are the M-day production planning files of the War Department, and all these people are working on those files."

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Mind you, the war had already been going on a while, and we were in the process of enlarging production plants, stripping some of the critical materials, and handling other things on construction projects. Here were people trying to tabulate the awards of production contracts whenever they heard about them, practically taking data from newspaper clippings, and putting the data in these files.

It was interesting to find out that those files, generated in the very early days of M-day planning, were for the purpose of contract allocations to various companies. It may have been a very fine plan, but the war did not develop that way. It developed from an emergency into a defense program, into a war program.

In the meantime, all the contractors who were listed and allocated this job or that job had already been given four other jobs. They had built additional facilities, and nobody knew where or what they were. But for a time the War Department still wanted to keep a lot of files.

All those files, incidentally, were soon sent to the Archives. They may contain some interesting study material, I doubt it.

Here is another interesting thing. We had worked like the very mischief getting the powder plants, TNT plants, and everything else, authorized and started. We had such people as Gus Requardt working himself to death trying to get some plants built. The Construction Advisory Board was in the operation of hiring the engineering firms, architectural firms, and contractors when a book called "Munitions of War--1918" came to my attention. Some person had the good sense to write that book at the end of the First World War. I think it was written as a War Department document or under its sponsorship, and it compiled much of the information that had been gathered during that war.

And just about this time, we were confronted with a rush demand for fuses and boosters because original planning contemplated that the fuses and boosters for shell-loading plants would be handled at the individual plants and not at separate facilities. Capacities of the small units proved inadequate. And, of course, we could not complete new fuse plants overnight to meet shell-loading output. The book I read said exactly the same thing had been done in the First World War, by chapter and verse. Perhaps somebody is writing a similar history today.

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You are going to have to face cutbacks if we get into another war, and they are going to be exactly what they were before. When you make a cutback, you have to realize you upset a lot of things: You upset production; you upset labor and you have an idle plant. You may at the same time be building a new one next door for another purpose. So you immediately have to put forth an earnest effort to the plant and its labor, and, incidentally, the housing already provided for that labor.

Cutbacks affect all the operations, and they are a very special field. Whoever authorizes new construction must be aware of all cutbacks. If he is not, you won't get your production as quickly which is all you care about in a period of war.

I am going to venture something else. I think there ought to be one agency for all construction of war plants and that it should tie into the civilian agency--the War Production Board, or whatever its name might be--that handles civilian production. The War Production Board plus the myriad of other agencies did a good job. But, believe me, there would be great advantages to having one direction. You would get better results.

For example, in the selection of the architect-engineer, and contractors, I think we did a pretty good job. You can delegate that responsibility, you can put it out in the field, but if there is no one control, you overload certain firms and you leave others without too much to do.

There is wisdom in the national distribution of contracts, but you are better off with one organization responsible and with one place to clear operations. You can figure out how to accomplish it.

This control office should have layout and production specialists with knowledge of tooling. I saw plants that I was reasonably sure could be better engineered as to production and the general handling of materials.

I am convinced that industrial engineering firms can contribute greatly to better results. They know the production field, and I think they can pull rabbits out of the hat.

Shell loading is something I am satisfied could be improved. I remember going out and looking at shell-loading plants in the very early days and seeing the way that production was handled, and then seeing small-arms ammunition production. If you want a good contrast

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between modern mechanized production and outmoded production methods, look at the small-arms ammunition plants, which are beautifully done, and then look at the shell-loading plants. Safety has a lot to do with it, and safety distances were increased several times because of accidents. Since somewhat of the same problem is involved in the manufacture of small-arms ammunition, it would seem that the shell-loading plants could learn a great deal from the ammunition plants.

I am sure that even if you lost an occasional mechanized unit for shell loading, you would derive an over-all benefit by having greatly reduced plant cost, land needs, and personnel. Shell-loading plants take big areas, and the personnel has to be transported and housed both of which are costly.

One agency could do something about site control. I wonder how many of you remember the site control problems when we were trying to keep all facilities 200 or 250 miles in from our border. It all sounded wonderful, but nobody ever did it. If you are going to avoid congested areas, it will be necessary to have some control that works toward that end, and it can better be done in one spot.

You must have some policies developed on dispersion. What are you going to do about the matter of the 250-mile limit on plant locations? What of blackouts and the air conditioning and ventilation that is required to satisfy some of the blackout conditions? What plant protection devices and camouflage are essential?

With respect to the expediting of production, we had an interesting experience with expediting the completion of plants for the production of penicillin, streptomycin, other drugs, carbon black and so forth. In the case of penicillin which was the first, the Army was told to get busy and do something about completion of the plants, or they were never going to get the medicine that was then coming out of a laboratory test tube and being put into production. About six or eight competent engineers were assigned to those plants, and they were completed in about 40 percent of the time that would otherwise have been spent.

What materials, prohibited lists, and things of that sort, are you going to use? What kind of design? Is there to be an emergency building code? In the last war, in about two weeks, we developed one that we put in operation for the Under Secretary's Office, and then worked it out with the War Production Board. A thing like that should not be done in two weeks. It ought to be thought out very carefully and be ready.

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What are you going to do to establish the priorities necessary for scheduling production from all of these plants? The rubber program pops up, and that is the most important thing on earth. Then comes the Manhattan Project. It is easy to understand the changing picture, but it seems possible for priorities to be placed on plant production so that those building the many plants could intelligently complete first things first. We could have scheduled a lot of things if we had been given the proper guidance. About the end of the war, we got things pretty well in hand.

Property accounting must be worked out because of disposal problems and all the rest that go with it. In connection with disposal, there is the matter of war reserves and stand-by operations. We racked our brains--and I suppose you are doing the same--trying to do the wise thing. Most of the disposals have now taken place. The early reserve programs were pretty well approved by everyone and may help if we ever have another war.

My advice to you is to read what has been done and try not to repeat too many of our mistakes.

Remember, you can expect that most of the men who are going to have the responsibilities in another war for construction of industrial facilities will never refer directly to your planning. You can sit down and plan and plan; but unless you find a method of reaching the men who are going to work on the plan when the time comes, you might just as well not do the planning. I think a little thought on that subject would be most helpful.

Another thing you are going to find is that the Reserve officers will have taken their retirement pay, will be too old, or are physically unfit, and you are going to have to turn for help to a lot of new civilians who are active in production, construction, and design activities. You can fully count on the support of those men. Just give them a pattern, and if you can give them a simple pattern, they will do the rest. They can take care of themselves pretty well.

War is a wasteful thing. You are not going to get too much efficiency out of individual operations. We used to throw a lot of complaints at every particular operation. I think all were dissatisfied with the efficiency their own offices were maintaining. The mistakes were just horrible at times. And yet, out of all the mistakes came one of the real production feats of the country--both in producing material and in construction. If you do it again, it will be quite a chore--more so than we had last time.

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Thanks a lot. If some of these comments have helped, I am glad.

Gentlemen, I understand that I am supposed to try to answer a few questions. If they are easy, I think I can.

QUESTION: I understand that, in the main, the plans—and I presume the specifications—developed under these architect-engineer management contracts are still pretty well scattered around the country in various offices, between procurement districts, private firms, and some of the corporate operators. Do you think it would be profitable to get these plans together at some place where a competent staff of architects and engineers could review them? They might possibly study them in connection with operating records and the advice and counsel of production industrial engineers, separate the good from the bad features, and establish improved criteria for the guidance of designers who would have to repeat the job in a future emergency.

MR. TATLOW: A lot could be done in spending time to review those plans, but I think the net result would be a waste of effort. Pretty much all the planning we did last time will be obsolete, to some extent.

The main thing that should be done is to study each major line intensively, as J. P. Harris did, on smokeless powder and TNT, with an outstanding corporate producer, keep in touch with modern technical advances, and be prepared to guide designers in their layouts. Colonel Harris had accumulated excellent data which he laid right down and said, for example, "This is a TNT plant." He may have overlooked such future developments as reverse nitration at the very beginning which made for two or three times the production, but he had the basic plant so laid out that nobody worried about it. The design of the construction team just started and ran. If he had not done this, I don't know where we would have been.

The same thing was true with the shell-loading plants. They were pretty well fixed. I just say they ought to be taken out and burned somewhere, and you should get intelligent new thinking about that problem right now from somebody who does not have any inhibitions about the fact that something may blow up. Let the thing blow up once in a while. It might be a good idea, if you were not going to lose too many people. But you might find that production would just be astonishing out of a decently designed shell-loading plant.

I would not go back and look through a lot of history. However, for your information the plans are in the hands of engineering firms. If they gave them to the War Department, they duplicated them, so far as tracing go, unless they were classified. I am sure

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of that. We required, under our contract, that copies be turned over to the Government, but, remember, the Government did not have a hand in about 50 percent of the work that was done. I would not spend money doing wasteful things. I would look at the new things.

QUESTION: It is my general impression that during the war we took better care, constructionwise, of our machines than we did of our soldiers. The machines were in concrete structures when the soldiers were in wooden structures; when the machines were placed in wooden structures, the soldiers collapsed into canvas. Would you care to comment on that?

MR. TATLOW: We certainly had problems with construction materials. There are several different viewpoints on it. If you want mine, I think that all the production facilities which were built became part of the national assets of our country. To the extent that we overlooked some of the construction limitations, because the plants were going to have postwar benefits of say 5 percent, we did not do much damage--so long as the materials were available.

We started building with any and all types of construction and materials. When the program was small, we got all of them. Then we started getting pinched. We needed steel for shells. The minute we started to get steel for shells, we gave up steel for other things. And we had to have a high-quality steel for shells which meant we did not get so much production as formerly. Construction had to go to concrete. Concrete means reinforcing, and it still takes some steel. Then everybody thought we could go to lumber. Well, the minute we touched lumber, it got to be so far out of balance that lumber was not available. Some balance has to be struck between what we can get, what we can use for the construction of the plants, and what is needed to house the field forces.

The early cantonments, and so on, were pretty well built from designs carefully worked out. We did go into more temporary construction as things became a little worse. We just could not get the lumber, we could not get the steel, and unfortunately we needed steel even though we were going to build in concrete. We cannot produce tanks, guns, and munitions in tents. It is just one of those things in which there is no good choice.

QUESTION: Would you go into a little more detail about your ideas on mobilization planning? You mentioned the various things you think might be done in settling policies and getting the structure planned, but I cannot forget those files you mentioned that were so useless. Do you mean get individuals

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earmarked for certain jobs in the organization, cut out the detailed planning, but get the policies settled? Or what do you mean?

MR. TATLOW: I think you have to settle broad policies, and you have to be prepared to lay those policies before the people who are going to operate them.

I don't think that any new emergency will be any different from the last one in its effect on us. Timewise it may be different. We may have much less time. But I doubt that you are going to press your button and be able to have daylight on this side and night on the other, or that, if you allocated certain contracts to one company and certain contracts to other companies, you will be able to enforce those when the time comes to get them.

The Army Ordnance Associations, followed, I suppose, by all the other services in somewhat similar fashion, are doing a wonderful job, and have long done a part of the basic production planning. Their members formed in small groups of specialties such as the making of shells, the making of fuses and so forth known production techniques. If you let some of those people work with you on your problems, they are going to come up with better ideas than you will with a lot of fine paper planning. You have to do a certain amount of planning, but try to make it so that you can give it to the other fellow to use.

That is easy to say and probably very difficult to do.

MR. O. F. SIEDER [Executive Vice-President, H. K. Ferguson Company, Inc.]: Mr. Tatlow, one of the things that appealed to me is your suggestion of having this all under one control. I wonder if you would elaborate on that. Do you mean a civilian control, a military control, or a combination?

I know we had a difficult time during the last war. One of our responsibilities was to get RDX plants completed immediately because of the sinking of shipping by submarines along the Atlantic coast. The "rubber program" stole some of our materials. General Groves stole some more. The question is, who should have had control?

MR. TATLOW: That is a good 64-dollar question. I don't know who should have control, and I don't think it matters.

There is a lot of internal politics. The Quartermaster General certainly did not think that the Corps of Engineers ought to take care of the construction. And you can find people anywhere you go who say there should be this or that agency handling it.

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I don't think it makes very much difference if you have one. But that one office, talking as an individual, ought to have control over what is happening.

Some of you may have to run into a man named Mike Deutsch. Mike is quite a character. He is still around this city somewhere. He was originally brought in to do a little planning with the War Production Board. Mr. Deutsch had conceived the idea that we could set up schedules of things that we wanted, a sort of priority list for basic scheduling. If the Manhattan District was to be top priority, all right; that is what it was. If RDX was to be another one, that is what it was. We would list them 1, 2, 3, and 4. And we could list all of them down the line as to their needs.

I think you still can do it. I think there can be some planning—whether it comes out of staff or whether it comes from any particular group—that can be given to a construction outfit, saying, "This is when I want what. This is the first, second and third."

There was no sense in building a power plant for the Manhattan District and getting that power plant completed before anybody in the world was going to be ready to use the power. Believe me, that happened. Don't ever think it didn't. It was not only true of these plants, but of others also.

When a person had a priority, that priority was used, in spite of the devil, to get anything he needed—even if it was silverware for the dining room table. And in many places, it played havoc with other things that needed the material much more.

I found out by our own operations, in taking on the scheduling of the drug programs—and I personally got into that thing and had people do it—that by just a little give and take we could work it out. I fortunately, had the blessing of the Under Secretary when I said, "I would like to have this done if it can be done without interrupting any of the other programs."

So priorities must be exercised in some one spot. Somebody must make those decisions, and they cannot be made all over the lot.

COLONEL SEAWARD: Mr. Tatlow, in behalf of the Commandant and the College, may I say thanks very much for a very fine presentation.

MR. TATLOW: Thank you very much.

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