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17

RECOMMENDATIONS FOR ADEQUATE INDUSTRIAL PLANNING

18 March 1948

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CONTENTS

	<u>Page</u>
SPEAKER--J. Carlton Ward, Jr., President, Fairchild Engine and Airplane Corporation .....	1
GENERAL DISCUSSION .....	15

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18 March 1948

CAPTAIN WORTHINGTON: It is a great pleasure to welcome back to this platform Mr. J. Carlton Ward, Jr., President of the Fairchild Engine & Airplane Corp.

Mr. Ward has had long service in industry. He has been an adviser to the United States Government on a number of occasions. He was on a mission to France in 1940 on airplane engine production problems, and on a mission to Great Britain in 1942 for the War Production Board. You are familiar with his testimony before the President's Air Policy Commission. He is a member of the Board of Advisers of the Industrial College.

I take great pleasure in introducing Mr. Ward.

MR. WARD: Gentlemen, I am probably the most unprepared lecturer who ever appeared before you. So this is not a lecture in any sense. It is what an old professor of mine in undergraduate days described as the true basis for any public speech--just a conversation from a platform. I do not have a written speech, but I have brought with me some papers which may be useful during this conversation we are going to have.

General McKinley's letter indicated that he would like to have me speak along the lines of my testimony to the Finletter Commission. However, that commission and that testimony are now months old; a great deal has happened since then. Perhaps we would profit a little more if we analyzed some of the things that have happened since that time and that are now happening which concern the subjects that you are studying here.

I am told that there are about 125 of you, that you are about evenly divided among the three Services, and that you are about half way through your course, or about six months along. I do not want to bore you with details of things with which you are thoroughly familiar. Instead, I shall try to give you something forward rather than backward.

It is clear that the purpose of the testimony to the Finletter group was to attempt, from industry's point of view, to bring industrial mobilization up to to the top level of vision of that commission so that, when the report came out, it would take cognizance of the factors of mobilization. I think everyone felt happy about the report in spite

RESTRICTED

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have a direct bearing on banking; namely, that there be some equivalent of "V" loans for peacetime availability in procurement and that, in the air-transport field, there be an equivalent of trust-certificate financing (the method used by the railroads to purchase locomotives and cars) which would be available to the air-transport people to buy the transports that would become the transport potential for war. They went much deeper than that.

In the course of this meeting, it was particularly made clear to me that these subjects are not academic. They are being hammered out in a period when they have all too real a significance. It should interest you professional military people sitting in this College to know that the big business institutions and banking institutions are, each in its own way, also worried about these same problems. You are not working in the theoretical atmosphere that you used to work in, in the old days of the Industrial College, before World War II, when it was only a small, although definite, voice in the wilderness on many of these problems and when there was not much understanding in the outside world of what industrial mobilization really stands for. There is an understanding of this today. Newspapers use the phrase freely, and often magazines have articles about it. There is hardly a person who has not heard of industrial mobilization or who does not understand its meaning in some dim sort of way.

Like most ideas, however, industrial mobilization, for most people, has a particular or personal meaning that may be far from the underlying facts. The underlying facts are that it is more difficult to mobilize industrially in the United States than it is to mobilize militarily. The army behind the lines is greater than the army in the front or combat lines, and the disproportion is growing with every war. Industrial mobilization from war to war takes on a more difficult complexion and a grander aspect. Therefore, it is perfectly natural that the problem of industrial mobilization is getting much more attention today than formerly.

The average individual is still at sea, however. I was asked to address, on 7 April, the National Metal Trades Association meeting in the New England area, which, as you know, is a very important munitions area. The reason for this is that the average industrial-firm member of that association does not understand what part it is expected to play. Many of the manufacturers who are going to come to that meeting are sincerely interested in your problem, but they do not know how they fit in. They do not understand what they ought to do about it, although they have a vague and uneasy feeling that they ought to be doing something. They cannot reconcile their desire to do something with their lack of understanding of what it is they are to do.

At a recent meeting of the Navy Industrial Association the discussion of this subject occupied a whole day. In that Association we have probably the most powerful industrial-mobilization committee in existence. The problem was so large that before the day was over, we introduced a resolution, which may or may not bear fruit in the near future, that the Navy Industrial Association become the Industrial Association for the Military Establishment so as to include the other Armed Services as well. That was almost forced by the very nature of the discussion.

RESTRICTED

or a machine shop when he reads these lovely pamphlets and testimony such as mine, which are in glittering generalities that go clear over his head. He does not understand how he fits into those pictures. Nor does the procurement officer in all cases understand the different psychologies of the persons he deals with as among these different so-called classes of industry and the in-between classes that may come to your mind. It is not limited to the procurement officer. This overlapping of concepts plagues the planners even on the top level of industrial mobilization planning in the Government.

In effect, we in industry had to ask in testimony that someone please resolve or explain the difference between the functions of the National Security Resources Board and those of the Munitions Board. You are all familiar, I am told by Captain Worthington, with the so-called tentative plan for industrial mobilization that was brought out by the Munitions Board. You probably already know that that "tentative" plan may now be marked "deceased," because the National Security Resources Board has had further investigations and has come to the conclusion that many of the plans in there will have to be broadly rewritten.

Again to go back to this meeting of the Navy Industrial Association and again to take you behind the scenes, I shall paraphrase for you one of the hottest items of discussion. It was in consideration of that plan, advance copies of which had been furnished to us for criticism before release, that most of the members of industry felt that it was too much of a staff function and not enough of an executive plan. Industry, in order to function and within itself is functioning, is accustomed to reasonably prompt decisions. In dealing with the Government it is not always possible to get reasonably prompt decisions. And right there is an area of frustration. The average businessman, when he returns from a trip to Washington, throws his hat and coat on the sofa at home, looks at his family, and probably says, "What the hell!" (Laughter) It is a natural reaction. He does not understand that the chap he dealt with does not have the power to give him the decision he wants. It has to clear through desks "A," "B," "C," "D," "E," "F," and "G" before that decision can be ground out; and by that time, one does not recognize the question or the decision in many cases. (Laughter) That is a process that we laugh at, but you cannot idly discard it. It has 175 years of democracy and its experience hammered into it. The businessman feels, however, that the next time there must be power to make quicker decisions.

So much of our discussion was: "How in blazes can we get into this plan vice presidents instead of consulting engineers?" They wanted a vice president on mining, to use a name, a vice president on shipbuilding, a man who would make a decision under some broad directive from his superiors in the mobilization echelon; not a man who had to sit down in a large committee and submit some plans for discussion, out of which would generate a subcommittee that would in turn try to lay out some

to designs for a home fleet in domestic commerce that can be used as an arm for transport airlift in the event of combat, but only between the homeland and the advance bases.

Military students who know the problem of operating DC-3's in combat areas understand what I mean. There are 3,000 pounds of structure in one of these combat-area transports that do not exist in peacetime transports of the same size and capacity. I am speaking roughly of a 50,000 pound and up gross machine. A 3,000 pound out-of-pay load is unthinkable as a commercial operation, but it is a necessary out-of-pay load for a wartime operation. There must be a certain amount of radar equipment and there must be a certain amount of "military characteristics"--to use a broad and much-abused term--built into that aircraft.

Having diverted you to that extent, I shall now take you back to the problem. In building this type of combat air transport, as opposed to civil transport, we found ourselves--due to a great deficiency in procurement procedure--namely, yearly budgets--operating at a level of activity that was suddenly going to run out before the level of activity was taken up again and carried forward in another procurement budget. This is one of the great instabilities of an industry that serves the Government. Having only one customer, it lives or dies or lies in a state of suspended animation somewhere between living and dying until it knows what the procurement officer is going to do. Having been in all three situations, I think the last one is the worst. (Laughter)

I give you a case that was brought out in the bank meeting yesterday. Out of Air Force funds in the last budget, 75 percent of the total contract procurement money went to three manufacturers. How do you keep an industry on that basis? The answer is you don't. I am sure that the procurement people and the combat people and the technical people who evaluate the combat needs did not recognize the importance of that procurement in preserving what they call the basis for a healthy industry for mobilization. One of those ideas was at one end of Wright Field and the other in old Patterson Field somewhere. They never got together. That constituted one of the problems of industrial mobilization, that the peacetime procurement activities were carried on in one set of corridors and offices while the mobilization thinking was carried on somewhere else. The streams never joined. We believe that there are many steps being taken to overcome these things. But this is history now; this occurred.

So this little Hagerstown operation, going along making military transports for combat areas, suddenly found itself liquidating its experienced personnel, only to see that on a procurement schedule some six months hence it was going to have to rehire the same number of people and put them to work.

RESTRICTED

That is industrial mobilization working in peacetime. That is the by-product Uncle Sam got from our Hagerstown works for the money he spent on an industrial-mobilization plan; and that is something we had not thought of when we first submitted our quotation on the plan.

If it can work in peacetime it can work in wartime. That is the point to my whole example, and I throw it out to you for consideration. Mind you, this is the first time the Air Force or any other branch of the Services, so far as I know, ever spent enough money to buy a real mobilization plan--the very first time. That ought to give you some idea of what can be done if industrial-mobilization planning is taken out of the clouds, where I put it in some of my testimony, and brought down to the level of what are you going to do about it with manufacturers "A," "B," "C," "D," and "E."

Since I am speaking essentially from the point of view of an aircraft manufacturer, obviously I am talking of the kind of problem he has to face in production. That would not apply to a mine. It would not need to. It would not apply to a textile works. It would not need to. There is no one solution, as you gentlemen who are in the different branches procuring the different types of commodities know. Each group has its own specific problem, and the solution has to be tailored to fit.

In talking with legislators, with high government officials, with Rotary Clubs, and with banking groups, it must be realized that they are not specialists as you gentlemen are. They do not understand all these ramifications. They want it done up in a nice, easy, little package which they can take home and say, "That's that. I learned all about industrial mobilization." There is no such royal road to learning about industrial mobilization. The further you get into it the more complicated it gets. The longer time you spend on it the more you realize you don't know about it.

Industrial mobilization is one of the hugest and most complex undertakings of the modern world. Without it there can be no national security. I know many officers who have been assigned to industrial-mobilization duty who look upon their term of work with horror. They come from combat areas or they come from purely technical-engineering areas. It is like Don Quixote and the windmill--tilting at something that doesn't exist, playing with an idea, turning out reams of reports that go in the bottom drawer of a file cabinet and accumulate dust and then are finally put in a furnace. But that's the way progress is often hammered out.

I remember the industrial-mobilization plan that I concocted in between World War I and World War II. In order to make it seem impressive, we had it bound in leather covers and had a gold seal put on it. We got a wonderful letter from Wright Field saying how fine the plan was. I really think they thought the cover was pretty. (Laughter) Actually, that plan was dead as a dodo the minute it was finished.

RESTRICTED

If nothing else had killed that venture, that conclusion should have killed it. We do not have five years for anything today.

The President's address is no five-year plan. It brings out very sharply one of the greatest headaches of industrial mobilization, selective service. Anyone today engaged in scientific manufacturing activities is faced with a drastic shortage of engineers and technicians. That shortage, in turn, was caused by a deficient selective-service policy in World War II. We, of all the nations in the world, attempted to put to work a concept which is unworkable; that is, that we are all like the rest of us and, therefore, no line should be drawn as to who carries a gun or who goes to Fort Belvoir, or wherever you want to send a recruit. So what did we do? We took gentlemen studying electronics and taught them how to march in close-order formation; and we took milk wagon drivers and put them in electronic schools. We took premedical and pre-dental students and students partly through their dental and medical courses and made them yeomen in the Navy; then we took ribbon clerks and made them pharmacists' mates. It didn't make any sense. It went on everywhere. You know more about that than I do. Industry has suffered from that. You reached into our factories, took out supervisors because they were less than 26 years of age, and put uniforms on them. And what did they do? They marched in the rear ranks as second-grade privates, whereas previously they had been accustomed to handling men. What did we have? We had fellows supervising people who ought to have been in the rear ranks as second-grade privates.

If Congress wants to investigate the costs of war, there is one cost for them to investigate. We can show them what it costs the public to build these highly technical things that get more technical as time goes on. This isn't static. The job of mobilization, as we said earlier, gets worse, not better; and the next war is going to find a greater need for the electronics man; yes, and for the atomic physicist. We will not be able to meet that need under a selective-service procedure such as we have used in the past.

One of the pleas that I have made in several instances of testimony was for a recognition of the enormous importance of looking at manpower seriously, from an industrial-mobilization point of view. You cannot possibly treat all people alike in selective service and mobilize intelligently. That creates a political problem. Mrs. Murphy sees her boy sent into the Army to carry a gun or man a tank while she sees the boy of Mrs. Jones, living next door, continuing to get high pay in a munitions plant. Politically, that is a tough problem, and my sympathy goes out to our representatives in the Congress. Sympathy, however, is not going to win a war. We must treat these things realistically.

I don't know that I am talking on your problem. I am afraid I have gotten onto the Finletter Commission's problem, but these are the thoughts

side and chaos on the other. The industry found itself in a position of not knowing whether it had the resources to go on in being. It decided that the time had come for a new Morrow Board. The last one was in 1926, and I can assure you that the air industry had not stood still since 1926. That is the last time any government agency spoke on air policy.

Out of that there grew some resolutions in Congress, one by Hinshaw in the House and one by Brewster in the Senate, which remained bottled up in committee. There were too many hot potatoes in the political scene, and that was not a hot potato. The problem was what to do. Well, the inevitable worked itself out by those well greased political forces that go on whether we regard them as such or not, and some of them are very good.

The fact that we use the word "political" should not make us turn up our noses as though we were smelling a bad odor. Politics is a constructive enterprise as well as having horse-trading aspects.

In this case politics began to work and the administrative branch of the Government got wind of the fact that there was a serious problem. The House was watching the Senate, and the Senate was watching the House. The question was who was going to get the credit. There were three groups, all members of the Government, out to get some credit. They have to have credit in order to live. You gentlemen do plenty of-- excuse the word--boasting about the things that you do. If you do not believe it, look at the stories that come out on rockets, supersonic airplanes, and a few other things. The three forces went to work, and it looked for a little while as though this great national issue was going to be a football. However, the cooler heads prevailed and pointed out that we were in a drastic international situation. It was no time to play football with this question of air policy.

Therefore, a deal was made, and when I say "deal," I do not imply a diminutive action. I am talking about a constructive deal in which everybody got something. The Executive branch decided that it would form a new Morrow Board, which became the Finletter Commission, and the Congressional group said, "All right, you go ahead. You get the first crack at the bat now and get your report out by 1 January. Then we will get out our report subsequently." The House went to bat with the Senate and the Senate with the House and formed a joint committee under joint resolution, a policy committee that could not bring out legislation.

That is a great device, one which our Government has needed for a long time. The Woodrum Committee dealing with national defense, a committee of the House, was such a device. These new devices in government should devote a great deal of their future possibilities to statements of policy, a thing which has been very difficult in our tripartite form of government.

merchant marine in time of war. Admiral Mahan's great document on sea power emphasizes the role of the merchant marine. Air power is very similar in its concepts. Therefore, this committee went into all phases of commercial transport.

They asked the military to develop commercial transports in fields not now equipped, such as cargo-carrying commercial aircraft. I think you gentlemen know there are none of those. All that had been done commercially was to put a big door and a strong floor in a Pullman-type transport article and it is called a freight plane. Well, that does not make it one. You can put parcel post in there and mail bags, but it is not a true cargo carrier. So the report said that the military should develop these commercial transports at military expense. The military registered strong opposition. They said, "We don't have enough money for our combat requirements. We cannot take on another load." So the report specifically says, "with funds especially earmarked for the purpose."

I throw that out as an example of how broadening this set of hearings has been to the Congress itself and to those of us in Air Force territory who sat on that committee. Representatives of the Armed Forces themselves on the council did a magnificent job. Some of the testimony given to the committee by a few representatives of the Armed Services, in my humble opinion, was not so magnificent. It was the old "school-tie" argument, and it did not go over. But the gentlemen representing the Armed Services on the committee dropped the "school tie" and behaved like statesmen, and a great deal of work of very sound and fundamental caliber was accomplished, although the basic issue of a Joint Chiefs of Staff plan, as you will read in the first portion of the report, was not resolved. Key West is no doubt a real milestone on the road to the solution of that problem.

Now, I seem to have gotten off on the Air Policy report, but it is really mobilization that is the basis for that report. There would have been no joint committee and there would have been none of this air statesmanship had there not been a world need. If the proof is required that industrial mobilization has its feet in industry and its head in international relations, these are strong evidences in that direction.

QUESTION: Sir, I would like to hear your views on the utilization of manpower. You touched on it here and there. I would say that the last few wars have been of relatively short duration, three or four years, that we blundered into them, and that we merely utilized our manpower, womanpower, and childpower as they came along. Necessarily we do our planning on a war basis. We hope there is not going to be a war, but that is our job. Some of us think that the next war is possibly going to last ten years. We have heard General Wedemeyer's philosophy of perimeter pegging.

between the fellow on the merchant vessel and the Navy gun crew that sits aboard. That is hot politics. I do not propose to give you an answer to that, but the very fact that this question is now being studied by these higher boards indicates that the old solution is not enough.

You say we would not give you the bums, we being industry and you being combat. We never thought we would give you bums. What we thought was that we would give you the milk-wagon drivers, the ribbon clerks, and the candy-store proprietors, but that you should not take our engineers and our technicians whom you depend on to give you materiel. We found that where you did take them, you did not always treat them as technicians. You can see that there is a defect on the military side as well as on the civil side of this question you have asked. You on the military side must do a better job internally on manpower utilization. We in industry certainly have to do a better job also, and we both have to come to grips with the problem in advance. We must agree as to the rules of the game that we are going to play.

What is an essential employee? You must ask us that question and we must then state our requirements and defend them. Out of that must come joint agreement. I have used the argument that no employee is essential if he can be replaced in less than three years of training. That may not be at all suitable to the rest of industry. So that question of whether it shall be three years of training, or more, or less will have to be hammered out. The next question will have to do with whether there is an agreed-upon approach as to how to train in terms of war. You military people used accelerated training. You did things in times of war which you do not do in times of peace. You made specialists out of everybody. You put them through "hurry up and get them out schools," and they became pretty good; better than you thought and better than we thought. We did it in industry. We called it the TWI (Training within Industry).

Let me tell you of this instance. We went to a town in North Carolina to build airplanes. They had 25 hosiery mills there. We learned that in North Carolina, much to our surprise, no airplane had ever been built since the Wright brothers flew in 1903. We had to make airplane builders out of hosiery-mill workers. The most skilled chap was a loom fixer. We didn't have any looms on airplanes. The rest of them just watched these circular needles go around and learned how to shut the machine off and call for help from the supervisor. We had to use them to build airplanes even though we do not use that kind of operation in airplane building. We became involved in a Congressional investigation for waste and extravagance in that operation, but we showed them our problems by a simple question. We asked, "Do you Congressmen like to conceive of your sons flying in airplanes built by hosiery knitters? Would you like to risk your life in that situation where planes were being built by people without training?" Of course, we had two

My belief is that UMT, in a large measure, is going to give us the experience to solve the question you are worried about. I have supported UMT since the middle of the war. I testified to the Woodrum Select Committee, and I was the first person I know of who so testified, in favor of UMT. It was in the environment of war so nobody paid any attention to it but it is in the records. My main argument was that only by UMT could we orient our manpower and know what to do with it if an emergency occurred. There is an angle to UMT you seldom see.

QUESTION: You have gone up to the cliff. Let me push you off and ask this question: What about universal conscription?

MR. WARD: Would you define what you mean by universal conscription?

QUESTIONER: I mean by universal conscription that under it a man who is driving nails into the side of an airplane gets the same pay as the man who is being killed at the front.

MR. WARD: Literally, the man who puts a nail into the side of one of our airplanes would get fired. (Laughter and applause)

Seriously, your question concerns total war. I alluded to it delicately, I thought, when I said that each war gets more closely to the true definition of total war.

I do not think our economy could stand a 10-year war, at least not as we have been running them under the old rules. If you want to put the economic subsistence level down to the Russian level, I think we could fight a 20-year war. That is a hot political problem.

Your question is a hot political problem. A man is a fool to predict, but this is a prediction. I do not think that in a democracy that problem can be solved in advance of the emergency. A sense of national danger has to be created in the public mind. I think the world would be startled to see how in a free democracy people will react under conditions of total danger.

Britain gave you a very good answer to your question. I was in Britain in 1942 on a mission. The impression I received at that time has continued to stay in my mind. The London underground extension had been turned into a munitions factory for what I shall call "Bendix components." The tubes were round tubes and in them were rows of machine tools, and there was a little narrow-gage electric railway to carry people and goods. The only way a person could get in and out of this factory was by going down into a subway station. Women largely operated that factory. I went down there on one of those dank British November days when there was smog and fog. It was a drab scene.

RESTRICTED

778

QUESTION: Do you have any figures or do you know whether any figures have been computed that might be used to determine how much aluminum would be required if the President's Air Policy Commission's policy is put into effect? Also is there any trend in the aircraft industry to use some other material, such as magnesium, in place of aluminum?

MR. WARD: That is a good question. Aluminum for aircraft is now such a small part of the total aluminum output of the United States that it is relatively insignificant. I do not believe that the public has understood that instead of the demand for aluminum falling off after the war as was expected, the construction industry stepped in and took enormous quantities. The result is that aircraft requirements are only a fraction of the construction industry requirements for aluminum. The Aluminum Company today has set up a totally new marketing approach toward aluminum which is not based on the aircraft industry. If war should come, it would be taken out of the construction industries and thrown back into aircraft. For any program envisioned in that report I think there would be ample aluminum. You should really ask the Aluminum Company about that. But that is my view, and it is not a problem. Bauxite is a problem and always will be in the United States until we learn to use alumina, in respect to which a process has not yet been worked out for practical purposes. If you were to ask me about cobalt, I would shed real tears because we do not know how to build jet engines today without cobalt. There is not enough world cobalt production to meet a cobalt production schedule. There are some other problems that are much worse than aluminum. The particular question you asked touches on a defect in the higher planning and that has to do with the sufficiency of materials. That is something that has not progressed as far as it should.

QUESTION: Mr. Ward, returning to manpower conscription, most of us are probably more sympathetic than you think. Most of us, at least in the Army, have had the experience of training a unit and then having to furnish cadres. Our own units naturally suffer as a result of that, but we realize that it is necessary because we have a job to do and it is a job that the other fellow cannot do entirely with milk-wagon and sub-marginal labor.

Every industrialist, with the exception of one man, I believe, who has spoken to us has complained about our conscripting skills that he has. We need those skills. We cannot run an Army, or an Air Force, or a Navy with milk-wagon drivers alone.

MR. WARD: That is a good point. You are probably talking about the affiliation plan. That ran into a storm in industry. If I may give you a constructive criticism, there are two reasons why it ran into a storm. One is that it hit a sore nerve; the other is that the plan was fully hatched out in some corridor of the Pentagon and then thrown at

RESTRICTED

that all of you were supposed to have read and which I now consider dusty. Our platform is to triple our production each year, but we cannot triple it if you take those people away from us. Our problem is still with you. We know you must have technicians. You and we in industry should be training our base groups and then we should be ascertaining from what source we are going to get the others. We should have the Selective Service law printed so that technical people are not put into areas that are nontechnical. The colleges should be allowed to go on grinding out technicians, and when war occurs it should be arranged so that a certain percentage of the output of the colleges flows into the military and a certain percentage is available for the group behind the lines. We are a team. You cannot be opponents.

QUESTIONER: I agree with that 100 percent, but we have had extreme pleading here on the part of some of the industrialists who have thrown up their hands at our drafting lathe hands and that sort of thing. We need those skills and we need advanced skills. We need engineers; we need physicists. Only a very small percentage of the men that are taken into the Army actually ever fire a rifle in anger at the enemy.

MR. WARD: We have some of the best "crocodile tear" experts in the world. Do not forget that. When a person goes before Congress, he asks for more than he thinks they are going to give him. Do not forget that many of the fellows who are going to come up here to talk to you are going to present their sides of the problem. The truth is that it is not so extreme as that. We know you must have these people. We just say, "Don't reach into our places as a grab bag and pull them out." If you do, you are not going to get airplanes.

MR. SWAREN: I would like to make a comment on the comment you made on aluminum. You said that the construction industry has become the chief user of aluminum. That is true from an economic basis. When war comes we will have a great deal of temporary construction. Then we think in terms of wood. But the manpower requirements of wood are very great and the demand unquestionably again will be for aluminum, both so far as cost is concerned and, more important, the conservation of manpower. I would like to hear your comment from that point of view if you have given it thought.

MR. WARD: In review I find that I really did not answer the question as it was stated. I was also asked about magnesium, as you recall. So far as design in aircraft today is concerned, magnesium does not take the place of aluminum for certain highly stressed parts and where certain corrosion factors have to be met. But you will find more and more magnesium in aircraft. That does not mean that it is displacing aluminum; it means it is complementing aluminum. So you are getting both aluminum and magnesium into aircraft today. But do not for a minute think that magnesium will take the place of aluminum. That is the point I am trying to make. Magnesium is supplementing aluminum. It is taking some of

RESTRICTED

700

MR. SWAREN: Yes, you have. You indicated that you feel, under priorities of some sort, the aluminum industry will be able to meet both of the justified requirements.

MR. WARD: At least as we knew them then. I do not know how to predict the next war, but as we knew them then that would seem reasonable from what I have been told by the aluminum industry.

CAPTAIN WORTHINGTON: On behalf of the College, Mr. Ward, I want to thank you for your up-to-the-minute, thought-provoking discussion.

(20 April 1948--580)S.

RESTRICTED