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NATIONAL PRODUCTION CAPABILITIES AND LIMITATIONS FOR WAR

2 March 1953

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Brigadier General Donald Armstrong, USA, (Ret), was born in Stapleton, New York, in 1889. He attended Columbia University and was awarded A.B. and A.M. degrees prior to his entry into the Army in 1910 as second lieutenant, CAC. He served overseas during World War I as Adjutant of the 35th Artillery Brigade and saw action with the Fourth French Army and the First American Army. Immediately after the war he served as an adviser to the French Army and later as Assistant Military Attache at the American Embassy. In 1923 he transferred to the Ordnance Department. He was graduated from the Army Industrial College in 1927. He then returned to duty with the Ordnance Department and held various routine assignments until 1939, when he became executive officer of the Chicago Ordnance District. In 1942 he was promoted to the rank of brigadier general and served successively as chief, Tank Automotive Center, Detroit; Commanding General, Ordnance Replacement Center, Aberdeen; and Commandant, Army Industrial College. He retired from the Army in 1946 and accepted the position of assistant chairman, Executive Committee, American Standards Association. In the summer of 1946 he received his doctorate from Columbia University. In 1947 he was appointed president of the United States Pipe and Foundry Company; he left this position in December 1951 to serve as a consultant in France on industrial mobilization and productivity. General Armstrong is considered an outstanding military historian and lecturer. He is President of the American Military Institute, President of the National Academy of Economics and Political Science, and a member of many other technical and learned societies.

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ADMIRAL HAGUE: We have this morning a rare treat. Our speaker is Brigadier General Donald Armstrong, U. S. Army (Retired), who was the Commandant of the Industrial College from 1944 to 1946. General Armstrong, during the period of his incumbency as Commandant, saw very clearly that, in the first place, the work of the college was of tremendous importance, not only to the Army, which had been the sponsor for the college, but to the Navy and to the Air Force, which was then a part of the Army, and to the Marine Corps; and he was the spark plug that succeeded in making this a joint institution. That was the first thing.

The second was, General Armstrong saw very clearly that the curriculum of the college should be broad enough to go far beyond the limits of what was then known as logistics; that in fact, if the college were to carry out its proper mission, it would have to examine all the factors and facets that were involved in the mobilization of the Nation's resources on a broad field; and he was instrumental in laying out the curriculum to cover that broad field.

So in a very real sense General Armstrong must be termed the father of the modern Industrial College of the Armed Forces. He retired in 1946 and immediately took on the job of chairman of the Executive Committee of the American Standards Association. That in itself speaks volumes of his energetic and intellectual capacity and the importance of his standing. He then became the president of the United States Pipe and Foundry Company. Later, in the past few years, he has been engaged in a succession of very important missions for the Government. As a matter of fact, General Armstrong belies the old song, "Old soldiers never die" If they follow in his footsteps, they keep steaming along energetically and effectively, doing worthwhile work for the country.

General Armstrong, you know what a pleasure it is for me to welcome you back to this platform.

GENERAL ARMSTRONG: Admiral Hague, gentlemen: Allow me to say, Admiral and gentlemen, that there is no greater pleasure for me than to come back to the Industrial College, where I first spent five years as a student and an instructor back in the twenties and the early thirties, and then had the good fortune to be Commandant for nearly two years, from 1944 to 1946.

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Toward the end of 1951, I was given what amounted to a very urgent invitation to go overseas to help out in the French economic mobilization and in productivity over there. It was particularly gratifying when my friend, Colonel Cave, came to me more than a year later and asked me to talk on production at the college. So here I am and happy to be with you.

There is no question that production in the United States is one of the most important potential weapons that we have. Speaking of potential, I have frequently used an analysis of what the potential of our Nation, or of any nation, consists. While it is obviously not all inclusive and can be criticized on various grounds, I have used it again and again, and in various applications, as a fundamental premise. It has served me something like the old procedure used in the estimate of the situation. I will show you what use I make of it now.

It pretty much covers the curriculum of the Industrial College. In other words, a national potential consists of manpower plus economic resources plus tools plus skills plus organization plus morale. Now, I use that yardstick to measure the course on production that you gentlemen have enjoyed here with the distinguished and very competent speakers who have preceded me in this course. I shall call the steel industry part of our economic resources, looking at it from the point of view of the ore, the coal, the limestone, and so on, and so you have had one talk on economic resources. In the tools of production you have, of course, the lectures on machine tools, on facilities for war production, on gages for production. Then you heard about the specific industries of aircraft and shipbuilding, guided missiles, and the chemical industry. Then you consider skills, to a certain extent, and you discussed automatic control techniques and management controls in industry, and the problems of producibility. Then you covered in organization the organization problems in industry, and coordinating production in an emergency on the top level.

On manpower and morale you didn't say anything; and that is the first point that I want to make in my talk to you here today. It just happens that since Colonel Cave asked me to come down here to address this class this morning, I was reading a book--it came out, I think, last year--and I commend it to you and the gentlemen of the Industrial College. It is entitled, "The New Society--the Anatomy of Industrial Order," by Peter F. Drucker. In chapter 16 of that book, he emphasizes the importance of human relations in productivity. Naturally, I realize that in the short weeks devoted to production in this course you are very far from having covered all the elements of production; and yet, as I saw my mission here in the college this morning, it seemed to me that, having reached my stage in life, if I have accumulated any experience that can be of importance in this field, then that is what I should bring to your attention this morning.

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I want to read to you what Mr. Drucker writes, because it emphasizes what you and I as old soldiers certainly ought to have realized long since. You remember that Napoleon said that the morale is to the physical in war as three to one; and nothing is truer. I can assure you that after my experience in industry I am more convinced of it than ever. I quote from Mr. Drucker:

"No part of the productive resources of industry operates at a lower efficiency than the human resources. The few enterprises that have been able to tap this unused reservoir of human ability and attitude have achieved spectacular increases in productivity and output. In the better use of the human resources lies the major opportunity for increasing productivity in the great majority of enterprises. So that the management of men should be the first and foremost concern of operating managements rather than the management of things and techniques on which attention has been focused so far."

Gentlemen, it illustrates one of the very essential points that, it seems to me, comes out of the observations that I recently made in France, in French industry, and that I have met in military history and in the history that I have lived through personally. Human resources is an element that ought to be emphasized and it is something that each one of you can influence for the better wherever you are, no matter in what level of authority or supervision if and when we get into an economic mobilization. I ask you to remember the importance of human relations, to see that it is never neglected, and that it is emphasized for the value that it potentially has.

I speak about France initially, because I feel that, along with military ineptitude and resources that were not so large as a nation in a major war would like them to be, and an industrial mobilization that was not so well organized as it should be, one of the principal reasons for the fall of France, which had been the dominant nation in Europe when I was at the Embassy in Paris for five years after the First World War, was in great measure due to low morale; and each one of us has the responsibility of seeing that, in the little area in which we operate, the question of morale is always one of our primary considerations.

We as a nation, and as the armed forces, are now beginning to recognize the importance of the morale element. We are now studying the questions of psychological warfare; but I think we have given, up to the present time, extremely inadequate attention to the question of, not psychological warfare, but to the psychology of our own people. I think that we ought to consider that; I think it is an important element.

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What is it that destroyed the psychology of the French nation? Disunity, communist propaganda, the division of society into classes in that nation. If you think, possibly, that has nothing to do with production, allow me to tell you that in the thirties the production in France was less than it was in 1913. Why? Just exactly for the reasons I have stated. One thing--I am not going into it; I haven't time; but I would like to call your attention to it before I leave this question of manpower and morale, and so forth--is the importance of job evaluation. We in the Army, the Navy, and the Air Force, I think, are pretty familiar with it--but you would be surprised, when you go out to industries, to find how many industries are remiss in setting up a job evaluation system.

Job evaluation has a great effect on the morale of the people who are working in an industry, because it gives them a status; it shows them the way to promotion; it shows what a man's situation is with respect to labor agreements that have been worked out between the union and management. I would like to go into more detail on that subject, but I haven't time.

Another factor, and one which you will not be surprised to hear me talk about, is the question of standardization. I am not sure whether you are going to hear anything about standardization in the United States. I notice it wasn't included so far in the curriculum of the course that I seem to be concluding here this morning. But at all events, I don't think it will do any harm if I say something about standardization and its importance. When I went overseas last year and looked back with the perspective of distance, it was perfectly obvious to me, after looking over France, that one of our great advantages in production was the high degree of standardization that we had reached. Let me caution you gentlemen about believing that it is as high as it ought to be or as it can be, because it is far from any such happy circumstance.

As a matter of fact, standardization in the United States is neglected; it is neglected to a certain extent in the armed forces, but much less than it used to be; and it is neglected in many industries, largely for one reason: That top management so far is--I won't say indifferent to it, but rather--ignorant of the advantages of increased standardization. It is amazing how many industrialists in the United States are not familiar with the basic principles of standardization and of the value that it has for reducing costs.

Some of you probably get this magazine down here, the "Combat Forces Journal," and I want to call your attention to something in here which I hope most of you realize already--how the major components of the Army's wheeled vehicles have been standardized. Engines: In World War II there were 18 different types of engines in wheeled vehicles;

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today there are only 7. Transmissions: There were 19; today there are 7. Front Axles: In World War II there were 21; today there are 7. Rear axles: There were 16 different types; today there are 7. Tires: There were 13 sizes; today there are 6 or 7.

Gentlemen, if you knew what that meant in production costs, in man-hours, in machine-hours, in the problems of filling up the pipelines to the front through the depots, and so on, that change that I have just read to you undoubtedly means, at a wild guess, hundreds and hundreds of millions of dollars to the American taxpayer and to our financial resources. But as important as that is, it means a great saving in our resources of raw materials which, as you well know, are extremely inadequate for any problem that we shall have to face in the future.

Then, you find that the problem of warehousing and distribution of spare parts has been made 50 percent easier, or even more, as a result of that degree of standardization.

I think it is interesting to see how others look on us--foreigners who come over here. I have here a report that was prepared by 15 British industrialists and labor leaders who came to the United States in 1949. I think it is important to see how foreigners size up our production which is so infinitely more fruitful than what they are accustomed to. I want to read you this paragraph:

"As a result of our visit to the United States, we are convinced that one of the main reasons for the high productivity and low cost which are characteristics of industry there is the ruthless elimination of unnecessary variety and the resultant concentration of manufacturing resources."

I want to read to you three definitions that I think are pretty good, because what they did when they returned was to write a report that would be of some value in bringing up productivity in Great Britain. They came up with these three definitions which I think are slightly different from those we are accustomed to:

1. Simplification is the process of reducing the numbers and types and varieties of products made.
2. Standardization is the process of organizing agreement on (a) a standard for a particular product, range of products, or procedure and (b) the application of that standard. A standard is a definition with reference to performance, called composition, dimension, or method of manufacture or testing.
3. Then they define specialization as the devoting of particular productive resources exclusively to the manufacture of a narrow range of products.

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So those are the three procedures under the heading of Standardization: simplification, standardization, and specialization.

I have given you some of the advantages--this report, incidentally, lists them. I will leave this report with Colonel Cave, but it is the only copy I have, so I will ask him to treat it carefully, but make it available to this class. It might be of some interest to you gentlemen.

One of the points, however, that I think needs clearing up and to be emphasized here today is, what remains to be done that would be helpful. Well, one of the things is nomenclature. Of course the standard catalog is working on that. When that job is finished it will be one of the most constructive things for an economic mobilization. There is another one--improving Army practices. The reason I mention these things, gentlemen, is not simply because of the fact that these are engineering standards of importance, but because you gentlemen will be in positions of authority where, if you are aware of the importance of standardization, you can give it an added impetus and see that it is done.

Certainly, one of the great problems today, or it was when I last looked into it and I don't think it has changed since, is in improving Army practices, and the variations between the armed forces, if they still exist, and the variations between military procedures and the procedures of industry.

Then, the two things that might be included in these fundamental engineering standards are the question of screw threads and limits and fits; all of tremendous importance in solving the problems of economic mobilization, not only within our own borders, but as between our allies and ourselves.

So don't get the idea that, because we are a nation where mass production has reached a high degree of efficiency and effectiveness, there is nothing left to be done. I think if you had the experience that I have had, you would be amazed at the unfinished business in the field of standardization in the United States; and how important it is, is evident to all you gentlemen in this room.

Now I want to talk about a few points that I have observed which cause low production or delay production, and where the responsibility is with the armed forces; so it is something that we ourselves can control specifically. I want to speak first of all about specifications and tolerances. I can certainly speak about some of the troubles that I had, first as the Chief of the Chicago Ordnance District, and then as an industrialist later on, in trying to meet specifications that

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were subsequently modified and should have been modified earlier to prevent a great deal of waste of time, resources, machine-hours, man-hours, and so forth.

Let me give you a specific case. When I went to Chicago in 1939, we were making the first experiments in industry on an educational order on the upsetter production of shell forgings. Somebody sitting back in the ivory towers of Washington had written a specification for that process, but actually, with some of the best commercial practice available in the use of upsetters, we were getting approximately 5 percent acceptances and 95 percent rejections. Obviously you could not use the upsetter as a commercial practice for the production of war material on such a basis.

We looked into the reasons for the specifications. They were fine. It was hoped to turn out by the use of an upsetter a forging that would be practically ready to use after just very minor machining operations. The theory was absolutely sound. But in practice you couldn't possibly reach that degree of avoiding eccentricities and things of that sort in the forging practice of that time.

If you think that was an easy fight, to convince Washington that what we ought to do was have a few more machine-hours and man-hours on the lathe, and so on, to get forgings out of these machines, of which there were many in the country, you don't understand what goes on in the bureaucratic mind. I was one of the bureaucrats myself, once, so I can speak freely. Gentlemen, someday you will have to solve problems like that and you will have to look at them very carefully. One thing I think you can always do, if you are going to have to stick to those specifications which industry objects to, is to explain to industry why you have to do it; make its representatives understand so they won't think it is some arbitrary decision of a bureaucrat that is making life hard for them on the industrial front.

These questions of good human relations, as I said in the beginning, are of vast importance. I can give you another story about gun forging specifications which required testing at--I forget whether it was 25 degrees below zero, something of the sort. It was a very tough specification to meet. Now, obviously, if we are going to fight in the Arctic regions, we are going to need certain severe specifications for our gun forging steel. That should be understood in industry; but I am just wondering a loud--because it may not be feasible--whether it is essential that all gun forgings be prepared for fighting in the Arctic.

I mean, you have to give in some place, gentlemen. You have to face the question of how much molybdenum is available. The Air Force needs it, the Navy needs it, and the Army needs it. How much is the

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Ordnance Department justified in taking for its gun program when there is such a severe shortage? I speak feelingly about molybdenum, because it happened to be a very essential and critical element in the steel molds in which we made our centrifugal pipe, and we carried out all kinds of research and development in our laboratories to find a substitute for the molybdenum, and we had a great deal of trouble finding out any way to do it.

Gentlemen, that question of specifications is going to be of the utmost importance as to whether you get out production in both quality and quantity. Look out for your specifications and your tolerances, and make every effort to see that both of these things conform, to as great a degree as possible, with commercial practice, whenever that is possible.

Gentlemen, one of the things that I hope is being done--I haven't had much chance to check up on it lately, to see how much is being done in what we used to call District Offices--in the way of getting data on manufacturing plants such as production equipment, machine tools and so on, management, labor, tolerances they are accustomed to work to, and all that sort of thing, because it is of the utmost importance. It was important in 1941 and 1942 and, in my opinion, it will be not only important but of the utmost critical need if and when we get into another war. I believe your assumption is a sound one down here, that war will start with the probable destruction of a good deal of our industrial equipment and resources. If that is the case, if we don't know where the facilities are, and what they contain, we have neglected one of our very important responsibilities.

Another thing--I am giving you these lists of things that bothered me in the actual job of procurement out in Chicago for three years--was inspection. One of your last lectures was given by an expert in the field of quality control--Dr. Juran, whom I consulted on several occasions when I was in industry. I am sure he told you, as Colonel Cave has already done, of the importance of quality control, not only in diminishing the load on inspectors, which is a very costly job, but also in doing something far better; which is to determine when things are going bad on the production line before it gets too late to do something about it. I just simply want you to know that, like standardization, which I spoke about a few minutes ago, the importance of quality control must be emphasized by top management and by you gentlemen, by giving it the consideration it deserves.

Another thing--I have only a few minutes more, gentlemen--that was important and caused a great deal of loss, was the hoarding of production equipment, such as machine tools and presses, and things of that kind, and the hoarding of raw materials. I'd hate to mention any names

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here, and I don't think I shall, but I could give you chapter and verse on that, too. I know what a temptation it is, because I wasn't completely guiltless in doing something of the sort myself from time to time. When you are getting ready to set up a production line, and you have a nice collection of milling machines and so on, you are going to be a very unusual human being if you are willing to let someone else have those on the basis that his particular production line won't get into production for six months. You are going to grab them and hide them, if you can. You are doing a disservice; you were in the old days, and if we start a war with the destruction of some of our important and essential industrial resources in the future, it may be much more than a disservice; it may be possible that hoarding of that sort could be an important element in defeat.

Another thing that I would like to spend some time on, but I shall not because the time is running out, is inadequate warehousing, the importance of warehousing, and the importance of changing design. I am sure that Colonel Cave will cover both of those points and tell you the importance of them.

I do want to close today on something which I observed in the past year or two, because I think it is extremely important. I found as an industrialist that the volume of paper work, the amount of negotiations that go into the preparation of contracts today, is so great that I am convinced that no war will ever be won unless we do something about it. That is how important I think it is.

When you spend months and months on negotiation to get a contract written that will enable you to get your machine tools ordered and get your buildings and facilities set up for running a production line, then something has to be done. I am not blaming the armed forces for this. I know that the armed forces are up against legal restrictions; they are up against laws of the land; they are up against our own regulations. But I say that the time has come to examine these obstacles to production and, in my way of thinking, it is one of the most important things we can do. I think we ought to have a committee to look over--if it is not already in existence--the procedural obstacles to economic mobilization. I think it is of the utmost importance.

Well, gentlemen, I have wandered over many fields here this morning. Colonel Cave gave me a mission to do down here. I am not sure that I can say, "mission accomplished," but at all events I have gotten off my chest some of the things that have been burdensome to me. So I suppose it is spiritually valuable to me. Whether it is valuable to you remains to be seen.

Thank you very much.

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COLONEL CAVE: Gentlemen, the "Combat Forces Journal" which the General mentioned is available in the library. Since he has lent it to us temporarily, this will be placed at the desk in the library for any of you who wish to look at it.

I think General Armstrong is ready for your questions.

QUESTION: Would you care to elaborate some on that warehousing and handling program?

GENERAL ARMSTRONG: I should say one of the great difficulties that we met in actual practice was the lack of adequate warehouses in 1941 and early in 1942, particularly; the consequence was that too frequently freight cars were not unloaded and were used for temporary storage, regardless of demurrage, and created the very serious shortage of freight cars that hampered the industrial mobilization. This is the one experience I saw that made me feel that warehousing could be a very distinct handicap if it is not ample for the job.

The other point, materials handling equipment, is something of which we in the United States can be extremely proud. I went through a great many French manufacturing plants this past year, and what I noticed immediately was the absence of material handling equipment in the French factories. It is one of the greatest causes of their high costs and of their misuse--I say "misuse," I think it is the word--of labor; because, as a matter of fact, although their engineering is outstanding, in most cases that I saw the materials handling was very poor. You know what progress has been made in the United States.

But there again, gentlemen, don't think that materials handling has reached the peak of performance in the United States. There are a great many places that you can see when you go out and look over industry where it is still not so good as it ought to be.

So my only point is the importance of it in reaching the scale of production that we would have to reach to meet the problems of a major mobilization.

QUESTION: On the basis of your French experience, would you say that the American pattern of production, utilizing machines for handling of production to the maximum, was the best pattern for the French to follow?

GENERAL ARMSTRONG: That is a very pertinent question. I have to answer it in a way that I detest--yes and no. The great trouble in France is that most of the factories are small, manpower is cheap, labor costs in direct wages are low. But I want to tell you something

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that isn't low, and that is what social security can become in a nation when it flowers to the degree it has in France. Where our social security costs may be 3, 4, or 5 percent at the outside, in France I think the average was 13 percent on the wage cost that goes in social security. So you can see what social security can do to your costs of production.

Now, the answer to your question is that materials handling is particularly adapted to the large manufacturing plants of the United States. It is not so well adapted, as you suggest in your question, to the manufacturing plants of France, where so many of them are small and where their output is much below ours. The answer, of course, is the success of the effort that is now being made over in France and in other countries, judging from the attitude of the industrialists with whom I spoke.

I had a letter from one of the top industrialists in France just the other day, pointing out all the difficulties involved in this Benelux plan to break down the barriers between these nations in the west of Europe. My belief is that we will never reach a satisfactory degree of production in those countries unless we attain that.

But don't think it is an easy problem, because, for example, if the currency in any one nation, let us say, is in a status of extreme inflation, it is just going to upset the applecart in the pricing system of that iron and steel operation over there. So you have to be a little bit patient about expecting immediate results from that union and the breakdown of customs barriers.

That is a very long answer to your question; but to give you a short one, I think I would say that it is a mixed answer. In some industries it would work well, and in many others, possibly in half of them in France, you would not anywhere nearly use the materials handling equipment in that country that we would find economical and efficient in the United States.

QUESTION: General, I gather from what you said that you would advocate perhaps a little better planning, closer liaison between the Defense Department and other responsible government agencies and the industry in planning and in keeping each other informed. Would you comment on that, please?

GENERAL ARMSTRONG: I should be delighted to comment on that, Colonel. I think that one of the most gratifying experiences that I had was in going out to Chicago in 1939 and having a year or two to become acquainted with the industries in the seven states that comprise the district.

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I am going to give you a rather long answer, because I think your question is extremely important and I don't know to what extent today's soldiers, airmen, and sailors realize the importance of what I am saying. Again and again, even in the mobilization of those days--and everything will be aggravated by the problems we face in a modern war--the knowledge that I personally had of the manufacturing plants, the facilities in my district, was a life saver. I knew the management, I knew what the labor supply was like, I knew the tolerances that they were accustomed to work to, I knew what their production equipment was.

So I got a telephone call from Washington, as I did quite often--and any people who are on this job in the future will get as a matter of course in the years to come: "We want you to get a fuse out that has just been designed; hasn't even been through its acceptance test. We need it for the campaigns in the Pacific; we need that at once." Gentlemen, that was a more or less isolated case in those years. It will be a common case in the future. In my opinion, nothing can be more valuable than for the three components in the Department of Defense to do the utmost with respect to determining the production equipment and the capacity of the various plants that are in existence, not only for direct contracts but for the subcontracting which is of such vital importance, and on which you gentlemen can certainly help if you have adequate knowledge.

I hope that gives you the answer to the question as you had it in mind. Is there anything else?

QUESTION: Would you say planning is adequate today, General?

GENERAL ARMSTRONG: I don't know. I haven't had any contact with it for a matter of several years, and I have no idea.

QUESTION: I think we all applaud the accomplishments in the direction of standardization and certainly there is much more to be done. You spoke especially of the reduction of 50 percent or more in the types of engines, axles, transmissions, and so on, in automotive equipment. Are there dangers that we can go too far in that direction? In other words, can it be too costly in time and tools to cause Timken, let us say, to make the same kind of axle some other element in the industry makes? If there is anything in this, would you point out any guidepost or policy that we should keep our eyes on to enable us to cope with the diminishing returns?

GENERAL ARMSTRONG: I would like to congratulate you, Colonel Cave, on the questions you have obtained from your students here. They are pretty tough on the victim. Colonel, I think that is a terrifically

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important question. It is important not only because, as you well know, you can standardize too soon in the time curve--that I once showed down here in the Industrial College when I talked about standardization--the way the Germans standardized their aircraft during World War II and then were at a very serious disadvantage. So tactically, you people have to watch out.

What rule do you apply? The only rule I can suggest is that nobody be put on standardization unless he has an I. Q. of 150; then he might possibly qualify.

On the other question of standardization of the industrial problems involved, there again you have to use a certain amount of intelligence.

Now, I know something about this question of engines for tanks in the Second World War. The large variety of engines was not due to the fact that we didn't realize the importance of standardization, but we had them because that type of engine could be produced; and you are going to run into exactly that same situation again. So you are not going to throw out a lot of production equipment and the capacity of a manufacturing plant just for the sake of obtaining standardization.

As I see it, it is the old question of whether man was made for the Sabbath or the Sabbath was made for man. You have to use intelligence in sizing up the answers to both of those very important questions; I don't think that any definite rule can be given except to use a great deal of discretion in making your solution. Seek standardization so far as possible, but by no means interfere with the tactical weapons that you are going to use, or with manufacturing facilities if they have to be used. It is simply a question of an intelligent approach to a tough situation, and you hope you won't have to face it too often.

QUESTION: General, you have discussed standardization. Will you tell us the effect of labor time standards on production, sir?

GENERAL ARMSTRONG: Well, I think that they are just as important as this job evaluation that I was talking about. One of the important elements is incentive. How are you going to create incentives? I think in time of war if you have a sound psychological approach directed toward your own people, you are going to accomplish a great deal, as management has accomplished by sound systems of communications between management and labor. But also the incentive system, which I can testify to from my own experience as president of a corporation, is a very effective way of reducing production costs; in other words, of getting a greater output per man-hour, per machine-hour, and a lower scale of losses.

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So I think it is extremely important. And the incentive system is something that you gentlemen also ought to be familiar with. When I get through here today, you will discover there are so many things you ought to be familiar with that you will be discouraged; but, at all events, you can't be experts on those things. What you can do, gentlemen, is realize they are important and give the necessary stimulus to carrying out these things like quality control, job evaluation, morale building efforts in the companies in which you work, and also the wage and the incentive plans, and things of that sort that I suppose you had in mind.

QUESTION: General, the American Standards Association has cooperated wholeheartedly in the Federal Specifications Program. Would you care to give us the ASA viewpoint on the adequacy or the inadequacy of our government specifications on military specifications and Federal specifications? Are we attaining the degree of accomplishment that the ASA feels we should on our program?

GENERAL ARMSTRONG: I wish I could answer that. I left the ASA in 1947 and I was a director for several years after that; but I haven't kept in sufficiently close touch with more recent developments. I know we always valued the close association we had with the armed forces. We considered that the work you were doing was of the utmost importance from the point of view of ASA and I personally was delighted with it, because I realized to the full the significance it had for economic mobilization.

So, judging from the long past, I would say that ASA was extremely grateful for the progress that was being made and extremely grateful for the progress that seemed to be in the offing; although we realized the length of time that would be involved in doing the job that had to be done.

That is probably an inadequate answer; but the best I can give you.

COLONEL CAVE: Recognizing that 1953 certainly is not 1941, in your judgment, where we are this winter of 1952-1953, with what may very well lie ahead of us, where do you think we stand as compared to 1941 and following it, from a standpoint of production, production capacity, and being prepared to meet the future?

GENERAL ARMSTRONG: Gentlemen, we are so far ahead of where we were in 1941 that there is no comparison; but it is a good thing we are, because the potential enemy is also a much more dangerous one; the weapons he can use against us are much more of a danger to the United States than anything that Hitler had. So it is a fortunate thing that today our posture of defense, from the economic production point of view, is far superior to what it was in 1941.

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But if you correlate the risk of 1941 and the status of 1941 with the risk of 1953 and the status of 1953, I don't know that we are much better off. In other words, there still remains so much to be done in the way of planning that I think we can by no means be complacent. But we can be thankful that we have such vast and effective industrial resources to support our efforts.

I think one of the great things that has strengthened our Nation is the billions and billions of dollars that have been spent by industry in the United States out of earnings to expand capacity. I commend another book to your attention. I have referred to Drucker's book, and I know that your professor here, Colonel Cave, has read Allen's "The Big Change." I suggest that you read Lillienthal's book on "Big Business." It will show you why bigness should not be sacrificed in the United States. It has been and will continue to be, in my opinion, one of the most important elements of our strength. We must be prepared to struggle against any silly theory among politicians or anybody else to destroy these great instruments of our national security, which are the American industries of today.

COLONEL CAVE: General, in laying out this Production Course several months ago, one of the things that constantly plagued us was the problem of making sure we picked up every vital element that we should consider. Certainly we didn't do it; but in being able to recruit you as our "clean up" man, sir, I think you have filled those gaps that we have missed, and you put a beautiful termination on our course.

Thank you very much, General Armstrong.

GENERAL ARMSTRONG: Thank you, sir.

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