

CONVERSION AND RECONVERSION OF INDUSTRY IN WAR

31 January 1955

1531

CONTENTS

	<u>Page</u>
INTRODUCTION--Brigadier General Urban Niblo, USA, Deputy Commandant, ICAF.....	1
SPEAKER--Mr. John W. Pocock, a partner in the firm of Booz, Allen and Hamilton, Management Con- sultants.....	2

NOTICE: This is a copy of material presented to the resident students at the Industrial College of the Armed Forces. It is furnished for official use only in connection with studies now being performed by the user. It is not for general publication. It may not be released to other persons, quoted or extracted for publication or otherwise copied or distributed without specific permission from the author and the Commandant, ICAF, in each case.

Publication No. L55-92

INDUSTRIAL COLLEGE OF THE ARMED FORCES

Washington, D. C.

Mr. John W. Pocock, Booz, Allen and Hamilton, attended the College of Wooster where he received his B. A. degree. He received his M. S. degree from the Massachusetts Institute of Technology. After completing his graduate studies, he joined the Armstrong Cork Company, serving for over five years in various engineering and executive capacities; he spent two years in industrial and plant engineering work, becoming staff assistant to the vice president of manufacturing. During World War II, as an assistant chief engineer of the Aircraft Division, he was responsible for design, tooling, and production engineering in the sizable airframe production operation established by the Armstrong Cork Company. Today, as a partner in the firm of Booz, Allen and Hamilton, Management Consultants, he is actively engaged in industrial planning assignments with and for both private industry and the Armed Forces.

CONVERSION AND RECONVERSION OF INDUSTRY IN WAR

31 January 1955

GENERAL NIBLO: As you know, during World War I America was not an arsenal of democracy, producing those hard-to-obtain items of military equipment which had no counterpart in our civilian economy. For example, you recall that not a round of American-made artillery ammunition was fired during combat in France from an American-made artillery piece.

You will also recall that shortly after the war, the Industrial College was established for the then specific purpose of planning for the conversion of American industry, so that we could obtain our requirements for those hard-to-obtain items of military equipment during any future war. And you know the result--the American Arsenal of Democracy during World War II.

Now, while that war was still in progress, the Industrial College opened its doors temporarily for the then specific purpose of planning for the reconversion of our then existing war industry, so as to meet our requirements of the civilian economy when that war should be over.

And, of course, you know that after the war the Industrial College was reestablished, with the basic fundamental principle and mission of planning for the conversion and reconversion of American industry during any future national emergency.

Our guest speaker this morning is going to discuss that specific problem--the conversion and reconversion of industry during any future economic mobilization.

Mr. John W. Pocock is an outstanding industrial engineer. He is at the present time a partner of the firm of Booz, Allen and Hamilton, Management Consultants, with home offices in Chicago. Mr. Pocock has been a member of the Industrial College faculty of guest speakers for many years. As a matter of record I might add that he is still a member in good standing as of this moment. How he will be later on, we will determine. This is his sixth lecture before the Industrial College.

Bill, it is a pleasure to welcome you back to this auditorium and present you to this audience. Mr. Pocock.

MR. POCOCK: I don't know whether this is my sixth and last lecture or not. You know, once upon a time there was a fellow bought a mule down in Missouri. Some of you fellows here will remember when the Army used mules. He couldn't get the beast to do what he wanted. Living next door was an old Army mule skinner, so he went over and asked him to come and help him a little bit.

The fellow came over to help work with the mule. He took a look at the beast standing there. He picked up a two by four that was leaning against the barn door, wound up, and broke it over the mule's nose.

When the first man had recovered, he said, "Why did you do that?" The neighbor said, "You've now had your first lesson in mule skinning. The first thing you have to do is to get their attention." I hope the general's remarks were only to get your attention.

It seems to me that the primary value in my talking to you rests in the somewhat unique position that my organization occupies in the field of industrial mobilization. As many of you know, through the years we have been concerned with matters of military administration, industrial mobilization planning, and research and development evaluation with the armed services. As a firm we are also continuously active with management problems of a large and diverse slice of American industry, and so have a chance to watch industry's reactions to the problems of industrial mobilization that they run into. And I think we can relate these industry problems appropriately to the corresponding problems within the Defense Department simply because of our continuing familiarity with these programs on both sides.

It is always a temptation to try to cover the waterfront when I get up here, and I think I have tried to do it too much in the past. Today I would like very much to hold most of my discussion within the framework of the company itself, and bring in some of the problems of our national economy and industrial policy only as they pertain to internal company operation during the conversion and reconversion cycle.

On this matter of conversion and reconversion--three or four years ago I made the point that our defense production in this country

had reached the point where these terms "conversion" and "reconversion" had lost much of their meaning in an absolute sense. While the ratio of our defense production to civilian production will vary through the years and will fluctuate as the pressures and counterpressures build up and dissipate in the international situation, actually, defense production on a broad base is here to stay. Rather than having 25 percent of our companies 100 percent converted, we are more likely to have 100 percent of our companies 25 percent converted.

Now, of course, this overstates any reasonable expectation; but at least it points out the direction of my argument. The terms "conversion" and "reconversion" now become more indicative of the direction of the swing between the civilian production and defense production.

During the last two years we have noticed that an increasing number of top-management executives seem to be adopting this perspective, taking the view that defense production is with them and their companies for a long period of years ahead. Of course they were helped along in this direction by the prospect of a more stable level of defense production in the future--taking up perhaps 10 to 15 percent of our total national output.

Now, this 10 to 15 percent may seem rather modest, but it is very large by historical standards during peacetime, if we can call this peacetime. For instance, during the twenties, defense production took about 1 percent of our national output. Just before the Korean situation broke, it was taking about 5 percent. Actually, at today's levels, defense production is larger than any industry in the United States, with the exception of the food and the construction industries. So we are talking about a very large segment of our economy.

The president's 50-year outlook for our military needs suggests that this situation will be with us for many years in the future.

Summing it all up, it seems to me that the United States now has a dual civilian-military industrial economy, such as the European nations have known for ages.

Top business executives, recognizing that the problems of defense production are going to be with them for many years to come, are particularly interested today in the fact that any future national emergency is going to require a far greater and more rapid expansion

than in past years or past emergencies. Because of this, it is simply good business for them to have some defense production activities geared right into their regular operations as a long-term program.

If this is so, what are the problems in attempting to deal with this sort of program in the whole company operation?

In speaking of this point today, I am not going to talk very much about the primary military production operations such as are carried out by aircraft and ordnance companies. Defense is their business. They are in it to stay. It is their whole business. It is not a special management problem with them. Nor am I going to speak of the group of industries producing the civilian products which are used during an emergency with little or no change--textiles, food, and so forth. Rather, our experience during World War II, and more recently during the Korean period, has emphasized that the problems are most severe with those companies whose civilian production and organization patterns have to undergo more or less severe modification in shifting to the defense items. It is in companies of this type, as we might expect, that the management problems of a dual-production operation are greatest.

Now, to understand the problems that these businesses face, we might examine five major problem areas which have been particularly identified out of our previous mobilization experience during the past four or five years. I am going to touch on product know-how, physical facilities, financial requirements, customer and market relations, and organization and people. You may say, "These are routine" and will find, therefore, that some of my remarks strike at the obvious. But, I hasten to point out that in my professional work I am repeatedly struck by what I might call the "obscurity of the obvious."

These comments are based not only on our own collective experience during the past five years, but also on a recent inquiry of management executives made in anticipation of this talk. So I am going to speak partly for myself, and partly I am going to mouth the words of these executives.

First, I want to talk about product know-how. For our purpose, know-how reflects knowledge of the principles that are related to the manufacture and the performance of the product itself. These principles are rather readily understood by any person with some technical

background. More importantly, then, we are talking about a myriad of little details, of between-the-lines information on tools, production operations, and so forth, that just cannot be adequately presented in any written or formal communication. It simply is something that the human animal has to learn by doing.

Just a few examples: I will take first a well-known gear manufacturer. You have all heard of him. He also has another line of business, which is his principal volume line. And this nongear line deals in tolerances of millionths of an inch. During Korea he got into producing jet engine gears. He demonstrated all the knowledge and all the skills that were necessary to meet the exacting standards of Air Force requirements. He moved into the production very quickly and very efficiently, and turned out his product at a reasonable cost, even though he never made gears for jet engines before.

Now, another competitive gear manufacturer, who had not had extensive previous exposure to some of the greater precision aspects of manufacture, as had the first man through his nongear work, had to work through a considerable refinement of his manufacturing and inspection procedures before he could get going and turn out acceptable gears. Yet this second company had made gears before for many, many years. In short, he needed more intensive process know-how--precision--in the very same product field in which he had been successfully engaged previously.

I might say that this second company had rated a very high score, as far as know-how is concerned, in premobilization industry evaluations. But it didn't work out.

Another simple example just briefly--there was a well-known appliance company, engaged in turning out washtubs, if you will, in a part of their operations. They moved into the making of canisters. They knew nothing about the product; but the washtub manufacturing processes were directly applicable, although they needed some new dies. Because the same processes and skills were involved; they moved directly in. The required know-how was present; and this manufacturer turned out the product in volume, at the right cost and right up to specifications. This fellow hadn't been rated as having the know-how in some of our premobilization evaluations.

Sometimes, again, we are fooled in the required know-how being present in some of our large outfits. This can be illustrated by the experience of some of our large automobile manufacturers moving into aircraft engine production. An engine is an engine, isn't it? Well, the principles are no particular mystery to these companies, but the

tooling, the manufacturing, and the testing details are all somewhat different.

Aircraft engines are far more complex, they have many more parts, and they are built to far closer tolerances than auto engines. As a result, at least two manufacturers found that their whole approach to manufacturing process, and its actual execution--tooling requirements, plant layout, machine-loading techniques, quality control, purchasing; you can go right through the whole line--had to be drastically changed. These people were engine builders, but they did not have the specific know-how required for aircraft engines.

Interestingly enough, a builder of steam turbines also ran into a know-how problem in building gas turbines. Although the company had all the required background in precision, complexity, and so forth, it discovered that there was a whole new high-temperature technology and metallurgy involved. This was a field in which the whole know-how had to be mastered before the builder could successfully proceed with his production. So he was tied up until it was mastered.

These are enough examples to demonstrate how we can misjudge the existence of know-how as we attempt to match it with our defense production requirements. Every example I have cited is based on a specific experience. In each of these instances, executives have specifically stated to me that the problems of know-how, as I briefly sketched them, were found to exist; and that they themselves were being surprised by the demands of such know-how. You fellows can probably think of many more cases in your own experience.

As to the solution, speaking very broadly, companies have tried in past years three alternates in seeking this know-how. First, they have tried to self-educate their own staff, through both formal training and trial and error experience. But, generally speaking, this has led to disappointment and the discovery that the trial and error experience period is far longer than anticipated. In many cases these people have ended up going outside for their know-how.

Now, as a second alternative, management has brought in know-how from the outside, either through the hiring of new people or by retaining some consulting organization. This alternative has been more successful, it seems, although in hiring talent from going organizations, you run the risk of getting second-level discontents. Also I might mention the fact that you stand the chance of breaking up the effectiveness of another organization which is already contributing heavily to the defense program.

As to the retention of consultants, I can speak fairly specifically. While it is satisfactory as an initial step, we have found that the requirement for extracting the know-how from the consultant and moving it across into the operating organization is too often overlooked.

A third alternate has been actually observing production in plants operating and doing the job, and then moving into production with a Chinese copy of the whole activity. As you observe and copy, you actually train your own people, right from the gang leaders on up to people who are experienced in manufacturing procedures and processes. Our own experience in the last five years indicates rather strongly that this third alternative has been the most successful.

As to the first alternative, it is difficult to train your own people if you don't know how to do it yourself. And as to the second, it is difficult to integrate outside people into your own organization if you don't have some competence already within your outfit that can accept the ideas and the efforts of people from the outside.

From time to time I hear dramatic stories of how some newcomer in the defense production field has brought in a fine, fresh concept of the operation, some innovations which have led to a very dramatic improvement in a defense production program. But I tell you, for every success story like that, there are nine that tried naive innovations and failed. It is very difficult to innovate successfully without specific production experience in a product.

My discussion so far has emphasized the acquisition of product know-how. Looking forward to the time when rapid expansion of our defense operations will require the efforts of most of our total organization, we have the additional problem of how best to spread, in anticipation, this know-how, which we have acquired, throughout our organization. We may then move more rapidly and effectively into complete defense production when the bombs start dropping. I think that this is most important to consider, but I merely want to call it to your attention here. I will return to it in a few minutes when I discuss the defense organizational problems.

Moving on for a moment to physical facilities, this is something we could talk about all day; so permit me just to hit the high spots. There is no escaping the fact, as we look back over the work that we have done, within both the services and industry, that most of the detail surrounding defense production has had to do, in one way or another, with the physical facilities required for production.

Everybody wants plant equipment at once. The problems of the machine tool bottleneck have been very substantially discussed. Yet many businessmen today feel that, somehow or other, we could do a better job in facilities operations. We simply get so tangled up with ourselves and our procedural work that it is sometimes questionable whether the machine tool and the construction bottlenecks are as big as the paperwork difficulty.

I know you have heard this one before; but, stripping aside all the overtones of self-pity, there remains a very strong sentiment on the part of businessmen that there must be a better and cleaner way of doing it. Let me give you just a few examples.

Here is an example of a manufacturer of propeller hub assemblies. He received a letter of intent at the outset of the Korean crisis. Under this letter of intent the company could act as its own agent for getting its tools, buildings, facilities, and so forth. The company set up its facilities and delivered its first assembly in seven months.

Later on, this company had additional production requirements handed to it. This time, however, all of our mobilization procedures were in good working order. Government clearances were now required to get facilities. It took seven months to obtain approval of the facilities contract and to set up a procedure for procuring the additional machine tools, although these machine tools had already been allocated and in many cases were sitting around waiting to be moved into position. The paperwork prior to setting up the second program took as long as it took the first program to get clear over to the first delivery.

I am sure that this particular case can be rationalized. I am sure it is not necessarily a 100-percent experience. But enough of this sort of thing has happened, you must realize, so that the industrial executive has considerable concern about facilities matters in looking ahead to a long period of partial military production.

In an attempt to improve this situation, a good deal of thought has been given to greater interchangeability of plant equipment. Such interchangeability is highly desirable when possible. But it is my own opinion that some folks have spoken rather glibly concerning this interchangeability pattern. Their thinking is unobstructed by knowledge of the actual problems out in the plant, and without too much idea of just how improbable it is to translate some of these gleaming ideas into greasy practice.

We can design our buildings to accommodate the peculiarities of defense production and still have them usable for our civilian production. We can maintain a defense production line in being over on one side of our plant and we can hope that our defense production policy in the future will lean more strongly in this direction. We can place in storage on our premises some of the machine tools and added tooling required for the expansion of our defense production, although we have to be willing to pay the cost, and we have to be able to plan a little bit better than we have in the past.

But, beyond this concept of interchangeability, I think we have overemphasized it. You simply don't turn out V-8 auto engines on Saturday and then start turning out aircraft engines on Monday. I think that the public is led to believe too often that this sort of thing perhaps can be done if some of us in this room were just a bit smarter.

As a supplement or an alternative to the dual plant, we are finding it necessary to maintain standby facilities for some of our critical items. Private capital can hardly make standby plant investments, because they have no prospect of a regular income return from them. So the Government itself has had to finance these facilities. In some cases these standby facilities are idling along with some minimum defense output. Some such production activity may well be warranted, since it keeps our motor warm, so to speak.

These facilities are generally operated by the larger companies, and this seems inequitable to the smaller businessmen. Even modest production coming from these large plants seems to favor the big companies. The small businessman finds it more difficult to obtain Government financing for brick and mortar should he like to move into competitive production. He must invest his own money and frequently feels that the certificates of necessity discriminate against him. Everything seems to be on the side of the bigger companies, so some small businessmen tell me.

On the other hand, it is well to point out that those people who are operating most any Government-owned plant also have their honest difficulties. The basic problem is what I would call "double management." The Government, as owner, understandably wishes to be informed, and to approve, of all changes in the operation of that facility. The reasonableness of this objective is understood and accepted. But once it gets into practice, it seems to get out of hand. As a trivial example, a change in the product design may require a new machine

tool or some other alternation in the manufacturing process. Private management requests authorization for such change and supports the request with facts and figures and detailed data justifying the shift. It sounds like a very reasonable and simple matter, but in practice it involves a tremendous volume of detailed work to cover every such shift; and this detailed work goes far beyond the point of diminishing returns, as seen by private industry. You have heard this before, I know.

One part-time manufacturer--by that I mean, working part time in aircraft engine manufacturing, and operating a Government plant--says flatly that the preparation and handling of such proposals for change to his facilities imposes the single largest requirement upon his manufacturing executives' time. This is certainly an indication that double management can be costly.

I don't pretend to know what the answer is to this facilities problem. What I am trying to do right now is to give you a feeling of the businessman's thoughts as he reviews his experience of the past few years. Of all the problem areas susceptible to more consistent policy definition and more effective practices, this entire area concerning the planning, provision, and operation of physical facilities can stand the most attention.

Now, very briefly, a few comments on financial and accounting requirements.

Financing a private business ranks among the foremost of management problems. The maintenance of earnings, liquidity, and line of credit--all of these epitomize the entire effectiveness of management.

It is interesting to me that in defense production the major financial problems seem to have been pretty well avoided. Businesses which undertake defense production generally find that their liquidity and borrowing position is improved.

A large expansion of production of course, ties up additional funds in material, equipment, and direct labor costs. Small businesses sometimes have short-term difficulty raising funds to sink into brick and mortar. But, looking at this in retrospect, it has not been a serious problem.

Private industry is concerned over how rapidly its investment will be returned. Tax provisions are important. On the whole, the rapid amortization provision has proved to be a very great incentive to get industry to build its defense facilities and get under way. The beauty of these tax arrangements has begun to fade a little bit now, since corporate income is remaining high, and higher tax payments now are and in the future will be offsetting the tax savings in the past.

But, if these major financial problems have been taken care of smoothly, in their place has come a group of minor fiscal and accounting problems. A few years back I talked here about all these problems of detail, under the title of "the anchor of detail." I would like to renew my story as "the tangle of trivia."

Just one example of what I am talking about--and it comes always as a surprise to me to see what a tremendous diversion of executives' time is involved on such things. Here is a manufacturing company trying to bill for kits of engine spare parts in such a manner as to obtain prompt payment. The parts are to be delivered as kits, and the contents are constantly changed. Billings for the kit must also be constantly changed. Billing on a per-item basis to save the time and trouble of kit analysis is turned down. The constant reexamination of the contents of each kit for billing purposes continues. All of us could cite other examples, each adding to the total management load. Defense management already has so many other things to do that it doesn't like to have any unnecessary confusion thrown its way.

In this connection I think of the story of a fellow racing into town for a date. He blew a tire. He had to change the tire. He got the wheel off, laid the four nuts in the hubcap on the ground, and turned around to get out the spare tire. In doing so he knocked the nuts down the sewer.

He was three or four miles from town and wondered what he could do about it. It so happened that he had pulled up alongside the county asylum. One of the guests of the asylum was standing looking through the bars while this fellow was bemoaning the fact that he would have to walk into town to get some more hub nuts.

This guest said: "Look here, buddy. You know, you don't have to walk all the way into town. Why don't you just take one nut off each of the other wheels and put the spare on with those three? Then you can drive into town and get some more nuts and go right on about your business."

"That's a wonderful idea," the sane driver said, "but what are you doing in this insane asylum?" To which the guest replied: "You may have to be crazy to get in here, but you don't have to be stupid."

Sometimes I think we are a little stupid in our administrative "tangle of trivia."

May I talk a bit about customer relations. A converting or dual production company, which has both Government customers and a private market to satisfy, has two different problems on its hands.

First is the military liaison requirement. The hardest thing for an executive to acquire in dealing with military customers is an appreciation of all the checks and controls that are involved in Government procedures. What appears to the Government as a reasonable precaution to safeguard the taxpayer's money appears to the businessman as unreasonable paperwork. What appears to the Government as coordination in planning and in decision appears to the businessman as buckpassing.

Patience and education are required on both sides. I would like to discuss what the plant representative can do to further this education, but we don't have time for it today.

More important to the long-range security of the company are the civilian market service requirements during defense production cycles. It can be said with very great truth that the strength of a company rests in its markets. Plants can be obliterated and rebuilt. Products can fail and be redesigned. Machines can break and be repaired. But markets lost are not easily regained.

These market ties must be retained by the company during the period of defense production. And this is the point: Their retention may require far more effort during these times than when their civilian product flow is ample. The market wants service, parts, or just a little attention. So when civilian sales drop, sales overhead do not necessarily drop in proportion.

This problem has been driven home to businessmen in two ways in the experience of the last five years. First, as an internal problem: When management's attention has been riveted on key defense assignments to the extent that they have turned their attention away

from their civilian markets, they have lost these markets. I will give you an example of this later.

Second, as an external manifestation: When they come to negotiate their contracts, and they want to include some civilian sales overhead as legitimate, such a proposal is given a glassy stare. I just leave the thought with you that we do have to let our converting businesses maintain their civilian sales programs to some extent, because when that market grows cold on them, they are gone when they try to re-convert.

Lastly, I would like to speak just briefly of organization and people. I have left the discussion of this to the last, because too often it doesn't appear as a very pressing problem at the time of conversion. Yet in the end, if our past five or six years' experience is any criterion, it has generally proved to be the single, more important element in the conversion and reconversion problem.

In a sense, of course, the organizational problem encompasses all the other problems that we have talked about. And also, organizational difficulties tend to accumulate rather slowly--a sort of a delayed time bomb. The weaknesses have usually become obvious only when there has been a dramatic failure. But in lesser instances with defense contractors experiencing high rejection rates, failure to meet schedules, and financial losses, we have learned the hard way, during the last five years, that a problem of organization and people probably exists.

In organizing our defense activities, we want to make sure we know what our objectives are. Our positions must be laid out in a clear-cut fashion; capable people must be placed in these positions; and then the various operating and control procedures must be laced through the organization, following the established lines of authority and responsibility. These principles hold true in organizing for any activity.

But, if we feel that we should accept a continuing activity in defense production as a part of our normal business operation, and if we desire to carry as much of our existing know-how into the defense operation as possible, and if we desire to use a small portion of our defense operation as a nucleus from which can grow an expandable defense activity during an emergency, then the central problem of management is to secure as much interchangeability or dual assignment within our organization as possible to speed the wartime shift.

I don't think you can overemphasize the importance of this point. Good management is the product of an intricate teamwork of men who have learned how to work together. The people comprising a successful organization have learned to know one another in terms of how the other fellows think and react. These people complement one another. They know each other's strengths and weaknesses--we all have them--and they compensate for them. They know where the real decisions are formed and where followup is necessary. All the delicate nuances of human personality and human relations have been successfully meshed together into a going management team. In short the know-how among people has been worked out. And, indeed, the importance of the organization problem stems from the fact that the know-how of a management team is more essential and more difficult to achieve than product know-how.

Since it is out of such variable stuff that an organization must be built, of course it is difficult to start from scratch. It is far more effective to take the management know-how of an existing team and adapt it to new purposes, building perhaps some new skills into the team, but still holding to the team experience. Therefore, the first principle, growing out of Korean experience of companies carrying on both civilian and defense production at the same time, as opposed to World War II where many converted completely, is to hold together as far as possible the management team and the people who already know how to get a job done.

In reviewing defense organizations during these last few years, we can divide the observed organizations into three broad categories, on a somewhat arbitrary basis, of course.

First, defense production may be absorbed into the present company structure with almost no organization change. This seems to have been particularly successful when the know-how and the production operations required for defense production were quite similar to that required in the civilian product, even though the products themselves may have been substantially different in function. When it can be done, this organization is an excellent thing. But experience has shown that some companies attempted such complete integration in the face of disparity in processes and manufacturing know-how between civilian and defense products. Such companies too often got themselves completely tangled up in their defense production. Then they carried that entanglement over to their civilian production as well, and ended up with

everything tied up in knots. Therefore this pat solution has not been invariably successful, and we should be warned against its automatic adoption.

Second, an entirely separate organization may have been set up for the defense work. This appears to be peculiarly appropriate, and has worked out well, when the processes involved in defense production were substantially different from those involved in the civilian production, and when detached plant facilities were used. If you have detached facilities in geographically remote areas, then you are almost forced to have separate organizations.

It appears in practice that these separate units have been most successful when a cadre of management men, steeped in the management atmosphere of the parent organization, have been bodily transferred over to the new plant and given the task of setting up shop. Thus the management flavor of the successful parent is carried across to the new organization.

In between these two extremes there is another organizational possibility which is receiving growing acceptance as a pattern of organization which can accommodate the ebb and flow of defense production through the years ahead. For want of a better term, I am going to call this an overlay organization. This organization integrates defense production into the present company activities, at least to the extent that the main functions--engineering, production, accounting--retain top-guiding cognizance over both civilian and defense operations. There may be small units at lower levels that are completely tied to the defense operation, such as an aircraft accountant under the chief accountant, an ordnance tool engineer under the chief tool engineer, and so forth.

Generally speaking, these organizations have had some central defense coordinator, acting directly out of the chief executive's office and having a functional tie with all these defense units down through the company.

Whether or not this is the ultimate answer, we don't know. But we do know this: Companies that have gone to this plan of organization seem to have had far less trouble during the cutback and the stretchout period that we have been through. And I suggest that we will see more and more of this type of organization in the years ahead.

So there are the problem areas rising out of business executives' experience in the last three years, and the principles we've cited may stick a bit better if given some actual supporting experience.

First, I want to talk about the conversion and reconversion of a large heavy-equipment manufacturer. In early 1951 a large heavy-equipment manufacturer, with well over a 100 million dollars of sales, was awarded a multimillion-dollar contract for armored vehicles. The company's main know-how was in heavy metalwork. It had produced similar vehicles in World War II. The know-how was present, at least it seemed so. The facilities of the company were not adequate for the required assembly operation, but two new plants were built with Government aid.

The company was very large and was adequately financed. The initial capital requirements were no problem at all. The company expected to maintain its normal relations with its civilian customers, to maintain a sizable volume of civilian output, and to service its customers. And it did. Liaison with the services had been maintained since World War II through a small Ordnance Division, in which was a cadre of people who were experienced in Government contractual procedures.

The company's Ordnance Division was only one of the operating divisions. It was headed by a vice president and, besides the contracting officer, had a divisional production manager. The unit, prior to this program, was very small. Most staff services, such as personnel, accounting, community relations, purchasing, and so forth, were provided by the regular staff divisions having only functional ties to the small Ordnance Division cadre.

Things looked almost too easy. But top management kept expecting weather.

The first and most immediate management problem was to plan the production scheme. As a first easement it was decided to buy all possible parts from vendors and manufacture only those which could not be purchased. To this extent this company acted wisely. Its representatives had a considerable procurement know-how, because in their civilian production they got a good many of their parts from the outside. They normally leaned somewhat upon the production know-how of their subcontractors.

But then there came the problem of the additional know-how required to assemble the vehicle. Perhaps some of you fellows have heard that the tank of 1951 was a bit different from the tank of 1941.

This problem pervaded the whole planning operation, from the sub-contract parts selection through production engineering, process engineering, tooling, quality control, and so forth. A lot of heads were needed to do the job, more than the company had. And a lot of detailed know-how was needed, more than the company had. New practices and procedures were needed to coordinate and control the complex planning job. It is hard to appreciate this complexity until you're in the middle of it.

Dozens of new procedures had to be put in. New men had to learn how to work them. A whole new body of practices had to be devised and put into operation. Things began to bog down a bit. The know-how and staff of this company wasn't quite enough.

So top management reached outside to employ men with experience to back up their own people. They also used consultants to carry some of the initial load. They did this before things got critical. There were some bumps, but eventually things shaped up pretty well.

During this period, the organization--and I am going to keep coming back to this problem, because in the last five years we have learned that this is the problem--had undergone substantial changes. In fact, the Ordnance Division--remember, we have separate facilities--had become a completely separate operation. While it continued to receive some staff assistance in personnel matters from the top staff organization, otherwise it was self-contained.

And today? Production completed. The cutback was a bit painful in spots, but it was eased by the Government's support of its plant as a standby facility. It has a separate defense organization, with a cadre ready to go back to work, with plenty of know-how and teamwork.

You might like to know that there has been an interesting dividend here. They have transferred some of the executives who sprouted their wings, so to speak, in the ordnance program, into their civilian operation, where their know-how is a bulwark to the growing operation there.

I want to talk next about the reconversion problem with a small company. In late 1953 a small Midwest automotive parts manufacturer, with about 10 million dollars of sales, was engaged in defense production to almost 50 percent of its volume. The main defense production items were shells and fuses. The product know-how for this type of work was very similar to its civilian automotive parts manufacturing. The parts were fabricated on machinery and with processes with which they were familiar. The assembly operations were light, similar to their civilian operation. Of three plants one plant was mainly engaged in civilian production. A second helped to accommodate some defense fabrication. But the company had also purchased a third structure, of considerable size, an old textile mill, especially for defense assembly and some fabrication.

Now, between 1950, when the defense contracts were undertaken, and 1953, the company had realized a reasonable profit on the efficient defense operations. However, the civilian profits were poor. As a result, the company's cash and earned surplus had increased but slightly. Its credit was good, but notes payable and long-term liabilities outstanding did not make further borrowings feasible.

Top-management efforts in this small company during these three or four years had gone into building a very successful defense program. The company's civilian markets had deteriorated, while its competitor's sales had gone upward. In 1953, although the company had a reputation for doing quality work and for meeting schedules in its ordnance work, it had to take a cutback along with everyone else.

The company's problem then became how to operate profitably with at least a 40-percent loss in total sales, due to loss in its defense production. And what profit it was to get out of this reduced activity had to come mainly from the competitive, civilian side of the business. The company began to experience serious financial losses in 1953 and a decline in its working capital set in, in 1954.

The main problem facing the company was to strengthen its sales program for civilian products while drastically cutting back its total operations. Moreover, this company was in a very small town, which made it very difficult to cut back. It was a serious community problem, since it was the major employer. Something had to be done and it had to be done fast.

Perhaps you are expecting this story to have the usual happy ending--a neat solution that always seems to come with such illustrations. There is no neat solution to this one. A heavy burden was taken off the company when Ordnance took over one plant as a standby facility. The company cut back its employment almost 50 percent. And in a small town that is a problem.

The company dropped unprofitable lines. It put in a new product line. It disposed of excess plant and machinery. It eliminated executive staff organization. It realigned territories and many more things had to be done.

The company went through a very difficult transition period in 1954. It has made progress. Its civilian sales are beginning to show some improvement. But it will still be a considerable time before it recovers from the effects of this journey into defense production. And this story could be repeated, I might say, as a general type for scores of smaller companies. It is something for these people to think about when they look forward to their participation in defense production in the years ahead.

Our third brief illustration concerns the organization of a modest-sized company organizing for the long pull. It had about a 40-million-dollar-sales operation. This company is a manufacturer of heating equipment and appliances, a quality producer, with a brand name well known to all of you. Airframe subcontracting was its field of defense interest. It had been in airframe business during World War II and during Korea and is currently active.

The airframe subcontract business was getting more and more competitive. This company wished to remain in the airframe business. But it stood in need of a reexamination of its total position.

Financially, the company was in very sound shape. It had good credit. Organizationally the company had integrated its defense activity into its regular organization.

As a matter of fact, as a policy this company had decided to look to defense activities for, let us say, 20 percent of its sales volume over the long pull. Here are the reasons given--and I think you'll agree that they reflect enlightened, socially responsible, yet practical management thinking:

1. "As a major unit in American industry, the company wants to do its part in contributing to the nation's defense.
2. "In time of all-out mobilization, the company has a responsibility to employees and stockholders to maintain a healthy, profitable enterprise even though the primary product line is discontinued.
3. "During peacetime, the profit contribution is reasonably attractive.
4. "An expanded volume of company sales will help carry the company overhead and thus bring greater management efficiency and lower cost to both civilian and defense products."

To improve its aircraft business, the company decided to reorganize its aircraft work. An overlay organization provided the concentration of coordination of the defense activity that was needed, while retaining the basic management strength.

In this organization structure they have a vice president and assistant general manager in charge of both the civilian production operations and the defense operations. He has a manager of defense contracts reporting directly to him. This manager of defense contracts has operating responsibility for contract administration and liaison with the military and the prime contractors but there his operating job ends. At the lower levels we have for example, an aircraft buyer, reporting directly to the general purchasing agent who reports to the vice president. But he has a functional line coming back up to our top defense coordinator.

Similarly, we find a chief production engineer over both civilian and defense operations. Under him is an assistant chief engineer for aircraft who has the specific know-how. And so in each area we have one or two people who have specific aircraft responsibility, who report in through the regular line organization, but are functionally coordinated by the assistant to the vice president.

This organization structure has proved out successfully. This company has maintained its competitive position in the aircraft subcontracting game. This company believes that the better organization of what it already had in being has made a difference in its competitive position.

Now, we've talked a lot about organization, since in retrospect it has proved to be critical. Here are some interesting facts:

In a recent study of defense organization practice, the list of the hundred largest defense contractors, as published by the Office of the Assistant Secretary of Defense, was used as a base. First, the 49 companies which were engaged in aircraft, munitions, shipbuilding, and basic materials production and extraction, as a regular business were eliminated. Their problems didn't change as they went into defense production--they were in that all the time. This left 51 companies with a substantial civilian-defense operating problem.

Six of these companies set up a separate corporation. It is interesting to note that four were producing a military product substantially different from their civilian product, and in all cases they had separate plants--separate and remote.

Thirteen companies set up separate divisions. Only 4 were making a military product different from their civilian product, but all were using separate plants.

Six companies used complete overlay organizations--the kind that I have just described--and were mainly in the automotive field.

However, of the 26 remaining companies that had integrated their military production with their civilian production, it is interesting that half of these reported some sort of a functional organization, with an officer at the top who concentrated on the defense activity. This tends toward the overlay type.

It is also very interesting as a closing note to see that these companies were thinking of defense production as a long-term activity.

Seven years ago, if we had walked up and talked with the presidents of these 51 companies, I daresay we would have found most of them anxious to get out of defense production. But today 38 of these 51 companies--on their own statements--are in defense production to stay. Only 13 of these 100 largest defense producers look at defense production as a conversion-reconversion activity.

To me it is extremely encouraging to note the emphasis now being put on long-term participation in defense production activities by top executives in our large companies. It clearly demonstrates a maturing of the military-industrial bond and a full recognition on the part of both executives and military people that our interest in these programs, which perhaps we might say are dedicated in the last analysis to national

survival, must go beyond mere emotional agreement and extend to a rather complete integration of our continuing day-to-day operating patterns. Thus, I believe industry is truly learning to understand the long-term defense problem.

On the other hand, it seems to me that the officers in our armed services charged with industrial liaison and industrial mobilization planning--our industrial executives in uniform, if you will--are also maturing in their attitudes and philosophies regarding industrial objectives and needs in these programs. This college had a major share in this development. And you gentlemen here today will go on to build more of this industrial maturity into our military programs. I believe that this is one of the great challenges in defense affairs today, and I hope that my summarization of lessons learned as industry has worked with defense agencies during the recent past has brought some new food for thought or at least has stimulated further inquiry in your minds.

It has been a great pleasure to spend this time with you. Thank you.

MR. BAUM: Mr. Pocock, I see our time has run out. On behalf of the college, I thank you for another most informative lecture. It has been a pleasure to receive such a lecture.

MR. POCOCK: Thank you very much.

(17 Mar 1955--750)S/gmh