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INDUSTRY'S APPROACH TO REQUIREMENTS

24 November 1947

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INDUSTRY'S APPROACH TO REQUIREMENTS

24 November 1947

MR. HENKEL: General McKinley, Captain Worthington, Colonel Mickelsen, and gentlemen: The subject of our lecture this morning is "Industry's Approach to Requirements." In selecting this subject, it was our thinking that you should have at least a picture as to how one industry develops its sales forecast or production goals, which, after all, is what we call requirements. At the same time consideration was given to the possibility that the Military Services could use some of the methods that industry uses in determining their requirements.

We are very fortunate this morning in obtaining a speaker whose company has set up a forecasting sales organization after having studied the methods which several other industries have used. He is Assistant to the President of the Pennsylvania Salt Manufacturing Company.

It gives me great pleasure to present to you Mr. Davies.

MR. DAVIES: Thank you very much. I wish all our people in industry could see this group today because it would increase the confidence that industry has in the Military Establishments.

I think if we are going to speak about industry's approach to requirements we ought to select an industry which may bear some analogy to the Military Establishment. The chemical industry is a broad one and it probably should be called a group of industries. Shall we select the insecticide industry as one which bears some resemblance to yours?

I am serious about the insecticide industry, because, whereas the fertilizer industry is engaged in increasing the well-being of agricultural growth and agricultural life, the insecticide industry is busy with the hard job of protecting it.

In any company there have to be basic objectives set forth if the company is going to prosper and do its job in the economy. The insecticide industry might very well have as its basic objective the making of money on its current insecticides, just as the Military Establishment might very well--not of this country but of another country--have as its principal objective the maintenance of its position at the present status.

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The excuse for the insecticide industry, of course, is not that it keeps its employees employed and keeps its salesmen working. The excuse is that it provides for the defense of the plants from attacking insects, and in so far as the insecticide industry loses that point and that objective, under our economy at least, it falls by the wayside.

In our company we have pioneered, I believe, a new philosophy of controlling the business. We have said that if we once set forth our objectives, then the decisions necessary to operate the company will be made on the basis of estimates of facts. That doesn't sound like a revolutionary thing, but if you will analyze it, you will see that it is.

The decisions for operating the company are made on the estimates of facts and not on recommendations--which means that when an official at any echelon has to make a decision, he must have before him estimates of facts on which he bases his decision. He must not do what has been done generally in the past--and I don't know how you do it in the Military Establishment--he must not say, "Because my principal lieutenant recommends this and I have confidence in him, I will make this decision."

What he does instead, he says, "I will make the decision myself on the basis of facts or estimates of facts presented to me. If the decision is something that I am not going to have time myself to look into, if I am not going to have time myself to examine these estimates of facts, then I will arrange that the subordinate make the decision and take the responsibility for it."

We found that system very useful and very effective. Facts regarding products, we find, fall nicely into a pattern; and in order to make the decisions we put all estimates of facts into this single pattern. Thus, we know where to look for pertinent facts. We know where the gaps are in the pattern.

Now, I think if I can use the board here a minute I can show you what I mean by this pattern. We say that the facts regarding a product can be divided into four groups: "use," "distribution," "manufacturing," and "raw materials." Now we say also that there are two types of facts on a product in each of these categories. There are the facts on the present situation and there are the facts on our opportunities. We then have a pattern, and down below here we have another group we add, which is "profit."

This pattern system is used first in the control of our current operations. Continuing with the insecticide industry as the example,

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suppose there is a demand for a product year after year to combat insects in the cotton South. We have to forecast the exact requirements per month, per quarter, or per year in order that we won't have excessive inventories or be short on inventories; in order that our labor supply may be kept smooth; in order that the company may be run smoothly.

This is what we do: The Market Research Department, which I suppose, would correspond somewhat to the intelligence group of the Military Establishment, reports, (1) the general outlook for industry over the next period, over the forecasted period; (2) the outlook for insecticides in general; (3) the outlook for insecticides in the cotton South; and finally, the outlook for the particular type of insecticide concerned, in the cotton South.

That report is the result of discussions with people throughout the industry, in government, and by personal investigation. That report on "use," which we will say comes from the Market Research Department, goes to the sales people, the people who are responsible for "Distribution"--actually moving the goods and delivering them to the users. The sales people, using that report as a background, stick their necks out and say how many pounds of this product they can sell during the next quarter or the next specific period to that industry. The estimates then pass to the Manufacturing Department.

The Manufacturing Department quickly compares the requirements specified here with the capacity of its processes, and it of course knows at all times the capacity of all of its processes. If the requirements here are below the ultimate capacity, the Manufacturing Department and the plant superintendents gear their planned operations to that requirement, and then pass the information along to the purchasing people, having interpreted them in terms of the pounds of raw materials and pounds of supplies necessary in "manufacture."

The purchasing people responsible for raw materials then look over their stocks. If they find "During this next quarter we don't have enough stock to supply what the Manufacturing Department says they need," they place orders for exactly the amount required to fill the need and maintain a safe stock.

Now, that is the method of controlling our current operations. There is a committee, composed of representatives concerned with all four of these functions, continually comparing performance with forecasts. We started out with our forecasting system about a year ago. Under our present forecasting system, we had an eight percent error over the first period in which we had complete performance figures. We now have it down to about a three percent error. The Armstrong Cork people have their forecasting system down to a one percent error on an annual basis.

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If representatives of these four groups have to be faced every month with a report of how far off they were, it has a remarkable effect in sharpening up their estimates. In fact, we give a prize to the sales division which is the farthest off in its estimate. It is a prize not to be desired. It passes from one sales division to another. I think on the last one somebody was 50 percent off in an estimate for one month, and the effect of calling attention to these errors in estimates is substantial. Of course, sometimes someone tries to shift a mistake to somebody else, but that custom is not applicable in a Military Establishment, I know.

Now, all we have spoken of so far concerns the method for controlling current operations. One reason why I think we should pick the insecticide industry is that frequently the "Use" as reported this month is entirely different from the "Use" reported two months ago, so that the capacity available for making the insecticide for which there is a demand may be only a tenth of what is required. We are constantly faced with the need for expansion in production of some commodity or for making an entirely new commodity, which, it seems to me, is analogous to the problems which you must have.

We follow a second pattern, however, when that happens. The Market Research Department determines that there is a sudden infestation of the velvet caterpillar in the cotton South and it reports that to the distribution people, and they report it to the manufacturing people, and so on down the line. And as happened a few months ago when there was this particular infestation of velvet caterpillar that was going to completely wipe out the peanut crop in the space of a few weeks, this word was passed down to the Manufacturing Department; it had enough stock pile of just the product required. It happened to be a very finely ground cryolite product which is used for combating the velvet caterpillar. Without having to go beyond this, the Sales Department's estimate was revised to 10 times as great as originally forecast for that particular period. When the Agriculture Department said it was necessary to save the cotton South to get this cryolite, the Manufacturing Department was able to ship 20 tons the first day and several carloads the day after because of the stock pile of finished product in the stock pile, not stock pile of raw materials, but stock pile of finished product. We were able to satisfy that threat to the peanut industry.

Frequently, however, the word comes that there is no stock pile; in fact, that we are not even making the product required. Then, this special pattern is followed by deciding whether to go ahead with expansion. The word comes that there is a new product which will be in demand. The amount is estimated. The Manufacturing Department says they haven't any of it. Together with the Research and Development Department they determine how much it would cost to build a plant to produce the amount required. They determine the raw materials required,

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and the Purchasing Department determines whether that would be available and how.

Now, when it comes to expansion, this item of "Profit" comes in. I think our analogy may fall down there. I don't know exactly what the analogy would be to "profit," in a Military Establishment, but in an industrial establishment, of course, we can't justify any expansion in "manufacture" unless we can show, first, that the investment can be repaid, and, second, that a fair return on it can be made to justify risking the investment.

This profit is hard to figure, of course, because it depends on predicting exactly what costs are going to be and what the selling price is going to be and what the volume is going to be, all before you have even built a plant. So, therefore, have an entirely separate activity in the company called an "expansion system."

Our expansion system embraces all the expansion decisions that have to be made in the company, and we say there are four types of expansion decisions. The first is, do nothing further, and that we label as a decision--"do nothing further." We say if we do nothing further that is just as much a decision as any of these others.

Second, to get more information regarding expansion, either in the laboratory, or in the marketing; information on how it is to be used; to get raw material information, as to whether we could make it if we had the process.

The third is to undertake exploratory operations--that is to build a pilot plant, to go out in the field and try to sell some other exploratory operations.

And, four, to undertake commercial operations--to make and sell on a commercial basis.

These represent the four degrees of interest that a company like ours has in getting into something new or expanding its production and sales.

Before we make any type of decision we must have the estimate of facts presented in "present situation" part of the pattern. We have to show what is the present situation in the use of the proposed product, how much is used now, where it is used, and how, who sells it now, through what channels, who makes it now, and what is the cost of manufacture? What method do they use, and what is their patent structure? Where do they get raw materials? Do they have an edge on raw materials?

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After we present the "present situation" side, then we move over here to the "our opportunities" and say, now, what are our opportunities regarding this proposed expansion as separate from just the general present situation? What are the opportunities regarding the "use" of it? Do we have some particular edge on, let us say, the cotton industry? In the "distribution," is the fact that our distributors are serving that industry going to be helpful to us and put us in a competitive advantage in the "manufacturing?" Do we already have know-how which is similar? Do we already have equipment which could be used? Do we already have a mine that would produce some of the "raw materials?" Do we have a satisfactory contract to get whatever raw materials we need? Then logically follows after these four, what "profit" could we make on it?

Now, profit here doesn't only mean dollars returned. It may mean lack of loss. That is, it may be necessary to expand without making any profit in order to hold our position in the industry. So profit is really, as we show it here, what difference would it make to our company's health and operations if we proceeded, as opposed to a decision of not to proceed?

Based on the estimates of facts presented in this pattern, we then decide whether to expand or not, and we decide which of these four expansion decisions to take, bearing in mind--and this, I think is the most important thing--bearing in mind that the No. 1 decision is just as much of a decision and may have just as much effect on the whole future of the company as any of the others. I refer to the No. 1 decision entitled to do nothing further. If we say we will look this over and put it aside and face the problem later, then we are in effect making the No. 1 decision.

One of our biggest problems is to get it across to the executives of the company that the No. 1 decision of do nothing further is just as vital and is just as much of a decision as getting more information, undertaking exploratory operations, or of undertaking commercial operations.

Now, with that pattern before you, you can see what a heavy responsibility there is on the Market Research Department, which is the outfit that determines what the "use" is. If the report is that there is a substantial use for a new product and at the end of a year after the plant to produce that product is built, that use evaporates, you see the disaster that could come to a company.

The Market Research Department in our organization is different from the intelligence groups in some other companies, in that we have a strict rule that the Market Research Department never makes any recommendation. The Market Research Department presents estimates of fact,

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but never makes any recommendations. We have had that rule for, I guess, eight years now, and it has worked out very well. It has preserved the reputation of the Market Research Department.

You see if the Market Research Department--the Intelligence, the Fact Finding Agency--presents the facts, and then at the bottom of the list says, "On the basis of these facts, we recommend decision No. 3 at this time," the fellow in the organization who doesn't particularly like decision No. 3 tries to present and emphasize facts against it. Then, when the Market Research Department has to make a reappraisal a few months later, the tendency would be to try to back up its previous estimate. This would be analogous to a high-ranking member of your profession making some estimates that it would be 15 years before the Russians would have an atomic bomb, and, having made that estimate, feels obligated to keep supplying estimates of facts in that direction.

We feel that it is very important that the fact-finding agency not make recommendations.

One thing that is extremely important in all this is that the fact-finding agency not under-estimate the competition. In the middle of the war, DDT began to be spoken of as a new American insecticide. We manufactured it on a small scale and it became a question of timing in that, if we were going to expand profitably, we would have to expand before competitors expanded.

Now, our manufacturing and engineering people said in this case that it would take another company 18 months, or under great pressure one year, to make the expansion required, and they figured that we could do it in one year because of the head start we had.

The Market Research Department had to be responsible for estimating how long it would take the competitor to get into production because if the competitor got into production ahead of us, we wouldn't have the requirements, we would have a plant on our hands, we would be too late. The Market Research Department estimated after talking with people on the outside that one competitor could get into production in three months. Our manufacturing and engineering people, who should know the most about it, demonstrated conclusively that they couldn't get into operation short of a year. However, at the end of three months the competitor was producing the material.

I remember very well the visit to the plant of the competitor with a member of the Engineering Department who had specified that it would take at least a year, and seeing that material coming out of the process and having him explain that it just was not legal--that is, the plant was not built right, the building code had been violated, and he pointed out all the places where it had been violated.

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This was alongside a body of water in a principal port of the United States, and there was a ship, a tanker, alongside, and here was this fellow's plant in the corner of a warehouse. As we walked along, we saw a stream flowing out of a pipe from the dock against the tanker. We traced the pipe and we found that that was the byproduct, hydrochloric acid, from this plant.

Now, one of the things that would take a lot of time in building this plant was to set up equipment for the recovery or disposal of waste hydrochloric acid, and there was no such equipment in this particular plant. So when this tanker got on the other side of the world and found it had a hole in it, there would probably be repercussions, if they could ever find out how the hole got in there.

The reason I mentioned that was that this fellow built his plant illegally, but the product coming out was beautiful, and it was just as much a threat and it took just as many of our customers away as if he had built his plant correctly.

The engineer then took me over and he said, "Look at the kind of labor he has got building this thing. It isn't even union labor." And right while we were watching, the engineer did something which saved the whole situation in my mind, he saved a fellow from losing his hand, because they had just picked up a man, a roustabout, to put up a framework of timber to put one of the tanks on. He had one of these electric circular saws with a handle on. You know the blade is down below and you are supposed to take it like this (indicating) and follow through. This fellow was holding the saw by the blade and was about ready to cut a piece of wood. Now, our engineer quickly explained to the fellow that if he did that there would be a bunch of fingers on the floor.

However, the competitor who told the man to do that, the man who decided to get this product produced in three months was getting it produced in three months. There might be fingers on the floor, and there might be a hole in the tanker, and a whole tanker lost in the middle of the Atlantic for all he knew, but he was getting his stuff produced.

Now the estimate that was made by our Engineering Department as to when this fellow could get into production cost us some money, but it didn't mean the destruction of the company. I think, if I may be permitted to say so, there are similar estimates in your hands where if a mistake is made, not only the company, but the whole country can change its security position rapidly.

One of the things that we have to do in providing requirements to meet the end uses and to meet the profits down here is to put stockpiles at the critical locations in the process. This velvet caterpillar

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thing I described is a sample. We happened to have a stock pile here to take care of that emergency.

But there are steps all through our process which are subject to damage, to stoppage, and as a general rule we must either see that we have insurance to cover use and occupancy, that is insurance to pay all our losses, in case of interruption, during the period of stoppage, or that we have enough of the output of that step to take care of us while that process is being fixed if it has stopped. It seems quite obvious, but frequently we fail to do it. I think perhaps in the whole industrial economy we are failing to do it now.

I believe we are typical of other industries in a policy that we have at present. We say we want all inventories reduced to a minimum. We keep putting pressure on the sales people to keep their finished goods at a minimum, on the manufacturing people to keep all supplies of raw materials at a minimum, and the same with the purchasing department. When the Market Department says, "Maybe there will be a depression, or maybe there will be a war economy," we say, "If there is a depression, obviously you want low stocks, and if you have a war economy"--and this is a thing that you people will be interested in knowing--we say, and I believe all industries say--"We don't have to worry because the Government will allocate us whatever we need for the war economy." So we have transferred responsibility, in our own minds anyway, to the Military Establishment for maintaining, not only the basic raw material stock pile but the "insurance" stock piles at every little point along the way.

Now, if I may be forgiven for using an analogy again, you remember when those Nazi saboteurs were picked up on the coast of New Jersey--the President of our company was called up at two o'clock in the morning by the FBI. The FBI said, "Have you any people at your Cernwells Heights plant to protect it?" Of course, we didn't have anybody there but a watchman. We promptly got people there to protect it.

The point is that the FBI said "We have got one man who was trained by the German General Staff and came all the way from Germany and his objective is to destroy this Cernwells Heights plant." Two days later somebody called me up from the office of the Under Secretary and said, "What is this cryolite plant you have there at Cernwells Heights? Where does it fit into the picture?" Now the German General Staff know what it was, what its effect was on ultimate requirements. The German General Staff not only know it, but it had trained somebody and sent him all the way across the ocean in a submarine, got him up on the beach and got him close to the plant, but our people didn't know about the plant. We found it was listed as No. 3 Classification or No. 4 Classification for security purposes and was thrown in with another group of plants.

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Now, as a result of that, I think, there was set up the Board on National Resources--I forget the name of it--the Board that handled the evaluation of the importance of plants to the war economy. That Board, up until recently anyhow, has not been brought up to date--it was not reactivated. If there is one thing that I would like to express as the urgent conviction of industry to this distinguished group, it is that our friends in industry feel that it is imperative that there be reestablished at the earliest day possible a responsible study to determine what are the 15 or 20 most critical producing points in the United States. Up until a couple of weeks ago when I talked to General Spalding, that had not been done. He was planning to do it. All those things are planned.

Suppose this group here were sitting in another country and we decided we wanted to stop any war mobilization of the United States. One of the things we would like to know would be, "Where are the first 15 or 20 plants which if stopped would immobilize any new effort?" If so, if it were the country we are thinking about, we certainly would have people in the United States already whose business it is to get into plants and to wreck them.

Tantalum is made, I believe, in only one plant in the United States --in Chicago. If someone wrecked the tantalum plant or called a political strike at the tantalum plant, it would stop the production of tantalum. I believe recently there was a ten days' supply of finished tantalum in the United States. That is just one example.

I will give you another example with which I am familiar, and that is the cryolite which these saboteurs wanted to wreck in the late war. We have one natural cryolite plant in operation in the United States. In case of mobilization which required more aluminum metal than is now being produced, there would be on that day an immediate demand for natural cryolite in great quantity.

Now, there are no stocks other than day by day stocks because of this policy that industry is following, that the Military Establishment will take care of stockpiling what they feel is necessary. If the aluminum industry wants cryolite it would ask the Government to allocate, and we would say, "That is fine. We will allocate as soon as we get it." But this plant is one which any three of us could wreck and put out of commission for three months without any trouble. This plant is what we are resting our security on with respect to the light metal industry.

Now, so far as our company is concerned, our objective is a little different from yours. Our objective could be called that "profit." It has to be. So we have insurance on that cryolite plant. We have use and occupancy insurance, so if there is a wreck in that plant or a

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political strike is called at that plant, we will have a continuation of the profit during that time. We have been forced to do that because we feel that it is a vulnerable target. At the same time, of course, we have reported to the Army and Navy Munitions Board all those facts so that they can decide whether it is important for them to take out their equivalent of use and occupancy insurance, not to protect profit, but to protect the product itself.

There are several ways to protect it. One is to have plenty of raw materials, to bring cryolite ore down from Greenland; another is to have protection at the plant by placing military guards at the plant; another would be just to tip off the security people to keep an eye on that plant; and a final one, which is probably the most logical, is to see how long it would take to rebuild that facility in case of a wreck.

We estimated three months. We estimated that with the worst wreck that could be caused there we could rebuild under high pressure in three months. The logical thing seems to be that the Munitions Board would acquire three months' supply of the finished output of that plant and put it in permanent containers in a permanent stock pile, so that if there is a wreck there at a time when mobilization is desired, it will have some finished product from that plant to constitute the raw materials for the light metal industry until the plant gets fixed again.

That is only one example. The other examples would be the other 15 or 20 key places. The Allis-Chalmers plant, we all know about in the late war. The Allis-Chalmers plant was under political strike at a time when it was the crucial plant in our then military expansion program. The Allis-Chalmers plant may not be the one now, but there are 15 or 20 plants which should be, it seems to us, carefully studied and appropriate amounts at the output of those plants should be stored to provide protection against wrecks or political strikes at those places.

I would welcome any discussion and be glad to tell further about our activities if anybody is interested.

MR. HENKEL: We are now ready for questions.

QUESTION: Does the fear of war in the near future affect the plans of industry in general for expansion, and, if not, what are the factors that affect your planning?

MR. DAVIES: In each one of these quarterly reports that comes from the Market Research Department, called "General Forecast," which is the basis for all our expansion forecasts, the possibility of a war economy or a depression economy are evaluated as best can be done. The possibility of a war economy for the last few months has been high in

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these reports. One reason for this, I think, is that the people, in our industry at least, who have been close to the atomic energy development from the beginning are convinced that the time of our monopoly is close to expiring and that the eastern German industry plus Russia will be able to start their production of atomic bombs in the middle or late 1948.

The reasoning behind our Market Research Department's estimates of business conditions is this: If that is so, even though high-placed people in the Military Establishment may not at the moment understand it to be so, when they do understand that industrial technical people who are close to it feel that way, they may feel not that we will be attacked within a year, but they may feel that more decisive stands are necessary, which may lead to a war economy. That is the thinking back of it.

GENERAL McKINLEY: I would like to ask about that supply of insecticides you had to meet the velvet caterpillar menace. Was that a stock of material that resulted from somebody's getting the booby prize on an estimate, or was it one of the reserves you normally hold? I ask that because I know you were trying to keep your inventories down.

MR. DAVIES: That particular one was planned that way, because this particular insecticide is one that is very seasonal. We say we have to have a large stock to take care of the ups and downs and emergencies. We say we have to keep inventories down, but we have to keep them down to the probable demand. The probable demand in this particular case is so up and down that we had to keep a stock there.

I think it may be interesting to give you this analogy of that product further. The product that used to be used on the cotton plant, calcium arsenate, to kill some of the bugs has now been put in disrepute because the bugs it killed used to kill the aphids. So you may wish to draw an analogy from the following.

We went to great efforts to kill off the bugs attacking the cotton plants, and as soon as we killed them off, we found that the aphids which had been kept under control by these other bugs were suddenly let loose. There was a rise in the number of aphids because there were no bugs to eat the aphids. So by the use of this insecticide we killed the bugs that ate the aphids. So now we have aphid trouble.

MR. HENKEL: I have one question, Mr. Davies. You mentioned your product insecticides particularly. You have a number of other products. Do you use the same approach in analyzing the other products?

MR. DAVIES: Yes, exactly. The difference is that with hydrogen fluoride, chlorine, caustic soda, anhydrous ammonia, and a whole series

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of industrial chemicals, the first part of the pattern is the one that applies most because there is a more steady operation. It is an operation where we sell the same amount month after month and year after year, and where our job is to do constructive things. Now in the insecticides, the thing that complicates it is that most of our problems are emergency problems. But the same pattern system is used for the emergency problems as for the others.

One thing about the insecticide industry which might be interesting, some companies have specific territories that they determine they will handle. Again you may draw an analogy if you wish. Some companies say "If there are insects in the State of Pennsylvania, that is our business--to combat the insects there, and whenever there is a demand for insecticides, whenever there is a sudden infestation of insects in Pennsylvania, we will quickly go to work and make some of the product and supply it." Now, other companies say, "Whatever there is an attack of insects anywhere in the country, it is our business. Our business is to combat insects anywhere in the country."

We don't, in our company, at least, wait until the insects have started to attack the plant before we manufacture the insecticide. We don't even content ourselves with drawing up a plan as to how we are going to construct a plant and ship to the distributor, who will then ship to the grower when the locusts begin to arrive or when the insects begin to eat the plant.

We say that if we are going to do our job as an insecticide industry, we will not only have to have the plans in advance, we will have to fix it so that there are enough insecticides somehow right at the field before the insects attack, because when the insect attacks, he destroys the plant unless there is an insecticide there.

We have found one of our biggest uses for DDT to be preventative. We use DDT to destroy mosquitoes in the lakes and in the pools before the mosquitoes have attacked anybody. In order to do that, we cannot content ourselves with making a plan--which I may say would be analogous to the mobilization plan before the Army and Navy Munitions Board--we are not content to make the plan. We have to actually build the plant, actually prepare the DDT, and actually use the DDT in order to avoid the spreading of the mosquito colonies into the area concerned.

QUESTION: Mr. Davies, do you find it is more difficult to estimate your future requirements on a product that goes directly to a consumer, that is, the general public, we will say, than it would be to estimate your requirements for a product used in the manufacturing process?

MR. DAVIES: It is more difficult. The reason in our case is that when we sell to the ultimate consumer, it goes through many more steps

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and the pipeline gets filled without our knowing it. It is more difficult to find out. One of the products we make is lye for household use in 13 ounce cans. We have been making that for many years and feel that we ought to know what the demand is going to be. But we supply the jobber, who supplies the wholesaler, who supplies the small corner stores all over the country. If we go to the jobber and ask him what the market is for the next month, his estimate won't do us much good. We have to go to him, then to the wholesaler, and finally to the retailer, and if we want to be accurate, we have to go to the individual consumer. One of the things we need to find out, in order to determine that, is what is the cost of soap compared with the cost of fat. If he is going to make his own soap rather than buying soap, that will determine his probable demands. When we sell to the ultimate consumer our estimates are likely to be further off than when we sell to a large industry.

QUESTION: I would like to have you describe for us a little more how you award the booby price to a sales division. In other words, you have to sell your product before you make a profit which you are looking for. Granted there may be times when it is more profitable not to sell any more than it would be to put the rest of your program out of balance, there was one time when we were accustomed to think of giving the sales department prizes for exceeding quotas rather than holding them in check. Obviously your company wouldn't tell the boys to come in off the road when they had 99.99 percent of their quota.

MR. DAVIES: The more ambitious salesman will always overestimate. The booby prize is awarded because a sales division said it could sell 100 units of a product during a month and sold 50 units. When he said he could sell 100 units, everybody turned hand springs to get those 100 units produced, and then he only sold 50 units. If he estimated he could sell 100 units and then tried to sell 200, that would be difficult in most products because if he estimated 100, that is all that would be made for him.

Now, one thing I should say is that these forecasts are corrected constantly. Every month there are corrections of the monthly, quarterly, semiannual and annual, and long-range forecasts, which is a lot of work for the sales managers and for the Market Research Department; but they do it. That is, the sales manager is supposed to sell as much as he can up to the capacity of the manufacturing department. The booby prize is awarded because the estimate was not corrected accurately.

QUESTION: Does your Market Research Department give an estimate of how many units your sales department can sell?

MR. DAVIES: No. The Market Research Department gives an estimate of the general trends and then of the total market available for this product. The responsibility for specifying what share of that market

we can sell goods to the sales manager concerned. He is responsible for delivering the goods. If he can sell 54 percent of the market and there are six other producers, he is pretty good. If he can only sell five percent of the market and there is only one other producer-- he would not seem to be so good.

QUESTION: In the method used to determine those estimates, for instance, in your Market Research group and your sales group, do they use a similar method that is based on correlating this with past experience, or what? Is the method similar?

MR. DAVIES: We do this: In the Market Research staff we correlate sales of an individual product, an individual group of products, with gross national income or with any other known figure which is forecast by the government agencies or by trade associations. Thus, we are likely to have a curve something like this (indicating on blackboard). Suppose that is gross national income. We then figure out a formula. The Market Research Department figures out the formula which will nearest make the actual sales of that product correspond with this, and it might be down. It happens in many cases that there is no change, up or down, except there is a lag of, say, six months. Now when gross national income goes down like that, let us say, then when we project, our sales are forecasted. This is done by the Market Research Department.

The report is presented to the sales manager and he has to take responsibility on the basis of that, and on the basis of knowing what he can do. If he hasn't any salesman that day or that month, then he can't expect to do so well. If he has good people, he can do more. He then specifies on that basis his proposal of what he can perform.

QUESTION: In other words, he modifies that by judgment as to his experience. That is where you get your judgment.

MR. DAVIES: That is right. The facts are presented by the Market Research Department to this man here who is going to distribute the stuff, who needs the material, and he takes the ultimate responsibility. So to follow the pattern I just described, the decision is made here, and although the vice president in charge of sales and this whole forecasting committee tries to tell him that his guess is away too high or isn't high enough, they still can only persuade, they can only urge him. He has to take final responsibility for that decision, and that is why we can give this booby prize if he is too far off. He is supposed to have all the facts at his disposal and then make the decision.

QUESTION: He doesn't project his own estimate; he doesn't draw his own graph?

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MR. DAVIES: The Market Research Department does all this, and then--suppose this is where we are now (indicating). The Market Research Department says, "If you extend the National Income curve this way, it will go like that." And they give him a lot of information which shows that it is liable, at this stage, to be either here or somewhere close to it. The Sales Manager then says, "I think it will be here, or here, or there," and he determines that himself.

Frequently what happens, is that a good sales manager is very optimistic and knows what he wants to do. He says, "I think I can sell a certain large amount." Then, the vice president in charge of sales or the forecasting committee says, "Look here, every time you estimate, you estimate high. Shouldn't you reduce this?" He still has to take the responsibility as to whether he does or doesn't reduce it. Perhaps this is analogous to the Military Establishment taking responsibility for saying what they need from industry.

QUESTION: The last statement you made brought up another question. In the war economy with a product such as cryolite that you were talking about before, which is used in another process, who is in the best position to award the requirements for cryolite, the military, the people who are going to use it as the final thing, or the people who are going to produce it in the first place?

MR. DAVIES: That is a very good point. Cryolite is a good example, too. If we leave out the war economy, let me describe how that works first. If there is not going to be a war economy, the Market Research Department is responsible for saying what is going to happen to the light metal industry; they are responsible for saying how much ingot will be produced; they are also responsible for determining whether there is going to be some change in technology which means twice as much or half as much cryolite would be required--an extremely difficult job.

Then they pass that information on to the sales manager and he takes the responsibility, based on his direct contact with the customers. It usually turns out pretty well.

Now, if there is a war economy, the light metal industry is going to double, let us say. The Market Research Department calculates what would happen to the cryolite requirement if it doubled, and it finds the requirement would be out of sight. There isn't enough cryolite to handle it, and so on.

That information is passed on, and when it goes to the forecasting committee, it develops that if we were to prepare for that, we would have to maintain a stock pile far beyond what is justified for

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business reasons. We therefore report to the government people concerned that we don't have enough to take care of a war economy and that we don't feel we should take the responsibility for stock piling for that contingency.

Also, in the case of cryolite, as well as in the case of many of these other chemicals, we have to bear in mind the interlocking use of these things. If natural cryolite is shut off, people say, "Why not use synthetic cryolite?" That would be all right, except for some facts that the Market Research Department presents. They say that if war started tomorrow, it would be impossible to make synthetic cryolite. Why? Because synthetic cryolite is made from hydrofluoric acid, which is also used in aviation gasoline. The aviation gasoline industry would immediately require all the hydrofluoric acid it could grab, if it could grab any--but the Atomic Energy Commission wouldn't let the aviation gasoline industry have it because it would probably requisition every facility for making hydrofluoric acid. So someone in the Government who is trying to plan requirements might think we are protected, on the basis that if cryolite is shut off, if Greenland is bombed, or if our one plant is destroyed, we can always set up a synthetic cryolite plant. But he has the other responsibility of going back two steps beyond synthetic cryolite and finding out that what they thought was there as a stand-by, isn't a stand-by at all.

QUESTION: Who is going to determine the requirements? I didn't quite get where you finally concluded it would be best to be determined.

MR. DAVIES: I would say that it has to be determined at the top of the defense establishment. That is, it has to be determined by the Munitions Board or the National Security Resources Board.

I am sure I speak for many of our friends in industry when I express the feeling that we, as a country, are not adequately handling this problem now, that the Munitions Board and the other Board as they have been able to operate so far are not as yet adequately handling the problems such as I have described. If we have plenty of time, if we have several years to do it, then it is all right. But if we had to mobilize right now, or next month, from conversations that I have had with Munitions Board people, I feel that we are just not equipped to do it. One of the first things that would have to be done and should be done is to analyze those bottlenecks, see where the bottlenecks are, and then stock pile to protect them.

MR. KNIGHT: You might tell them about the necessity of using natural cryolite for starting production of light metals.

MR. DAVIES: Yes, there is another point again that an individual procurement officer in the Government might not recognize, that is,

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for the starting up of an aluminum industry, or for the expansion of it, we have to use natural cryolite and not synthetic cryolite. Synthetic cryolite can be used for the continuation of production but not at the start. Now a thing, like that isn't in textbooks and is known only to those concerned with it, but things like that can be worked out by the Munitions Board with the help of the Industry Advisory Committees.

QUESTION: That is what I was trying to get you to bring out. I didn't want to labor the question any further, but the Munitions Board alone can't do that work. They haven't the staff to do it.

MR. DAVIES: The question is who takes the initiative. I know the advisory committee cannot take the initiative. As a matter of fact, I don't think the Chemical Advisory Committee has met since the war. I think there is a plan for this. Is there a representative of the Munitions Board here?

RESPONSE: Colonel Holmes is here.

MR. DAVIES: I am sure Colonel Holmes can explain this in much greater detail.

COLONEL HOLMES: I didn't come for that. I have been keeping my ears open and listening. This has been very interesting and instructive.

Do you have any particular question you wish to ask?

MR. DAVIES: I think the Munitions Board is doing a wonderful job with the amount of staff that it has; but to be very specific, it would seem to me that there are many of these problems that could be expedited, which perhaps should be expedited, if only there were an adequate staff, if there were only enough people in the Munitions Board to do it.

COLONEL HOLMES: You are absolutely correct.

MR. DAVIES: I can't conceive of how the few people, outstanding in their fields as they are, in the Munitions Board could really make the study of the 15 principal bottlenecks. There just aren't enough hours in the day. Perhaps the Colonel would correct me on this matter of whether there is a really full-scale, adequate study being made to find out what are the greatest targets as of today, the greatest industrial targets.

COLONEL HOLMES: Well, yes, sir, indirectly. These commodity studies on all raw materials are being made by means of interagency committees, composed of representatives of the Army, Navy, and Air Force, together with other government departments interested in specific

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problems, such as Commerce, Agriculture, State, and so on. But, of course, all these departments are short of personnel and there is a limit to the amount of work we can get done. We started out on magnesium and the study is not completed as yet. So to date, we have done very little. We will start work as soon as possible on aluminum and on chemicals.

MR. DAVIES: Am I correct in saying that we still haven't had a meeting of the Advisory Committee on Chemicals?

COLONEL HOLMES: There was one meeting of the Chemical Industry Advisory Committee. They decided that they didn't want to get into it any further until we had obtained a letter from the Attorney General on the subject of the Antitrust Law. That letter has now been obtained and has been forwarded to the committee. We hope to get actively going soon. They withdraw from any further participation until that had been obtained.

MR. DAVIES: I think it would be obvious to each of you if you saw the first letter from the Attorney General why members of the Advisory Committee decided to wait until they got a second letter. The way the first one was written it meant that any time a member came down to an industry advisory committee meeting, he was liable to get home and have an indictment waiting for him.

In answer to the Colonel, it seems to me it might be useful to have some civilian studies made under proper security--if you can't get the staff immediately--to go into the general problem of the United States economy, assuming the position of a potential enemy of the United States and saying, "What shall we wreck? If we can wreck only 15 places, which ones shall we wreck?"

Now a committee of a dozen industrial people could with the help and guidance of some of your people, I think, get an answer pretty soon on that. Certainly, we know that if there is any country that has unfriendly intentions toward the United States, that is one of the things they have already. They know where these places are. We don't want the next time to have a situation where a plant is wrecked and two days later the Under Secretary's Office calls up and says, "What is the plant's position in the economy?"

QUESTION: I am interested in one thing with respect to this discussion of the Munitions Board. Is it the feeling of industry that the Munitions Board, that is, the military, should decide on these requirements although possibly there are a lot of civilian requirements that would be in the same war economy?

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MR. DAVIES: I see what you mean. That is, you want to know if we mean only military requirements?

QUESTION: That is what I am getting at.

MR. DAVIES: Military requirements, I believe our friends in industry all feel, should be specified by the Military Establishments in advance, not in just some general way. If we are going to be attacked sometime in the future, we must mobilize, and organize, and plan. But specifically if we should be attacked or if there is a showdown next year, industry ought to know what you will need. Our chemical industry ought to know, if there is a showdown next spring, what you are going to want. We don't know; we haven't any idea what you are going to want. I know our friends in other industries don't know. On the chemical side, we don't know. What we would like is for the Military Establishment to say, "If there is a showdown next year"--which we hope to Heaven there won't be--"this is what we want." If, on the other hand it is going to be five years from now, they should say, "It is all hazy, but in general this is our thinking of what we would require." The biggest gap, it seems to me--and it seems to many of our friends in industry--is that if there should be a showdown soon, industry is completely unprepared. We are counting on the military to let us know what will be required, and the military has not yet done so.

Our friends in industry are very anxious to cooperate with all of you, Colonel Holmes' organization and anybody else, in working this out, but so far there hasn't been that invitation.

MR. HENKEL: I am sure we could go on and on, but the time is growing short. Mr. Davies, I thank you on behalf of the College for a very interesting, valuable, and instructive lecture.

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