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ARMY INDUSTRIAL COLLEGE.  
Washington, D. C.

"PRODUCTION CONTROL"

Lecture

by

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289

INTRODUCTORY REMARKS - COLONEL IRVING J. GARR, S. C.

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Gentlemen:

This morning Colonel Swann is to talk to us on a subject that we are very much interested in, and that subject is "Production Planning" and "Progress Reports".

This is an intangible problem the solution of which we must get from business men who, from their own experiences, have adopted practicable systems of planning and checking production in their own establishments. Branch and District Chiefs must have this information. Reports on progress of production are essential throughout our chain of procurement agencies, each adapted to the particular needs of the agency concerned.

Colonel Swann is President of the Federal Phosphorus Company and the Federal Abrasive Company, besides two power companies. He has followed our course for the past two weeks and has been of great assistance to us and to the Planning Branch, Office of the Assistant Secretary of War, in giving advice on the subject in question.

I take great pleasure in introducing Colonel Theodore Swann.

270

"PRODUCTION CONTROL".

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Gentlemen:

In planning production for next year the Sales Department of our company always prepares a plan of what they expect to sell, who they expect to sell to and in what quantity; they compare that with the quantity consumed by each particular concern during the previous years. In our own case we started in business in 1921; the '21 records were not very good but from 1922 on there was a good comparison. I keep a Data book that shows each large company we deal with, the exact quantity they use by months, years as well as quarters.

To give you a tangible example of the benefit and value of proper planning ahead I would like to say to you that I sympathize with you gentlemen; you are working on the intangible, something you cannot see - on plans you feel will not be executed in your own life time, whereas in business we see that which is planned take place and the mistakes which are thereby made corrected accordingly.

We shipped ninety-three and one-half (93½%) percent of our capacity last year. Business was increased about eleven (11%) percent over that of the previous year. It could be seen that another furnace might be considered necessary to care for our work. The organization as a whole thought so, although I

211

was a little skeptical. We went over all our records and finally figured out that fifteen of our largest customers took ninety-five (95%) percent of our products. We analyzed the individual conditions of those customers as we knew it to actually exist. We found the increase that would take place and assuming that it would be business that would be unprofitable we decided we could afford to buy in the open market to meet the increased demand, paying considerable above cost if necessary. Consequently we decided not to install the new furnace. It so happened that business did fall off, but we were still running at capacity. Some of our competitors who had expanded were running below capacity. Without a budget system, proper planning and analysis we would have made an investment of \$250,000 for that new furnace.

The work of the budget is carried on by the Sales Department. It is passed around to all department heads and everyone takes a shot at it. The Treasurer particularly gives very careful attention to his records. After we decide that that is the budget we are going to adopt, a list of raw materials is made up to cover the year's operations. We tabulate where these materials can be purchased, where we are now purchasing them, the prices we are now paying, and so on. When you throw a whole year's supplies together it becomes a substantial sum. As compared to the Government's expenditures it may seem small but while our business is only about \$4,000,000 a year we have

31--

to make money out of that. We take the entire list of materials and can intelligently go about planning the year's operations.

It is all right to plan to make your sales budget, your operating budget, but the next question is - how near are you going to come to the budget. We have a weekly comparative report of operations and budget and in there is kept the furnace number, the days run, the percent delays to date, and other vital data pertaining to operations. For example when you keep an electrical furnace constantly running it means loss of operation. We expected to produce acid at 2,342,000 pounds a month, we actually produced 2,471,000 pounds; we expected to use power at 7,872,000 K.W., we used 3,772,000 K.W. That very readily accounts for why we made an improvement. We made lower percentage of lost time, therefore we used more power and it naturally follows there was more production.

Under finished materials of production to meet rate and budget the same data is furnished, also the stocks on hand. We build up stocks to the extent thought desirable. With a record of that sort any management can know absolutely what they are doing. We keep our record on a printed form. There is a man in our Operating Department appointed to follow that record all the time. I do not look at the report daily but he keeps it up. I do not believe that it is always necessary or desirable to have daily records - they only mean work for some one - but there are some reports you do want daily.

3/5

That is just such a control as you are talking about having for the Chiefs of the different supply branches. If he had one of these sheets he would know just what was going on - if you had decided on your budget. If your budget shows M plus 12 and you do not expect to get into production until after four months you could tell just how far you were advancing. I can tell what our rate of production is as compared to the budget chart on transportation, power, recovery, etc.; if they are all right I do not bother, if not all right I commence figuring to ascertain the reason.

In peace time some younger officer will be sent in to Washington and will be detailed to follow your records. Therefore you must have them built up so that if everything is not all right he will be able to find the cause in a short time.

Personally, I am more vitally interested in shipments than in anything else. I have to do with the sales, consequently the delivery thereof. People used to wire "Has such-and-such a car been shipped?", and we would have to institute all sorts of tracers to follow the car. In order that I can answer these questions immediately we now have a daily shipping report that carries a record of the shipments made to date as well as the corresponding date last month. I glance at it and if we are running up to shipments of last month, everything is all right. It carries the car number, the customer shipped to and the galue and gross number of pints that we send out.

214

At the Birmingham office we are about sixty-five miles from the plant. I have been to the plant about three times in the last five months. The control is so well worked out that it is a waste of time to visit that plant personally. The shipping report that I spoke of gives us the control desired.

In a major unit there is not much attention paid to the production of days and weeks so we have a monthly budget. A comparison is turned out of the budget and actual operations for the month, the actual increase and decrease, for the month of March our grand total showed a slight increase amounting to about five (5%) percent. That is followed through by the first quarter budget. When the end of the first six months is over we will make the first one-half comparison; then the year's is followed through in the same manner. By such a control as that a man can within a few hours handle four operating companies and does not need to spend more than two hours a day looking over the management of all of them.

When I return to Birmingham I am going to call on Colonel Stoll and try to sell the idea to he and other representative business men to accept your tentative orders. I can talk to them in a different way than I could before; I can tell them how the planning is being carried on. On last Wednesday I thought there were several things we could suggest; we foolishly suggested one or two of them - I noticed Major Hanley smile. Out of all the things we suggested (the other reserve officers of the class and

29

myself) we have found that there was not a solitary thing we could think about that had not been taken care of previously or at least was being planned for. You have been doing the intangible but you have been carrying it on along logical, business lines. If I could leave but one thought with you I would be satisfied with my trip up here. That thought is that this work will pay the Government, will be a great protection against war, and is being carried on every day in every successful business. What I am going to say to those people in Alabama is that this is a good business insurance. Out of all this work I see a development coming of the so-called strategic war materials. You are going to start people thinking along those lines and substitutes will be developed far better than the originals.

Our operative budgets are consolidated into an Annual Operating Budget. Every bill of raw materials we expect to use, freights, labor, etc., is consolidated. To follow this through is an interesting thing. We not only budget raw materials, labor, required freight, etc., but we also budget what the balance sheet is going to be - the business side. You do not have to worry quite so much about that in the Government. We make up a balance sheet, we have ours now for December 31st. Each department makes its own estimates; the Treasurer used to do all this but that was wrong. The user should always estimate for himself; we go over the estimation and if we find anything wrong we ask about the item in question.

We have curves similar to those you are proposing to use showing when we expected to receive a certain commodity and the

3/10

date upon which it was actually received.

Another item we have to take care of, when necessity causes us to do so, is shipping in tank cars. We are the only concern shipping phosphoric acid in tank cars. These cars have to be specially prepared; you can not rent tank cars because the acid destroys the cars in about two years time. You do not want any more cars on hand than is necessary. We have a big chart on the wall in the shipping department giving the location of every tank car, twenty-four in number. The car is "pegged" for its trip; we keep moving the peg showing the actual location of the car. I used to have to guess on exact location of the cars sometimes but with this record I can now check easily. If the car is on the move, we have a postal card system in operation - a card, which we have previously addressed to ourselves, being mailed in every day showing the location, time of arrival and departure of the car from a certain point. We are consequently able to trace those cars with a minimum of effort.

We now come to the question of raw materials and where to get them. During the war I was making ferro manganese. We found this unprofitable later. When you go to balancing shipping against high cost of domestic ores you may find that the cost of manufacture is too high. However if necessity comes and shipping is cut off, I am confident that this country can be self-contained in ferro manganese - at a cost, of course.

We had our business gone over by the best metallurgists there were to see what could be done with it. Have you ever

217

wondered why all the brass mills are located in Connecticut; why all the cotton mills in New England? True enough the cotton mills are now being moved South. We would take a map and write on it the location of ferro tungsten or other ores located during this investigation; another map covered the principal points of manufacture, the principal consuming points, etc. We could look at those maps and tell where we ought to draw or ship materials. I never read twenty-three of the reports which were made. I came to one marked "Ferro Phosphorus". That brought the question of phosphoric acid and what it was to my mind. I did not know what that product was used for. I found that Florida was the greatest producing State, Tennessee next. That was before the western deposits were known. Alabama was substantially midway between Tennessee and Florida; we had coke and had electrical power, so I decided that phosphoric acid was something that belonged in our section. We started the plant in 1921; today we are producing over fifty percent of all the phosphoric acid produced in the United States.

How can a little business of a concern the size this one originally was develop to a point where it can take care of over fifty (50%) percent of the total requirements of an item? It is so economically sound with relation to the location of raw materials, its markets, and other vital elements that its cost is less than any other concern's. Sixty-two (62%) percent of the output was sold to our competitors cheaper than they could make it themselves. You cannot stop a business located on that basis.

31

There is only one plant producing white phosphorus on the Canadian border; assuming that Canada would be an Ally in case of an emergency, is that any reason for the Government to haul from Florida or by rail from Tennessee during times of peace. Government plants should be located on the same basis, fundamental facts that industry locates its plants. In war time requirements will be forty-five to seventy-five percent times the present figure.

In a few years from now when you have finished this peace planning study, you will have rendered a great aid to industry by carrying out your ideas. The business men who come here and see the character of study you are following are getting ideas in their heads as to whether the same methods could be applied to their own businesses.

In December 1924, I told our Sales Manager we would not take any more new customers; we would quote high enough prices to keep them away. We then started looking for something else to do.

We found that aluminous abrasives could be made. We had coke, cast iron, etc. I wondered why they were shipped in to Niagara Falls, on account of the excessive freight rates. In fact there is no more excuse for the abrasive industry at Niagara Falls than for us to sell refrigerating machines to the Eskimos. Aluminous abrasive plants in Alabama are economically located and are making money.

311

We then looked for something else to start on. By the same method of planning, calcium carbide was located. That is made out of coke and limes fused together in a electrical furnace. This industry was formerly located at Sious St. Marie. With the prevailing high freight rates there was a good profit in it for us.

You get the point in all this - Locate your industry correctly; nature will take care of the rest. You take a business fairly well established, correctly located, and it will succeed beyond that of a business extremely well managed but incorrectly located. We are spending one hundred thousand dollars a year to find out what belongs in Alabama, or should be moved there. When we get a little money available we will start something else. If that applies in business it will also apply in your work. We are doing just as much planning as you are doing; if industry finds that it pays to take its own money and spend it, it would pay the United States to spend its money also.

The State of Alabama is doing a piece of work I would like to tell you about. I was the State Chairman of Alabama for the Southern Exposition, and I realized to what extent people were ignorant of the resources of Alabama. I believe that were Horace Greeley alive today he would say, "Young man go South to Alabama". That is based on the natural resources of the State. The Governor called a convention of business men together and said he wanted an inventory of the resources of the State of Alabama. He appointed a commission of seven, the Alabama Industrial Development Commission.

300

Gentlemen, those members are serving without pay - are not even getting their expenses. That will eliminate politicians applying for the positions. They will have a small fund, \$50,000, to employ technical men who are going to make an inventory of every natural resource in the State of Alabama, what is consumed within the State, what should be made from the raw materials within the State, and what shipped out. They are going to publish those in pamphlets on each material, dealing only in facts. With a survey of that kind, conducted along general lines, the State of Alabama is going to bring new industry down South and will bring along with it an increase in taxes which will far outweigh the amount of money necessary to be spent at the particular moment.

If you gentlemen on this work could only get a vision into the future as to the value of your work to industry and, therefore, to the United States as a whole, you would feel you are doing something that was going to pay even in peace time.

I do not think there is another Reserve Officer who has had more experience than I have had in planning or who is making it pay better, and I see possibilities in this work that you are doing that are very great--some few developments that are going to come which will pay the whole cost of the work, to say nothing of the Industrial Preparedness value.

Stop and think what that is going to lead to.

201

OPEN DISCUSSION.

QUESTION

In your progress reports how much dependence does the head of any industry really put on the subordinates in requiring normal progress reports to come to them? How much does the big executive want to see of the routine work the small executives are doing?

ANSWER

Absolutely nothing, if it is going all right, if not going right, every single detail must be brought to his attention. I do not even set our sales - the Department head has absolute authority and corresponding responsibility. When I appropriated \$100,000 for research, and was approached by the director regarding some question of personnel, I told him I was uninterested in any phase of the matter except the results produced, and would judge only by same. The men in my company have more freedom than in most any other company. If the executive fails to put the responsibility on the other man, then he has failed in his job of running the company.

QUESTION

I would like to have you explain just one point. You say the high executive does not want to know if everything is going right. Therefore, does the higher executive not have to determine a system of reports which will be so used, that are so

designed as to require the lower executives to submit reports that can be traced through, if necessary.

ANSWER

A report should cover all operating details. If our organization the system is so constructed that each responsibility from the chief clerk up is so outlined that when anything goes wrong and I ask for the trouble it can be traced directly to the start. Without such a check your system is no good. The value of that, gentlemen, is the size of your company.