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WHAT IS
PRODUCTION
AND WHY?

HOWARD

MODERN FARMERSHIP AND
PRODUCTION METHODS

KANSAS STATE EXTENSION UNIVERSITY

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The way to wealth depends chiefly on industry and frugality.—FRANKLIN

La Salle Extension University

4046 Michigan Avenue

Dept of Modern Foremanship

Chicago, Ill.

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LASALLE EXTENSION UNIVERSITY

MICHIGAN AVENUE AT FORTY-FIRST STREET • CHICAGO

DEPARTMENT OF
MODERN FOREMANSHIP
HUGO DIEMER, DIRECTOR

To the Members of
Modern Foremanship and
Production Methods Groups:

This manual on "What Is Production and Why?" takes up another of the factors which interfere with production—a discontented mind.

You know how the mental attitude of a worker affects his production. Every production man has met workers who are top-notch men one day and far below standard another. Worry over financial or domestic problems, late hours or other outside influences, discord between the worker and his foreman or associates, or wrong thinking on industrial subjects, will have their effect upon the production of the man, both as to quantity and quality.

In the manual on "The Working Force," you remember, we took up the normal instincts and desires to which you may appeal to get the co-operation of the men. Under ordinary conditions, from the analysis which you made of your working force, you could expect a natural reaction from any specific appeal to a desire or instinct, according to the strength of that desire or instinct in the individual. But every production man knows that when the mental attitude is not right, the appeals do not have the effects they should.

Another factor that influences the mental attitude is the working surroundings and conditions. How these affect the men and production was taken up in the manual on a "Good Place to Work."

There are, however, still other factors, in addition to working conditions, which interfere with the normal action and reaction of desires and instincts. One of the most common is the discontented mind, which is troubled by wrong ideas or misunderstandings of the importance and necessity of work and its relation to the worker.

Production executives have an important problem to combat in these misunderstandings of workers. By setting them right, the executive puts them in a frame of mind where the normal instincts and desires which ordinarily influence actions, are constructive rather than destructive. Many of these wrong impressions which prevent men from doing their best, are explained in this manual.

The practical problem with this manual affords you an excellent opportunity to give constructive thought towards diverting the minds of some of your "wrong thinkers" into the right channels.

Very truly yours,

Hugo Diemer
Director

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LaSalle Extension University

DEPARTMENT OF MODERN FOREMANSHIP

HUGO DIEMER, *Director*

CHICAGO

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Always fill this in so that we can identify you, handle your problem promptly,
and give you credit for your work

PRACTICAL INDUSTRIAL ECONOMICS—PROBLEM NO. 12

Take a look over your working force and pick out those who are most interested in their work and most ambitious to succeed. Do these men cause you any trouble unless it happens that you have nothing for them to do? Probably not. The difficulties come from others.

No doubt when picking out this group of good workers, you noticed one characteristic common to most of them—they were savers. Didn't several own their homes and most of the rest have savings accounts?

Generally, men with homes or with savings accounts are ambitious, are striving to get ahead, and have a clear, sane view of their work, its necessity, and its relation to the rest of the industry.

Obviously, then, if we can get our workers to save and invest money, we are building up a class of men whose thoughts are not distracted from their work, men who look on work and its principles with the right attitude. The accompanying problem gives you an opportunity to try out your ability along this line.

Suppose you decide that the best way to get a contented working force is to organize and promote a thrift campaign. In this, a definite amount is to be deposited each pay in a savings bank to the credit of the worker. The company is to give a bonus at the end of the year to all those who deposit in this account regularly and consistently. In this plan you will meet some objections which you must answer. A few of these are given on the next page.

First, tell just how you would meet each of the following objections if they should be raised by one of the workers, when you talked over the plan. Give the arguments you would use in detail.

(a) "I get only 3 per cent, when the bank lends it out at 6 per cent."

(Remember that he deposits his savings in small amounts of a few dollars a week, while the bank accumulates the savings of depositors and puts them in loans of the size which the borrowers demand.)

(b) What would you say to another man who said, "My wife and I spend all that I make. I do not know where it goes, but it gets away somewhere."

(Do not stop with simply telling him that he is doing wrong, but give him suggestions on how to spend his money and the amounts he should spend for food, clothing, rent, etc. In other words, make out a budget for this man.)

(c) Suppose he says: "Oh, a dollar or two a week is only fifty or a hundred a year. Why should I bother with it?"

WHAT IS PRODUCTION AND WHY?

THE TWELFTH WORK MANUAL

MODERN FOREMANSHIP AND PRODUCTION METHODS

The Tested Experience of Practical Production Men

Assembled, Organized, and Edited by

HUGO DIEMER, MEYER BLOOMFIELD, DANIEL BLOOMFIELD,
AND E. F. DAHM

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There are two kinds of discontent—healthy and unhealthy. Healthy discontent spurs us on, makes us dissatisfied with any but the best workmanship, and causes us to put aside earnings to protect ourselves and our families against old age. This healthy discontent—ambition, we often call it—sets a goal, and we are not satisfied until we reach it.

Unhealthy discontent, however, gives us a “grouch,” makes us dissatisfied with what we do and with our relations to industry. It holds us back instead of urging us on to accomplish more.

One of the important causes of this discontent is wrong thinking or misunderstanding of the laws of work. Some of these laws of work are taken up in this manual on “What Is Production and Why?” Their explanation will assist in correcting misunderstandings and wrong thinking, which interfere with a man’s giving his best.

THE MODERN FOREMANSHIP COUNCIL

There are production managers, practicing foremen, executive officers, labor managers, and educators on this Foremanship and Production Methods Council.

Tho from different walks of life, they have one strong tie binding them together—that is, their experience with and interest in the work of modern foremen and production.

The Council reviews the course and lessons and serves in an advisory capacity. It brings to bear on the planning, organization, presentation, and service of the Modern Foremanship and Production Methods Course the judgment of many experts in practically every line of industry. You profit by their tested experience exactly as you do by your own.

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William Bethke, Educational Director, LaSalle Extension University.

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3. Leadership
4. The Foreman and Training
5. The Foreman and Job Analysis
6. The Flow of Work
7. A Good Place to Work
8. Getting the Work Out
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WHAT IS PRODUCTION AND WHY?

This manual takes up many of the facts production men are called upon to explain every day which show the relation of work and workers to their job, to the rest of the shop, and even to the place they take in the whole industrial system.

All executives are confronted, some more than others, with questions or situations which must be dealt with wisely. These questions have to do with production only indirectly.

But they affect production directly, and sometimes disastrously, if they are dealt with unwisely. The questions we refer to are described in the word, which we may not clearly understand, "Economics." Yet the big word covers for the most part simple, everyday ideas, so far as the average executive is concerned. But they are simple only to the man who makes it his business to understand them as they come up, and they keep coming up every day, whether he understands them or not.

These ideas have to do with questions under-

lying production, and they are bothering a good many people. Much agitation and trouble, to say nothing of oceans of discussion, all center on the notions, right or wrong, which men have regarding what production is, the reasons for production, and the justification for a given industrial program. However, when these reasons for production are properly explained so that men can understand their necessity and their use, they set men's minds at rest.

Overcoming Misunderstandings

"If we could all get together," many an employer has said, "and come to an understanding about our common interests and problems, if we could once and for all grasp just what it is that makes an industry go up or down or out, we could settle nearly all the questions that have been bothering us and upsetting our relations in the plant."

There will always be differences of opinion, however; such is human nature. Our law courts or boards of arbitration take care of these. Life is a game of adjustment, giving and taking, and trying to square our wants with the wants of others, our rights with the rights of others.

Healthy and Unhealthy Discontent

We must remember, however, that discontent is not always harmful. It often serves as the spur which urges some men onward. This healthy type of discontent is generally called ambition, pride in work, a desire to possess, or some other normal desire which makes men willing to make the extra effort necessary to get ahead. Because of these, the foreman has risen from the bench, the workman has bought his home, the employer has come up from the ranks of the laborers. These desires can be furthered, as they are the factors which cause progress. With them come hard work, co-operation with others, and thrift—the price of success. Men of this type do not ask why they work. They have a purpose, a goal ahead of them.

The unhealthy type of discontent acts differently. It pulls men backward instead of advancing them. It is discontent, but differs in that it did not have a purpose. Many men are given over to unhealthy discontent because they do not know.

It is this unhealthy discontent that has been interrupting work with disturbances of various kinds. Because of the production ex-

ecutive's close contact with the men in the ranks, he has a wonderful opportunity to change their attitude from unhealthy to healthy discontent.

When discontent flows thru constructive channels, much good can be accomplished. When it takes the form of obstruction, violence, hatred, and ill will, only mischief can result.

Who Are the Producers?

Some men feel that because they use muscle and work with their hands that they are the only true producers. But is it necessary to touch the plow to help the farmer produce his wheat? Do not the men who make the plow, those who handle the train which carries it to the farmer and carries away the grain, those who sell him the plow, those who make and erect the fence which protects his field, those who provide his shoes, as well as many others, assist, perhaps unknowingly, in the production of the wheat?

Doesn't almost everyone for that matter produce? Of course there are nonproducers? A few are idle, and some are thieves. There are those who destroy property, and those engaged in what we know as dishonest means of obtaining what they want. Our laws and

their enforcement protect us from this class of people, which is small in number.

What Is Production?

The great mass of our associates assist in the performance of a helpful service for others. To do this, broadly, is producing. Production may consist of a service either of convenience or necessity which can be used in the performance of a service for ourselves or for others. The dictionary defines production as the act of producing (which is work) by the application of intellect or labor. From this we see that the man whose mental effort is applied to the job is as much a producer as one who uses muscle.

The act of producing (or work) takes many forms to-day, some of which are closely related to actual production. These we call direct producers or direct labor. Others not so closely related we refer to as indirect producers or indirect labor. In the manual on "Cost Control in the Shop" we define our shop distinction between indirect and direct labor on work in the shop. Practically no one will dispute that the workers classed as direct labor, those on the machines or at the bench, are producers.

Some Are Indirect Producers

But what about the many other men, including the foremen and other production men, who are classed as "indirect" labor, or whose salaries are included in the overhead expenses? These men contribute toward the production with their intellect, and in many cases even with muscle, altho they may not be able to claim that they make any individual part of the finished product. Each, however, has definite work to do which has its part or place in the production of the whole.

But production is not limited to those in the plant. The doctor who makes us well, the lawyer who tells us how to keep out of trouble, the investor who provides funds for investment, the policeman who protects us and our homes, those who write books or magazines for our instruction or entertainment, and many others are also producers or workers. That is, repeating our interpretation of a producer, they perform an intellectual or labor service of necessity or convenience for themselves or for others.

"Why Do We Have to Work?"

But, we might ask, why do we have to per-

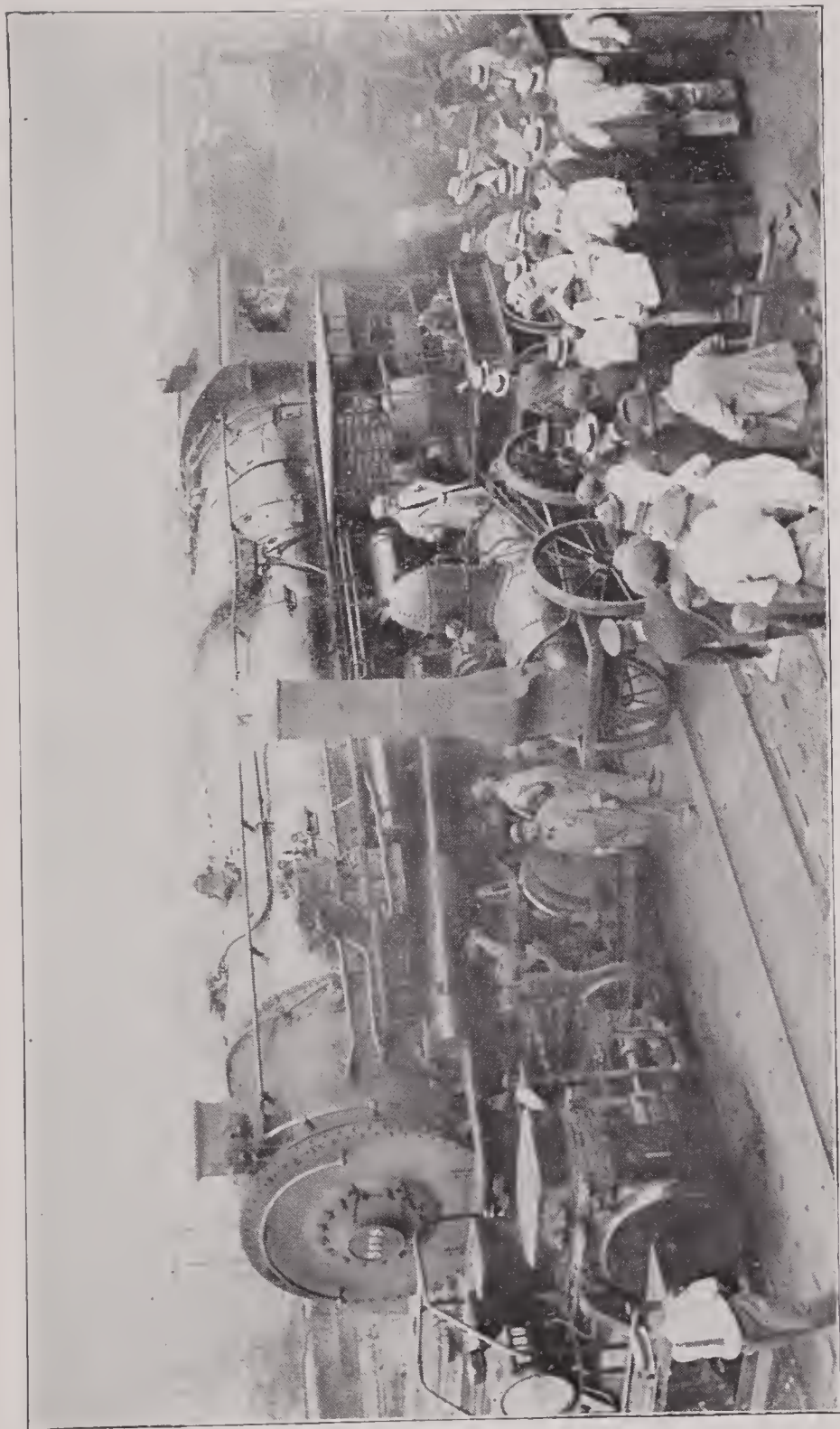


Fig. 1.—This photograph of 90 years' development of steam transportation from the first locomotive to the present-day Mallett compound engine, illustrate the tremendous value that headwork and the utilization of the experience of others play in industry. Every engine built from 1831 to the present time has begun where the preceding inventor has left off and has benefited from the experience of each previous effort. Also, with handwork alone no engine would have been better than the first; for that matter, the first would not even have been invented. It is only thru headwork that we progress; doing things as they have always been done does not lead to improvement.



form these services—to produce, or as most men put it, “Why do we have to work?” A brief answer to this is that if we want anything we have to work for it. The savage, with wild fruits and game in abundance, must get them—must work—if he is to use them. But in this he does so little work that he does not get ahead very far.

Work—the basis of our development—has some basic principles which will guide us in our efforts toward progress or advancement. These basic principles of industry, commonly called in textbooks “industrial economics,” are simply truths or facts that underlie all industry. When we forget these truths or principles, we get into a false way of thinking which interferes with production and progress.

There are many points concerning these basic principles about which there is a difference of opinion, but reasonable men on the whole are agreed that some propositions may be accepted as laws of industry or of work. To break them or to disregard them is to invite failure.

Every man connected with industry will find it helpful to know and to understand these principles. Men connected with production,

in particular, find opportunities to apply them to their everyday shop experience, and to put straight those men who labor under a misunderstanding of the principles, so that they will be producers all the time, instead of only part of the time.

To get at these fundamental or basic principles of industry we must go back to the beginning of industry; just as in studying our job we found it necessary to go back to the beginning.

Work Existed in Primitive Days

Primitive man had no seven o'clock whistle, neither did he have a weekly pay envelope. He had to get out and hustle for his daily wants, for the game which supplied him with meat and clothing, and for the wild vegetables and fruits which nature provided for the picking. But the supply was not regular, and he had to work for what he got. Hunting and fishing are work when we have to do it to live.

History teaches us that man moved from the stage of the caveman's existence when he learned to lay something by for the morrow. When men went out with clubs and sticks to get their food, they would, if luck was good,

have a great feast. Sometimes famine came before the feast got started because private property was not recognized nor respected. Force was the only law. When force governs, nobody cares to store up, not knowing when the strength of an opponent will snatch away all that he has laid by.

Men saw in time that such an existence was not worth while, so they organized to protect their possessions. With safety came foresight and enterprise. Men not only stored up what they made or grew, but they found a way to get some of the things they needed by making or growing a surplus in excess of their own needs and by trading this with others who were likewise making or producing a surplus of other products. Therefore, one family or group devoted its efforts toward raising wool and spinning and weaving it into cloth which they traded to the hunter for meat or to the fisherman for fish. Each was beginning to do the kind of work he liked best and could do best. This was the beginning of trade and production.

The Beginning of Business

Gradually the people became more specialized in their work; one family raised the wool, an-

other carded and spun the thread, and still a third wove it into cloth. Their production was practically all surplus, as only the weavers could use any portion of their product for themselves. This growth of specialization in production and in exchange—the beginning of business—is known as the “domestic system.”

The fisherman had no use for wool or thread, nor could he use more than a small amount of cloth, so he had but little direct exchange. Similarly, much of the work that we do would, alone, be of no value to us. To complete these exchanges and see that each obtained what he needed for what he produced, trading agencies or corporations—the forerunners of modern sales organizations—were organized. These would take the wool, thread, or cloth and give food and other necessities for them.

Limitations of the “Domestic System”

The period from shortly before the discovery of America to about 1750 was given over to rapid growth of the domestic system. In this period the production per individual was small, as it was restricted to what each individual could produce by hand or by the aid of crude, foot-driven equipment.

During the period of the growth of the domestic system the organization of the exchange or bartering groups became strong. This was the forerunner of our system of sales organizations. In the meanwhile the workers were producing all they could by hand. Cloth was expensive, even tho labor was cheap, because it took a large amount of work to produce cloth. The people could not afford to pay much for cloth, because they did not have the money to pay or its equivalent to trade for it. This shows how the ability to pay—the amount of money people have—affects the price things can be sold for. When prices get too high, the people do not buy, they use what they have longer and more carefully.

The Beginning of Modern Industry

But great industrial changes were taking place in Europe about 1750. Men began to invent machinery to do the work formerly done by hand. As cloth was a necessity which required long, tedious hours to make, it was but natural that the first inventions were in connection with the spinning of thread and the weaving of cloth. Thus we have Hargreave's "spinning jenny," invented in 1764.

This was quickly followed by improvements

and additional inventions, until in a short time the entire process of making cloth was done by machinery. These first machines were operated by water power, and so were located on streams at waterfalls. The invention of the steam engine by John Watts in 1782 made it possible to operate these machines anywhere.

Many other inventions followed rapidly, which changed the system of producing from what we called the domestic system, where each home was the workshop, to the modern industrial or factory system. These machines were too large and expensive to put in the home. They must also be located where either steam or water power could be procured which could drive several machines practically as easily as one. Thus several machines were grouped in one building, which was the beginning of the factory.

What Modern Industry Brought

The growth of the factory system did not progress smoothly, however. Some men did not think straight on these industrial subjects which were brought up in connection with the new conditions. Altho those arguments brought up over a hundred years ago have

proved themselves false, similar arguments are still met by the modern production executive.

The principal thought in a worker's mind, then as now, whenever any change in the method of doing work is suggested, is, "How is this new thing going to affect me and my job?"

The weavers saw one man producing more in a day with a machine than they had been able to do in several days. They saw cloth getting cheaper until they could not afford to make it in the old way and compete with the machine-made cloth.

Someone told them that just a few men with machinery could produce all that could be used, and that skilled artisans would have nothing to do. They were told that there would be an overproduction and no one would buy the surplus. This condition of affairs caused riots, and many mills and machines were destroyed. But they were rebuilt and in increased numbers. Why? Because the men who thought this did not think far enough.

The Result of Increased Demands

They did not stop to think that if more cloth

were produced at a lower price more cloth would be used. Soon, instead of being a luxury to the rich, cloth became a necessity to the poor. More and more cloth was required, which called for increased numbers of machines and more men to operate them.

Soon the men who had slaved long hours to produce a small amount of cloth had become machine operators and were producing yards of cloth daily, and they were receiving more for their work than ever before.

If these men had thought far enough ahead, they would have seen that the result would have been just what it turned out to be because of the industrial law that as the things men want become easier to get and less expensive, men demand more of them, until what has been a luxury becomes a commonplace necessity. For example, two hundred years ago watches and clocks could be obtained only by kings and the very wealthy. Now they are necessities to all and within the reach of all.

We have seen how this industrial law worked out with cloth and watches. It was just as true with the change from the traveling shoemaker to the modern shoe factory. Automobiles, electricity, telephones, and many other

indispensables are some of the industrial growths and developments due to this industrial principle.

Increased Demand Requires More Work to Satisfy It

Another point overlooked is that as the demand for any article increases, more men are required to make it. More operators are employed in the textile, the shoe, the automobile, and many other industries at increased wages than there were when these products were difficult to obtain, expensive, and laboriously made by hand.

Labor-saving equipment, opposed by some for similar reasons, follows the same principle. It would be absurd to think of a hod carrier carrying a hod of bricks to the top of a twenty-story building. Labor-saving equipment has made the construction and use of tall buildings possible. In just the same way machinery made the universal use of cloth, shoes, watches, and many other common necessities possible.

The Factors of Production

Two of the most important industrial changes which accompanied the transition from the

domestic system to the factory system were the introduction of machinery, as has been explained, and the separation or subdivision of the factors of production into what are known as land, capital, labor, and management. These names sometimes stir up resentment in those who do not think straight or who are misinformed as to the reason for their existence, relation, and purpose.

Of these basic production factors, "land" is so essential and commonplace that production men usually omit it when ordinarily referring to production. In speaking of "land" as a factor of production, we mean not only the land we walk or build on, but all nature's resources, such as climate, wind, tides, rainfall, minerals, stone, forests, natural light, water, and air. Some of these resources are used in producing everything. Because of the confusion in our minds when we refer to "land," we will speak of this basic production factor as "nature's resources."

In industry, nature's resources are provided or utilized by capital, labor, and management, the three production factors about which most of our misunderstandings arise, and so most of our discussion will be devoted to them.

Getting a Surplus

The first of these production factors we shall take up, is capital. Perhaps because it is so little understood, a discussion of capital is usually received with antagonism.

When a man produces for himself only and for his immediate needs, he is just about where the cave man was. He is near hunger, cold, and possibly death, every day. No family life can thrive. When the Eskimo gets up in the morning, he starts, not where he left off the night before—he begins all over again. Every day is just like another with him, a ceaseless struggle with nature single-handed, and in a sense, barehanded. Every man is for himself, because there is little teamwork and never any real surplus. Without a surplus there is no protection against the day of shortage and against old age.

What a Surplus Does for Us

There is no real wealth in the Eskimo's existence. There never can be wealth—by which, we mean that surplus which spreads over long periods, regardless of good luck or bad luck—so long as men work for only the necessities of the day with few tools, poor tools, or no tools, with no exchange of products, and with

no organization which keeps going while they sleep. In order to keep from ruin, men have slowly learned to exert themselves beyond the point where they are merely fed, clothed, or sheltered.

Finally, men began to use their spare time or their extra product in order to get those things which they could not or did not make. In such ways wealth began to grow, and men got beyond the animal stage of life. Their advancement began the moment they set out to produce beyond their own needs; that is, when they began to work for a surplus.

Security Brings Savings

We must not get the idea, however, that our ancestors learned their industrial economics easily. They surely did not. For a long, long time men lived in the state of fear of losing what they had saved, until they could back up the commandment "thou shalt not steal" with an effective exhibition of strength of their own. All that our laws, our courts, our institutions, and our city, state, and federal governments are trying to do for us is to protect us against violence and robbery while we are at work for ourselves, for our families, and our fellow men.

If you have two suits of clothes, you do not expect that a gang of tramps will be allowed to break in on you and tell you that you shouldn't have more than one suit for yourself. You have the idea that you alone have the right to settle this question. If you have a bicycle that you use in going to and from your work, you feel sure nowadays, and certainly in any country with a good government, that the whole strength of the nation is back of you in preventing any man from taking it away from you without your consent, and in punishing him if he should. And this holds good for your tool chest, your farming implements, your horses, your cattle, your furniture, your savings, your dwelling house, and your shop.

All these things are the wealth, the surplus, of the people, which is used in part to make more wealth and more surplus, in order to meet the growing wants of the human race.

If we tamper with this wealth, if we squander it or seize it without paying for it, it all comes to the same thing, we push ourselves back to the Eskimo's and the cave man's level.

If we take proper care of our wealth, our surplus, our capital, we have taken out the only insurance that is any good against the future.

Why Money Is Used

If you want the farmer's wheat, you must give him shoes, tools, clothing, or the things that mean just about the same amount of effort and value that has gone into the wheat you require of him. At the present time not much bartering is done with the actual commodities we produce. If there were, a shoemaker, for example, would have to find a butcher who would supply him meat and who wanted his shoes.

As a convenience, or, as one man calls it, a "labor saver," we use money instead. We receive money for our work, which we exchange for what we want. The advantage of a type of money as a convenience in making exchanges was recognized in ancient times and is also used by most savage tribes. The Indians used strings of beads or shells; the early settlers used tobacco or furs, to which they assigned a value.

Modern money represents an assigned value which is guaranteed by the government. Most gold coins contain practically their full value in gold. Silver coins seldom contain their full value in metal. The paper in paper money has no value. But we accept all these each day without question, because they have the stamp

of the government, which says that it will accept this gold or silver or paper token at the full value stamped on it. Because the government in this way guarantees the value of this token, it keeps to itself the right of making or coining money.

Why We Need Capital

Under the domestic system, the individual workers owned their few tools. As soon as they finished carding and spinning the wool, they exchanged the thread for food and other necessities and for a new supply of wool.

When larger numbers of men and machines were grouped together in the modern factory, larger supplies of wool were required. In modern industry, materials must be brought from foreign countries. Also the buildings must be constructed and the machines and engines built. The product may not be sold for some time; it may be years before it is paid for, or in some cases it may require several weeks or months to make. In the meantime the men must be paid for their work, coal and other supplies must be purchased to keep the shop going, and raw materials must be gotten in stock to work on.

To do this requires capital. To find out what capital is, it may be well to begin by telling how capital originated and is built up.

What Is Capital?

The first forms of wealth, when people began to live together for security and neighborliness, were in the form of cattle, kept for increase and for trade. Before this, cattle would be killed off as necessity demanded, for food and skins, and therefore they could not be said to represent property in a real sense, and certainly not capital.

When cattle were kept against the day of shortage, to avert famine, and in order to trade for the things that other tribes had, they stood for capital, and commanded a price, often a good price. People were glad to pay for the prudence that had saved up the food supply in the form of cattle, because such saving meant taking risks and perhaps putting off the pleasure that might come from having an immediate feast.

Capital, as we commonly speak of it, is a part of our surplus or wealth which is set aside to be used in production. Capital is necessary before we can start an industry, and we can

get it only from those who have saved it and have it to loan or invest.

When a man works and saves some of his money, he is building up a surplus or storing up something which represents the value of his work. When he invests this surplus of stored-up work, he is merely putting it to work for him. When we bought bonds during the War, we were investing—putting to work our money which we received for work. This invested money brought in its wages, or as we called it, interest. It also financed more work.

Capital must come from something and represent something. It is not possible to create it out of nothing.

Putting Our Savings to Work

Where nobody saves, there can be little or no capital with which to start a business. To keep your money at home is to run the chance of having it lost or stolen. Besides, it does no good unless it goes to work for you and for your community. When your money is put to work, it gets into action by hiring labor and ability to increase wealth. Money alone is a dead thing. When money works for us, it is also helping to give work and jobs to others.

We Work for Others Who Work for Us

When we produce, we do so for hundreds and for thousands all over the world, and they do the same for us and for others. The primitive man produced for himself alone. The modern workman produces for all mankind. We are truly working for one another and we depend upon each other. No man can ever do justice to his fellows, unless he gives them the best work of which he is capable. If we do poor work, we are really trying to get a loaf of bread from the baker for less than he is entitled to receive from us. The only just return we can make to those who are busy for our comfort is to turn out good value in the things they buy from us—the things we make for them.

In the domestic system, as explained, each worker owned his tools and the raw material which he needed, and his home was his workshop.

Why "Capital" Is Necessary

With the introduction of the factory system, which required special buildings, expensive machinery, and the holding of larger quantities of raw material and finished products,

there came new requirements of ownership. To provide these required the investment of savings.

Often one man was not able to supply all the investment required to start or "found" a new business, buy the material, pay the rent and wages, and keep it going until he obtained customers and collected for his production. He sometimes took a few other men in with him and formed a partnership.

In a partnership, each partner has invested a definite amount of money and is actively interested in the operation and control of the business. Also he is responsible, not only to the amount of his investment, but to the extent of his total wealth and property for all obligations of the partnership.

However, as the organization grows and needs more capital, the partners have to interest additional investors. These men may wish to risk a few hundred or thousand dollars in a business even tho they are at work elsewhere and cannot watch the use of their investment. At the same time they do not care to risk, as they would in a partnership, losing their home and other property if mismanagement or dishonesty of any of the partners runs the com-

pany heavily into debt. If investors desire to limit their responsibility, organizations known as corporations are formed.

What Is a Corporation?

A corporation is an organization which acts as the representative of the investors in its control of a business and also limits the amount of the responsibility of the investor to his investment. If the corporation fails, the investors lose only what they have invested. In a corporation, each investor, instead of directly stepping into the active control of the business, elects representatives called "members of the board of directors" to represent him for a definite time in its operation or management.

The board of directors elects the more important officers, such as the president, secretary, and treasurer. These officers take over the active control of the corporation and appoint associates who hire the remainder of the force. The officers are responsible to the board of directors. The board in turn is responsible for the acts of the officers they appoint.

Three or more investors can form a corporation instead of a partnership, if they prefer.

In a corporation of only a few investors, however, the investors usually elect themselves to the more important offices and dispense with the board of directors.

How the Investor Is Represented

Unless the investor is satisfied with the work of the directors, he need not reelect them. Thus the investor can indicate his pleasure or displeasure in the actions of his directors in the same way that he approves or disapproves of his representatives in control of the city, state, or national government when they come up for reelection.

These individual investors are called stockholders, as they hold or own "stock" representing shares in the total amount invested in business. The stock is represented by a certificate which indicates the value assigned to the investment. Shares of stock usually represent investments of \$10, \$50, or \$100. A stockholder shares in the profits according to the amount of his investment, as announced by the board of directors, and is paid in the form of dividends. When there are no profits, there are no dividends. The real or market value of the shares of stock rises or falls largely according to the dividend rate paid.

When More Capital Is Needed

Frequently a company after it is organized finds it necessary to get additional money. This it does either by increasing the amount of the stock issued and selling it, or by borrowing the money on its security. In borrowing, you will notice a close similarity to the way an individual borrows money. If small amounts are wanted for a short time, the money is generally loaned by the bank on notes signed by the officers of the company. Short-term loans of this sort are made to finance special jobs from the manufacture to collection, or for other temporary needs of money.

Whenever extensive improvements, as new buildings and similar large expenditures, are planned, the loan is made on the security of a mortgage, and for a period of several years. The individual borrows to pay for his home in much the same way. In industry, however, whenever the loan is larger than one individual is able or desires to make, it is divided up into many small amounts or "bonds," which can be taken by numerous individuals who wish to loan a part of their savings or surplus. Common practice has made the amount of these bonds \$100, \$500, \$1,000 and \$10,000. This fits the loan to any man's pocketbook.

The Difference between Bonds and Stocks

Since, in the minds of many not familiar with financing, there is considerable confusion between a bond and a share of stock, it will pay us clearly to differentiate them. A share of stock represents a definite portion of the actual ownership of the corporation. The investor has risked his money in this enterprise and stands to lose all. A man with \$10,000 in stock in a concern of \$100,000 total stock owns one-tenth of it. He, therefore, should receive 10 per cent of the profits when divided. Also he can cast 10 per cent of the votes when the board of directors are elected.

A bond, however, represents a different kind of a loan made to the concern. The ownership of a \$1,000 bond shows that its owner has \$1,000 loaned, altho the whole loan or bond issue may be hundreds of thousands of dollars. The bondholder does not own any share of the corporation and has no control of its policies or methods, excepting in emergencies. Bondholders, however, must be satisfied first in cases of business embarrassment.

On this bond they receive a definite rate of interest, say 6 per cent or more. After this interest is paid out of the profits, the board of

directors divide up the remainder among the stockholders. Wise managements, however, lay by a surplus of these profits so that they can have something to draw on in case of an emergency. A surplus for an emergency is just as necessary for the concern as for an individual.

As corporations have increased in size, the number of people investing in them has increased until, for example, 120,000 investors are stockholders in the Pennsylvania System. Over 100,000 of these have less than \$5,000 each invested. This and the large bond issue outstanding give a widespread interest in the company.

Many companies are giving those on the pay rolls an opportunity to buy stock and become investors in the company with which they work. Each of these investors, even tho he owns but one \$50 share of stock, is a capitalist. His money helps make the enterprise possible and enables it to remain in operation. Providing the money is the function of the capitalist.

Why Capital and Labor Need Each Other

But capital alone does not make a factory. It

merely provides the buildings, the machinery and the money necessary. Before the factory can produce, however, there must be men—labor—to operate the machinery and work up the raw material into a finished product. Also, obviously, labor without the machinery, buildings, and other factors would be handicapped in producing. Alone, it would be back in the old domestic system.

Capital and labor, as we know them, have a common purpose—production. One cannot get along without the other. Labor also must work with labor. Each man is interdependent with others and with capital, and all must work together for the common purpose—production, and to make the best use of nature's resources. Any factory executive knows the large amount of misinformation existing in reference to the importance and relation of labor and capital. One example shows the fallacy of some of these arguments.

A coal miner who digs a ton of coal does not create the coal, and not the whole ton belongs to him. Altho he receives about 90 cents for mining the ton, the miner cannot maintain that he should receive the \$3.00 that the ton of coal brings when loaded on the railroad cars simply because of the fact that without his

efforts the coal would have remained in the mine. Of course part of this is true, but without the assistance of the man who hauled the coal to the base of the shaft, the engineer who hoisted the coal to the surface, and others, the coal would have remained in the little "room" where it was dug.

This miner must take into account the important place capital occupies. How would he have ever gotten to the ton of coal if capital had not dug the shaft several hundred feet down and then extended the galleries perhaps miles back to where the coal was dug? Capital supplied the mine "tipple" and engine which hoisted the coal to the surface. Capital pays the wages regularly whether the coal is sold and collected for or not. Capital also keeps the mine in condition to operate.

So it is that each group of labor is dependent on the other and on capital. Another factor—management—is also necessary, as will be explained later.

Why Work Is Necessary

We all know how necessary work is if we are to receive any benefit from nature's storehouse full of resources. It is only when the

ore is turned into steel or automobiles, clay into dishes and homes, trees into furniture or paper for books, and wheat into bread and pastry that we can make use of it. Also when we use the result of our work—as eat our bread or break our dishes—we have to provide more to take its place. This requires more work.

Will the “Labor Reservoir” Get Empty?

Some men advance the false theory that we had better “slack up” on our work or shortly we shall have so much of everything on hand that there will be no more work to do. They maintain that there is only so much work in the world and that if we do too much the “labor reservoir,” as they call it, will become empty and there will be no work to do. But the labor reservoir is constantly being filled by new wants and new desires. It is like the lakes and seas — nature’s reservoirs — which are filled by the rivers and streams which run into them. Water in nature’s reservoir may evaporate, but it forms clouds, then rains, and so refills the reservoirs. In the same way our clothes wear out, our dishes break, and our children want new houses for themselves. Each new desire or need helps refill this labor reservoir—it is a shop order for more work.

An old proverb which sizes up human nature pretty well runs, "The more you have, the more you want." It doesn't look very much as tho this labor reservoir would be exhausted soon with human nature as it is, does it?

Most of us do not want to cheat our fellow men, but will put our best into our work. But we find that for all our good will and skill, something more is needed before the result of our effort and before the outlay of money can go very far. That something more is management.

Why We Have Management

If we take away management, we have cut the head from the body; all intelligent movement comes to an end. There may be some squirming which looks like movement, but it isn't anything that will go forward much.

There is a mighty good reason, isn't there, for giving management all the support possible and fairly large rewards? Good executives are the final factors which settle the fate of any venture. They make possible the large growth of modern industry, because they have the vision and also the courage and the skill to tackle the job of putting that vision into action.

Management is not merely those members of an organization identified by a high salary or the title of manager, nor only the men who may be holding what we call executive positions and directing the business. Management includes the plan or policy to be used in directing a business. In other words, isn't management the thinking, planning, and controlling end of a business?

The executives in control of the management of a manufacturing organization, for example, find it necessary to decide its policy on important problems in connection with the work. Policy problems differ from the routine production problems concerning what shall be worked on any day and who shall do it. Summed up in a few words, a policy problem affects the shop as a whole, while production or personnel (man) problems affect only the individual or closely related groups of individuals or gangs.

Every veteran production man understands this necessity of a management deciding all policy questions and to a certain extent the production problems. He knows that such questions as which order shall come out first and whether to add a building, are not questions for him to decide on his own judgment

only. Obviously these questions could not be left to the workmen to decide, but must be left to the management.

What Is Management?

Here is what an able man, of long experience with different kinds of industries and managers, has been saying lately about management and what it covers. The production executive who keeps his words in mind will get a good picture of the subject, something that will serve him in good stead whenever he meets with misunderstandings as to the importance of capable executives in any and every kind of enterprise. Nothing will help the rank and file appreciate the value of good organization or management better than a clear picture in the foreman's own mind of just what such organization or management actually is responsible for. The management's picture is given in Fig. 2 as the above-mentioned authority sketches it.

Sometimes workers believe they could get along without management. However, practically every veteran production man knows of instances where companies have tried to get along with the next thing to no management—poor management. In these cases the com-

WHAT MANAGEMENT INCLUDES

BUYING	TECHNICAL PROCESSES	SELLING	FINANCING	ORGANIZING
<p>Purchasing of materials at the right time; foreseeing market conditions, often thruout the world, and deciding how far to go in storing supplies ahead. Questions of foreign imports and the price of exchange are to be mastered.</p>	<p>The state of the arts in all countries, the power to decide whether a new invention will be a commercial success, good judgment in adjusting machinery to floor space, and sequence of processes, are a few of the problems requiring a special training for years in any one industry.</p>	<p>To know accurately home and foreign markets, to devise the best selling agencies for a particular kind of product, to know when to sell and at what price, are vital to the continuance of the industry.</p>	<p>Financing all operations involved in buying and selling, determining the form of credit, discriminating among buyers as to integrity and promptness of payment, introducing cost accounting, borrowing capital, and discounting paper, while dependent on an expert knowledge of banking at home and abroad, require a very exceptional ability among managers.</p>	<p>The capacity to organize an industry into a well-knit whole, to know human nature, and to have an instinct for selecting the right man for a given duty, to keep all parts of the institution in proper co-ordination, to reserve leisure to think, and to keep a grasp on the industrial tendencies of the world, are essential to the highest type of an executive.</p>

Fig. 2.—Management's main purpose is to keep the organization operating properly. In this, management's duties may be subdivided into these five elements which must co-ordinate and function together. Because of the great responsibility, management commands an appropriate reward.

panies were soon out of business, and the men had to find a new place to work unless a new management came in and put the concern on its feet. The management alone is responsible for many factors in connection with production which will put the company out of business in a short time unless they are properly handled. This is well shown by records of failures which place a large proportion of the responsibility directly upon the management or within its activities.

Some of these factors which require such close watching by management are: amount of raw material, work in process and finished parts on hand, sales, collections, bills for supplies, material and incidental expenses, cash to meet the pay roll, competitor's prices, obtaining work for dull seasons, supplying buildings, obtaining machinery and men, and many other points. Practically all these are considered by the men out in the shop as incidentals to the operation, if they are even considered at all. However, the neglect of any of these or many other important factors will put an organization into serious difficulty.

Who Appoints the Management

The management is placed in control of the

business by the investors. Altho the investors actually appoint only the higher executives, every man in the organization is the representative of the investors. In many cases, especially in small concerns, the investors or owners are the management. The management must make good, just the same as the workman at the bench, if it expects to retain its position. The management is, therefore, responsible to the investors and is expected by them to exercise care and judgment in handling the property or plant. This relation and responsibility of money, management, and men is indicated by Fig. 3, which indicates how closely they are related. Management overlaps into both money and men.

This diagram also indicates the important place the foreman takes in the industrial organization; he is the part of the management which ties it up with the man. This gives him the greatest opportunity to influence his men in their work, in their thoughts, especially those concerning the shop, and even to a large extent in their actions.

The president or board of directors is at the other end of the management group. In between are the various other executives, as is

easily seen by a study of practically any industrial organization.

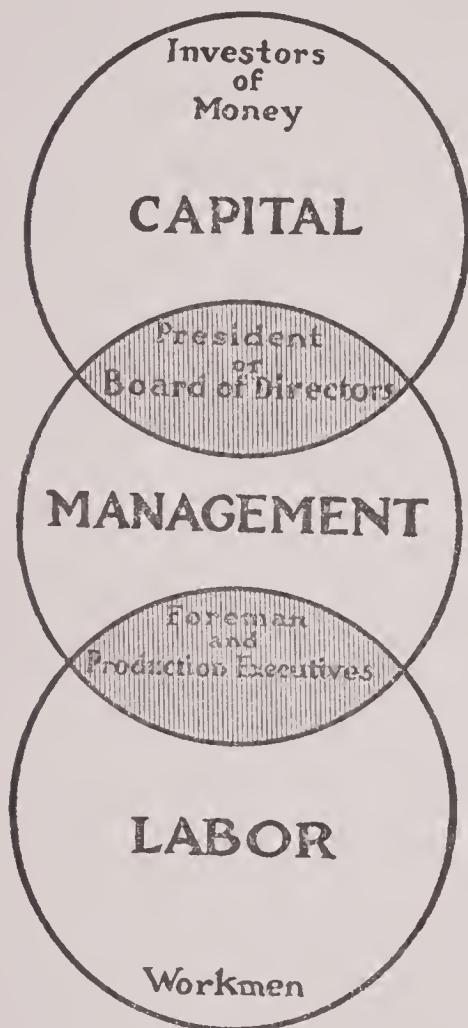


Fig. 3.—One of the common misconceptions of industry is that capital, labor, and management not only are separate production factors but that they have nothing in common. This diagram shows not only that capital and labor are tied together by management, but that the functions and responsibilities of management overlap, as shown by the eclipse, and become a part of both capital and labor. This explains why the foreman is such an important link between the management and the workers. When the workers buy stock in the concern, they then become investors and so are within the circle marked "capital." In small plants where one man owns the business and also acts as foreman and manager, the "capital" circle completely eclipses. Where he does the work also, as in many one-man plants, the three circles become one circle.

What Makes a Man an Executive

Many think of an executive as merely a job holder, but an analysis of his work shows him to be much more. The foreman is an executive, and the worker at the machine or bench

can be one if he so wishes. Let us see, therefore, what an executive is. Many confuse the term executive with that of management. An executive is one of the personnel of the management.

Primarily an executive is a man who coördinates and works out the ideas of others. But to be a really valuable executive he must originate his own ideas and put them into practice. Many men are able merely to follow out the ideas of others but are unable to add ideas of their own or to put them into practice. It is largely thru our ability to add and apply our own ideas to those of others that we advance. Veteran production men are always looking for men with ideas of their own who can be taken on as understudies, so as to have men ready to step into their own positions when the opportunity opens in a better department or when the position of superintendent is open.

Headwork *vs.* Handwork

This description of an executive brings up another important factor—the discussion of the relative importance of headwork and handwork. Some say that only handwork is worth considering, as it is the “creative work.” Let

us see how this theory applies to the foreman's job.

The foreman is more of a headworker than a handworker, altho generally he is able to "get his hand in" when necessary. But if he spent his time at one machine or bench, he could see only that the output of that one machine or bench was kept up to full output—that it produced all that it was capable of. However, by directing the handwork of others, by seeing that each machine is supplied with something to work on and each man with some work to do, and that each does his work properly, quickly, and well, the veteran foreman is able to get more out of his department than he could if he "pitched in" with his hands.

How Headwork Reduces Handwork

But ideas, or headwork, are not limited to directing or managing only. Ideas which result in machines doing work much quicker and much cheaper save the work of many men and enable us to get what we need at lower cost.

Ideas, however, are not restricted alone to building new and better machines which reduce the effort or the hours of work, or make the work more agreeable, and so lower the

cost of doing the work, which in turn enables us to buy the product cheaper.

Ideas can be used anywhere, even in our simplest tasks. One foreman, at the suggestion of one of the workers, moved two benches together. The work was then lifted two or three feet from one man to the next, instead of having to be carried thirty feet from one bench to the next. A little idea, indeed, but it had a big effect upon the convenience of doing the work and on the output.

Getting the Men to Thinking

When a production executive gets his men to thinking, he is putting heads to work in addition to hands. The best results come where heads and hands both work. For this reason many executives have found that it pays to encourage the men to give suggestions about their work. These suggestions not only help get out the work but often overcome some of the production interferences which the executive with his two busy eyes does not see, but which the many men in the shop, each with two eyes which do not have so much to look after, do see. The men who think and make suggestions are also good timber for under-studies.

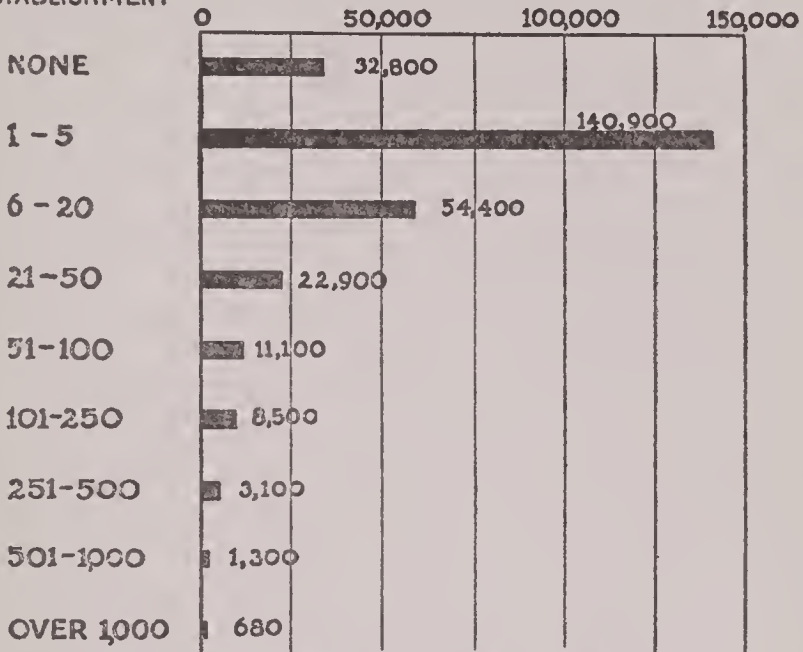
When a man begins to think on the job, he immediately becomes a part of the management—he is managing his own job. The ash handler who dumps his first wheelbarrow load of ashes so that each succeeding load must be wheeled thru it, is not thinking—he is not managing his job, and it is causing him extra labor. In many other cases headwork makes hard work easy. Even on the jobs which many executives classify as requiring “a strong back,” the work can be made easier by using the mind. Making every man a thinker on the job makes every man a manager. Training the worker, as explained in the manual on the subject of training, helps make him a thinker.

Problems of Modern Industry

Up to this time we have discussed the numerous industrial changes in the transition from the domestic to the factory system. We saw how the workers came to be grouped together operating machines in a factory instead of each working in his own home on crude foot-power devices. Along with this change came greater conveniences, and many of the former luxuries, thru the greater ease of making, became necessities. Our whole mode of living has changed on account of this.

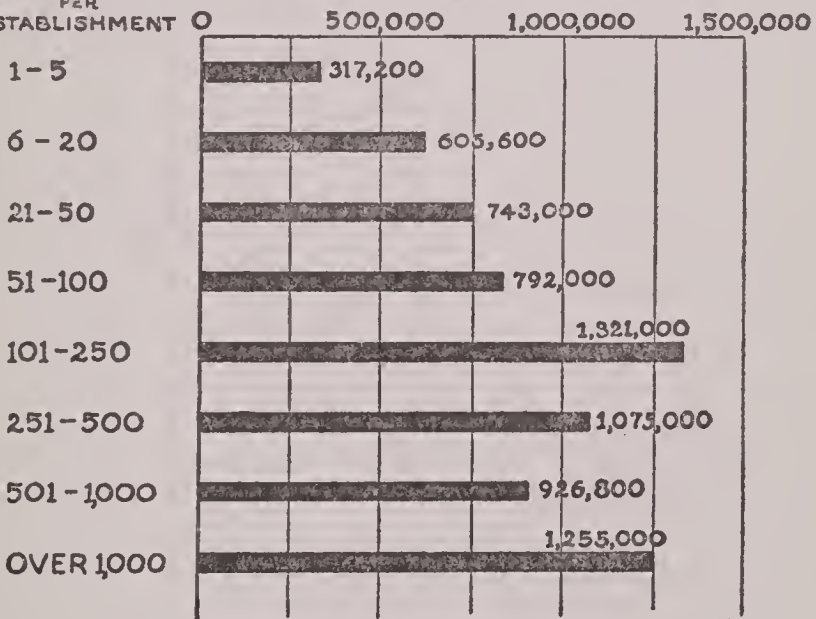
WAGE EARNERS
PER
ESTABLISHMENT

NUMBER OF ESTABLISHMENTS



WAGE EARNERS
PER
ESTABLISHMENT

NUMBER OF WAGE EARNERS



U.S. CENSUS REPORT

Fig. 4.—This shows how the wage earners are divided among the various industrial establishments producing over \$500 in a year. Since almost two-thirds of these employ five men or less, there still exist many opportunities to become a business man. This shows that industry is not all big plants, for only 2 plants out of every 1,000 employ over 1,000 men. In those 32,856 plants listed with no employees the proprietors do all the work.

One of the most important changes has been in the introduction of the modern subdivision into what we so commonly speak of as capital, labor, and management, or sometimes as money, men, and management. Under the domestic system, each worker supplied his own capital and managed himself; but, as we saw, his output was limited by his ability and his poor equipment.

The Bringing Together of Men and Management

Under the subdivision of industry into these three elements, some difficulties have grown up which are in many cases exaggerated thru wrong thinking or misinformation. One of the most important of these is the separation of management and men.

When plants were small, the owner was often the manager, the superintendent, and perhaps even the foreman. He knew all the men who worked for him; he knew their families and their personal interests and ambitions, both outside and inside the plant. The men also knew him, and any differences were talked over in a friendly spirit.

How the Management and Men Became Separated

As the plant grew in size, the owner had to

get foremen, and soon a superintendent, and so lost touch with his men. The financial or money control kept him busy. Due to this growth, the worker has to take his differences up with the foreman, who, to him, is the management. When the man gets laid off or fired, he blames the management. This separation or lack of mutual understanding is indirectly responsible for many strikes, which are the workers' method of expression.

Various methods have been used to overcome this difficulty. Some executives adopt what they call the "open door" policy—their office door is open to any man who wishes to make a complaint or a suggestion. Also, a number of companies have had remarkable success with the shop representative or committee plan, where the workers elect representatives to meet with the management or its representatives and thrash out any differences or unhealthy discontent.

Still another method is thru the organization of a personnel department. This department takes charge of the employment, transfer, and discharge of the men, all welfare work, legal advice, and any other assistance to the man, which in former times the owner of the small business was able to render to him. How the

personnel department operates and the work it does, is a big subject in itself, which deals largely with activities outside of, altho related to, actual production.

Understanding Profits

Another result of this subdivision into money, men, and management is a difference of opinion as to the share of each in the profits or the wages of money invested. Each must have profits or wages, or it will not be used in producing. Labor takes its share immediately in the form of wages and even before it is known whether there will be any profits. The personnel of the management are usually paid in the same way. The investors, however, must wait until the end of the business year to see what their profits, or wages on their investment, are.

Some men even insist that money has no right to a profit; that any profit should be divided up among the workers. Most workers would be surprised to find that if all the profits made in the United States were divided up among all the workers they would add only a few cents an hour to their wages. The total amount of profits of a company may seem large, but an analysis shows that often they are made

up of the small profits on the output of each worker. This, however, is not the usual method of computing profits, but let us see just what they become when figured that way in the case of the Johnson-Day Company, with the following facts about it:

Capital invested	\$1,000,000
Profit (including interest)	100,000
Interest on investment at 6%.....	60,000
Actual profit	40,000
Number of workers.....	300
Average number of days employed	250
Hours per day	9

With these facts about the business we will get this information about the \$100,000 profit.

Investment per man.....	\$3,333.33
Profit per man per day (including interest)	1.33
Interest per man per day.....	.80
Actual profit per man per day.....	.53
Actual profit per man per hour (not quite)06

It is surprising to learn that a \$1,000,000 organization making an indicated profit of \$100,000 a year could not raise the wages of its employes six cents an hour without wiping out its entire profits, but this analysis shows this condition to exist.

Why Invested Capital Should Receive Interest

Perhaps some men will question the 6 per cent interest allowance, but from our study of savings and capital we can easily see why it

What Capital Must Invest in Industry		
Industry	Capital Invested per \$1,000 in Wages Paid	Interest Earned by Capital at 6% per \$1,000 of Wages Paid
Chemical	\$18,000	\$1,080
Steel and iron and their manufac- ture	6,000	360
Textile	4,000	240
Food	8,000	480
Woodworking	4,000	240
Paper and printing.....	5,000	300
Stone, clay, and glass.....	4,000	240
Miscellaneous	6,000	360
Tobacco	4,000	240
Metals and metal products other than iron and steel.....	6,000	360

From U. S. Census Report

Fig. 5.—How many men ever stop to estimate the amount of investment necessary so that they will have a place to work? Examining this table shows an average amount of investment per thousand dollars in wages paid in your industry. It takes money to provide factories, tools, machinery, and material—essentials if men are to have a place to work.

is justified. Any man who has sacrificed and saved some of his money and invested it, is entitled to his earnings from it. Otherwise, why should he save it? If he invests it in a factory or business, he is not sure that he will be successful or even receive the in-

terest return he could obtain with a well-secured investment, such as a home or farm mortgage or a bond. Many companies never succeed, and those who put their money into them, and so give men work, lose all or at least a part of what they invested. Because of this risk most fair-minded men agree to the justice of an additional profit over and above the natural interest which the investor would receive from a safe investment. The investment necessary in various industries for each \$1,000 paid in wages and the interest that the investment earns is shown in Fig. 5. Ordinarily, the worker never stops to think of the investment in tools, machines, and other essentials which he uses in his everyday work. Without them his opportunities would be limited.

In the case of the Johnson-Day Company the interest on the investment amounts to 80 cents a day per man on the \$3,333.33 per man which the investors have to put into the business before he can have a place to work in. But few workers could supply that much money to invest in the shop to give themselves a place to work. The profit of 53 cents per day per man is a little less than 6 cents an hour per man. Thus we see that what may appear to be a big profit of \$100,000 a year means less

per hour than many men were asking as a raise in wages during 1919 and 1920.

Practically every veteran foreman has heard men maintain that corporations were making \$10 or more a day per man. When the facts are worked out concerning any company, these statements of such high amounts will generally be found to be based on the imagination.

Even tho a company shows a profit of a million, it may, and often does, mean a loss, or less than the investors could get by more secure investments. The difficulty lies in the fact that most people look at the total amount instead of analyzing it down to the profit per dollar invested and at work, or the profit per man. Figure 6 shows how one company spends each \$100 of income.

How Production Factors Facilitate Business

In the preceding pages we have corrected a number of the misunderstandings of the principles of work or industrial economics which have been the cause of unhealthy discontent among workers.

A discussion of these principles, however, would not be complete without bringing in

the close application to modern industry of the factors of production—nature’s resources (land), capital, labor, and management. Of course they facilitate our everyday industrial activities, but how? Let us take, for example, the little, one-man tailor shop. The tailor, because of his savings, is able to buy his scis-

How a Steel Mill Spends Each \$100 of Its Income	
Operating expenses (salaries, wages, and general operating expenses)	\$68.19
Taxes	16.67
Interest on borrowed money and appropriations to pay off loans, etc.....	2.14
Repairs, renewals, and depreciation, etc.....	5.92
Profit for year (for surplus and dividends).....	7.08
	\$100.00

Fig. 6.—After deducting expenditures for operation and providing the interest on borrowed money, there remained only \$7.08 out of each \$100 received from the sale of products. In this actual case the disbursements for dividends amounted to \$5.39 for each \$100 of income; the remainder of the profits were set aside as a surplus for an emergency.

sors, needles, sewing machine, table, and other equipment he needs. He also buys the thread and cloth—his raw material. He rents his space.

The rest of his money is deposited in the bank for emergencies. These expenditures and savings represent his capital. He does all the work of tailoring. He also manages his

job—that is, he buys, sells, takes orders, looks after his financing, looks up more business, advertises, and apportions his time to the various elements of his work so that the work is done properly, on time, and as wanted.

In this simple industrial establishment this one man represents capital, labor, and management. We meet numerous examples of a one-man organization, such as storekeepers, shoe-repair men, barbers, doctors, lawyers, and others. But in each case where the man has to devote his efforts to all activities, his business is small. He cannot make it much larger alone, because it is impossible for him to perform the additional labor which would be necessary with the increase in business.

How a Business Grows

To increase his business he first adds another man to do this additional work. He can then devote more time to the management functions—buying, selling, getting more business, and other managerial duties. He also would have to increase the amount of tools, material, etc.—his capital—unless he does not expect to do any more tailoring himself.

As more men—labor—are added, more capital

is necessary, larger space must be provided, and more supervision is necessary. He then gets a foreman, who puts in all his time in supervising the men, and leaves himself free to perform the other managerial duties.

By this time the financial, sales, and buying problems are occupying a considerable amount of his time. He therefore gets assistance in these lines. In the meantime, the demands for additional capital to keep this larger business going make it necessary to take in partners with money to invest, or to form a corporation and sell stock or shares in the business. Capital, labor, and management are now entirely separated, and instead of one man in a little shop we have a big tailoring shop in a special building and employing several hundred people.

Up to this time we have omitted all reference to the other factor of production—nature's resources. The tailor did not shear the sheep, nor card, spin, or weave the wool. Consider the additional machinery and capital as well as the work and skill involved if he had tried to do all this. Wool comes to him in the form of cloth, coal in the form of heat or power, the ore already made into equipment.

The Tendency toward Specialization

We have seen in this example of the growth of a little tailor shop into a big industry, how the tendency is to specialize and subdivide the work according to its importance and the skill it requires. All industry, for that matter, is specialized. Thus we have coal mines, railroads, steamship lines, woolen mills, sheep ranches, lawyers, banks to provide money, sales organizations, distributing agencies, engineering and industrial consultants, and many other specializations to facilitate business.

Each of these operations requires capital, labor (high-grade perhaps), and management; but all, as they tie together and function together, make it easier to carry on business. The tailor, for example, can get a wide variety of cloth in any quantity as he wants it, can have it transported on the railroad, can arrange with the banks to finance the purchase until he has it made up into suits and sells them, can call in his lawyer to see that his agreements with these other specialists are not to his disadvantage, and can call on many other specialists to facilitate his industrial and business operations.

But this industrial specialization is not restricted to facilitating the management in its operations, as has been explained in the previous paragraphs. An equally important change in the handling of the work in the shop has occurred at the same time.

The Specialization of Labor

For example, the old shoemaker cut and sewed each piece of leather to fit one individual. He had to pick up the sole leather, cut the sole and lay it down, then pick up other rolls of leather, untie them, cut the parts for the uppers, and then tie the rolls up again. He was then ready to sew the shoe together. A large part of his time, we notice, was occupied in picking up and putting down the rolls of leather. As shoemaking became a factory operation, some workers began to cut soles all the time, some to cut uppers, some to sew uppers together, and others to sew the soles to the uppers.

The Advantage of Specialization

Thus we see how each man, instead of making a whole shoe, began to specialize on a few operations. At present this specialization is carried out until with one company 195 opera-

tions, each performed by a different operator, are required to make a pair of shoes. This specialization eliminates the waste motion of changing from one operation to another with a corresponding putting away of one set of tools or material and picking up another set. An unskilled worker can be trained to perform these individual operations rapidly and accurately in a short time, while it would take months or perhaps years to learn to make an entire shoe or suit of clothes or automobile.

This specialization of labor has been carried out in almost all lines of industry until we have but few trades in which one man completely makes a finished product. Some exceptions exist in highly skilled work, such as model work, tool making, pattern making, and, particularly in small shops, fancy cabinetwork.

Effect of Standardization on Industry

Closely connected with specialization of labor is standardization, or a specialization of products or parts. Probably the best-known example of specialization is the manufacture of the Ford automobile. In producing the four models, practically everything is standardized. One chassis serves for all and will

take any one of the four bodies. In this way there is less trouble connected with making the chassis, as the parts in it are all standard also.

Standardization of parts is carried out quite extensively in industry to-day, even tho several sizes, models, or styles of the same product are made. The cap screws, gears, and perhaps some of the other parts, may be designed to fit any of the product. Clothing, shoes, and similar products, which require variation as to size and perhaps as to color, are, however, standardized at least in the method of handling in their manufacture.

Making Parts Interchangeable

One of the most frequent difficulties in standardizing any product is in getting it to fit together quickly and easily. Any veteran production man remembers the time when a hammer and a file were necessary in assembling. This took time. When it became desirable to use specialized labor in assembly, it was necessary to be sure that the parts would fit together at the first trial.

The obvious way to do this is to eliminate or reduce the variation in size between the parts

so that all are practically the same size and none too big or too small. To accomplish this, the method of manufacturing "interchangeable parts" was adopted. Parts are made and inspected within a very narrow limit, sometimes as low as .0003 of one inch.

The American watch is a good example of a standardized, interchangeable-part product. When repairs are necessary, a jeweler can send to the factory and get a new part which will fit. In contrast to this is the Swiss watch, which does not have interchangeable parts. The repairs for it must be made by hand.

Standardizing Production Methods

These changes in production methods would naturally lead up to standardizing the methods of controlling processes. How this is done has been taken up in considerable detail in previous manuals, which gave some of the shop practices of scheduling, dispatching, planning, routing, and following up. Thus we have seen how standardization has affected not only the product manufactured but also the method of its manufacture and the handling during its manufacture.

This process of standardizing our method of

handling a product, which we learned in the previous manuals, is commonly known as scientific management—the stepping-stone to efficiency.

What Is Efficiency?

Efficiency consists in doing our work without waste of time, motion, or effort. We have found thru our experience that by planning and scheduling what we are going to do, and by planning how, when, where, and with what we are going to do it, we can eliminate much of this waste motion, time, or effort. That is, we approach more nearly perfect production, or 100 per cent efficiency.

In considering efficiency, we must take into account the fact that if one man or one machine is lagging or wasteful the plant is not 100 per cent efficient. Even if all the other men on machines are efficient, neither that department, nor the whole plant for that matter, can be 100 per cent efficient.

What Efficiency Depends Upon

But the lack of efficiency of men and machines is not alone responsible for industry's being below 100 per cent perfect. Management and capital must also be efficient if the organiza-

tion is to be efficient. Also, they have a great responsibility in making labor efficient. For example, if management has not standardized its methods of handling and controlling labor, machines, and material, none of these can be efficient. Similarly, if capital on the advice of management has provided a building or machinery unsuited for the work, then labor, even with its best efforts, cannot be efficient.

In an industrial organization made up of many elements of capital, labor, and management, the efficiency of each of these elements must be carefully controlled to get a good percentage of efficiency for the whole.

Where Competition Helps Industry

In the growth of modern industry all these industrial specializations grew out of finding a better way to do the work. They became necessary to facilitate business. There is, however, another factor—competition—which has helped speed up or has made necessary the discovery and adoption of these changes to industry and to business.

Industry has to meet competition of the same factors as a store—price, quality, service, or convenience. If in one plant better machin-

ery or better management and headwork, or better coöperation between capital, labor, and management, enable one concern to offer better inducements, that concern will get business away from a competitor.

How Production Men Benefit by Competition

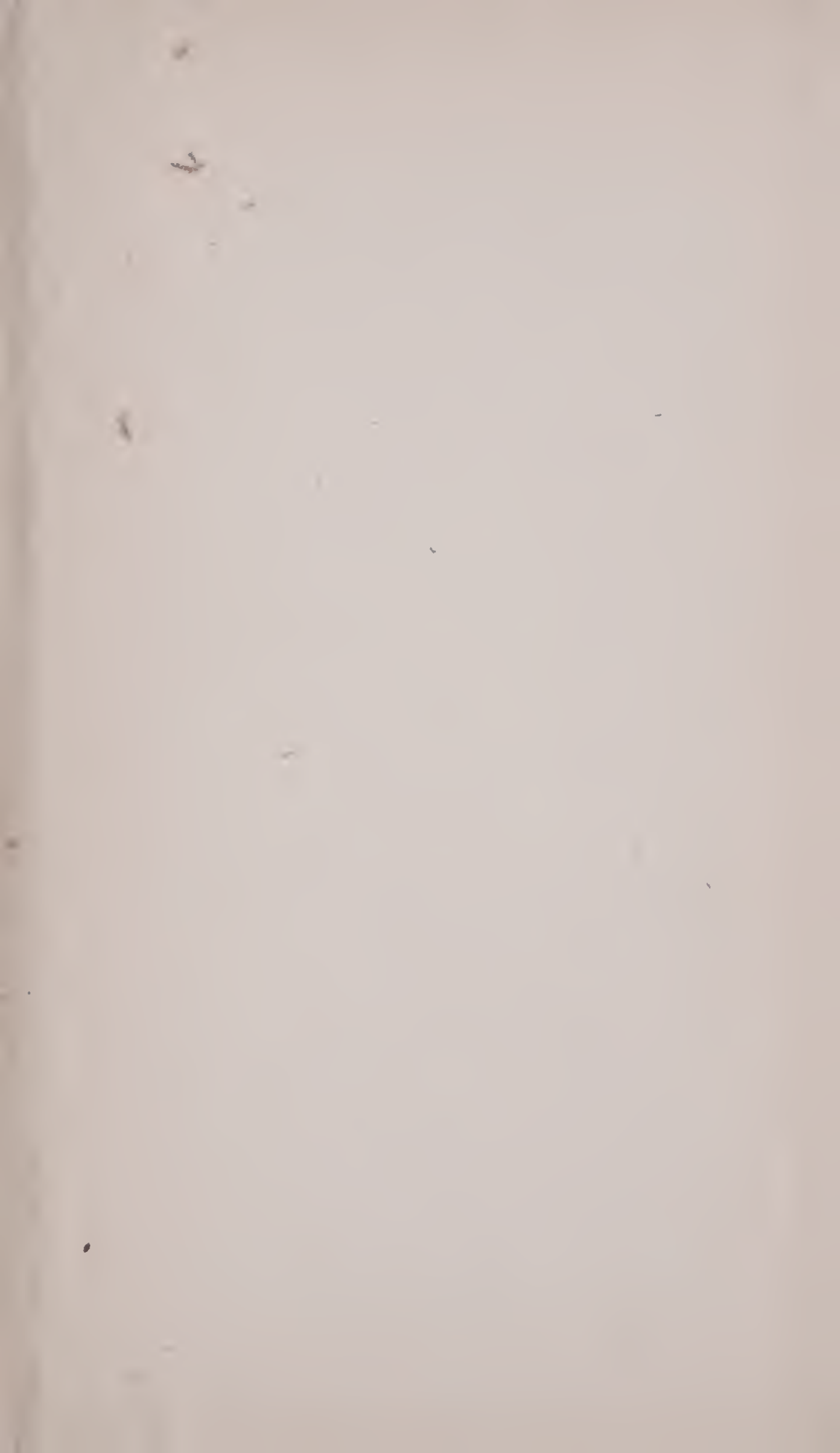
Because of their position as the tie-up between management and labor the foremen and other production heads have a very important responsibility in making betterments which will meet, or even better, competition. Their doing this has an important effect on the workers and managements too. By meeting or bettering competition the company is generally able to give its employes more steady work and is often both able and willing to pay a higher rate of wages than their competitors who do not have such good management nor such close coöperation of labor.

With this better understanding of the principles of work, particularly with our mind set right on why we have to work, the problem of changing unhealthy to healthy discontent, and obtaining ambition and coöperation, is simplified.

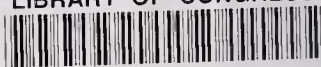
We saw in the manual "A Good Place to

Work," how the advantages of physical conveniences helped men produce. Right thinking also gives to men who work a mental contentment which, practically every veteran production man knows, shows up in the amount of work handled. With the other manuals on how to handle work and how to handle men, production men have the necessary elements to meet competition and provide more regular work at fair wages.





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