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SYSTEM

THE MAGAZINE OF BUSINESS



MAKING MEN LIKE THEIR JOBS

How Shall I Merchandise
Today? A Business That
Nearly Runs Itself

And in addition the best methods and ideas of 563
executives on ways to conserve labor and materials
and meet changing conditions

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MAKING MEN LIKE THEIR JOBS

By ROBERT B. WOLF, M. E.

WE all know that no man will loaf or slack on a job when he is interested in it. Neither will he slight the quality. It may be possible to work without interest, spurred on by some force of necessity, but the man working in such fashion has no heart in his work.

Why do men work half-heartedly, giving a minimum of return for their wages? Why are they so commonly dissatisfied, grumbling at petty annoyances, resentful of efforts to help them, and quitting their jobs apparently without reason? Why do they strike, and why are they so willing to listen to those who are capable of voicing their discontent? By men, of course, I mean all employees, men and women, in every branch of industry and merchandising.

One can answer glibly, of course, that people are naturally lazy and that it is human nature to want to get something for nothing; that the present demand for workers and the resulting tremendous wages offered through necessity have unsettled a class of human beings which was particularly anxious to be unsettled. Or, if one wishes to be cynical, it is easy to remark that all are opportunists anyway, and that the workers just now see their opportunity. Such answers, however, go only to results—they do not touch causes.

Intelligent workers and intelligent employers are more interested in locating causes than in tabulating results. They want to prevent labor diseases rather than treat them. For the present labor unrest, which we are right in calling "dis-ease," is one of the most serious things that confront the nation today. The worker is the biggest national asset, the most potent in war or peace. Labor is not an incident of industry. It is industry.

Q IS THERE A CURE FOR UNREST AMONG EMPLOYEES?

Everything seems to indicate that we are approaching an industrial crisis in which the differences between employer and employee will grow more sharp and bitter; it is therefore vital that the employers who are directing the industrial situation use their utmost efforts to get down to fundamentals and cease confusing results with causes. This will be no easy task for the average employer, as he has so long been engrossed in the immediate manufacturing problems that he has given little thought to one that is larger and more important, the human problem.

I hope, therefore, that our experience will prove helpful. If the principles involved are universal, as I believe them

THIS ARTICLE, one of the most important which **SYSTEM** has ever published, outlines the philosophy of work as applied in a practical manner to the daily direction of workers. Mr. Wolf shows why men leave, why they are dissatisfied, why they take no interest in their work. He traces the causes and then shows that the surface indications are due to a disobedience of fundamental laws. Then he explains how in his own work he has obeyed these laws, and describes the remarkable results attained. He cuts under the surface and gives "reasons why." We all know the surface, but no one, so far as the editors know, has worked out so completely as Mr. Wolf, the causes.

It is not an article to be merely skimmed through; it is to be read and reread, for it unfolds a whole philosophy of work. And every executive knows that today the human problem is the biggest. Mr. Wolf is manager of the Spanish River Pulp and Paper Mills, Ltd.

to be, investigations in other lines of productive effort will confirm the conclusions, and as a result of the combined efforts of many minds, each completing and correcting one another, we should be able to evolve an industrial philosophy in America which will enable us to avoid the threatening deadlock so seriously interfering with productive effort today.

The cause of practically all labor inefficiency—a prelude to labor disturbance—is lack of interest. There are only two ways out of the dilemma. The first is to create interest in work, and the second is to accept disinterestedness as inevitable and to speed up the treadmill so that a certain amount of work has to be turned out, interest or no interest. The first is the democratic American way, the second is the Prussian. In reality, there is no choice, as the Prussian method is now in the process of destroying itself.

Therefore, the way of expression, rather than the way of repression, is the only course open to us. At first sight it may seem impossible to change the monotony of routine work without extremely radical changes in operating conditions, but I know from actual experience that it is possible so to stage even routine work that it will draw and hold the interest of the worker to an absorbing degree.

In other words, the work ceases to be routine under methods which bring forth intelligent conscious control of the process on the part of the worker, when we make him master of the machine instead of merely furnishing the machine with organs of sense.

It is just as necessary to get away from "rule of thumb" methods in directing human activity as it is in the process of handling materials which conform to natural laws. There are laws underlying

human nature, and it is the function of the science of philosophy to organize these laws for the benefit of all those who wish to study them.

I worked at days' wages for several years in different paper mills in New York State and New England, so that I approached the problem from the practical side, working from the bottom up and not from the top down. It was this intimate association with the workers that gave me, first, the point of view of the workers, and later, the point of view of the operator.

While I had the direct object in view to learn the papermaking business, and cannot say that I found the work uninteresting, nevertheless I could see that most of the work was done by pure "rule of thumb"; that the workman in the big majority of cases had no real intelligent interest in his work, and no means of knowing exactly what he was doing.

Personally, however, I found a great deal to interest me in the working out of the underlying laws of the various processes, and to this conscious use of brain power I attribute the fact that I was able very quickly to learn to operate all of the various machines in the industry.

Q HOW THE WORKER OFTEN VIEWS INNOVATIONS

The average workman, however, because he did not go into the industry equipped with technical training, could not of himself so easily work out the laws of the process. And while he was constantly desiring to have his ideas developed, he nevertheless found it difficult to express them, and therefore, because of the lack of encouragement, he soon became set in his ways and antagonistic to innovations.

What I say about papermaking I know from observation in other industries applies equally well to them, and the more specialized the work the less interest the worker shows. In many of our industries the worker is no longer a mechanic or a craftsman, but performs merely a series of motions in which there can be no pride because in the minds of the men these motions are only remotely related to the finished product.

John P. Burke, who is president of the Pulp, Sulphite and Paper Mill Workers' Union, expressed this thought very clearly in a letter which I received from him recently. I quote in part from Mr. Burke's letter:

"When I worked in the factories, which I did from the age of 12 to 25, one of the things I found the most dissatisfaction with was the deadening sameness of the work. I never remember a time, when working in the factories, that I became so interested in my work that I didn't long for quitting time to come.

"After leaving factory work I got a job with a building contractor. Becoming proficient as a carpenter, I time and again did certain work of more or less creative nature; I often became so interested in it that I paid no attention to quitting time. I have worked for two or three hours after the time when I might have quit work. There is joy in creative work."

This feeling of being an automaton, with a lack of responsibility that goes with it, is to my mind the greatest cause of the workman's dissatisfaction. Unfortunately, the workman has in too many cases accepted the state of affairs as inevitable and inherent in the modern industrial movement, so that his idea is to shorten the hours and raise the pay, in order to have as much time away from the work as possible to develop himself along the lines he really enjoys.

WHAT IS THE REAL MOTIVE THAT MAKES MEN WORK?

Every individual craves responsibility—this is the very foundation rock upon which individuality is built; but modern industry tends to take responsibility away from men and they cease to care—for there is nothing to care about. Of course, they can be made to work faster by giving production bonuses, but the production bonuses operate very much like the outer pressure which comes from low wage conditions. They are outer stimuli, whereas what we need is the inner desire, which is the real motive power of all individual creative activity.

A man cannot work from within, however, unless the work interests him, and the work cannot interest unless the man is using his mental as well as his physical powers. There is nothing creative about pure physical, muscular effort, as creative work begins only when the mental powers of selection and adaptation of means to ends come into play.

What, therefore, has happened to the creative spirit in the progress of industry from individual craftsmanship to infinitely divided, standardized, machine production?

The development of modern industry has taken away from man the opportunity to create a finished article. In other words, the man has become part of a larger individual which we may term an organization. An industrial organization that is performing a particular function in our industrial life is really creating as a whole what the individual man once created in its entirety. Therefore, if we are to enable this larger individual to do its creative work well, we must so design it that the greatest possible number of men are conscious of what the whole organization is doing. They must be conscious participators in the creative process of the organization, which must be so sensitively adjusted that it in turn will be conscious of the welfare of individual members, and of the degree, therefore, of their intelligent participation in the work.

We must give individuality to the organization, in order to give individuality to the men in the organization.

Of course, it is true that because of the creation of this larger industrial unit, with its accompanying specialization through the aid of mechanical devices, production has been enormously increased. But if through these same mechanical devices we destroy the individuality of the workman, the apparent advantage to society will soon be seen to be a disadvantage. We cannot get greater enjoyment out of life by simply increasing our possessions, but only by increasing our capacity for self-expression. Greater expression means manifestation of greater life and therefore a fuller realization of individual capacity which, after all, is what we are striving for.

It is useless for us to try to develop an *esprit de corps* in an organization by artificial means of a purely emotional nature. The only kind of an organization that will have a permanent *esprit de corps* is the kind where the creative power of the individual is freest to express his real inner spirit. Unless men intelligently participate in the productive process the organization cannot be efficient, for team work comes only when men work together not only with their muscles but also with their hearts and minds.

When we realize that every industrial organization is created by man and that he cannot create something of which he does not contain at least the essence within himself, it seems to me we have a right to take the human body as an example of the highest type of organization. Why not, then, pattern our system of control after the nervous system of the human body, through which the life impulses or vitalizing forces are distributed to the bodily structure?

A GOOD PATTERN FOR A SYSTEM OF CONTROL

The nervous system of the body is made up of three parts:

1. The sympathetic nervous system, which controls all the subjective or involuntary functions of the body, such as the beating of the heart, contraction and expansion of the blood vessels, and thousands of kindred functions, which are in a certain sense automatic.

2. The spinal cord, that part of the cerebrospinal nervous system controlling many of our reflex or semi-automatic functions, which we have by conscious effort learned to perfect, such as walking, riding a bicycle, playing a violin, and so forth. This system is the great connecting link and coordinating factor between the highest controlling nerve centre—the brain, and the more widely distributed functions of the individual groups of cells or organs immediately controlled by the sympathetic nervous system.

3. The cerebral part of the nervous system (the brain), which is the seat of our memory, through which most of our past experiences can be consciously recalled when needed to solve problems immediately confronting us. It is there-

fore the seat of our consciousness and volition.

These three parts of the nervous system of the body in the same order correspond (1) with the principle of general or universal activity, such as is exhibited by the myriads of body cells, each one of which conforms to the law of the body; (2) with the principle of individual specialized activity, which is reflected in the internal organization of the body cells into organs performing special functions; (3) the principle of unified activity, which coordinates both the general and specialized activities of the body—to form the one resultant personality that the philosopher calls the ego. It is this we mean when we say I am.

All of this may sound rather erudite and irrelevant to the subject of interesting men in their work, but it seems to me that if we are to understand the laws underlying human activity we must first understand the laws underlying individuality, and that if we are to understand the laws underlying individuality we must look for them in the highest type of individual that has been created, namely, man.

GIVING MEN A GREATER CHANCE TO EXPRESS THEMSELVES

Industrial organization, when consciously patterned after the organization of the human body, is bound to cease repressing the life principle in the individual workmen, for bodily organization in man does not repress the development of the individual cells or the development of the individual bodily organs, but works consciously to give them a greater chance to express life.

To continue the analogy between the organization in man, and the industrial organization created by man, I would like to call attention to the fact that man's body is made up,

First, of substance which functions according to exact natural law. This law must be obeyed if the individual is to express the greatest possible amount of life and vitality;

Second, bodily organs and structures which exhibit certain definite characteristics, these organs, of course, being created out of that material substance of which the body is composed; each organ, however, takes on individual characteristics, depending upon the function that it has to perform. This aspect of the body we might call the aspect of multiplicity, and the more highly organized is the body the greater the power of expression of the individual;

Third, the unity principle which uses the nervous system as its great channel of expression, bringing all parts of organized man into intimate and close relationships, associating and coordinating the parts with the spirit of the whole, restraining and accelerating all functions so that perfect equilibrium and balance may be maintained between inner and outer stimuli or impressions. Every man knows

that he is One. It is not an accident that both the letter "I" and the figure "1" are expressed by the same symbol, and the foregoing is merely a way of defining in physiological and psychological terms what everyone knows to be a fact. It is only when the nervous system is diseased, and therefore unable to keep proper balance between the various individualized bodily activities, that we are conscious of the lack of oneness or unity.

From this we see that every individual centre of life expresses itself in three aspects: the aspect of unity, the aspect of multiplicity (individual interior organization), and the aspect of substance, which modern science today is disclosing to be a universal form of activity. To illustrate what I mean, I will quote from an article on "Periodic Law"—the law which indicates that all chemical elements are created from one primordial substance. This quotation is taken from the *General Electric Review* and is written by Dr. Saul Dushman of their research laboratory.

"Considering the relationships exhibited by the different radio-active elements, one realizes that the dream of the alchemists may not have been as fatuous as has appeared until recently. The concept of an absolutely stable atom must be discarded once for all, and its place is taken by this miniature solar system, as it were, consisting of a central nucleus and one or more rings of electrons.

"But the nucleus itself is apparently the seat of immense forces, and in spite of its exceedingly infinitesimal dimensions it contains both alpha particles and electrons. Once in a while the nucleus of one of the atoms will spontaneously disintegrate and expel an alpha or beta particle.

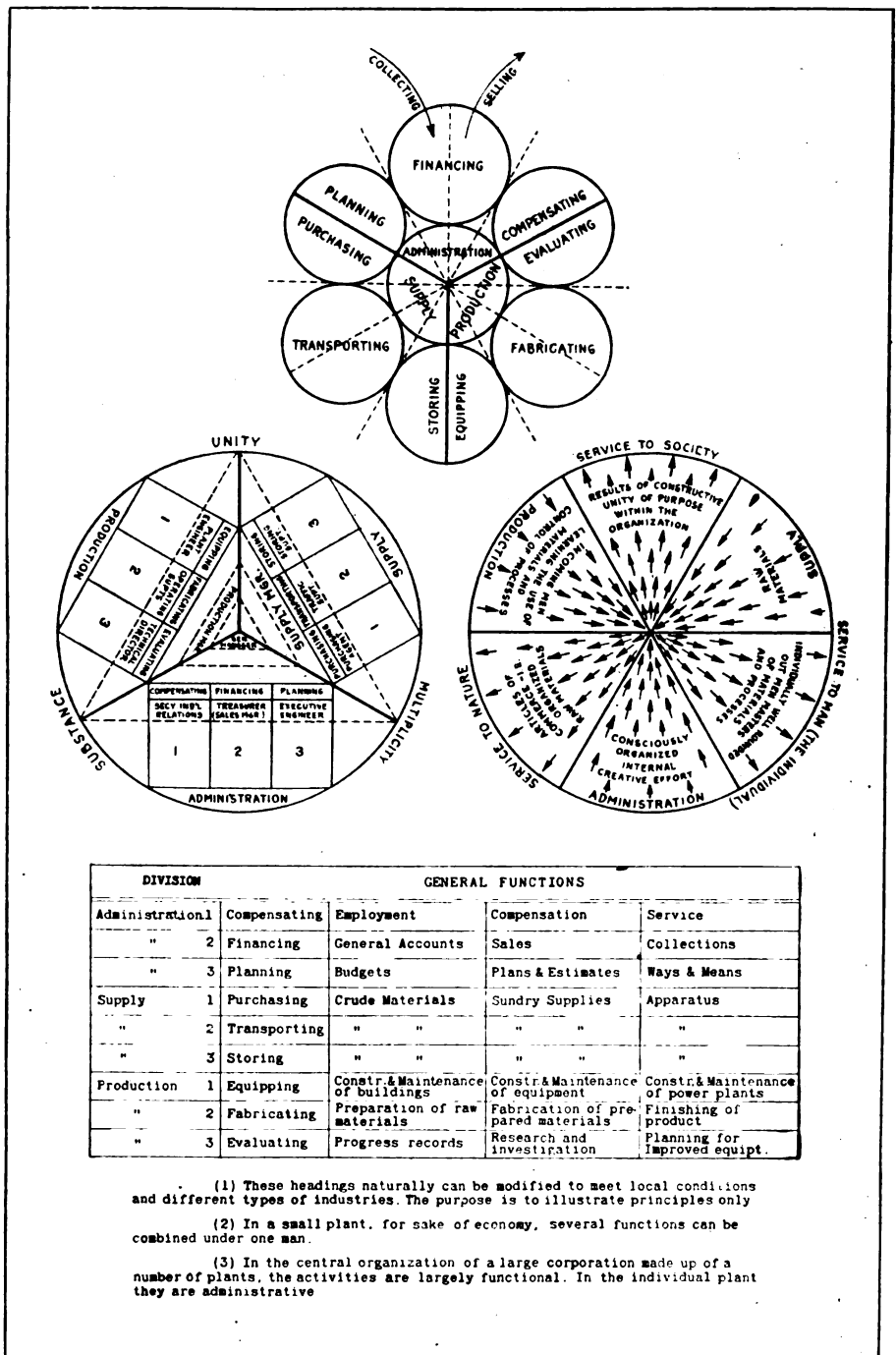
"A new element has been born. What causes these transformations? Can they be controlled? These are questions which only the future can answer. But if we had it in our power to remove two alpha particles from the atom of bismuth or any of its isotopes, not only would the dream of the alchemists be realized, but man would be in possession of such intensely powerful sources of energy that all of our coal mines, waterpowers, and explosives would become insignificant by comparison."

Put in less technical terms, this means that modern science has discovered that there is no dead or inert substance, but that the form and character taken by the various chemical elements is caused by their particular type of internal activity. Logically, when this manifestation of life stops, the atom ceases to exist. The internal character or vitality of the atom (or molecule) depends upon its rate of vibration; its form upon the direction of this vibration, that is the axes of growth, and its bulk or outer form upon the extreme limits of these vibrating paths.

Now let us turn to our industrial organization to see how this analogy must hold in order to obtain a high degree of creative power within the organization. The chart on this page is a convenient way of expressing the principles of unity, multiplicity, and substance. It will be noted that unity corresponds with the function of administration, multiplicity with production, and substance with supply.

Supply is naturally made up of three functions: purchasing, transporting, and storing.

Production: Of equipping, which has to do with plant design and naturally is more or less concentric with storing;



This chart—the circles, lines, and arrows of which you may at first glance think rather complicated—indicates graphically the principles underlying Mr. Wolf's philosophy of work. In his article he tells how he applies these principles

fabricating, which has to do with the organization of the individual parts; i.e., finished or partly prepared materials and evaluating, which has to do with the recording of individual operations with reference to quality, quantity and economy of performance,* assembling these for the purpose of research and investigation; and then giving unity and vitality to the productive process by providing means for the creation and design of more suitable operating equipment, thus completing the productive function that the plant is organized to perform.

(Note: I use the word *evaluation* because it is more comprehensive than "statistical"; it includes statistics but adds the implication of judgment based upon knowledge.)

Administration is made up of compensating, which has to do not only with employment and service, but also with the establishment of proper industrial relations within the organization from the point of view of reward for services rendered, in other words, the democratic carrying out of the law of compensation within the organization.

Financing has to do with the organization's relationship to its environment, or the general market, and therefore the assembly of all data for the finished cost statement of output; the disposal of the finished product at proper market prices, and the final collection of all the money due the organization for the

services that are being rendered. It is distinctly a unity function in the administrative branch of the organization. Planning is the third administrative function and has to do with the determining of ways and means for the proper disposition of the incoming financial returns for services rendered.

Q HOW THESE LAWS ARE PUT TO WORK

To record the laws in such a way that they are quickly available for use, the evaluating department uses graphical charts. In the production divisions the graphical department is the memory and corresponds to the cerebral part of the nervous system. Of course the production progress records which are given to men and groups of men throughout the plant are the means of releasing intelligent thought wherever a particular operation is performed. These records insure proper functioning without direction from the conscious mind of the organization, so correspond to the reflex action of the spinal cord. The sympathetic system of the production division is the system of daily reminders not to forget to do certain things, which experience has taught us are necessary as a matter of routine. We call this our plant "tickler" system and through its means not only release creative power by relieving our department heads of the burden of remembering routine work, but insure against forgetting important operations which should be repeated at regular intervals.

Just as evaluating and compensating are more or less concentric functions, as they are the point of contact with the production and administrative divisions, so planning and purchasing are also concentric functions.

The stream of finished product, after proper evaluation, passes out through the selling side of the financing function, and the reward for the service rendered by the organization comes in on the collecting or receiving side, which contacts the planning sphere of the larger organization. Of course, by the operation of the law of cause and effect the greater the service rendered the greater the reward.

This is the basic law of life as it is known to all engineers and scientists. We call it the law of the conservation of energy on the material plane. The philosopher who deals with mental concepts calls it the law of compensation. No one can escape the working of this law.

The employer may pursue the shortsighted policy of preventing the employee from using his brains in his work and thereby hold his compensation down to a low level, but he does not gain one single advantage by doing so. The result is simply to repress creative effort and, what is even worse, to deflect creative power into destructive channels.

Practically all the destructive forces at work in the industrial world today, which are manifesting in organized efforts

to reduce production, are the results of this autocratic domination of the wills of the workmen by forcing them into an environment where free self-expression is an impossibility.

By destructive forces, I mean the sabotage methods exhibited by certain aspects of the I. W. W. and Bolsheviki movements. We cannot repress the creative process in the individual; we can only deflect it into useless channels, or what is worse still, into destructive channels.

For example: Let us liken the individual to a steam power plant, into the boilers of which fuel (food) and water are constantly being fed to keep up the internal energy. This power plant can do useful work by allowing the result of this internal combustion (digestion and respiration), the steam, to pass through the cylinders of the engine, thereby making the energy in the fuel available for useful work. If, however, the steam pipe to the engine is plugged and the boilers are still being fired, by properly bringing together fuel, air and water, we must allow the steam (energy) to escape through the safety valve, and so dissipate it into the surrounding atmosphere.

Q —UNLESS THERE IS AN OPPORTUNITY FOR EXPRESSION

The word dissipate is significant when applied to man. If this relief is not provided, the accumulated pressure will build up until the whole plant will explode and destroy itself, and in so doing may destroy and injure many other useful devices which have been laboriously created by man.

The employer who dams up the channels to useful constructive work by preventing intelligent (conscious) self-expression of the individual workman, is just as sensible as the engineer who shuts off his main steam valve to the engine and then sits on the safety valve of the boiler. The laws of nature are destined to operate always in the same way, and if a man wilfully disobeys them, they will break him. "Ignorance of the law is no excuse," for an all-wise Providence (the universal principle of unity) gave to man the power to work with or against the natural law, and therefore was compelled to predetermine the exact operation of this law, which science designates as the law of evolution.

All of this is for man's benefit, however, for nature serves him in proportion to his knowledge and intelligent use of her laws. If they change from day to day, he could not increase his knowledge, and then, indeed, our condition would be hopeless.

As previously indicated, the higher creative power in man is a mental process and lies in his intelligent adaptation of means to ends; he does not create matter or force, the universal energies so graphically depicted by Dr. Dushman (quoted above), but he does by study or conscious observation of the laws under-

lying these natural phenomena, learn how nature works.

Through the use of his memory—the faculty of recalling past experience for the purpose of solving the problem immediately confronting—he can tell what to do if he wants to produce (create) combinations of natural elements that do not occur spontaneously in nature—this is what the horticulturist does. He studies nature's laws in action and then works with them. It is the specializing power of the will of man that literally created the wonderful, juicy apple of today. The uncultivated apple orchard, however, reverts to its original wild state, when this originating, choosing, and adapting faculty of man is removed. "Nature unaided fails" is a world old proverb, the proof of which modern science is bringing home to us today.

Q HOW THE MEN FOUND AN ANSWER TO ONE PROBLEM

Take a different kind of illustration from the wood pulp industry. Some years ago the men who cooked our digesters, in which the wood is disintegrated, observed the natural law that if we increased the strength of the cooking acid, we would be able to decrease the cooking time. This information, because of the unity of our plant organization, came to the attention of the men in the acid plant, who began to study the operation of the laws governing the absorption of sulphur dioxide gas in water.

The acid makers, who had records of past experience before them, recalled the fact that in winter the acid was stronger than in summer. From this we reasoned that if we could create, by artificial means, the low temperatures in our acid-absorbing systems that we had in winter, we would be able to maintain a uniformly strong acid all the year around. Knowing that natural laws never change, we were able to prophesy ahead what would happen if we reduced these temperatures, and, what is more important, we were able to figure out just what size refrigerating plant to install to reproduce the winter conditions.

What we actually did because of this knowledge of natural law, was to re-create the whole acid-making process, and the refrigerating plant we installed—while it cost us nearly \$60,000—was paid for by the increased productiveness of the pulp mill in a period of less than 90 days!

These illustrations will show what I mean by the creative power of the intellect, and how, while man does not create material substance, he does actually create combinations of material substances which did not exist and which could not exist without the aid of his powers of observation and selection. Unless we accept the illogical premise that man's only mission in life is to reproduce his kind, we cannot fail to see that his creative power must have another outlet. What other outlet is there than

that of mental creation—just described?

Before leaving the diagram to give more specific illustrations as to how creative power can be released in the individual workman, look at the striking analogy to the whole human body. I am well aware that direct comparisons to the human body are apt to be "far-fetched," but this is not the case when we compare principles only.

The whole supply division refers to what is taken in by the aid of the special senses. Purchasing corresponds to the complete digestive apparatus; transporting to the blood stream and its attendant vascular system which transports the food to the place where it is finally stored up in the cells which form the body—the storing function.

Q PRODUCTION—HOW IT CORRESPONDS TO HUMAN FUNCTIONS

The production aspect of the organization refers to the arrangement or organization of these body cells into differentiated parts. Equipping, which has to do with plant structure or design, corresponds to the main body structure, such as head, arms, legs, skeleton; fabrication, which has to do with internal arrangements within the buildings, such as boilers, engines, digesters, machine tools, corresponds with the internal body organs, such as stomach, lungs, heart, kidneys, whose functionings form the internal individualized activities of the body; and evaluation to the whole glandular system, the secretions from which give vitality to the individual. Without these vitalizing and humanizing glandular secretions it would be impossible for the man to produce that which it is his particular mission in life to produce.

Referring now to administration which, of course, corresponds to the nervous system in its entirety, we see that compensation corresponds to the sympathetic system which permeates the entire body. It is concentric with evaluation, and because of this fact is enabled to adjudge values in accordance with actual performance. In a very real sense it keeps a proper evaluation or balancing of body activities.

Similarly, if we are to keep a vital flow of creative fluid in our industrial organization we must, after a proper evaluation of work performed by the individuals of which it is composed, see to the determination of the proper financial compensation for services rendered. When men feel they are not being treated fairly they cannot be expected to put enthusiasm into their work. Naturally then, under conditions of improper evaluation of performance (for the purpose of arriving at just compensation) the amount of constructive, creative power will be automatically reduced.

The next branch of administration, finance, whose function has been previously described, of course corresponds to the brain or cortical system, where all resul-

tant records are kept. The conscious contact of man (the individual life) with the universal life is through the brain; so also is the conscious contact of the industrial organization with the world of commerce and industry through the financial department.

Finally, the planning function of the administration nervous system corresponds to the central or spinal nerves whose particular function is the control of internal individualized operations. The reason for its connection with the purchasing function of the supply division is obvious.

Now, to return to man's place in the organization into which he must consciously fit himself if he is to cooperate in its perfection. We must first remember that the whole diagram symbolizes humanity in action. And while all the activities are human, we are concerned mostly with the production division, as here is where the least opportunity for creative work exists as industry today is in the main constituted. The executives as a rule have plenty of opportunity to express their individuality in creative work, as do those in charge of the supply division, although in a lesser degree. But in the production divisions, where by far the larger number of men are employed, the creative work is largely confined to the superintendents and department heads, and even these men are in all too many cases limited in their activities by the red tape imposed by those higher up.

Q HOW "RED TAPE" ORIGINATED—AND THE HARM IT MAY DO

In any individual plant red tape is usually the result of the over-development of administrative power, which makes rules and regulations preventing the spontaneous self-expression of the individual.

It may also result—in fact often does result—from over-emphasizing the power of the supply division, especially the purchasing department section, which frequently fails to recognize that efficient operation depends on the operating departments receiving those materials which they know from experience to give the best results.

Or, if the production divisions are given too much authority, and have not sufficient intelligent information about the relative value of the materials, they may through mere prejudice tie the hands of the supply division, so that it cannot properly serve the organization. Red tape from this latter source, however, is much less apt to cause trouble than the over-development of the administration or supply divisions, for the practical operator being close to the work of conversion has more first-hand information as to his material requirements, and he, of all others, should be given the greatest freedom of choice and selection.

Obviously, the remedy for red tape lies in increasing each man's conscious-

ness of his place in the organization, so that instead of selfishly reaching out for more power to rule or exploit others he will direct his energies to creating a department which will render the greatest possible amount of service to the organization. We might call this enlightened self-interest, for naturally the greater the service the greater the reward.

Q THE GREATEST LEADER IS THE GREATEST SERVANT

This fact can not be too strongly emphasized. The greatest man in the organization is undoubtedly the one to whom the greatest number of men look for intelligent leadership. He is therefore the greatest servant.

The organization having the greatest creative power is the one in which administration, supply, and production are all equally developed functions, as represented by the equilateral triangle within the circle, pictured on page 36, which symbolizes the unified field of activity of the whole organization.

Now proceed to the actual illustrations of how in our mills we were able to work out with our men the kind of progress records which enabled them to know what they were accomplishing. This work was done in direct cooperation with our men, and it is significant that their sympathetic interest in the work came from a realization that it meant greater opportunity to use their brain power, and more chance, therefore, for individual development.

While we have many other progress records, the one which I will illustrate is typical, and will serve to show the methods.* For those who may feel that such records are applicable only to a continuous process, let me say that in the maintenance and construction department, where we had about 300 men at work, we kept everyone informed as to his progress by giving cost records of all jobs done, not only labor costs, but complete material costs, as well.

These records were furnished daily, and while we did not pay bonuses of any kind, not even to superintendents or department heads, we actually cut the maintenance material costs in two by the greater thought of economy released in the organization. We are installing these job costs and department cost sheets now in our mills in Canada, for we know that the only way to produce the greatest possible amount of the finest quality of paper at the lowest cost a ton is to give the maximum amount of intelligent information to the largest number of men.

(To be concluded in February)

*The best example of this type of organization in the country is in the mill of the Fletcher Paper Company, at Alpena, Michigan. The clear vision and fine spirit of Mr. Henry E. Fletcher, the general manager and treasurer, is responsible for its development. It has been my privilege to be associated with Mr. Fletcher in some work for the United States government recently, and I wish to take this opportunity to acknowledge his assistance in presenting this subject, especially in the classification of the three divisions of organization.

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THE MAGAZINE OF BUSINESS



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THE MAGAZINE OF BUSINESS



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IN January *SYSTEM* a British business man told what opportunities the American business man now has for trade in England. Next month a South American business man, Jorge A. Mitre, shown here, will tell what fields for American goods are open in South America. Mr. Mitre is the editor and owner of *La Nación*, a daily newspaper of Buenos Aires

WHY THEIR BUSINESS GREW

"SEVERAL months ago," Tom G. Moore, of the Moore-Summers Hardware Company of Welch, W. Va., writes, "we wrote and asked you for information on ways of changing from a credit to a cash basis.

"You referred us to a number of articles which proved very helpful. As a result of reading them, we sent out, 15 days apart, three circulars explaining our new policy to our customers. The first circular announced the passing away of 'Mr. Credit,' and enumerated the 'complications causing his death'—too many accounts lost, fees paid attorneys for collecting, too much capital tied up in accounts, taxes on accounts, and others.

"The second circular showed the customer why he can be given lower prices when everyone pays cash. The third mailing was a short announcement of the new cash system.

"During two of the three months that we have had the plan in operation, our volume of sales has been greater than formerly; its failure to come up during the third month we attribute to the influenza epidemic."

IDEAS THAT MAKE FRIENDS

"THE 'What I Would Do' columns in *SYSTEM* advance many ideas which I change to suit my business," wrote Abe Kaufman, president of Kaufman Specials, Memphis, Tenn., to the editors recently.

"There are many ideas, too, that I clip and send to my friends. Those for bankers particularly bring me good will.

"Then, of course, many suggestions come to me from the longer articles. I used, for instance, the five collection letters quoted in an article by Norman Lewis, 'How Can We Collect that Money?' which appeared in the December, 1917, issue of *SYSTEM*. They brought me very good results."

FOR SERVICE RECEIVED

"I HAVE been a regular reader of *SYSTEM* for a number of years, and a subscriber for over a year," wrote Chris

M. Anderson of The Flagler Lumber Company of Flagler, Colorado, when he sent in a contribution recently.

"Although there are not many articles dealing especially with our line of business—lumber—it is possible to apply the same principles to this business. In fact, the principles of business are much the same in any line of endeavor, regardless of the difference in methods and material handled.

"I certainly get a lot of good from *SYSTEM*, and I have been thinking that it was no more than right that I should contribute something to this store from which I have received so much good. The essence of cooperation is 'giving to get.'"

IT COULDN'T BE TRUE!

A NUMBER of readers have called attention to an obvious error on page 823 of December *SYSTEM*. The statement was that by eliminating one of three fender clips formerly considered necessary on certain kinds of bicycles, the manufacturers would be able to save 250,000,000 tons of steel the coming year. Through error, the saving was multiplied by a million: it should have read "250 tons."

"WHY NOT?"

G. W. GREENWOOD, manager of the G. United Firebrick Company of Uniontown, Pennsylvania, told one of the editors the other day how he introduced a *SYSTEM* executive to a friend.

Mr. Greenwood had just been reading one of the "V. W." fiction articles that appeared in July and August of last year when he met a friend, a state senator of Pennsylvania. He told the senator about "V. W.," advising him to read the stories and adding that he "wouldn't stop until he had finished."

Several days later Mr. Greenwood met the senator, who told him he was going right out to see the manager of his farm, and say to him: "Why not? Now go ahead and make some money." "Why not?" were "V. W.'s" encouraging words to executives who wanted to try out new plans.

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MAKING MEN LIKE THEIR JOBS

By ROBERT B. WOLF, M. E.

CHARLES M. SCHWAB said in a recent interview:

"I know something about making steel, but I don't know any where near as much as the millions of steel workers know. No man can know as much as the crowd knows. No one can do as much as the crowd can do. The real leader is not the man who substitutes his own will and his own brain for the will and intelligence of the crowd, but the one who releases the energies within the crowd so that the will of the crowd can be expressed."

When Mr. Schwab used the word "crowd" he did not mean an unorganized mob. He recognizes that the crowd is composed of individuals, and that the problem of management is therefore how to release through organized effort the greatest possible amount of individual intelligence. The mass man can find expression only through the unit man, and just as the intelligence of an organization is but the sum of the intelligences of its individual members, so is the intelligence of humanity as a whole but the sum of the intelligences of the individuals composing it.

I will now illustrate the method of keeping progress records on our paper machines. The publishers are very particular about the weight of the paper. A ream to be satisfactory should weigh exactly 32 pounds. Paper that is lighter is apt to cause breaks in the press room. If it runs heavier, the paper cost for each edition will be high. Furthermore, if the paper is very dry it becomes brittle, and is apt to break.

The dryness, too, prevents the paper from taking a good finish. As a result, the surface will "fuzz" up and fine particles will come off on the printing press and cause trouble by filling up the type and meshes in the cuts.

In the ordinary course of events the publisher sends his complaint in to the sales office, where it is passed on to the manager's office. The matter is then taken up with the superintendent, and he passes the "kick" along to the boss machine tender. It finally reaches the machine tender, or backtender, or any member of the machine crew who is responsible. This process has to be repeated constantly in order to maintain a uniform quality of paper.

Obviously, therefore, the trouble was due to lack of interest upon the part of the men operating the machines in keeping the operating conditions where they should be. This lack of interest came largely from a lack of knowledge as to what the conditions actually were. We determined, therefore, that more samples should be taken, to give the machine crews more continuous information.

The usual method is for the backtender to take a sample of paper, every time a reel is changed, weigh it, and let the machine tender know the result. The machine tender then turns on or

This article describes specific methods developed and used successfully to get men to take a real interest in their work. These methods have had far-reaching results, which the author describes. The editors feel that Mr. Wolf presents an extremely important message for all employers. In the first installment of his article, published last month, he outlined the fundamental laws and principles on which the methods described here are based. -Mr. Wolf is manager of the Spanish River Pulp and Paper Mills, Ltd., of Sault Ste. Marie, Ontario, Canada

shuts off stock, according to whether the sample is heavy or light. A sample from the front, middle, and back of the sheet is taken occasionally, but, as a rule, not as often as it should be, largely because the men have not the time.

From previous experience we knew that the problem was to produce a desire upon the part of the machine crew to get the required results, so we put on each shift a man (one for every two paper machines) to take samples every time a reel was changed from the front, middle and back of the sheet, these three samples being weighed and recorded, as shown in the reel record on page 223.

These forms are kept in the machine room at the end of the paper machine. While the sample testers are instructed in the work by the Research Department, they are controlled by the boss machine tender and are largely recruited from the machine crews. In our mills they are members of the labor unions.

HOW EMPLOYERS CAN INTEREST EMPLOYEES IN THEIR WORK

There is no thought in the minds of our men, therefore, that this is a follow-up system designed to enable the management to find fault with the workmen. They recognize it as a system to help them to get information which they have not had time to get for themselves, and which they must have in order to do their work intelligently. In other words, we were recording the facts which enabled the operators to recognize the natural laws underlying the process.

The notes on the reel record shown explain fully how this record is kept, so no further explanation is necessary, except to say that the suggestions regarding the moisture test in addition to the weight came from one of the international officers of the Paper Makers' Union. It has proven to be a great help, for previously the only way the backtender could tell anything about the moisture content of the sheet was to "feel" it as it passed from the calendar stack to the reel.

Of course, no record of this "feel" could be made to enable the backtender to tell how well his work was being done, so there was no particular reason why he should be interested in this part of his work. It is only the exceptional man who has imagination enough to create within himself a consciousness of his progress.

The intelligent interest that men in all departments take in creating better operating conditions, when encouraged through the progress records to do so, it seems to me demonstrates conclusively that the employer has everything to gain and nothing to lose by making his industry thoroughly democratic. The attitude of secrecy is repugnant to a free people, for it savors too much of exploitation. With everything open and aboveboard there can be no feeling of mutual suspicion and distrust.

I believe we have failed to recognize the curative properties of knowledge and truth. Just as darkness cannot exist in the presence of light, so ignorance and prejudice cannot exist when met by frankness and cooperation.

The employer is an individual, generally a very strong character. I believe, however, that his usual disregard for the individuality of the workman comes largely from the fact that he has been so engrossed in the task of creating an efficient organization to express his own individuality that he has entirely overlooked the fact that in the creation of this thing he has forgotten to extend the same privilege to his employees. If he only stops to think of it he will recognize at once that he cannot hope to get the initiative of the workman except by giving him a similar privilege of seeing his own creations grow, either by leaving the impress of his personality upon the article produced or upon the progress record of his work.

The workman has combined against the employer in order to obtain the freedom which he sees steadily being taken away from him, as industry tends more and more to make automatons of men; and the unfortunate part of it all is that he has accepted in all too many cases the premise that this tendency is logical and, therefore, inevitable.

Probably the reason the average employer is opposed to labor unions is that he is afraid that the restrictions which he thinks the unions seek to impose will take away his own opportunity for self-expression by preventing him from working out his problems in his own way.

Furthermore, if the unions can demonstrate, as they have in our plants, that this fear is founded, but that on the contrary their united cooperative effort

REEL RECORD

Tour No. / Machine No. / Machine Tender WAITE Date OCT 15 1917

Time	Reel	Uniformity Record			Weight of Samples					Total Weight		Weight Record		Percent Moisture			Moisture Record			Pop Test		
		1	2	Average	1	2	3	4	5	Reel Average	Average for Day	Reel Record	Average Record	Roll	Reel	Average	Reel	Average	Test	Reel	Average	
8:20	1	30.0	90.0	65.0	30.75	29.00	28.50			29	50	50.0	50.0	7.5	6.5	6.5	62.5	62.5	37	35		
9:00	2	70.0	60.0	65.0	33.25	32.50	31.25			33	33	74.0	74.0	8.0	8.0	6.5	100.0	62.5	41	38	35	
9:40	3	70.0	100.0	85.0	30.75	30.00	30.00			30	25	66.0	62.0	7.7	6.4	7.2	60.0	81.2	40	32	36	
10:20	4	100.0	50.0	75.0	30.25	29.00	30.25			29	83	56.0	63.3	6.7	5.9	7.0	222.5	74.2	37	34	35	
11:00	5	70.0	90.0	80.0	31.75	30.75	31.00			31	17	84.0	66.0	5.9	5.9	6.7	270.0	67.5	38	32	35	
11:40	6	50.0	80.0	65.0	32.50	31.25	30.75			31	50	92.0	70.3	6.0	6.1	6.5	52.5	63.5	36	33	34	
12:20	7	100.0	50.0	75.0	30.25	31.00	32.25			31	83	96.0	77.4	7.0	7.4	6.6	85.0	65.0	33	31	32	
12:55	8	90.0	80.0	85.0	31.75	31.00	31.50			31	92	88.0	75.7	7.1	6.6	6.6	65.0	65.0	34	32	32	
1:25	9	90.0	90.0	90.0	30.25	30.75	30.50			30	50	70.0	75.1	6.4	6.5	6.5	62.5	69.7	31	31	33	
2:15	10	70.0	80.0	75.0	32.75	31.50	32.00			32	08	98.0	77.4	6.9	6.5	6.6	582.5	64.7	30	29	33	
2:55	11	70.0	80.0	75.0	33.25	32.00	32.50			31	41	774.0	77.4	6.3	6.5	6.5	645.0	64.5	31	31	33	
3:30	12	60.0	90.0	75.0	31.75	30.50	30.75			31	00	80.0	78.5	6.8	5.9	6.7	47.5	66.4	32	31	33	
	13	Total			905.0					374	99	31	25	77.7	6.6	6.6	777.5	64.8	296	296	33	
	14	Ave.			75.4																	

TIME OF TAKING SAMPLE WHEN SHEET IS BROKEN DOWN TO START ANOTHER REEL.
 CONTINUOUS REEL NUMBERS FOR SHIFT
 FIGURES OBTAINED BY CALLING MIDDLE (NUMERAL) WT. NORMAL AND COMPARING OTHER TWO TO IT
 10 POINTS OFF FOR EACH 1/4 LB. HEAVY OR LIGHT
 TOP FIGURES WEIGHT AT FRONT BEFORE DRYING BOT. AFTER DRYING
 DITTO - MIDDLE OF SHEET
 DITTO - BACK OF SHEET
 EXTRA COLUMN FOR WIDE MACHINES
 TOP FIGURES AVER. OF FRONT, MIDDLE & BACK. BOT. ACCUMULATED TOTALS FOR PURPOSE OF OBTAINING AVER. TO DATE.
 SHIFT AVERAGE
 FIGURE OBTAINED BY CALLING 32# - 100 AND TAKING OFF 20 POINTS FOR EACH POUND HEAVY OR LIGHT
 SHIFT AVERAGE
 MOISTURE TEST OF EACH SAMPLE AVERAGE OF EACH 3 SAMPLES AND ACCUMULATED TOTALS
 SHIFT AVERAGE
 8% = 100-20 POINTS OFF FOR EACH % OVER OR UNDER
 SHIFT AVERAGE
 STRENGTH TEST OF SHEET FOR MACHINE - TENDER'S INFORMATION

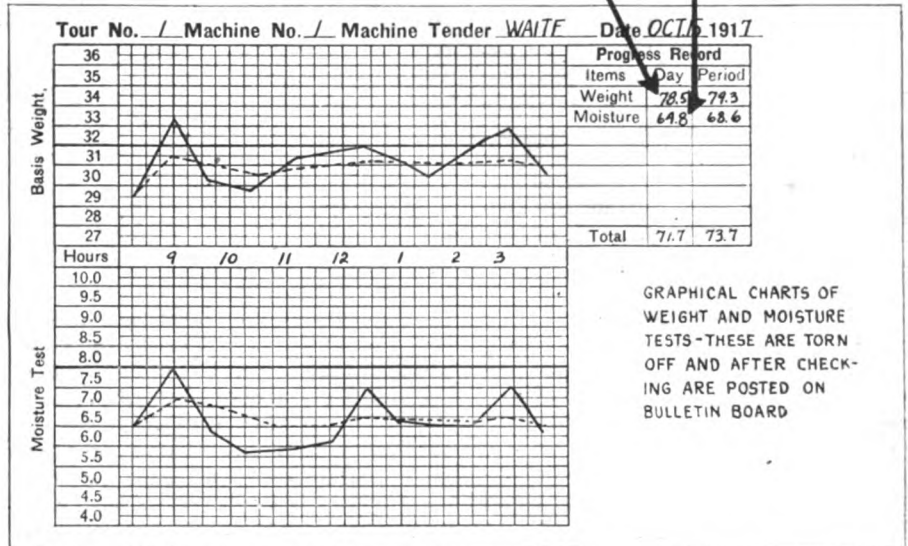
A CHECK THAT HELPS

Constant records of variations in the product enabled the men to discover the means of making both product and process more uniform. These forms were used in paper making, and the principles apply in other lines of manufacturing

helps to develop *esprit de corps*, would not this antagonism on the part of the employer disappear?

The progressive improvements shown in the charts on this page and the following indicate clearly the increasing interest in the work, and how completely the man has become master of the machine. That this improvement is due to increasing interest alone is borne out by the fact that we do not pay a man more money for a good record, but pay the prevailing union scale for all positions in our plants. These are adjusted each spring by joint conferences with our men. In this way we keep a proper wage balance between the different classes of work in proportion to the skill required, and as a consequence avoid all the innumerable difficulties which confront the piecework system, task and bonus plan, and other direct payment methods.

It is often argued that it is not right to pay a good man the same rate as a poor



man and to this I absolutely agree; but the fact is that when these progress records are furnished to men, all men in a certain operating class finally come to be practically equal in performance and the differences will be only between the amount of skill required in each different class of work. And in these classes there is a difference in compensation.

Invariably the competition is keen enough on all quality records to bring

nearly all the men (who have been at the work a sufficient length of time to become expert) practically to the same degree of proficiency.

The period is four weeks and the average to date begins all over again at the end of each four weeks' period. The reason for indicating the standing of the men on a period average rather than the day's average is that it tends toward greater continuity of effort, which in

itself is a source of much greater satisfaction to the workman.

It is the steady progress that really counts and not the spasmodic, spectacular high record for any one day. The record, to give joy to the worker, must reflect the constant, steady inner urge which indicates the degree of his mastery of the forces he controls in the day's work.

The "uniformity" record shown first in the three charts to the right of the page came as the result of suggestions from our men after the weight and moisture records had been in use for some time, and we purposely left other spaces in the progress records attached to the charts. We knew that we would be sure to have requests from our men for other factors which they would like recorded. While we have not had time to work them out as yet, we have already had a number of suggestions. We find that the greater number of factors or laws that we record, the greater is the interest in the work, because it brings to bear upon the problem a greater amount of thought.

WHAT KINDS OF RECORDS PRODUCE GREATEST EFFORT

The "basis weight" and "moisture test" records had been operating only a short time when the machine tenders called our attention to the fact that they could get better results if the stock thickness or density furnished them by the beater room was more uniform. They asked us to find a way to measure the thickness of the stock so that the beater engineer could do his work better.

As a result of this suggestion, and after discussing the matter with the beater engineer, our research department has tackled the problem of measuring this stock thickness and it is now practically solved. The beater engineer immediately suggested to us that the variation in the stock thickness which was furnished him by the sulphite pulp mill and ground-wood pulp mill was not uniform, and that we should find some way of recording the thickness at these points.

We found that to do this we had to increase the amount of agitation in the pulp-storage tanks, and as a result are making some radical improvements which will tend to produce greater uniformity throughout the entire process.

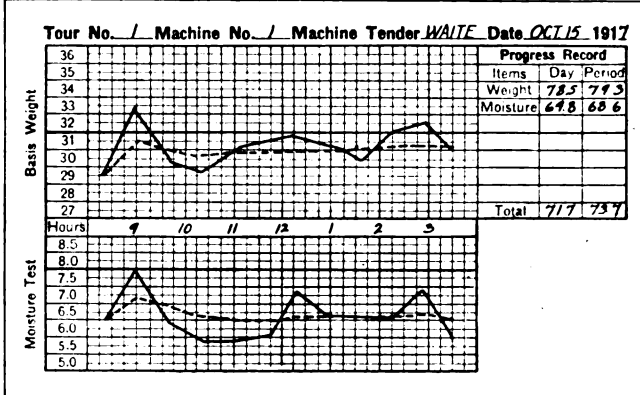
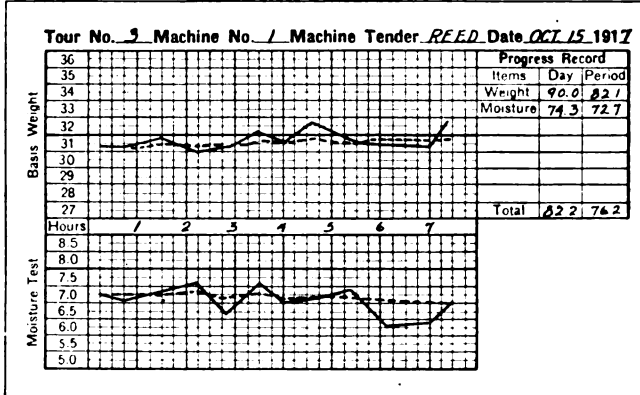
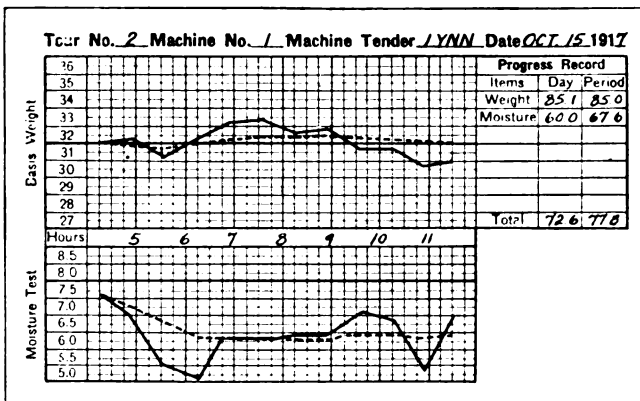
Right here it might be well to call attention to the fact that our experience has been that men do not have to be stimulated to make suggestions by offering prizes. They are glad to suggest improvements, for in this way they are helping to create conditions in the plant which help them to get better results (the results being indicated by their progress records). Then, too, they are sure to receive recognition for their suggestions, for the foreman knows our judgment of his ability depends largely upon how he succeeds in getting his men to use their brains. He naturally hastens to give credit for all suggestions made.

Of course, it goes without saying that this greater uniformity is bound to result not only in a better quality of paper, but in increased output as well; in fact one of our mills, without making any changes in the speed of the paper machines, has already increased its output over 5% because of the uniform operating conditions.

We have further made the discovery that what we call the slowness or freeness of the stock has quite a bearing on the quality of the paper as it comes off the paper machines, and as a result we adopted a method which would record this slowness and freeness. By free stock I mean stock that the water leaves rapidly and by slow stock a stock which the water leaves slowly. We found incidentally that this slowness and freeness is one of the best indexes of the quality of the groundwood pulp, and we are now working upon a series of factors which will record the operations of the grinders upon which the wood blocks are reduced to pulp.

This work has always been one of the most uninteresting and monotonous jobs in the plant, but from the small amount of work we have already been able to do, we find increasing interest upon the part of the worker, and I feel free to prophesy that when these several factors have been recorded, we will convert this into one of the most interesting jobs in the plant. I base this prophecy on my previous experience in another plant where we recorded hundreds of operations. These records we found to be grouped under three general classes: quantity records, quality records, and economy records.

Quality records (which occupy the middle position) are, perhaps, of the greatest importance, for they bring the individual's intelligence (brain power) to bear upon the problem and as a consequence, by removing the obstacles to uniformity of quality, remove at the same time the obstructions to increased output. The creative power of the human



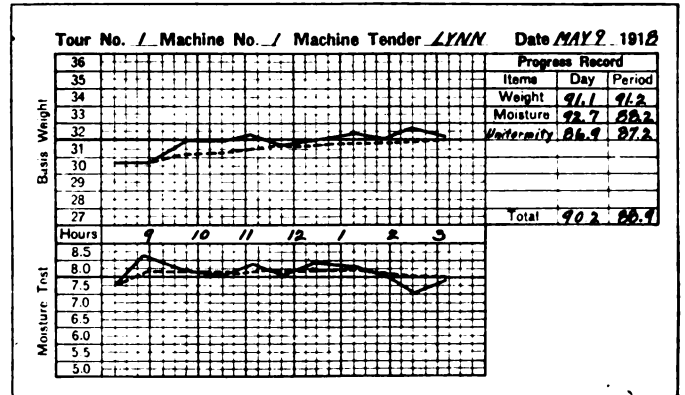
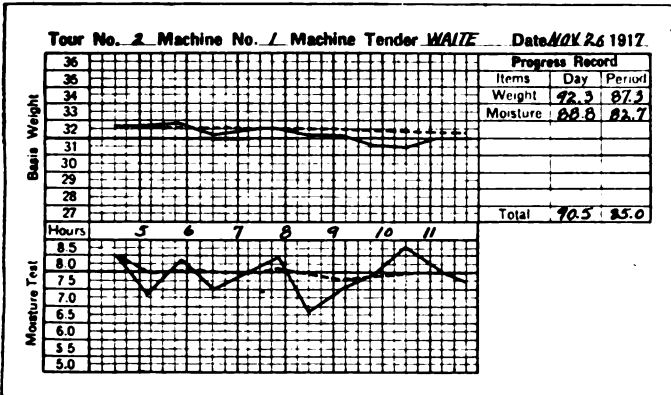
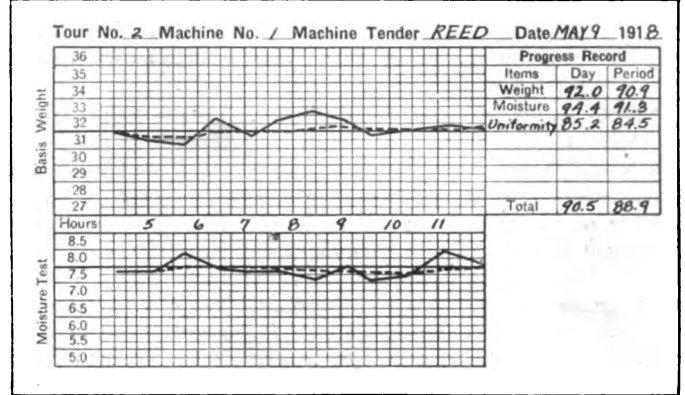
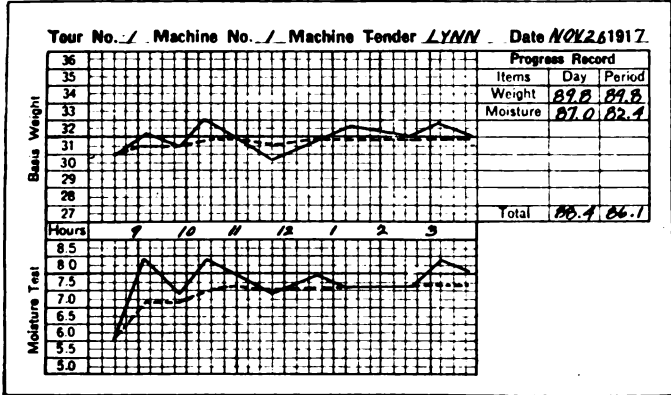
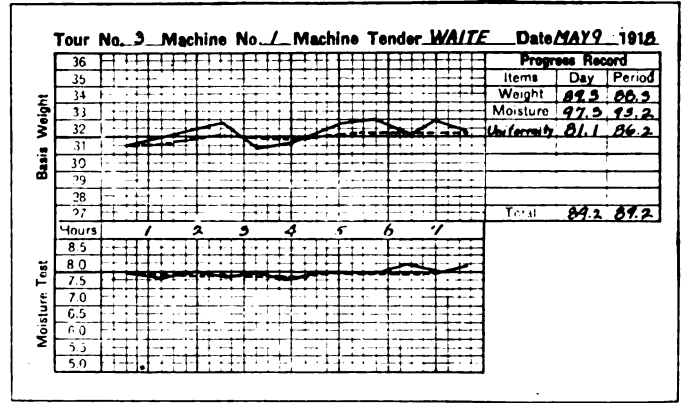
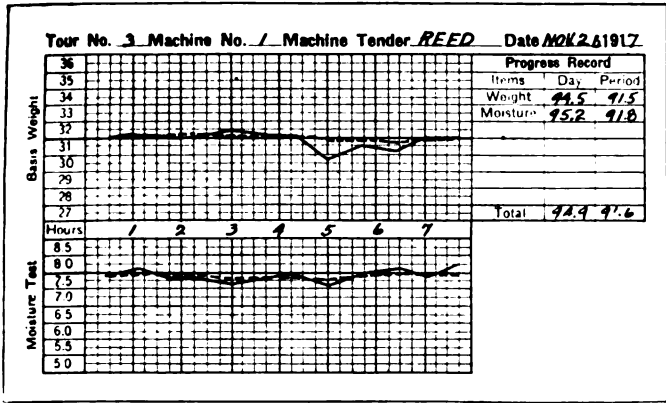
MASTERS: MEN OR MACHINES?

Machine records like these used to be typical in a paper mill. Now they are like those shown on the next page

mind is, however, not content simply to produce the best quality under existing conditions of plant operation. So the desire to create new conditions for the more highly specialized working out of the natural laws of the process demands expression, and this expression at once takes the form of suggestions for improvements in mechanical devices.

This desire contains within it the germ of economic thought which will unfold and express itself eventually in a request for cost records, and the organization that neglects its opportunity to satisfy this desire is overlooking one of the great avenues leading toward intelligent productive effort.

Because of the interrelation of quality, quantity, and economy records, any complete record of individual progress must, of course, take them all into account. However, as this is not always practical,



BY MAKING THE MEN MASTERS OF THEIR MACHINES

When the machine was master of the three workers whose October records are shown on the opposite page, the highest average attained was 77.8. Introducing the worker's individuality moved all the averages above 88 by May

we have at least one of three ways of measuring progress always open to us.

As further illustrating the necessity for giving individual records to the men, we discovered that the backtenders who sometimes work on other shifts than their regular ones lost interest in their records to a certain extent when on a different shift. Therefore, a request came to keep the backtenders' records separately, so that no matter what machine tender he worked for, his record would follow him.

This was done, and the two records of November 26 and May 9, reproduced on this page, show clearly not only the gains made but the increasing competition for a good record. Other factors under control of the backtenders have been already suggested for recording, and these we are planning to work upon as soon as our Research department has had time to develop a plan.

We had an interesting experience with one of our backtenders which illustrates how men appreciate these progress records. At one plant we have two small 120-inch machines. At another our narrowest machine is 164-inch and the widest 198-inch. Whenever we have openings on these wide machines, which pay more money for backtenders, we like to advance our own men.

One of our men went from the former mill to the latter. His machine tender, who told me the story, said he noticed this man ran his paper much more uniformly than any backtender he had ever had as regards moisture test. Upon inquiring where he had learned to run paper so uniformly, he explained our plan for letting backtenders know just what the moisture was every time a reel was changed. He said the scheme was "great" and he hoped they would start it at this plant.

Mistakes in records cause a lack of confidence. We overcame this trouble by giving "accuracy" records to the "sample tester." We had the Research department check over the number of mistakes made each day in the "reel record" sheets. A perfect score with no mistakes we call 100; 2½ points were taken off for every mistake. An average of eight or ten mistakes a day was a common occurrence and almost immediately this changed so that today a mistake is decidedly the exception.

Now to go back to our original premise that it is necessary to teach man his place in the organization. These paper-machine records enabled the machine tender to become a conscious participator in the entire process of production. The individuality of the plant, it must be remembered, is increased by developing the individuality of the men in the plant and, conversely, the individuality of the man

BACK TENDERS MOISTURE RECORD									
Date <u>NOV 29 1917</u>									
No. 1 Machine					No. 2 Machine				
Name	Moisture		Progress Record		Name	Moisture		Progress Record	
	Day	Period	Day	Period		Day	Period	Day	Period
RAOUL	7.9	7.7	94.1	94.2	FRYON	7.7	7.8	92.7	93.1
CLELAND	8.3	7.8	82.7	83.8	DREW	7.4	7.5	81.8	80.2
DOANE	7.9	7.6	89.3	83.5	ALLEN	7.4	7.2	84.2	78.9

BACK TENDERS MOISTURE RECORD									
Date <u>MAY 9 1918</u>									
No. 1 Machine					No. 2 Machine				
Name	Moisture		Progress Record		Name	Moisture		Progress Record	
	Day	Period	Day	Period		Day	Period	Day	Period
WOOD	8.0	8.0	97.3	95.5	RAOUL	8.0	7.9	97.5	92.1
CLELAND	8.1	7.9	92.7	92.0	DREW	7.9	7.8	95.0	91.9
JONES	8.0	7.8	94.4	90.2	FRYON	8.0	7.8	95.6	91.8

A CONTRAST IN RESULTS

"Invariably the competition is keen enough on all quality records to bring all the men to practically the same degree of proficiency," says Mr. Wolf. These records, made six months apart, show a great difference in the degree of variation

will be increased by consciously developing the individuality of the plant.

It is equally true that the individuality of the corporation which is made up of a number of plants is increased by a development of the individualities of these plants. The unit of the corporation is the plant; the unit of the plant is the man. Because of this fact the administrative, supply, and production activities in the larger organization should be confined to policies. It should be a "policies organization" only. If it attempts to control actual manufacturing operations in detail, it at once interferes with the individuality of the unit plant. And consequently with its creative power.

One often hears it said that it is impossible to manufacture either as cheaply or as well in a plant which is part of a larger organization as it is in an individually owned plant where those with whom rest the final decisions are right on the job. This is true. But we cannot go back to the old order with all its wastes of competition; therefore, we must solve the problem of uniting men without, at the same time, crushing them. And this solution cannot be reached without a knowledge of the philosophy of individuality.

The paper maker is in the fabricating department of the production division and I will now again trace his knowledge of each division through administration, supply, and back again to production. This will complete the analogy.

By proper evaluation, of course, he is furnished with knowledge of his own definite relationship to the whole process of manufacturing. The knowledge of individual performance as related to the work done by others he sees leads to just compensation. The quality of the paper enables him to be conscious of the selling side of financing—he knows that the customer's satisfaction with the output depends upon its quality, over which he has very definite control—the quality being reflected in the progress record.

He also knows that better quality brings a higher price. He is further conscious of his contact with the receiving side of financing by knowing that increasing the moisture test (which also very ma-

terially betters the quality of the paper) decreases the shrinkage, so that the same amount of raw material will make more paper. An increase of 1% in the moisture test decreases the cost of our paper 50 cents a ton. Planning, he contacts through his constantly expressed desire for improvements in process suggested by his knowledge of needed changes in the paper machine. As he obtains better results, the improvements reflect themselves in the quality record.

The supply of material needed to make these changes in apparatus (or manufacturing raw material) must be purchased, transported and stored ready for use in the new equipment to be created by the plant engineer, who is responsible for the maintenance and construction work. The paper maker's many relationships to the fabricating department of the production division have been previously described in considerable detail. The important point to remember is that the conscious knowledge of his relationships to the entire production process comes through the progress records which accurately record his mastery of the natural forces he is using.

The paper machine becomes an instrument through which he can express the art of paper making, and the records become organized facts available to all and gradually accumulate to form the basis of a real science of paper making.

IS THIS THE WAY TO ELIMINATE INDUSTRIAL UNREST?

We must not forget we can only have a great art where the organized facts which record the science are so complete and comprehensive that the individual who wishes to express the art can master the natural laws recorded in the science.

In conclusion, does not the problem after all resolve itself into a conscious realization of man's part in the great universal creative plan?

As has been previously indicated, industry has to do with three great fields.

On the one hand we have the field of natural or universal activity, which functions according to pre-determined law. The so called exact sciences, such as

chemistry, physics, and mechanics, record the operations in this field. It has to do with our raw materials.

On the other hand we have the field of plant unity—that "spirit of the whole," which reflects itself as *esprit de corps*. It is this that we must develop if the plant is to become a creative center for consciously specializing nature's laws.

Between the field of natural or universal activity and the field of plant unity we have that great field which we may call The Will of Man. For man considered generically forms the one connecting link between these two fields. As an individual, he is free to work with or against the great law of natural evolution; that is, constructively or destructively, and this fact emancipates him from the operation of the exact sciences. If the employer attempts to confine or repress this free spirit in the individual workman by exploitive methods, he will rebel and work against him. On the other hand, if the employer stimulates free self expression by encouraging conscious, i. e. thoughtful, participation, he will release such powerful creative forces within the organization that no obstacles will be too great to be overcome.

When most industrial institutions are organized along these lines, men will begin to realize that they are free only when they conform to natural law.

The main function of the administration division is to provide an environment in which the greatest possible number of men in the production divisions have the very best opportunity to express their individual creative power in constructive work. And it is the main function of the supply division to provide a sufficient quantity of the most suitable materials in order to develop the highest type of organized creative power.

There is no other way to eliminate industrial unrest, for man is not an animal, but a free, self-determining, mental center of consciousness, who exists that the universal life can deal with a particular situation in time and space, and thereby be enabled to evolve a material universe organized to express the one great individual life of which we all are a part.