

ful for that purpose; but our object was to control the process, to understand it better than our beater men, to qualify ourselves to direct it in detail day and night for every order that goes through the plant, and to take upon ourselves the right responsibility for the results. It is one of the most interesting phases of the matter; that a careful scientific treatment of the most obvious physical variables of beating, variables apparent to a day's visitor, should have led us so far toward accomplishing this object.

So far as the organization is concerned, one thing is plainly called for. By using the records of the kind of treatment given the pulp which are made by the drags, and by setting the thickening points and drag curves, one man can manage the beating for a large establishment. That is not a simple task, but one man can do it. He substitutes his judgment for the judgment of many individual beater men. He must know the stock, know the beaters, know the results he is aiming to get, and how to get them. The beating characteristics of beaters vary very much as the beaters wear or are repaired, and the raw stock is not constant as to the treatment it may require, or be capable of; consequently, the curves set at one time for a given paper will not necessarily produce it at another time. The work calls for a man of some flexibility. He will be the beating director.

In many cases the quality of paper which the management must obtain is more difficult to handle on the paper machine, has to be watched more closely, and requires unusual and troublesome adjustments for safe running. It is the habit in many establishments to subject the beating pretty much to the direction of those responsible for operating the paper machines, and the temptation there is to ease the beating a bit for the sake of simplifying matters; the result is a failure to realize an especially distinctive and attractive quality. The true guide must therefore be central, subjecting the beating director to instructions which will cause him to produce what is wanted, and seeing to it at the same time that the difficulties of the paper machine room are understood and provided for. The harmonizing of beating and machining is vital, but not to be accomplished best through subordination of one to the other.

It is also a matter of good organization to see to it that the beater men and their helpers are provided with all the materials for furnishing which the formula prescribes, to make sure that the beaters are in good working order, and to see that the working floors are kept clear and clean; in short, to perform all the services to the beater man which really advance his work. It is a matter of fairness to see to it that his record is not lowered by reason of failure of the management in any of these things. It is in the interest of good management and the best results to

provide means of recognition, reward, or incentive, inducing that desire within that may result in the very highest class of work of which the beater men are capable; and further, it may be remembered that unless the management is interested enough in doing the job in its own way to stake something on it, no one else is going to care very much. What are sometimes called incentives serve more to show that the management is in dead earnest. They serve to stimulate respect quite as much as effort. Nothing is so fatal to an enterprise of this sort, as to let all hands suppose that the management is only dabbling.

It will also be noticed that we have made no use of this problem of time study. Knowledge on the part of the management as to what constitutes a proper day's work for a workman, is far more important, in paper making, on the side of the character and quality of that work, than it is on the side of quantity. In order to manage, to control, to direct, it is necessary for the management to know first of all how, and later to decide for each workman, how much. There is a large field for time-study, but it is a secondary field. And the beater man himself would hold in little esteem the management that tried to keep his time occupied without first knowing how to do the job.

And lastly, a little plea. There seems to be great turmoil today. We have societies, magazines, clubs, chambers of commerce, and correspondence schools, all talking at once, all anxious to participate in, and to contribute something to, what we call the great present-day movement for efficiency. We ourselves are carrying the discussion out into the realms of social and industrial welfare. We are turning here to solve the problems of unionism, and there, to alleviate the evils of unemployment. We have been getting before us an amazing amount of unrelated problems in the last few years, in regard to which many of us are rapidly developing proposals of great weight. None of these things ought to be made light of, but are we not in some danger of dissipating our efforts? Do we not need definition? Ought we not to become oriented over again? What, after all, is our aim?

The Society, rather than one writer, can best answer the question. Nevertheless, so far as the work outlined above is concerned, the aim has been on the part of the management to obtain knowledge of what constitutes a proper day's work for a workman, and skill to direct that work in detail day and night. Did not Taylor emphasize over and over again, that the lack of this knowledge and skill is the greatest obstacle to hearty co-operation between management and workman? Was he not right? When the American Society of Mechanical Engineers undertook a few years ago through special committee to summarize recent progress in the art of manage-

ment, the report was that the new element which had been introduced, was the "transference of skill" from workman to management, a really illuminating conclusion, even if it is easily misinterpreted. At any rate, what is new springs from the assumption of new duties and obligations on the part of the management toward the workman which formerly managements did not recognize belonged to them. This, also, Taylor dwelt on again and again. He dwelt on the painstaking hard work, the patient research, and the necessity for "hanging on with your teeth."

Yet, it has been a matter of disappointment to the writer that there have been very few reports to show that those on the management side are digging in to obtain knowledge of the day's work, better ordered and more complete than the workman himself possesses. What progress are we to make, in the long run, unless we do more of this?

#### DISCUSSION

MR. ROBERT B. WOLF: Mr. Green has certainly demonstrated that it is practical to record the beating operations in a paper mill and I have nothing but praise for the painstaking efforts that he has made to solve this problem. I agree with him thoroughly that there has been very little scientific research work done in this branch of industry and I have always felt that when these problems are approached at Dr. Taylor would have approached them a great deal of guess work and rule of thumb will be eliminated. I say this from the point of view of one who has actually worked in every branch of paper making, for I worked nearly four years in the mills learning the practical parts of the business before going into executive work.

His paper, in spite of one or two reassuring paragraphs makes me feel that he is attempting to have the organization as a whole do entirely too much of the detail work of directing the beating operation; for instance, one paragraph in the second column of page four, reads as follows:

"It is therefore the duty of the management to obtain the knowledge and skill necessary to do what the beater man can do, by using his sense of feeling as a guide. That was the object of our work. We had to develop means whereby the management could give to the beater men and their helpers definite duties to perform which could be understood and measured by a competent person not himself doing the work, the result of which would be greater uniformity in the treatment of the stock."

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It is not necessary for the management to obtain the skill necessary to do what the beater man can do. It must have the knowledge as to why the operation should be done in a certain way; but it is unnecessary for the central directing power to be as skillful in doing the work as the beater man himself. Furthermore, the question of understanding and measuring the operation should be very largely a function of the beater man. I do not mean by this that the recording instrument charts that are used in the work should be changed by the beater man, but this should be done by some neutral party whose particular duty it is to look after the recording instruments throughout the plant. I know, however, from my own experience, that it is necessary for the beater man himself, who is actually doing the work, to know more about the operation than anyone else can possibly hope to know, because he is the only man who is in constant intimate contact with the work. The management then should perform the function of co-operating with the beater man to teach him more of the technical side of the question than he himself can know, the beater man contributing the practical knowledge which he alone can have to the fullest extent because he is actually doing the work.

In our plant we make it a practice always when making studies of a particular operation or task to call into consultation as many men as possible who are actually doing the work. Where the group is large we take a representative number and, while in some cases they may not be able to give us any real information, the fact that they had a share in forming the standard practices makes them take an interest in their work, which they would not do to any great extent if they had not been consulted.

Again I quote from the bottom of page five:

"The kind of skill and judgment employed by the experienced beater man in interpreting the "feel" of the stock is now exercised by the man who sets these curves, and he is on the management side."

The question of eliminating the "management side" and the "employees' side" in determining matters of this character seems to me is very important. We try to eliminate this thing as much as possible and make the men themselves feel that they have much, if not all to do deciding standard practices. The management should primarily furnish the men with the information necessary for them to intelligently co-operate in determining what the standard practices should be.

Again I quote from the latter part of this same paragraph: