

## EXCERPTS

THE following article is reprinted, with permission, from the December, 1921 issue of *Management Engineering*. It is a reply of Frank B. Gilbreth to the editorial which appeared in the September, 1921 issue of *Management Engineering* (reprinted in Vol. VI, No. 4, of the BULLETIN) which was concerned with the time-study symposium which appeared in Vol. VI, No. 3, of the BULLETIN.

We desire to call attention to what we believe to be misstatements in your editorial on page 188 of the September issue of *Management Engineering*.

1. Your title "The Time-Study Controversy" leaves out an important part of the controversy, namely, "motion study." This is not merely a "time-study controversy."

2. Your statement in Paragraph 1, that "the majority of the points raised still seem to be at issue, because of the absence of facts and quantitative data," seems to be unwarranted, because: (a) The numerous notes and references quoted, in addition to the paper itself, give all the facts and quantitative data needed to prove the case, and (b) The Managing Director of the Taylor Society stated that:

"The proponents of the stop-watch, on the other hand, seem to concede what is claimed for micromotion technique with regard to the above characteristics (a simple, matter-of-fact concession, however, unaccompanied by any statement of their valuation of what is conceded) and focus their discussion on the determination of standard times and standard rates for current use. The definite point which remains at issue, therefore, seems to be whether the stop-watch technique is so 'un-scientific' as to be unsuitable for the determination of standard times and standard rates as a basis for current wage contracts."

Therefore, they have already conceded all points but one of our indictment.

3. In Paragraph 2, you state "there seems to run a lack of appreciation of perspective." It must be remembered that the micromotion method records the one best way to do work, and records and transfers the skill and education of the worker and his foreman, not merely the time that it takes a certain worker to do work under the existing conditions, which cannot possibly be recorded with a stop-watch.

Examine any stop-watch time-study in any book now published, and you will see exactly what we mean. The time element of any one individual worker's work is perhaps the least important of any of the features of the motion study. The recording of the one best way to do work is the principal feature and the most valuable.

4. We are unable to see your viewpoint or reason for ignoring the fact that the micromotion method does not entail taking pictures any oftener than is necessary to obtain the desired facts. "Boring and turning 16-in. gun forgings" is not a stranger to us. On such work it is sometimes advisable to take pictures on some parts of the operation not oftener than, say, once in 15 min. or once per hour—perhaps even less frequently.

It is not to be supposed that engineers of more than a third of a century's continuous experience in motion study in managing large numbers of men will continue to take pictures that have no value. Obviously, when there are no changes in the surrounding conditions and no motions to record, it would be silly or subnormal to take pictures. In any case, we have again and again emphasized that the times are of little importance without accurate records of the surrounding conditions and the methods used. These the stop-watch cannot give, and neither can the 8-day grandfather's clock. Yet these are fundamental requirements for the transference of skill most efficiently in the one best way.

5. In Paragraph 4, you state "The editor of the matter appearing in the *Bulletin* asks for further evidence, particularly in regard to actual times and costs." To this we reply that

immediately upon reading his request we called upon him and informed him that we were ready to do our part. As evidence of this we delivered a second indictment before the New York Section of the Taylor Society, September 15, 1921, and at that time stated:

"We are perfectly willing to present all the additional facts that may be required. We have all the material ready at the present time. We have among our files and data over a million lantern slide negatives from which to select to exhibit for proof of these facts. We also have micromotion study and stop-watch data that were made simultaneously. When the comparisons are made, the proof is certain that the only reasons for the continuation of the inaccurate non-recording stop-watch are the ignorance of the employers of the inadequacy and wastefulness of the stop-watch methods and results, and the lack of knowledge of the stop-watch proponents of the technique of motion study, micromotion study, and the chronocyclegraph processes for obtaining better methods. We are willing also to review stop-watch time-study in detail, and we are willing to make new studies in competition with the stop-watch time-study process, if the stop-watch proponents are not willing to use their data of the past to prove their case."

This offer we repeated later to the Director of the Taylor Society and it stands open at the present time.

6. Regarding your Paragraph 5, where you question the relative accuracy of the stop-watch and the micromotion recording devices, we think this is sufficiently answered in our paper and discussion. However, we will state that accuracy of time without records of method can hardly be considered as competing with photographed time with the complete record of all motions and surrounding conditions.

Regarding the statement "even the application of a microscope to the films themselves cannot possibly show the condition of repair of the machine, the correct shapes and settings of the tools, nor the spindle revolutions and the feeds of the machine observed"—we would say, if anyone who fails to understand or who doubts these possibilities will call at our laboratory, we will show him that we can record all desired information much better than has ever been possible with the stop-watch method. What is more, we would like to emphasize that we have always from the start, and without exception, done such recording.

We desire to state emphatically that we can do much more than photograph "the correct shapes and setting of the tool," and "the spindle revolutions and the feeds of the machine," for we can record on the photographic micromotion study films the shape of the tools and the chemical composition of the high-speed steel of which they are made. We can also show plainly and beyond question the skill and past experience of the observed worker. This also we will be pleased to show anyone who will call at our laboratory (by appointment).

7. We can scarcely answer the question in Paragraph 6 as to the comparative degree of skill needed "to interpret stop-watch observations on the one hand, and the motion-picture films on the other." We cannot conceive how stop-watch observations of motions and skill can be interpreted when there is no record whatever of motions or skill. The micromotion records are interpreted by the simultaneous motion cycle charts which were referred to in the *Bulletin*.

8. The question in Paragraph 7 of the relative cost of stop-watch time-study and of micromotion study is already answered in the *Bulletin*. We will say again, however, that, all things considered, the micromotion method is the cheaper because it will pay for itself from the first. Furthermore, we will gladly take micromotion study records gratis, and furnish a positive print, free, of the best man obtainable doing the work in the one best way to do work. His priceless skill is worth much more than the insignificant cost of the film. This surely answers the "How much?" question.

Regarding the criticism in Paragraphs 8, 9 and 10 of our statistical quotations, we would suggest that this point be left to any experts in statistics. The criticism contained in these paragraphs was taken by us to such statistical experts and all those consulted agreed with us in every particular. Moreover, we desire to state that we are entirely satisfied with our

wording exactly as you have quoted it. We might add, however, that almost invariably we have found that the "lowest time," which is frequently discarded as being "abnormal" under the stop-watch method, is often found to be nearer correct than the "average" of many observed stop-watch times. There are always other factors than the personal errors of the observer, for neither the method nor the effort of the worker is ever twice exactly alike. Therefore, "first year statistics" do not apply.

We believe that, in the light of the above facts, if our indictment of Stop-Watch Time-Study is reread it will be seen that stop-watch time-study is fully as "inaccurate as the indicators of stop-watch time-study would lead us generally to believe."

WE abstract the following "inferences" from "Industrial Government" (Macmillan and Company), by John R. Commons and eight assistants. The book is the report of a study of industrial government in eighteen of thirty establishments visited in the summer of 1919. It will be of interest to members of the Society to know that among the eighteen plants described—the studies of which led to these inferences—were The White Motor Company, The Link-Belt Company, The Joseph and Feiss Company, Wm. Filene's Sons Company, The Dennison Manufacturing Company, The Printz-Biederman Company, The Plimpton Press, Hart, Schaffner & Marx, the Labor Adjustment Board of Rochester, all of which are more or less closely identified by sustaining or personal membership with the Taylor Society.

From 10 per cent to 25 per cent of American employers may be said to be so far ahead of the game that trade unions cannot reach them. Conditions are better, wages are better, security is better, than unions can actually deliver to their members. The other 75 per cent to 90 per cent are backward, either on account of inefficiency, competition, or greed, and only the big stick of unionism or legislation can bring them up to the level of the 10 per cent or the 25 per cent.

No one can squarely defend all of the restrictive policies of unions, but if they are carefully examined, as we have tried to do, they will be found to be not so very different from the restrictive policies of employers and of non-unionists.

In all cases these policies have their source in the knowledge that there is not, at all times, enough work to go around. The workers were restricting output in 1919 in order to spread out the work or make more wages out of the apparent prosperity—then the employers were restricting output in 1920 in order to keep up prices in the evident collapse. It would seem that what is needed by both is "stabilization and standardization."

We do not find that "labor" wants participation in the responsibilities of ownership or management. . . . In fact, the whole history of labor organization shows that "labor," as such, cannot manage industry. . . . Labor, as such, is made up of young laborers and new laborers continually coming in, without experience or discipline. It is even immoral to hold up to this miscellaneous labor, as a class, the hope that it can ever manage industry. Labor, as such, in control of industry breaks down on discipline, on credit, on depreciation accounts, on planning for the future, on finding managers who can shoulder responsibility. But if it seems to succeed in these points, it is because certain individuals succeed, and then those individuals immediately close the doors, and labor, as a class, remains where it was.

What we find that labor wants, as a class, is wages, hours, and security, without financial responsibility, but with power

enough to command respect . . . then so much the greater is the opportunity and responsibility of management. Management, then, becomes responsible, not only to the stockholders, but also to the workers and the nation.

Modern capitalism has been built up on security of investments. It is not labor, or management, or machinery that produces wealth—it is the credit system, and the credit system is nothing but confidence in the future.

But, while capitalism is based on security of investment it has not provided security of the job.

The outstanding fact in our investigation is the importance of Management. . . . It is management that attracts capital through the confidence of investors, for the bulk of investors, like the bulk of laborers, do not want and cannot manage industry.

On the whole we have seen enough, in these establishments and others, to be convinced that management can provide security for the job if security is deemed important enough.

The concerns that we visited have shown that it can be done.

JOB standardization may be defined as the method of determining and applying standards of operating in productive and distributive enterprises for the purpose of increasing production and lowering costs.

The results of job standardization are . . .

(1) increased production per machine or individual, of better quality at a lower cost; (2) establishment of better labor relations. Both of these results are due to the same cause; that facts in the hand of the management as well as in the hands of the employees have replaced half-knowledge and rule of thumb.

Neither result, however, can be attained unless job standardization is undertaken as a part of scientific management.

The standards are formulated in terms of time, because, . . . time is the yard stick by which to measure the effectuality of each element and operation.

The standard time should first be found separately for each element.

Standards will not remain standard very long unless written instructions are drawn up covering every factor in detail.

The work of job standardization cannot be considered complete until the standards are actually put into effect. . . . (Wm. O. Lichtner in *Time Study and Job Analysis*, pp. 16, 18, 38, 43, 44.)

THE chief sales executive . . . will do well to give himself plenty of leisure and freedom from detail, and plenty of counsel of a high creative order, so that the best creative brains may be focused upon the great major problems and opportunities in that business. . . . Salesmanagement to-day . . . dominates the entire business . . . since all the departments of business rely upon the salesmanagement for their instruction and planning, the salesman-