A FURTHER CONSIDERATION OF THE REPORT OF THE COMMITTEE ON ELIMINATION OF WASTE IN INDUSTRY

By Thomas W. Mitchell[1]

At the December, 1921 meeting of the Taylor Society, a session was devoted to discussion of the report of the Hoover Committee on Elimination of Waste in Industry. This discussion was printed in Vol. VII, No. 2 (April, 1922) of the Bulletin. Shortly after the meeting the following letter was received from a prominent member of the Society.

By the way, at the Taylor Society meeting the other night I was a good deal stirred up by that report on Waste in Industry. It seems to me the most grotesque, unfair and unsound report that I have ever seen given out over the signatures of respectable gentlemen. I don't mean to compare it with the reports of a blather-skiting nature, but because it is throughout in dignified and gentlemanly tone it seems to me far more dangerous. Several things about it impress me particularly:

1. The effort to appraise entire industries from such ridiculously inadequate samples.
2. Basing appraisals on examination of things so indefinite as "textile manufacturing." I take it there was quite as much difference between the types of textile manufacturing in plants in regard to the subject matter of this report as there is between many fundamental industries.
3. The adoption of an effort to make a quantitive analysis of waste which seems to me absurd on its face. The refinement of absurdity is reached when this effort for quantitive analysis is carried to two points of decimal.
4. The effort to apportion the responsibility for this quantitive analysis between management, labor and all other causes, this apportionment being on a different basis.
5. The spreading broadcast of a statement that over fifty per cent. of the responsibility for waste is on the manager and twenty-five per cent. on labor with no differentiation whatever (even assuming the correctness of percentages which cannot by any possibility be definitely determined) between waste caused by the inefficiency of managers who are as a class doing their level best to accomplish results and waste caused by labor which is very largely due to improper motivation.
6. The grotesque failure of this group of engineers to realize and lay any stress on the time element in correcting waste. From a reading of the report one would get the idea that these things for which management is responsible should be corrected immediately a statement entirely comparable to the statement which Mr. Brandeis extracted from Mr. Taylor in that railroad investigation some years ago in which the statement went out that one million dollars a day could be saved by the railroads without Mr. Taylor's being given any opportunity to state that it would take from five to ten years for anyone with carte blanche to realize the necessary economies.
7. My reason for sending you this screed is that so far as I can see this report is substantially a Taylor Society report and I wonder if it does not indicate that the whole crowd of Taylor Society people are fundamentally about as far away from Mr. Taylor's own point of view as it is possible to get. Personally I cannot conceive of Mr. Taylor's ever putting out such a ridiculous, unscientific, inadequate and absurd report as this seems to be. How do you feel about it?

A copy of this letter was sent to Thomas W. Mitchell, who had participated in the investigation of the Hoover Committee, and Mr. Mitchell prepared the following reply:

The Committee on Elimination of Waste in Industry labor under no illusion that their report is one hundred per cent accurate quantitatively. Indeed, the report explicitly states (page 4) that because of the manifest impossibility of adequately covering nearly 300,000 plants in five months, the nature of the study is to be "compared in point of view to that of a reconnoitering party for a proposed railway, or to the preliminary assay of a mine, or to the first pencil drawings of the design of a new machine. The object in each case is to disclose the main phases of the project, which may then be developed and perfected by the engineers, through further study and elaboration, in whatever detail may be required."

Furthermore, your friend's impression that the Committee placed great reliance upon the valuations yielded by the Field Report Evaluation Sheets is mistaken. We do consider the questionnaire and evaluation sheets to constitute the most valuable product of the assay; not, however, because we consider the questionnaire to be anywhere nearly perfect or the relative valuations assigned the forty-odd factors on the evaluation sheet to be even approximately accurate. Of the reports on individual industries, only one (the Textile, pp. 240 et seq.) either is based extensively on the Field Report Evaluations or even gives them more than passing mention; in most cases they were merely appended to the engineer's report without comment. The Committee's feeling is fairly well expressed by Mr. M. L. Cooke (Men's Ready-Made Clothing Industry, p. 118): "We are fairly well satisfied," he said, "that our evaluation sets forth the *comparative* wastefulness of the nine plants with substantial accuracy. However, it is evident that a considerable element of judgment enters into our relative evaluations of the forty-seven items and that until these judgments can be tested and rectified in the light of later experience, too much reliance should not be put upon the absolute accuracy of the several evaluations. We feel that the chief value of this field report evaluation sheet is to be found not in the results of this investigation, but in that it *constitutes* an important *beginning* out of which will be perfected a very powerful and very valuable instrument for investigation. Later experience will of course suggest other causes of waste than those we have enumerated. It will give us more accurate measurements of the waste-producing powers of the various causes than is possible now." I may add on my own account that I find the questionnaire, irrespective of the field report evaluation sheet, a very excellent guide in making a preliminary survey of a plant on the basis of which to develop the major plan for the development of scientific management. A major defect of the field report evaluation sheet I shall point out later.

[1] Industrial Engineer, Philadelphia.

In your friend's third objection, he thinks it absurd to attempt a "quantitative analysis of waste." The meaning of his expression is not clear. Possibly he means quantitative measurement of the *whole waste* in a plant, possibly the quantitative *distribution* of this whole among its causes. In either interpretation, it should not be difficult to convince him that he is mistaken, provided that he thoroughly understands the significance of a scientifically determined performance standard. To illustrate, I shall interpret the data charted on page 109.

The standard time for creasing an arm-hole seam by the best method found in use among eleven "finish pressers" is 0.295 minutes; for pressing a sack coat shoulder, 0.315 minutes. These standards were ascertained by painstaking elementary time study and include the fatigue and variation allowance as per Carl Barth's and Dwight Merrick's formula. In creasing arm-hole seams, however, operative A regularly averaged 1.02 minutes, B 0.58 minutes, etc.; or the eleven operatives together were producing at the composite rate of 626.8 armhole seams per hour as against the standard of 2233 (See Appendix A, totals of columns 3 and 1); they were averaging but 28 per cent of the possible output, i.e., this operation was but 28 per cent efficient, or there was a waste of 72 per cent of the possible rate of output. In like manner the eleven operatives were pressing an average of only 844.6 shoulders per hour (when on that work) or only 40.3 per cent of the possible hourly rate of 2095 shoulders per hour. There is a waste of 59.7 per cent of the possible rate of output in this operation.

Thus by carefully determining a performance standard for each operation and then recording actual performance and comparing it with the standards, the average efficiencies of operation and their complements, the wastes, can be measured. Appendix B shows how the average efficiency of any specific operative, of any group of operatives, of a whole factory, can be measured by comparing the recorded time actually taken on completed "jobs" during any specified week, month or other period, with the standard time for the same "jobs." By the same process the average efficiency of two or more plants, of a whole industry, can be measured. Only two things are requisite: viz., (1) a scientific determination of a standard rate of performance for each operation; (2) a record of all "jobs" or specific work assignments completed by each operative, together with (a) the standard time, and (b) the time actually taken on each.

So much for the measurement of the *whole waste* of operation when the operatives are working. If this is supplemented by "wait tickets," one of which is given to a workman whenever he has to lose time while waiting for work, waiting for tools, waiting for his machine to be repaired, and the like, the loss of operative-capacity through such delays and interruptions can be measured and even separated by causes. The sum total of man-hours consumed during a given week by operatives as recorded on their work tickets is also the sum total of work-place hours operated by work-places (except in case of multiple-unit machines, which cases can easily be handled). Comparison of this with the total full time for all work-places, gives the loss of work-place time or loss of potential plant capacity through idleness of work-places, whatever the *cause* of such idleness may be. This record might be made *positive* and the idleness classified and measured by causes—absenteeism, sickness, accident, labor turnover, breakdown, etc., etc.—by providing an "idle time ticket" for each work-place when it is idle. Thus the whole waste of potential capacity can be measured separately as various idleness wastes and waste resulting from operatives failing to attain standards.

However, the latter waste may be due to any one or more of a number of causes; viz., (1) various operations may contain unnecessary work; (2) the appliances furnished or used may be inferior to the best existing apparatus for the purpose; (3) the appliances may not be in proper operating condition, or there may be other