HENRY TOWNE

Henry R. Towne was co-founder of the Yale and Towne Manufacturing Company of Stamford, Connecticut, and served as president of that firm for 48 years.

Towne's two papers which follow reflect his two main interests. First, he wished to obtain recognition of management as an activity distinct from the various techniques employed in industry, and in this connection wanted engineers to work on solutions to the problems involved. He suggested that the American Society of Mechanical Engineers devote themselves to this work, and some years later the A.S.M.E. did set up a separate mahagement division. Secondly, Towne was an innovator in his own right and like so many others at the time, attempted to improve the piece-rate wage systems. His paper on "Gains Sharing" outlines his ideas on the subject.

The Engineer as an Economist

The monogram of our national initials, which is the symbol of our monetary unit, the dollar, is almost as frequently conjoined to the figures of an engineer's calculations as are the symbols indicating feet, minutes, pounds, or gallons. The final issue of his work, in probably a majority of cases, resolves itself into a question of dollars and cents, of relative or absolute values. This statement, while true in regard to the work of all engineers, applies particularly to that of the mechanical engineer, for the reason that his functions, more frequently

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than in the case of others, include the executive duties of organizing and superintending the operations of industrial establishments, and of directing the labor of the artisans whose organized efforts yield the fruition of his work.

To insure the best results, the organization of productive labor must be directed and controlled by persons having not only good executive ability, and possessing the practical knowledge of how to observe, record, analyze and compare essential facts in relation to wages, supplies, expense accounts, and all else that enters into or affects the economy of production and the cost of the product. There are many good mechanical engineers;--there are also many good "business men";--but the two are rarely combined in one person. But this combination of qualities, together with at least some skill as an accountant, either in one person or more, is essential to the successful management of industrial works, and has its highest effectiveness if united in one person, who is thus qualified to supervise, either personally or through assistants, the operations of all departments of a business, and to subordinate each to the harmonious development of the whole.

Engineering has long been conceded a place as one of the modern arts, and has become a well-defined science, with a large and growing literature of its own, and of late years has subdivided itself into numerous and distinct divisions, one of which is that of mechanical engineering. It will probably not be disputed that the matter of shop management is of equal importance with that of engineering, as affecting the successful conduct of most, if not all, of our great industrial establishments, and that the management of works has become a matter of such great and far-reaching importance as perhaps to justify its classification also as one of the modern arts. The one is a well-defined science, with a distinct literature, with numerous journals and with many associations for the interchange of experience; the other is unorganized, is almost without literature, has no organ or medium for the interchange of experience, and is without association or organization of any kind. A vast amount of accumulated experience in the art of workshop management already exists, but there is no record of it available to the world in general, and each old enterprise is managed more or less in its own way, receiving little benefit from the parallel experience of other similar enterprises, and imparting as little of its own to them; while each new enterprise, starting de novo and with much labor, and usually at much cost for experience, gradually develops a more or less perfect system of its own, according to the ability of its managers, receiving little benefit or aid

from all that may have been done previously by others in precisely the same field of work.

Surely this condition of things is wrong and should be remedied. But the remedy must not be looked for from those who are "business men" or clerks and accountants only; it should come from those whose training and experience has given them an understanding of both sides (viz.: the mechanical and the clerical) of the important questions involved. It should originate, therefore, from those who are also engineers, and, for the reasons above indicated, particularly from mechanical engineers. Granting this, why should it not originate from, and be promoted by The American Society of Mechanical Engineers?

To consider this proposition more definitely, let us state the work which requires to be done. The questions to be considered, and which need recording and publication as conducing to discussion and the dissemination of useful knowledge in this specialty, group themselves under two principal heads, namely: Shop Management, and Shop Accounting. A third head may be named which is subordinate to, and partly included in each of these, namely: Shop Forms and Blanks. Under the head of Shop Management fall the questions of organization, responsibility, reports, systems of contract and piece work, and all that relates to the executive management of works, mills and factories. Under the head of Shop Accounting fall the questions of time and wages systems, determination of costs, whether by piece or day-work, the distribution of the various expense accounts, the ascertainment of profits, methods of book-keeping, and all that enters into the system of accounts which relates to the manufacturing departments of a business, and to the determination and record of its results.

Gain-sharing

Webster defines profit as the excess of value over cost, and gain as meaning that which is obtained as an advantage. I have availed of this well-expressed though delicate distinction between the two terms, to coin a name for the system herein described, whereby to differentiate it from profit-sharing as ordinarily understood and practised.

Profit-sharing, as the term is now commonly used, implies a voluntary agreement, on the part of the principal

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in a business, to set aside some portion of the profits of his business for division among all or certain of his employees, as a stimulus to their zeal and industry. Thus understood, profit-sharing involves the participation of the employee in all the complex factors that affect the final result, or profit, of a business, including necessarily its losses, since these tend to impair, or may even extinguish, the profit. He thus becomes practically a partner, except that his participation in losses is limited to the surrender of his share in anticipated profits, and does not involve any impairment of his personal capital.

It follows, therefore, in most cases of profit-sharing, that the interest of each participator in the profit fund is largely affected by the actions of others whom he cannot control or influence, and that what he may earn or save for the common good may be lost by the mismanagement or extravagance of others. For example, let us suppose the case of a trader who buys and sells a certain staple, such as cotton, and who, having two clerks, entrusts to one of them the purchasing of the staple, and to the other the business of selling it to the customers of the house. Obviously here the amount of profit will depend partly upon the ability of the buyer to purchase material of the proper quality at the lowest market rate, and partly upon the ability of the seller to dispose of it promptly at the highest obtainable prices. If each does his share well, a large profit may result; while if either fails in his part there may be no profit, or even a loss, no matter how well the other may have performed his part. But it does not follow that the work of either or both will determine the question of profit, for unexpected changes in the market may neutralize the best plans and cause loss, or may result in large profit in spite of unskilful management.

Let us now suppose the case of a manufacturer who, in addition to buying the raw material, converts it into a finished product before selling it, and who voluntarily concedes to the operatives of the manufacturing department of his business, as well as to his chief assistants, a participation in its profits. The factors affecting the profit fund now become more complex, and may be divided into several distinct groups, as follows:

1. Those contributed or controlled by the owner or principal,--such as capital, plant, character of buildings, machinery and organization; and, to a greater or less degree, the skill, experience, industry, and ability of the owner so far as he personally manages the business.

2. Those influenced by the mercantile staff,--the buyer and the selling agent in the case supposed.

3. Those determined by causes beyond the control of the principal and his agents; such as fluctuations in cost of raw material or in the market value of the finished product, the rate of interest, losses by bad debts, etc.

4. Those influenced by the workmen or operatives; such as care of property, economy in the use of material and supplies, and, chiefly, efficiency in the use of machinery and employment of labor.

Now it is obvious that while the operatives may influence the items in the fourth or last group to an extent which may be large, or even controlling, in determining the question of profit or loss, they have little control--and in most cases none whatever--over the items specified in the other three groups; and that to admit them to participation in the net results of the whole business, while commendable as an act of generosity, is not defensible either as an equitable adjustment of the complex and often conflicting interests involved, nor as a theoretically correct solution of an economic problem.

The right solution of this problem will manifestly consist in allotting to each member of the organization an interest in that portion of the profit fund which is or may be affected by his individual efforts or skill, and in protecting this interest against diminution resulting from the errors of others, or from extraneous causes not under his control. Such a solution, while not simple, is attainable under many circumstances, and attainable by methods which experience has shown to be both practical and successful.

This resolution of the profit fund into component parts obviates many of the crudities in, and objections to, profit-sharing in its common form, but still leaves untouched another feature which is wrong in theory and often objectionable in practice, namely, the surrender by the principal of any portion of his legitimate profits without the assurance of an equivalent return from those on whom he bestows it. This, as said above, may be commendable as an act of charity, but as a solution of the problem in question it is neither complete nor accurate. Moreover, mere charity to those who do not need it is a doubtful good, and among intelligent and self-respecting men is not always relished. Certainly the problem we are considering will be best solved if it can be so formulated that the element of gratuity or charity, of giving without tangible consideration, can be eliminated, and that, as presented to the employee, it becomes an invitation from the principal that they should enter into an industrial partnership, wherein each will retain, unimpaired, his existing equitable rights, but will share with the other the benefits, if any are

realized, of certain new contributions made by each to the common interest. For example, to recur to our former case, let us suppose that the wages of the operatives are already fairly adjusted according to the prevailing scale, so that for the employer to offer them a portion of his profits without a guaranty of return would be equivalent to his giving them more than the fair market value of their services; while if, under this inducement, they gave him better or more work than before, they would not receive fair recompense in case, by reason of causes beyond their control, his business yielded no profit. But let us suppose, further, that the principal, wishing to enlist the self-interest of his employees to augment the profits of the business should offer to the operatives a proposition somewhat as follows:

"I have already ascertained the cost of our product in labor, supplies, economy of material, and such other items as you can influence. I will undertake to organize and pay for a system whereby the cost of product in these same items will be periodically ascertained, and will agree to divide among you a certain portion (retaining myself the remainder) of any gain, or reduction of cost, which you may affect by reason of increased efficiency of labor, or increased economy in the use of material, or both; this arrangement not to disturb your rates of wages, which are to continue, as at present, those generally paid for similar services."

Can there by anyquestion as to the inherent fairness and accuracy of this solution of our problem or any doubt as to its cheerful acceptance by intelligent labor? As to the latter point an emphatic answer has already been given by actual experience; as to the former a reply will be attempted in what follows.

The system for which I have adopted the designation of "Gain-sharing" aims to recognize and provide for the conditions typified by the foregoing supposititious case, and to afford a basis for allotting to the employees in a business a share in the gain or benefit accruing from their own efforts, without involving in the account the general profits or losses of the business. The system is now in actual use as affecting some 300 employees, has been in operation more than two years, and is demonstrated to be practical and beneficial. It has been applied to nearly one half the divisions of a large and unusually varied industry, and will ultimately be extended to nearly all. As soon as understood by the employees it is liked, and those not working under it in the instance referred to are desirous that it should be extended to include them. Its most obvious application is to productive industries, especially those whose product is of a simple or uniform kind; but it may be adapted to many others, and also the the business of

large mercantile houses. It is equally applicable to cases where labor is employed either by the piece, by the day, or by contract, and in no way impairs the existing freedom of the relation between employer and employee, but tends to confer substantial benefit on both sides.

The basis or starting-point of the system is an accurate knowledge of the present cost of product (or, in the case of a mercantile business, the cost of operating it), stated in terms which include the desired factors, that is, those which can be influenced or controlled by the employees who are to participate in the result, and which exclude all other factors. In some cases the previous method of accounting or book-keeping may have been such as to supply this information, in which case the gain-sharing system can be easily and promptly organized. In others the existing books may contain the record from which the desired information can be digested and compiled. Where no such record exists, however, the only safe method consists in devising and putting into action a system of accounts which will furnish the desired data, and in awaiting the accumulation thereby of information which, being based upon the operations of a reasonably long period,--usually from six to twelve months,--will constitute a fair mean or average.

... The length of time which it is desirable to adopt for a gain-sharing contract depends greatly upon the conditions of the case. As already explained, the starting-point of the system is a knowledge of the previous cost of product, the "gain" or increased economy in this constituting the fund out of which the increased compensation to labor is to be paid. When, therefore, the cost of product is already accurately known, a gain-sharing contract may safely be made for a considerable length of time, whereas, when the cost is not well known, it is better to fix its terms for a shorter period, in order that they may be revised when the necessary information has been obtained. The best results will be obtained, however, when the contract is definitely fixed for a reasonably long period, say from three to five years, or even longer. A necessary element in the case is the adoption of a "contract price" for each article to be produced, by which, as previously explained, the credit side of the account may be determined. At the beginning of a contract the employer obviously has the right to adopt whatever "contract prices" he pleases, since their purpose is merely to serve as a basis from which to compute the "gain" in which he voluntarily tenders participation to the employees, and since the contract does not diminish the obligation of the employer to pay each employee his stipulated wages. Presumably the employer will adopt reasonably low contract prices, that is, closely approximating to previous cost; because to do otherwise would be prejudicial

to his own interests, although to fix them on too low a scale would defeat the object of the system by leaving no opportunity for "gain," and hence no stimulus to increased efficiency of the employee. In like manner, at the expiration of a contract, the option and right reverts to the employer of revising the "contract prices" before offering a renewal of the contract; in which event, if during the previous term the cost of product has been considerably reduced, he will presumably (although this is not always the wisest course) proportionately reduce the contract prices. If, therefore, the contract period be short, the employee will naturally ask himself whether it is to his interest, for the sake of a small increase of compensation during that period, to make increased exertion in view of the fact that, at the end of the period, the employer will probably again reduce prices to a point where, in order to increase his earnings, the employee would have to exert himself even more than at first. If, however, the contract price be definitely fixed for a long period, the employee can afford, for the sake of present gain, to disregard this question as one only affecting a somewhat remote future, and to use his best efforts and intelligence to effect a reduction in the cost of product. As a result of this the employer will be able, when the opportunity for a revision of prices arises, to make a larger reduction than he would probably attain in the same time under the plan of frequent revisions, and can also then afford to act more liberally toward the employees in the matter. In my judgment, therefore, both parties will usually be benefited by having a long contract period in all cases where the previous cost of product is well known, and where no radical change of product or method is likely to occur.