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PRACTISING EFFICIENCY
AND KNOWING COSTS

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A LETTER TO A NEW ENGLAND
MANUFACTURER

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DEAR SIR:—In compliance with your request of last week, I give you here-with the substance of my remarks on practising efficiency and knowing costs.

In the operation of any undertaking one may attain high efficiencies and know little about costs, or one may know all about costs and practise no efficiencies. *Which is more important?*

When I was manager of a glass works I occasionally took Sunday-dinner with a French glass-blower. Such meals for flavor and savoriness I have never eaten anywhere before or since, not even in the best restaurants of Paris, London and New York. The wife who cooked and served the meals was a French peasant woman, unable either to read or write. Her husband gave her \$20 a month to run the table. She could scarcely count, so she would buy one thing at a time and pay for it, receive the package and change and then buy another item. She also had a garden full of marvelous vegetables and herbs. My! but she was efficient as to quality; she did not pay more than she ought in price nor did she buy table salt mixed with corn starch at \$0.10 a pound when rock salt at \$0.02 answered the purpose as well. My! but she was efficient as to quantity; she did not buy more than she needed nor did she ever use more than

enough. This peasant woman did not know anything about cost-keeping, but she was a born and trained manager, practising that French thrift which has made the French nation one of the richest in the world.

I also knew a young American who had "system" on the brain. He subdivided his expenses under a great number of heads. He did not have a very large income—had to earn or beg or borrow it. He would pay any price that sellers asked, and he bought fourteen-dollar shoes when three-dollar shoes would have answered. He had twice as many suits as he needed and he got very little use out of them. It was the same with food, with lodging and with travel. On trains he paid extra fares, took the drawing-room but spent most of his time in the buffet car. My! but he was inefficient; paying more than he should for everything, using higher qualities, buying more, using more than he should. Yet his accounts were beautifully drawn up in blue and red and green inks as well as black.

Which quality is more important in running a plant, *efficiency* or *system*?—the efficiency of the Scotch, the Quakers, the Yankees and the Swiss, or the system that balances up United States expenditures to a cent and spends in proportion to what it gets four times as much money as the Swiss Republic?

No doubt there are efficient French managers who know how to read and write and figure. No doubt there are systematic men who also practise efficiency, but the point I wish to make is that *efficiency and system are totally different and that efficiency is by far the more important of the two*. If I knew that every part of a plant I was managing was being operated at 100 per cent. efficiency, detailed costs would be relatively unimportant. To know every cost, yet not know what the efficiency is, whether high or only 50 per cent., is as reckless as to run a steam boiler without safety valve or steam gauge, trusting that it will not blow up.

Efficiency is the relation between *what is* and *what ought to be*. To determine what actual costs are is a clerical task, but this helps very little if we do not know what costs ought to be. Also, even if we are told what costs ought to be, it requires all sorts of skill to attain the ideal.

We may be running a foundry in which our castings cost \$2.75 per hundred pounds. We may know that in another foundry similar castings cost \$1.75 per hundred pounds. In such cases it is very usual for the superintendent to blame the equipment, to assert that if he had a new foundry with new equipment he could undoubtedly surpass the rival. It is also quite usual for the owners to blame the

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superintendent or the equipment and to advocate a change. Nobody knowing where or why the losses occur, everybody blames somebody or something else. If the where and the why are known, a thousand-dollar investment might cut the cost to \$1.75. If the facts and remedies are not known, the emotional expenditure of \$100,000 might run the cost up to \$3 per hundred pounds. There is, therefore, a great difference between the relative importance of cost determinations (only a fraction of the efficiency principle of "Reliable, Immediate, Adequate and Permanent Records") and the skilled experience that can determine fair standards, and there is also a great difference between the analytical ability to determine fair standards and the executive ability and skill to attain them.

To illustrate from horse-racing. The ancients five thousand years ago raced horses. Although it would have been very easy to have raced over a measured course and to have timed the speed by an hour-glass, a water clock, or by the beats of a pendulum regulated to an hour-glass, it does not seem that even these elementary records, corresponding to cost accounting, were applied until about one hundred years ago. After thirty years of records as to trotting horses, one or two men who had given the subject life-long practical study set the

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extreme achievement of the trotting horse at two minutes. It took forty years more of intense refinement of track in shape and surface and banking, intense refinement of shoes and harness, intense refinement and improvement of sulky, intense and special skill on the part of driver as well as immense betterment in the physical welfare and training of the horse to realize two minutes out of the most carefully and selectedly bred horse.

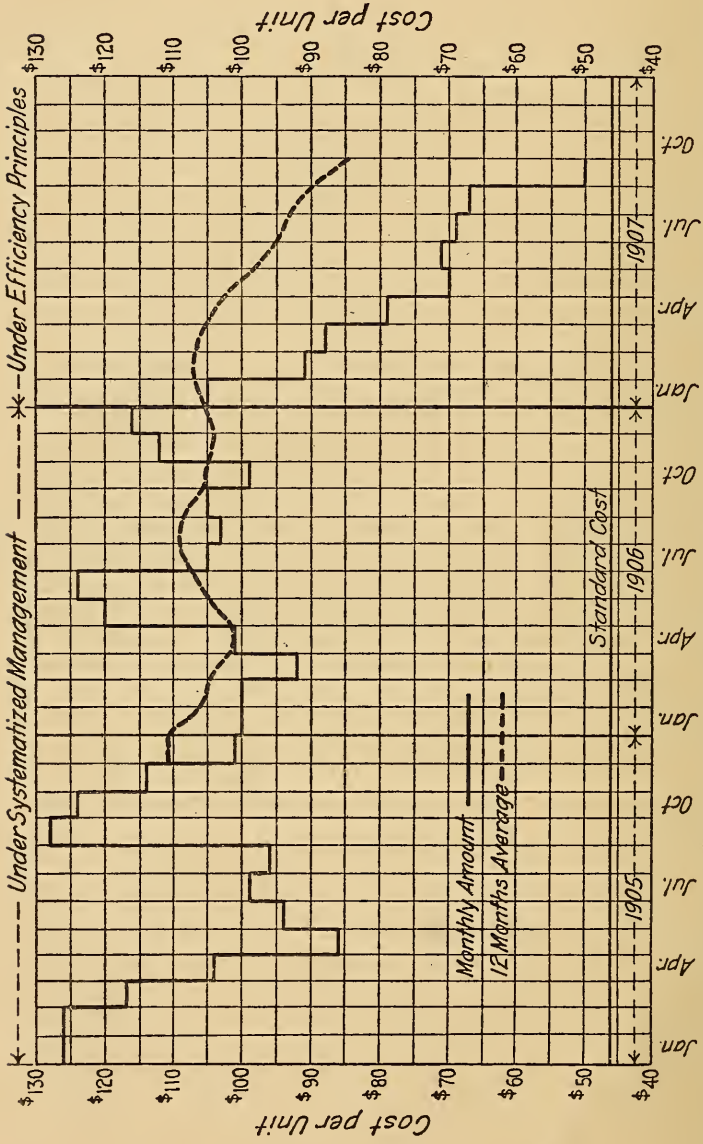
The following percentage estimates, based on experience in many industries, show the relative importance of cost records (requiring merely clerical fidelity and skill), efficiency standards (requiring the co-operation of engineers and scientists of many kinds) and of attainment of standards (requiring the highest executive skill):

Cost Records	5 per cent.
Efficiency Standards	30 per cent.
Attainment of Standards	<u>65</u> per cent.
Total	100 per cent.

The diagram on page eight illustrates plainly the difference between cost determination and efficiency achievement. It is an actual record of cost and efficiency work in a large plant.

Cost records had been most voluminously maintained in exhaustive, expensive and useless detail for several years prior to 1907. For

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SHOP COSTS UNDER SYSTEMATIZED MANAGEMENT AND UNDER EFFICIENCY PRINCIPLES

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one of the items of expense in this plant the diagram shows the cost per unit, which in the most bewildering manner fluctuated between the extremes of \$86 in May, 1905, and \$128 in September, 1905. Each total was made up of several thousand items as to each of which a subsidiary but similar monthly record was made up.

Without any connection whatever with the cost department, which was in fact intensely hostile, efficiency work was begun in January, 1907. Immediately and with a few men, preliminary standard costs were established, these individual standard costs summing up to a total of \$46 per unit. These preliminary standards were based on time and motion studies numerous and varied enough to establish the average current efficiency of the plant, for if a hundred well-selected tests show only 40 per cent. average efficiency, it is an impossibility that a thousand or ten thousand tests will vary much in either direction, either above or below the test average.

Efficiency depends almost wholly on the application of certain broad general principles. If these are lacking, it is as impossible to have high efficiency as to run an automobile 60 miles an hour up a rocky mountain side where there is no road. The cause of the inefficiency in this plant, in spite of

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elaborate cost records, was the failure to apply principles.

The measurement of the loss was determined by tests. Having on the strength of the tests and previous experience, boldly, but not rashly, established a standard of \$46, less than one-half of the previous twelve months' average (\$105) and 46 per cent. below the previous lowest record of \$86, the next task was to bring up efficiency from 44 to 100 per cent., to bring down cost from \$105 to \$46 per unit. In going about this task none of the elaborately-kept records were of the slightest use except to record progress. They had no more influence on the result than a thermometer has on the weather or a stop-watch on the speed of an aeroplane. If there had been no cost records, efficiency would have gone up and costs come down just the same. If the records had not been kept by a hostile department on exactly the same plan as during previous years, few would have known and still fewer have admitted that any progress had been made. As the record shows, efficiencies increased and costs diminished steadily after the first month.

By September, 1907, efficiency had risen to 92 per cent. cost per unit had fallen from \$105 to \$50. In October, 1907, the panic occurred, the plants were almost closed and both records and efficiency work were suspended.

SUMMARY

On account of the excessive expense and small returns cost accounting is viewed with disfavor by many executives. It adds considerably to overhead expense, which every manager and superintendent is ambitious to keep down. Also, so many records are often required from workers, from foremen, from superintendents that they do not have enough time for their own work.

Efficiency work is not an overhead expense. It is a productive department whose motto is "Wealth from Waste." An efficiency department is inexcusable unless it yields in gain even the first year several times what it costs. If there is a big loss due to inefficiency, it may cost anywhere from \$5 to \$50 to rescue \$100. If the plant is a small one the percentage of cost to saving is naturally higher than if the plant is a large one, though an efficiency scheme in its elements is essentially the same for the little plant as for the big one. Even if in a little plant an expenditure of \$50 yields only \$50 *net* profit, it is after all a remarkably productive investment.

The largest part of the value of the efficiency counselor is that he knows what *not* to do. If a chicken is put in a cage or maze from which it can only escape by taking one course out of a hundred, it will take it

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half a day of anxiety, of fluttering, before it accidentally strikes the right combination and gets out. If put back again it takes a shorter time to get out and finally by not taking the wrong paths it makes its way out in a few minutes. Its improved efficiency is due to the omission of mistakes.

Any one can open a tumbler lock if he knows the combination. If he does not know it, the chances against hitting it by accident are many and this alone constitutes the safety of the lock.

So, too, in efficiency work, there are a score of things that must not be done for every one that must. It requires thorough knowledge of efficiency principles and long experience in their application to know what "not to do," and in knowing these pitfalls lies success in applying efficiency principles.

Very truly yours,

HARRINGTON EMERSON

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