

3-1913

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### Recommended Citation

Nau, Carl H. (1913) "Accounting as a Basis for and a Measure of Efficiency in Business," *Journal of Accountancy*. Vol. 15: Iss. 3, Article 1.

Available at: <https://egrove.olemiss.edu/jofa/vol15/iss3/1>

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# The Journal of Accountancy

Official Organ of the American  
Association of Public Accountants

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Vol. 15

MARCH, 1913

No. 3

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## Accounting as a Basis for and a Measure of Efficiency in Business\*

BY CARL H. NAU, C.P.A.

Our modern industrial civilization owes its existence chiefly to two great types of inventions:

1. The invention of the steam engine and the application of steam power to the means of locomotion, making possible the evolution of that wonderful, modern highway of commerce, the railroad.

2. The invention of labor-saving agricultural machinery, of which the McCormick reaper can be taken as a type, making possible the production of our food supply by a smaller proportion of our population than formerly was possible.

As progressively a larger number of our population were released from the necessity of producing their own subsistence, and as the development of transportation facilities permitted the food supply to be carried from those by whom it was produced, to those who were thus permitted to direct their activities toward the production of things other than the mere necessities of life, these latter gradually grouped themselves together for easier co-operative effort, and evolved our modern industrial center, the city. This industrial evolution has given rise to many new political and economic problems, some of them calling for a high order of intelligence and patriotism for their proper solution.

These, however, are outside the scope of the present address and attention need be called to only one of these problems, viz.,

\* An address delivered before the Cleveland Chamber of Commerce, February 18, 1913.

that the growth and concentration of population, and the wonderful development of transportation facilities that have characterized our progress during modern times, have materially increased the keenness of competition, reducing the margin of profit to the narrowest point and thus making imperative the most careful methods in handling the details of production and distribution.

The selling price of an article which is not the subject of an absolute monopoly is largely determined by the competition of the market, and therefore, to that extent, it is beyond the control of the manufacturer. Its cost, however, is determined by an intelligent manipulation of the contributing factors and hence is largely within his control.

The elements of cost are:

1. The raw materials entering into the product in any given case.
2. The direct labor cost expended in its production.
3. The factory burden or overhead and indirect expenses.
4. The cost of disposing of the finished product or the selling expenses.

These four factors are all variable factors (some of them much more variable than others), and they largely depend upon the wisdom and intelligence with which their combination is directed; upon the limitations of the capital employed; and upon the relation of the marketable output to the time and effort employed in its production and distribution. These conditions are all more or less capable of being controlled.

In any given case each of these factors bears a certain relation to each of the others and to the whole cost, and the mere alteration in a wisely directed change in the relation of the factors to each other, frequently measures the difference between profit and loss.

When a factory is being operated at a profit, under existing costs of material, labor and administration, that profit may be greatly increased if the output of the factory can be enlarged without a proportionate swelling of the cost of administration. In other words, if the quantity of finished product be increased at the expense only of cost for additional material and productive labor, at existing rates, but without increase in the outlay for heat, light, power, taxes, insurance, interest on the capital, un-

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productive labor, superintendence, and the other charges that enter into the cost of conducting a business, the *rate* of net profit per *unit* of output is increased, in proportion to the percentage of increase in the factory production.

This increase in output beyond the normal is, to the factory, what the "strap-hanger" is to the traction line—a source of pure net profit—"velvet," as it were—and to secure it to the maximum of capacity is the aim of the wide-awake manufacturer. To the manufacturer who is confronted by the apparent necessity of either reducing wages or advancing prices—who is in the situation colloquially expressed by the phrase "between the devil and the deep sea"—there may remain this safe "side-step" of increasing output without correspondingly increasing overhead expense.

It is, in fact, the ultimate purpose of producing this increase in output without proportionately increasing overhead expense, which has given rise to all piece-work, differential, bonus, and premium wage systems; that has inspired investment in automatic machinery, and is the moving force behind the thousand and one labor saving devices that occupy the attention of inventive genius the world over.

The manufacturer who cuts wages or piece-rates may or may not be wise, and he may or may not be fair; in any event, he lays himself open to adverse criticism and direct opposition; and so it is with the manufacturer who advances selling prices. No thoughtful person, however, can criticise the manufacturer who requires a maximum capacity output and who pays for material and labor in proportion.

Parenthetically, it may also be observed that there is no such direct relation between day rates of wages and cost of production as is sometimes assumed in current discussion (especially in discussion upon the ever present tariff question). It is not the day rate of wage which counts, but the rate of wage per unit of product, and it is entirely possible to attain an increase in profit even through an increase in the unit rate, if such increase can be effected coincident with a change in the relation of the fixed overhead to the factory output.

What then, is the guide to this safe and profitable result? There is only one. Accurate information as to what constitutes

maximum output, for each man, for each machine unit, and for the factory as a whole.

This knowledge can be gained only through correct measurement of the material, and equally correct measurement of the amount of labor invested in each piece of product at each stage of manufacture, and through a scientific and logical distribution of overhead expense to each "unit of product" toward which this "prime cost" investment has been made.

This proper measurement of material, labor and overhead expense constitutes the true function of a cost system, and is the only foundation upon which can be built a permanently profitable business in any competitive industry.

Such accurate knowledge, obtained only through systematic and correct accounting, lies at the base of all so-called efficiency engineering and studies in "scientific management."

That manufacturer who does not know, beyond all guess work, what his product costs—step by step and operation by operation—is in no position to decide intelligently upon selling prices, wage rates, the merits or demerits of machines which purport to cheapen his labor processes, the comparative value of his workmen as producers, the efficiency of his foremen, or, finally, to judge what ratio the normal output of his factory bears to that maximum production which, beyond a certain point, is all net profit.

Within the limits, imposed by this address, an amplification and extended discussion of this proposition cannot, of course, be attempted and a mere statement of these fundamental principles will, therefore, have to suffice for present purposes.

In the absence of accurate knowledge concerning the interrelation of these factors determining cost, and their relation to selling price, and in the absence of accurate means of comparison of the results attained by experimentation and under varying methods and policies, resorted to for the purpose of controlling their combination in the interest of the largest margin of profit, the directing management of the business is, of course, entirely without rudder or compass in steering the course of the enterprise.

Mr. Harrington Emerson, whose testimony before the Interstate Commerce Commission in the railroad rate cases excited so much attention, and who has become so widely known as one

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of the leading exponents of scientific management and as a pioneer in studies of production efficiency, makes the statement that he has visited factories in all parts of the United States, Europe and Asia, and the rarest thing he found was a system of accounting from which correct, reliable and immediate records could be obtained.

It will readily be appreciated, therefore, that intelligent economy of time and effort is the keynote of success in the operation of the daily transactions, not only of the immense corporations of the country, where even a fraction of a cent in some detail will run up to thousands of dollars in the aggregate, but also of moderate sized as well as small business enterprises.

To bring about this economy of time and effort, and thus form the basis for increased profits, it is necessary that nothing bearing upon the cost of the finished product shall be neglected; that no department shall exist at the expense of the rest of the establishment without the management being thoroughly conversant with the reason for its so existing; that there shall be a definite knowledge of the relation to each other of all of the factors of earnings and costs, and their relation to net earnings, in each department; that all overhead charges shall be included in figuring cost—in a word, it is necessary that thoroughly accurate, systematic methods shall prevail everywhere, and that no detail, however small, shall be overlooked.

The securing of these systematic time and labor saving methods in modern business has, particularly of late years, engaged the most careful and painstaking attention of business men, with the result that a number of entirely new professions have been developed. Expert accountants, systematizers, production and efficiency engineers have been called upon to devote their technical knowledge, experience and skill to placing upon a scientific and practical working basis and reducing to a matter of routine the daily problems of modern business.

How well they are succeeding is best evidenced by the general increase in present day business efficiency, by the elimination of vast amounts of waste, and especially by the fact that, from one end of the country to the other, business men, in every line of industry large and small, are employing the services of the professional accountant and expert systematizer to assist them in introducing absolute accuracy into every detail of work, and

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in placing their entire establishments upon a permanent basis for making profits by saving them.

It is a truth needing little emphasis that accuracy in the recording of the data upon which the management must base its program for the effective control of the business, is, under all circumstances, an absolute necessity in the accounting department of any business. Errors, even though small in themselves at the start, especially if they be errors in principle, grow with startling rapidity as they are carried forward and frequently result in serious loss before being discovered and remedied.

In this connection, the services of a competent public accountant who regularly inspects the books of an establishment are indispensable, for, not only will it thus be made impossible for errors of principle and of detail to pass undetected, but, in addition thereto, the auditor, by reason of his knowledge and wide experience, is frequently able to suggest ways of simplifying existing methods, and thus time, labor and money are saved and general efficiency increased.

The gain to a business of any character which makes a practice of systematic, periodical audits, is far from being limited to a review of the integrity of those serving it in a trust capacity and to the ensuring of accuracy, valuable as that is. The excellent moral effect of such a policy, both inside and outside of the establishment, is impossible to overestimate. Trusted and valuable employees are not subjected to the temptation which an unaudited accounting record always affords, and the effect upon the discipline of the organization, the favorable sentiment created among stockholders, and, where the enterprise is of a public character, its effect upon the general public, is of inestimable value. Confidence is created and maintained, desirable publicity of the most profitable kind secured, and a helpful spirit of cooperation is engendered among all those concerned in the welfare of the institution.

An excellent proof of this is seen in the rapidly spreading practice among banks throughout the country of advertising broadcast the fact that independent auditors are regularly employed to examine into and report upon every detail of their business. The investing, as well as the general public, has learned to distrust secrecy in business, and rightfully insists upon facts and figures before it extends its patronage.

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Montgomery, the author of the best American work on auditing, says: "The value of the publicity of audited accounts cannot be overestimated. In a general way all corporations are believed to be making unreasonable profits, particularly all corporations which in any way attempt to serve the public.

"For instance, in New York City, the taxicab companies have been attacked in the newspapers and one ordinance after another has been passed regulating fares, all, of course, reducing them. During the last four or five years at least two million of dollars have been lost by three or four of these companies. During this time they have not made periodical statements to their stockholders nor to the public, setting forth these losses and the reasons therefor. For some mysterious reason publicity has been shunned.

"It is about as certain as anything can be that if certified statements of operations had been secured and sent to the newspapers annually, commencing, say, four years ago, a far different state of public opinion would have resulted.

"Corporations which are secretive about their accounts, or which issue statements not certified to, have only themselves to blame if they are made the victims of hostile legislation."

In the everyday details of office routine, it very often happens that a business house will conduct its affairs along lines which, almost imperceptibly, yet very surely, have become superannuated and, therefore, wasteful in many ways. The management may be, indeed often is, wholly unaware of the fact that its methods need a thorough revision, and the result is that, instead of steadily advancing, the business will drag along year after year, barely paying expenses, or, at most, making but a small fraction of the profit that should be earned.

Then, too, it must be remembered that "the world do move." The day of personal, individualistic management is passing and an era of organized and cooperative management is at hand. The conditions of factory management have changed and the strenuous, individual type, shackled to precedent, unable to follow the trend of modern change, adheres to customs, methods and practices which have become obsolete and his concern drifts to decay and industrial death. There is an involuntary aversion toward relinquishing those former customs and methods under which success by its founders was achieved, but as Emerson ob-



serves: "Concerns which adhere to primitive types are foredoomed to death. They rarely outlive the original founder. It is almost a miracle of succession if able individuals are found to direct them."

There is a decided difference between strenuousness and efficiency, although frequently the former is mistaken for the latter. Strenuousness means the expenditure of greatly increased effort for a correspondingly small increase in results. Efficiency means the obtaining of greatly increased results for the expenditure of a lessened effort.

Efficiency management differs from strenuous management in that it subordinates both individuals and system to broad general principles. Many managers fail to place a sufficient value upon system, and do not accord to it the importance it deserves. As a consequence, their foremen and workmen are not afforded the opportunity to be at their best and accomplish the greatest results.

Strenuousness is often an excellent quality. It enables one to set rational standards, with generally one-half the speed of extreme effort or, perhaps, a little better. But when this otherwise commendable quality is applied to certain subjects, say for instance, to the determination of rates for awarding and payment of premium wages, it can work greatly to one's detriment. It is precisely in such cases of wrong adjustment, regardless of whether or not conditions have become acute, that the skillful systematizer is able, by expert analysis, to detect the trouble and to install up-to-date methods and devices, which immediately have the effect of putting new life into all departments of the business, increasing profits and generally improving conditions from end to end. And, a very important feature of these improvements they are, almost invariably, accompanied by a material reduction in operating expenses, so that the outlay involved in the readjustment is soon repaid many times over.

The exceedingly rapid growth of many concerns is often responsible for the adoption of methods economically unsound, yet seemingly unavoidable under stress of circumstances. Such methods, perhaps intended to be temporary, gradually become part of the daily routine, resulting in definite and increasing, though by no means readily noticeable, loss.

Similar loss is frequently caused by inadequate or incomplete knowledge of the details of the cost of production and distribu-

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tion, with the result that prices are made or contracts closed with what may seem a very fair margin of profit, but which, when completed, bring the balance on the wrong side of the ledger.

Such adverse conditions and many others of more or less similar character, involving serious loss, find their remedy in the installation of manufacturing cost, of factory, office and other accounting systems, by means of which the management of a business is enabled to secure at all times, and without delay, a comprehensive, yet concise and thoroughly clear, statement of every detail that enters into the cost of production and distribution of the articles produced. Thus, in quoting prices, it is possible to know exactly how low a bid can be made, and thereby avoid the ruinous policy of accepting work just to secure a contract, without regard to whether a reasonable amount of profit is made thereon.

The modern true cost finding and cause exhibiting systems of accounting are scientific achievements, born during the last decade, and filling a long felt want by supplying the measurements and other data calculated to promote the practice of economies. These systems must not be confounded with the cumbrous, so-called cost systems of fifteen or twenty years ago, with their far-fetched schemes of percentage or "blanket" methods of burden distribution; they are as different from these as is a modern steam engine from its original Stephenson prototype. The past decade has witnessed important advances in many lines, but possibly none of greater importance than in the science of cost accounting.

Proprietors and managers have long wanted exact knowledge of the cost of their output and have realized the great advantage of the cost of their output and have realized the great advantage will admit (if they are honest about it) that they really do not know anything certain about their costs. Many self-styled "expert cost accountants," with their "ready to wear," "fitted to any plant" cost systems, have taken advantage of this condition of affairs, have reaped a harvest for themselves and their employers, and have left their clients in a worse state of confusion than they were before on the subject of costs. There is no such thing as a ready-made cost system. Each plant, even in the same line of business, has its individual peculiarities and requirements

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and calls for individual study and organization in adapting to it the system fitted for its needs.

The public point of view toward the professional accountant, at the present time, was well expressed in a recent article by Frank W. Main,\* who said, *inter alia*:

“That there is much confusion in the popular mind as to the real work of the accountant and as to the very important service which he is rendering in the business world, is not at all surprising.

“In the first place, jobless bookkeepers without number, auditors of individual companies, seeing other fields of advancement closed, and cost clerks, certain that their grasp of the one particular business with which they are familiar has given them a grasp of all businesses and a knowledge of all manufacturing problems, have started out in the professional field as full-fledged auditors, accountants, systematizers, and business experts, when, if experienced at all, their experience is confined to but one limited business. In some cases, at least, these “auditors” have about the same right to be known as professional accountants as a hospital orderly would have to palm himself off as a skilled physician. The initial work which usually falls to the lot of the self-styled accountant on his first incursion into the professional field is usually in a line of business somewhat of the same nature as the one he has recently left. With the nerve which was necessary to start out in business for himself, and with his practical experience in that particular line, he is often able to render valuable service to his clients. As time goes on, however, and his business is extended into other lines, his difficulties increase; for unconsciously the effort is made to conform all business to the methods and the systems of the one concern with which he was most familiar. As a result, ludicrous situations usually arise, and the usual experience is that after heroic efforts of a few years he is glad to accept some permanent position at an assured salary with an established concern.

“In his trail, however, are usually left scores of business men with the well-grounded belief that their own bookkeepers know all that any professional accountant does, and with the conviction that the paying to the accountant of the fees which he

\* Saturday Evening Post, July 26, 1912.

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demands is only foolishness, as they are certain that the same services can be as well rendered by their own employees.

"The second cause of confusion as to the real service which is being rendered by the professional accountant is the impression created by some auditing companies, with their more or less prominent boards of directors, that auditing, accounting, and systematizing constitute purely and solely a business; and that contracts for such work should be very largely placed in the same way that a contract for painting or brick work would be, namely, to the lowest bidder."

However, a satisfactory manufacturing cost system, in addition to showing whether a business undertaking is profitable and affording a basis for fixing selling prices should, above everything else, furnish such clear, precise and comprehensive information as will enable the executive officer to obtain, upon short notice, the facts and data necessary to inform his administrative judgment and guide him in intelligently planning and carrying out his administrative and selling policies.

A properly designed manufacturing cost system enables the business manager:

(a) To determine which lines of production or merchandise are profitable and which are unprofitable, so that steps may be taken to increase the production and sale of such lines as are profitable, and to reduce or eliminate altogether the unprofitable lines.

(b) To decide intelligently and accurately the basis upon which commissions or salaries can be paid to salesmen or agents upon the various lines, and to what extent, if any, extra commissions can profitably be paid for sales exceeding a certain fixed amount.

(c) To *reduce costs*, either through direct reduction, or through a readjustment of the elements composing cost, or through an increase of production.

(d) To discover leaks and thus stop all unnecessary waste or extravagance.

(e) To develop the highest type of productive efficiency, by discovering and strengthening the weak points and harmonizing the work of the various departments or operating groups.

(f) To estimate the relative efficiency of managers by com-

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paring the net results of their administration; thus the manager whose cost of production is, say \$10 per unit, is obviously less efficient than the manager or foreman who, under similar conditions, obtains a production cost of \$8 per unit.

(g) To compare the similar work of superintendents, foremen, operatives, machines or other "centers" of production.

(h) To distribute, correctly and scientifically, the departmental and general overhead expenses, the failure to do which so frequently characterizes many so-called cost systems and leads to the adoption of dangerous, and often fatal, administrative and selling policies.

(i) To maintain continuously "perpetual inventory" records, enabling the same accurate accounting for merchandise that is now required for cash, and making possible the determination of the financial position of the enterprise at all times.

(j) So to relate the perpetual inventory records to the records and activities of the purchasing department, as to increase general efficiency by preventing the necessity for emergency purchases, enabling the easy maintenance of a proper balance of materials and supplies carried in stock, by facilitating the buying in such quantities and at such times as to obtain the greatest advantage from the state of the market, from discounts, and so forth.

(k) To determine whether it be cheaper to buy or manufacture incidental parts forming an integral part of the factory output.

(l) To compare costs in general and in detail the costs of one period with those of another, and to arrive at a clear understanding of the exact reason for such variations as exist.

(m) To compare actual costs with estimated or predetermined costs. The tendency of modern productive methods is toward standardization. It being possible to arrive at definite standards, a comparison of actual costs with such standard costs determines the percentage of inefficiency.

(n) Finally, any cost system to be dependable, must be integrally related to, and controlled by, the financial books of account.

The foregoing are some of the advantages to be derived from a comprehensive, modern system of cost finding and efficiency

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records under which, regularly and automatically, the information passes in review before the executive in command of the business or any of its departments.

The general manager, upon whose shoulders rests the final responsibility for the success or failure of a business, should always be in a position to place his finger upon the pulse of the entire organization, and detect instantly any need that may exist for alteration or improvement in methods, and to know exactly where to apply the remedy. The day has gone by when by mere visual observation, the factory manager could see what was going on inside the various departments of the factory, and upon the basis of such physical outlook only efficiently manage the same. He requires a more accurate and better perspective than can be obtained by mere ocular observation, and all this can be accomplished with certainty, economy and dispatch when the daily routine of a business has been intelligently and accurately systematized.

Many manufacturers realize the importance of this subject, but hesitate to take any definite action through a vague fear of encumbering their establishment with red tape, interfering with their productive effectiveness during the installation of a new system, and above all of incurring the "heavy expense" of devising and installing a manufacturing cost system.

Others, while well aware of the fact that the existing system is deficient, in that it fails to furnish them much of the information enumerated above, yet are deterred by this same fear of "heavy expense" from taking steps to revise it or to replace it in its entirety with a modern system constructed along lines of absolute accuracy and effectiveness.

Less consideration, however, would be given to this matter of expense did the manufacturers realize that the resulting economies, in nearly every instance, would in a very short time more than repay the entire cost of devising, installing and operating an intelligently designed cost system. It has truthfully been said that more companies are bankrupted by too much business than by too little. Such an indictment of modern methods could never be justified if the average business man made certain, in quoting prices, that there be included, not merely the main items of cost, with a rough guess for extras, but a definite and intelli-

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gent allowance, based on accurate knowledge, for the indirect expense of each and every department as well as the proper proportion of general overhead charges, such as rent, light, heat, insurance, interest, taxes, depreciation and numerous other items, all of which have to be paid before profits can be assured.

All of the foregoing, of course, applies not only to a manufacturing business but also with equal, and in some respects greater, force to a purely mercantile or trading business. The problems of cost, though less complex, are nevertheless exactly the same in principle, while the competition of the market, affecting the selling price, is usually much keener.

The public accountant and expert systematizer, by reason of his broad experience and knowledge gained in many branches of industry, is able to be of practical value in such cases, and many concerns have been rejuvenated and have started out with a new lease of life as a result of the time and money saving methods installed, and the counsel and advice furnished by certified public accountants.

The importance of the work of the public accountant is beginning to be generally recognized. In this country, where methods of business in the past necessarily had to adjust themselves, somehow, to rapidly changing conditions, the official, legal, recognition of the certified public accountant is comparatively recent, dating back only about fifteen years. The state of New York was the first to take action, but at the present time the degree of Certified Public Accountant, the American equivalent of the English Chartered Accountant, has been given legal recognition in some twenty-five states. His professional standing in Europe, however, dates back considerably over half a century.

The certified public accountant occupies a distinct and important position in the economy of modern business. His ability to furnish those engaged in commercial enterprises with a strictly accurate perspective of their affairs is of the utmost importance in eliminating waste and in directing effort and the value of this assistance is being recognized more and more widely every day.