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NATIONAL ASSOCIATION
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BUSH TERMINAL BUILDING
130 WEST 42nd STREET, NEW YORK

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E. F. DU BRUL, General Manager,
National Machine Tool Builders' Association,
Cincinnati, Ohio

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IMPORTANCE OF THE COST OF IDLENESS IN EQUIPMENT INDUSTRIES

PUBLICATIONS DEPARTMENT NOTE

Years of boom and depression have coincided with various events in the life of the subject of this sketch, so that it is small wonder that he is interested in the question of business cycles. He was born in the year 1873, one of grave crisis and one that was succeeded by five years of business depression. This early influence may account for some of his interest in eliminating depressions.

Following the need of ending the depression of 1888, he entered college in the fall of that year, and during the next three years business continued on a good high level until his graduation in 1892, with the degree of Bachelor of Letters. In that summer the gold reserves of the United States were being depleted, supposedly due to the operation of the Silver Coinage Act, but in the fall all fears were allayed when the subject of this sketch continued his college work.

In the spring of 1893 he took a degree of Bachelor of Arts in the traditional classical courses, and in June the panic of 1893 occurred about the time of his second graduation. Recovery began again when it was found that he would still continue at college, and in the spring of 1894 heavy gold withdrawals from the United States Treasury continued. The subject of this sketch in the meanwhile accumulated two more degrees, one as Bachelor of Letters, and one as Master of Letters.

In the fall of 1894 he decided to continue in graduate work, studying economics, and business revived slightly until the spring of 1895 when he had gained the degree of Master of Arts. Returning to college for further study in the fall of 1895, business continued on the up-grade, but in the summer of 1896 depression again became prevalent due to Wm. J. Bryan's nomination, and the decision of the subject of this sketch to end his school career and to go into business where he could make some application of the knowledge he had accumulated in the Halls of Notre Dame, and Johns Hopkins Universities.

Business picked up from that time and continued good until 1900, when there was a recession in business in the latter part of the year. To end this recession, the subject of this sketch was made Secretary of the Miller, DuBrul & Peters Mfg. Co., and business picked up.

In the spring of 1901, the widespread strike of machinists affected all the machinery interests of the country, and this strike naturally had some effect on business. To prevent a further depression, the author of this publication was made Vice-president, and later Commissioner of the National Metal Trades Association, in which capacity he served until the summer of 1904.

In the meanwhile, in 1903 the injudicious speculation of certain malefactors of great wealth had brought on the so-called Rich Men's Panic, and to end the subsequent depression, Mr. DuBrul gave up the work of the Metal Trades Association and went back into business. Business thereupon boomed until 1907, when some more injudicious speculation among great interests in Wall Street brought the subsequent depression of 1907.

This was a very severe depression, and it required drastic measures to end it, so in that year, Mr. DuBrul was made Vice-president

of the Miller, DuBrul & Peters Mfg. Co., and in the same year established the Pyro Clay Products Co., of which he has been the President since its organization.

In 1915 when it was necessary to end the depression during which the European War broke out, the subject of this sketch was made President of the Miller, DuBrul & Peters Mfg. Co., in which capacity he continued until 1919, when he sold his interests in that company. Depression quickly followed, and in 1921 the author undertook the work of General Manager of the National Machine Tool Builders' Association, and business revived and has been fairly prosperous ever since.

In fact it has been so good for the rest of the country, that even the machine tool industry picked up some in 1923, but a good deal remains to be done to set the stage for a long period of prosperity, so the subject of this sketch is still on the job. Every one of these events can be traced to fluctuations in the production of pig iron, which is considered to be a first-class barometer of current events.

He thinks the work of a Trade Association Executive, acting as consulting economist to a whole industry, is a man-sized job, particularly if that industry is suffering as a consequence of its efforts to end the war by producing enough machinery to make enough shells, ships, cannon, rifles, aeroplanes, tanks, and similar war material, in a few months, to overcome the years of preparation that the Germans had been indulging in.

If any one takes this sequence of events too seriously he ought to be put to writing books about the bones and skulls of the prehistoric man and other similar debris.

Owing to the fact that production is no longer at the peak and that most industries are undergoing a process of readjustment, idleness, unnecessary and necessary, is an extremely important managerial problem. This is especially true in equipment industries with which the following article deals.

It is a regrettable and unpleasant fact that equipment industries have always had periods of depression that were longer, deeper and more severe than those of the industries they have served. It is an habitual and equally unpleasant fact that the periods of prosperity or boom have always been shorter for the equipment industries than for their customers. Management has often bumped into these facts with disastrous effects, as shown by the large proportion of failures in these industries.

Need of Economic Analysis

When it came to analyzing the causes for this disconcerting irregularity, the typical manager was about on a par with the African medicine man giving his reason for an eclipse of the sun. He took it as a visitation from some demon of business, who maliciously stopped prosperity. But as eclipses were observed and observations recorded astronomers worked out the causes of eclipses. As the facts of depression and activity become recorded in statistics, business analysts are piecing scattered information together into a co-ordinate, logical explanation, which, of course, is still far from complete.

In the course of such study some analysts have found statistical evidence that equipment industries fluctuate more widely and more rapidly in the business cycle than the industries for which equip-

ment is built. Such analysts have concluded that these wide and rapid fluctuations in activity are largely beyond the control of the equipment builders.

But economic analysis has not come very largely within the reach of the men operating these construction and equipment industries. Managers of such industries are generally of the production or construction type and not of the financial or analytical type. They have dealt with the physical side of their problems and not with their economic aspects. As a result, the very industries whose conditions have demanded the greatest amount of analysis have received the least, much to their own detriment and to that of society as a whole. Too often the problems of the construction and equipment industries have been overlooked and fallaciously considered as being of no great difference from those of the consumer goods' industries.

In 1911, George H. Hull, a business man, wrote a book on "Industrial Depressions."[1] From a business man's observations of some facts and their influence on other facts, Mr. Hull pointed out that construction industries seemed to be subject to peculiarly violent and wide fluctuations in their demand. In 1913, Prof. Wesley C. Mitchell published a monumental study on "Business Cycles."[2] He traced the main causes and effects through various stages of the cycle. In his book, Prof. Mitchell brought out statistical evidence pointing to the soundness of many of Mr. Hull's conclusions. In 1917 Professor J. Maurice Clark published an article,[3] presenting and analyzing some underlying reasons why demand for equipment should behave as it does.

The depth of the depression of 1920-1921 led many economists and business men to give some of these causes much more consideration than they had ever been given before. A report on "Business Cycles and Unemployment" was drawn up by one of the Committees of President Harding's Unemployment Conference.[4] It, too, brought out the necessarily bad load factor that confronts all construction and equipment industries. In the late book by Professor J. Maurice Clark entitled "The Economics of Overhead Costs,"[5] the subject is further expanded.

Now that the analysts have explained these economic causes and effects, it is up to the managers of equipment industries to conduct their enterprises so that they will suffer less loss from these necessary fluctuations than they have in the past. It will not do for a man who is himself a "blue print hound" to impatiently dis-

[1] "Industrial Depressions," by Geo. H. Hull, F. A. Stokes Co., 1911.
[2] "Business Cycles," by Wesley C. Mitchell, published by the University of California, 1913.
[3] "Business Acceleration and the Law of Demand." by J. Maurice Clark, "The Journal of Political Economy," March, 1917, Page 217.
[4] "Business Cycles and Unemployment," published for the National Bureau of Economic Research by McGraw-Hill Book Co., Inc., 1923. See Pages 12-13.
[5] "The Economics of Overhead Costs," by J. Maurice Clark, Pub. University of Chicago Press. 1923. See Pages 389-396.

miss the economic analyst as a "chart hound." Hunters find need for different kinds of dogs in pursuing different kinds of game. They don't set bird dogs to chasing rabbits, nor do they use rabbit dogs in bird hunting. The business huntsman can use both the blue print hound and the chart hound to advantage.

Why Production of Equipment Cannot be Stabilized

Let us see why demand for equipment must necessarily fluctuate more than demand for the product of the equipment. Suppose that over a long period users of certain machinery were to have a steady demand, no more and no less than their equipment is capable of turning out. During that period this demand on the machine builders is merely to replace physical wear out. But now suppose that over another period, demand for this product recedes. The users have more than enough equipment to supply their demand, so they make good the wear-out by putting the idle machines to work as the others wear out. During that time, their demand on the machine builders is not as much as the actual wear-out of the machines in use. So the plants of the machine builders are necessarily thrown into idleness, although the machine users may have only a moderate recession in their demand. The machine builders cannot resume work until the users have used up all the machines that the recession in business left them as an excess supply. For this reason, at the first clear sign of recession, the user stops buying replacements, and thereby causes the equipment industries to feel a recession long before consumer goods' industries do.

But demand for staple commodities does not permanently stay at any level. In the long run it would naturally grow at least in proportion to the growth of population. In fact, it grows faster than population, because by transfer of skill and intelligence from men to machines, the equipment industries multiply human muscle power. They thereby make possible the release of muscle workers from production of some goods, and enable them to go producing other goods not previously made. These causes create a natural expansion demand for equipment, over and above the natural replacement demand due to wear out.

Due to the vagaries of the business cycle, this normal growth, however, is not regular. Industry is like the frog in the well who got out by jumping up three feet and slipping back two feet. So at times its expansion demand is much stronger than it would be under a steady rate of growth. In such times, the expansion demand added to the deferred replacement demand makes a superstrong demand on the machine builder, thus violently magnifying his fluctuation in operation.

For these reasons, equipment demand can easily be twenty times as violent in fluctuation as the demand for the product of the equipment. While this violent fluctuation adds zest to the profession of managing the equipment industries, it greatly increases

the sporting chances of failure of the manager who refuses to learn to ride this bucking steed of business.

Management Difficulties Intensified in Equipment Industries

The very irregularity of demand makes some problems of management more difficult in the equipment industries than in consumer goods' industries, or in industries producing staple raw materials. Take sales problems, for instance. Before any salesman can book a firm order he must find a buyer who has both the ability-to-buy and the will-to-buy. When business is slack, the will-to-buy is greatly weakened, even among those who have ability-to-buy, in the shape of ready funds. No super-salesman has yet devised ways to persuade many people to be fore-sighted, and to anticipate an increased demand for their own goods when all the psychological influences are giving everybody the blues. In some rare cases, where an exceptionally strong mind is behind an exceptionally strong cash reserve, some orders can be picked up. But every such prospect is eagerly sought by every order-taker, as well as by every salesman. The wisdom that leads such a prospect to purchase at such times helps him to play one seller against another to his own good advantage when it comes to price.

Then in a boom even the super-salesman would have quite a bit of trouble to persuade men to hold back their orders when the whole mob of order-takers are swearing that there never again will be enough goods to go around. That is when the ill-informed and over-enthusiastic insist on building new plants and installing more machinery to make the profits they think they see ahead in limitless amounts.

Since human nature is what it is, heavy orders for equipment are thrown mostly on a high market, not on a low one. They come with a rush at just about the worst time all round the cycle. Producing under those conditions, any equipment industry's problems of production are magnified in difficulty, and its cost problems are likewise magnified. The labor market is about cleaned up, wages are high, and efficiency of labor is low, because there are more jobs bidding for men than there are men available. Good men have long been employed elsewhere, and the construction and equipment industries have to take what is left.

At the same time, materials of all kinds are high in price, scarce in quantity, and irregular in delivery. Small orders are sidetracked, so the equipment builders are tempted to overbuy and so stick themselves with an excessive inventory when the inevitable recession comes on. Interest rates are also highest at that time, and money borrowed to carry the high inventory has to be paid back some time. Overtime and other expenses of all kinds are highest, due to the pressure to get out orders. Rush orders always cost a lot more to get out than do those made on reasonable production

schedules. Not all those super-normal costs are anticipated and provided for in the price, so that in very many cases the realized profits fall far short of those anticipated when orders were taken. Then at the first sign of recession some users will seek to cancel orders for which the equipment builder has made commitments. As some rash competitors will accept such cancellations under threat of losing future business, similar pressure is put on the sensible competitor who realizes that along that way lies suicide.

Any one who thinks this picture is overdrawn need only consult some reasonably sensible and experienced machine tool builder who builds equipment for the builders of other equipment, and whose problems are the ultimate of difficulty because of that very fact.

Effect of Violent Fluctuations on Costs and Profits

We all know that costs and profits depend on three main factors: 1, Production efficiency; 2, Amount of output; and 3, Price at time of delivery. Each of these factors influences the other two and is influenced by them in turn. Productive efficiency is necessarily affected by the amount of output that can be sold. For some goods this amount depends very largely on the price itself; for other goods price is not much of a factor. So price and output have varying reactions on each other.

In equipment industries, the demand depends on the user's necessities, which in turn depend more on the demand for the product of the machine than on a small variation in the price of the machine. The fact and the amount of interdependence of these factors makes it vitally necessary that the business executive of a highly fluctuating equipment industry should reckon on various elements of cost that may not concern other industries very much. It makes it necessary for his accountants and cost analysts to clearly distinguish the kind and amount of various costs and profits. He needs analysis of the sources from which costs and profits arise, whether through productive efficiency, or through the general course of demand and its consequent effect on output, or through price changes. Without such analysis the executive too often gets a mere coroner's verdict that death was due to causes unknown. It is much cheaper to invest money in diagnosis of the facts and application of necessary remedies than it is to pay for burials of owner's capital. The equipment industries are always in continuous need of such analysis because of the very violence of their fluctuations. The greater the fluctuation in demand, the more do the relations change between constant and variable costs.

So it is no small job for the cost analyst to show where economics of increased output begin and end, to distinguish between avoidable and unavoidable idleness and what each sort of idleness costs, and to show to what point management may go in cutting prices to buy business for the purpose of minimizing losses.

Cost Analysis as a Basis for Determining Managerial Policy

There is far too little cost analysis of the sort that management can safely use in determining policy. Perhaps this is so because the cost men have not themselves been educated up to the point of showing all that they can and should get out of cost records. Real cost analysis is no office boy's job, nor is it the job of a mere pen pusher. It requires brain work of the highest order. If industry were steady, it would not be difficult to make true cost analyses. Fluctuation increases both the necessity for and the difficulty of cost analysis.

The losses of the years 1920 to 1922 are estimated by good statisticians to have been from five to six billions of dollars. If industry had spent a very few millions for better economic and cost analysis, these losses could have been largely prevented. Consider some of the features of the post-war boom, as illustrating wherein such analysis would have helped. During that boom, it was not the rise in costs that caused the losses. The losses came from the way producers were caught in their commitments. At the height of the boom, orders were taken at prices that were in line with the costs, but "cancellitis" set in and left sellers stuck with inventories the replacement cost of which was heavily deflated by price recessions during the slump. On the rising side of the boom, orders were taken on a current basis of cost, but conditions changed rapidly and actual costs of production turned out much higher than the estimates. Material prices soared, wages soared, labor efficiency fell, expense items of all kinds rolled up far beyond anticipations, and when contracts were completed and paid for they frequently registered losses instead of gains.

Likewise, when the slump came on, it was not the fall in costs that was so important but how that fall caught the business man in relation to his inventories and commitments. If heavily committed or heavily stocked, and with little demand for his product, it was not long before the same physical amount of stock was replaceable at less direct cost for material and labor, through greater efficiency of workers, as well as at decreased wages. Any competitor who had not overstocked or over-committed, sat in the golden chair when it came to making prices. But the overstocked machine builders had to meet such competition at a loss.

Some managers were not caught napping, either by the boom or by the slump. Had there been more of that kind, there would not have been such a wild boom, with its consequent penalty of such a deep slump.

Managers of equipment industries need to be more than ordinarily well informed as to the causes and effects of these wide fluctuations in their branch of industry. Otherwise, they are likely to do things that prevent their enterprises realizing the amount of profit necessary to keep their industry in pace with the country's requirements. It will not suffice to merely pay a fair dividend on an original investment. Intelligent managers know that unless

their enterprises keep pace with the country they will be surpassed by others and finally drop out of the race through dry rot.

Humanity progresses in satisfying more and more of its physical wants only as its equipment industries progress in their true function of transferring skill and intelligence from men to machines. The equipment industries, above all others, must be conducted so that in the long run they can earn a considerable surplus over mere dividend requirements. It is only from such surplus that the equipment industries can finance research, new developments, and new inventions for the benefit of the rest of humanity. Equipment of all kinds must become larger and larger if human wants are to be satisfied through greater and greater production of consumer goods. That in itself requires equipment shops to become larger and larger, and to be equipped with machinery of progressively increasing size. This in turn, means that larger and larger sums of surplus capital must be earned to build the shops and to carry the increased length of process necessarily accompanying the increased size of the product to be made.

Suppose that locomotive frames have increased four times in length. The planer to plane them must be four times larger. It will cost more than four times as much as a small planer, and it will probably not turn out the large frame as fast as the small planer did the small frames. The locomotive builder must earn surplus enough over dividends to be able to finance the purchase of the larger planer, or the railroads will not get the large locomotive that will haul freight at so much lower cost per ton-mile. The planer builder must also earn enough on small planers to finance the building of bigger ones.

This necessity for providing increasing capital out of highly fluctuating earnings means that the equipment industries need financial and sales intelligence of the highest order. Well-known economists have said that success or failure in manufacturing depends more on the manufacturer's ability as a prophet than on his ability as a producer. If this be true of manufacturers generally, how much more it is true with respect to equipment builders! How much more they must need the best information available!

Managerial mistakes are much more likely to be serious in widely fluctuating industries than in those of more steadily flowing demand. For an equipment company that is financed largely with borrowed money, a relatively long depression is likely to be disastrous through pressure to meet obligations, just when the market for its product is at the very worst. Even though there were no added pressure to pay off old debts, if overloaded with inventory, or if without good solid financial reserves, there is a pressure for cash to keep an organization going.

Management not intelligent enough to properly finance an enterprise is quite likely to try to buy orders at any price that will help carry overhead, or help liquidate inventory. Naturally,

such a policy reacts on competitors. No matter how well informed they may be, they cannot give up the place in the sun that they have obtained. They dare not risk losing their standing in the trade. Against their better judgment they have no alternative but to meet the distress prices made by the less skillful manager who has gotten himself into a financial jam. So no matter how skillful most of the managers may be, a cut-throating price war is easily started and the skillful manager has to suffer for the mistakes of the ill-informed as well as for any that he may make himself.

In some industries, moderate reductions in price do promptly stimulate demand, and widen the market so that a greater physical volume offsets the loss by price reduction. This characteristic has been called the "Elasticity of Demand." This elasticity varies widely between different commodities, but in the equipment industries, demand does not depend on price as much as it does in other industries. Equipment demand is highly inelastic for the reasons previously given, and even disastrous price-making cannot get the whole market to respond with orders. Equipment is not bought if and because it is cheap, but if and because the user thinks he needs it to produce his own product in the volume his customers require. Even though he were given equipment for nothing, that gift would not affect the demand for his product. For that reason, prices made out of line with reasonable costs of production are useless in expanding equipment demand to any appreciable extent.

In fact, price cuts have exactly the contrary effect on the user. When prices are cut beyond the point justified by falling costs, the user's faith is shaken. He thinks there may be still further cuts so he defers placing his order until no further cuts are forthcoming. He naturally questions the fairness of the previous level. He knows about how much of a reduction may be fairly justified by falling costs. He gives others credit for business sense and expects to pay a price that will keep the seller on the job of supplying his wants. He cannot see how he can make money by selling his own goods below cost. So when offered a price far below a previous price, he naturally feels that the previous level must have been extortionate and always thereafter will show more resistance to any price made, no matter how the seller attempts to explain its fairness.

If the equipment builder could expand the market as a whole by taking a moderate loss, it would be a small price to pay for the advantage to be gained by a policy of coaxing out demand. But for the reasons already given, the demand is not stimulated, even by price cutting that goes into the bone, and such deep cuts merely increase the loss they are expected to reduce.

Besides their effect on the buyer's mental reaction, such cuts, have an equally important effect on the minds of competitors. When price slashing goes beyond reason in any industry, it is not long before a war is on to the hilt of the knife. A strong "fear

complex" is generated in those who lose a fair amount of business to one whose price is recognizably too low to be profitable. The loser fears that his own position will be jeopardized. If the competitor succeeds in capturing enough business to keep his plant in full operation without loss, he has a triple advantage. He strengthens his position with the buyers, he runs without loss himself, and increases the losses of those who do not get business. This is altogether more than most men can bear, so the next move is to make a still lower price to get back a share of the business going, and to get enough more to make up for what was lost in the beginning of the cut-throat fight.

See-sawing prices down is much easier than see-sawing up. There is no telling where prices may go if the downswing becomes heated by resentment at actions that are well known to be detrimental to a whole industry. The force of the human fighting instinct is added to that of the instinct of self-preservation and such fights become very bitter. They have often led to disastrous and weakened conditions that took many years for recovery. Such price competition led to the organization of some of our largest combinations. The U. S. Steel Corporation grew out of just such a situation.

All industrial history confirms the experience and judgment of seasoned business men, that except momentarily, the policy of raiding a market at the expense of competitors has very few chances for success, but has every chance of demoralizing and even bankrupting whole industries.

Management in equipment industries is peculiarily susceptible to temptation to try these disastrous policies. Until such industries become organized in large units, the managers will be mostly of the construction or production type, rather than of the analytical or financial type. Men of the production type are prone to neglect the financial side of their business. Statistics of failures show that in numbers of failures and amount of liabilities, manufacturers of machinery have led the parade for some time past. If managers have small financial ability, is it any wonder that they get their businesses into unhealthy shape? They make commodities where bargain sales cannot clear out excess stocks of finished goods. Their inventory is very poor collateral for loans. Under forced sale, the realization value of finished parts is less than that of the raw material from which they are made. Unless the parts are assembled into finished machines, they are just scrap under the hammer.

Necessarily, equipment plants must be built to take care of the peak loads that the buying habits of their customers force on them. Necessarily there is little or no hope of their developing off-peak business. Therefore, the cost of idleness is a very important element in their total cost. Unfortunately, it is not so recognized to any great extent, as the statistics of failures show. Even in times of activity prices are often based on an idea of normal costs that

does not include the cost of idleness during these long periods of cyclical dullness. If managers of electric light companies figured only peak load costs as normal, the companies would all be financially scuttled in a very short time.

It is seldom that the physical supply of finished equipment puts price pressure on the market. It comes because during frequent and long periods the capacity to produce equipment is in excess of the off-peak demand. It is true that in boom times, even the peak load plants may be unable to promptly supply equipment as fast as users think they want it just then. But these times are never as long as the periods when a surplus of capacity exists.

Improvement in the situation can come only with growing intelligence of management. It involves greater analysis and study of conditions, and better realization of the weaknesses to be guarded against. It also involves more conscious and concerted effort to educate equipment users to the greater cost of producing equipment in peak load plants. If the importance of these matters is realized, the user may eventually become more amenable to arguments, and be led to improve his buying habits, and to look forward a few months more than he does now. If equipment industries could save a half of their present losses, and devote the savings to research, our rate of mechanical progress would be geometrically accelerated.

Much of this discussion may seem to be somewhat off the trail of the work of the cost analyst, but his most important work is to segregate the costs of idleness, to show his executive where their trouble lies and show them the remedies. A high grade cost analyst will develop some knowledge of the total market for the wares made by the company. He will develop some way of knowing what participation his company can expect to get out of any given market, and why, and how. He will find some way of determining whether his company is getting a normal participation and analyzing why it is getting the amount it receives. He will have full data on costs, direct and indirect, and in that data he will set out clearly the costs of idleness, distinct from the costs of producing goods. He will have his idleness costs classified as between the necessary and the unnecessary, so that the unnecessary can be eliminated by internal betterments in methods. Then he will show how much the necessary idleness influences cost, and give the responsible executive a sound basis for price making. He will show what reductions in price are justified by reductions in costs. He will show truly what losses and gains are due to administrative policy, distinct from those due to shop efficiency or sales efficiency. This is the work of a real cost analyst. The man who can do all that is well worthy of a good salary.

Business has been so "chancey" in the past, that such work is in greater demand than ever before. Running "by guess and by God" is looked upon with increasing disfavor. The man who persists in doing it finds it less easy to convince bankers of a clear

title to a line of credit. Banks are beginning to study the relative risks of different industries, as well as the relative capacity of different managers. As the credit men's science becomes better and better, it will be increasingly difficult for the business ignoramus to get away with mere bluff at knowing his business. That bluff has run the failure loss up to figures much greater than the annual fire loss.

Saving production wastes of various kinds, is a large job, but saving financial waste is the biggest salvage job before the country today. In this job, the real cost analyst will come into his own. The man who can do a real job of analyzing will eventually be found somewhere on the Board of Directors—where such men are too often sadly missing.

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