ORGANIZING FOR WORK

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PREFACE

The two greatest forces in any community are the economic force and the political force backed by military power. To develop the greatest amount of strength for the benefit of the community, they must work together, hence must be under one direction.

Germany had already accomplished this union before entering the war by having her political system practically take over the industrial, and the Allies rapidly followed suit after the war began.

We also found soon after entering the war that our political system alone was not adequate to the task before it, and supplemented it by a food administrator, a coal administrator, a war labor board, a war industries board, a shipping board, and others, which were intended to be industrial, and as far as possible removed from political influences. There is no question that they handled their problems much more effectively than was possible under strictly political control.

The Soviet system is an attempt to make the

business and industrial system serve the community as a whole, and in doing so to take over the functions of and entirely supplant the political system. Whether it can be made to work or not remains to be seen. Up to date it has failed, possibly because the control has fallen into the hands of people of such extreme radical tendencies that they would probably wreck any system.

The attempt which extreme radicals all over the world are making to get control of both the political and business systems on the theory that they would make the industrial and business system serve the community, is a real danger so long as our present system does not accomplish that end; and this danger is real irrespective of the fact that they have as yet nowhere proved their case.

Is it possible to make our present system accomplish this end? If so, there is no excuse for such a change as they advocate, for the great industrial and business system on which our modern civilization depends is essentially sound at bottom, having grown up because of the service it rendered. Not until it realized the enormous power it had acquired through making itself indispensable to the community did it go astray by making the community serve it. It then ceased to render service demo-

cratically, but demanded autocratically that its will be done. "It made tools and weapons of cities, states, and empires." Then came the great catastrophe.

In order to resume our advance toward the development of an unconquerable democratic civilization, we must purge our economic system of all autocratic practices of whatever kind, and return to the democratic principle of rendering service, which was the basis of its wonderful growth.

Unless within a short time we can accomplish this result, there is apparently nothing to prevent our following Europe into the economic confusion and welter which seem to threaten the very existence of its civilization.

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I

THE PARTING OF THE WAYS

Modern civilization is dependent for its existence absolutely upon the proper functioning of the industrial and business system. If the industrial and business system fails to function properly in any important particular, such, for instance, as transportation, or the mining of coal, the large cities will in a short time run short of food, and industry throughout the country will be brought to a standstill for lack of power.

It is thus clearly seen that the maintenance of our modern civilization is dependent absolutely upon the service it gets from the industrial and business system.

This system as developed throughout the world had its origin in the service it could and did render the community in which it originated. With the rise of a better technology it was found that larger industrial aggregations could render better and more effective service than the original smaller ones, hence the smaller ones gradually disappeared leaving the field to those that could give the better service.

Such was the normal and natural growth of business and industry which obtained its profits because of its superior service. Toward the latter part of the nineteenth century it was discovered that a relatively small number of factories, or industrial units, had replaced the numerous mechanics with their little shops, such as the village shoemaker and the village wheelwright, who made shoes and wagons for the community, and that the community at large was dependent upon the relatively smaller number of larger establishments in each industry.

Under these conditions it was but natural that a new class of business man should arise who realized that if all the plants in any industry were combined under one control, the community would have to accept such service as it was willing to offer, and pay the price which it demanded. In other words, it was clearly realized that if such combinations could be made to cover a large enough field, they would no longer need to serve the community but could force the community to do their bidding. The Sherman Anti-Trust Law was the first attempt to curb this tendency. It was, however, successful only to a very limited extent, for the idea that the profits of a business were justified only on account of the service

it rendered was rapidly giving way to one in which profits took the first place and service the second. This idea has grown so rapidly and has become so firmly imbedded in the mind of the business man of today, that it is inconceivable to many leaders of big business that it is possible to operate a business system on the lines along which our present system grew up; namely, that its first aim should be to render service.

It is this conflict of ideals which is the source of the confusion into which the world now seems to be driving headlong. *The community needs service first, regardless of who gets the profits, because its life depends upon the service it gets.* The business man says profits are more important to him than the service he renders; that the wheels of business shall not turn, whether the community needs the service or not, unless he can have his measure of profit. *He has forgotten that his business system had its foundation in service, and as far as the community is concerned has no reason for existence except the service it can render.* A clash between these two ideals will ultimately bring a deadlock between the business system and the community. The "laissez faire" process in which we all seem to have so much faith, does not promise any other result, for

there is no doubt that industrial and social unrest is distinctly on the increase throughout the country.

I say, therefore, we have come to the *Parting of the Ways,* for we must not drift on indefinitely toward an economic catastrophe such as Europe exhibits to us. We probably have abundant time to revise our methods and stave off such a catastrophe if those in control of industry will recognize the seriousness of the situation and promptly present a positive program which definitely recognizes the responsibility of the industrial and business system to render such service as the community needs. The extreme radicals have always had a clear vision of the desirability of accomplishing this end, but they have always fallen short in the production of a mechanism that would enable them to materialize their vision.

American workmen will prefer to follow a definite mechanism, which they comprehend, rather than to take the chance of accomplishing the same end by the methods advocated by extremists. In Russia and throughout eastern Europe, the community through the Soviet form of government is attempting to take over the business system in its effort to secure the service it needs. Their methods seem to us crude, and to violate our ideas of justice; but

in Russia they replaced a business system which was rotten beyond anything we can imagine. It would not require a very perfect system to be better than what they had, for the dealings of our manufacturers with the Russian business agents during the war indicated that graft was almost the controlling factor in all deals. The Soviet government is not necessarily Bolshevistic nor Socialistic, nor is it political in the ordinary sense, but industrial. It is the first attempt to found a government on industrialism. Whether it will be ultimately successful or not, remains to be seen. While the movement is going through its initial stages, however, it is unquestionably working great hardships, which are enormously aggravated by the fact that it has fallen under the control of the extreme radicals. Would it not be better for our business men to return to the ideals upon which their system was founded and upon which it grew to such strength; namely, that reward should be dependent solely upon the service rendered, rather than to risk any such attempt on the part of the workmen in this country, even if we could keep it clear of extreme radicals, which is not likely? *We all realize that any reward or profit that business arbitrarily takes, over and above that to which it is justly entitled for service rendered, is just as much the exer-*

cise of autocratic power and a menace to the industrial peace of the world, as the autocratic military power of the Kaiser was a menace to international peace. This applies to Bolshevists as well as to Bankers.

I am not suggesting anything new, when I say reward must be based on service rendered, but am simply proposing that we go back to the first principles, which still exist in many rural communities where the newer idea of big business has not yet penetrated. Unquestionably many leading business men recognize this general principle and successfully operate their business accordingly. Many others would like to go back to it, if they saw how such a move could be accomplished.

Under stress of war, when it was clearly seen that a business and industrial system run primarily for profits could not produce the war gear needed, we promptly adopted a method of finance which was new to us. The Federal Government took over the financing of such corporations as were needed to furnish the munitions of war. The financing power did not expect any profit from these organizations, but attempted to run them in such a manner as to deliver the greatest possible amount of goods.

The best known of these is the Emergency Fleet Corporation. It is not surprising that

such a large corporation developed in such great haste should have been inefficient in its operating methods, but there are reasons to believe that it will, in the long run, prove to have handled its business better than similar undertakings that were handled directly through the Washington bureaus. It gave us a concrete example of how to build a Public Service corporation, the fundamental fact concerning which is that it must be *financed by public money.* That it has not been more successful is due, not to the methods of its financing, but to the method of its operation. The sole object of the Fleet Corporation was to produce ships, but there has never been among the higher officers of the Corporation a single person, who, during the past twenty years, has made a record in production. They have all without exception been men of the "business" type of mind who have made their success through financiering, buying, selling, etc. If the higher officers of the Fleet Corporation had been men who understood modern production methods, and had in the past been successful in getting results through their use, it is probable that the Corporation would have been highly successful, and would have given us a good example of how to build an effective Public Service corporation.

Mr. William B. Colver, Chairman of the Federal Trade Commission, in the summer of 1917, explained how we might have a Public Service corporation for the distribution of coal. In such a corporation as Mr. Colver outlined, there would be good pay for all who rendered good service, but no "profit." Of course, all those who are now making profits over and above the proper reward for service rendered in the distribution of coal, opposed Mr. Colver's plan, which was that a corporation, financed by the Federal Government, should buy at the mouth of each mine such coal as it needed, at a fair price based on the cost of operating that mine; that this corporation should distribute to the community the coal at an average price, including the cost of distribution. We see no reason why such a corporation should not have solved the coal problem, and furnished us with an example of how to solve other similar problems. We need such information badly, for we are rapidly coming to a point where we realize that *disagreements between employer and employee as to how the profits shall be shared can no longer be allowed to work hardship to the community.*

The chaotic condition into which Europe is rapidly drifting by the failure of the present industrial and financial system, emphasizes the

fact that in a civilization like ours the problems of peace may be quite as serious as the problems of war, and the emergencies created by them therefore justify the same kind of action on the part of the government as was justified by war.

Before proper action can be taken in this matter it must be clearly recognized that today economic conditions have far more power for good or for evil than political theories. This is becoming so evident in Europe that it is impossible to fail much longer to recognize it here. The revolutions which have occurred in Europe and the agitation which seems about to create other revolutions, are far more economic than political, and hence can be offset only by economic methods.

The Labor Unions of Great Britain, and the Soviet System of Russia, both aim, by different methods, to render service to the community, but whether they will do it effectively or not is uncertain, for they are revolutionary, and a revolution is a dangerous experiment, the result of which cannot be foreseen. The desired result can be obtained *without a revolution* and by methods with which we are already familiar, if we will only establish real public service corporations to handle problems which are of most importance to the community, and realize

that capital like labor is entitled only to the reward it earns.

Inasmuch as the profits in any corporation go to those who finance that corporation, the only guarantee that a corporation is a real public service corporation is that it is financed by public money. If it is so financed all the profits go to the community, and if service is more important than profits, it is always possible to get a maximum service by eliminating profits.

This is the basis of the Emergency Fleet Corporation, and numerous other war corporations, which rendered such public service as it was impossible to get from any private corporations. Realizing that on the return of peace many private corporations feel that they have no longer such social responsibilities as they cheerfully accepted during the war, it would seem that real public service corporations would be of the greatest possible advantage in the industrial and business reorganization that is before us.

We have in this country a little time to think, because economic conditions here are not as acute as they are in Europe, and because of the greater prosperity of our country. But we must recognize the fact that our great complicated system of modern civilization, whose very

life depends upon the proper functioning of the business and industrial system, cannot be supported very much longer unless the business and industrial system devotes its energies as a primary object to rendering the service necessary to support it. We have no hesitation in saying that the workmen cannot continue to get high wages unless they do a big day's work. *Is it not an equally self-evident fact that the business man cannot continue to get big rewards unless he renders a corresponding amount of service?* Apparently the similarity of these two propositions has not clearly dawned upon the man with the financial type of mind, for the reason, perhaps, that he has never compared them.

Such a change would produce hardships only for those who are getting the rewards they are not earning. It would greatly benefit those who are actually doing the work.

In order that we may get a clear conception of what such a condition would mean, let us imagine two nations as nearly identical as we can picture them, one of which had a business system which was based upon and supported by the service it rendered to the community. Let us imagine that the other nation, having the same degree of civilization, had a business system run primarily to give profits to those

who controlled that system, which rendered service when such service increased its profits, but failed to render service when such service did not make for profits. To make the comparison more exact, let us further imagine a large portion of the most capable men of the latter community engaged continually in a pull and haul, one against the other, to secure the largest possible profits. Then let us ask ourselves in what relative state of economic development these two nations would find themselves at the end of ten years? It is not necessary to answer this question.

I say again, then, we have come to the *Parting of the Ways,* for a nation whose business system is based on service will in a short time show such advancement over one whose business system is operated primarily with the object of securing the greatest possible profits for the investing class, that the latter nation will not be long in the running.

America holds a unique place in the world and by its traditions is the logical nation to continue to develop its business system on the line of service. What is happening in Europe should hasten our decision to take this step, for the business system of this country is identical with the business system of Europe, which, if we are to believe the reports, is so endangered

by the crude efforts of the Soviet to make business serve the community.

The lesson is this: *the business system must accept its social responsibility and devote itself primarily to service, or the community will ultimately make the attempt to take it over in order to operate it in its own interest.*

The spectacle of the attempt to accomplish this result in eastern Europe is certainly not so attractive as to make us desire to try the same experiment here. Hence, we should act, and act quickly, on the former proposition.

II

THE ENGINEER AS THE INDUSTRIAL LEADER

The principles explained in the preceding chapter may seem to be sufficiently clear and simple to appeal to almost any enlightened person, and give him the desire to carry them out. The desire to put them in operation, however, is not enough. He must have at least some inkling of the methods by which their application can be made. He must understand the forces with which he will have to contend in introducing the newer methods; the arguments that will be brought up against them, and the obstacles that will be put in his way by those who are perfectly well satisfied to go on as they are, in spite of the fact that a change is seen to be absolutely necessary in the long run.

In the following chapters we shall try to give a picture of how business and industry are conducted, and some explanation of the forces controlling each. Most of our business and industrial troubles arise from the fact that the controlling factors are not apparent to the public in general and can be disclosed only by a

thorough and exhaustive study of what is taking place.

Following this general exposition of the subject, we shall show a system of progress charts which bear the same relation to the statistical reports which are so common that a moving picture film bears to a photograph. This chart system has been in use only a few years, but it is so simple that it is readily understood by the workman and employer, and so comprehensive that one intelligent workman made the remark, "If we chart everything we are doing that way, anybody can run the shop." While we are hardly prepared to agree with this opinion, we are entirely satisfied that if the facts about a business can be presented in a compact and comprehensive manner, it will be found possible to run any business much more effectively than has been the custom in the past.

We wish to emphasize the practicality of our methods, because we have been accused of preaching altruism in business, which our critics say will not work. We know altruism will not work and absolutely repudiate the idea that our methods are altruistic; as a matter of fact, we believe we should get full reward for service rendered. Moreover, we believe that if everybody got full reward for service rendered there would not be so many "profits"

for the employer and employee to quarrel over, so often to the detriment of the public.

With this introduction, we shall try to make clear what has been happening in the industrial and business world, and draw our conclusions as we go along.

When the war broke out, many of our leading business men who had accumulated wealth through the accepted business methods, which had to do primarily with buying, selling, financing, etc., went to Washington and offered their services at a dollar a year. They did this with the best intentions, believing that the business methods which had brought them success in the past were the ones needed in time of war. They soon found that the government had taken over all financial operations; that there was no selling to be done, and that the problem quickly reduced itself to one of production, in which many of them had had no experience. There were, of course, many marked exceptions, for some grasped the problem at once and did wonderful work. As a general rule, however, this was not the case, for it takes a very capable man to grasp quickly the essentials of a big problem that is entirely new to him. Hence, as a rule, they adhered strictly to the methods they had been accustomed to, and called to assist them great numbers of accountants and stat-

isticians (all static), both groups thoroughly convinced that record-keeping was the main aim of business; and while the army was calling for ships and shells, trucks and tanks, these men busied themselves with figures, piling up statistics, apparently quite satisfied that they were doing their part. In many cases these statisticians did not differentiate between that which is interesting and that which is important. In but few cases did they realize that from the standpoint of production, yesterday's record is valuable only as a guide for tomorrow. They did not understand that it is only the man who knows what to do and how to do it that can direct the accumulation of the facts he needs for his guidance. In too many cases, such men had been left behind to run the factories, while their superiors, who had had no experience in production, undertook for the government the most important job of production we have ever had, depending almost entirely upon accountants and statisticians for guidance. The results of their labors are now history, a knowledge of which will soon be the common property of all. In spite of this handicap, we did much good work.

There is no question that both our army and navy have made good to a degree which none of our allies anticipated, but it is also true that

if we had not had economic assistance from our allies, the results they have obtained would have been impossible. As a matter of fact, it is well known that our industrial system has not measured up as we had expected. To substantiate this we have only to mention airplanes, ships, field guns, and shells. The reason for its falling short is undoubtedly that the men directing it had been trained in a business system operated for profits, and did not understand one operated solely for production. This is no criticism of the men as individuals; they simply did not know the job, and, what is worse, they did not know they did not know it.

Inasmuch as our economic strength in the future will be based on production, we must modify our system as rapidly as possible, with the end in view of putting producers in charge. To do this, opinions must give place to facts, and words to deeds, and the engineer, who is a man of few opinions and many facts, few words and many deeds, should be accorded the leadership which is his proper place in our economic system.

It must be remembered, however, that the engineer has two distinct functions. One is to design and build his machinery; the second is to operate it. In the past he has given more attention to the former function than to the

latter. At first this was but a natural and necessary condition, for the various engineering structures were comparatively few and were operated in a measure simply and independently. Now, however, with the multiplicity of machines of all kinds, the operation of one is many times intimately dependent upon the operation of another, even in one factory. In addition to this the operation of one factory is always dependent upon the successful operation of a number of others. Because this interoperation is necessary to render service or produce results, the complexity of the operating problem has greatly increased, for the operation of a large number of factories in harmony presents much the same problem as the harmonious operation of the machines in one factory. It is only, however, where the factories have been combined under one management that any direct attempt at this kind of control has been made. To be sure, the relation between the demand for and supply of the product, supplemented by a desire to get the greatest possible profit, has resulted in a sort of control, which has usually been based more on opinion than facts, and generally exercised to secure the greatest possible profits rather than to render the greatest service.

Emphasizing again the self-evident fact that

great reward can only be continuously got by corresponding service, and that the maximum service can be rendered only when actions are based on knowledge, we realize that the logical director for such work is the engineer, who not only has a basic knowledge of the work, but whose training and experience lead him to rely only upon facts. So far, however, there is not in general use any mechanism which will enable the engineer to visualize at once the large number of facts that must be comprehended in order that he may handle effectively the managerial problems that our modern industrial system is constantly presenting. It is one object of this book to lay before the public the progress we have made in visualizing the problems and the available information needed for their solution.

III

EFFICIENCY AND IDLENESS

What we accomplished in our preparation for war and in getting men to the front surprised ourselves, and apparently satisfied our allies. It was accomplished by the splendid energy and tremendous resources of the American people, but nobody pretends that we showed any high degree of efficiency in doing the work. Our expenses were enormous, and we have reconciled ourselves to their magnitude by saying over and over again that nothing counted except winning the war, which in the last analysis is true; but it is also true that excessive expense not only did not help us to win the war, but rather hindered us in accomplishing this result.

Our fumbling in war preparation seems to indicate that the great campaign for efficiency, which has been waged so assiduously in this country for the past twenty years, has not accomplished for us all we had led ourselves to believe. That we have increased individual efficiency and profit-making efficiency, and perhaps other kinds of efficiency, is not to be denied. That we have attained a high degree of national

efficiency or a high degree of efficiency in the production of goods, is nowhere indicated. It took the shock of a great war to arouse us to the realization that our great prosperity was due to something other than our productive efficiency.

Yet surely the long campaign for efficiency has been honestly and seriously waged. Why, then, have our results been so meager? The answer is simple enough and plain. The aim of our efficiency has not been to produce goods, but to harvest dollars. If we could harvest more dollars by producing fewer goods, we produced the fewer goods. If it happened that we could harvest more dollars by producing more goods, we made an attempt to produce more goods: but the production of goods was always secondary to the securing of dollars.

In the great emergency created by the war, our need was not for dollars but for goods, and people who had been trained for the seeking of dollars were in most cases not at all fitted for the producing of goods. Those who had been most successful in acquiring dollars were, however, the ones best known as business men, and when it was thought we needed a business administration, such people, with the best intentions in the world, offered their services to the Federal Government, many at a great sacri-

fice of their own interests. They found, however, that for war we needed goods, and that dollars were only the means to that end. Then they found that unless people knew how to produce the goods, dollars were ineffective.

Another phase of the efficiency movement with which we are all so familiar, was the attempt to increase the efficiency of the worker, and to ignore entirely the idler, because the system of cost-keeping generally in vogue made that seem the most profitable thing to do. The case was worse than this, for not only did the system ignore the idler, but it eliminated the inefficient, absolutely ignoring the fact that both the inefficient and the idle were going to continue to live and be supported, directly or indirectly, by the workers.

The war waked us up to the fact that the world was running short of the necessities of life, and that the product of even the most inefficient was some help. The scheme for the selection of the efficient, of which much had been made, was now found to need supplementing by one for forcing the idler to work and training the inefficient.

The great difficulty of installing such a system was that the cost-keeping methods in general vogue indicated that training methods were not profitable, for trainers were classed as non-

producers. In spite of this fact, however, the war emergency forced us to adopt them, and the results were beneficial. The inevitable deduction is that the cost-keeping methods in general vogue are fundamentally wrong, and that we shall continue to suffer from inefficiency until they are corrected. The great error in them is the fact that they absolutely ignore the expense of idleness. As a matter of fact, it costs almost as much to be idle as it does to work. This is true whether we consider *men* or *machines,* or, in other words, *labor* or *capital.*

This leads us at once to two natural questions:

What is our expense for idle labor?

What is our expense for idle capital?

Manufacturing concerns pretty generally eliminate idle labor as completely as they can (many times by discharging workmen who could be profitably used if work were planned for them).

They cannot get rid of idle capital so easily, for it is tied up in machines that cannot be sold. The only possible way to eliminate idle capital, then, is to put it to work. The first step toward putting it to work is to find out why it is idle. As soon as this is done, means for putting it to work begin to suggest themselves. Our cost-keeping system, to meet the present and future

emergency, must not content itself with charging to the product all expenses, but must charge to the product only that expense that helped to produce it, and must show the expenses that did not produce anything, and their causes. If this fundamental change is made in our cost-keeping methods, our viewpoint on the subject of production changes, with the result that we devote our attention first to the elimination of idleness, both of capital and labor.

IV

PRODUCTION AND COSTS

Manufacturers in general recognize the vital importance of a knowledge of the cost of their product, yet but few of them have a cost system on which they are willing to rely under all conditions.

While it is possible to get quite accurately the amount of material and labor used directly in the production of an article, and several systems have been devised which accomplish this result, there does not yet seem to be in general use any system of distributing that portion of the expense known variously as indirect expense, burden, or overhead, in such a manner as to make us have any real confidence that it has been done properly.

There are in common use several methods of distributing this expense. One is to distribute to the product the total indirect expense, including interest, taxes, insurance, etc., according to the direct labor. Another is to distribute a portion of this expense according to direct labor, and a portion to machine hours.

Other methods distribute a certain amount of this expense on the material used, etc. Most of these methods contemplate the distribution of all of the indirect expense of the manufacturing plant, however much it may be, on the output produced, no matter how small it is.

If the factory is running at its full, or normal, capacity, this item of indirect expense per unit of product is usually small. If the factory is running at only a fraction of its capacity, say one-half, and turning out only one-half of its normal product, there is but little change in the total amount of this indirect expense, all of which must now be distributed over half as much product as previously, each unit of product thereby being obliged to bear approximately twice as much expense as previously.

When times are good, and there is plenty of business, this method of accounting indicates that our costs are low; but when times become bad and business is slack, it indicates high costs due to the increased proportion of burden each unit has to bear. During good times, when there is a demand for all the product we can make, it is usually sold at a high price and the element of cost is not such an important factor. When business is dull, however, we cannot get such a high price for our product, and the question

of at how low a price we can afford to sell the product is of vital importance. Our cost systems, as generally operated at present, show under such conditions that our costs are high and, if business is very bad, they usually show us a cost far greater than the amount we can get for the goods. In other words, our present systems of cost accounting go to pieces when they are most needed. This being the case, many have felt for a long time that there was something radically wrong with the present theories on the subject.

As an illustration, I may cite a case which recently came to my attention. A man found that his cost on a certain article was thirty cents. When he found that he could buy it for twenty-six cents, he gave orders to stop manufacturing and to buy it, saying he did not understand how his competitor could sell at that price. He seemed to realize that there was a flaw somewhere, but he could not locate it. I asked him of what his expense consisted. His reply was, labor ten cents, material eight cents, and overhead twelve cents. I then asked if he was running his factory at full capacity, and got the reply that he was running it at less than half its capacity, possibly at one-third. The next question was: What would be the overhead on this article if the factory were running full?

The reply was that it would be about five cents. I suggested that in such a case the cost would be only twenty-three cents. The possibility that his competitor was running his factory full suggested itself at once as an explanation.

The next question that suggested itself was how the twelve cents overhead, which was charged to this article, would be paid if the article was bought. The obvious answer was that it would have to be distributed over the product still being made, and would thereby increase its cost. In such a case it would probably be found that some other article was costing more than it could be bought for; and, if the same policy were pursued, the second article should be bought, which would cause the remaining product to bear a still higher expense rate. If this policy were carried to its logical conclusion, the manufacturer would be buying everything before long, and be obliged to give up manufacturing entirely.

The illustration which I have cited is not an isolated case, but is representative of the problems before a large class of manufacturers, who believe that all of the expense, however large, must be carried by the output produced, however small. This theory of expense distribution indicates a policy which in dull times would,

if followed logically, put many manufacturers out of business. In 1897 the plant of which I was superintendent was put out of business by just this kind of logic. It never started up again.

Fortunately for the country, American people as a whole will finally discard theories which conflict with common sense; and, when their cost figures indicate an absurd conclusion, most of them will repudiate the figures. A cost system, however, which fails us when we need it most, is of but little value and it is imperative for us to devise a theory of costs that will not fail us.

Most of the cost systems in use, and the theories on which they are based, have been devised by accountants for the benefit of financiers, whose aim has been to criticize the factory and to make it responsible for all the shortcomings of the business. In this they have succeeded admirably, largely because the methods used are not so devised as to enable the superintendent to present his side of the case.

One of the prime functions of cost-keeping is to enable the superintendent to know whether or not he is doing the work he is responsible for as economically as possible, a function which is ignored in the majority of cost systems now in general use. Many accountants who make

an attempt to show it, are so long in getting their figures in shape that they are practically worthless for the purpose intended, the possibility of using them having passed.

In order to get a correct view of the subject we must look at the matter from a different and broader standpoint. The following illustration may put the subject in its true light:

Let us suppose that a manufacturer owns three identical plants, of an economical operating size, manufacturing the same article,—one located in Albany, one in Buffalo, and one in Chicago—and that they are all running at their normal capacity and are managed equally well. The amount of indirect expense per unit of product would be substantially the same in each of these factories, as would be the total cost. Now suppose business suddenly falls off to one-third of its previous amount and the manufacturer shuts down the plants in Albany and Buffalo, and continues to run the one in Chicago exactly as it has been run before. The product from the Chicago plant would have the same cost that it previously had, but the expense of carrying two idle factories might be so great as to take all the profits out of the business; in other words, the profit made from the Chicago plant might be offset entirely by the loss made by the Albany and Buffalo plants.

If these plants, instead of being in different cities, were located in the same city, a similar condition might also exist in which the expense of the two idle plants would be such a drain on the business that they would offset the profit made in the going plant.

Instead of considering these three factories to be in different parts of one city, they might be considered as being within the same yard, which would not change the conditions. Finally, we might consider that the walls between these factories were taken down and that the three factories were turned into one plant, the output of which had been reduced to one-third of its normal volume. In such case it would be manifestly proper to charge to this product only one-third of the indirect expense charged when the factory was running full.

If the above argument is correct, we may state the following general principle: THE INDIRECT EXPENSE CHARGEABLE TO THE OUTPUT OF A FACTORY SHOULD BEAR THE SAME RATIO TO THE INDIRECT EXPENSE NECESSARY TO RUN THE FACTORY AT NORMAL CAPACITY, AS THE OUTPUT IN QUESTION BEARS TO THE NORMAL OUTPUT OF THE FACTORY.

This theory of expense distribution, which was forced upon us by the abrupt change in conditions brought on by the war, explains

many things which were inexplicable under the older theory, and gives the manufacturer uniform, or at least comparable, costs as long as the methods of manufacture do not change.

Under this method of distributing expense there will be a certain amount of undistributed expense remaining whenever the factory runs below its normal capacity. A careful consideration of this item will show that it is not chargeable to the product made, but is a business expense incurred on account of maintaining a certain portion of the factory idle, and chargeable to profit and loss. Many manufacturers have made money in a small plant, then built a large plant and lost money for years afterward, without quite understanding how it happened. This method of figuring affords an explanation and warns the manufacturer to do everything possible to increase the efficiency of the plant he has, rather than to increase its size.

This theory explains why some of our large combinations of manufacturing plants have not been as successful as was anticipated, and why the small plant is able to compete successfully and make money, while the combinations are only just holding their own.

The idea so prevalent a few years ago, that in the industrial world money is the most power-

ful factor, and that if we only had enough money, nothing else would matter very much, is beginning to lose its force, for it is becoming clear that the size of a business is not so important as the policy by which it is directed. If we base our policy on the idea that the cost of an article can only legitimately include the expense necessarily incurred either directly or indirectly in producing it, we shall find that our costs are much lower than we thought, and that we can do many things which under the old method of figuring appeared suicidal.

The view of costs so largely held, namely, that the product of a factory, however small, must bear the total expense, however large, is responsible for much of the confusion about costs and hence leads to unsound business policies.

If we accept the view that the article produced shall bear only that portion of the indirect expense needed to produce it, our costs will not only become lower, but relatively far more constant, for the most variable factor in the cost of an article under the usual system of accounting has been the "overhead," which has varied almost inversely as the amount of the product. This item becomes substantially constant if the "overhead" is figured on the normal capacity of the plant.

Of course a method of cost-keeping does not diminish the expense, but it may show where the expense properly belongs, and give a more correct understanding of the business.

In our illustration of the three factories, the cost in the Chicago factory remained constant, but the expense of supporting the Buffalo and Albany factories in idleness was a charge against the business, and properly chargeable to profit and loss. If we had loaded this expense on the product of the Chicago factory, the cost of the product would probably have been so great as to have prevented our selling it, and the total loss would have been greater still.

When the factories are distinctly separate, few people make such a mistake, but where a single factory is three times as large as is needed for the output, the error is frequently made, with results that are just as misleading.

As a matter of fact it seems that the attempt to make a product bear the expense of plant not needed for its production is one of the most serious defects in our industrial system today, and farther reaching than the differences between employers and employees, for if it were removed, most of the difficulties would vanish.

The problem that faces us is first to find just what plant or part of a plant, is needed to produce a given output, and then to determine the

"overhead" expense needed to operate that plant or portion of that plant. This is primarily the work of the manufacturer, or engineer, and only secondarily that of the accountant, who must, as far as costs are concerned, be the servant of the superintendent.

In the past, in almost all cost systems the amount of "overhead" to be charged to the product, when it did not include all the "overhead," was more or less a matter of judgment. According to the theory now presented, it is not a matter of judgment, but can be determined with an accuracy depending upon the knowledge the manufacturer has of the business. Following this line of thought it should be possible for a manufacturer to calculate just what plant and equipment he ought to have, and what the staff of officers and workmen should be to turn out a given product. If this can be correctly done, the exact cost of a product can be predicted. Such a problem cannot be solved by a cost accountant without shop knowledge, but is primarily a problem for an engineer whose knowledge of materials and processes is essential for its solution.

In any attempt to solve a problem of this type, one of the most important functions we need a cost system to perform is to keep the superintendent continually advised as to how

nearly he is realizing the ideal set, and to point out where the shortcomings are.

Many of us are accustomed to this viewpoint when we are treating operations singly, but few have as yet made an attempt to consider that this idea might be applied to a plant as a whole, except when the processes of manufacture are simple and the products few in number. When, however, the processes become numerous or complicated, the necessity for such a check becomes more urgent, and the cost-keeper who performs this function becomes an integral part of the manufacturing system, and acts for the superintendent, as an inspector, who keeps him advised at all times of the quality of his own work.

This conception of the duties of a cost-keeper does not at all interfere with his supplying the financier with the information he needs, but insures that the information shall be correct, for the cost-keeper is continually making a comparison for the benefit of the superintendent, of what has been done with what should have been done. Costs are valuable only as comparisons, and comparisons are of little value unless we have a standard, which it is the function of the engineer to set.

Lack of reliable cost methods has, in the past, been responsible for much of the uncertainty so

prevalent in our industrial policies; but with a definite and reliable cost method, which enables us to differentiate between what is lost in manufacturing and what is lost in business, it will usually become easy to define clearly the proper business policy.

V

VALUE OF AN INDUSTRIAL PROPERTY DEPENDS ON ITS PRODUCTIVE CAPACITY

In the summer of 1916 a professor of political economy in one of our most conservative universities admitted to me that the economists had been obliged to modify many of their views since the outbreak of the European war. My comment was, that the professors of political economy were not the only people who had been obliged to modify their economic and industrial views.

The war taught everybody something. Military methods have undergone radical changes, but industrial methods are undergoing changes which promise to be even more radical than the military developments have been.

If there is any one thing which has been made clear by the war it is, that the most important asset which either a man or nation can have is the ABILITY TO DO THINGS. Our industrial and economic developments have in the past been largely based on the theory that the most im-

portant quality a man can possess is his ability to buy things; but the war has distinctly shown that this quality is secondary to the ability to do things. The recognition of this fact is having a most far-reaching effect, for it makes clear that the real assets of a nation are properly equipped industries and men trained to operate them efficiently. The money which has been spent on an industrial property, whether it has been spent wisely or unwisely, and the amount of money needed to reproduce it are both secondary in importance to the ability of that plant to accomplish the object for which it was constructed, and hence cannot be given the first place in determining the value of the property.

Inasmuch as every industrial plant is built to produce some article of commerce at a cost which will enable it to compete with other producers, the value of a plant as a producing unit must depend upon its ability to accomplish the object for which it was created.

To determine the value of an industrial property, therefore, we must be able to know with accuracy the cost at which it can produce its product, and the amount it can produce. To compare two factories on this basis, their cost systems must be alike; for, if there is a lack of agreement as to methods of cost accounting,

there will necessarily be a lack of agreement as to the estimated value of the properties. There are many methods of cost accounting; but there are only two leading theories as to what cost consists of. They are:

First, that the cost of an article must include all the expense incurred in producing it, whether such expense actually contributed to the desired end or not.

Second, that the cost of an article should include only those expenses actually needed for its production, and any other expenses incurred by the producers for any reason whatever must be charged to some other account.

The first theory would charge the expense of maintaining in idleness that portion of a plant which was not in use to the cost of the product made in that portion of the plant which was in operation; while the second theory would demand that such an expense be a deduction from profits, or at least be charged to some other account. When plants are operated at their full capacity, both theories give the same cost. If, however, they are operated at less than their full capacity, the expense of carrying the idle machinery is, under the first theory, included in the cost of the product, making the cost greater; while under the second theory, this expense of idle machinery is carried in a

separate account and should be deducted from the profits, leaving the cost constant. It is most interesting to note that, when costs are figured on the second basis, great activity immediately ensues to determine why machinery is idle, and to see what can be done to put it in operation. It is realized at once that this machinery had better be operated, even if no profits are obtained from its operation and only the expense, or even part of the expense, of owning and maintaining it is earned.

Fig. 1 illustrates this subject most clearly, and is an indication of the efficiency of the management as contrasted with that of the workmen, about which we hear so much. It is interesting to note that charts of this nature, which are being made monthly in several large plants, have already had a very educational influence on the managers of those plants. They show that idle machinery which cannot be used should be disposed of, and the money received, and the space occupied, put to some useful purpose.

A little consideration of the method of getting the data on this chart will make its value more apparent. It is a logical outgrowth of the previous chapter on Production and Costs, and is based on the fact that simple ownership of a

MILL, *Textile* *June,* 1916.

SYMBOL	DEPARTMENT OR MACH. CLASS	% OF CAPACITY USED ON *Day* TURN (20 30 40 50 60 70 80 90)	TOTAL EXPENSE OF IDLENESS	DETAILS OF IDLENESS EXPENSE DUE TO: LACK OF WORK	LACK OF HELP	LACK OF AND POOR MATERIAL	REPAIRS	POOR PLANNING	REMARKS
	Spinning		18 70	18 70					
	Winding		118 74		103 74		15 00		
	Doubling		10 61	10 61					
	Twisting		17 95	17 95					
	Quilling		70 67	10 67	10 00				
	Warping		390 75			390 75			*Lack of Wound Yarn*
	Weaving		915 25	75 00		840 25			*Lack of Warps*
	Finishing		210 72			210 72			*Lack of Woven Goods*
	Inspecting		49 70		10 70	39 00			*Lack of Woven Goods*
	Shipping		216 17	66 00		150 17			*Lack of Woven Goods*
	Total		1969 26	198 93	124 44	1630 89	15 00		

APPROVED BY

SUPT

FIG. 1.—IDLENESS EXPENSE CHART

machine costs money, inasmuch as it takes away from available assets. For instance, if we buy a machine for $1,000 we lose the interest on that $1,000, say at five per cent per year, then we have taxes on the machine at two per cent, and insurance of one per cent. Further, the machine probably depreciates at a rate of twenty per cent per year, and we must pay $50 or more per year for the rent of the space it occupies. All these expenses, together $330, go on whether we use the machine or not. Thus, the simple fact of our having bought this machine and kept it takes from our available assets approximately one dollar per day.

If now the cause for idleness is ascertained each day we can find the expense of each cause of idleness as shown on the chart. That part which is due to lack of orders points out that our selling policy is wrong, or that the plant is larger than it should be—in other words, that somebody in building the plant has over-estimated the demand. It is clear, however, that no conclusion should be based on the figures for one month, but on the results for a series of months during which the problem has been carefully studied. If a mistake has been made in building too large a plant, an effort should be made to determine the proper disposal, or utilization, of the excess, in order that the ex-

pense of idleness may be taken care of, even if no profit can be made.

The next column shows the expense due to a lack of help, which means that we must investigate the labor policy.

The next column, showing the expense due to lack of, or poor, material, is an indication of the efficiency of the purchasing policy and storekeeping system. The next column reflects the repair and maintenance department.

If in any case the expense of idleness is greater than can be attributed to all of these causes together, it must go in the last column as poor planning.

We can hardly claim that such a chart gives us a measure of the efficiency with which the above functions are performed, but it certainly does give us an indication of that efficiency. In several cases, the first of such charts gotten out resulted in the scrapping of machinery which had been idle for years. The space thus saved was used for a purpose for which the superintendent had felt he needed a new building. In another case it resulted in the renting of temporarily idle machinery at a rate which went far toward covering the expense of carrying that machinery.

Under the first system of cost-keeping the facts brought out by this method are not avail-

able and the increased cost that a reduced output must bear is a great source of confusion to the salesman. The newer system with its constant cost shows that non-producing machinery is a handicap to the industry of a company, just as workmen who do not serve some useful purpose in a plant, or industry, are a handicap to that plant or industry. Similarly, plants or people, therefore, who do not serve some useful purpose to a community are a handicap to that community, for idle plants represent idle capital, and idle people are not producers but consumers only. The warring nations recognized these facts, and put both idle plants and idle people to work wherever possible.

The statements so far made concern principally the operation of industrial plants and the production of articles of commerce; but they are none the less true concerning the construction of industrial plants. We may ask the same question about construction that we ask about operation; for instance, should the "cost" of a railroad include all the money spent by the people engaged in building it, or should it include only such money as contributed to the building of the road? As an illustration, is the cost of a piece of road which was built and then abandoned for a superior route before

being used a part of the cost of the railroad built, or is it an expense due to improper judgment on the part of the builders?

I am not discussing the question as to whether the public should be called upon to pay interest on the money uselessly spent through improper judgment, but I do think that in all construction it should be possible to separate those expenses which contributed to the desired result from those which did not so contribute. A comparison of these amounts will give a measure of the efficiency of the builders. On this knowledge, proper action can ultimately be taken.

Still another factor enters into the value of a "going plant." We all have known cases where the same plant operated under one manager was a failure, and under another a very decided success. The value of a going plant, therefore, consists of two elements; namely, the value of the physical real estate and equipment, and the value of the organization operating it. In considering the value of an organization we should realize that it lies not so much in the personality of the managers or leaders (who may die or go elsewhere) as in the permanent results of their training and methods, which should go on with the business, and are therefore an asset and not an accident.

We have the authority of no less a person

than Andrew Carnegie, for the statement that his organizations were of more value to him than his plants. Before we can determine exactly the value of a going plant, therefore, we must find some means of measuring the value of the organization which operates it, for this is an integral factor in the valuation of an industrial property, which is just as real as the more tangible brick and mortar of which buildings are composed.

Our charts showing the expense of idleness give us at least a rough indication of this value, for they show the expense of inefficient management.

VI

AN EXTENSION OF THE CREDIT SYSTEM TO MAKE IT DEMOCRATIC

Looking backward over the great war, we have the opportunity better to understand and evaluate the different phenomena which were developed by it. Many incidents which seemed natural and in a measure unimportant when they took place, had a profound effect upon the outcome of the war, and promise to affect still more profoundly the period to follow.

Perhaps no one incident was more significant and fraught with greater consequences to the civilization of the world than the transfer, soon after we entered the war, of the credit center from Wall Street to Washington. This transfer took place without creating any stir, without any special opposition, and with the general approval of the community at large. We had just got the Federal Reserve Banking System into operation, and it had enormously increased our power as a nation to dispense credit, yet notwithstanding the most advantageous position in which we had thus been placed, the expert

financiers of Wall Street submitted without remonstrance to the transfer of the whole credit center to Washington, where it was administered by men who, compared with the "giants" of Wall Street, were mere amateurs.

Why was it necessary for this transfer to be made, and why did Wall Street consent to it? Surely if it had been within the possibilities of Wall Street to finance the war, a serious remonstrance at least would have been raised to this transfer of the credit center. The New York bankers not only did not remonstrate, but in a most patriotic manner offered their services to help the comparatively inexperienced men in Washington handle their great undertaking.

If it had been possible for Wall Street to finance the war, it is inconceivable that the bankers of New York should have allowed the work to be taken over by other hands. Why, then, was it possible for Washington to do what was impossible for Wall Street? The answer to this question is not only very simple, but is indicative of the flaw in our whole business system. The financial methods of Wall Street were designed to operate only when we conducted "business as usual;" hence their mechanism could give credit only to those who had tangible securities. They had no mechanism for extending credit to men who, although

they had few or no tangible assets, might have tremendous productive capacity.

Because the war demanded that the nations as a whole produce goods to the utmost, we were obliged to invent a new kind of finance, in which the production of goods would be the first object. There was no tradition among the bankers of this country for financing any proposition except on the basis of tangible assets, and for the sole purpose of making profits. In many cases men who knew how to build ships or to make guns did not have tangible assets in sufficient quantity to satisfy the usual banking system. It was therefore necessary for the Federal Government to initiate a finance which was new, at least in this country: namely, that of extending credit to a man according to his productive capacity. There was no established mechanism for doing this, but it had to be done, and we did it, in a rather haphazard and ineffective manner. Nevertheless, the results have justified the venture, and the possibilities of a new credit system of vastly greater potentiality are opening themselves to us as soon as the mechanism for its operation shall have been developed.

A few of the great leaders of industry have understood in a general way this kind of finance. Among them may be mentioned Mr. Andrew

Carnegie, who said he valued his organization more than his plants; and Mr. Henry Ford. Mr. Carnegie, through an understanding of this general principle, was able to dominate the steel industry; and Mr. Ford, by the same token, became the greatest automobile manufacturer in the world. The war has backed up Mr. Carnegie and Mr. Ford by proving that productive capacity is enormously more important than wealth, but inasmuch as our credit system has been based on "tangible assets," and not on productive capacity, there has been developed as yet no generally accepted mechanism for measuring the value of productive capacity.

The cost and accounting systems in general vogue take note only of what are called the "tangible assets," which are necessarily static, showing only potentialities. They make but little attempt to find out how these assets are being used. The reason undoubtedly is that they see such assets from a sales standpoint; in other words, our economic system is still patterned after the one which was originally built up to serve the needs of buying and selling. Productive capacity, on the other hand, can be measured only by taking account of what is happening. When we begin to regard matters from this standpoint, the so-called "tangible

assets'' are not nearly so important as the use being made of them, or the amount of product being turned out. In other words, the modern accounting system which deals with production must give us a picture of what is happening, as well as of the mechanism which causes the happenings. It must be based on charts which show what progress is taking place, and which bear the same relation to statistics as a moving picture film does to a photograph.

The question naturally asked is: If the above statements are correct, why have we not realized their correctness before? It took a great war, which required us to put forth all our strength, to wake us up to their importance. They have been increasing in importance for a number of years, and our failure to recognize this fact was one of the factors in producing the great catastrophe through which we have just passed.

For many years previous to the outbreak of the great war, financiers told us there couldn't be any war, because the bankers wouldn't stand for it. They thought money controlled the world. Books were written to prove that we could have no more war. The idea of war was called ''the great illusion.'' When this ''illusion'' was realized, they still maintained that the war could last only a few months. Nevertheless it lasted over four years, to the great

confusion of our economists and theorists. We all know now that it was supported, not by finance, but by the grand scale production of modern industry. It stopped, not for lack of money, but for lack of means to live and fight with. We see, then, without any possible shadow of doubt, that inasmuch as production was the controlling factor in the great war, it will hereafter be the controlling factor in the world, and that nation which first recognizes the fundamental fact *that production, and not money,* must be the aim of our economic system, will, other things being equal, exert a predominating influence on the civilization, which is to be built up in the period of reconstruction upon which we are now entering.

Our immediate problem, then, is to develop a credit system that will enable us to take advantage of all the productive forces in the community. Such a credit system must not only be able to finance those who have ownership, but also those who have productive capacity, which is vastly more important. This is equivalent to saying that *our wealth in men is more important than our wealth in materials.* So far we have never used this force to more than a small fraction of its capacity, simply for the reason, as previously stated, that the originators of our financial system were traders and

not producers. Now, however, when the supreme importance of the producer has been recognized, we must enlarge our credit system in such a manner as to enable us to take full advantage of his possibilities; in other words, we must make it democratic.

To meet the exigencies of war the Federal Government had no hesitation in inaugurating such a finance, for the benefit of the community. While it was done in a new and crude manner, we recognize that it was in the main successful. We shall soon find that there are exigencies in times of peace also that could be helped by a similar financial method. Some nations are going to see this, and realizing that the credit system of the country must always be available for the benefit of the community, take such action as to accomplish that result, and thereby force others to do the same. Through the War Finance Corporation Act (amended) section 21, March 3, 1919, we have already taken such action with regard to exports. During the war, we financed necessary production with public money; now in time of peace we finance another essential activity with public money. This is a most encouraging beginning. Can we not make public money available for the financing of all socially necessary activities whether of war or peace?

In the past what a man could do was limited by his financial and social condition; hence many of our most capable men were severely restricted in their activities. To be sure, a few have been able to rise above their restrictions —a railsplitter becomes the president of a great republic, and a harness-maker the first president of another. These examples, however, only illustrate the possibilities that are unutilized, because our credit system has not been democratic.

VII

ECONOMICS OF DEMOCRACY

The prime function of a science is to enable us to anticipate the future in the field with which it has to deal. Judged by this standard, economic science has in the past been practically worthless; for it absolutely failed to warn us of the greatest catastrophe that has ever befallen the civilized world. Further, when the catastrophe burst upon us, economists and financiers persisted in belittling it by insisting that the great war could last only a few months. Are they any nearer the truth in their theories of labor and capital, protection and free trade, or taxation?

When they talk about preparedness, what do they mean? *Do they mean that we must so order our living as to prevent another such catastrophe, or do they simply mean that we must aim to be strong when the next catastrophe comes?*

The latest economic thought indicates clearly that the fundamentals of both kinds of preparedness are the same, and that preparation

for the former is the best basis on which to establish preparation for the latter. *True preparedness, then, would seem to consist in a readjustment of our economic conditions with the object of averting another such catastrophe.*

In considering this subject we must realize that:

The Nation reflects its leaders.

The Army reflects its general.

The Factory reflects its manager.

In a successful industrial nation, the industrial leaders must ultimately become the leaders of the nation. The condition of the industries will then become a true index of the condition of the nation. If the industries are not properly managed for the benefit of the whole community, no amount of *military* preparedness will avail in a *real* war. The military preparations of Germany, vast as they were, would have collapsed in six months had it not been for the social and industrial conditions on which they were based.

Army officers and others have told us most emphatically what military preparedness is, and how to get it. Innumerable papers have been written on industrial preparedness, and people in general are getting a pretty clear idea of what we mean by the term. Moreover, many are beginning to appreciate our lack in this

respect. Figs. 2, 3, 4, and 5 illustrate what this means.

Admittedly these pictures are not typical of our industries, but they do represent a condition which is all too common, and which must be corrected if we are to be prepared either for peace or for war.

Our record in the production of munitions, especially of ammunition, is not one to be proud of. Note what Mr. Bascom Little, President of the Cleveland, Ohio, Chamber of Commerce, and Chairman of the National Defense Committee of the Chamber of Commerce of the United States, said in the spring of 1916:

"The work of Mr. Coffin's committee has seemed to us very important, and so clearly related, in such practical ways, to what the business organizations of the country are trying to do to further national defense, that those with which I am connected immediately formed a union with the committee on learning of its work.

"The thing that has stirred up the business men of the Middle West during the past eighteen months has been the lesson they have learned in the making of war materials. It points a very vivid moral to all our people. It all looked very easy when it started a year and a half ago. The plant with which I am associated in Cleveland got an order for 250,000 three-inch high explosive shells. It was a simple enough looking job—just a question of machining.

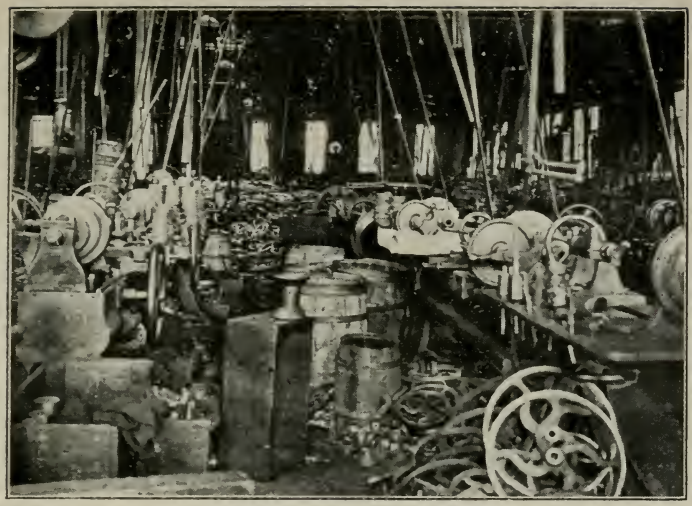

FIG. 2.—UNPREPARED

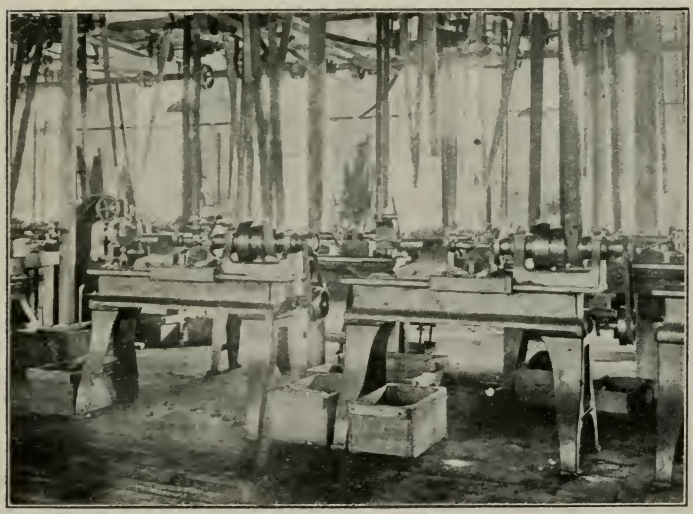

FIG. 3.—PREPARED

Two views of the same shop doing substantially the same work. The lower picture was taken about a year after the upper from a slightly different viewpoint.

The forgings were shipped to us and we were to finish and deliver. It began to dawn on us when the forgings came that this whole order, that looked so big to us, was less than one day's supply of shells for France or England or Russia; and we felt that in eight months by turning our plant, which is a first-class machine shop, onto this job we could fill the order. In a little while we got up against the process of hardening. That—and mark what I say —was fourteen months ago. To date we have shipped and had accepted 130,000 shells, and those, about half our order, are not complete. They still have to be fitted by the fuse maker, then fitted in the brass cartridge cases with the propelling charge, and somewhere, sometime, maybe, they will get on the battlefield of Europe. Up to the present, none of them has arrived there.

"Now this is the situation in a high-class efficient American plant. This is what happened when it turned to making munitions of war. The same thing has occurred in so many Middle Western plants, that their owners have made up their minds that if they are ever going to be called upon for service to their own country, they must know more about this business. They feel that they are now liabilities to the nation, and not assets in case of war. *Proud as we may be of our industrial perfection, it has not worked here, and the country—particularly you in the East —may as well know it.*"

The comment on this will be that it is three years old, and that we have made great ad-

vances since then. In reply I can only say that if we have made marked advances I have been utterly unable to discover them.

The most casual investigation into the reasons why so many of the munition manufacturers have not made good, reveals the fact that *their failure is due to lack of managerial ability* rather than to any other cause. Without efficiency in management, efficiency of the workmen is useless, even if it is possible to get it. With an efficient management there is but little difficulty in training the workmen to be efficient. I have proved this so many times and so clearly that there can be absolutely no doubt about it. Our most serious trouble is incompetency in high places. As long as that remains uncorrected, no amount of efficiency in the workmen will avail very much.

The pictures by which this chapter is illustrated do not show anything concerning the efficiency of the individual workman, but they are a sweeping condemnation of the inefficiency of those responsible for the management, and illustrate the fact, so well known to many of us, that our industries are suffering from lack of competent managers,—which is another way of saying that many of those who control our industries hold their positions, not through their ability to accomplish results, but for some other

FIG. 4.—UNPREPARED

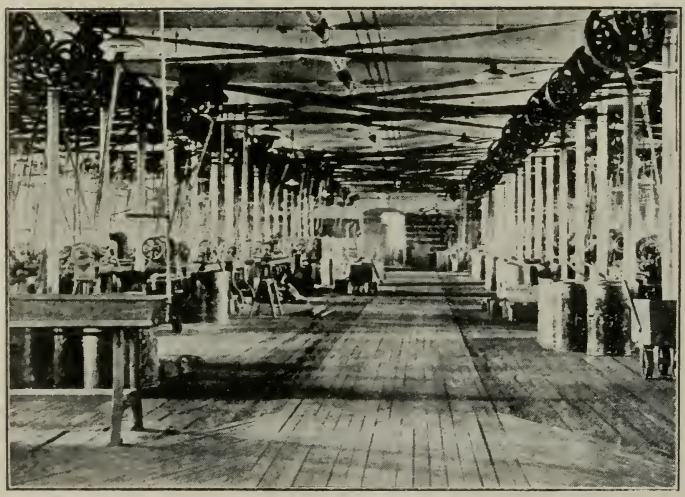

FIG. 5.—PREPARED

Two views of the same shop doing substantially the same work, taken from the same point. The lower view was taken about a year after the upper.

reason. In other words, industrial control is too often based on favoritism or privilege, rather than on ability. *This hampers the healthy, normal development of industrialism, which can reach its highest development only when equal opportunity is secured to all, and when all reward is equitably proportioned to service rendered. In other words, when industry becomes democratic.*

We are, therefore, brought face to face with a form of preparedness which is even more fundamental than the Industrial Preparedness usually referred to, and I am indebted to Mr. W. N. Polakov for the name "Social Preparedness," which means the democratization of industry and the establishment of such relations among the citizens themselves, and between the citizens and the government, as will cause a hearty and spontaneous response on the part of the citizens to the needs of the country.

At the breaking out of the great war in Europe, the thing which perhaps surprised us most was the enthusiasm with which the German people entered into it. Hardly less striking was the slowness with which the rank and file of Englishmen realized the problems they were up against, and their responsibilities concerning them.

A short consideration of what happened in Germany in the last half of the nineteenth century, or before the war, may throw some light on this subject. Bismarck and Von Moltke, following the lead of Frederick the Great, believed and taught that the great industry of a country was War. In other words, that it was more profitable to take by violence from another than to produce. The history of the world, *until the development of modern industrialism*, seemed to bear out that theory. Bismarck argued that to be strong from a military standpoint the nation must have a large number of well trained, intelligent, healthy men, and he set about so ordering the industries of Germany as to produce that result.

Military autocracy forced business and industry to see that men were properly trained and that their health was safe-guarded. In other words, because of the necessity of the military state for such men, the state saw to it that industry was so organized as to develop high-grade men, with the result that a kind of industrial democracy was developed under the paternalistic guidance of an autocratic military party.

Under such influences, the increase of education and the development of men went on apace, and were soon reflected in an industrial system

which bade fair to surpass any other in the world.

In England, on the other hand, the business system was controlled by an autocratic and "socially irresponsible finance," which, to a large extent, disregarded the interest of the workman and of the community. At the breaking out of the war, the superiority of the industries of Germany over the industries of England was manifest, not only by the feeling of the people, but by their loyalty to the National Government, which had so cared for, or disregarded, their individual welfare. This superiority became so rapidly apparent, that in order to make any headway against Germany, England was obliged to imitate the methods which had been developed in Germany, and to say that *the industries* (particularly the munition factories) *which were needed for the salvation of the country, must serve the country and not the individual.* The increased efficiency which England showed after the adoption of this method was most marked, and in striking contrast with the inefficiency displayed previously in similar work.

Confessedly our industries are not managed in the interest of the community, but in that of an autocratic finance. In Germany it was proved beyond doubt that an industrial system,

forced by military autocracy to serve the community, is vastly stronger than an industrial system which serves only a financial autocracy.

The method by which Germany developed a singleness of purpose and tremendous power both for peace and for war—namely, autocratic military authority—is hateful to us, but we must not lose sight of the fact that such power *was developed* and may be developed by some other nation again in the future. If we would be strong when we are again faced with a contingency of developing a greater strength, or submitting, we must first of all develop a singleness of purpose for the whole community.

England demonstrated the same thing; for had England not rapidly increased her efficiency in the production of munitions, it would have been indeed a sad day for the British Empire.

In considering these facts, we should ask ourselves if there is not some fundamental fact which is accountable for the success of industry under such control. The one thing which stands out most prominently is the fact that, in the attempt to make the industries serve the community, *an attempt was made to abolish industrial privilege, and to give every man an opportunity to do what he could and to reward him correspondingly.*

As before stated, the industrial system of Germany was developed largely as an adjunct to its military system, which, to a degree at least, forced the abolition of financial and industrial privilege, and thereby in a large measure eliminated incompetency in high places. What results may not be expected, therefore, if we abolish privilege absolutely, and devote all our efforts to the development of an industrialism which shall serve the community and thus "develop the unconquerable power of real democracy?"

The close of the war and the abolition of political autocracy has brought us face to face with the question of a choice between the economic autocracy of the past, or an economic democracy. To prove that this is not mere idle speculation, note what one of our leading financiers said on the subject during the war:

"The President of the New York Life Insurance Company," says Mr. Charles Ferguson, "told the State Chamber of Commerce, during the great war, that under modern conditions the existence of even two rival sovereignties on this little planet has become absurd. This is true. We must therefore drive forward, through incredible waste and slaughter, to the settlement of the question of which of the rival Powers is to build the New Rome, and establish a

military world-state on the Cæsarean model—or else we must now set our faces toward a real democracy.''

What is the basis of such a democracy?

The one thing in all the civilized world, which, like the Catholic Church of the middle ages, crosses all frontiers and binds together all peoples, is business. The Chinaman and the American by means of an interpreter find a common interest in business. Business is therefore the one possible bond which may bring universal peace. *Economists and financiers fully realized this, and believed that an autocratic finance could accomplish the result.* That was their fatal error. *The beneficiaries of privilege invariably battle among themselves, even if they are strong enough to hold in subjection those that have no privileges, and who have to bear the brunt of the fight.*

This is true whether the beneficiaries be individuals or nations. Hence neither internal strife nor external war can be eliminated as long as some people have privileges over others.

If privilege be eliminated not only will the danger of war be minimized, but the causes of domestic strife will be much reduced in number. Then, and not until then, will the human race be in a position to make a continuous and uninterrupted advance.

The nation which first realizes this fact and eliminates privilege from business, will have a distinct lead on all others, and, other conditions being equal, will rapidly rise to a dominating place in the world. Such a nation will do by means of the arts of peace, that which some Germans seemed to think it was their mission to do by means of war. The opportunity is knocking at our door. Shall we turn it away?

The answer is that we must not turn it away. In fact, we dare not, if we would escape the economic convulsion that is now spreading over Europe. Soon after the signing of the armistice Mr. David R. Francis, formerly ambassador to Russia, said that the object of the Soviet Government was to prevent the exploitation of one man by another. According to Mr. Francis, the cause of this convulsion is the attempt of the social body to free itself of the exploitation of one man by another. Then he added, "Such an aim is manifestly absurd." The convulsion is made all the more severe because there are people in every community that not only consider this aim absurd, but use all their influence to prevent the accomplishment of it.

If, at the end of a victorious war for democracy, a prominent representative of the victors is willing to proclaim publicly such a sentiment, it is perfectly evident that we have

not yet solved all of our problems. Whether we approve of the Soviet method of government or not, even Mr. Francis must admit that their aim, as expressed by him, is a worthy one. It would be surprising if in the time which has elapsed since the Russian revolution an entirely satisfactory and permanent method should have been developed to prevent the exploitation of one man by another, but the fact that they have not yet established such a government is hardly a basis for the statement that the establishment of such a government is absurd.

This statement by Mr. Francis brings clearly to the front the question—Is our business system of the future going to continue to be one of exploitation of one man by another, or is it possible to have a business system from which such privilege has been eliminated?

In this connection it may be interesting to note that, for the past fifteen years, I and a small band of co-workers have been attempting to develop a system of industrial management which should not be dependent on the exploitation of one man by another, but should aim to give each as nearly as possible his just dues. Strange as it may seem to those of the old way of thinking, the more nearly successful we have been in this attempt, the more prosperous have the concerns adopting our methods be-

come. In view of this fact we beg to submit that the proposition does not seem to us to be absurd, even though we may not admit that any of the solutions heretofore offered have really accomplished the result. In a subsequent chapter, however, we shall present the progress which we have recently made in this direction.

VIII

DEMOCRACY IN PRODUCTION

(Progress Charts)

It is unquestionable that the strategy of General Foch, who so promptly took advantage of the error of the Germans in not flattening out the French salient between Montdidier and Château-Thierry, enabled him to establish his offensive which, with the new spirit put into his whole force by the splendid fresh troops of the American army, would undoubtedly have wrested victory from the Germans in the long run, even if they had been able to stave off the revolution at home and keep their economic system in good shape. It is a fact, however, that a growing discontent due to the increasing hardships which their economic system was unable to relieve, and which threatened a revolution, was unquestionably an important factor in lowering the morale of the army and worked strongly in our favor. Of course, a knowledge of the real conditions at home was kept as much as possible from the soldiers at the front, but

from what we have learned since the armistice it must have been perfectly clear to those in control some time before the armistice, that their economic strength was exhausted, and hence, the end had come.

It has even been suggested that the attempt of the Germans to extend the salient at Château-Thierry before they flattened out the salient between Montdidier and that point, was taking a "gambler's chance," for they realized then that they were near the end of their economic resources and that they must have a quick victory or none.

Whether this theory is true or not, the fact remains that the threatened collapse of the economic system was a controlling factor during the last few months of the war. In other words, war cannot be waged unless the economic system is capable of supporting the population and also furnishing the fighting equipment. To be as strong as possible in war, therefore, we must develop an economic system which will enable us to exert all our strength for the common good, which will therefore be free from autocratic practices of either rich or poor, for such practices take away from the community for the benefit of a class.

It is pretty generally agreed that this philosophy is correct in time of war, but both the rich

and the poor seem to think that we do not need to be strong in time of peace, and that we may with impunity go back to the pull and haul for profits regardless of the results to the community. Such a condition does not produce strength, but weakness; not harmony, but discord.

In the struggle that arises under the above conditions, between an autocratic ownership and an autocratic labor party, the economic laws which produce strength are largely disregarded and the whole industrial and business system becomes infected with such a feebleness that it is incapable of supporting our complicated system of modern civilization. This is exactly what is happening in eastern Europe, where civilization is tottering due to the fact that the industrial and business system by which it was supported is no longer functioning properly. The production portion seems to have absolutely broken down, hence there is a shortage everywhere of the necessities of life. This failure is undoubtedly due to a combination of causes; but whatever the cause, the result is the same, for the violation of economic laws, whether through interest, ignorance, or indolence, will ultimately, to use the language of a distinguished economist, "blow the roof off our civilization just as surely as the violation of

the laws of chemistry will produce an explosion in the laboratory."

We must avoid the possibility of this explosion at all hazards. If we would accomplish this result we must begin at once not only to make clear what the correct economic laws are, but to take such steps in conformity with them as will get the support of the community in general, and lessen the danger of following Europe into the chaos toward which she seems heading.

Those who believed the war could last only a few months based their opinion on the destruction of wealth it would cause. They had absolutely no conception of the tremendous speed with which this loss might be made good by the productive force of modern industry. They did not understand that the controlling factor in the war would ultimately become *productive capacity.*

When we entered the war, it was of course necessary to raise money, and through the persistent use of the slogan *Money will win the war,* our loans were promptly oversubscribed. Although we were able to raise all the money we needed, we had difficulty in transforming that money quickly into fighting power, for we made the fundamental error of considering that those who knew how to raise money, also knew how

to transform it into food and clothing, weapons, and ships. The sudden ending of the war prevented us from realizing how great this error was. Even a superficial review of what took place during 1918, however, reveals the fact that our efforts at production were sadly ineffective. So true is this that some of those in authority not only discouraged all efforts to show comparison between their promises and their performances in such a manner that the public could understand, but they actually forbade such comparisons to be made.

There was, in Washington, at the beginning of the war, however, one man who understood the necessity for just this kind of record, which should be kept from day to day and should show our progress in the work we had to do. This man was Brigadier General William Crozier, Chief of Ordnance. Apparently alone among those in authority at that time, he recognized the important principle that *authority and responsibility for performance must be centered in the same individual, and organized his department on that basis.* Before the breaking out of the war a simple chart system, which showed the comparison between promises and performances, had been established in the Frankford Arsenal. This system General Crozier began to extend throughout the Ord-

nance Department as soon as we entered the war, in order that he might at all times see how each of his subordinates was performing the work assigned to him. As the method was new, progress was necessarily slow, but before General Crozier was removed from his position as Chief of Ordnance, in December, 1917, a majority of the activities of the Ordnance Department were shown in chart form so clearly that progress, or *lack of progress,* could be seen at once. No other government department had at that time so clear a picture of its problem and the progress being made in handling it.

The following incident will serve to show the results that had been produced by this policy. Late in November, 1917, Dean Herman Schneider of the University of Cincinnati, was called to the Ordnance Department to assist on the labor problem. Before deciding just how he would attack his problem, he naturally investigated the activities of the department as a whole, with the result that early in December, 1917, he wrote General C. B. Wheeler, under whom he was working, a letter from which the following is an extract:

"*The number of men needed for the Ordnance Program* should be ascertainable in the production sections of the several divisions of the Ordnance De-

partment. Investigation so far (in three production sections) discloses that, except in isolated cases, a shortage of labor is not evident.

"Each production section has production and progress chart systems. These seem to vary in minor details only. Even without rigid standardization, the charts give a picture of the progress of the whole Ordnance Program including lags and the causes therefor. Combined in one office and kept to date they would show the requirements as to workers, as well as to materials, transportation, accessory machinery, and all of the other factors which make or break the program.

"With a plan of this sort the Ordnance Department would be in a position to state *at any time its immediate and probable future needs in men, materials, transportation, and equipment.*

"The other Departments of the War Department (and of other departments engaged in obtaining war material) can, through their Production Sections, do what the Ordnance Department can do, namely, assemble in central offices their production and progress charts through which they would know their immediate and probable future needs.

"Finally, these charts assembled in one clearing office would give the data necessary in order *to make the whole program of war production move with fair uniformity, without disastrous compe ition and with justice to the workers.*"

This letter not only sets forth clearly what General Crozier had accomplished, but it shows

still more clearly Dean Schneider's conception of the problem which at that time lay immediately before us. General Crozier's successors allowed the methods which had been developed to lapse, and Dean Schneider's vision of the industrial problem and ability to handle it were relegated to second place.

The methods referred to by Dean Schneider were afterward adopted in an elementary way by the Shipping Board and by the Emergency Fleet Corporation. Although they were never used to any great extent by those in highest authority, who apparently were much better satisfied simply to report what they had done, rather than to compare it too closely with what they might have done, they were used to great advantage by many who were responsible for results in detail.

Fig. 6 is a sample of the charts referred to above. This is an actual Ordnance Department chart, entered up to the end of December, 1917, the names of the items being replaced by letters. It was used to illustrate the methods employed and to instruct people in the work.

The distance between the current date and the end of the heavy or cumulative line indicates whether the deliveries of any article are ahead or behind the schedule and how much.

It is thus seen that the short lines indicate instantly the articles which need attention.

As said before, when General Crozier was removed from his office about the 1st of December, 1917, he had a majority of the items for which he was responsible charted in this manner, and was rapidly getting the same kind of knowledge about the other items. Charts of this character were on his desk at all times, and he made constant use of them.

This chart is shown only as a sample and represents a principle. Each item on such a chart as the above may have been purchased from a dozen different suppliers, in which case the man responsible for procuring such articles had the schedule and progress of each contract charted in a manner similar to that on Chart 6. Chart 7 is such a chart. The lines on Chart 6 represented a summary of all the lines on the corresponding detail charts.

Similar charts were used during the war to show the schedules and progress in building ships, shipyards, and flying boats—and are now being used for the same purpose in connection with the manufacture of many kinds of machinery. The great advantage of this type of chart, known as the straight line chart, is that it enables us to make a large number of comparisons at once.

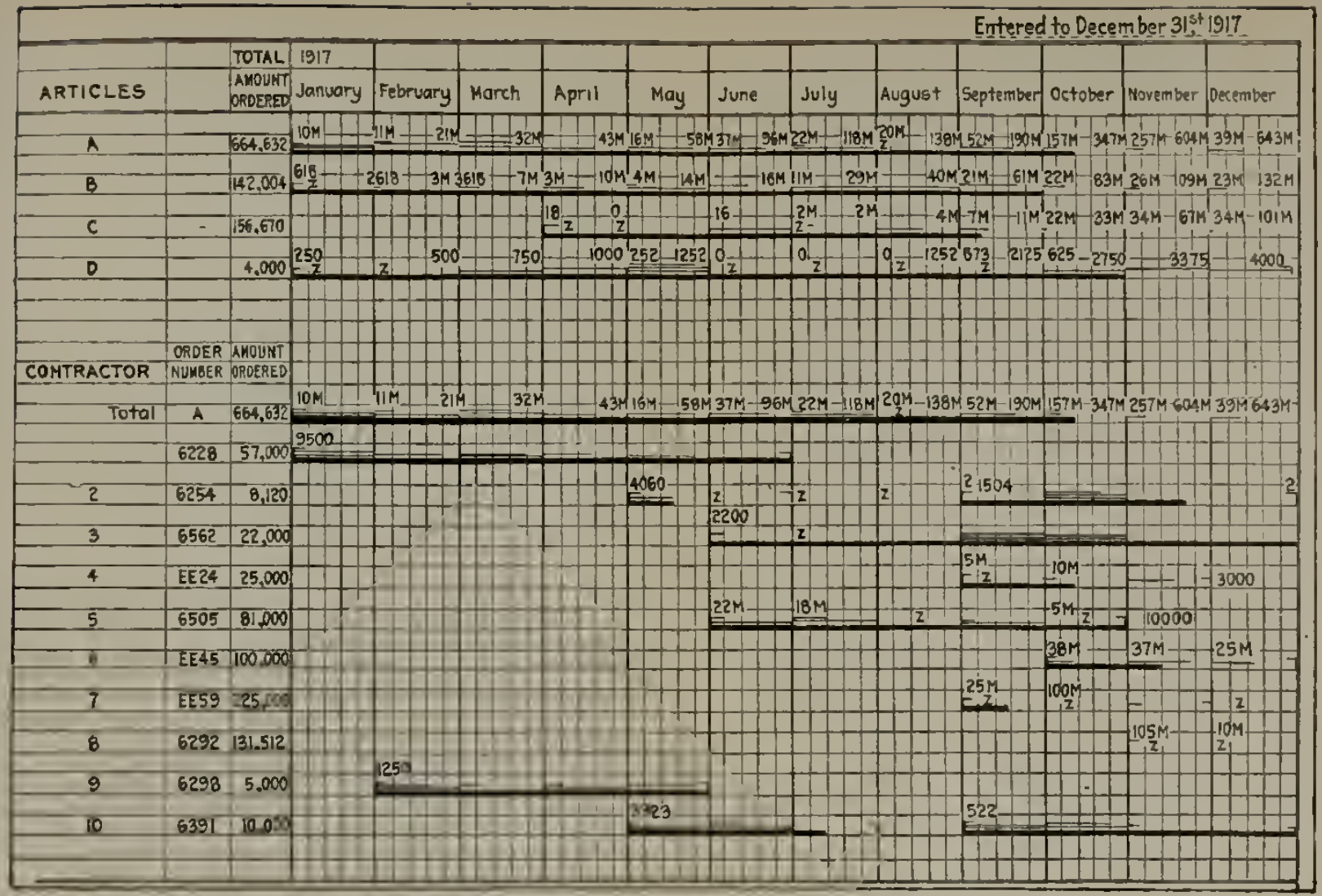

Fig. 6.—Progress Chart (top) and Fig. 7.—Order Chart (bottom)

At the left of the upper chart is a list of articles to be procured The amounts for which orders have been placed are shown in the column headed "Amount ordered." The dates between which deliveries are to be made are shown by angles The amount to be delivered each month is shown by a figure at the left side of the space assigned to that month. The figure at the right of each time space shows the total amount to be delivered up to that date.

If the amount due in any month is all received, a light line is drawn clear across the space representing that month If only half the amount due is received, this line goes only half way across. In general, the length of the light line or the number of lines indicates the amount delivered during that month.

The heavy line shows cumulatively the amount delivered up to the date of the last entry. It will be noted that, if this line is drawn to the scale of the periods through which it passes, the distance from the end of the line to the current date will represent the amount of time deliveries are behind or ahead of the schedule. It is thus seen that the short cumulative lines are the ones which require attention, as they represent items that are farthest behind schedule Z represents no deliveries

The top line on the lower chart is a summary of the individual orders and is represented on the upper chart by line A.

From the illustrations given the following principles upon which this chart system is founded are easily comprehended:

First: The fact that all activities can be measured by the amount of time needed to perform them.

Second: The space representing the time unit on the chart can be made to represent the amount of activity which should have taken place in that time.

Bearing in mind these two principles, the whole system is readily intelligible and affords a means of charting all kinds of activities, the common measure being time.

IX

DEMOCRACY IN THE SHOP

(Man Records)

In the chapter on "An Extension of the Credit System," we referred only to financial credit. The term credit, of course, has a much broader meaning. For instance, when a man has proved his knowledge on a certain subject, we "give him credit" for that knowledge; when he has proved his ability to do things, we "give him credit" for that ability. In other words, we have confidence that he will make good. The credit which we give a man, or the confidence which we place in him, is usually based on his record. We placed confidence in General Pershing because of his record. We gave him credit for being able to handle the biggest job we had, and our faith was not misplaced. If we had an exact record of the doings of every man, we should have a very comprehensive guide for the placing of confidence and the extending of credit—even financial credit.

Inasmuch, however, as our record of individuals is exceedingly meager and our informa-

tion concerning them is usually derived from interested parties, we have very little substantial basis for placing confidence in or extending credit to people in general. It is therefore hardly to be expected that a business system will risk investment without a more substantial guarantee for the financial credit it extends. It would seem, then, that if we really wish to establish such a credit system as is described in Chapter VI, we must keep such a record of the activities of individuals as will furnish the information needed to give a proper guarantee.

All records, however, are comparative, and the record of a man's performance is comparatively valueless unless we are able to compare what he has done with what he should have done. The possibilities in the modern industrial system are so great that there is scarcely any conception of them by people in general. In fact, many accomplishments which have been heralded as quite extraordinary, are shown on careful examination to have been quite the reverse, when a comparison is made with the possibilities.

In the past if a man has accomplished a desirable result, we have been pretty apt to let it go on its face value, and have seldom inquired into how it was done. We have no criticism of

this as a habit of the past, but the war has brought an entirely different viewpoint into the world, and shown others besides Americans how inefficiently the world is conducting its civilization. Other peoples have realized that the real asset of a nation is its human power, and undoubtedly will soon begin to adopt means of measuring this power to the end that they may use it more effectively.

Some of us have made a start in this work by keeping individual records of operatives, showing as nearly as possible what they have done in comparison with what they might have done, with the reasons for their failing to accomplish the full amount. By systematically attempting to remove the obstacles which stood in the way of complete accomplishment, we have secured a remarkable degree of co-operation, and developed in workmen possibilities which had been unsuspected. Further, we have developed the fact that nearly all workers welcome any assistance which may be given them by the foreman in removing the obstacles which confront them, and teaching them to become better workers. Chart No. 8 is an actual chart of this type from a factory and covers a period of two weeks. Each working day was ten hours, except Saturday, which was five. The charts are ruled accordingly. If a worker did all that

was expected of him in a day the thin line goes clear across the space representing that day, and if he did more or less, the number of such thin lines or the length of the line indicate the amount. The number of days' work he did in a week is represented by the heavy line. Wherever a dotted line is shown, it indicates that during that time the man worked on a job for which we had no estimated time. The letters are symbols indicating the cause of failure to perform the full amount of work. A key to these symbols follows Chart No. 8.

Inasmuch as, according to our idea of management, it is a foreman's function to remove the obstacles confronting the workmen, and to teach them how to do their work, an average of the performance of the workmen is a very fair measure of the efficiency of the foreman. This is shown by the line at the top of the chart. It may readily be seen that such a chart system gives a very fair means of fixing the compensation of workers and foremen, and a series of such charts kept up week after week will give us a measure of the amount of confidence which we may place in the individual foreman and workman, for if all obstacles are removed by the foreman the workman's line is a measure of his effectiveness.

Just as the line representing the average of

all the workers is a measure of the foreman, so a line representing the average of all the foremen is in some degree at least a measure of the superintendent.

The improvement which has been made by workers under our teaching and record-keeping systems involves more than is at first apparent. For instance, it has clearly been proven that poor workmen are much more apt to migrate than good workmen. The natural conclusion from this is that if we wish to make workmen permanent, our first step must be to make better workmen of them. Our experience proves this conclusion to be correct.

Many of our large industrial concerns have estimated that the cost of breaking in a new employee is very high—running from about $35.00 up. We have already satisfied ourselves that if only a fraction of this amount is expended in training the inferior workman, we can reduce migration very materially. In other words, money spent in proper teaching and training of workmen is a highly profitable investment for any industrial concern, provided there is some means of measuring and recording the result. So beneficial have our training methods proved that we are inclined to believe that *the practice of stealing good workmen from*

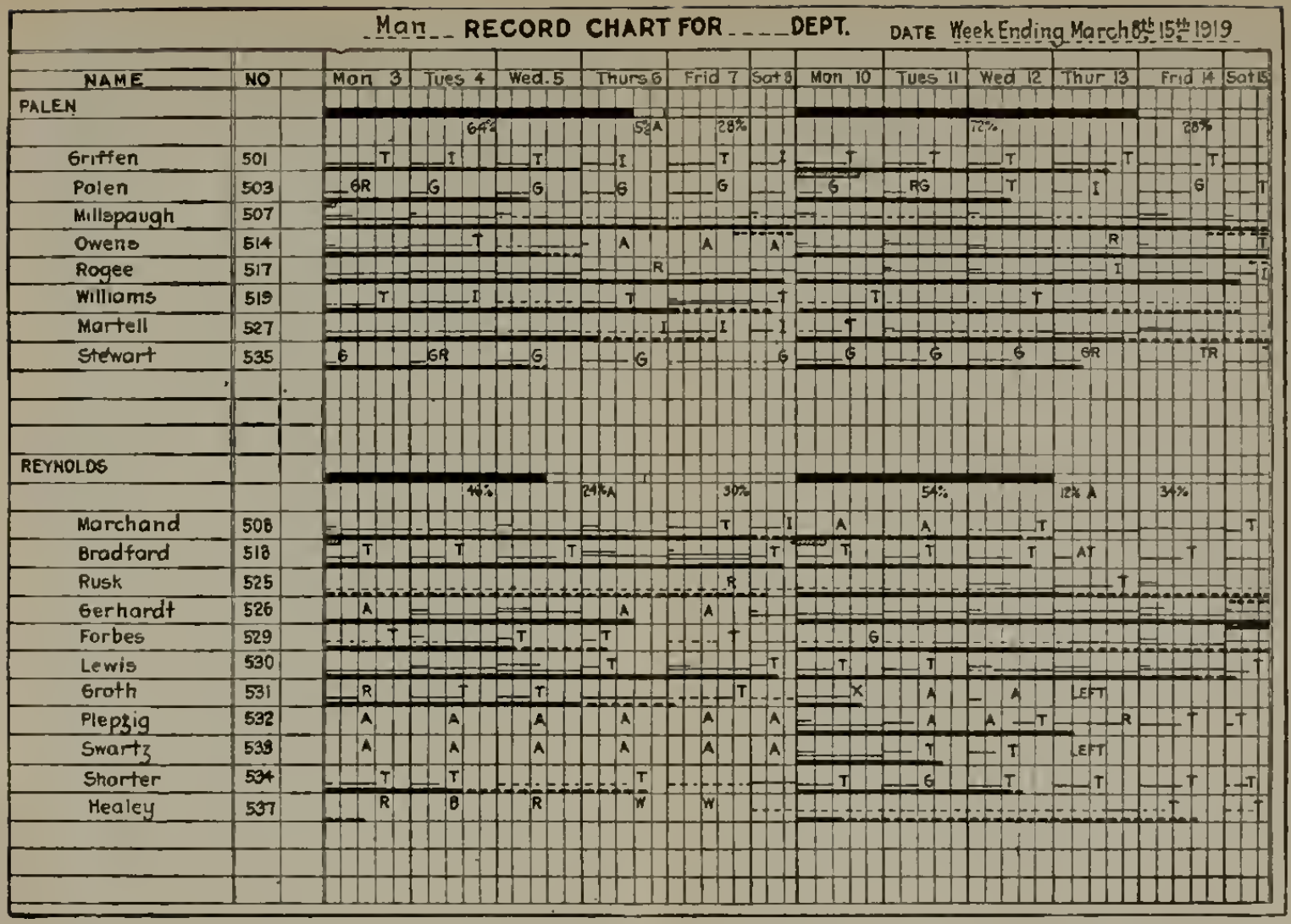

FIG. 8.—KEY FOR MAN RECORD CHART

The daily space represents the amount of work a man should have done in a day, and also the time taken to do the work.

Estimated time for work done

Time on job for which we have no estimates

Solid line = cumulative estimated time for work done. Broken line = total time used on work not estimated

The portion of the daily space through which no line is drawn shows how much the man has fallen behind what he was expected to do. The reasons for his falling behind are indicated by the following symbols:

A	Absent	I	Lack of instruction	V	Holiday
D	Defective work	M	Lack of or defective material	X	Reason not clear
G	Green operator	T	Tool troubles, or lack of tools		

one's competitor will ultimately prove to be as unprofitable as stealing his property.

Before the rise of modern industry the world was controlled largely by predatory nations who held their own by exploiting and taking by force of arms from their less powerful neighbors. With the rise of modern industrialism, productive capacity has been proven so much stronger than military power that we believe the last grand scale attempt to practice the latter method of attaining wealth or power has been made. In this great war it was clearly proven that *not what we have* but *what we can do* is the more important. It clearly follows, then, that the workers we have are not so important as our ability to train others; again illustrating the fact that our productive capacity is more important than our possessions.

That the methods which I have here so inadequately described are of broad applicability, has been proven by the fact that they have received enthusiastic support of the workmen wherever they have been tried. As previously said, it is undoubtedly true that the "efficiency" methods which have been so much in vogue for the past twenty years in this country, have failed to produce what was expected of them. The reason seems to be that we have to a large extent ignored the human factor and failed to

take advantage of the ability and desire of the ordinary man to learn and to improve his position. Moreover, these "efficiency" methods have been applied in a manner that was highly autocratic. This alone would be sufficient to condemn them, even if they had been highly effective, which they have not.

In this connection it has been clearly proven that better results can be accomplished if the man who instructs the workman also inspects the work and not only shows the workman where he is wrong, but how to correct his errors, than if the inspection is left to a comparatively ignorant man, who is governed by rules. The attempt to combine instruction and inspection in one man has met with the highest approval among the workmen, with the result of better work and less loss. This method is contrary to the usual practice, inasmuch as instruction and inspection have been considered two functions, the former requiring an expert and the latter a much less capable, and hence cheaper, man. We are satisfied that this analysis is defective; the inspector who can show the workman how to avoid his errors is usually worth far more than the extra compensation required to secure his services. It may be impossible to measure the exact material value of these methods individually,

but the total effect is reflected in an improved and increased product at a lower cost.

Inasmuch as there is no necessity for any coercion in applying these methods when we have an instructor who is capable of being a leader, we rapidly attain a high degree of democracy in the shop. On the other hand, if the instructor chosen fails to measure up to the standard of leadership, it is never long before his shortcomings are exposed, for through the medium of our charts available facts are easily comprehended by all. By these methods we automatically select as leader the man who knows what to do and how to do it, and when he has been found and installed, progress is rapid and sure.

X

DEMOCRACY IN MANAGEMENT

(Machine Records)

Having demonstrated by experience that it is possible to run a shop democratically and that the idea of giving every man a fair show and rewarding him accordingly is not really absurd, we naturally ask how far upward into the management we can carry this principle. The world still believes that authority must be conferred, and has a very faint conception of what we mean by *intrinsic authority,* or the authority that comes to a man who knows what to do and how to do it, and who is not so much concerned with being followed as on getting ahead.

The problem of the manager is much wider than that of the superintendent or the foreman, for he must see that there is work to be done, materials to work with and men to do the work, besides numerous other things which are not within the sphere of the foreman.

The object of a shop being to produce goods, the first problem which comes to him is to find

out to what extent the shop is performing the function for which it was built. In other words, are the various producing machines operating all the time and if not, why not? An opportunity for our chart comes in again, and the reason why a machine did not work at all is indicated by symbols. Chart No. 9 is one of this type. The thin lines represent the number of hours each day a machine was operated; the heavy line represents the total number of hours it operated during the week. The symbols indicate the causes of idleness; some were due to lack of work; some to lack of material; some to lack of men; some on account of repairs, etc. If we have not work enough to keep the shop busy, we must look for the cause by asking: Is there work to be had? Is our price low enough? Is our quality good enough? The answer to the first two must be determined by the manager in connection with the sales department. The third by the manager in connection with the shop superintendent. If our idleness is due to lack of material, the question must be taken up with the buyer and storekeeper. If it is due to lack of help, the labor policy and the wage system must be studied. If the idleness is due to repairs on machinery, the question is one for consideration by the superintendent and the maintenance depart-

ment. In every case the responsibility for a condition is traced directly to its source. Moreover, as it is entirely possible to determine the expense incurred by idleness, such expense may be allocated directly to the responsible parties.

Inasmuch as a real management system is simply a mechanism for keeping all concerned fully advised as to the needs of a shop, and for showing continuously how these needs have been supplied, the *comparison between what each man from the top to the bottom did and what he should have done* is easily made. Under a system of management based on our charts, it soon becomes evident to all, who is performing his function properly and who is not. A man who is not making a success, knows about it as soon as anybody else, and has the opportunity of doing better if he can. If he is not making good, it is very seldom that he has any desire to hold on to the job and advertise his incompetency to his fellows. Moreover, it takes but a short experience with these methods to convince a man that his record will discredit him very much if he uses opinions instead of facts in determining his methods and policies. We are thus able to apply the same standards to those in authority that we apply to the workmen. In other words we ask of all—how well did he perform his task? A

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upside down

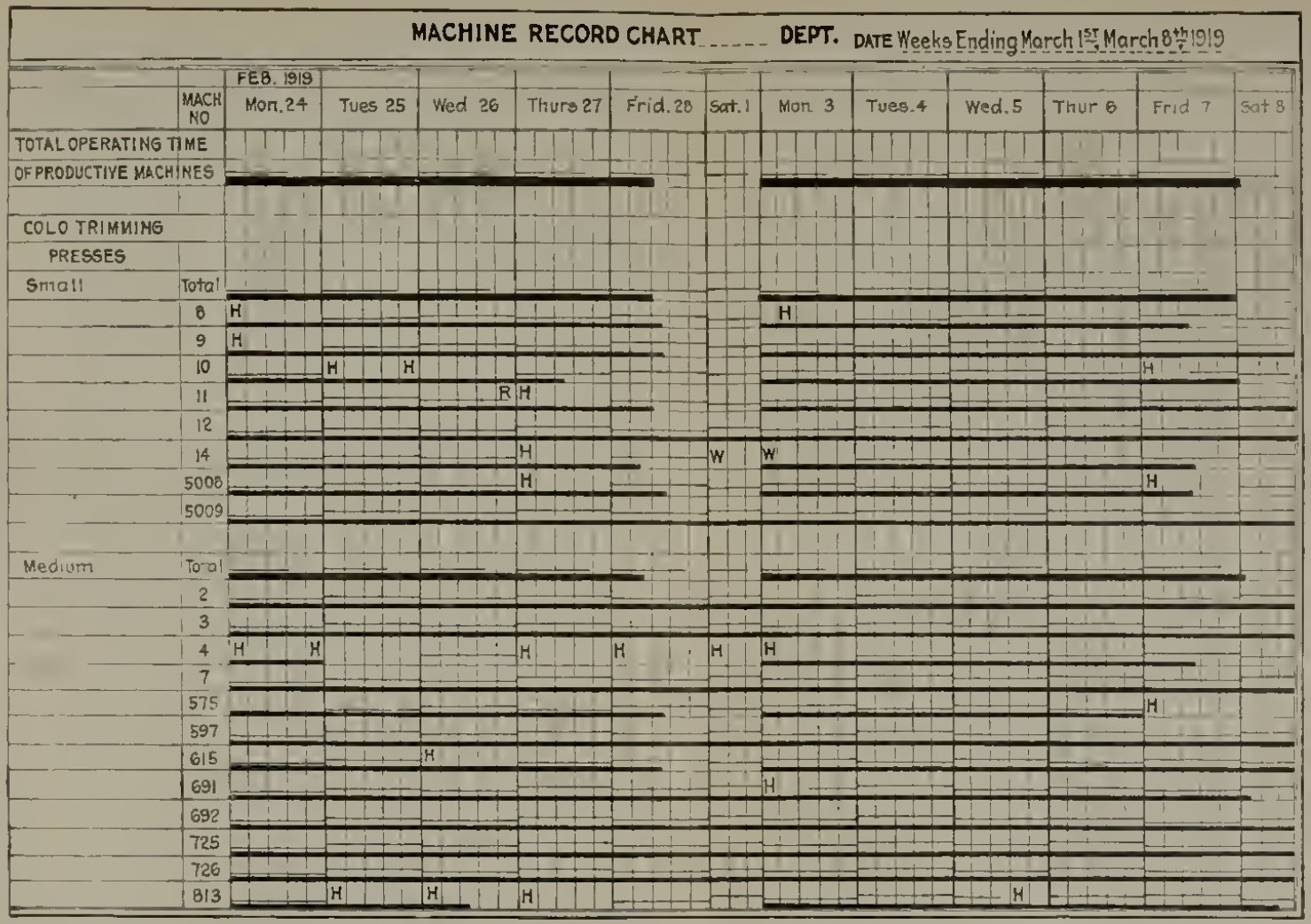

FIG. 9.—KEY FOR MACHINE RECORD CHART

Time machine was working
Cumulative working time of individual machines.
Cumulative working time of a group of machines.

The portion of the daily space through which no lines are drawn represents the time the machine was idle. The reasons for idleness are indicated by the following symbols:

H	Lack of help	R	Repairs
M	Lack of or defective material	T	Lack of tools, or tool troublea
P	Lack of power	W	Lack of work

short line on a chart points unfailingly to him who needs most help.

The Machine Record charts just referred to have to do with what proportion of the plant was operated. The Man Record charts indicate the effectiveness with which the machines were operated during the time they were operated. For instance, if a machine were operated only one-half the time, and with only one-half of its effectiveness during that time, we should get out of the machine only one-quarter of its possible use. A combination, therefore, of these two sets of charts, which gives a measure of the manager, is a basis of our faith in him, and a measure of the financial credit that may be extended to him as a producer. A little consideration will show that such a record is a far safer basis for financial credit in many cases than physical property, and affords a means of financing ability or productive capacity as well as ownership. It is not to be concluded that this subject is being presented in its final and complete form, but it is claimed that enough has been established to enable us to make *an intelligent start in the operation of the new credit system, which the Federal Government was obliged to adopt without any guide.*

Further, it is safe to say that if such records as the ones just described had been available

for the prominent business men of the country at the breaking out of the war, we should have been saved much time, and the expenditure of many millions of dollars.

The fact that such a system is applicable to the arts of peace as well as those of war; that it will pay for itself over and over again while it is being installed; and that it will enable us to value men according to service they can render, would seem to be sufficient reason why we should lose no more time than is necessary in taking steps to extend it throughout the nation. The fact that it is not an efficiency system as the term is generally understood, nor a system of scientific management as that term is understood, but simply one which enables us to use all the knowledge available and in a manner which is intelligible to the most ordinary workman as well as to the best educated executive, is responsible for the enthusiasm with which it has been received by the workmen as well as the executive. It is designed to enable all of us to use all the knowledge we have to the best advantage, and does not in the slightest interfere with, but rather supplements and supports, the work of those whose problem is to acquire additional knowledge.

In the preceding chapters we have given our

view of the economic situation; of the forces that were affecting it, and whither it was tending. We have also shown our mechanism for making effective use of all the knowledge available. We also see that with increase in the amount and availability of knowledge the more certain our course of action is outlined, and the less we need to use opinion or judgment.

Moreover, our record charts invariably indicate the capable men, and not only give us an indication of how to choose our leaders, but a continual measure of the effectiveness of their leadership after they are chosen. We thus eliminate, to a large extent at least, opinion or judgment in the selection of leaders, and in so far do away with autocratic methods from whatever source.

XI

"THE RELIGION OF DEMOCRACY"

For over a thousand years the history of the world has been made by two great forces—the church and the state—the church basing its power on idealism and moral forces, the state depending almost entirely upon military power. At times these two forces have seemed for a while to co-operate, and then to become antagonistic. Today they are absolutely distinct, working in different fields, with but little ground in common, and a rival claims the middle of the stage, for during the last century there has come into the world another force, which has concerned itself but little with our religious activities, and interested itself in our political activities only in so far as it could make the political forces serve its ends. I speak of the modern business system, based on the tremendously increased productive capacity of the race due to the advance of the arts and sciences. The rapid expansion of this new power has thrown all our economic mechanism out of gear, and because it failed to maintain a social purpose, which is common to both of the other

forces, produces cross-currents and antagonisms in the community which are extremely detrimental to society as a whole.

One hundred years ago, each family—certainly each community—produced nearly everything needed for the simple life then led.

The village blacksmith and the local mill served the community, which existed substantially as a self-contained unit.

With the growth of the transportation system and grand scale production many of the functions of the local artizans were taken over by the factory, just as the flour mills of Minneapolis supplanted the local mills, which went out of existence.

In the same manner other large centralized industries by superior service drove out of existence small local industries. By reason of improved machinery and a better technology the centralized industries were able to render this superior service, at the same time securing large profits for themselves. Unfortunately for the country at large, those who later came into control of these industries did not see that the logical basis of their profits was service. When, therefore, the community as a whole had come to depend upon them exclusively, they realized their opportunity for larger profits still, and so changed their methods as to give

profits first place, oftentimes ignoring almost entirely the subject of service. It is this change of object in the business and industrial system, which took place about the close of the nineteenth century, that is the source of much of the woe that has recently come upon the world. Unless the industrial and business system can rapidly recover a sense of service and grant it the first place, it is hard to see what the next few years may bring forth.

The great war through which we have just passed has done away with political autocracy, apparently forever, but it has done nothing whatever in this country to modify the autocratic methods of the business system, which is a law unto itself and which now accepts no definite social responsibility. This force is controlled by and operated in the interest of ownership, with, in many cases, but little consideration for the interests of those upon whose labor it depends, or for that of the community. We should not be surprised, therefore, that the workman who is most directly affected by this policy is demanding a larger part in the control of industry, especially as the war has taught him, in common with most of us, that the method of operating an industry is more important to the community than the particular ownership of that industry. The result of this knowledge

is that the workers throughout the world are striving everywhere to seize the reins of power. Unfortunately for the world at large, these workers as a rule have no clearer conception of the social responsibility than those already in control. Moreover, having had no experience in operating grand scale industry and business, it is more than likely that their attempt to do so will result disastrously to the community. The industrial system as a whole is thus threatened with a change of control which we can scarcely contemplate with equanimity. We naturally ask if there is any possible relief from the confusion with which we are threatened. We think there is, but not by any of the methods generally advocated by "intellectuals" who are not closely in touch with the moving forces.

One class believes that the answer comes in government ownership and government control of industries. The experience of the world so far does not, however, give much encouragement along these lines, for in some quarters where public utilities have to a large extent been run by the government, it is frankly admitted that the government is being run by the business system, which leaves us just where we were, *unless we can get a social purpose into that system,* in which case the need for government ownership would disappear. Is such a

thing possible? Unless it can be shown that a business system which has a social purpose is distinctly more beneficial to those who control than one which has not a social purpose, I frankly confess that there does not seem to be any permanent answer in sight. On the other hand, if it can be shown conclusively that a business system operated by democratic methods (and the test of such a system is that it acts without coercion and offers each man the full reward of his labor) is more beneficial to those who lead than the present autocratic system, we have a basis on which to build a modern economic state, and one which we can establish without a revolution, or even a serious jar to our present industrial and business system. In fact, so far as I have been able to put into operation the methods I am advocating, we have very materially reduced the friction and inequalities of the present methods much to the benefit of both employer and employee.

In 1908 I wrote a paper for the American Society of Mechanical Engineers, on "training workmen" in which I used the following expression: "The general policy of the past has been to drive; but the era of force must give way to that of knowledge, and the policy of the future will be to teach and to lead, to the advantage of all concerned."

This sentiment met with much hearty support, but inasmuch as no mechanism had at that time come into general use for operating industry in that manner, the sentiment remained for most people simply a fine sentiment. At that time the organization of which I am the head had already made some advance in the technology of such a system of management, and since that time we have continued to develop our methods along the same lines, as shown in the previous chapters of the book.

Throughout this little book we have attempted to make clear that those *who know what to do and how to do it* can most profitably be employed in teaching and training others. In other words, that they can earn their greatest reward by rendering service to their fellows as well as to their employers. It has only been recently that we have been able to get owners and managers interested in this policy, for all the cost systems of the past have recorded such teachers as non-producers and hence an expense that should not be allowed. Now, however, with a proper cost-keeping system supplemented by a man-record chart system, we see that they are really our most effective producers.

We have attempted in this book to show an example of the mechanism by which we have

put into operation our methods, and some of the results that have been obtained by them, the most important of which is that under such a system no "blind guides" can permanently hold positions of authority, and that leadership automatically gravitates to those who know what to do and how to do it. Moreover, we have yet to find a single place where these methods are not applicable, and where they have not produced better results than the old autocratic system. Moreover, they produce harmony between employer and employee and are welcomed by both. In other words, *we have proved in many places that the doctrine of service* which has been preached in the churches as religion is not only good economics and eminently practical, but because of the increased production of goods obtained by it, promises to lead us safely through the maze of confusion into which we seem to be headed, and to give us that industrial democracy which alone can afford a basis for industrial peace.

This doctrine has been preached in the churches for nearly two thousand years, and for a while it seemed as if the Catholic Church of the middle ages would make it the controlling factor in the world; but the breaking up of the Church of the middle ages into sects, and the advance of that intellectualism which placed

more importance upon words and dogma than upon deeds, gave a setback to the idea which has lasted for centuries. Now, when a great catastrophe has made us aware of the futility of such methods, we are beginning to realize that the present business system needs only the simple methods of the Salvation Army to restore it to health. It is absolutely sound at the bottom.

The attempt to run the world by words and phrases for the benefit of those who had the power to assemble those words and phrases involved us in a great war, and the continued application of these methods seems to be leading us into deeper and deeper economic confusion. We are therefore compelled to recognize that the methods of the past are no longer possible, and that the methods of the future must be simpler and more direct.

It should be perfectly evident that with the increasing complexity of the modern business system (on which modern civilization depends) successful operation can be attained only by following the lead of those who understand practically the controlling forces, and are willing to recognize their social responsibility in operating them.

Any attempt to operate the modern business system by people who do not understand the

driving forces is sure to reduce its effectiveness, and any attempt to operate it in the interest of a class is not much longer possible.

For instance, under present conditions the attempt to drive the workman to do that which he does not understand results in failure, even if he is willing to be driven, which he no longer is; for he has learned that real democracy is something more than the privilege of expressing an opinion. We are thus forced into the new economic condition, and, whether we like it or not, will soon realize that only those *who know what to do and how to do it* will have a sufficient following to make their efforts worth while. In other words, the conditions under which the great industrial and business system must operate to keep our complicated system of modern civilization going successfully, can be directed only by real leaders—men who understand the operation of the moving forces, and whose prime object is to render such service as the community needs.

In order to secure such leaders they must have full reward for the service they render. This rules out the dollar-a-year man, whose qualifications too often were not that he knew how to do the job, but that he was patriotic and could afford to give his services for nothing. In spite of such a crude way of selecting men

to handle problems vital to the life of the nation, many did good work during the war.

The laws of the United States, however, forbid a man to work for the government for nothing, and both those who served at a dollar a year, and those who accepted that service, violated the spirit of the law, which was aimed to sustain the democratic practice of rewarding a man according to the service he rendered. Any other practice is undemocratic.

In 1847, Mr. Lincoln wrote: "To secure to each laborer the whole product of his labor, or as nearly as possible, is a worthy object of any good government. But then the question arises, how can a government best effect this? * * * Upon this the habits of our whole species fall into three great classes—useful labor, useless labor, and idleness. Of these, the first only is meritorious, and to it all the products of labor rightfully belong; but the two latter, while they exist, are heavy pensioners upon the first, robbing it of a large portion of its just rights. The only remedy for this is to, so far as possible, drive useless labor and idleness out of existence."

Attempts are always being made to eliminate the idleness of workmen and useless labor by the refusal of compensation. Unfortunately, however, there has been no organized attempt

as yet to force capital to be useful by refusing compensation to idle capital, or to that expended uselessly. Capital which is expended in such a manner as to be non-productive, and capital which is not used, can receive interest only by obtaining the same from capital which was productive or from the efforts of workmen, in either of which cases it gets a reward which it did not earn, and which necessarily comes from capital or labor which did earn it.

Reward according to service rendered is the only foundation on which our industrial and business system can permanently stand. It is a violation of this principle which has been made the occasion for socialism, communism, and Bolshevism. All we need to defeat these "isms" is to re-establish our industrial and business system firmly on the principles advocated by Abraham Lincoln in 1847, and we shall establish *an economic democracy that is stronger than any autocracy.*

Moreover, it conforms absolutely to the teachings of all the churches, for Christ, who was the first to understand the commanding power of service, thus stands revealed as the first great Economist, for economic democracy is simply applied Christianity. This was also clearly understood by the great leaders of the Church of the middle ages, whose failure to establish it

as a general practice was largely due to the rise of an intellectualism which disdained practicality.

Now, however, when a great catastrophe has shown us the error of our ways, and convinced us that the world is controlled by deeds rather than words, we see the road to Universal Peace only through the change of Christianity from a weekly intellectual diversion to a daily practical reality.

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