• THE CENTENNIAL EDITION

ORGANIZING FOR WORK

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HENRY L. GANTT · 1919

FOREWORD BY FRANK ZUURING · FOUNDER, ORDER OF WORK

Organizing for Work

By H. L. Gantt

The 1919 classic on making work visible,
with a modern foreword for the age of AI

Foreword by Frank Zuuring
Founder, Order of Work

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Organizing Work for AI

Foreword by Frank Zuuring

I first started using Gantt charts in a practical way in 2022 while scoping a complicated e-commerce website build.

There were a lot of moving parts. Design, development, content, products, integrations, testing, approvals, launch planning. If you looked at the project as one big thing, it felt messy. But once the work was broken down into smaller steps, the project became visible. You could see what had to happen first, what depended on what, who was responsible, and where things were likely to get stuck.

That is the real value of a Gantt chart. It is not just a project management tool. It is a way of making work visible.

That is why Henry Gantt's writing still matters.

This book comes from a very different era. Gantt was writing about industrial production, factories, machines, labour, management, and the organization of work after the First World War. The language and examples belong to that time.

But the problem he cared about has not gone away. Work still becomes confused when people cannot see it clearly. Teams still lose time when responsibility is vague. Systems still fail when planning is separated from the reality of execution.

Artificial intelligence makes that problem sharper.

Today, businesses are adopting AI quickly. That can be useful, but it can also be chaotic. Tools get added before the work is understood. Processes are automated before they are examined. Tasks get handed to software without anyone clearly deciding whether they should be automated. The result is confusion, wasted effort, and sometimes more work instead of less.

I believe the better starting point is the work itself.

Before a business adopts AI, it should take a workflow and break it down from start to finish. List every task. Put the steps in order. Identify the inputs, the outputs, the person responsible, and the systems involved. Make the process visible.

Then, and only then, decide what role AI should play.

In an augmented workplace, not every task belongs to AI. Some tasks should stay human-handled. These are tasks where there are real consequences if something goes wrong. They require judgment, accountability, trust, access to sensitive data, or control over important systems.

Some tasks are best handled by AI and a human together. AI can do most of the drafting, summarizing, sorting, researching, formatting, or preparing, but a person should still review the result and remain responsible for the outcome.

Some tasks can be handled by AI directly. These are repetitive, low-risk, clearly defined tasks where the output can be checked easily and where failure is not catastrophic.

That is the basic distinction behind the Workflow Map included with this edition: Human Handled, AI + Human, and AI Handled.

The point is not to replace people with tools. The point is to organize the work so the right kind of responsibility sits in the right place.

That requires a method.

The accompanying Workflow Map is meant to help with that first step. It is not a full AI implementation plan. It is not meant to tell you which tools to buy or how to rebuild your business. It is a simple way to slow down, look at one workflow, and write down how the work actually moves from beginning to end.

Read Gantt as a reminder that good management starts by understanding the work. Then use the Workflow Map to examine one real process in your own business. Break it down into small steps. Decide where human judgment is necessary, where AI can assist, and where automation is safe.

That is how work becomes visible again.

How to Map the Order of Work

The Workflow Map is included as a practical companion to Gantt's text. Its purpose is simple: choose one real business process and make the order of work visible before deciding where AI belongs.

Start small. A useful workflow is specific enough to observe from beginning to end. Sales is too broad. Website inquiry to booked consultation is narrow enough to map.

Write each step as an action and place the steps in chronological order. The map should show what must happen first, what depends on that work, who owns it, what information is needed, and what output is produced.

Do not begin by choosing software. Begin by understanding the sequence of the work. Once the path is visible, tool choices become easier and less speculative.

The Three Control Zones

Human Handled means a person should remain responsible for the task. Use this zone when the task involves judgment, trust, sensitive information, access to important systems, money, legal exposure, or customer relationships.

AI + Human means AI can prepare the work, but a person should review, approve, or complete it. This is often the most useful zone for early AI adoption because it improves speed without removing accountability.

AI Handled means the task is repetitive, low-risk, clearly defined, and easy to verify. These tasks may be candidates for automation once the workflow is stable and the failure modes are understood.

The zones are not permanent labels. They are a first decision about responsibility. A task may move from Human Handled to AI + Human, or from AI + Human to AI Handled, as the process becomes clearer and safer.

From Map to Implementation

After the workflow is mapped, look for sequence and friction. Which steps must happen first? Which steps cannot start until another task is complete? Where does work wait? Where do people copy information between systems? Where are mistakes common?

Then look for risk. Which steps affect customers, money, privacy, security, legal obligations, or trust? Those steps need stronger human accountability even when AI is used to assist.

The best first AI use cases usually sit at the intersection of high friction and manageable risk. Drafting, summarizing, classifying, routing, checking, formatting, and preparing work are often good starting points.

The goal is not to automate everything. The goal is to put tasks in the right order, assign responsibility clearly, and organize people, tools, and systems so the business can do better work.

Preface

By H. L. Gantt (1919)

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 democratically, 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.

Chapter 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 exercise 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.

Chapter 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 statisticians (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 inter-operation 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.

Chapter 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 sacrifice 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.

Chapter IV

Production and Costs

While we have developed a reasonably satisfactory method of determining 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 powerful 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.

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.

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.

Chapter 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 important 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.

MILL, Textile ..... June, 1916.

SYMBOL	DEPARTMENT OR MACH. CLASS	% OF CAPACITY USED ON Day TURN (10 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		20 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		

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FIG. 1.—IDLENESS EXPENSE CHART

Figure 1: Chart showing the efficiency of machine operation, illustrating the contrast between management efficiency and worker efficiency

Figure 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 machine, or for that matter any piece of property, does not in itself entitle the owner to any return. He is entitled to a return only when that property is put to some useful purpose.

The value of any industrial property lies primarily in its ability to produce, and should be measured by that ability and not by the amount of money spent on it. A factory is worth what it can earn, not what it cost to build. This being true, it follows that the most economical expenditure of money is that which will develop the greatest productive capacity, and not necessarily that which will create the most impressive appearance.

Organization is just as much a part of the productive capacity of a plant as the machinery itself. In many cases good organization will more than make up for poor machinery, while the very best machinery with poor organization may be a complete failure. Because organization is not a tangible thing which can be seen and

felt, it is many times overlooked in making estimates of the value of a property, although it may be the most valuable asset the property possesses.

This principle applies to men as well as to property. A man's value is measured not by what has been spent on his education, but by his ability to accomplish results. The amount spent on a man's education may be a good indication of his value, but it is not a safe criterion on which to base his compensation.

Chapter VI

An Extension of the Credit System to Make It Democratic

The financial world recognizes two kinds of credit; namely, personal credit based on the character of the individual, and security credit based on property which is pledged as security for the amount advanced. In the extension of personal credit, the question which is always asked is: "Will he pay?" In the case of security credit, the question asked is: "If he does not pay, is there sufficient security so that we can get our money back?"

Both forms of credit are based on the idea that money is the most important factor in all business transactions, which, as we have shown, is no longer true, if it ever was. The idea of personal credit should be modified so that the question asked will not be "Will he pay?" but "Can he produce?" because the ability to produce is rapidly becoming more important than the ability to pay. If a man can produce more than he consumes he can pay; but if he cannot produce, paying becomes impossible, except by robbing some one else.

The idea of security credit should be modified so that the question asked will not be "What security can you give?" but "What can you produce with the money if it is advanced to you?" In other words, the security for a loan should not be property already accumulated,

but the ability to produce new property. If this policy were followed, credit would be extended to all who could produce wealth, and denied to those who are attempting to secure money merely to take it out of productive channels.

Such an extension of credit to productive capacity instead of to accumulated property would be thoroughly democratic, because productive capacity is not necessarily related to accumulated property. Many of our most capable producers are men who have no accumulated property to give as security for a loan, and many of our largest property holders are men who could not produce anything if they tried.

Credit, to be truly democratic, should be based on the ability to render service to the community, because it is only through such service that the borrower can pay interest and principal. The lender who extends credit on any other basis is likely to lose his money, and the community is likely to lose the services which capable men could render if they had access to the necessary credit.

The war has given us many illustrations of this principle. When the government found it necessary to build ships and make guns, it did not ask the men who undertook the work what property they had to give as security. It asked what they could produce, and advanced the money on that basis. Many of the most successful war contracts were given to men who had little or no accumulated property, but who had demonstrated their ability to accomplish results.

One result of such a system would be that credit would be extended for productive purposes rather than for speculative purposes. Another result would be that many capable men who are now unable to make their contributions to the wealth of the world

because they cannot get credit, would be enabled to make such contributions. Still another result would be that accumulated property would cease to be the measure of a man's ability to secure credit, and actual productive capacity would become the measure.

Such a change in our credit system would do more than any other single thing to democratize our industrial system and give every man an opportunity to make his contribution to the wealth and welfare of the community.

Chapter VII

Economics of Democracy

As a result of the great war there has grown up a widespread conviction that for the safety of democratic institutions the nations practicing democracy must maintain what has been termed "industrial preparedness." The general idea seems to be that this is a problem which has to do primarily with the accumulation of materials and supplies. There has been much discussion of the accumulation of strategic materials, of the maintenance of an adequate supply of shipping, and of the necessity for keeping our steel and other essential industries in efficient condition. All of this is important, but it does not go to the root of the matter.

Real industrial preparedness requires a social organization that will ensure that the control of industry will be in the hands of those most competent to handle it, and that the rewards of industry will be distributed in such a way as to develop the greatest productive capacity in the community. It requires the elimination of every form of privilege which gives to any person a return greater than the service he renders, whether that person be a workman or a financier. Such an organization would be thoroughly democratic because it would be based on service rendered rather than on privilege secured.

The war has shown us that under our present social organization it is impossible to develop anything approaching our full industrial capacity, because so much of the energy of our most capable men is devoted to getting privileges for themselves rather than to rendering service to the community. In times of war such energy is necessarily diverted from these relatively selfish purposes to the service of the community, and the result is a great increase in productive capacity. The problem of permanent industrial preparedness is to organize society in such a way that this energy will be devoted to community service in times of peace as well as in times of war.

This can be accomplished only by eliminating special privileges and by making the reward which any man receives dependent solely upon the service which he renders to the community. Any man who receives a greater reward than his service entitles him to is living partly at the expense of those who render service without receiving adequate reward. Any such condition is undemocratic and is bound ultimately to lead to a conflict between the class which receives unearned rewards and the class which renders unrewarded service.

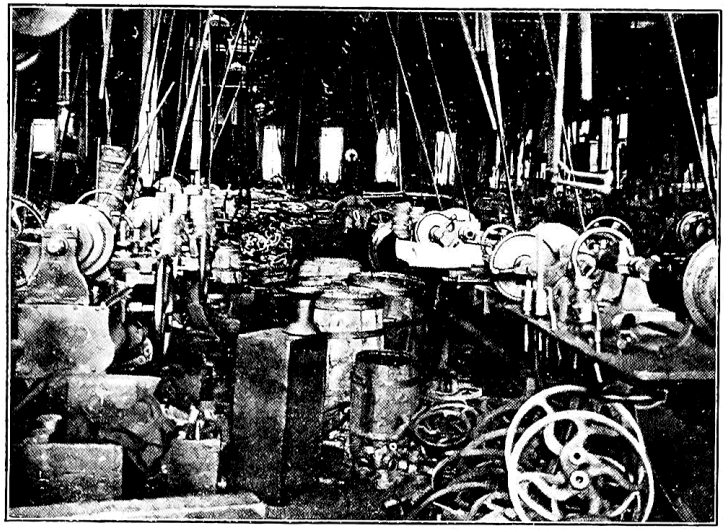

FIG. 2.—UNPREPARED

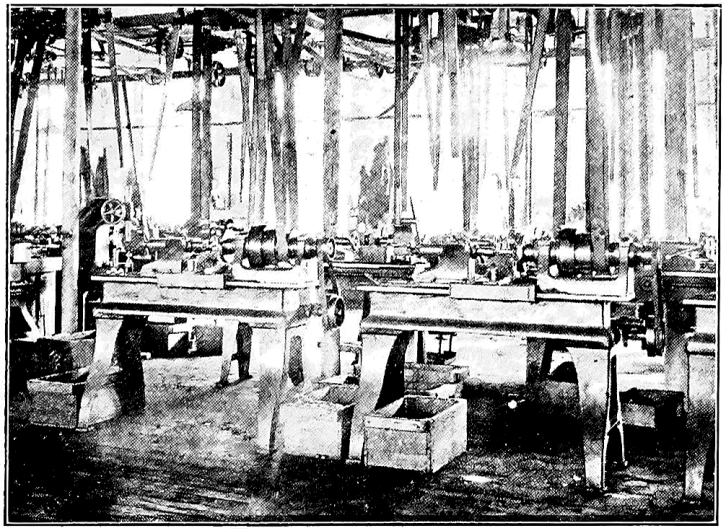

FIG. 3.—PREPARED

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.

Figures 2 and 3: Charts illustrating the principles of economic democracy and reward distribution

Figures 2 and 3 show the practical application of these principles. When we study these charts we see clearly why democracy in industry is essential to democracy in government. A government which tolerates an industrial system based on privilege rather than service cannot long remain democratic, because the privileged class will inevitably use its economic power to control the political machinery for its own benefit.

FIG. 4.—UNPREPARED

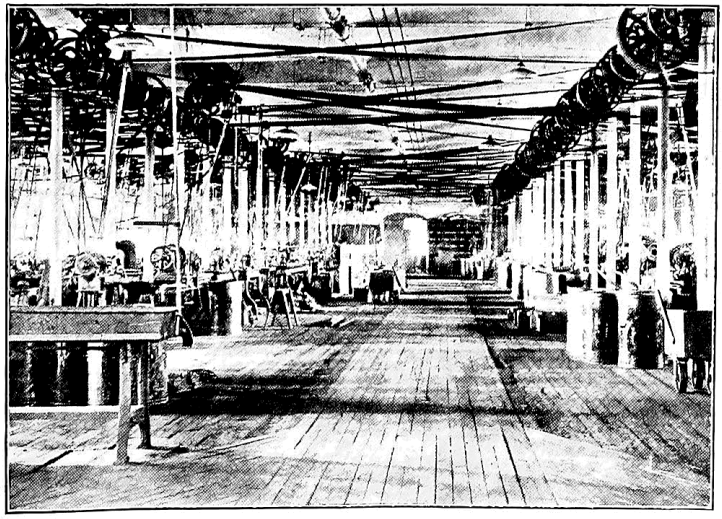

FIG. 5.—PREPARED

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.

Figures 4 and 5: Charts showing the organization of industry based on service rather than privilege

The figures illustrate how an industry organized on the basis of service differs from one organized for the benefit of a privileged class. In the first case, all the energy of the organization is directed toward rendering the greatest possible service to the community. In the second case, a large part of the energy is directed toward securing special advantages for particular individuals or groups, and the service rendered to the community is incidental to these selfish purposes.

Industrial democracy means that the control of industry shall be in the hands of those who understand industry and who have demonstrated their ability to render service through industry. It does not mean the control of industry by popular vote, any more than democracy in government means that every citizen shall have an equal voice in determining military strategy or judicial procedure. It means that those who control industry shall be responsible to the community for the service which industry renders, and that they shall hold their positions because of their ability to render such service, and not because of their ability to secure special privileges.

Such a system would ensure that every man would have an opportunity to make his contribution to the productive capacity of the community, and that he would receive a reward proportional to the service he rendered. It would eliminate the waste which comes from having competent men in subordinate positions while incompetent men, who hold their positions through privilege rather than ability, direct the productive energies of the community.

Chapter VIII

Democracy in Production

Democracy means responsibility, and responsibility means that authority must be definitely located. In any organization, whether it be a nation, a business, or any other form of group activity, some person must have the authority to make decisions and the responsibility for the results of those decisions. Democracy does not mean that everyone has an equal voice in every decision. It means that those who have authority are responsible to the community for the use they make of that authority.

In production, this principle means that the man who is responsible for getting certain work done must have the authority necessary to get it done. He cannot be held responsible for results unless he has the power to control the methods by which those results are to be obtained. If he is to be responsible, he must have authority; if he has authority, he must be held responsible.

The progress chart system, which we have developed for industrial use, is designed to make this responsibility clear and definite. It shows exactly what has been promised and exactly what has been performed. It makes it impossible for any man to escape responsibility for his commitments by showing exactly who made each promise and exactly how well that promise has been kept.

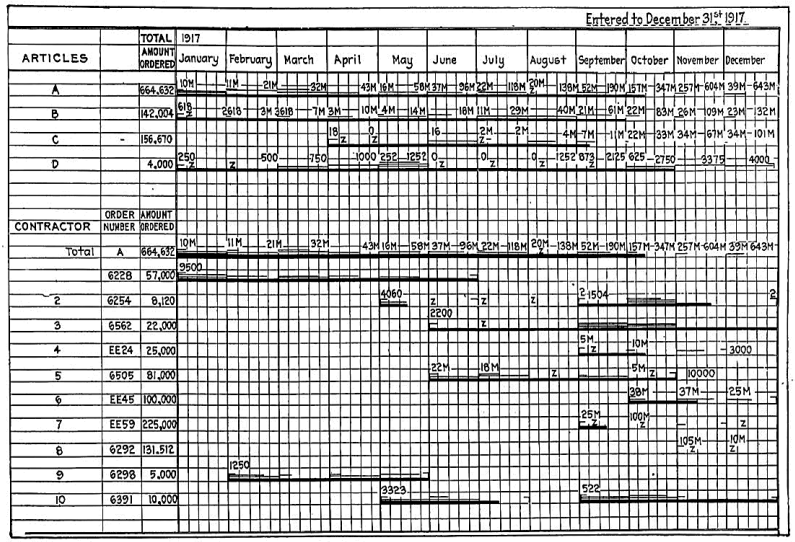

FIG. 6.—PROGRESS CHART (top) and FIG. 7.—ORDER CHART (bottom)

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.

Figures 6 and 7: Progress charts showing the relationship between promises made and performance delivered in production planning

These charts represent one of the most significant developments in industrial management because they make visible the relationship between planning and performance. They show not only what was supposed to happen, but what actually happened, and when it happened. This visibility creates accountability in a way that verbal commitments and written reports never could.

The beauty of these charts is their simplicity. Any workman can understand them at a glance. Any manager can see immediately where his planning has been accurate and where it has failed. There is no hiding behind excuses or explanations. The facts speak for themselves.

When men know that their promises will be recorded and their performance measured against those promises, they become much more careful about what they commit to do. They also become much more diligent about doing what they have committed to do. The chart system does not create responsibility; it simply makes existing responsibility visible.

This visibility is essential to democratic management because it ensures that those who have authority will be held accountable for how they use it. A manager who consistently fails to meet his commitments will have that failure clearly documented. A workman who consistently exceeds his commitments will have that success equally well documented.

The system also makes it possible to identify where problems exist and to take corrective action before small problems become large disasters. When a chart shows that a certain operation is falling behind schedule, steps can be taken immediately to determine the cause and correct it. This preventive approach is far more efficient than waiting until a crisis develops and then trying to solve it under pressure.

Democracy in production means that every man has the opportunity to contribute his best efforts and that he will be recognized and rewarded according to his contribution. The progress chart system makes this possible by providing an objective measure of each man's contribution to the success of the enterprise.

Chapter IX

Democracy in the Shop

The application of democratic principles to shop management requires a complete reversal of many ideas which have been prevalent in industry for a long time. The old idea was that the workman was hired to do what he was told, and that it was not his business to think about how the work should be done. The new idea is that every workman should be encouraged to contribute his intelligence as well as his physical effort to the solution of the problems connected with his work.

This change of attitude is not mere sentimentality. It is based on the solid foundation of economic necessity. The modern competitive situation is so keen that no business can afford to waste any part of the intelligence available in its organization. The workman who is doing a job every day is likely to have ideas about how that job can be done better than anyone else, including the engineer who designed the process.

The problem is to create conditions under which the workman will be encouraged to contribute his ideas and will be properly rewarded when his ideas prove to be valuable. This requires a system which makes it safe for a workman to suggest changes and which ensures that he will get credit for valuable suggestions.

One essential element of such a system is the individual record of each workman's performance. This record should show not only the quantity and quality of his work, but also his attitude toward learning new methods and his willingness to help train other workmen. Such records make it possible to identify the men who are capable of taking on greater responsibility and to promote them accordingly.

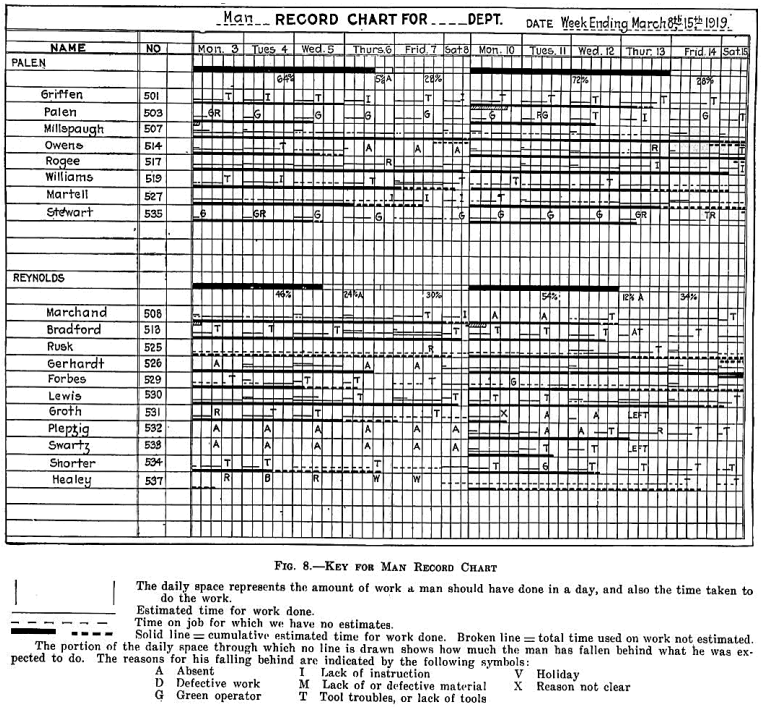

FIG. 8.—KEY FOR MAN RECORD CHART

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		

Chart 8: Individual worker progress and performance records showing development over time

The chart shown here illustrates how individual performance can be recorded and tracked over time. This visibility serves multiple purposes. It helps identify workers who are ready for

advancement. It shows where additional training is needed. Most importantly, it makes clear that good performance is noticed and recorded.

Another essential element is the function of the instructor. In the democratic shop, the instructor is not a driver but a helper. His job is to show the workman how to do better work, not to force him to work faster. The workman welcomes help that will make his work easier and more satisfactory, but he resents pressure that simply makes his work harder.

The democratic principle requires that the same man who instructs should also inspect the work. If one man teaches a method and another man judges the results, there is likely to be conflict between them, and the workman suffers from this conflict. When the instructor is also the inspector, he is responsible for both the method and the results, and he has every incentive to make sure that his instruction is clear and effective.

Training should take precedence over firing. When a workman fails to meet the standard, the first question should not be "How can we get rid of him?" but "How can we help him to meet the standard?" Many workmen who appear to be incompetent are simply untrained, and good training can convert them into valuable employees.

This approach is not only more humane; it is more economical. Training a man who is already familiar with the general conditions of the work is usually much cheaper than hiring and breaking in a completely new man. Moreover, the man who has been helped to overcome his difficulties is likely to be particularly loyal and cooperative.

The key to democracy in the shop is to create conditions under which every man feels that he has a stake in the success of the enterprise and that his individual contribution is recognized and valued. When workmen feel this way, they will voluntarily contribute their best efforts, and the results will be far better than can be obtained through any system of driving or coercion.

Chapter X

Democracy in Management

The principle of democracy in management is that the facts should govern decisions rather than the opinions or prejudices of those in authority. This means that management must have accurate information about what is happening in the business, and that this information must be presented in such a form that its significance is immediately apparent to those who must make decisions based upon it.

The progress chart system which has been described in previous chapters provides this kind of factual information for management decisions. But there is another type of chart which is equally important for the proper management of any business which uses machinery or equipment. This is the machine record chart, which shows exactly how each piece of equipment is being utilized.

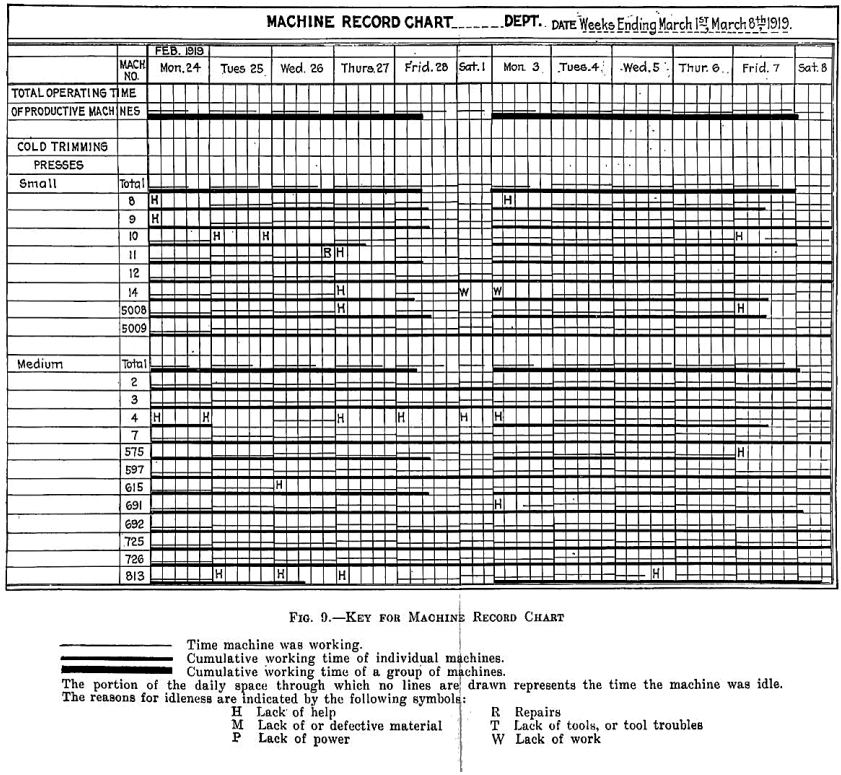

FIG. 9.—KEY FOR MACHINE RECORD CHART

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

Chart 9: Machine records showing equipment utilization and identifying sources of idle time

This chart shows at a glance which machines are producing and which are idle, and more importantly, it shows why they are idle. A machine may be idle because there is no work for it to do, or because it is broken down, or because there is no one available to operate it, or because the necessary materials are not available. Each of these causes requires a different remedy, and management cannot take effective action until it knows which cause is responsible for the idleness.

When such records are kept systematically, patterns become apparent that would otherwise be invisible. It may become clear that certain machines are consistently short of work while others are overloaded, suggesting that work should be redistributed. It may become apparent that breakdowns are occurring more frequently on certain machines, suggesting that maintenance should be improved. It may be discovered that material shortages are the principal cause of idleness, suggesting that the purchasing or scheduling system needs attention.

The beauty of this system is that it automatically exposes incompetence and elevates capability. A supervisor who consistently has machines idle due to poor planning will have this fact clearly documented. A supervisor who keeps his machines consistently busy through good planning will have this success equally well documented. There is no hiding poor performance and no overlooking good performance.

This automatic exposure of results creates a natural selection process within the organization. Men who can get results are naturally promoted to positions of greater responsibility. Men who cannot get results are naturally moved to positions where they can do less damage or are eliminated entirely. This process is fair because it is based on objective facts rather than on personal opinions or favoritism.

The system also makes it possible for management to help supervisors improve their performance. When the charts show that a particular supervisor is having trouble with machine utilization, management can investigate the causes and provide whatever assistance is needed. This might be additional training, better tools, more materials, or additional men. The important thing is that the need for help is identified quickly and specifically.

Democratic management does not mean management by popular vote. It means management by facts rather than by arbitrary authority. It means that every man in the organization, from the highest manager to the lowest workman, is evaluated on the basis of his contribution to the success of the enterprise rather than on his ability to curry favor with his superiors.

Such a system creates an organization in which merit is recognized and rewarded, in which problems are identified and solved quickly, and in which every man is encouraged to do his best work. It is democratic because it is fair, and it is efficient because it is based on facts rather than opinions.

Chapter XI

The Religion of Democracy

The fundamental principle upon which all democratic institutions must be based is the doctrine of service. This doctrine holds that every man should contribute to the welfare of the community according to his ability, and should receive from the community a reward proportional to his contribution. Any system which allows some men to receive rewards greater than their service, while others receive rewards less than their service, is essentially undemocratic, regardless of its political forms.

This principle is not merely a moral ideal; it is a practical necessity for any community that wishes to develop its full productive capacity. When men know that their rewards will be proportional to their service, they have every incentive to render the best service of which they are capable. When they know that rewards are based on favoritism, political influence, or inherited privilege rather than on service rendered, they have little incentive to exert themselves.

The doctrine of service is particularly important in industry because industrial organization has such a profound effect on the character and ideals of the community. Men spend the greater part of their waking hours in industrial activity, and the principles which govern their industrial relationships inevitably influence their attitudes toward all other social relationships.

An industrial system based on privilege rather than service teaches men to seek unearned advantages and to use whatever power they may have to exploit others. Such a system corrupts both those who receive the unearned privileges and those who are exploited by the system. It creates class antagonisms which threaten the stability of all democratic institutions.

On the other hand, an industrial system based on service teaches men to seek opportunities to contribute to the welfare of the community and to find their satisfaction in the knowledge that they are performing useful work. Such a system develops the character traits which are essential to the success of democratic government: respect for merit, willingness to cooperate for the common good, and recognition of the dignity of honest work.

The doctrine of service does not require that all men should receive equal rewards. Men differ greatly in their abilities and in the value of the service they can render. What it does require is that each man should receive a reward proportional to his service, and that no man should receive a reward greater than his service no matter what his social position or political influence may be.

This principle applies to property as well as to personal service. Property is entitled to a return only when it is put to productive use in the service of the community. Property which is held idle, or which is used in ways that do not serve the community, is not entitled to any return and should be taxed accordingly.

The religion of democracy is simply the application of the golden rule to industrial and economic relationships. It asks every man to consider what kind of industrial system he would want to live under if he did not know in advance what his position in that system would be. Such consideration leads inevitably to a system

based on service rather than privilege, because no man would willingly accept a system in which he might be exploited if he happened to be born into an unfavorable position.

The great contribution which America can make to world civilization is to demonstrate that it is possible to organize industry on the basis of service rather than privilege, and that such an organization is more efficient as well as more just than any system based on exploitation. This demonstration would do more than any other single thing to establish democracy as the accepted form of social organization throughout the world.

The task before us is to apply the principles of democracy to our industrial system with the same thoroughness with which we have applied them to our political system. When this is accomplished, we shall have achieved not only industrial democracy but the economic foundation which is essential to the permanence of political democracy.

The Life of Henry L. Gantt

A short biographical sketch

Gantt's education placed him in the technical and managerial world that would shape his career. He graduated from the McDonogh School in 1878 and from Johns Hopkins University in 1880. After college, he returned to McDonogh to teach for three years, then earned a master's degree in mechanical engineering from Stevens Institute of Technology in New Jersey.

In 1899, Gantt married Mary E. Snow of Fitchburg, Massachusetts. By then he had already begun the industrial work that would make his name familiar to generations of managers, engineers, builders, and project planners.

From Engineer to Management Consultant

Gantt began his industrial career in 1884 as a draughtsman at Poole & Hunt, an iron foundry and machine shop in Baltimore. Three years later he joined Frederick Winslow Taylor, first as an assistant and then as one of Taylor's important collaborators in the emerging field of scientific management.

The two men worked at Midvale Steel and Bethlehem Steel, applying measurement, analysis, and planning to industrial work. Gantt also followed Taylor to the Simonds Rolling Company and worked with him on a consulting project at Bethlehem Steel. Together, they received six patents.

From 1902 until his death in 1919, Gantt worked as a private consultant to industry. His work focused on efficiency improvement, industrial planning, wage systems, and the responsibilities of management.

Making Work Visible

Gantt is best remembered for the chart that bears his name. His charts were designed to let foremen and supervisors see quickly whether production was on schedule, ahead of schedule, or behind schedule. The aim was not decoration. It was control through visibility.

His early charts showed what each worker should do and what was actually done. Other versions showed the daily balance of work: the amount planned, the amount completed, and the cumulative progress toward a target. These ideas were later adapted into the modern Gantt chart used in project management and program management.

The chart's endurance comes from its simplicity. It turns time, sequence, responsibility, and progress into something a team can inspect together.

Work, Wages, and Responsibility

Gantt's work was broader than scheduling. He developed a task and bonus system that tied rewards to performance and to the manager's responsibility for training workers. He believed that management should improve the system, not merely pressure individuals inside a poor system.

In Work, Wages, and Profits, Gantt wrote about scheduling in job-shop environments and warned that even elegant plans were useless if ignored in practice. Planning had to connect to the daily reality of the shop.

He also argued that industrial efficiency required scientific analysis of work. But his later writing moved beyond narrow efficiency. He increasingly emphasized the obligations of business to society and the need to reconcile profit with public welfare.

Organizing for Work

Organizing for Work, published in 1919, brought Gantt's technical and social concerns together. In it, he described charts that measured activities by the time needed to complete them and used space on the chart to represent how much activity should have been completed in that time.

The book also reflects Gantt's larger argument: that industry exists to serve the community. He worried about systems that treated profit as an end in itself and ignored the social consequences of industrial power.

That is why the book remains interesting beyond the history of management tools. It is about the relationship between work, responsibility, planning, and service.

A Lasting Legacy

Gantt died on November 23, 1919, in Montclair, New Jersey, at the age of fifty-eight. The American Society of Mechanical Engineers later published a biography of him and created an annual medal in his honor.

Gantt charts went on to be used in major infrastructure projects, including the Hoover Dam and the Interstate Highway system. Today, they remain a common way to plan, schedule, and control work.

This sketch is based on the Wikipedia article "Henry Gantt," accessed May 24, 2026. The central lesson is still practical: before work can be improved, it must be made visible.

orderofwork.com

An order of work is the chronological sequence or schedule for completing multiple tasks, whereas a work order is the formal document authorizing a specific job.

An order of work dictates when things happen, while a work order authorizes what needs to be done.

Order of Work Definition:
The step-by-step plan or schedule for a project.

Purpose:
Ensures tasks happen in the most logical, efficient, and safe sequence, such as framing a wall before hanging drywall.

Scope:
Often applies to an entire project or daily and weekly operations.

Most people know Henry L. Gantt because of the Gantt chart. His real contribution was making work visible — so responsibility, capacity, idleness, and performance could be managed honestly.

That idea matters again. Businesses everywhere are being pushed to adopt AI. The common mistake is starting with tools before understanding the workflow. Software gets purchased. Experiments begin. Teams are told to "use AI." But without a clear map of how work moves from start to finish, AI often adds confusion instead of capability.

Organizing for Work is a reminder that good management starts by understanding the work itself.

ENCLOSED / THE ORDER OF WORK WORKFLOW MAP V1.0 · 3 ZONES

HUMAN HANDLED	AI + HUMAN	AI HANDLED
Judgment, trust, accountability, sensitive systems.	AI prepares the work; a person reviews and approves it.	Repetitive, low-risk tasks — candidates for automation.

// EDITOR'S NOTE

This edition pairs Gantt's original 1919 text with a new foreword by Frank Zuuring, founder of Order of Work — connecting Gantt's ideas to the practical challenge of building an augmented workplace.