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# TEN YEARS' PROGRESS IN MANAGEMENT

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TEN YEARS have passed since the Committee report on The Present State of the Art of Industrial Management was presented to The American Society of Mechanical Engineers. The request is now made for a review of the progress of management during the intervening decade. Unfortunately for the purpose of such a study, eight of these ten years were abnormal, many of the management changes and innovations introduced were of a temporary nature or were mere expedients, and it is difficult to separate them from other and more permanent developments.

2 The only satisfactory way to treat the review is to base it upon the report of 1912, which was well received and in large measure approved. This course has therefore been adopted.

3 At the outset we should recall and pay generous tribute to three of our late great leaders who aided in preparing that report and took part in its discussion: Frederick W. Taylor, the pioneer in management; Henry L. Gantt, who humanized the movement; James M. Dodge, the earnest, constructive supporter. During our ten-year period these men of vision and power completed their life work.

4 To obtain information on the worth-while changes which have taken place, letters were written to management and industrial engineers, to executives of plants in various lines of industry, and to educators familiar with industrial developments. Many interviews were held with men having industrial and managerial

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responsibilities. The response to these requests has been most generous. The author is deeply indebted for the information received and expresses his sincere gratitude to all who have given aid.

5 The report of 1912 declared the new element in management to be: "The mental attitude that consciously applies the transference of skill to all the activities of industry." It also quoted [1] and endorsed three regulative principles:

*a* The systematic use of experience
*b* The economic control of effort
*c* The promotion of personal effectiveness.

6 New interpretations and expanded meanings have been given to these principles, but they have in nowise been weakened or superseded. One correspondent writes: "Note, for example, the nearly universal acceptance of the principles . . . ."

7 In answer to the question, "What steps have been made in the progress of management since 1912?" a wide range of opinion was expressed as shown by the following sixteen quotations from correspondents' letters. The first gives a particularly well-balanced judgment of the situation.

It seems to me that management has very definitely progressed in the last ten years along certain main lines.

In the first place, good management is more insistent today on knowledge as a basis of judgment, rather than the old judgment based on personal observation. Management is more and more demanding costs, a knowledge of inventories, monthly profit and loss statements, statistics, and records of all kinds as pictures of events on which to base judgment.

In the second place, management is now undergoing a definite metamorphosis in the matter of industrial relations, and managers are waking up to the fact, as a practical element in their business, that they owe more to their employees than mere wages, and that whistle blow and hustle are not all there is to factory operation.

It is this belief and the spirit developing, rather than the volume of the action up to date, which is a matter of very definite progress in the past ten years of management.

8 Ten opinions, three to the effect that management has retrogressed or made little or limited progress, and seven stating the belief that progress has been made and mentioning certain details of improvement, are grouped to present a contrasting though in the main favorable picture.

[1] *American Machinist,* vol. 36, p. 857, The Principles of Management, by Church and Alford.

Management (the directing group) has retrogressed in its acceptance of the principles of management, while labor has materially progressed toward a broader acceptance of these principles.

I believe that very little progress has been made in the adoption of scientific management principles in industries outside of metal working, with a few notable exceptions.

The main advance, and that lamentably slow, has been in putting into practice knowledge already available previous to 1912.

During the past ten years we have passed through the period of first glamour, then the reaction of a loss of confidence, and have finally evolved into the general recognition of the legitimate place of a new branch of engineering art and science — management engineering.

The important steps in progress in management during the past ten years have been from unintelligent rule-of-thumb management through scientific management to intelligent management. The latter has advanced steadily during the decade.

The greatest progressive step has been toward standardization of appliances and methods.

The most definite progress made during the past ten years is the universal acceptance of the merits of specialized production and standardization of design. These two steps have opened the way to a third simplification of method.

The reaction from destruction and waste incident to warfare and reconstruction has been toward the elimination of waste in industry as a management function. Waste in all forms has been more closely observed than hitherto, especially during the past two years. This effort to do away with waste has led to the fixing of budgets and the determination of cost standards.

Important steps in the progress of management since 1912 are:

*a* Greater use of facts in the establishment of the standards by which business is conducted;

*b* Broader recognition of the principle that industry exists for service to humanity;

*c* Greater appreciation of the importance of regularization or control in the successful conduct of our industries;

*d* Wider understanding of the economic value and importance of the management engineer in the operation of business.

There has been a great increase in the use of specifications not only to govern purchased materials but also to attain uniformity of process, quality and cost, and thus to insure reliability of product. Many plants now have well-equipped laboratories staffed by scientific men and some regularly employ consulting scientists. In the larger corporations research laboratories are not uncommon. Few of these departments are over ten years old and they evidence a rapidly growing appreciation of pure science as a tool of management.

The need of early and reliable figures as a mechanism of management has caused many companies to prepare monthly a complete statement of their business and earnings. A constantly increasing number of companies are publishing annually a detailed statement of their financial condition and many are publishing such statements quarterly. This voluntary publicity indicates a sincerity and frankness rare in management of an earlier decade.

9 The final quotations in regard to progress, five in number, discriminate between management form and substance. Progress is indicated in both of these aspects.

The biggest and most lasting accomplishment in the inculcation of management principles is that, like religious teaching, whose significance has been forgotten during years of prosperity, they again, in the years of depression following the war, developed a new significance in the minds of the thoughtful. A principle is not established in the actual social inheritance of the race — as a step forward — until man has applied it to himself and seen whether its application makes him a better man in his social relations. So management principles are being used as yardsticks to measure individual industrial development. This means that these principles are becoming a subconscious part of the mental equipment of industry, and not only is this real progress, it is fundamental.

The development and use of the Gantt chart is the most important step of progress, because it calls attention to the movement of facts, to the necessity of basing decisions on facts rather than on opinions, and because it helps managers to foresee future happenings.

A second important step is the change in the method of installation from the old type which organized from the top down to the new type which builds from the bottom up.

A third important step is the development of the theory that the cost of an article includes only those expenses actually incurred in the production of the article, and that the expenses of maintaining one machine in idleness cannot be charged into the cost of the output of another machine. Along with this theory came the development of a method of arriving at costs of idleness and work.

Probably the greatest progress consists in a better understanding of the problems of management with a particular acceptance of the facts to which Taylor called attention, that management is an art which may be practiced advantageously through the application of certain principles and the scientific method. I do not think, as yet, that the great majority of men at the head of industries have anything like an adequate understanding of scientific management, nor that they are able to distinguish between form and substance in this respect. They have, however, apparently emerged from the attitude of opposition and mistrust of so-called scientific management, but are satisfied with a superficial application of the principles of management.

The important steps of progress made in management since 1912, I would say, are as follows. The order in which they are named is not significant:

*a* A greater appreciation of the human factor in industry.

*b* The growing recognition that employees should have a voice in the management as relating to those questions that directly affect them.

*c* The recognition of the strategic position of shop foremen and the necessity of more carefully selecting and training them.

*d* The increased recognition of the value of fundamental principles.

*e* The recognition of, and in a large degree the adoption of, standard systems of cost accounting from the point of view of timeliness, as a barometer rather than history, as an instrument of production rather than a matter of finance.

*f* A great development in mechanical equipment, combined with improved plant layout and building plants to fit manufacturing process.

*g* A marked advance in sales policies.

*h* A marked advance in substituting the trained, competent engineer for the old " cut-and-try " type of executive.

Using figures, which after all are most impressive, but basing those figures purely on my impressions, I would say that since 1912 industry has progressed in management by some 30 to 40 per cent in the appreciation of the fact that there is a management problem aside from the old concept, which was that the owner had simply to censor the things that happened within his jurisdiction. I should say that there had been a 20 to 25 per cent endeavor to install the mechanisms of management, considering in this figure the generally known stores systems, operation studies, wage-incentive plans, etc. In some cases, as for instance in stores control, the percentage might run a great deal higher, but I am refraining from increasing my estimate, for it is my belief that these mechanisms that we have installed are, for the most part, of a makeshift character, and that in industry as a whole and considering only the larger companies, I doubt if more than five or six per cent are possessed of mechanisms at all acceptable in the final scheme of what management should do and possess.

As to the real concept existing today of what management is, and what conditions must be considered, influenced and coördinated to bring about the situation which should exist, I doubt if more than one-fifth or one-fourth of one per cent of the companies in this country possess a knowledge or even appreciation of what is real management.

10 Combining and weighing these carefully prepared statements and adding to them certain well-recognized facts, there emerges a group of factors of varying importance which mark the progress of management during the past decade. These naturally arrange into three groups, of which the first concerns changes in mental attitude.

*a* The ancient controversy as to whether management is a science or an art has subsided, with increased recognition of the scientific basis of management.

*b* The attitude of opposition and mistrust toward management and the passionate antagonism to the installation of management methods have in general disappeared.

*c* Among those responsible for the carrying on of industry there has grown an appreciation of the existence of problems of management. (The appointment of Herbert Hoover as Secretary of Commerce and General Dawes as Director of the Budget reflect an appreciation by the Government of the need for management in our national affairs.)

*d* Acceptance of the principles of management has broadened among engineers, executives in industry, and educators.

11 The second group of factors of progress concerns the application of management methods.

*e* The engineering or scientific method has extended in industrial cost accounting. Among the developments are uniform cost-accounting systems (64 manufacturers' associations which have adopted such systems), the theory and method of determining and applying standard costs, the methods of determining idleness losses, the forecasting of sales leading to long-term production schedules, and the budgeting of future expenditures.

*f* Appreciation of the possibilities and advantages of standardization, simplification, and elimination of waste has spread rapidly during the past two years.

*g* The demand for knowledge, facts, as a basis for judgment has grown insistent in all good management. This has led, among other developments, to a widespread use of specifications and graphics as a means of recording and communicating management knowledge. (The first modern book on graphics in the English language was published as recently as 1910. The Gantt-type control chart has been developed into its present form since 1917.)

*h* Management methods have been applied or installed in practically every manufacturing industry, in distributing concerns and in institutions. (The report of 1912 listed 52 industries in which some form of management had been installed. A similar list prepared in 1922 would group all the branches of American industry.)

12 The third and final group of these factors concerns especially significant developments, which after being stated are subject to explanation and comment.

*i* Management activities have broadened far beyond the installation of those mechanisms which are usually associated with the Taylor System, and which were emphasized in the report of 1912. (Appendix No. 1 lists 77 items of management work arranged under four headings: General, Labor, Material, Equipment.)

*j* Some eight or ten of the leading American engineering schools have established courses in management since 1912.

*k* Appreciation of the importance of the human factor in industry and attempts at its study from a fact basis have been the most striking management development.

*l* Management engineers have declared that the service motive must prevail in industry and that all questions concerning human relationships must be considered in a spirit devoid of arbitrariness or autocratic feeling.

### MANAGEMENT MECHANISMS

13 To secure information as to the use of management mechanisms, the question was asked, "What (if any) mechanisms of management do you consider as generally accepted (*a*) in principles, (*b*) in practice?" From correspondents' replies the following twelve quotations have been selected.

I do not believe that any of the mechanisms of management are generally accepted in principle or in practice.

I know also that even where some of these things (mechanisms of management) have been established and we hear about them and might conclude that the firm using one or more of them is quite advanced, it often is not at all so. The feature described is only an unrelated "stunt," not supported by a complete coördinated system of administration and usually begins to go to pieces not long after it is installed.

There is at the present time a retrograde movement in regard to the building up of stores and making operation studies. However, as I see it, this is merely a temporary depression in the curve, and I believe that the general tendency of this curve is upward with a very slow ascending grade.

Incentive wage-payment plans have had a temporary setback due to labor conditions caused by the war and to the reluctance of managers in general to consider such plans in any other light but of profit to the company. I do not think that the main service which the incentive plan can give — namely, that of stabilizing relations between employers and employees — has been given sufficient attention by the management.

I believe that such mechanisms as balance of stores, routing, operation studies, incentive wage plans, personnel work, etc., are generally accepted in principle, but that efforts to install them frequently (perhaps most of the time) miscarry, and either accomplish little or no good. This is often due to a failure to see to it that details connected with the mechanisms are fully understood and looked after.

In a general way, the mechanisms of management are widely accepted now in principle and much less widely in practice.

Undoubtedly, good storeskeeping is becoming very generally accepted. We know that unless we keep accurate records of the materials used we cannot get the most satisfactory results. I think storeskeeping is accepted both in principle and practice as well as the intelligent study of operations.

I believe that balance of stores is accepted in principle and in practice, that is, in so far as a written record of quantities in stores is kept in the office rather than in a storesroom, and that a minimum or order point is predetermined and an order placed when it is reached. It is generally accepted in principle, though not in fact, that an incentive wage-payment plan is desirable and effective. It is accepted in principle that facts are shown on charts better than in tables of figures.

In principle, undoubtedly, all of the main mechanisms of management have been thoroughly established.

In a great measure all of the mechanisms of management as developed by Taylor and his immediate associates have been generally accepted in principle. But while they are being widely applied, my impression is that in the great majority of the cases the application is half-baked in character, and the results, while they may be satisfactory to the companies concerned, are far from being as satisfactory as they should be, either to the management or to the employees. My experience indicates that in most such cases an application such as Taylor would have approved will almost invariably result in increased production ranging from 30 to 100 per cent or more, depending on the nature of the business.

The following management mechanisms have been accepted in varying degrees:

*Stores Control.* In principle and practice very generally.

*Operation Standardization.* (*a*) In technical aspects, generally in principle, fairly so in practice. (*b*) In personal aspects, fairly accepted in principle, to a limited extent in practice. [By (*a*) I mean speeds

feeds, equipment, tools, etc.; by (*b*) motion and time studies of human elements.]

*Wage-Payment Incentives.* Generally in principle and in practice so far as direct labor is concerned. But little application has been made to indirect labor.

*Cost Accounting.* Generally accepted both in principle and practice.

*Selection and Training of Employees.* Fairly well accepted as to principle, but little in practice.

*Purchasing Control.* Generally as to both principle and practice.

*Scheduling and Planning.* Fairly well accepted in principle. Limited in practice in some industries, well established in others.

I find mechanisms being accepted one by one without a full realization of the part they are to play in the scheme as a whole. That is to say, I will find a company suddenly appreciative of the value of operation studies. It will thereupon proceed to organize to make operation studies, and for the time being in its new enthusiasm it pursues what threatens to become a hobby rather than a part of its business. This pursuit at times leads into the installation of other mechanisms. It begins to recognize, from the operation studies, that a balance of stores is essential, and that a wage incentive is desirable. I find, however, that this progress is accidental rather than planned.

Mechanisms of management such as are discussed in the 1912 Report are generally accepted in principle, but poorly carried out in practice in the majority of establishments. On the other hand, a few, representing the best organizations, have developed these things to a degree which serve as valuable guides.

Planning and control are used more and more extensively in plant operation. The tendency of the majority, however, is to try to gain the benefits of more intensive control through partial makeshifts which record past accomplishments instead of actually planning the work. The importance of control, in fact, in increasing production through elimination of idle time, men, and machinery, is not yet recognized except in a few markedly successful establishments. The developments along these lines are being undertaken frequently through inexperienced, low-grade men, who adopt mechanisms as such, instead of developing existing methods on fundamental principles.

Balance of stores is accepted almost universally in principle and widely used in practice. Accountants have been quick to recognize its advantages, and have made it an essential part of their accounting mechanism. On the other hand, two of the most vital features for assisting in the control of production, the column of "stores apportioned" and the entering of "minimum" quantities of each item permissible, are apt to be omitted.

The development of time study and job analysis, while wide-spread, has been unsatisfactory; piece rates are more and more universal, but their determination is still largely on a basis of past performance, aided by time studies which simply record these performances in more detail instead of analyzing the operations and determining the methods and units which will

give most satisfactory results. There is still lack of appreciation of the fact that the chief aims of time study and job analysis must be:

*a* To resolve the operations into such units that they can be recombined to provide for all variables;

*b* To take advantage of this unit study to eliminate unnecessary operations, substitute improved methods, and remove defects in equipment and in control;

*c* To enable the workman to earn more money often with less effort; and,

*d* To indicate means for improvement in quality and practicable methods for making the improved quality routine.

14 To these statements of the acceptance of management mechanisms it is possible to add a few quantitative facts. It will

TABLE 1

Name of Industry: *Metal Trades.* No. of Questionnaires: 16

NOTE: The wide diversity in kinds of work, varying from machine-shop to shipyard, must be borne in mind, also a wide variation in size of plants.

| Mechanisms of Management | None | Inadequate | Good | Questionnaire Reference |
|---|---|---|---|---|
| 1 Selection and Placement | 0 | 6 | 10 | K7 |
| 2 Incentive Wage Plan | 2 | 6 | 8 | K13 |
| 3 Planning Centralized | 3 | 8 | 5 | U4 |
| (*a*) Routing, order of work | 5 | 6 | 5 | U4. 9 |
| (*b*) Schedules, machine assignments | 4 | 5 | 7 | U5. 6. h |
| 4 Time Study | 6 | 2 | 8 | U4. ef |
| 5 Cost Control | 4 | 3 | 9 | U7 |
| 6 Idle-Time Analysis: | | | | |
| (*a*) Men | 13 | 0 | 3 | U8 |
| (*b*) Machines | 9 | 1 | 6 | U3 |
| 7 Purchase Control | 3 | 4 | 9 | U11 |
| 8 Balance of Stores | 2 | 4 | 10 | U11, 12 |

be recalled that the field reports of six industries, given in the Report of the Committee on the Elimination of Waste in Industry of the Federated American Engineering Societies, were based on an extensive questionnaire. The replies in four of these industries — metal trades, boot and shoe manufacturing, men's ready-to-wear clothing manufacturing, and printing — have been studied to show the use of mechanisms of management. The facts brought forth are presented in Tables 1 to 6, inclusive. Table 1 records the results for 16 metal-trades plants where the entire questionnaire was used; Table 2 is from 12 metal-trades plants where a condensed questionnaire was used; Table 3 is from 8 boot and shoe shops;

TABLE 2

Name of Industry: *Metal Trades.* No. of Questionnaires: 12

NOTE: This is additional information from 12 plants assayed more briefly than the 16 of Table 1. A condensed questionnaire was used.

| | Mechanisms of Management | None | Inadequate | Good | Questionnaire Reference |
|---|---|---|---|---|---|
| 1 | Selection and Placement | 0 | 4 | 8 | No. 10 |
| 2 | Incentive Wage Plan | 1 | 3 | 8 | No. 13 |
| 3 | Planning Centralized | 1 | 2 | 9 | No. 19 |
| | (*a*) Routing, order of work | 2 | 2 | 8 | No. 19 |
| | (*b*) Schedules, machine assignments | 1 | 3 | 8 | No. 19 |
| 4 | Time Study | 2 | 1 | 9 | No. 19 |
| 5 | Cost Control | 2 | 6 | 4 | No. 18 |
| 6 | Idle-Time Analysis: | | | | No. 22 |
| | (*a*) Men | 8 | 0 | 4 | |
| | (*b*) Machines | 6 | 0 | 6 | |
| 7 | Purchase Control [1] | 1 | 1 | 10 | No. 4 |
| 8 | Balance of Stores | 1 | 1 | 10 | No. 4 |

[1] Purchase Control *as such* was not covered in the condensed questionnaire, but this estimate was based on the general stock and stores systems; whether there were maxima and minima in stores, and a control of raw material all through.

TABLE 3

Name of Industry: *Boot and Shoe Mfg.* No. of Questionnaires: 8

| | Mechanisms of Management | None | Inadequate | Good | Questionnaire Reference |
|---|---|---|---|---|---|
| 1 | Selection and Placement [1] | 0 | 6 | 2 | K7 |
| 2 | Incentive Wage Plan [2] | 0 | 0 | 8 | K13 |
| 3 | Planning Centralized | 4 | 0 | 4 | U4 |
| | (*a*) Routing, order of work | 4 | 1 | 3 | U4, g |
| | (*b*) Schedules, machine assignments | 3 | 3 | 2 | U5, 6, h |
| 4 | Time Study | 5 | 2 | 1 | U4, 3, f |
| 5 | Cost Control | 1 | 3 | 4 | U7 |
| 6 | Idle-Time Analysis: | | | | |
| | (*a*) Men | 7 | 1 | 0 | U8 |
| | (*b*) Machines | 7 | 1 | 0 | U3 |
| 7 | Purchase Control | 1 | 4 | 3 | U11 |
| 8 | Balance of Stores | 1 | 1 | 6 | U11, 12 |

[1] Not important, as skilled operatives are always available.
[2] Union control very strong in this industry.

TABLE 4

Name of Industry: *Men's Ready-to-Wear Clothing Mfg.* No. of Questionnaires: 9

| | Mechanisms of Management | None | Inadequate | Good | Questionnaire Reference |
|---|---|---|---|---|---|
| 1 | Selection and Placement [1] | 0 | 4 | 5 | K7 |
| 2 | Incentive Wage Plan [2] | 4 | 2 | 3 | K13 |
| 3 | Planning Centralized | 4 | 2 | 3 | U4 |
| | (*a*) Routing, order of work | 4 | 2 | 3 | U4, 9 |
| | (*b*) Schedules, machine assignments | 3 | 2 | 4 | U5, 6. h K13 |
| 4 | Time Study | 3 | 3 | 3 | U4, e, f |
| 5 | Cost Control | 2 | 5 | 2 | |
| 6 | Idle-Time Analysis: | | | | |
| | (*a*) Men | 6 | 3 | 0 | U8 |
| | (*b*) Machines | 8 | 1 | 0 | U3 |
| 7 | Purchase Control | 3 | 1 | 5 | U11 |
| 8 | Balance of Stores | 3 | 1 | 5 | U11, 12 |

[1] Not important, as skilled operatives are always available.
[2] Union control very strong in this industry.

TABLE 5

Name of Industry: *Printing.* No. of Questionnaires: 6

| | Mechanisms of Management | None | Inadequate | Good | Questionnaire Reference |
|---|---|---|---|---|---|
| 1 | Selection and Placement [1] | 0 | 5 | 1 | K7 |
| 2 | Incentive Wage Plan [2] | 1 | 1 | 4 | K13 |
| 3 | Planning Centralized | 3 | 2 | 1 | U4 |
| | (*a*) Routing, order of work | 5 | 0 | 1 | U4g |
| | (*b*) Schedules, machine assignments | 3 | 2 | 1 | U5, 6, h |
| 4 | Time Study | 5 | 0 | 1 | U4, e, f. |
| 5 | Cost Control | 3 | 2 | 1 | U7 11 |
| 6 | Idle-Time Analysis: | | | | |
| | (*a*) Men | 5 | 0 | 1 | U8 |
| | (*b*) Machines | 2 | 0 | 3 | U3 |
| 7 | Purchase Control | 3 | 2 | 1 | U11 |
| 8 | Balance of Stores | 4 | 1 | 1 | U11, 12 |

[1] Not important, as skilled operatives are always available.
[2] Union control very strong in this industry.

Table 4 from 9 men's ready-to-wear clothing shops; Table 5 from 6 printing establishments; Table 6 is a summary for the 51 plants studied. The questions from whose replies the facts were drawn are given in Appendix No. 2.

15 Turning to Table 6 and arranging the eight mechanisms

TABLE 6 SUMMARY FOR 51 PLANTS IN 4 INDUSTRIES

| Mechanisms of Management | Boot & Shoe, 8 plants | | | Men's R. M. Clothing, 9 plants | | | Printing, 6 plants | | | Metal Trades, 28 plants | | | Totals, 51 plants | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | None | Inadequate | Good | None | Inadequate | Good | None | Inadequate | Good | None | Inadequate | Good | None | Inadequate | Good |
| 1 Selection and Placement | 0 | 6 | 2 | 0 | 4 | 5 | 0 | 5 | 1 | [1] $0_0$ | $6_4$ | $10_8$ | 0 | 25 | 26 |
| 2 Incentive Wage Plan | 0 | 0 | 8 | 4 | 2 | 3 | 1 | 1 | 4 | $2_1$ | $6_3$ | $8_8$ | 8 | 12 | 31 |
| 3 Planning Centralized | 4 | 0 | 4 | 4 | 2 | 3 | 3 | 2 | 1 | $3_1$ | $8_2$ | $5_9$ | 15 | 14 | 22 |
| (a) Routing, order of work | 4 | 1 | 3 | 4 | 2 | 3 | 5 | 0 | 1 | $5_2$ | $6_2$ | $5_8$ | 20 | 11 | 20 |
| (b) Scheduling, machine assignments | 3 | 3 | 2 | 3 | 2 | 4 | 3 | 2 | 1 | $4_1$ | $5_3$ | $7_8$ | 14 | 15 | 22 |
| 4 Time Study | 5 | 2 | 1 | 3 | 3 | 3 | 5 | 0 | 1 | $6_2$ | $2_1$ | $8_9$ | 21 | 8 | 22 |
| 5 Cost Control | 1 | 3 | 4 | 2 | 5 | 2 | 3 | 2 | 1 | $4_2$ | $3_6$ | $9_4$ | 12 | 19 | 20 |
| 6 Idle-Time Analysis: | | | | | | | | | | | | | | | |
| (a) Men | 7 | 1 | 0 | 6 | 3 | 0 | 5 | 0 | 1 | $13_8$ | $0_0$ | $3_4$ | 39 | 4 | 8 |
| (b) Machines | 7 | 1 | 0 | 8 | 1 | 0 | 3 | 0 | 3 | $9_6$ | $1_0$ | $6_6$ | 33 | 3 | 15 |
| 7 Purchase Control | 1 | 4 | 3 | 3 | 1 | 5 | 3 | 2 | 1 | $3_1$ | $4_1$ | $9_{10}$ | 11 | 12 | 28 |
| 8 Balance of Stores | 1 | 1 | 6 | 3 | 1 | 5 | 4 | 1 | 1 | $2_1$ | $4_1$ | $10_{10}$ | 11 | 8 | 32 |

[1] The two figures shown separately in the metal-trades columns represent totals for the 16 plants (upper figure) covered by the regular questionnaire, and the 12 plants (lower figure) which filled out only a condensed questionnaire.

in the order of the number of plants in which they are installed *in some form,* we have:

Selection and Placement
Incentive Wage Plan
Balance of Stores
Purchase Control
Cost Control
Planning (routing, scheduling)
Time Study
Idle-Time Analysis.

Rearranging in the order of the number of plants where the installation is *good,* we have:

Balance of Stores
Incentive Wage Plan
Purchase Control
Selection and Placement
Planning (routing, scheduling)
Time Study
Cost Control
Idle-Time Analysis.

16 The weight of opinion and fact brings the conclusion that certain mechanisms of management have made decided headway in acceptance both in principle and practice, and from an assay of four industries the importance of application yields two groups:

*a* Balance of Stores
Incentive Wage Plan
Purchase Control
Selection and Placement

*b* Cost Control
Idle-Time Analysis
Planning
Time Study.

17 In the installation of such mechanisms a significant change is becoming evident. In the early days of management the mechanisms concerned the physical means of production. They were originated by the executives and were ordered into the shop.

18 At a later date, as emphasized in the report of 1912, the value of methods which concerned the worker was appreciated. Training was the first to have any widespread trial. But the attitude was still the developing or forcing of a mechanism from the top downward.

19 Within the decade under review, another attitude has been adopted in a few instances. It seeks to make the foremen and even the workers consciously parties to the development of the plans before they are put into effect. It endeavors to arouse interest, to inspire to achievement, to release creative energy. Its effect is to install methods and mechanisms from the bottom upward with celerity and improvement in personnel relations.

### MANAGEMENT EDUCATION OF ENGINEERING GRADE

20 Where there was probably but a single college course in management in 1912, there are now eight, in these institutions:

Columbia University
Massachusetts Institute of Technology
New York University
Pennsylvania State College
Purdue University
University of Kansas
University of Pittsburgh
Yale University — Sheffield Scientific School

In addition to this form of instruction, management subjects have been introduced in mechanical-engineering courses. Examples are the pioneer work at Cornell University — Sibley College, and at the Worcester Polytechnic Institute.

21 The growing importance of this branch of engineering education is shown by the number of men enrolled. Appendix No. 5 gives the enrollment of all students in colleges of engineering in the United States for the school year 1921–22. The total is 53,414. The number in management courses is 1123, identified as

| | |
|---|---|
| Administration Engineering | 725 |
| Industrial Engineering | 389 |
| Industrial Management | 9 |
| Total | 1123 |

22 The 277 students in "Commercial Engineering" courses have not been included, although they undoubtedly received some instruction in management subjects.

23 While these management courses in the beginning were based on mechanical engineering, their character seems to be changing, so that it can now be said that they are based on engineering broadly, with emphasis on fundamental subjects. There is a tendency to lessen or limit qualitative instruction in details of production. Without doubt, the character of the instruction is improving as teachers gain a wider and sounder experience in the application of management principles.

24 The significance of this new branch of engineering education is not its extent as measured in numbers of students, but in the fact that at least eight leading institutions have added it to their regular and older courses.

25 It is unfortunate that no common name has been adopted for these courses; at least four are in use.

## THE HUMAN FACTOR IN INDUSTRY

26 The report of 1912 presented the human factor in industry with particular emphasis on the responsibility of managers and executives to train their workers and the same thought was prominent in the discussion. According to the comment of the Committee in its closure, one of the striking characteristics which had already gripped attention was "the presence throughout the dis-

cussion of a human spirit in keeping with the best trend of thought toward social justice," and "the development that has taken place within the last few years leading to a new appreciation of the needs and rights of employees."

27 Henry P. Kendall in his discussion of the report [1] outlined the operation of an employment department which he had initiated. The employment man interviewed applicants, selected workers by tests, placed them in positions for which they were fitted, required medical examinations, kept records of each employee, kept in touch with the foremen in regard to the deportment, skill and earning power of the employees, had charge of discipline and discharge, and gave advice, suggestions, and sympathy to the workers.

28 These disclosures in outline foreshadowed a great wave of industrial relations work which swept through American industry after the outbreak of war. The movement received its impetus from the demand for workers in a time of extreme shortage, and was influenced by emotionalism and social theory. With the return of a labor surplus in 1921 the unsound features have in the main disappeared, leaving but vestiges of the methods and devices which were initiated in such profusion.

29 The present situation as regards personnel work is appreciation that personnel problems exist, recognition that their solution is a responsibility of management, and a growing realization that job analysis, selection, placement, and training can be put on a scientific basis.

30 Associated in thought, though not necessarily a part of any employment or industrial relations plan, is the rise of works councils in American industry. Several hundred have been established during the past decade. In August, 1919, there were 225, in February, 1922, approximately, 725.[2] Their development has been in response to a desire on the part of the workers for a means of expressing their beliefs and wishes in regard to matters arising in employment, and on the part of the management for a means of communicating with their employees and gaining and holding their confidence and good will. The movement but emphasizes the fact that the development of the relationships of employer and employed is a responsibility of management.

[1] Trans. Am. Soc. M. E., volume 34, p. 1208.

[2] See Reports of the National Industrial Conference Board.

THE SERVICE MOTIVE

31 Management engineers as a group have declared that the service motive must prevail in industry, that everything planned and done must be directed to securing the worthy result of producing useful goods with a minimum expenditure of time, material, and human effort. One of the clearest statements was written by Henry L. Gantt a few weeks before his death: [1]

> We have proved in many places that the doctrine of service which has been preached in the churches as religion is not only good economics and eminently practical, but, because of the increased production of goods obtained by it, promises to lead us safely through the maze of confusion into which we seem to be headed, and to give us that industrial democracy which alone can afford a basis for industrial peace.

32 This disinterested purpose has been accepted as an ideal for the entire engineering profession, by becoming the challenging thought in the preamble to the constitution of the Federated American Engineering Societies.

33 To the factors dealing with the steps in the progress of management which have been discussed, should be added a consideration of the extension and growth of management societies which has taken place during the past ten years.

34 The earliest was the Society for the Promotion of Scientific Management, founded informally in 1910 and organized in 1912. In 1916 the name was changed to the Taylor Society, and in 1918 it was reorganized. See Appendix No. 3.

35 The first national organization to deal with personnel matters beginning with the training of workers was the National Association of Corporation Schools, founded in 1913. By 1917 its work had broadened to include all of the activities classified as human relations. In 1920 the name was changed to the National Association of Corporation Training. In May, 1922, it was merged into the National Personnel Association. See Appendices Nos. 4 and 8.

36 In May, 1917, in response to a war demand, The Society of Industrial Engineers was founded. In 1919, it was functionalized and has carried on the activities of a professional engineering society. See Appendix No. 5.

37 A second personnel society was organized during the war, May, 1918, under the name of the National Association of Employ-

[1] Organizing for Work, p. 104.

ment Managers. On March 1, 1920, the name was changed to The Industrial Relations Association of America. May of that year registered the peak of the movement, the Chicago National Convention being attended by 5000 persons. The change in business conditions affected it adversely and in December, 1921, the Board of Directors voted to disband the organization. Early in 1922 it was merged into the National Personnel Association. See Appendices Nos. 6 and 8.

38 Although The American Society of Mechanical Engineers provided the forum for the presentation of the earliest papers on management, no part of that society was particularly devoted to management matters until the formation of Professional Divisions in 1920. In July of that year, the Management Division was organized. It soon led all of the other Professional Divisions in membership and has held that position ever since. See Appendix No. 7.

39 There are, therefore, four societies concerned with management — three in its engineering or technical aspects, and one restricted to personnel matters. The combined membership, not discarding duplications known to exist, is 4041.

| | |
|---|---|
| Management Division A. S. M. E. | 1,740 |
| Society of Industrial Engineers | 1,032 |
| The Taylor Society | 769 |
| National Personnel Association[1] | 500 |
| Total | 4,041 |

40 This membership is growing rapidly; more than one-half has been gained during the past two years, for that period spans the founding and growth of the management division of The American Society of Mechanical Engineers.

41 Within the last two years joint activities have been originated among these and other societies with the promise of benefits to all who are concerned with management. Included are: Development of a management terminology; development of a classification for management literature; standardization of management graphics; and development of methods for the measurement of management.

[1] The National Personnel Association also has 129 company members.

MANAGEMENT RESULTS

42 The report of 1912 stated that the results of good management had been: "A reduced cost of product, greater promptness in delivery with the ability to set and meet dates of shipment; a greater output per worker per day with increased wages; and an improvement in the contentment of the workers." There was no evidence at that time that goods had been reduced in price to the consumer.

43 To a degree this evidence has now been supplied. There are examples where good management has held down prices during a period of inflation and reduced prices as soon as business conditions changed. These acts benefited the consumer. Therefore the management movement has earned its economic justification.

44 Management as developed through a generation of effort stands today as a great body of knowledge and practice to facilitate the operation of industry and the conduct of business. Through organization it determines policies, plans basically over long periods of time and fixes impersonal relationships; through preparation it plans in detail how, when, and by whom work is to be done; through direction it initiates and maintains the processes of production and distribution.

45 Here, then, is a tremendous, hitherto unknown engineering tool. What is it for? The answer is a spur to every engineer and industrial executive:

46 *Industry and business* as developed in modern civilization must continue, else infinite misery will overtake the human race. Management is the agency by which community, state, and nation shall endure.

# APPENDIX NO. 1

## MANAGEMENT WORK

47 An incomplete list of management work follows, arranged under four headings — General, Labor, Material and Equipment:

*General*

Reduce Kinds and Varieties of Product
Stabilize Production
Determine Best-Product Design
Locate Unprofitable Lines of Product
Develop New Lines of Product
Set Basic Production Rates
Establish Production Control
Organize or Reorganize Plant
Develop Organization Charts
Coördinate Sales Effort with Factory Conditions
Predetermine Selling Costs and Prices
Improve Deliveries to Customers
Prepare Graphical Statements for Executives
Provide Plans for Executive Conferences
Prepare Financial Statements
Establish Idleness Records
Standardize Office Procedure
Prepare Standard Practice Instructions
Define Engineering and Drafting-Room Procedure
Develop Control Accounts
Determine Standard Costs
Capitalize Suggestions
Establish Financial Aids for Workers
Institute Safety Campaigns
Establish Employees' Committees and Representation.

*Material*

Organize Material Storage, Records and Control
Prepare Bills of Material or Parts Lists
Determine Materials Specifications
Organize Purchasing, Traffic, and Receiving
Develop Despatching and Scheduling
Establish Order Progress Records
Determine Departmental Loads
Determine Limits and Tolerances
Analyze Rejections and Spoilage
Establish Quality Control
Salvage Surplus Materials
Utilize By-Products
Reduce Material Inventories

Take Physical Material Inventories
Improve Material Handling
Determine Causes of Cost Variations
Budget Plant Expenditures
Determine Payroll Distribution
Establish Standing Expense Orders
Determine Burden Rates
Set Machine Rates
Equalize and Budget Burden Expenses
Prepare Economic Reports
Prepare Market Analyses
Institute Research.

*Labor*

Organize Employment
Establish Training Methods
Prepare Job Specifications for Hiring
Prescribe Trade and Vocational Tests
Determine Basic Wage Rates
Install Wage-Payment Methods
Establish Personnel-Efficiency Records
Establish Man-Production Records
Establish Timekeeping Methods
Take Time Studies
Make Motion Studies
Analyze Operations and Jobs
Determine Operations and Sequence
Establish Standard Manufacturing Times.

*Equipment*

Survey Plant Location, Design and Construction
Develop Equipment Inventories
Analyze and Arrange Equipment Layout
Standardize Equipment
Improve Use of Equipment
Establish Machine Production Records
Standardize Cutting Tools
Develop Small Tools
Provide Tool Storage and Service
Improve Transmission and Application of Power
Improve Sanitary and Hygienic Equipment
Improve Means of Lighting.

# APPENDIX NO. 2

## QUESTIONS CONCERNING MANAGEMENT MECHANISMS

48 The questions in the Waste in Industry questionnaire, whose answers supplied information to prepare Tables 1, 3, 4, and 5, dealing with the use of the mechanisms of management, are as follows:

K7 Are your workers selected carefully on basis of interviews, trade and other tests?

K13 How is wage remuneration determined, union scale, competitive market, etc.; day work, piece work, or other form of incentive wage?

U4 Is your planning of work centralized or distributed among a number of shop executives and workers?

U9 Do you compare production performance with production standards, with reference to worker, job, department and equipment?

U5 Does your shop administrative mechanism enable you to anticipate idleness of machines and workers and provide against it?

U7 Have you a good current cost system tied in with the financial books?

U8 Do you compile a record of idle workers' time by amount, cost and causes?

U3 Do you compile a record of idle machine time by amount, cost and causes?

U11 To what extent is purchasing done to standard specifications, and does it clear through a purchasing agent?

U12 What control exists over receipt, issuance, and return of materials?

49. The questions in the condensed questionnaire whose answers supplied information to prepare Table 2, dealing with the use of the mechanisms of management, are as follows:

4 Storeskeeping: (*a*) General methods? (*b*) How are stock records maintained up to date? (*c*) Where are storesrooms located with reference to producing departments? (*d*) How is material transported?

10 Employment Methods: (*a*) What examination or tests are used? (*b*) How are discharges or quits handled?

13 Wage Scale: (*a*) By classes of labor? Ratio of day workers to piece workers? Is any form of incentive system used?

18 Production and Cost Control: (*a*) Is there a budget by departments? (*b*) Are periodic comparisons made between output by departments or trades and labor costs? Is overhead standardized periodically, or is *all* overhead distributed monthly?

19 Planning Functions: (*a*) Is there a central planning department, or does each department do its own planning and follow-up of

schedules? (*b*) How are schedules and standards set? (*c*) Are work tickets given out ahead of workers' needs?

22 Idleness: (*a*) Are records kept of idle machines and causes? Of idle men?

## APPENDIX NO. 3

### THE TAYLOR SOCIETY

50 This brief statement of the founding and development of The Taylor Society (originally the Society to Promote the Science of Management) was prepared by Dr. H. S. Person, the Managing Director of the Society.

51 *The Background.* In 1886 Henry R. Towne presented the paper The Engineer as Economist before the A.S.M.E. Thereupon followed in that society a series of papers relating to management, chiefly on wage systems, ending with Taylor's A Piece Rate System in 1895. Then followed seven years of no papers on management before the A.S.M.E. In 1903 and 1904 several papers were presented, among them Taylor's Shop Management. In 1906 Taylor's On the Art of Cutting Metals was presented before the A.S.M.E., followed by one paper on a phase of management in each of the years 1907, 1908, 1909, and 1910. In 1911 the A.S.M.E. had no paper on a management subject.

52 The group of young engineers associated with Mr. Taylor felt during this period that it required a struggle to get a paper on management before the A.S.M.E.; that each time a paper of significance was presented (Towne's in 1886, Taylor's in 1895 and 1903) consideration of the subject was stimulated, but the interest soon waned; that the dominant group in the Society did not believe management subjects should engage its attention and put obstacles in the way of such attention; that there was in the Society possibly hostility to the Taylor theories and methods and that they could not receive adequate consideration; and that in general the A.S.M.E. was not giving adequate attention to the subject of management as compared with the growing public interest.

53 On the following page is a tabulation of the number of items relating to management by years, and whether presented before the A.S.M.E. It has been prepared from *Scientific Management;* a list of references in the New York Public Library, compiled by Walter D. Brown, Technology Division, N. Y. Public Library, 1917.

54 This group therefore decided that to secure a discussion of management problems to an extent warranted by the importance of the subject and public interest in it, a forum other than the A.S.M.E. would have to be found.

55 *The Founding of the Society to Promote the Science of Management.* On November 11, 1910, a meeting was held at the Athletic Club, New York, to consider the matter. There were present Morris L. Cooke, Frank B. Gilbreth, Robert Kent, Conrad Lauer (representing Charles Day), and Wilfred Lewis. Mr. Gilbreth was the host.

56 It was decided to organize a society for the discussion and promotion of scientific management. A formal organization was not effected, but

from then on James M. Dodge presided at meetings and Robert Kent acted as secretary-treasurer. For two years, with such informal organization, meetings were held approximately once each month, usually at Keene's Chop House, where management subjects of live interest were discussed. The membership during this period increased to some twenty-five or thirty.

57 As a result of the increasing public interest resulting from the Eastern Rate Case Hearings (winter of 1911–1912), it was decided to make the organization more formal and to make more of the society. Accordingly a meeting was held at the Hotel Astor, November 7, 1912, and a formal organization effected. The Society was named The Society to Promote the Science of Management. James M. Dodge was elected president and Robert Kent, secretary. Meetings were thereafter held less frequently (three times a year) but were more carefully planned. The place of meeting was usually

| | Year | Presented before A. S. M. E. | Not presented before A. S. M. E. Published in periodicals such as *Engineering Magazine* and others |
|---|---|---|---|
| Towne's The Engineer as Economist ..... | 1886 | 2 | 0 |
| | 1889 | 1 | 0 |
| | 1891 | 1 | 0 |
| | 1893 | 1 | 0 |
| Taylor's A Piece-Rate System ..... | 1895 | 1 | 1 |
| | 1896 | 0 | 1 |
| | 1897 | 0 | 4 |
| | 1898 | 0 | 2 |
| | 1899 | 0 | 10 |
| | 1900 | 0 | 12 |
| | 1901 | 0 | 24 |
| | 1902 | 0 | 17 |
| Taylor's Shop Management ..... | 1903 | 5 | 20 |
| Taylor's On the Art of Cutting Metals .... | 1904 | 1 | 22 |
| | 1905 | 0 | 17 |
| | 1906 | 3 | 17 |
| | 1907 | 1 | 22 |
| | 1908 | 1 | 46 |
| | 1909 | 1 | 30 |
| | 1910 | 1 | 57 |
| | 1911 | 0 | 219 |
| Committee Report, The Present State of the Art of Industrial Management ..... | 1912 | 1 | 165 |

New York, Philadelphia, or Boston. In 1913 H. S. Person was elected president, and succeeded himself annually until 1919. In December, 1914, was begun the publication of a small journal for members called Bulletin of the Society to Promote the Science of Management. By 1917, when the United States had entered the war, the membership had increased to about 110.

58 *During the War.* During the war the activities of the Society were

in abeyance, the officers and over fifty per cent of the members of the society having been absorbed into the war organization of the United States.

59 *Reorganization and Change of Name to Taylor Society.* Immediately after the armistice in 1918, members of the society in Washington and the vicinity held a meeting to consider the resumption of activities of the society. It was felt that the society should undertake more serious work, in view of the probable larger public service possible during reconstruction, and it was decided to establish a central office with a salaried executive. The name of the society had been changed in 1916 to Taylor Society, in honor of Frederick W. Taylor, who had died in 1915; an office was established April 1, 1919, in the Engineering Societies Building, New York; H. S. Person was chosen the managing director, and John Otterson, Winchester Repeating Arms Co., was elected president. Mr. Otterson was succeeded by Henry S. Dennison, and Mr. Dennison by Richard A. Feiss, who is president at the time of this writing, August, 1922.

60 The objects of the Socitey as stated in the Constitution are, through research, discussion, publication and other appropriate means:

1. To secure an understanding and intelligent direction of the principles governing organized effort, for the accomplishment of industrial and other social purposes for the mutual benefit of
   - *a* The Community
   - *b* Labor
   - *c* The Manager
   - *d* The Employer
2. To secure the gradual elimination of unnecessary effort and of unduly burdensome toil in the accomplishment of the work of the world.
3. To promote the scientific study and teaching of the principles governing organized effort, and of the mechanisms of their adaption and application under varying and changing conditions.
4. To promote general recognition of the fact that the evaluation and application of these principles and mechanisms are the mutual concern of the community, labor, the manager and the employer.
5. To inspire in labor, manager, and employer a constant adherence to the highest ethical conception of their individual and collective social responsibility.

## APPENDIX NO. 4

### THE NATIONAL ASSOCIATION OF CORPORATION TRAINING

61 The National Association of Corporation Schools was organized on January 24, 1913, to formulate a definite and constructive educational program for firms engaged in industry and commerce. Its officers and directors were drawn from representative firms including: The New York Edison Company; Burroughs Adding Machine Company; General Electric Company; The Pennsylvania Railroad Company; The Curtis Publishing Company; Yale and Towne Mfg. Company; Consolidated Gas Company of

N. Y.; Dodge Manufacturing Company; National Cash Register Company; and the Westinghouse Electric and Manufacturing Company.

62 At the first meeting of the Executive Committee, an Educational Committee was appointed "to devise courses and recommend best how to teach: salesmanship, advertising, manufacturing, transportation, accounting, financing, purchasing, general office work, stenography, clerical work, filing, correspondence, physical efficiency, hygiene, sanitation, recreation, exercise and the elements of psychology. The general purpose was to assist firms having established educational work, or about to start such work. Through reports, members were informed as to what others were doing and what they might and should be doing.

63 For the first three years the emphasis of the work of the Association was directed toward preparing the new employee for his first working duties. In 1916 the scope was enlarged to develop employees old in point of service. By 1917 the work had broadened to include "all of the activities classified as human relations." This meant that the Association was definitely in the personnel field. In 1919 it was declared that the Association "has become a great clearing house for all authentic information on the subject of Employee Relations in Industry."

64 In 1920 it was believed that the Association faced a crisis brought on by the increased service being rendered and rising costs. A plan of reorganization was therefore developed providing for incorporation. The name of the organization was changed to The National Association of Corporation Training. The object was stated to be "the founding of an organization that shall contribute in every way possible to the mutual benefits of all concerned in industry and commercial enterprises; to develop the efficiency of the individual employee and to coördinate his best interests with those of employers; to develop the highest standards of efficiency in industrial operations; to have the courses in established educational institutions expanded to meet more fully the needs of industry and commerce; and to encourage all branches of literature, science and art, or any of them that pertain to industry and commerce." Three classes of members were provided for:

A — Commercial, industrial, transportational, financial, or governmental organizations

B — Any employee of a Class-A member

C — Individuals not eligible as a representative of a Class-A member, or as a Class-B member.

65 However, this reorganization did not modify appreciably the work of the Association, which continued until May 20, 1922, when the plan of merger with the Industrial Relations Association of America into the National Personnel Association was approved.

# APPENDIX NO. 5

## THE SOCIETY OF INDUSTRIAL ENGINEERS

66 In May, 1917, the Western Efficiency Society held a national convention in Chicago on The Importance of the Human Factor in Industry. On the day following the close of this convention, a group of engineers and executives met to discuss the human factor in preparedness and to consider the part which the expert could play in winning the war. At this meeting the Society of Industrial Engineers was organized. Before this meeting, the Council of National Defense had strongly urged the organization of such a national society and had indicated how such a body could assist the Government in the emergency of war. In June, 1917, the chairman of the Aircraft Board invited the directors of the society to a conference in Washington. As a result the society was called upon to gather through its members information on the personnel, financial and industrial resources of firms capable of building aircraft parts. Later work was done for the Ordnance Bureau of the Army. Until the armistice, the activities of the society were devoted to furthering the carrying on of the war. Two-thirds of the first board of directors filled positions in Government service; a majority of the members were engaged in organization and production work incident to the war.

67 During this period the activities of the society were devoted to the first object for which it was founded: "To furnish a vehicle for bringing together in closer relationship persons who are actively engaged in promoting efficiency in business and for making the training and ability of such persons available in the emergency arising out of the present war."

68 At the close of the war the second object became the guide for society work:

"To furnish a medium for bringing out original contributions to the science of management.

"To provide an organization through which persons who are applying scientific methods to the solution of the problems of production and distribution may exchange views and coördinate their efforts.

"To coöperate with other societies.

"To codify and standardize professional principles and practice.

"To develop the professional standards of the industrial engineer.

"To promote efficient, energy-conserving management.

"To enhance the efficiency and prosperity of American industry."

69 In July, 1910, the board of directors put into effect a plan of functional organization which has continued in force. The membership (September, 1922) is 1032, divided into six classes: patron, professional industrial engineers; professional technical engineers and accountants; managing executives of commercial and industrial activities; educators in engineering economics, psychology and other lines associated with management; juniors and students.

# APPENDIX NO. 6

## THE INDUSTRIAL RELATIONS ASSOCIATION OF AMERICA

70 This brief statement of the founding and career of the Industrial Relations Association of America (originally the National Association of Employment Managers) was prepared by Mark M. Jones, the first secretary and a director of the organization.

71 Sporadic attempts to organize the relationship between manager and men, rendered impersonal by the division of labor and the introduction of automatic machinery, can be traced as far back as the 80's. At first the development of this management function was slow. Somewhat later the number of specialists in the personnel field increased. It was not made up entirely of persons specializing on employment management. The growing importance of the whole problem of industrial relations had much to do with the formation of this association and while the majority of the members were specialists in the personnel field, a large number were either in the general management field, or outside of industry but directly interested in industrial relations.

72 Between 1910 and 1917 other local organizations for the discussion of employment problems developed in New York, Philadelphia, Chicago, Pittsburgh, Cleveland, Newark, and Rochester.

73 The inter-city aspect and the beginning of the national movement dates back to 1914, when men responsible for hiring held a meeting in Minneapolis for the purpose of exchanging ideas. The success of this small meeting was such that it resulted in a second meeting in the same city in May, 1915, which was attended by persons from a much wider area.

74 In May, 1916, a general meeting was held in Boston, and in the same month of 1917 a conference at Philadelphia was attended by several hundred.

75 At this Philadelphia meeting it became apparent that some medium for coöperation, a clearing house for the experience of local groups, was needed, and a committee of ten was appointed to consider the advisability of forming a national association. The committee reported that it believed the time inopportune for such action but recommended that a national committee be created for the purpose of arranging an annual convention, as well as continuing the study of the desirability of a permanent national organization. Adoption of this recommendation resulted in the creation of the National Committee of Employment Managers' Associations.

76 A meeting was immediately planned for Cleveland, Ohio, to be held during the following year. The war situation, however, caused a change in plans. The National Committee arranged to hold the convention in Rochester, in May, 1918, in recognition of the pioneering work of Rochester University in graduating the first class of employment managers trained under a special course for the United States Government.

77 An attendance of over 800 men and women at the Rochester con-

vention was evidence of the need for a more formal national agency, and after considerable discussion it was voted to organize a national association. An organizing committee was elected for the purpose of so doing.

78 When the National Association got under way during the closing months of 1918 it was mainly an organization of organizations. Its control was in the hands of representatives of local associations, for while there were three other classes of members, the group members representing local employment managers' associations held the balance of power and determined the policies of the National Association of Employment Managers.

79 The task of the National Association when first organized was stated as follows:

1 To arrange and manage an annual convention
2 Issue a bulletin
3 Promote the organization of local employment managers' associations
4 Assist local employment managers' associations then in existence
5 Operate a free employment service which would assist specialists in the personnel field to secure positions
6 Establish and maintain a central clearing house for employment information
7 Conduct such research work and surveys within the employment field as might be approved by the Board.

80 The first convention after the formation of the National Association of Employment Managers was held at Cleveland, Ohio, in May, 1919. An attendance of 2000 was an indication of the stimulus to the movement provided by the war.

81 As the result of a widespread demand arising out of the widening scope of the employment manager, with the result that his activities comprehended many more functions than could be described through use of the word "employment," the name of the National Association was changed on March 1, 1920, to The Industrial Relations Association of America. It was under this name that the first peak in the movement was reached. The annual meeting in Chicago, in May, 1920, attended by 5000, was one of the very great national conventions of that period.

82 Soon after the 1920 meeting the change in the business situation was reflected in the personnel field and a decline in interest and support set in. As personnel work had in many cases been the last addition to specialized management functions, there was a widespread belief that it would be the first to be discontinued. Experience has since indicated that such apprehension was not well founded. There were but few cases where that policy was applied in retrenching or where intemperate action destroyed a sound piece of work. Personnel work was decreased greatly, but not often to the same extent as other management functions. Wherever a severe reduction took place it came more as a result of individual work than an inherent weakness in the idea or plan.

83 In the first discussions of a national organization there was present a small group which was anxious to decentralize the unit of association

membership to the utmost by placing membership on an individual basis. The majority did not look with favor upon this departure, and the concentration of power and control in a group membership was the result. The experience of the organization ultimately established the fact that the group basis could not be entirely satisfactory. It did not provide the foundation for coöperation which was necessary if the Association were to make a real contribution to the progress of its members. It required many months, in fact, several years, for the advocates of individual membership to prove their case. However, at the 1921 convention of the Industrial Relations Association of America, held in New York City in November, a committee, widely representative of the whole country, presented a report which strongly advocated reorganization on an individual basis. The problems of the individual members of the National Board of Directors were so numerous, however, that they had little opportunity to apply themselves to the problems of the association.

84 Finally, the Board of Directors recognized the need for a considerable alteration in the structure of the Association and decided that the way might be cleared for the most expeditious action if the Association were dissolved and an organization established along the lines suggested to the convention by the Reorganization Committee. The necessary steps to that end were taken and the Industrial Relations Association of America ceased functioning on December 31, 1921.

85 An organizing committee for the new association was then at work, and out of the whole situation a merger with the National Association of Corporation Training was arranged. This crystallized in the formation of the National Personnel Association in April, 1922.

## APPENDIX NO. 7

### THE MANAGEMENT DIVISION OF THE A.S.M.E.

86 The Management Division of The American Society of Mechanical Engineers was organized in July, 1920. In the first annual report, the following definition of management was given:

"Management is the art and science of preparing, organizing and directing human effort applied to control the forces and to utilize the materials of nature for the benefit of man."

87 Interpreting the thought of that definition into a program, the same report stated the purpose of the Division to be:

"Inasmuch as the problems of management are of the utmost complexity and difficulty, the Management Division of The American Society of Mechanical Engineers in seeking to render disinterested service therefore declares its purpose to be the formulation and declaration of the fundamentals of management, both regulative principles and accepted practice, and the dissemination of Management knowledge.

"In working toward this object, the Management Division can thus

not only be of service to the other Professional Divisions of the Society, to the individual members of the Society and to other societies of like aim, but also to all who are in responsible charge of human effort, and therefore, through them can benefit society at large.

"In carrying out such a broad purpose the activities of the Management Division will vary with changing need, thus no comprehensive listing can be made to cover the present or the future. It is only possible to suggest a few already in project, namely:

"The standardization of management terminology, units of measurement, the improvement and development of management education; the elimination of management wastes in industry; the elimination of unnecessary fatigue in industry and engineering; and lastly, management research."

88 Almost from the start, the membership of the Management Division has exceeded that of any other Professional Division. It now (September, 1922) numbers 1740.

## APPENDIX NO. 8

### THE NATIONAL PERSONNEL ASSOCIATION

89 The National Personnel Association was formed to take over the activities of the National Association of Corporation Training and the Industrial Relations Association of America. The possibility of such a union was discussed informally at a joint meeting of the Executives Club of New York and the New York Chapter of the National Association of Corporation Training, held on February 17, 1922. On the following day a letter of invitation was drafted and signed by 20 men who supported the suggestion of union, requesting attendance at a meeting to be held on March 9. On that day 34 persons were in attendance out of about 100 invited.

90 It was unanimously decided to form a national organization devoted to employment or personnel activities, provided the two existing organizations could be combined. A committee was appointed to consult with the officers of these two organizations and report a plan.

91 This committee reported on April 7, submitting a plan for the new association and providing for an organizing committee to put it into effect. This committee was appointed and met on the same day. Anticipating this action, the officers of the I.R.R.A. had secured authorization to enter the merger. An expression of opinion from Class-A members of the N.A.C.T. was overwhelmingly in favor of the union.

92 On April 21 the articles of incorporation were completed and signed, putting the union into effect and bringing the National Personnel Association into existence. Its purpose is:

"To advance the understanding of the principles, policies and methods of creating and maintaining satisfactory human relations within commerce and industry.

"1 By assisting administrative executives, those engaged in personnel work and others who are interested in problems of personnel administration

through providing opportunities for conferences, coöperative research, and exchange information among members.

"2 By studying the problems of personnel administration, including employment, training, development, health, employee service and coöperation.

"3 By assisting established educational and other institutions to interpret the personnel needs of commerce and industry by maintaining reciprocal relations with them."

93 Two kinds of members are provided for: individual and company. The membership is (September, 1922) 500 individuals and 120 companies.

## DISCUSSION

FRED J. MILLER. Mr. Alford's admirable paper is, I think, very comprehensive, especially as a review of what may be called the tangible or measurable advances that have been made in the past ten years within the field to which the paper relates. I think, however, that the most important progress that has been made, mostly within the ten-year period, cannot be measured nor weighed, for it is manifested mainly in a changed attitude of mind.

At a time, about twelve years ago, when I, as factory manager, came into an intimate and responsible relation with the leading exponent of the art of Scientific Management then in active practice, and was in daily contact with his work, the dominant idea was that a new system of management was to be handed to the body of factory executives; they were expected to learn by rote to do each little part in working the system, and to ask few if any questions as to the whys or wherefores. This did not go very well, especially with our large group of department foremen who had been accustomed to be consulted, to have their opinions more or less deferred to, and to be left pretty much with a free hand in the management of their departments. Some of them resisted passively; others of them somewhat actively; scarcely any of them really liked it, especially at the beginning. Questions of discipline arose and a considerable proportion of previously satisfactory minor factory executives would have been dismissed if the advice of the industrial engineer had been followed. Eventually this led to an agreement that all matters of discipline and of bringing factory men into line were to be left to the regular factory executives. This worked much better, and the installation was completed with entirely satisfactory results. But it was not until

we had entered the World War and the necessity arose for devising a method that would immediately, almost from the first day, without change of personnel, bring about an improvement in efficiency and promote smooth working of an organization already in being, that the difficulty was entirely overcome.

Just here, stimulated by patriotic motives, Mr. Gantt, assisted by his staff, did, in my opinion, his most important piece of work. He had the breadth of mind needed to perceive that he was confronted by a new set of conditions that, so to speak, compelled the enlistment and active participation of the foremen and others already familiar with the technique of the work they were engaged in. Many of the things formerly done by clerks were then done by the foremen or men working under their direction, — and much better done; but, better still, the foremen no longer felt that they were being shelved or sidetracked. On the contrary they realized that their status was improved in many ways. Thus the war led to Mr. Gantt's conversion to our view, that foremen and others in the factory ought to be more actively engaged and their interest enlisted in the new methods of administration.

Mr. Gantt rose to the occasion magnificently. He entirely abandoned his earlier method of approach in installing his work, and found, what most intelligent shop men already knew, that factory men respond quite as readily and heartily to considerate and fair treatment as do other people.

I look upon the development of a method which is compatible with the facts cited above and in harmony with them, and which promotes coöperation instead of arousing opposition and antagonism, as being the most important advance of the past ten years and as being at least one superlatively important result of our participation in the war. This is so for the reason that aside from the fact that it is the decent, human thing to do, a method by which we attract and secure the hearty coöperation of those whose coöperation is vital to complete success is, obviously, scarcely less important than improved management methods themselves. In the earlier days especially, there was far too little of real management in the installation of management methods; and their adoption was, — and for that matter, still is, — much retarded by that fact.

H. A. Person. I think Mr. Alford showed a great deal of commendable bravery in tackling this particular subject. Ten or

twelve years ago when the first report was made regarding progress in management, the problem was relatively simple, for the reason that there had been, during the preceding twenty years, marked advance in the development of management, and particularly marked advance in the statement of principles of management. Now, when one tackles the problem in 1922 of measuring the advance during ten years, over the achievements of 1912, one has a very much more difficult problem — in my judgment, almost an unsolvable problem; and, therefore, while I admire Mr. Alford's bravery in attaching this particular subject, I am not of the opinion that the achievement, in the very nature of the case, is comparable with that of ten years ago.

As I recall the printed paper, the first pages are devoted to proof on the basis of opinions. Now, I do not think much of proof on the basis of opinions. It is true that the report of ten years ago had a certain amount of proof on the basis of opinions, but it was a very much smaller proportion of the whole, so for a moment, I want to eliminate that.

Then, in the appendix and the latter part of this report is a very considerable amount of what I should call not exactly irrelevant matter, but matter which is over-stressed and does not seem particularly impressive as proof, in proportion to the amount of space devoted to it.

That leaves us what I may call the central part of the paper — the more substantial proof based upon certain data secured by the Committee on Elimination of Waste in Industry.

Now, with respect to that I have two particular observations to make: First, those data had been used once before by the Committee on Elimination of Waste in Industry to prove that industry is not so very efficient, from the point of view of management, and, of course, one has to be cautious in using it over again as a sort of proof that there has been very considerable advance in management. Nevertheless, in the second place, it does indicate an advance in management during the past ten years, but not in a positive, a precise and what I would call a measurable way.

We have, as evidence of advance in management, the existence of these various mechanisms which are tabulated in that part of Mr. Alford's report, but the mere existence of these mechanisms is not sufficient proof to me of a great increase in the art of management. It is simply proof that there has been some increase; for the excellence of management, in my judgment, is a result of these

elements in combination, and when one counts them and tabulates them as isolated phenomena, one does not get that measure of proof which one would get by counting them and tabulating them in combination, because one plus another means a very much greater advance in management than two times either one alone.

In my judgment, a real measure would be an analysis of the existence of these mechanisms in combination, and that I conceive to be an almost impossible task at present.

I think, as Mr. Miller has said, that our greatest measure of advance in management is that more or less intangible, but very real, thing which we all feel in the industrial atmosphere — a new point of view, a new approach — and, in my judgment, that is the big thing; so that while I cannot say that this paper compares in significance to that of ten years ago, I think Mr. Alford is to be commended and congratulated for attacking the problem.

J. P. JORDAN. The question has been asked, "Why does the industrial or management engineer fail to have the standing of a mechanical, civil, electrical, mining, chemical or any other engineer of like class?" Is not this question pregnant with wide opportunity for much discussion? And can we not find in this paper by analysis a possible answer?

Par. 10*d* states "Acceptance of the principles of management has broadened among engineers, executives in industry and educators." May I ask what are these principles? Has any individual or any group of individuals fixed any such principles which have been generally accepted? and if so, who? Frankly I personally do not know of any such principles which can be accepted as such at one hundred per cent value, with the exception of two or three of very general import.

In Par. 15 we find in the arrangement of the eight "mechanisms" in the order of the number of plants where the installations were good, that cost control is seventh or next to the last. We then find in Par. 16 that cost control is again in the rear rank. This conclusion seems to me to be a most serious and damaging flaw in management progress, if it should be really true that such a condition exists generally in industry. Do we class general or financial accounting as a mechanism of management? Certainly not. Why, then, should we class cost control as a debatable mechanism rather than an absolutely indispensable organ of enlightened management?

Par. 19 states that an attitude seeking to make foremen and even workers conscious parties to the development of certain mechanisms has been noted, the effect of which is the installation of methods and mechanisms from the *bottom upward.* This is invariably so in plants where recognized and properly executed cost control is in effect; and it is not only a perfectly natural result, but probably it will be found that the upward demand for various so-called mechanisms occurs *only* in plants where cost control has clearly indicated the need for such mechanisms.

Under the general heading of "The Human Factor in Industry," Pars. 26 to 30 inclusive, I feel that Mr. Alford has restricted his consideration to but one phase of industry. The confining of thoughts respecting the human element to actual workers, to the exclusion of superintendents and foremen, seems to me to miss the biggest point of all. And this again leads us to cost control.

The first and greatest step is to humanize the foremen by giving them full and complete cost statements, — something which exists in comparatively few companies today. And a continual neglect of this feature will rob industry of a most powerful and necessary means of progress. The lack of such backing for foremen has probably been a leading reason for the handling of workers on a bluffing basis, with no definite facts to work on or show. Without such facts efficient work was subjected to the same pressure as the inefficient work which was actually causing high costs. Therefore, those workers who were unfairly borne down upon, resented it; and we deliberately created the conditions of labor calling for the works councils and other movements mentioned under "The Human Factor in Industry."

It is to be regretted that "management" has not awakened to the realization of the necessity to "Know Thyself"; that the advisers of management have failed absolutely as a class to recognize cost control as *the control;* that all such things as time study, incentive wage plans, planning, idle time analysis and such are but means to the end of reducing costs; and that management is so blind to the creed that facts and facts only should guide their every action. Then — when facts are known, and known month in and month out, put into operation such necessary adjuncts of management as may be clearly indicated as necessary.

I want to express my regrets to the Management Division of The American Society of Mechanical Engineers, the Society of In-

dustrial Engineers, the Taylor Society, and the National Personnel Association, that Mr. Alford did not include with you our little organization of about 3,000 members, called the National Association of Cost Accountants, of which I have the honor to be President, which is dealing with the problems of management along the lines as brought out in this discussion.

Perhaps we are wrong in our premise, but we believe in taking the position that the managements of industrial institutions are fully capable of fairly proper action, if they know, through accurate and usable costs where action is most needed. If figures show enormous costs in burdens for handling materials, management surely will cure it; if inventories are mounting on account of congestion in shop, management will surely take steps to use the standardized records and put in planning methods to reduce the congestion; and so on with all other mechanisms which may be indicated as necessary.

Management can progress only as it sees the light; and notwithstanding the apparent apathy of management, and perhaps also its professional advisers in the past, I feel that the future progress of management will come only through the guidance of cost control, accurately determined, properly presented, adequately interpreted and effectively used.

DEXTER S. KIMBALL. My own view of this matter is somewhat different from those presented by the preceding speakers, perhaps for the reason that I was long in close touch with industry and later have had a chance to stand at one side and see it pass by.

The great idea that sprung from the mind of Mr. Taylor has often reminded me a great deal of religious growths. Some great prophet gets an inspiration and teaches, through parables, what he essays to get before men's minds. Mr. Taylor's great paper, which is the fountain-head and will probably remain so, of this movement described a specific form or piece of mechanism of management. Many interpretations, however, have been put upon this paper, just as many and diverse interpretations have invariably been made of the work of all religious prophets. One man finds in one particular item the thing that he considers the vital truth, while another pins his faith for salvation on an entirely different passage of Scripture.

The question then as to whether we have or have not made

progress cannot therefore be measured by the progress made in any one portion of the field, and I agree with Mr. Miller that it is very difficult to find criteria to tell us whether we have made any progress. This much is certain, however: the human race has never had before it for any length of time any great economic principle, and seriously considered and pondered over it, but that it has emerged with the truth. And out of the movement Mr. Taylor started there will surely emerge certain basic principles. Of course, some of the practices that Mr. Taylor advocated have already been discarded by forward-looking managers, but nevertheless as time goes on it becomes increasingly clear that this classic document contains certain important truths, basic and fundamental, that are destined to influence industrial management for many years to come. Mr. Alford's paper, if I interpret it correctly, is an effort to bring out more clearly to our view the most important results that are emerging from this movement.

It is not difficult, I believe, to recognize the most important of these basic fundamentals as such but it is not so easy always to see just how and where they should be applied. What is applicable to one shop is not applicable to another. The plan that may operate well with one set of men may not operate at all with a group having different personality. This is essentially true of cost keeping which is nothing more or less than one form of recorded experience so strongly urged by Mr. Taylor as a basic requirement for predicting results. Mr. Taylor did not invent cost-finding, however, though his work and writings no doubt gave an impetus to its development. As a matter of fact, cost-finding has been a matter of steady growth for many years. Not so long ago this science, like many others, was almost purely empirical in its character, and I have seen bids on great battleships worth at that time four million dollars prepared by a single individual with only such data as he himself had gathered during a busy life and contained mostly in personal note books and similar records. Today cost-finding forms a part of the education of most students of engineering.

This in general is true, also, of other economic industrial principles. Mr. Taylor himself disclaimed the invention of any new thing in management. In effect he said: Here are some things that are true: here is a combination of principles that will produce results, though no doubt there are other variations and combinations of these basic principles that will produce equally

good results. I consider Mr. Alford's paper, therefore, a very important one since it presents a clear résumé of the progress made in interpreting and applying Mr. Taylor's gospel of management.

I agree fully with Mr. Person that it is difficult to mark progress. As time goes on the curve flattens out and it becomes increasingly difficult to see what principle should be applied next to keep the movement progressing. But I do believe that as time goes on the fundamentals that underlie successful management will be made clearer and clearer and that these laws will be as well known as those that underlie engineering or any other well founded science. I have every confidence that the industrial engineer and the cost accountant will eventually come into his own. Not the least important index that this is true is found in the fact that every progressive educator believes that no man should leave college without some training in economics and in the fundamentals of industrial engineering and all good technical schools are now teaching these fundamentals as they conceive them to be at present.

R. L. SACKETT. Dean Kimball has commented on the educational feature and I want to point out two evidences of progress in management, both of which are educational:

Nothing has been more striking than the sudden increase in foreman's training, which ten years ago did not exist as an organized educational movement. Those who have been in touch with industry know that no educational movement was ever introduced into industry until it had gained the sanction of administrative officials. Foremen do not take up educational work; no man in the ranks does until it has had something more than the tacit support or encouragement of those who are responsible for management.

The other evidence is that there has been a reflex in engineering education, and there will be a more marked reflex. Those institutions which have installed courses in administrative engineering or industrial engineering have taken the fundamentals, as Dean Kimball has pointed out, and built upon those a course; and their minds have been directed more toward the personal relation than they had been directed in the old courses, which gave more attention to materials and their uses. My point is that the development of management has been accompanied by the development of those courses, and those courses are going to have, and are

having influence upon the courses in civil, mechanical, and electrical engineering in drawing the attention of students, during perhaps the senior portion of their career, to the humanistic and personal side of industrial engineering.

DAVID B. RUSHMORE. In the number of points that are open for discussion on this paper I wish to add only one thought, and that is that in management there is need of a definition as to what management is. Broadly, I conceive it to be a function connected with industrial organization, but we need a definition as to what organization is. It is something made up, in part, of human beings, and we certainly need more or less, a definition in this work as to what a human being is, as to what he is composed of, as to the motives which actuate him, as the results of certain forces that play upon him.

If we do as Professor Kimball said, — enunciate the fundamental underlying principles, — we are doing the best we can in any line of work.

It has been my experience to see in a large number of organizations men attempting to function as executives without having devoted any thought of their own as to what an executive is. I am very sure that Mr. Alford and this committee will accomplish a great deal in bringing to the attention of the younger men who are going from the colleges into industry the suggestion that they acquire a clear appreciation of what an executive is before they undertake to function as executives.

Some of our young men, the moment they get a stenographer, become executives. We find a great many men in industry, large and small, who are not making the most of themselves, and many remain in the same positions much longer than they ought. In general we blame the man, but to some others it seems that where a man is not getting the best out of himself, the man to whom he reports — his executive — is, in part at least, responsible. One of the great needs of industry is a clear vision on the part of the younger men of the province of an executive, the functions of which are rapidly changing; as to what the possibilities are, what the responsibilities are, what the opportunities for accomplishment are, and what the line of future development should be, along the line of these fundamental principles for making the best executives. A large number of men who are trying to function in this way are, as I see it, many of them, doing it without any analysis, with-

out any thought of their own, and doing it in about as many different ways and acting on about as many different principles as there are individuals; and this committee will indeed do a great work if it can inject into this situation a sense of the desirability of the development of executives along fundamental lines, which will be a real constructive work for industry.

L. W. WALLACE. I feel sincerely that we owe a debt of gratitude to Mr. Alford for having searched all sources of information for the purpose of presenting before us the significant developments in relation to management during the last ten years.

I know something of the task of trying to correlate information, because one of the shortcomings of management today is that it has not kept systematic and fundamental facts and information on record and made them available to a large number of our people. I think the important thing that we need to do, from a management standpoint, is to make available to a larger number of people, and especially to employees, the fundamental economic facts regarding American industry. We, as industrial leaders, if I may be so immodest as to use that expression, for the moment — have been too content, we have been too complacent, we have sat behind our desks and let our employees get their information regarding the economics of industry from the speaker on the soap box in a street corner; and it is time for us to begin to open our eyes, and, as Mr. Alford has said, to begin to train from the bottom up, instead of from the top down; so I think that, from the standpoint of our employees, we should begin to give them the fundamental information that they need in order to arrive at a fair judgment as to what industry means to them; in other words, and in brief, I am arguing for greater publicity, the opening up of our books and our cost records to our employees, so that they will realize that the cost of production involves something more than simply wages and material. If industry is to go forward without being hampered by federal and state legislation and by various commission forms of regulation, it is going to be necessary also for management, in the coming years, to give to the public the fundamental information that it should have and is entitled to, regarding industry.

So I hope that within the next ten years we will see a decided step in the direction of giving to employees and to the public fundamental information regarding industrial economics; and that pre-

supposes that the leaders of industry will have to collect and codify this information for themselves. In our investigation of Waste in Industry we found that in numbers of instances, if not in almost every case, there was a serious lack of fundamental data within the organization itself. I may say to you that I am rather inclined to believe that many managers are more ignorant regarding the fundamental economics of their business than many of their employees. Before management can intelligently give to labor and to the public the information that it deserves and should have, by right, management itself has got to become more informed as to the fundamental economics involved, and I hope that the next ten years will show a marked progress in that direction.

FRANK B. GILBRETH AND L. M. GILBRETH.[1] Mr. Alford's plan of basing the progress report on the report of the Committee of 1912, of which he was a valued member, has both advantages and disadvantages. It furnishes a definite method of attack. On the other hand it restricts observation. New developments may be omitted or, if observed and recorded, emphasis may be incorrectly distributed, thus both recording and weighing of data may be affected. It necessitates a thorough review of the 1912 Report, with its discussions and closure, before the new report can be adequately criticised.

The four points specially emphasized in the 1912 Report are:

1 The advance in unskilled work and the trades. (Par. 1) "The unquestionable proof of the advance that can be made in unskilled work . . . and in ancient trades. . . . These are the most striking phenomena of all."

2 The change in mental attitude toward the problems of production (Par. 22) which is called "the most important change and one that comprehends the others."

3 The transference of skill (Par. 41). "We have pointed out that the underlying principle, that is, cause in the widest sense, the application of which has built up modern industry, is the transference of skill."

4 The making of utility the aim of laboratory methods (Par. 56). "The end and aim is utility."

This being the basis of the 1912 Report, — and a careful study will make this clear, we may expect to find these four points extensively discussed, — in fact made the basis of the 1922 Report.

What do we find when we turn to the 1922 Report? It starts

[1] Very much abridged.

with an account of the limitations of the report; states its methods; notes the loss of three great pioneers and outlines the method of acquiring data. It then states as the chief subject the "new element," "the mental attitude that consciously applies the transference of skill to all the activities of industry." Then follow quotations from answers to the questionary as to progress since 1912, deductions from these plus "certain well-recognized facts," a review of progress in use of management mechanisms, a summary of management education, a statement of the results which affect the human element, of the acceptance of the "service motive," and of results that affect production and ultimately industry, business, community, state and nation.

The only strong emphasis noted is on consideration of the human factor. This is one of three factors introduced as concerning "especially significant developments, which after being stated are subject to explanation and comment" — and it is stated later that "appreciation of the importance of the human factor in industry and attempts at its study from a fact basis have been the most striking management development."

The questionary method is always open to objections — as those who have used the questionary, or are acquainted with its use in the field of education well know. It is difficult to select those to whom to send the questions; only a small per cent respond; and only a small per cent of responses are of value.

In examining the four factors of application of the 1922 Report (Par. 11), we note that they have to do largely with the keeping of records, — cost accounting, specifications, graphics; also with the extent to which management has been introduced. We find no list of measurement units, measurement methods or measurement devices introduced or developed. Yet we find stressed "the demand for knowledge, facts, as a basis for judgment."

Among the significant factors (Par. 12) it is well stated that management has expanded beyond the mechanism of the Taylor System. It might be appropriate also to list those mechanisms of the Taylor System which, while obviously antique, obsolete and superseded, are still in use — telling where, by whom, and especially why.[1]

In the review of the college courses, the nature of the work as it concerns technic might well be mentioned.

The study of the human factor "from a fact basis" has gone

[1] June 1921 Taylor Bulletin.

far beyond "attempts" (Par. 12k). Detailed discussion should be invited on this point.

In the discussion of management mechanisms that follows (Par. 13) the consensus of opinion seems to be that these are generally accepted in principle, but not in practice. The final sentence of Par. 13 states admirably the reason why this is the case.

The tables discussed (Par. 14) are interesting, but the vital point is — *why* are the results as they appear to be? Why is Time Study, for example, sixth, seventh and eighth on the lists?

The 1912 Report stressed the human element. The 1922 Report states that the human factor is today the important element — yet the report places only five short paragraphs (Pars. 26–30) under this topic. This is not because Mr. Alford underrates the importance of the subject, but because he reflects the customary failure to realize that *training the worker is the real key to industrial relations.* The work of an employment department (Par. 27) and of "works council" (Par. 29) is not to be disparaged, but the *training of the worker,* instead of being dismissed in a few phrases in a paragraph or two, should cover that transference of skill which is stressed in the 1912 Report.

It is necessary to note most carefully the results of progress listed (Pars. 42-46). The only new result claimed since 1912 is the reduction of cost of the product to the consumer.

It is claimed that, through the work of "generations of effort" management now has "a great body of knowledge and practice," by which it directs both planning and performing.

But has skill been transferred during this period? If so, to what extent? If not transferred, has it been recorded? Are the data available to be formulated into transferable form for transference later If not, why not? The report fails to say.

Real progress has been made. Skill can now be, and is being recorded, and is being transferred. The demands of those who wrote and discussed the 1912 paper have been met to an extent sufficient to prove the wisdom of that report.

The appendices are valuable as bringing much material into brief reviewable form.

A most unfortunate and serious error occurs in Appendix No. 3,[1] where an account is given of the founding of the Taylor Society (Pars. 52–57). As the writers of this discussion thought of and planned this first Society of Management, selected and invited

[1] Contributed by Dr. H. S. Person.

those who were to attend a dinner which was the first meeting of any Management Society, and then and there disclosed and outlined the purpose of the gathering, we may therefore speak with authority.

We can state without question that the Taylor Society was not founded because of dissatisfaction with the attitude of The American Society of Mechanical Engineers toward management. The idea in mind in calling the group together to form the Society was to furnish an opportunity for men intensively interested in the principles and practice of Scientific Management and occupied in installing such management to discuss not only the theories and philosophy of management, but the technic. It was to furnish opportunities for the exchange of experience and for best utilizing such time as Mr. Taylor had to give those interested in the new type of management. There was no feeling of criticism toward The American Society of Mechanical Engineers; no desire to withdraw from the Society, in any way or in any sense, and, so far as we know, all members of the original group were, always have been and are at present enthusiastic and loyal members of The American Society of Mechanical Engineers.

We have noted that the keynote of the 1912 Report was the transference of skill. This idea was not new, as Mr. Alford himself acknowledges, but it was very well phrased, and its appreciation, and emphasis in the Report mark a milestone.

Too much emphasis can hardly be laid on the transference of skill, because the further developments during the last ten years have proved beyond doubt the importance of emphasizing everything that has to do with the most efficient transference of skill with the least loss in transmission. Naturally, to transfer skill it must first be recognized, recorded, and put in such form that other people than those who *have* the skill, or *notice* the skill, or have the ability, facilities and opportunity to record the skill can actually leisurely refer to, visualize, measure and evaluate the data that contain the skill.

This transference of skill does not mean the transference of skill of a laborer or mechanic only, — it also means the skill of the manager, the executive, the artist and everyone from the super-expert, to the novice of all classes. There is skill in performing manual operations, and there is skill in performing managerial functions and operations, the laws of acquiring skill and automaticity in manual laborer's work and that of the mental laborer are

identical, even though the results and their behavior are entirely different.

The transference of skill is a very great conception, as Mr. Alford realizes, and obviously, if we are to emphasize the transference of skill we must observe those who are the most skillful.

There must be great emphasis placed on the type of method which is used for recording, otherwise "transference of skill" becomes mere words, as it often has.

There will be no transference of skill until the method of work is recorded *in detail.* This is a fact not mentioned in the 1922 Report.

The recording of the method in measured errorless detail is the step precedent to any attempt at the transference of skill. Because of the lack of recording of the method in detail, Taylor was obliged to discard all of his time study data and the data of his associates when he started planning his book on time study which was finally written after his death by Dwight Merrick.

The state of the art in 1912 can be seen where it is advocated that the end and aim of management investigation be utility, and consideration of any other purpose than immediate utility is deprecated. There is no comment on this in the 1922 Report. The fear, in 1912, was that there would be too much time study and motion study. There was no recognition at the time that, inasmuch as all accurate motion study records not merely so-called elementary unit times, but actually the elements of the motions themselves, therefore all observations are absolutely transferable to other work immediately, besides being of the same value for all future work. This answers any possible criticism of the management investigator using his laboratory methods to discover facts apparently other than those for immediate use. All knowledge of any trades that has to do with elements of motions is *usable in all other trades,* for the reason that information regarding each of the sixteen subdivisions of a cycle of motions is usable in every kind of cycle of motions.

On every hand are found words emphasizing the training of the worker, but where and in how many instances are found those who train the workers, knowing in detail how the work should be done, and how they should be trained? There is but one thing that will hold the respect and the attention of the worker permanently, and that is training in the one best way to do work, based on measured facts together with original data that he can look over

just as an engineer can look over the derivation and source of a formula given to him.

The respect of the worker will never be obtained when data are accumulated only on the fastest or most strenuous or most continuous worker, instead of the worker with the best method. No one thing has done so much to kill progress in scientific management among the workers as the misplaced emphasis on the time it takes to do work, instead of the one best way to do work. Usually the one best way to do work will produce the quickest time, but this is not necessarily so.

We desire to emphasize the fact not as yet generally recognized, that any information regarding methods where the motions are recorded in their most elementary details is usable for synthesis in making the one best way in any other kind of work, and also permits the prophecy of times, even when automaticity in the new synthesized method has not yet been acquired and is not yet in existence, and therefore cannot be actually demonstrated in practice. This is of vital importance, for time study must include the prophecy of the time it will take to do work after the worker has become highly skilled, not merely the time the work did take during the timing period.

It must never be forgotten that the quest for the one best way and the search for records of skill worthy to be transferred have the same object in view: The former simply adds the thought that the skill shall embody the best elements of method to be found, thus offering a method to be transferred that may excel any skilled method in actual existence. The one best way is not only an adequate answer to the demand of the 1912 paper for records of skill and their transference, it gives more than was there demanded.

We maintain that stop watch time study, although much better than nothing, will not give information on details of method. These can be obtained only through details of motions, which must, therefore, be completely separated from time study both in description and definition.

The realization that method, consequently detailed motions, must be considered, studied and recorded, placed new emphasis on the importance of considering superstandardized equipment and tools. An important new condition of the new type of management is the emphasis on furnishing the best tools procurable to the worker, instead of having the worker use such tools as he may de-

sire, or he may provide for himself. This is important under all types of management, and is stressed under scientific management, but it is vital if the one best way is to be used and maintained, and the resulting skill to be utilized.

It may focalize attention upon distinct and definite advances since 1912 to list some which are the direct result of emphasis on the one best way to do work, as follows:

1 The recognition that management consists of definite fundamental units and that the greatest progress in management can come only by the selection of the right units to measure, the right methods for measuring these units, and devices that will make the cost of measuring the units accurate and cheap.

2 The recognition that the sixteen elements of a cycle of motions and not the motions are the true fundamental units for the one best way to do work.

3 Process charts and other devices that show the sequence and relation of operations of making, inspecting and moving, in a form that makes possible easy visualizing, as a whole and in detail, of the problems confronting the management in the plant, the office and the sales or any other department.

4 Instruction sheets for operations based on accurate knowledge of the one best way to do work.

5 Graphical control on the exception principle for executives, with provision for those executives to write and sign causes of deviation from class, task or program.

6 Standing orders for executives as well as others, with provision for notification, inspection and enforcement, together with the reason for the standing order, that all members of the organization may coöperate intelligently. This results in one best way maintenance.

7 Change orders with standard provisions for changes in the procedure and practice of management, together with the reasons for the change.

8 Suggestion systems and the proper accompanying mechanism for obtaining, absorbing and enforcing the benefits of the craft and managerial knowledge and skill of all of the individual members of the organization.

9 Superstandardization that will permit working in the one best way for the highest wages combined with the lowest costs.

10 Recognition that automaticity resulting from standardization is the greatest free asset of the worker.

11 Recognition of the mnemonic classification as a necessity for the filing of information regarding the one best way to do work.

12 Recognition that data on skill for current use only, is an unnecessary economic waste, and that, for maintenance, records must be in such form that, once made, they are usable forever.

13 Recognition that for recording skill, it is an economic waste to observe any other than the best men obtainable.

14 The application of and conscious and intentional use of psychology to solve the problems of management.

15 Devices for obtaining, synthesizing and transferring the precious skill of super-experts.

16 Devices for an efficient learning process for all, including those who have neither the opportunities, technical knowledge or apparatus to record or to derive the one best way to do work.

17 Provision for each member of the organization to share in the management according to his ability.

18 The recognition that the percentage of labor turnover is a measure of the efficiency of the management.

19 The recognition of the economic value of the placing of all workers, including the handicapped worker, in the highest positions that they can fill.

20 Standard opportunities for fitting for promotion that maintain stability and at the same time recognize individual aptitudes.

21 The recognition that the waste from unnecessary fatigue is as definite and as real as the waste of tangible material. The organization of the Fatigue Committee of the Society of Industrial Engineers to attack the problem of the elimination of all forms and instances of unnecessary fatigue as an economic and social duty as well as a philanthropic act, and to disseminate the information that any fatigue elimination means more output or more comfort, or both, and that fatigue study is a first step in motion study.

22 The recognition of accident prevention, and the safety first movement as a managerial duty.

23 The recognition of the value of professional management engineers as executives.

24 The recognition that all blank forms that have not been observed in accordance with the laws of motion study are entirely obsolete.

The above twenty-four advances in management have been either entirely omitted or merely hinted at in Mr. Alford's report.

They are the memorable fundamentals on which management has progressed. They will be the fundamentals on which management will progress, because they are economically sound and conform to the laws of psychology, the greatest law of which is the Golden Rule.

WILSON P. HUNT. In discussing the question of management and its advance and improvement in the past ten years, I naturally lean towards the human problems as my training and experience have brought me in constant touch with this side of the question, having been brought up in the shop and still taking a special delight in keeping close to the shop side of things and the men in it. There is no doubt that tremendous advances have been made in the past ten years along the lines of efficient and scientific management. After Taylor and his associates showed what can be accomplished by time and motion study, many so-called efficiency experts broke loose and what they did in the name of efficiency and scientific management was a wonder.

It seems to me that one great weakness of most of the time study and efficiency plans has been the assumption that all of the brains were in the office, entirely ignoring the vast store of experience and knowledge among the men in the shop. A man who proceeds on this plan and forces his schemes and plans ready-made on the men in the shop without seeking their coöperation is missing a lot. Any plan that does not seek the coöperation of the workmen and get them to *want* the improvements and changes in place of forcing them may be made to work, but it will not accomplish one-half of what might be accomplished by proceeding along the other line. The handling of men, recognizing the human element in all dealings is the big problem of management, whether it be in the buying, the production or the sales end. The tendency is growing towards having the employees more directly interested either through some form of stock-holding or profit sharing, or through the various forms of work councils. I believe along these lines that the greatest advance is to eliminate the friction between employer and employee, as the farther we go along these lines, the more certainly is the employer an employee and the employee an employer, and he cannot very long strike against himself, nor can he help to tread himself under foot. I believe the next ten years will show wonderful progress along these lines.

H. A. SOVERHILL. My experience tells me that it is necessary to have sufficient management installed in a plant to give results.

It seems necessary to have a sales or shipping schedule, stores records, bills of material and cost system at least sufficient to give the desired results.

It is very evident that the same management mechanisms do not fit a jobbing shop and a strictly manufacturing plant. The underlying principles are of course very similar.

The name Scientific Management has left a long string of disappointments and I quite like Mr. Alford's reference to a term we can call Common Sense Management. This sort of management applied in the proper manner will surely produce a good working organization and results that will be satisfactory to the stockholders.

MAX SKLOVSKY. It is well at the start to dispose of the skepticism that has existed on the subject of scientific management. As in the medical profession, there has developed what might be called quack engineering, and patent medicines have from time to time been prescribed by so-called engineers, one of them having as many as twelve patents which he has seen fit to classify under the dignified term of principles of efficiency. Mr. Alford very wisely ignores all of these and adheres strictly to the legitimate endeavor.

It is no reflection to recognize that many of the engineers that followed in the trail of such pioneers as Frederick Taylor and Gantt have failed in the fulfillment of their claims. Their chief weakness lay in:

*a* Too great a generalization
*b* A lack of appreciation of "inertia" in human enterprises
*c* A lack of appreciation in the human element
*d* Lack of understanding of executive viewpoint
*e* Lack of knowledge of selling methods.

The result of the work of these men has been that many industries have started on a series of experiments in methods and management, resulting in a series of disappointments in many instances with disastrous results. These disappointments were the result of assuming the presentation of the engineer as a practical plan, and the failure to materialize had, therefore, cast a reflection upon so-called scientific management. In the long run, however, it may be said that these experiments have been a fore-runner of real progress that has since been and is further to be made, so that industry as a whole, has gained as a result of the efforts of these

men notwithstanding the many blunders and disappointments resulting in many cases of a far-fetched and unwarranted claim. The engineering profession will, however, live down these mistakes and possibly some day hail as heroes and benefactors the men that we have in more recent years whole-heartedly discredited as false prophets. The chief error on the part of these engineers has been that they endeavored to reconstruct industry quickly by revolutionary methods in place of recognizing that the slower evolutionary method was the path by which the greatest progress would be made. This haste in the endeavor to establish new conditions has resulted in the use of undigested and unreliable data with the result in damage as followed. It is no surprise, therefore, to note in Mr. Alford's paper under Item 8 that opinions on progress in management vary widely and also that in cases reaction had set in. This, however, is a temporary attitude which will correct itself by time. There is a healthy index in the endeavor on the part of engineers through special study courses to attain a better understanding of business enterprise. The engineer has been usually weak in this direction. His business equipment had been very close to the vanishing point and as a consequence he has ignored the selling side, the financial side, and the human side of business enterprise. This attitude on the part of the engineer is shown to be itself weakest in dealing with intangibles, particularly with the human factor. It is no secret that on the whole, men without formal training have succeeded better in dealing with men than the engineer, but the engineer is waking up.

The data given by Mr. Alford in the tables indicate conclusively that *control* of industry has made substantial progress in dealing with the physical side of the business, but comparatively little progress has been made in dealing with the intangible or human side. Just what progress may be made in the future in that direction is difficult to predict. In fact it appears that it may be wisest for the engineer to leave that field entirely alone and apply himself to the development of the physical in industry, holding at all times in mind, however, that the human element is a factor that should always be taken into account and that to a large degree it is an uncontrollable item.

THE AUTHOR. Ten years ago, when Mr. Dodge gave the closure for the Committee, which reported on the status of management, he said substantially this: It was unnecessary for the

Committee to make any closure, because the points of objection which had been raised, on the one hand, by certain speakers, had been adequately answered, on the other hand, by other speakers. I feel like taking the same position.

However, I should like to correct Dr. Person on at least one point: He referred to the tabular matter dealing with the mechanisms of management, saying it was material that had been used in the Waste Report, and, therefore, lacked value in being represented. As matter of fact, that matter does not appear in the Waste Report, and was not in the possession of the committee that wrote that report. To secure these data, it was necessary to go back to the original questionnaires, about 125 in number, and make a careful study of all of them to secure the information presented in those six tables. It is new information and never has been presented before.

Dr. Person objected to the presence of quoted matter — opinions — but mentioned that the same method was used by the Committee in 1912. The methods used in developing these two reports are identical. The matter presented as quotations, grouped under a number of headings, gives background for the actual experience of men who are engaged in industry, as to the progress which has been made. From those, and other fact material, a number of conclusions have been drawn.

Dr. Person objects further to the failure to present the matter in combination, referring particularly to that absence in the matter of mechanisms. It appears, however, that the matter presented is in combination, for there are twelve items of progress grouped under three heads. Or from another point of view there are twelve items in combination, although only four are explained in detail.

Mr. Jordan brought out the lack of agreement or acceptance of principle. Par. 5 states three so-called regulative principles of management, which were a part of the Report of 1912, and seem to have stood the test of ten years' study and discussion. He also criticized the position of cost accounting, saying it does not deserve to be considered as one of the mechanisms of management. That may be true, but there is a difference between presenting that which you discover, and that which you would like to discover. The position which cost accounting occupies in the six tables is by the results of the 125 questionnaires.

He also regretted that the National Association of Cost Accountants was not included in the list of management societies.

I concur with him in that regret, merely saying, however, that that organization has lived largely within itself, is not well known at the present time in the management field, and that this report was written before the society honored itself by electing Mr. Jordan as its president. I am sure that any consideration of management organizations from this time on must include the National Association of Cost Accountants.

Dean Kimball presented the detached point of view which any report of this kind must seek to take.

Dean Sackett emphasized the educational advance, which unquestionably is one of the most significant and most striking developments of the last ten years. Today some eight or ten of our great national engineering educational institutions have highly organized courses in management, in connection with mechanical, civil, and electrical engineering.

Mr. Rushmore very properly emphasized the need of definitions — of a language of management which we will all understand and use in the same way. A report,[1] one of the first of a series which will attempt to define management terminology and give the common language or grammar which we need, has been presented to the Society.

Mr. Wallace emphasized the points brought out in Pars. 17, 18, and 19 — the necessity of working from the bottom up — and laid particular stress upon economic knowledge. Without doubt, if a study of this kind be made ten years hence, the development in economic knowledge will be found to have been one of the great steps taken in the development of management in industry.

[1] Progress Report of Committee on Standardization of Terminology.